



MASTER DEVELOPMENT DRAINAGE PLAN

BENT GRASS RESIDENTIAL SUBDIVISION

El Paso County, Colorado

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

PREPARED BY:
Galloway & Company, Inc.
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DATE:
May 2019
Revised November 2019

Engineering Review

12/16/2019 10:02:40 PM

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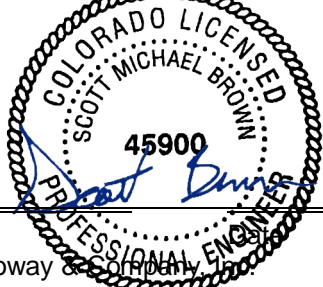
**EPC Planning & Community
Development Department**

See comment letter and
revise per EGP19005 PDR.



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 Drainage Criteria Manual for the City of Colorado Springs and El Paso County. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.



Scott Brown, PE 45900

For and on behalf of Galloway & Company, Inc.

Date

10/21/2019

DEVELOPER'S CERTIFICATION

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

By: _____

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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Provide an overall channel improvements map/plan calling out anticipated improvements and phasing.

I. Purpose

The intent of the developer is to develop the residential portion of the Bent Grass Subdivision. The purpose of this Master Development Drainage Plan (MDDP) 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. Potential drainage issues associated with the proposed development will also be discussed, as well as possible solutions. The concepts within this report are preliminary in nature and final drainage reports are required upon any development within the site.

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 $\frac{1}{4}$ and Southwest $\frac{1}{4}$ 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 has already been approved for the site, PUD-14-002. 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 and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
3. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
4. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
5. *Master Development Drainage Plan for The Ranch*, by Classic Consulting Engineers & Surveyors, LLC, November 2018.
6. *Falcon Highlands Master Development Drainage Plan & Preliminary Drainage Report & Final Drainage Report for Filing 1*, by URS, January 2005.
7. *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.

8. *Final Drainage Letter Report for Lot 1, Latigo Business Center Filing No. 1*, by Colorado Design Concepts, April 2005.
9. *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.

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.

The UD-Detention spreadsheet was utilized for sizing the water quality orifices on the proposed water quality portion of the regional detention pond as well as the on-site water quality ponds.

HEC-HMS will be 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 its addition of water quality.

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 the appendix.

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 and 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.

may (?)

verify

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.

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 E and basins are described below.

Basin A-1 (5.42 AC, $Q_5 = 2.2$ cfs, $Q_{100} = 12.4$ cfs): is associated with the northeastern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the 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, $Q_5 = 6.9$ cfs, $Q_{100} = 28.6$ 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, $Q_5 = 11.4$ cfs, $Q_{100} = 41.7$ 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, $Q_5 = 5.4$ cfs, $Q_{100} = 23.4$ 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, $Q_5 = 12.0$ cfs, $Q_{100} = 55.4$ 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.

Basin OS-5 (14.13 AC, $Q_5 = 4.9$ cfs, $Q_{100} = 27.5$ 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.

Address additional offsite flows ~186 acres?

Basin OS-6 (5.81 AC, $Q_5 = 1.9$ cfs, $Q_{100} = 12.8$ 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.

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. The channel will be redesigned and improved in phases throughout the development of the site. 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 city's 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.

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. A box culvert will be installed with the construction of Bent Grass Meadows Parkway.

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. The required volume of this pond was only 1 acre-foot for the entire tributary area. It has been discussed with El Paso County to not construct this pond, but in lieu of that provide on-site water quality capture volume detention ponds prior to releasing into the channel and revise the existing detention pond WU South to provide water quality for the entire tributary area. This modification will be discussed later in the report. The on-site water quality ponds designed with the first phase (Filing 2) provide 1 acre-foot of volume. Therefore, by eliminating the SR3 pond, there is really no impact on the downstream property owners.

The site will release to on-site water quality ponds that will be designed with each phase. These ponds will then release into the West Tributary channel RWT204.

As has been mentioned previously the site is proposed to be single family residential. The site has been 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 0.25 acre lots.

Basin OS-1 (31.35 AC, Q5 = 16.0cfs, Q100 = 68.2 cfs) 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 to the northern property line of the site at Design Point (DP1) where a swale will be provided and convey flow to the RWT204 channel. **It**

Basin A-1 (22.12 AC, Q5 = 29.5 cfs, Q100 = 70.3 cfs) is located in the northeast corner of the site. It encompasses single family residential lots along with several of the local roads and sits north of Bent Grass Meadows Parkway. A large portion of this basin is associated with the first phase of the development. Runoff from the basin is anticipated to be conveyed through the basin generally from northeast to southwest to DP2. Portions of the basin will flow directly into RWT204 while portions are anticipated to be collected in inlets within Bent Grass Meadows Parkway.

Basin A-2 (19.05 AC, Q5 = 25.6 cfs, Q100 = 61.2 cfs) is located in the northern middle portion of the site. It encompasses single family residential lots along with several of the local roads and sits north of Bent Grass Meadows Parkway. Runoff from the basin is anticipated to be conveyed through the basin generally from northwest to southeast to DP3. Portions of the basin will flow directly into RWT204 while portions are anticipated to be collected in inlets within Bent Grass Meadows Parkway.

Basin A-3 (4.04 AC, Q5 = 6.7 cfs, Q100 = 15.6 cfs) is located in the middle of the site. It encompasses Bent Grass Meadows Parkway. Runoff from the basin drains towards a low point at the crossing of the RWT204 channel through the middle of the site, DP 4. Runoff will be captured in inlets and will connect to the culvert passing under the roadway.

Basin A-5 (0.80 AC, Q5 = 1.6 cfs, Q100 = 3.6 cfs) is associated with the rears of several lots from the Bent Grass Residential Subdivision Filing No. 1. Runoff is anticipated to be collected in a swale between the two subdivisions and will outfall into the street at DP 5. Runoff will then be conveyed via curb & gutter through Basin A-4 to the RWT204 channel.

Basin A-4 (27.70 AC, Q5 = 39.3 cfs, Q100 = 86.4 cfs) is located in the southeast corner of the site. It encompasses single family residential lots along with several of the local roads and sits south of Bent Grass Meadows Parkway. A large portion of this basin is associated with the first phase of the development. Runoff from the basin is anticipated to be conveyed through the basin generally from northeast to southwest to DP 6. Runoff will outfall directly into the RWT204 channel.

Basin B-1 (0.35 AC, Q5 = 1.0 cfs, Q100 = 2.1 cfs) is located on the east side of the site. It encompasses a portion of Bent Grass Meadows Drive. 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 roadway is in conformance with the anticipated runoff in the Filing No. 1 Report. A calculation for the street capacity of the existing Bent Grass Meadows Drive has been included in Appendix B.

Basin B-2 (1.37 AC, Q5 = 3.2 cfs, Q100 = 7.0 cfs) is located in the southeast corner of the site. It encompasses the rears of some of the lots and an undeveloped tract between Bent Grass Residential Filing 2 and Bent Grass Residential Filing 1. Runoff is anticipated to flow offsite following historic patterns.

Basin OS-2 (20.07 AC, Q5 = 9.3 cfs, Q100 = 43.4 cfs) is associated with The Meadows Filing No. 1 lots 8, 9, 10 and 11. Runoff from this basin sheet flows east to the western property line of the site. It is anticipated that with the construction of the lots along the western property line swales will be constructed to divert flows from Basin OS-2 to the south around the proposed development where it will be collected in a culvert under Bent Grass Meadows Parkway at DP 10. It will then be conveyed in a swale east to the RWT210 channel.

Basin C-1 (19.95 AC, Q5 = 23.2 cfs, Q100 = 58.0 cfs) is located on the west side of the site. It encompasses single family residential lots along with several of the local roads and sits north and west of Bent Grass Meadows Parkway. Runoff from the basin is anticipated to be conveyed through the basin generally from northwest to southeast to DP 10. Runoff from the basin is anticipated to be partially collected in inlets near Bent Grass Meadows Parkway. All runoff will be captured either within the basin or within Bent Grass Meadows Parkway and will be directed east towards the RWT210 Channel.

Basin OS-3 (10.61 AC, Q5 = 5.2 cfs, Q100 = 24.3 cfs) is associated with The Meadows Filing No. 1 lots 5, 6, and 7. Runoff from this basin sheet flows east to the western property line of the site to DP 11. It is anticipated that with the construction of the lots along the western property line swales will be constructed to divert flows from Basin OS-3 to the south around the proposed development where it will be collected in a culvert under Bent Grass Meadows Parkway at DP 10. It will then be conveyed in a swale east to the RWT210 channel.

Basin OS-4 (Q5 = 0.9 cfs, Q100 = 6.0 cfs) is associated with an undeveloped portion of property currently owned by the self storage complex. Runoff from the basin is anticipated to be collected in Bent Grass Meadows Parkway at DP 12.

Basin C-2 (1.88 AC, Q5 = 4.1 cfs, Q100 = 9.0 cfs) is located in the southwest corner of the site. It encompasses Bent Grass Meadows Parkway. Runoff from the basin drains towards south towards the site's southern property line and the existing Bent Grass Meadows Parkway at DP 13. Runoff is anticipated to be collected in on-grade inlets and will be directed east to the RWT210 channel.

Basin D-1 (21.44 AC, Q5 = 33.8 cfs, Q100 = 74.3 cfs) is located on the southern middle portion of the site. It encompasses single family residential lots along with several of the local roads and sits south of Bent Grass Meadows Parkway. Runoff from the basin is anticipated to be conveyed through the basin generally from northwest to southeast to DP 14. Runoff from the basin is anticipated to be collected and directed into the RWT210 Channel.

describe the existing system and outfall.

Basin E-1 (0.26 AC, Q5 = 1.0 cfs, Q100 = 1.9 cfs) is located in the southwest corner of the site. It encompasses Bent Grass Meadows Parkway. Runoff from the basin drains towards south towards the existing Bent Grass Meadows Parkway at DP 15. Runoff is anticipated will be released into the existing roadway where it will be collected in the existing storm system south of the property.

Basin OS-5 (14.13 AC, Q5 = 4.9 cfs, Q100 = 27.8 cfs): a basin that is associated with Bent Grass Filing No. 1. Runoff from this basin sheet flows from the North to the South towards DP 16 and into basin OS-6 and an existing sediment pond. See existing condition redlines above.

Basin OS-6 (5.38 AC, Q5 = 8.8 cfs, Q100 = 19.4 cfs): a basin that is associated with Bent Grass Filing No. 1. This basin will be developed as residential lots in the future, so runoff values have been estimated for the developed conditions. In undeveloped conditions, runoff from this basin sheet flows from the North to South to an existing sediment pond and is then released at DP 7 into the existing Bent Grass Meadows Drive. This sediment pond works in existing conditions but a permanent pond will need to be provided upon development of this site.

Address how and where 100-year flows are currently conveyed and will be conveyed in the future.

VIII. Proposed Channel Improvements

The Falcon Area DBPS has made recommendations for the channels as they run through the project site. For both the RWT202 and RWT204 the DBPS has recommended protecting the channels in place. This is very problematic for both of the channels. The RWT204 is grossly oversized for the actual flows expected through it. The RWT202 is not a clearly defined channel as it passes through the site, it more closely resembles a shallow overland flow. This is not conducive to a development. RWT202 will be rerouted on the north end of the site to convey flows to RWT204. RWT204 will generally stay in a location similar to where it is in existing conditions but will have new designed channel sections. The channels will have longitudinal slopes flattened to below 1% in order to reduce the scour potential of the channel. Grouted Sloping Boulder Drops will be utilized within the channel as grade controls (maximum height of 4' with 4:1 slope).

It is anticipated that the site plan approved within the DP will be revised to remove crossings of the channels and reduce infrastructure costs. It is currently planned that only one crossing of the channel will occur, located at Bent Grass Meadows Parkway. HEC-RAS models have been prepared for the conceptual layout and preliminary culvert sizing has been completed. Further detail for the culvert sizing will be provided with the first phase, Bent Grass Filing No. 2. The models are located in the Appendices of this report.

South of the property is the RWT210 channel. The DBPS calls for a natural channel design through this reach of the channel. A site visit was made and the channel was walked with El Paso County staff. The channel shows little to no sign of degradation in its current state. There are areas of minor sloughing along the top of slope that may be corrected as the sites develop around the channel. In order to provide a natural channel as the DBPS is proposing would require major grading operations within a nicely

defined and stable channel. Additionally, the proposed drop detail within the channel deals only with the low flow portion of the channel and the existing channel does not have a natural low flow section defined.

HEC-RAS models of the channel show that velocities within the channel are relatively low in the 5 ft/s range. However, it does show that Froude numbers exceed 0.8 and at points 1.0. This is seen in the existing conditions. Again, based on field investigation it does not appear that the channel is degrading given the existing developments upstream of the channel. Because of this it is proposed to do a check structure design through the RWT210 section of the channel. The check structure design is similar to a prudent line design. Concrete check structures will be installed using an estimated equilibrium slope for the channel and given a drop height of 3'. This allows the channel to create its own equilibrium slope, allowing it to cut or fill as necessary. At times the channel may cut, and then at other times it may fill itself at the same point it had cut. This is all based on the sediment load of the channel and storm events the channel may see. As the channel cuts to an equilibrium slope the check structures will be exposed on the downstream face creating a vertical drop. If over time the channel has reached an unchanging equilibrium and leaves a vertical drop exposed it may be replaced with an actual grade control structure, such as a grouted sloping boulder drop or vertical hard drop.

The check structures will be installed for full bank width meaning they will pass the full 100-year event. This is as opposed to the proposed vane drops from the DBPS which will only pass low flows or small storm events.

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 Parkway. The DBPS also shows the pond SR3 which has been removed with this project, so it was necessary to remove it from the model.

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 had identified a flow diversion from the Falcon Watershed into the Sand Creek Watershed. This diversion has been corrected 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 has also investigated the connection from The Ranch site through the Meadows Filing No. 3 to the Bent Grass site. It has been 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 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.

It is the intent of this study to provide a downstream facility for the future improvements through the Meadows to connect to. The RWT202 channel will be constructed to the northern property line and will be left approximately 6.5' below existing grade allowing a channel to be connected to it.

IX. Proposed Regional Pond Improvements and detention

As has been previously mentioned 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 Pond WU will be modified to provide water quality for the entire tributary area. On-site water quality pond will also be provided to treat runoff prior to releasing it into the channel. The two water quality ponds associated with the first phase of the project have a volume of approximately 1 acre-foot just for water quality and therefore eliminating the SR3 pond really has no impact on the detention of the site or the downstream property owners.

easements required for increased flows

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. The revised HEC-HMS model prepared for the channel flow rates will review the pond function and release rates when prepared.

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. Not much discussion or design can be located regarding the original embankment. 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 scouring 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 grades around it. The 18" pipe through the embankment will be replaced. 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. 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 downstream side of the top of the embankment. It is proposed to install a portion of the cutoff wall as sheet pipes. This will be through the area of the embankment that is still existing to avoid reconstructing the entire embankment. In the area where the washout occurred and where the pipe will be passing through the cutoff wall it is proposed to do a concrete cutoff wall. The concrete wall should be cast around the sheet pipe wall on both ends to prevent flows cutting between the walls and creating a failure.

X. Construction Phasing

The exact phasing of the development is unknown at this time. The first phase is known and will lie within Basins A-1 and A-3 east of the RWT204 channel. It is also known that Bent Grass Meadows Parkway will be installed in its entirety with the first phase of the development. This phase will include the diversion/realignment of the RWT202 channel, and the installation of the culvert under the roadway. There will be improvements to the channel that occur around the culvert location and the channel will be modeled to make sure it remains stable with the proposed development.

When the western portion of Basin A-1 and the eastern portion of Basin A-2 develop, the channel improvements to RWT204 north of Bent Grass Meadows Drive will need to be completed. The improvements to RWT204 and RWT210 south of Bent Grass Meadows Drive will need to be completed when or before Basin D-1 develops.

The final drainage reports for the individual phases will revisit the need for channel improvements as the site develops and will use HEC-RAS models to ensure the channel remains stable. Each area will provide on-site water quality ponds prior to releasing runoff into the channel.

All Regional Pond WU improvements will be completed with the first phase of the development.

XI. Maintenance

The proposed channels are to be public facilities. After completion of construction and upon the Board of County Commissioners acceptance the channels will be owned and maintained by El Paso County along with all drainage facilities within the public Right-of-Way.

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 the appendix.

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. Since there is a discrepancy between the DPBS and FEMA maps, the RWT202 channel that is shown on the DBPS is being rerouted on the north side of the site to the RWT204 channel. No-rise certifications will be completed with each phase as necessary. A LOMR may be necessary after all channel improvements are completed.

XIV. Drainage Credits/Reimbursements

Per the Drainage Basin Fee Addendum – Chapter 3 for El Paso County, drainage credits/reimbursements will be applicable to this development for construction costs associated with regional facilities. These specific credits/reimbursements will be better defined in the final drainage reports and site construction drawings.

Below is a cost estimate for all improvements for the development according to the approximate phasing. The improvements listed as Phase 1 are being proposed with the first phase of the development, Bent Grass Filing 2. When the areas to the north and south of Bent Grass Meadows Drive and adjacent to the channel develop, the improvements summarized below and described in the Construction Phasing will need to be completed.

Item	Quantity	Unit	Unit Cost	Cost
PHASE 1				
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
Channel (Public)				
Grouted Boulder Drop Structure	2	EA	\$ 50,000.00	\$ 100,000.00
Excavation and Recompanction	21030	CY	\$ 1.50	\$ 31,545.00
Subtotal				\$ 131,545.00
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				\$ 814,132.80
Contingency			10%	\$ 81,413.28
Total Phase 1				\$ 895,546.08

NORTH OF BENT GRASS MEADOWS DRIVE				
Channel (Public)				
Grouted Boulder Drop Structure	3	EA	\$ 50,000.00	\$ 150,000.00
Excavation and Recompaction	8350	CY	\$ 1.50	\$ 12,525.00
Subtotal				\$ 162,525.00
WQCV Detention Ponds (Private)				
Pond	1	EA	\$ 80,000.00	\$ 80,000.00
Subtotal				\$ 80,000.00
Total				\$ 242,525.00
Contingency			10%	\$ 24,252.50
Total North BGMD				\$ 266,777.50

SOUTH OF BENT GRASS MEADOWS DRIVE				
Channel (Public)				
Grouted Boulder Drop Structure	3	EA	\$ 50,000.00	\$ 150,000.00
Excavation and Recompaction	15400	CY	\$ 1.50	\$ 23,100.00
Subtotal				\$ 173,100.00
WQCV Detention Ponds (Private)				
Pond	1	EA	\$ 80,000.00	\$ 80,000.00
Subtotal				\$ 80,000.00
Total				\$ 253,100.00
Contingency			10%	\$ 25,310.00
Total South BGMD				\$ 278,410.00

Grand Total				\$ 1,440,733.58
--------------------	--	--	--	------------------------

Phase 2 / check structures?

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 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. All drainage facilities within this report were sized according to the Drainage Criteria Manuals. All of the channel corridors will be publicly owned and maintained and shall be the responsibility of El Paso County. Upon development of the individual parcels within the Bent Grass Residential Subdivision, separate Final Drainage Reports will be required to be submitted and approved by El Paso County.

Call out what accommodations/permissions have been made for the downstream property owners that will receive un-detained developed flows. (considering the removal of the planned detention facility SR 4)

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

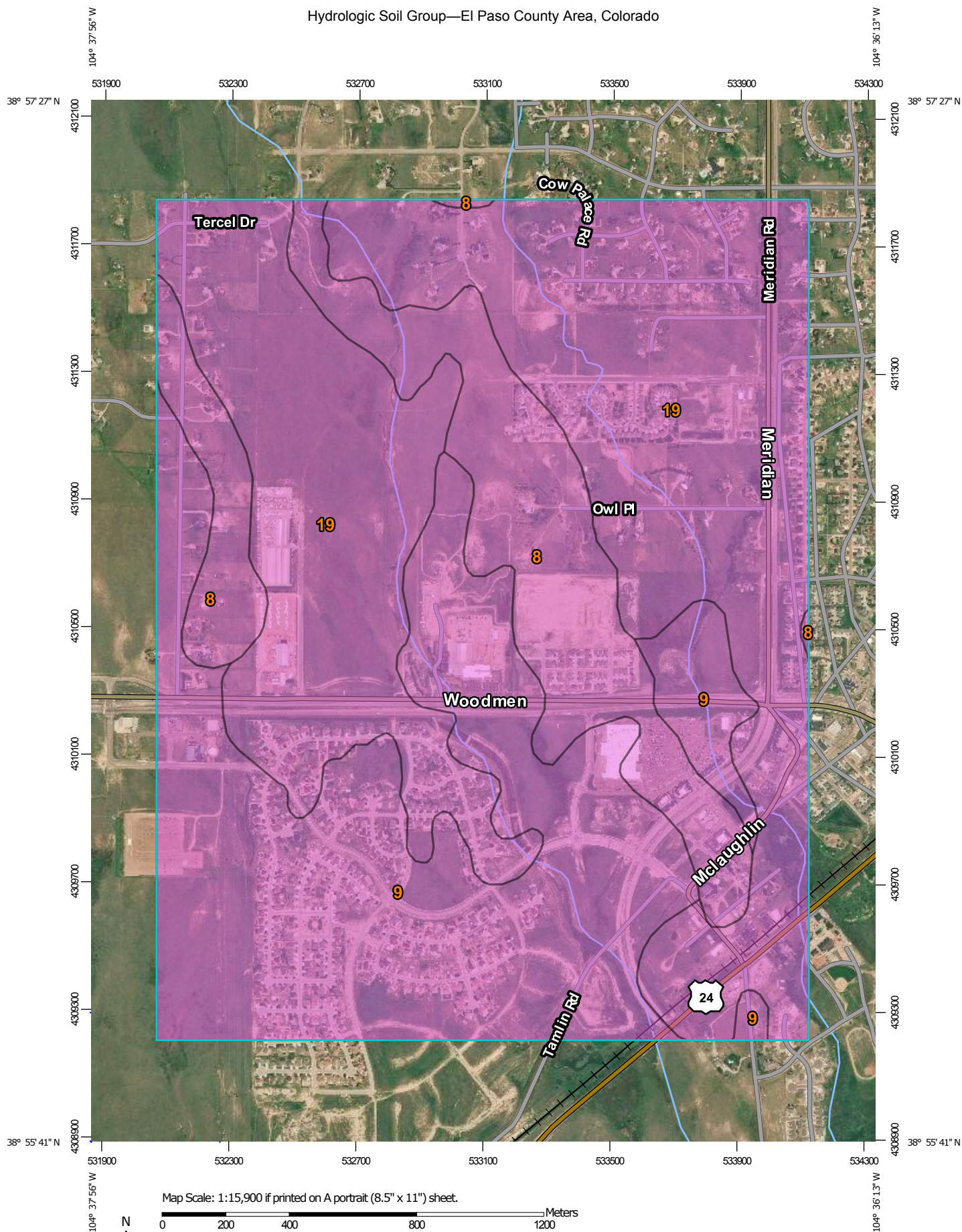
Date:

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



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/2/2019
Page 1 of 4

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, NIMS12
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.

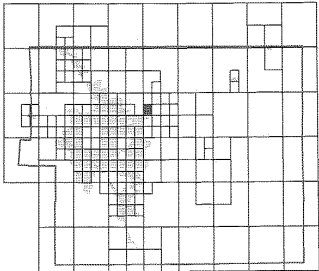
Contact **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9820 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/nfp>.

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.

Base Flood Elevation line and value; elevation in feet*

Base Flood Elevation value where uniform within zone; elevation in feet*

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

Cross section line

Transect line

67° 07' 30.00" 32° 22' 30.00" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4750000N 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 FT 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPS ZONE 0552), 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



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 08059 5553 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

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

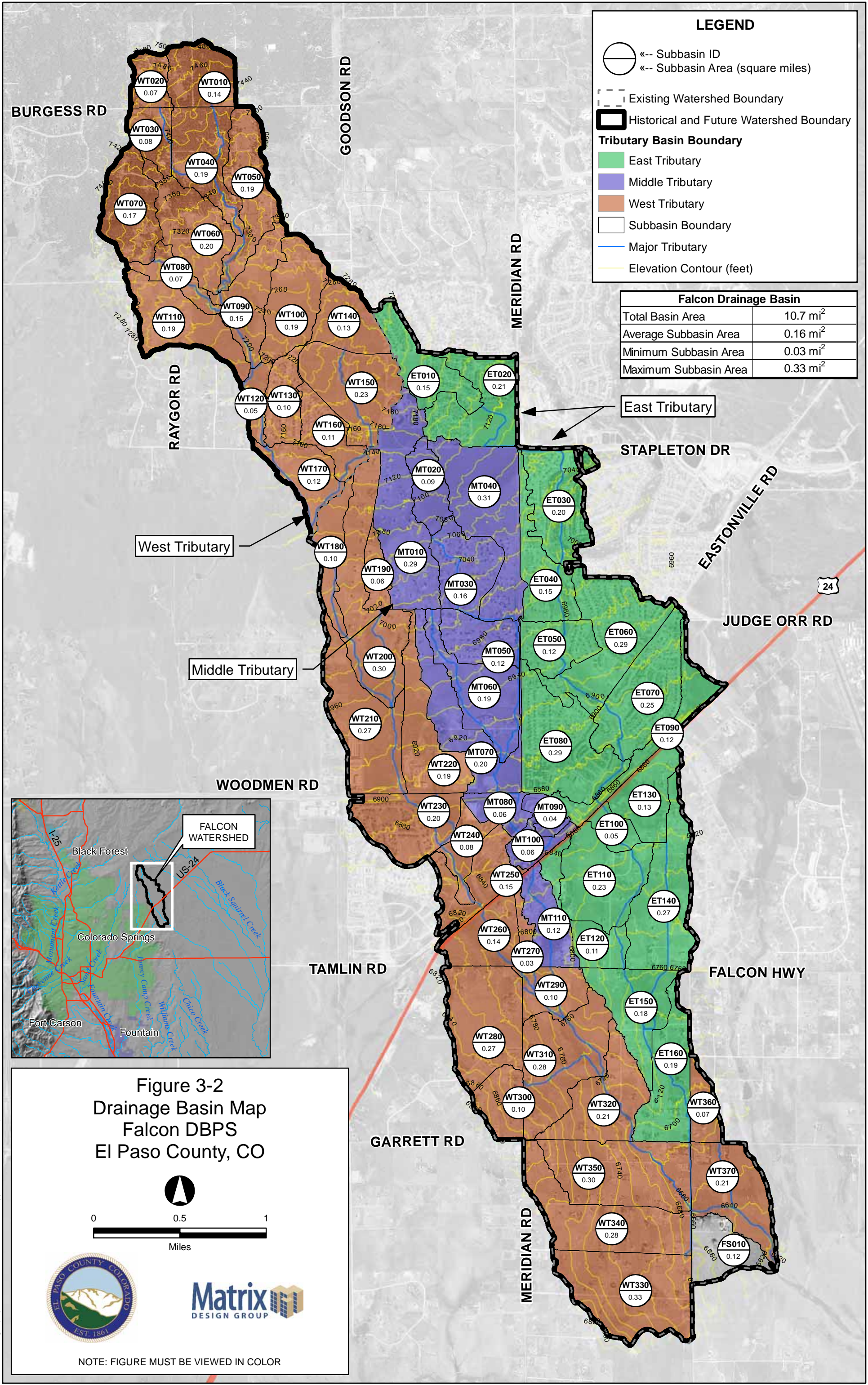
Prepared By:



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

Matrix Project No. 10.122.003

FILE: G:\gis_projects\Falcon_Creek_DBPS\active\apps\20110613\basin_map.mxd, 8/29/2011, wilson_wheeler



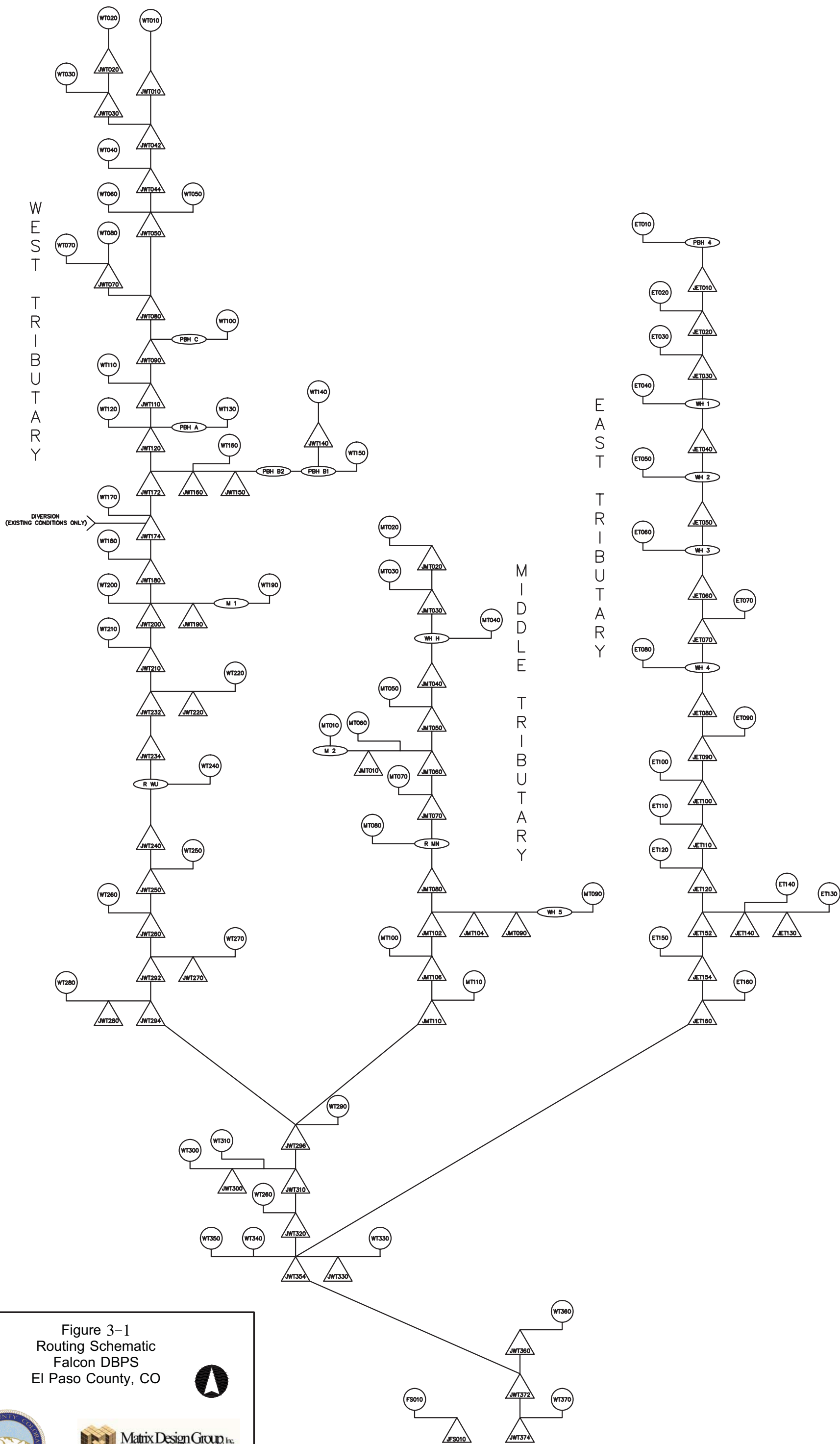
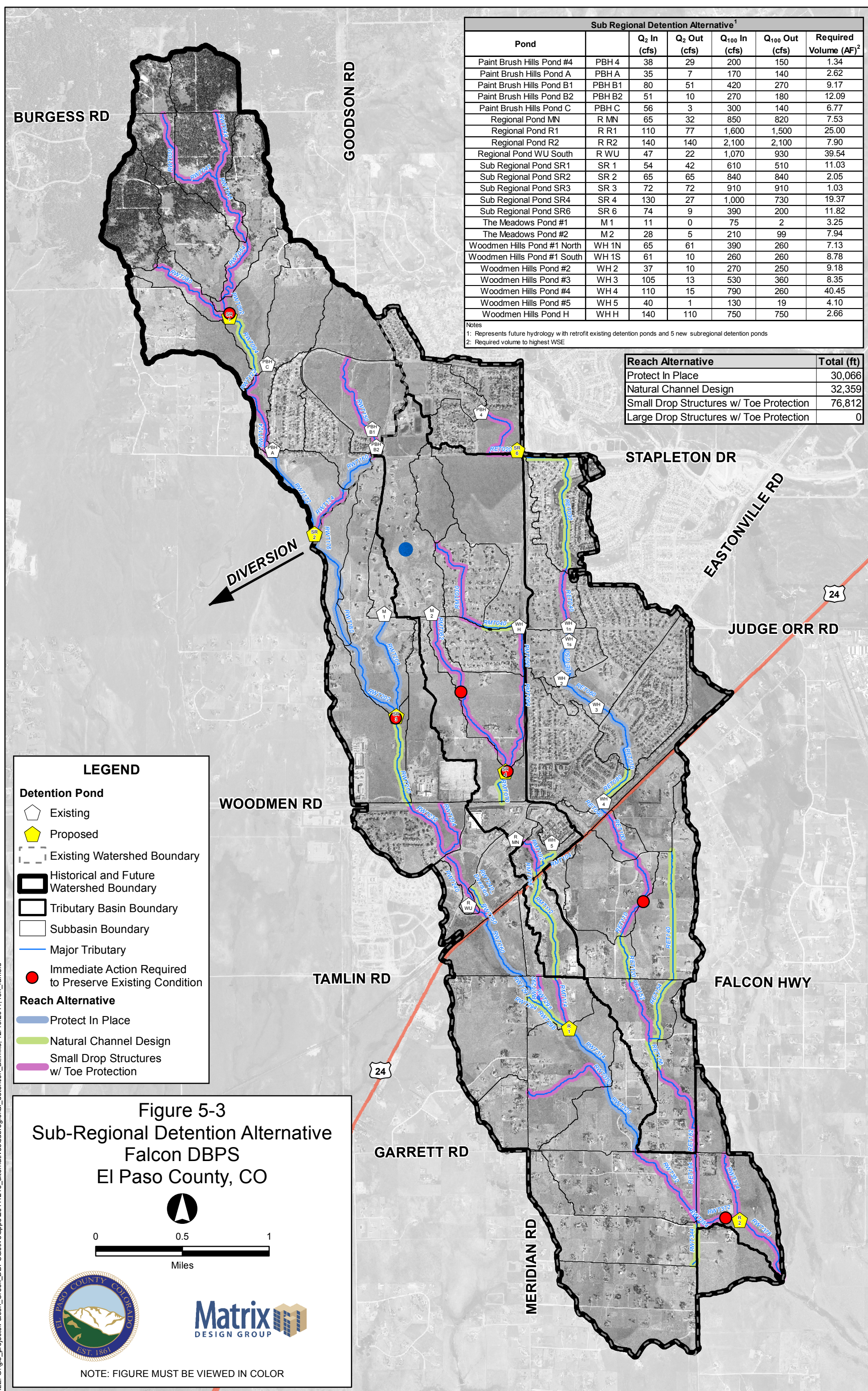
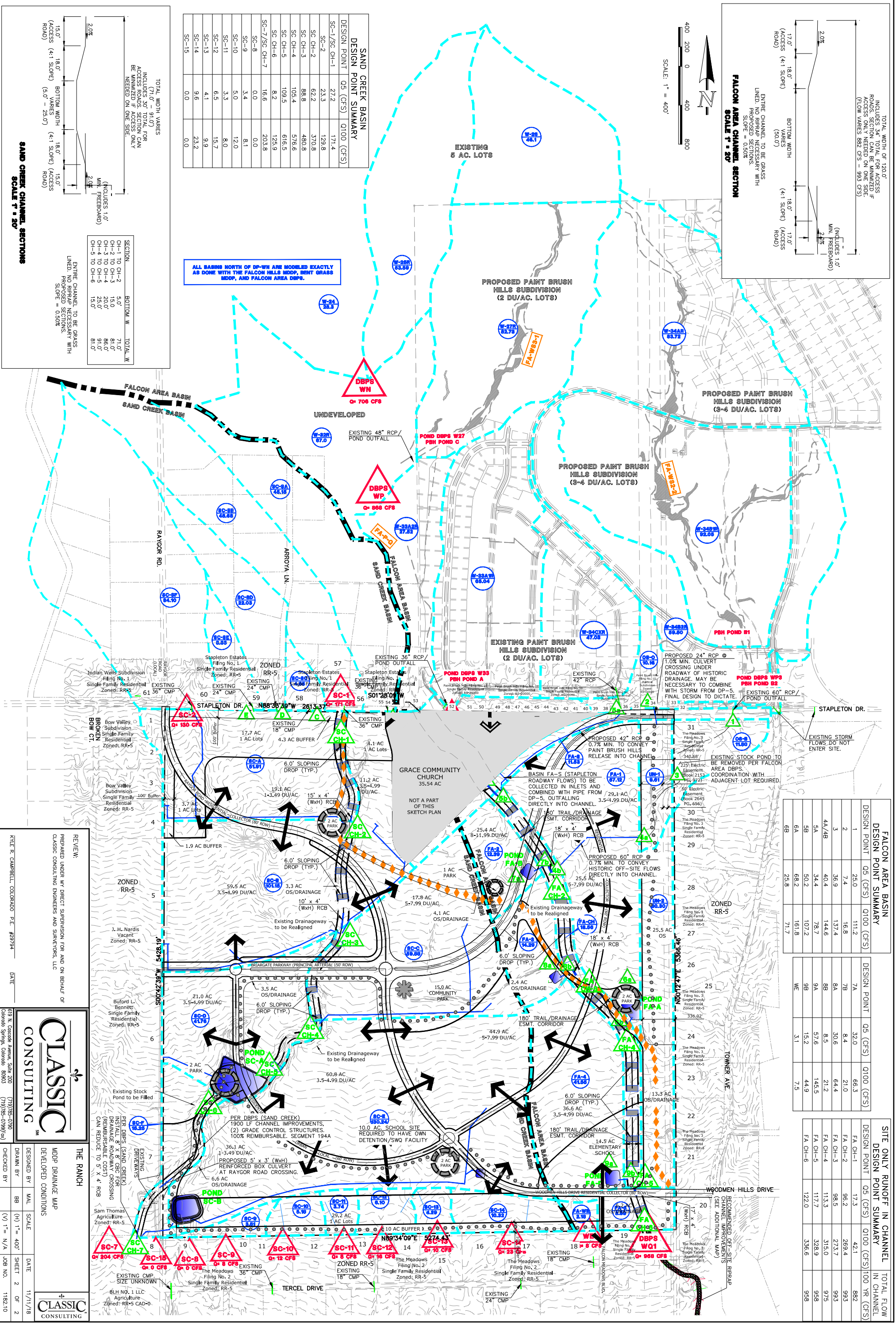


Figure 3-1
Routing Schematic
Falcon DBPS
El Paso County, CO



DRAWING NOT TO SCALE





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

KYLE R. CAMPBELL, COLORADO P.E. #23794 DATE

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.: 118210

THE RANCH

MDDP DRAINAGE MAP

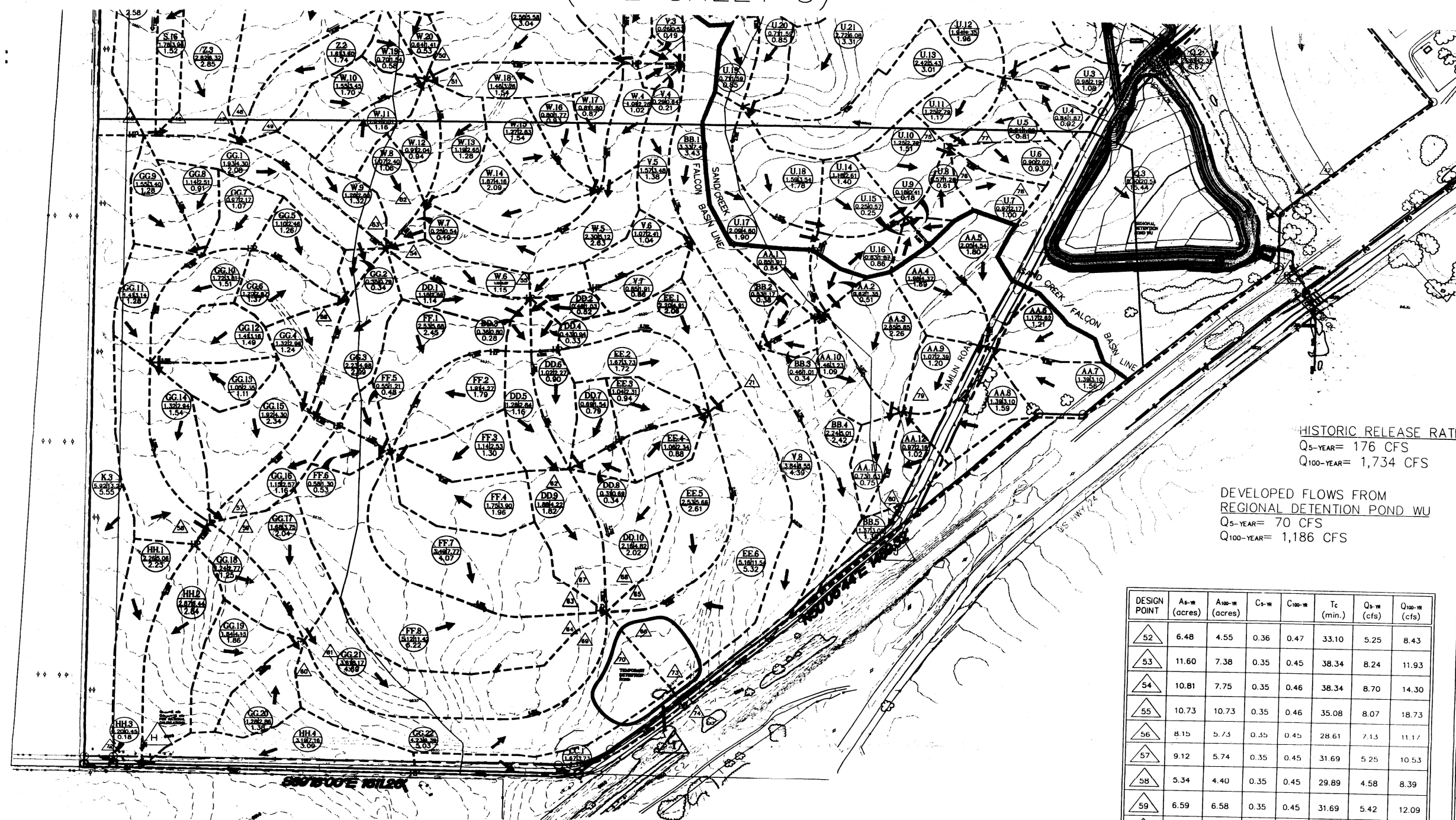
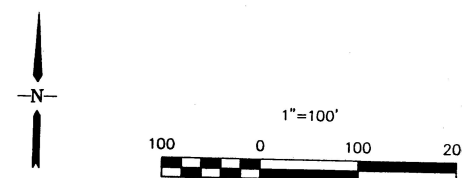
DEVELOPED CONDITIONS

CLASSIC CONSULTING

FINAL DRAINAGE FALCON HIGH

SHEET 4 OF 4

(SEE SHEET 3)



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

DEVELOPED FLOWS FROM
REGIONAL DETENTION POND WU

Q_{5-YEAR} = 70 CFS
Q_{100-YEAR} = 1,186 CFS

DESIGN POINT	A ₅₋₁₀ (acres)	A ₁₀₀₋₁₀ (acres)	C ₅₋₁₀	C ₁₀₀₋₁₀	T _c (min.)	Q ₅₋₁₀ (cfs)	Q ₁₀₀₋₁₀ (cfs)
52	6.48	4.55	0.36	0.47	33.10	5.25	8.4
53	11.60	7.38	0.35	0.45	38.34	8.24	11.9
54	10.81	7.75	0.35	0.46	38.34	8.70	14.3
55	10.73	10.73	0.35	0.46	35.08	8.07	18.7
56	8.15	5.73	0.35	0.45	28.61	7.13	11.1
57	9.12	5.74	0.35	0.45	31.69	5.25	10.5
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	12.05
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	11.8
64	6.58	6.58	0.35	0.45	32.94	5.30	11.8
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-m (acres)	A-m-m (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

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

HISTORIC RELEASE RATES
Q₅-YEAR= 64.50 CFS
Q₁₀₀-YEAR= 159.70 CFS

UR
9960 FE
COLORAD
(719) 53
FIGUR

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 C ₅	Composite C ₁₀₀
		C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
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						INITIAL/OVERLAND			TRAVEL TIME					Tc CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₁₀₀	C ₅	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _t (MIN)	COMP. T _c (MIN)	TOTAL LENGTH(FT)	Urbanized 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 $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

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: 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													
	1	A-1	5.42	0.11	14.3	0.62	3.60	2.2													Total flow going offsite to Bent Grass F1 Residential
	2	A-2	18.00	0.09	17.9	1.62	3.25	5.3													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
	11	OS-5	14.13	0.11	19.4	1.55	3.13	4.9													Flows into Basin OS-6
	12	OS-6	5.81	0.09	13.9	0.52	3.64	1.9													Existing Sediment Pond in Basin and then flows to Bent Grass Meadows Drive

← Provide upstream basin

**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													
	1	A-1	5.42	0.38	14.3	2.05	6.04	12.4													Total flow going offsite to Bent Grass F1 Residential
	2	A-2	18.00	0.36	17.9	6.48	5.46	35.4													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
	11	OS-5	14.13	0.37	19.4	5.29	5.26	27.8													Flows into Basin OS-6
	12	OS-6	5.81	0.36	13.9	2.09	6.10	12.7													Existing Sediment Pond in Basin and then flows to Bent Grass Meadows Drive

← Provide upstream basin

Proposed Computations

COMPOSITE % IMPERVIOUS CALCULATIONS: PROPOSED (LOTS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By: SMB
Date: 10/25/19

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			1/8 Acre or Less			1/3 Acre			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.	
A-1	22.13	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	16.89	49.6	30	0.00	0.0	20	5.24	4.7	54.3
A-2	19.05	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	14.24	48.6	30	0.00	0.0	20	4.81	5.0	53.6
A-3	4.05	100	1.78	44.0	2	2.27	1.1	90	0.00	0.0	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	45.1
A-4	27.69	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	27.69	65.0	30	0.00	0.0	20	0.00	0.0	65.0
A-5	0.80	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	0.80	65.0	30	0.00	0.0	20	0.00	0.0	65.0
B-1	0.34	100	0.20	58.8	2	0.14	0.8	90	0.00	0.0	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	59.6
B-2	1.37	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	1.37	65.0	30	0.00	0.0	20	0.00	0.0	65.0
C-1	19.95	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	11.75	38.3	30	5.83	8.8	20	2.37	2.4	49.5
C-2	1.88	100	1.01	53.7	2	0.87	0.9	90	0.00	0.0	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	54.6
D-1	21.44	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	21.44	65.0	30	0.00	0.0	20	0.00	0.0	65.0
E-1	0.26	100	0.20	76.9	2	0.06	0.5	90	0.00	0.0	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	77.4
OS-1	31.35	100	2.15	6.9	2	28.32	1.8	90	0.88	2.5	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	11.2
OS-2	20.07	80	0.90	3.6	2	18.61	1.9	90	0.56	2.5	65	0.00	0.0	30	0.00	0.0	20	0.00	0.0	8.0
OS-3	10.61	80	0.48	3.6	2	9.83	1.9	90	0.30	2.5	65	0.00	0.0	30	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	0.00	0.0	30	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	0.00	0.0	30	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	5.38	65.0	30	0.00	0.0	20	0.00	0.0	65.0

Lot Type Identification:	
Lot Size (SF)	Lot Size (Acre)
< 8,167	1/8 Acre or Less
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

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS: PROPOSED

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By: SMB
Date: 10/25/19

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Basin ID	Total Area (ac)	Paved Roads			Lawns/Undeveloped			Roofs			1/8 Acre or Less			1/3 Acre			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)		
A-1	22.13	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	16.89	0.25	0.47	0.00	0.20	0.44	5.24	0.39	0.55
A-2	19.05	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	14.24	0.25	0.47	0.00	0.20	0.44	4.81	0.39	0.55
A-3	4.05	0.90	0.96	1.78	0.09	0.36	2.27	0.73	0.81	0.00	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.62
A-4	27.69	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	27.69	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.59
A-5	0.80	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.80	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.59
B-1	0.34	0.90	0.96	0.20	0.09	0.36	0.14	0.73	0.81	0.00	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.57	0.71
B-2	1.37	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	1.37	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.59
C-1	19.95	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	11.75	0.25	0.47	5.83	0.20	0.44	2.37	0.36	0.54
C-2	1.88	0.90	0.96	1.01	0.09	0.36	0.87	0.73	0.81	0.00	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.53	0.68
D-1	21.44	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	21.44	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.59
E-1	0.26	0.90	0.96	0.20	0.09	0.36	0.06	0.73	0.81	0.00	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.71	0.82
OS-1	31.35	0.90	0.96	2.15	0.09	0.36	28.32	0.73	0.81	0.88	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.16	0.41
OS-2	20.07	0.90	0.96	0.90	0.09	0.36	18.61	0.73	0.81	0.56	0.45	0.59	0.00	0.25	0.47	0.00	0.20	0.44	0.00	0.14	0.40
OS-3	10.61	0.90	0.96	0.48	0.09	0.36	9.83	0.73	0.81	0.30	0.45	0.59	0.00	0.25	0.47	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	0.25	0.47	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	0.25	0.47	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	0.25	0.47	0.00	0.20	0.44	0.00	0.45	0.59

Lot Type Identification:	
Lot Size (SF)	Lot Size (Acre)
< 8,167	1/8 Acre or Less
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

C values are taken directly from Table 6-6 in the Colorado Springs DCM Vol. 1. CH. 6 (Referencing UDFCD 2001)
Coefficients use HSG A&B soils - Refer to Appendix # for soil map

STANDARD FORM SF-2: PROPOSED TIME OF CONCENTRATION

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By: SMB
Date: 10/25/19

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL
DATA						(T _i)			(T _p)					(URBANIZED BASINS)			
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₁₀₀	C ₅	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _i (MIN)	COMP. T _c (MIN)	TOTAL LENGTH(FT)	Urbanized T _c (MIN)	
A-1	22.13	A	54.30	0.55	0.39	100	2.0	10.3	1000	1.0	20.0	2.0	8.3	18.6	1100.0	16.1	16.1
A-2	19.05	A	53.60	0.55	0.39	100	2.0	10.4	900	1.0	20.0	2.0	7.5	17.9	1000.0	15.6	15.6
A-3	4.05	A	45.10	0.62	0.45	24	2.0	4.7	1050	1.0	20.0	2.0	8.8	13.4	1074.0	16.0	13.4
A-4	27.69	A	65.00	0.59	0.45	100	2.0	9.4	1650	2.0	20.0	2.8	9.7	19.2	1750.0	19.7	19.2
A-5	0.80	A	65.00	0.59	0.45	35	2.4	5.3	400	2.4	20.0	3.1	2.2	7.4	435.0	12.4	7.4
B-1	0.34	A	59.60	0.71	0.57	24	2.0	3.8	150	1.0	20.0	2.0	1.3	5.0	174.0	11.0	5.0
B-2	1.37	A	65.00	0.59	0.45	20	2.0	4.2						4.2	20.0	10.1	5.0
C-1	19.95	A	49.50	0.54	0.36	100	2.0	10.7	1400	2.0	20.0	2.8	8.2	19.0	1500.0	18.3	18.3
C-2	1.88	A	54.60	0.68	0.53	24	2.0	4.1	950	2.0	20.0	2.8	5.6	9.7	974.0	15.4	9.7
D-1	21.44	A	65.00	0.59	0.45	100	2.0	9.4	850	1.5	20.0	2.4	5.8	15.2	950.0	15.3	15.2
E-1	0.26	A	77.40	0.82	0.71	24	2.0	2.8	110	2.0	20.0	2.8	0.6	3.4	134.0	10.7	5.0
OS-1	31.35	A	11.20	0.41	0.16	100	2.4	12.8	1600	2.4	15.0	2.3	11.5	24.3	1700.0	19.4	19.4
OS-2	20.07	A	8.00	0.40	0.14	100	2.3	13.3	1400	2.3	15.0	2.3	10.3	23.5	1500.0	18.3	18.3
OS-3	10.61	A	8.00	0.40	0.14	100	2.0	13.9	1000	2.0	15.0	2.1	7.9	21.7	1100.0	16.1	16.1
OS-4	2.64	A	2.00	0.36	0.09	100	2.0	14.7	400	2.0	15.0	2.1	3.1	17.8	500.0	12.8	12.8
OS-5	14.13	A	4.50	0.37	0.11	100	2.5	13.4	1600	3.0	15.0	2.6	10.3	23.6	1700.0	19.4	19.4
OS-6	5.38	A	65.00	0.59	0.45	100	2.0	9.4	600	2.0	15.0	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

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

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

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
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By: SMB
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)	
	1	OS-1	31.35	0.16	19.4	5.13	3.13	16.1													
	2	A-1	22.13	0.39	16.1	8.65	3.41	29.5													
	3	A-2	19.05	0.39	15.6	7.37	3.47	25.6													
	4	A-3	4.05	0.45	13.4	1.81	3.69	6.7													
	4								16.1	17.83	3.41	60.8									
	5	A-5	0.80	0.45	7.4	0.36	4.58	1.6													
	6	A-4	27.69	0.45	19.2	12.46	3.15	39.2													
	6								19.2	12.82	3.15	40.4									
	7	B-1	0.34	0.57	5.0	0.19	5.15	1.0													
	8	B-2	1.37	0.45	5.0	0.62	5.17	3.2													
	9	OS-2	20.07	0.14	18.3	2.89	3.22	9.3													
	10	C-1	19.95	0.36	18.3	7.22	3.22	23.2													
	10								18.3	10.11	3.22	32.6									
	11	OS-3	10.61	0.14	16.1	1.54	3.41	5.3													
	12	OS-4	2.64	0.09	12.8	0.24	3.76	0.9													
	13	C-2	1.88	0.53	9.7	0.99	4.18	4.1													
	13								18.3	11.34	3.22	36.5									
	14	D-1	21.44	0.45	15.2	9.65	3.50	33.8													
	15	E-1	0.26	0.71	5.0	0.19	5.17	1.0													
	16	OS-5	14.13	0.11	19.4	1.55	3.13	4.9													Flows into Basin OS-6
	17	OS-6	5.38	0.45	13.9	2.42	3.64	8.8													To be developed in the future

STANDARD FORM SF-3: PROPOSED
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

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

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By: SMB
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)	
	1	OS-1	31.35	0.41	19.4	12.97	5.26	68.2													
	2	A-1	22.13	0.55	16.1	12.27	5.73	70.3													
	3	A-2	19.05	0.55	15.6	10.52	5.82	61.2													
	4	A-3	4.05	0.62	13.4	2.53	6.19	15.7													
	4								16.1	25.32	5.73	145.1									
	5	A-5	0.80	0.59	7.4	0.47	7.69	3.6													
	6	A-4	27.69	0.59	19.2	16.34	5.29	86.4													
	6								19.2	16.81	5.29	88.9									
	7	B-1	0.34	0.71	5.0	0.24	8.65	2.1													
	8	B-2	1.37	0.59	5.0	0.81	8.68	7.0													
	9	OS-2	20.07	0.40	18.3	8.02	5.41	43.4													
	10	C-1	19.95	0.54	18.3	10.72	5.41	58.0													
	10								18.3	18.74	5.41	101.4									
	11	OS-3	10.61	0.40	16.1	4.24	5.73	24.3													
	12	OS-4	2.64	0.36	12.8	0.95	6.31	6.0													
	13	C-2	1.88	0.68	9.7	1.28	7.01	9.0													
	13								18.3	20.97	5.41	113.4									
	14	D-1	21.44	0.59	15.2	12.65	5.87	74.3													
	15	E-1	0.26	0.82	5.0	0.21	8.68	1.8													
	16	OS-5	14.13	0.37	19.4	5.29	5.26	27.8													Flows into Basin OS-6
	17	OS-6	5.38	0.59	13.9	3.17	6.10	19.3													To be developed in the future

10/25/2019, 2:17 PM

APPENDIX C

Preliminary Channel HEC-RAS Models

Existing Conditions Model

Provide plan/map showing all channel cross-section locations including downstream.

HEC-RAS HEC-RAS 5.0.3 September 2016
 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
XXXXXXXX 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. 20_Channel . prj

Run Date and Time: 5/21/2019 2:12:02 PM

Project in English units

Project Description:

CRS Info=<Spatial Reference> <CoordinateSystem Code="3502"

Unit="US_survey_Foot" AcadCode="" /> <Registration OffsetX="0" OffsetY="0"

OffsetZ="0" ScaleX="1" ScaleY="1" ScaleZ="1" /></Spatial Reference>

PLAN DATA

Plan Title: Existing

Plan File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04 Grad-Drain\3.04.2

Prop Drain Rpt\Channel Design\GeoHecRas\CLH14. 20_Channel . p01

Geometry Title: Existing

Geometry File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04

Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14. 20_Channel . g01

Flow Title : Existing

Flow File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014. 20-Bent Grass\3. Permit Const Docs\3.04

Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14. 20_Channel . f01

Plan Summary Information:

Number of: Cross Sections =	81	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: Existing

Flow File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014. 20-Bent Grass\3. Permit Const Docs\3.04 Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14. 20_Channel . f01

Flow Data (cfs)

River	Reach	RS	100-YR	5-YR
Existing Channel East		5000	43	4
Existing Channel East		3900	880	14

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Existing Channel East		100-YR	Normal S = 0.0329	Normal S = 0.0247
Existing Channel East		5-YR	Normal S = 0.0329	Normal S = 0.0247

GEOMETRY DATA

Geometry Title: Existing

Geometry File : H:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04
 Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14.20_Channel . g01

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 5000

INPUT

Description:

Station		Elevation Data		num= 10		Sta		El ev		Sta		El ev	
0	6963.58	38.49	6963.58	42.67	6962.96	75	6959.7	89.7	6962.75				
110.04	6963.46	118.77	6963.24	121.11	6963.48	125.8	6963.63	150	6963.63				

Manning's n Values		num= 3		Sta		n Val	
0	.05	38.49	.045	89.7	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	38.49	89.7		53.22	50	51.12	.1
							.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4950

INPUT

Description:

Station		Elevation Data		num= 15		Sta		El ev		Sta		El ev	
0	6964.91	4.49	6964.91	14.11	6964.28	28.72	6963.12	45.08	6961.83				
66.68	6958.45	67.88	6958.26	72.91	6957.97	75	6957.85	81.59	6957.48				
83.44	6957.78	105.7	6961.57	120.79	6962.71	134.68	6963.68	150	6963.68				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 45.08 .045 105.7 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45.08 105.7 56.3 50 55.05 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 4900

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6963.53 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 6956.22 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 .045 126.33 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.95 126.33 71.1 50 38.94 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 4850

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6959.99 34.39 6959.99 54.42 6958.91 58.9 6957.85 72.94 6954.52
 75 6954.47 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 6962.04

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

0 .05 54.42 .045 111.09 .05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.42	111.09		49.15	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4800

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6960.57	9.2	6960.57	44.01	6958.08	59.83	6954.92	68.81	6953.23
75	6953.14	76.25	6953.12	79.12	6953.16	91.93	6955.91	95.94	6956.94
100.1	6956.93	150	6956.93						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	44.01	.045	95.94	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.01	95.94		61.25	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4750

INPUT

Description:

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6958.34	35.51	6958.34	38.45	6958.32	40.25	6958.17	43.73	6957.56
73.46	6952.3	75	6952.25	75.36	6952.24	77.32	6952.32	89.26	6955.07
96.38	6956.45	105.11	6956.9	123.28	6956.85	137.41	6956.83	150	6956.83

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	40.25	.045	96.38	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40. 25	96. 38		62. 73 50	41. 17		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4700

INPUT

Description:

Station	Elevation	Data	num=	18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6958. 93	6. 21	6958. 93	26. 86	6957. 79	46. 91	6956. 53	55. 57	6954. 93
72. 9	6951. 61	75	6951. 59	75. 6	6951. 58	77. 45	6951. 54	84. 09	6952. 97
93. 45	6955. 07	97. 28	6955. 56	135. 4	6956. 48	143. 04	6956. 78	144. 21	6956. 78
145. 18	6956. 78	147. 21	6956. 91	150	6957. 05				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	46. 91	. 045	97. 28	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46. 91	97. 28		48. 59 50	53. 31		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4650

INPUT

Description:

Station	Elevation	Data	num=	18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6955. 92	13	6955. 92	15. 98	6955. 77	17. 47	6955. 75	19. 19	6955. 69
39. 7	6954. 03	40. 71	6953. 88	59. 63	6950. 54	61. 54	6950. 65	62. 99	6950. 73
63. 73	6950. 75	68. 59	6951. 79	81. 56	6954. 29	100. 82	6955. 21	110. 87	6955. 88
117. 25	6955. 97	128. 49	6956. 29	136. 54	6956. 29				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	39. 7	. 045	81. 56	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39. 7	81. 56		31. 33 50	63. 68		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4600

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6955. 98	3. 42	6955. 98	11. 44	6955. 16	22. 53	6954. 54	39. 05	6953. 33
60. 56	6950. 2	67. 66	6949. 26	68. 34	6949. 29	69. 24	6949. 27	71. 52	6949. 23
78. 98	6950. 86	88. 89	6953. 25	99. 87	6954. 11	104. 06	6954. 54	107. 26	6954. 49
144. 24	6954. 49								

Manning's n Values

num=	3
Sta	n Val
0	. 05
39. 05	. 045
88. 89	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39. 05	88. 89		31. 96 50	60. 47		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4550

INPUT

Description:

Station	Elevation	Data	num=	11				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6954. 47	15. 6	6953. 37	18. 05	6953. 02	48. 88	6948. 55	52. 45
55. 27	6947. 91	55. 52	6947. 88	59. 39	6948. 6	75. 66	6952. 81	89. 66
91. 58	6953. 08							

Manning's n Values

num=	3
Sta	n Val
0	. 05
15. 6	. 045
75. 66	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
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15. 6 75. 66 69. 03 50 28. 51 . 1 . 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4500

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6955. 85	9. 47	6955. 85	42. 52	6953. 36	46. 11	6953. 07	52. 65	6951. 78
69. 08	6947. 9	75	6947. 95	75. 53	6947. 96	76. 98	6947. 94	83. 7	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
0	. 05	46. 11	. 045	107. 55	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46. 11	107. 55		50. 62 50	52. 59		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4450

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6954. 6	18. 39	6954. 6	39. 23	6952. 75	40. 72	6952. 62	44. 07	6951. 87
69. 43	6946. 6	73	6946. 49	75	6946. 44	76. 07	6946. 4	95. 73	6951. 85
96. 83	6952. 15	115. 18	6952. 51	150	6952. 51				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	40. 72	. 045	96. 83	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40. 72	96. 83		46. 56 50	51. 87		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4400

INPUT

Description:

Station	Elevation	Data	num=	16						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6954.57	12.29	6954.57	24.56	6954.28	34.56	6953.13	39.34	6952.67	
42.47	6951.97	70.43	6945.75	70.85	6945.66	70.89	6945.64	70.91	6945.64	
75	6944.96	75.01	6944.96	96.91	6951.35	98.66	6951.94	121.74	6952.08	
150	6952.08									

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.34	.045	98.66	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.34	98.66		61.22 50	41.17	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4350

INPUT

Description:

Station	Elevation	Data	num=	13						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6951.38	40.69	6951.38	47.23	6951.34	70.53	6944.91	70.85	6944.84	
70.91	6944.83	75	6944.47	75.21	6944.46	87.72	6947.7	104.7	6951.48	
134.53	6952.12	141.79	6952.34	150	6952.34					

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	47.23	.045	104.7	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	47.23	104.7		50.69 50	48.39	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4300

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6949.81	27.06	6949.81	45.38	6949.59	68.23	6944.71	72.38	6943.8
72.71	6943.79	75	6943.87	78.16	6943.97	98.85	6948.57	107.94	6950.62
120.3	6951.57	129.52	6951.73	150	6951.73				

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	45.38	.045	107.94	.05		

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.38	107.94	39.47	50	60.56		.1	.3	

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4250

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6948.57	9.29	6948.57	42.5	6948.14	64.45	6944.4	72.35	6942.82
75	6942.96	75.29	6942.98	79.17	6943.16	89.72	6945.8	103.42	6949.07
109.38	6949.39	124.14	6949.31	150	6949.31				

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	42.5	.045	103.42	.05		

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.5	103.42	47.28	50	53.35		.1	.3	

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 4200

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6947.06	16.62	6947.06	37.93	6946.33	57.15	6943.81	69.99	6941.92
73.64	6941.77	75	6941.74	77.7	6941.68	85.94	6943.75	100.62	6947.59
107.28	6947.97	118.1	6948.6	141.84	6948.75	150	6948.75		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	37.93	.045	100.62	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	37.93	100.62		34.12	50	59.42	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 4150

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6946.72	21.81	6946.72	33.75	6946.21	44.72	6944.88	62.77	6942.12
71	6941.78	75	6941.68	75.99	6941.65	88.27	6943.68	99.02	6945.62
133.28	6946.17	148.4	6946.47	150	6946.47				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	33.75	.045	99.02	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	33.75	99.02		54.56	50	47.87	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 4100

INPUT

Description:

Station		Elevation		Data		num=		14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6946.92	12.52	6946.92	26.8	6946.38	41.81	6945.52	49.62	6943.85
65.65	6940.64	75	6940.5	76.62	6940.48	80.6	6940.53	99.13	6942.25
110.21	6943.95	122.91	6944.07	136.87	6945.44	138.58	6945.44		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	41.81	.045	110.21	.05

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	41.81	110.21	78.87	50	30.41		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4050

INPUT

Description:

Station		Elevation		Data		num=		17	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6944.33	26.04	6944.33	27.03	6944.25	27.69	6944.25	31.28	6943.83
69.09	6939.89	69.24	6939.61	75	6939.61	78.24	6939.61	78.37	6939.6
78.82	6939.73	95.65	6943.72	103.92	6943.86	115.58	6945.3	119.28	6945.5
124.8	6945.27	136.11	6945.27						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	27.69	.045	95.65	.05

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	27.69	95.65	48.52	50	51.38		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 4000

INPUT
 Description:
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6944.13	6.34	6944.13	8.29	6943.89	23.16	6942.56	71.88	6938.59
75	6938.53	76.88	6938.49	77.66	6938.51	79.85	6939.03	94.21	6943.12
108.06	6943.52	148.53	6944.03	150	6944.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	6.34	.045	94.21	.05

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

6.34	94.21	53.35	50	53.9	.1	.3
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CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3950

INPUT
 Description:
 Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.02	28.34	6941.02	73	6938.11	75.49	6938.03	75.83	6938.01
77.39	6937.94	81.6	6939.05	111.91	6941.68	115.43	6941.7	136.93	6940.99
138.53	6940.99								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	28.34	.045	111.91	.05

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

28.34	111.91	66.9	50	63.88	.1	.3
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CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3900

INPUT
 Description:

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6943.22	2.46	6943.22	33.41	6939.86	35.37	6939.67	36.6	6939.52
40.25	6939.3	47.13	6939.08	82.19	6938.13	92.84	6937.57	93.35	6937.54
108.61	6937.58	113.66	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	6942.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	2.46	.045	171.58	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2.46	171.58		29.56	50	67.78	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3850

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.79	3.34	6941.79	16.12	6941.2	44.4	6939.51	73.28	6937.89
89.2	6936.79	89.45	6936.8	103.72	6937.45	123.96	6937.2	133.88	6935.31
149.05	6939.25	156.89	6941.24	161.79	6941.24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	3.34	.045	156.89	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	3.34	156.89		54.23	50	63.45	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3800

INPUT

Description:

Station Elevation Data num= 14

CLH14. 20_Channel . rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6938.59	23.83	6938.59	26.75	6938.1	64.69	6934.35	65	6934.41
72.38	6935.95	78.29	6937.48	86.93	6938.68	87.76	6938.73	89.76	6938.23
107.51	6934.66	127	6938.71	132.8	6939.83	140	6939.83		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	23.83	.045	132.8	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	23.83	132.8		51.02	50	49.21	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3750

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6938.4	22.93	6938.4	39.82	6937.64	64.36	6934.46	73.46	6933.22
73.77	6933.18	76.31	6933.49	86.66	6934.62	92.06	6934.61	95.12	6934.69
103.76	6934.62	132.38	6934.34	155.38	6938.15	162.61	6939.21	169.1	6939.38
170.59	6939.38								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	22.93	.045	162.61	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	22.93	162.61		52.26	50	46.49	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3700

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

CLH14. 20_Channel . rep

0	6938.69	13.37	6938.69	28.67	6938.2	70.27	6932.3	72.77	6931.91
72.8	6931.9	74.04	6932.1	88.79	6933.84	92.58	6934.15	96.39	6934.03
121.74	6933.67	137.6	6933.46	148.44	6933.23	164.2	6936.02	181.52	6938.72
185.99	6938.72								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	28.67	.045	181.52	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28.67	181.52		60.14	50	33.53	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3650

INPUT

Description:

Station		Elevation Data		num= 15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6937.92	15.4	6937.92	21.77	6937.78	43.82	6934.93	72.59	6931.21
72.68	6931.2	76.28	6931.74	89.29	6933.63	104.89	6934.34	113.84	6934.54
126.98	6934.36	154.1	6932.43	160.15	6933.47	184.83	6938.29	190.1	6938.29

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	21.77	.045	184.83	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	21.77	184.83		51.25	50	52.46	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3600

INPUT

Description:

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. 31	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. 26						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	0	. 045	181. 06	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	0	181. 06		62. 01	50	47. 9	. 1	. 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3550

INPUT

Description:

Station Elevation Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev
0	6935. 73	5. 33	6935. 73	37. 55	6934. 96
73. 65	6929. 51	95. 34	6930. 85	104. 54	6931. 6
135. 86	6930. 75	147. 9	6929. 91	163. 85	6933. 22
				175. 35	6935. 76
				179. 76	6935. 76

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	37. 55	. 045	175. 35	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	37. 55	175. 35		59. 06	50	53. 38	. 1	. 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3500

INPUT

Description:

Station Elevation Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev
0	6935. 25	15. 01	6935. 25	28. 58	6934. 15
74. 87	6928. 8	75	6928. 81	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. 93

Manning' s n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 . 05 15. 01 . 045 146. 26 . 05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15. 01 146. 26 39. 9 50 66. 73 . 1 . 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3450

INPUT

Description:

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6933. 2 12. 09 6933. 2 13. 53 6932. 95 41. 86 6930. 45 64. 8 6928. 71
 75 6928. 49 78. 25 6928. 42 89. 89 6928. 01 109. 29 6933. 08 109. 55 6933. 15
 150 6933. 15

Manning' s n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 . 05 12. 09 . 045 109. 55 . 05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 12. 09 109. 55 24. 8 50 100. 26 . 1 . 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3400

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6932. 69 17. 69 6932. 69 60. 53 6928. 38 63. 35 6928. 09 63. 87 6928. 07
 72. 82 6927. 76 80. 87 6927. 47 86. 02 6928. 04 105. 87 6929. 71 122. 83 6930. 24
 177. 44 6932. 03 180. 28 6932. 03

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 17.69 .045 177.44 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 17.69 177.44 54.43 50 48.43 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3350

INPUT

Description:

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6932.72 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 73.79 6926.56 81.57 6926.79
 98.39 6928.03 119.22 6929.56 143.64 6930.24 162.24 6930.68 169.23 6930.68

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 35.04 .045 162.24 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 35.04 162.24 60.4 50 46.98 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 3300

INPUT

Description:

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6931.16 1.46 6931.16 44.98 6930.18 48.76 6929.8 64.02 6925.77
 69.23 6924.78 72.69 6924.97 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 6931.08

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

0 .05 44.98 .045 128.8 .05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.98	128.8		56.3	50	33.79	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3250

INPUT

Description:

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	73.72	6924.03	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	6930.38

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	50.59	.045	122.82	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	50.59	122.82		48.03	50	52.79	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3200

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6928.61	16.79	6928.61	37.89	6927.96	47.88	6927.46	61.58	6925.2
70.66	6923.44	75	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	.045	109.33	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47. 88	109. 33		50. 1	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3150

INPUT

Description:

Station	Elevation	Data	num=	13
Sta	Elev	Sta	Elev	Sta
0	6926. 88	22. 24	6926. 88	45. 77
75	6923. 39	82. 58	6923. 53	93. 8
133. 38	6928. 12	144. 02	6928. 52	150

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 05	45. 77	. 045
		106. 55	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45. 77	106. 55		44. 23	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3100

INPUT

Description:

Station	Elevation	Data	num=	15
Sta	Elev	Sta	Elev	Sta
0	6925. 44	41. 21	6925. 44	42. 21
72. 45	6922. 5	75	6922. 53	96. 06
120. 75	6926. 15	136. 34	6927. 41	138. 56

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 05	42. 21	. 045
		109. 76	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42. 21	109. 76		33. 1	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3050

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6927.04	20.4	6926.3	37.77	6925.36	47.85	6924.76	63.81	6921.9
64.86	6921.72	68.48	6921.7	75	6921.67	101.35	6921.56	109.5	6922.78
119.15	6924.48	139.32	6925.18	150	6925.18				

Manning's n Values

num=		3	
Sta	n Val	Sta	n Val
0	.05	47.85	.045
119.15	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.85	119.15		67.72	50	48.85	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 3000

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6926.75	12.07	6926.75	30.38	6924.81	46.17	6923.42	69.32	6920.99
70.32	6920.85	70.81	6920.84	75	6920.75	83.92	6920.57	92.87	6922.59
100.45	6924.17	134.8	6924.77	150	6924.77				

Manning's n Values

num=		3	
Sta	n Val	Sta	n Val
0	.05	12.07	.045
100.45	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	12.07	100.45		64.93	50	45.01	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2950

INPUT

Description:

Station	Elevation	Data	num=	16						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6925.81	18.13	6925.81	19.68	6925.79	20.08	6925.76	21.08	6925.7	
40.93	6924.34	62.31	6920.25	64.23	6919.84	65.4	6919.86	73.12	6919.94	
79.78	6920.01	89.4	6921.77	95.22	6922.65	166.18	6924.46	175.43	6924.7	
179.51	6924.7									

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	40.93	.045	95.22	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40.93	95.22		50.79	50	51.25	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2900

INPUT

Description:

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6924.92	20.3	6924.92	22.17	6924.89	24.13	6924.76	41.82	6923.67
59.09	6919.82	61.33	6919.34	64.69	6919.34	73.26	6919.33	82.61	6919.31
94.28	6920.95	99	6921.46	183.37	6923.45	185.87	6923.45		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	41.82	.045	99	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	41.82	99		65.91	50	45.14	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2850

INPUT
 Description:
 Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6923.53	14.01	6923.53	32.65	6922.77	47.73	6922.24	62.37	6918.47
64.37	6917.96	70.64	6918.05	72.59	6918.07	78.56	6918.13	84.89	6918.97
98.45	6920.68	118.89	6921.29	188.61	6923.26	189.28	6923.26		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	14.01	.045	118.89	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	14.01	118.89		66.73	50	53.41	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2800

INPUT
 Description:
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6922.35	10.49	6922.35	37.01	6921.12	54.97	6920.34	63.84	6917.94
66.89	6917.16	75	6917.29	81.41	6917.39	81.5	6917.39	81.68	6917.42
98.3	6920.39	144.82	6921.51	150	6921.51				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	54.97	.045	98.3	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.97	98.3		67.78	50	48.95	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 2750

INPUT

Description:

Station		Elevation		Data		num=		12	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6920.98	8.09	6920.98	32.07	6919.62	49.48	6918.77	61.26	6917.17
64.88	6916.55	75	6915.94	75.38	6915.92	78.15	6915.84	83.39	6917.25
92.71	6919.98	150	6919.98						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	8.09	.045	92.71	.05

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
		8.09	92.71		45.41	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 2700

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6919.86	10.07	6919.86	28.38	6918.78	49.99	6917.31	60.09	6916.05
67.57	6915.26	70.91	6915.09	75	6914.88	77.09	6914.78	83.92	6917.05
90.44	6919.08	131.67	6919.81	150	6919.81				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	10.07	.045	90.44	.05

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
		10.07	90.44		62.4	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East

RS: 2650

INPUT

Description:

Station		Elevation		Data		num=		14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6919.1	8.33	6919.1	17.17	6918.81	23.07	6918.56	53.21	6917.64
56.81	6916.91	68.79	6914.18	72.13	6913.94	75	6913.83	78.45	6913.71
89.72	6916.51	95.1	6918.05	106.86	6918.14	150	6918.14		

Manning's n Values

num=		3	
Sta	n Val	Sta	n Val
0	.05	53.21	.045
		95.1	.05

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
		53.21	95.1		54.3	50	79.13	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2600

INPUT

Description:

Station		Elevation		Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6918.03	15.61	6918.03	18.34	6917.93	20.86	6917.82	26.37	6917.5
46.83	6916.29	48.34	6915.95	62	6913.18	68.32	6912.98	71.23	6912.9
73.59	6912.84	82.87	6915.73	87.16	6916.8	113.27	6916.84	164.93	6917.5

Manning's n Values

num=		3	
Sta	n Val	Sta	n Val
0	.05	46.83	.045
		87.16	.05

Bank	Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
		46.83	87.16		60.01	50	72.05	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2550

INPUT

Description:

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6917.98	16.03	6917.98	30.3	6917.37	33.44	6916.28	39.01	6915.48
47.77	6914.45	64.51	6912.49	71.43	6912.49	71.67	6912.49	75.28	6912.38
89.77	6914.65	90.88	6914.77	108.35	6915.07	144.31	6915.68	157.36	6915.97
178.95	6916.25	199.36	6916.51	211.51	6916.51				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	47.77	.045	108.35	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.77	108.35		65.45	50	93.8	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2500

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6917.34	21.33	6917.34	43.19	6915.76	50.05	6915.24	58.83	6913.21
65.27	6911.7	72.35	6911.56	73.69	6911.54	75.82	6911.56	81.29	6912.14
96.3	6913.77	116.43	6914.35	183.46	6915.89	185.27	6915.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	21.33	.045	183.46	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	21.33	183.46		69.23	50	85.3	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2450

INPUT

Description:

Station Elevation Data num= 13

CLH14. 20_Channel . rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6914.52	.64	6914.52	46.94	6913.89	51.13	6913.72	53.31	6913.16
67.55	6910.62	75	6910.7	78.02	6910.73	79.98	6910.73	98.22	6913.34
98.49	6913.37	134.64	6914.39	150	6914.39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	46.94	.045	98.49	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46.94	98.49		38.25	50	54.23	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2400

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6913.88	.43	6913.88	22.4	6913.14	42.22	6912.55	51.23	6911.52
66.38	6909.67	72.38	6908.29	75	6907.83	75.12	6907.81	79.67	6909.31
90.18	6912.93	130.62	6913.82	150	6913.82				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	42.22	.045	90.18	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.22	90.18		62.04	50	59.15	.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2350

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6913.3	15.78	6913.3	61.91	6911.47	66.32	6911.31	76.86	6910.37

CLH14. 20_Channel . rep

95.48	6908.73	100.28	6908.56	101.17	6908.5	104.23	6908.31	110.73	6909.36
126.12	6911.75	135.5	6912.03	171.12	6912.6	174.35	6912.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	15.78	.045	135.5	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	15.78	135.5		50.75 50	50.85		.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2300

INPUT
 Description:

Station		Elevation Data		num= 18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6911.72	22.76	6911.72	33.65	6911.34	69.33	6910.1	78.94	6909.72
85.8	6908.79	90.2	6908.18	100.69	6908.29	102.97	6908.31	116.1	6908.44
121.54	6909.11	135.6	6911.06	146.49	6911.35	179.8	6912.22	187.16	6912.38
192.88	6912.56	216.57	6912.97	229	6912.97				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	78.94	.045	135.6	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	78.94	135.6		40.98 50	54.76		.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2250

INPUT
 Description:

Station		Elevation Data		num= 13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6910.61	1.56	6910.61	23.77	6909.76	50.13	6908.84	60.48	6907.4
61.16	6907.31	62.7	6907.3	75	6907.38	89	6907.46	92.6	6908.02

107.95 6910.49 119.02 6910.41 150 6910.41

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 1.56 .045 107.95 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1.56 107.95 49.97 50 49.41 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2200

INPUT

Description:

Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6910.07 8.28 6910.07 13.9 6909.74 24.43 6909.15 45.28 6908.07
 57.94 6906.38 59.54 6906.18 61.87 6906.21 75 6906.3 88.29 6906.39
 94.06 6907.33 109.9 6910.46 150 6910.46

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 8.28 .045 109.9 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 8.28 109.9 53.67 50 48.88 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2150

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6909.25 5.2 6909.25 19.11 6908.3 32.48 6907.46 50.08 6905.59
 53.71 6905.09 59.94 6905.13 75 6905.29 92.37 6905.47 103.43 6907.89
 118.11 6910.41 137.07 6910.55 144.67 6910.76 150 6910.76

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 5.2 .045 118.11 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 5.2 118.11 34.58 50 63.09 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2100

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6908.5 6.15 6908.5 10.02 6908.21 19.07 6907.14 26.74 6906.22
 32.27 6905.66 49.04 6903.79 75 6904.43 88.43 6904.77 103.66 6905.1
 122.34 6909.12 127.5 6909.92 143.26 6910.52 150 6910.52

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .05 6.15 .045 127.5 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 6.15 127.5 31.66 50 64.9 .1 .3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 2050

INPUT

Description:

Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 6907.45 9.89 6907.45 17.07 6906.74 23.21 6905.85 42.66 6903.64
 45.68 6903.25 75 6903.71 98.82 6904.09 109.01 6904.25 110.23 6904.49
 132.05 6908.89 142 6909.17 150 6909.17

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

0 .05 9.89 .045 132.05 .05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	9.89	132.05		49.84	50	49.41	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 2000

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6906.54	9.47	6906.54	20.03	6905.52	29.79	6904.81	44.84	6903.15
46.69	6902.93	50.42	6902.97	75	6903.16	111.98	6903.44	122.44	6905.66
132.44	6907.76	144.92	6907.83	150	6907.83				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	9.47	.045	132.44	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	9.47	132.44		47.64	50	56.5	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1950

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6906.83	2.6	6906.83	24.26	6906.52	57.8	6904.5	68.74	6903.96
75.6	6903.31	86.59	6902.27	110.3	6902.52	134.76	6902.78	138.55	6902.8
144.24	6903.49	165.28	6905.85	170.19	6906.05	182.84	6906.05		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	24.26	.045	170.19	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	24. 26	170. 19		52. 36	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1900

INPUT

Description:

Station	Elevation	Data	num=	15
Sta	Elev	Sta	Elev	Sta
0	6906. 08	5. 45	6906. 08	18. 2
81. 9	6902. 98	82. 53	6902. 93	98. 87
130. 99	6901. 8	137. 41	6902. 43	143. 62
				6903. 03
				173. 17
				6905. 83
				186. 59
				6905. 83

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 05	28. 51	. 045
		173. 17	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28. 51	173. 17		63. 75	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1850

INPUT

Description:

Station	Elevation	Data	num=	13
Sta	Elev	Sta	Elev	Sta
0	6904. 47	10. 75	6904. 47	13. 78
52. 48	6901. 98	61. 55	6901. 26	75
104. 78	6902. 72	137. 72	6905. 89	150
				6905. 89
				33. 62
				6903. 13
				51. 09
				6902. 12
				81. 26
				6901. 25
				88. 3
				6901. 2

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 05	10. 75	. 045
		137. 72	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	10. 75	137. 72		61. 98	50		. 1	. 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1800

INPUT

Description:

Station		Elevation		Data		num=		14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6903.01	10.31	6903.01	20.44	6902.68	47.13	6901.17	48.74	6901.04
58.16	6900.25	69.18	6900.3	75	6900.32	93.92	6900.39	132.45	6905.6
133.42	6905.71	133.78	6905.72	148.41	6905.96	150	6905.96		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	10.31	.045	133.78	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	10.31	133.78		50.79	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1750

INPUT

Description:

Station		Elevation		Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6903.28	1.47	6903.28	3.64	6903.26	15.26	6902.98	16.04	6902.96
51.67	6902.08	60.78	6901.9	64.92	6901.8	92.65	6900.99	104.5	6900.66
106.01	6900.54	119.29	6899.84	139.25	6899.82	140.69	6899.82	159.99	6899.76
164.67	6899.75	195.04	6904.47	196.26	6904.65	197.05	6904.67	212.31	6904.88
212.46	6904.88								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	15.26	.045	196.26	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	15.26	196.26		61.55	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1700

INPUT

Description:

Station		Elevation		Data		num= 20		Station		Elevation		Station		Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6903	.45	6903	3.91	6902.88	31.82	6901.95	34.62	6901.88						
36.89	6901.82	115.47	6900.28	119.22	6900.19	123.6	6899.98	140.07	6899.58						
161.01	6899.71	163.07	6899.72	182.45	6899.75	186.05	6899.76	214.78	6903.01						
215.32	6903.07	215.47	6903.08	234.71	6903.44	269.69	6904.2	276.85	6904.2						

Manning's n		Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	3.91	.045	215.47	.05

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	3.91	215.47		28.94	50	59.09	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1650

INPUT

Description:

Station		Elevation		Data		num= 24		Station		Elevation		Station		Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6902.16	4.27	6902.16	6.93	6902.4	12.64	6902.49	15.67	6902.55						
21.47	6902.35	25.2	6902.23	52.02	6901.33	103.14	6900.15	118.47	6899.75						
142.92	6898.99	157.7	6899.12	160.56	6899.28	174.94	6899.63	175.17	6899.63						
188.88	6899.92	189.58	6899.93	197.96	6899.52	201.38	6899.35	218.42	6901.04						
224.9	6901.7	228.87	6901.79	281.79	6902.4	295.03	6902.4								

Manning's n		Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	15.67	.045	224.9	.05

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

15. 67 224. 9 50. 13 50 73. 62 . 1 . 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1600

INPUT

Description:

Station Elevation Data		num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6901. 59	2. 06	6901. 59	7. 04	6901. 57	15. 57	6901. 33	43. 98	6900. 34		
66. 12	6899. 74	74. 32	6899. 49	118. 46	6899. 89	145. 39	6899. 62	166. 55	6899. 4		
180. 14	6898. 93	185. 57	6898. 29	201. 22	6899. 59	206. 55	6899. 96	252. 15	6900. 82		
254. 18	6900. 88	255. 31	6900. 91	259. 84	6900. 91						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	7. 04	. 045	254. 18	. 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	7. 04	254. 18		77. 3	50	30. 02	. 1 . 3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1550

INPUT

Description:

Station Elevation Data		num= 16									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6900. 06	4. 45	6900. 06	9. 08	6900. 11	32. 59	6899. 49	43. 11	6899. 21		
85. 62	6898. 17	136. 71	6897. 97	148. 44	6897. 92	152. 79	6897. 91	154. 06	6897. 87		
157. 25	6897. 99	202. 23	6899. 17	208. 34	6899. 21	236. 29	6900. 05	262. 22	6900. 88		
275. 94	6900. 88										

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 05	9. 08	. 045	262. 22	. 05

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

9.08 262.22 50.69 50 49.44 .1 .3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1500

INPUT

Description:

Station		Elevation		Data		num= 18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6899.23	10.45	6898.71	16.94	6898.13	54.66	6897.28	72.38	6897.55		
92.11	6897.48	108.73	6897.41	135.95	6897.51	142.61	6897.58	144.79	6897.6		
172.75	6898.08	172.79	6898.08	180.01	6898.25	214.74	6899.1	227.93	6899.3		
259.53	6900.29	259.56	6900.29	266.11	6900.29						

Manning's n Values

num= 3	
Sta	n Val
0	.05
259.53	.05

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	0	259.53		65.39	50	50.26	.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1450

INPUT

Description:

Station		Elevation		Data		num= 25					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6897.19	2.4	6897.19	7.1	6897.19	9.98	6897.11	13.15	6897.51		
28.03	6897.92	30.39	6897.92	33.72	6897.79	64.2	6896.43	97.65	6897		
111.18	6897.22	136.14	6897.73	136.58	6897.73	136.63	6897.73	137.26	6897.73		
179.1	6896.36	180.44	6896.37	183.9	6896.41	185.63	6896.94	208.58	6897.29		
258.32	6899.12	259.97	6899.22	265.98	6899.49	280.35	6899.49	302.4	6899.49		

Manning's n Values

num= 3	
Sta	n Val
0	.05
30.39	.045
265.98	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	30. 39	265. 98		109. 19	50	50. 75	. 1 . 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 1400

INPUT

Description:

Station	Elevation	Data	num=	23
Sta	Elev	Sta	Elev	Sta
0	6895. 61	. 12	6895. 61	36. 32
76. 03	6897. 29	76. 07	6897. 29	91. 24
125. 33	6894. 94	129. 54	6894. 98	135. 84
183. 07	6897. 51	193. 08	6898. 17	218. 95
229. 54	6899. 61	237. 52	6899. 45	241. 42

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 . 05	76. 07 . 045	218. 95 . 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76. 07	218. 95		51. 77	50	59. 74	. 1 . 3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 1350

INPUT

Description:

Station	Elevation	Data	num=	18
Sta	Elev	Sta	Elev	Sta
0	6897. 05	. 01	6897. 05	6. 43
28. 83	6893. 78	36. 57	6893. 53	43. 63
63. 1	6895. 55	72. 88	6895. 91	91. 22
118. 27	6897. 5	140. 44	6898. 4	156. 39

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 . 05	0 . 045	100. 4 . 05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	0	100.4		44.72 50	60.04		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1300

INPUT

Description:

Station	Elevation	Data	num=	23
Sta	Elev	Sta	Elev	Sta
0	6895.69	2.98	6895.69	11.3
45.21	6891.73	57.32	6891.49	62.54
69.25	6889.35	75	6889.28	85.9
127.41	6893.56	129.81	6893.59	137.69
146.08	6895.8	147.85	6896.16	150

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.05	21.38	.045
		137.69	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	21.38	137.69		53.12 50	50.07		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1250

INPUT

Description:

Station	Elevation	Data	num=	21
Sta	Elev	Sta	Elev	Sta
0	6894.47	2.29	6894.47	7.64
42.32	6891.9	45.96	6891.17	51.88
65.86	6888.78	75	6888.97	75.36
104.84	6892.1	123.12	6892.71	129.88
150	6894.17			

Manning's n	Values	num=	3
-------------	--------	------	---

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	7.64	.045	134.6	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	7.64	134.6		56.63	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1200

INPUT

Description:

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6892.64	36.66	6892.64	38.75	6892.52	40.72	6892.49	42.5	6891.63
42.59	6889.77	45.59	6890.58	47.79	6890.64	47.8	6890.64	48.4	6890.41
65.51	6888.27	75	6888.47	81.47	6888.61	84.3	6888.57	85.23	6889.07
112.76	6891.66	118.83	6891.86	129.94	6892	131.5	6892.4	142.26	6892.66
150	6892.66								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	36.66	.045	131.5	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	36.66	131.5		46.46	50		.1	.3

CROSS SECTION

RIVER: Existing Channel

REACH: East RS: 1150

INPUT

Description:

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6894.07	2.72	6894.07	9.98	6893.64	21.21	6891.55	25.74	6891.01
35.28	6889.26	55.82	6886.35	62.27	6885.25	67.09	6885.33	72.87	6885.38
82.05	6885.45	123.13	6886.62	131.01	6888.31	159.52	6889.99	175.93	6890.37
182.4	6890.4	182.62	6890.41	183.5	6890.43	186.85	6890.43		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .05 9.98 .045 175.93 .05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	9.98	175.93		49.8 50	49.97		.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 1100

INPUT

Description:

Station Elevation Data	num=	17
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 6893.38 7.97 6893.47 11.03 6893.11 43.57 6887.14 55.97 6885.38		
59.86 6884.72 72.02 6884.92 74.21 6884.96 82.63 6885.03 105.76 6885.69		
124.96 6889.81 142.19 6890.83 178.29 6891.67 192.54 6891.73 193.02 6891.75		
194.96 6891.8 199.21 6891.8		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .05 7.97 .045 178.29 .05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	7.97	178.29		50.13 50	72.83		.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 1050

INPUT

Description:

Station Elevation Data	num=	16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 6892.05 10.03 6892.05 13.94 6892.08 15.76 6892.37 40.21 6887.63		
40.39 6887.58 54.33 6885.03 58.63 6884.41 59.99 6884.18 73.7 6884.42		
83.82 6884.59 85.74 6884.61 91.01 6884.76 121.46 6891.3 127.47 6891.66		
171.48 6891.66		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	15.76	.045	127.47	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	15.76	127.47		72.28	50		.1	.3

CROSS SECTION

RIVER: Existing Channel
 REACH: East RS: 1000

INPUT

Description:

Station	Elevation	Data	num=	26	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6891.26	5.44	6891.26	11.48	6891.3	19.25	6891.2	19.5	6891.76			
19.5	6891.74	19.58	6891.76	26.72	6892.42	26.75	6892.42	26.76	6892.42			
31.73	6892.62	38.17	6892.85	39.06	6892.87	53.88	6890.92	62.2	6883.33			
75.01	6883.38	76.97	6883.39	89.26	6887.7	96.33	6893.15	97.62	6892.7			
104.25	6892.35	105.39	6892.98	105.63	6892.96	106.44	6892.9	107.05	6892.85			
150.01	6892.85											

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.06	.045	96.33	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39.06	96.33		0	0		.1	.3

SUMMARY OF MANNING'S N VALUES

River: Existing Channel

Reach	River Sta.	n1	n2	n3
East	5000	.05	.045	.05
East	4950	.05	.045	.05
East	4900	.05	.045	.05
East	4850	.05	.045	.05
East	4800	.05	.045	.05

East	4750	.05	.045	.05
East	4700	.05	.045	.05
East	4650	.05	.045	.05
East	4600	.05	.045	.05
East	4550	.05	.045	.05
East	4500	.05	.045	.05
East	4450	.05	.045	.05
East	4400	.05	.045	.05
East	4350	.05	.045	.05
East	4300	.05	.045	.05
East	4250	.05	.045	.05
East	4200	.05	.045	.05
East	4150	.05	.045	.05
East	4100	.05	.045	.05
East	4050	.05	.045	.05
East	4000	.05	.045	.05
East	3950	.05	.045	.05
East	3900	.05	.045	.05
East	3850	.05	.045	.05
East	3800	.05	.045	.05
East	3750	.05	.045	.05
East	3700	.05	.045	.05
East	3650	.05	.045	.05
East	3600	.05	.045	.05
East	3550	.05	.045	.05
East	3500	.05	.045	.05
East	3450	.05	.045	.05
East	3400	.05	.045	.05
East	3350	.05	.045	.05
East	3300	.05	.045	.05
East	3250	.05	.045	.05
East	3200	.05	.045	.05
East	3150	.05	.045	.05
East	3100	.05	.045	.05
East	3050	.05	.045	.05
East	3000	.05	.045	.05
East	2950	.05	.045	.05
East	2900	.05	.045	.05
East	2850	.05	.045	.05
East	2800	.05	.045	.05
East	2750	.05	.045	.05
East	2700	.05	.045	.05
East	2650	.05	.045	.05
East	2600	.05	.045	.05

East	2550	.05	.045	.05
East	2500	.05	.045	.05
East	2450	.05	.045	.05
East	2400	.05	.045	.05
East	2350	.05	.045	.05
East	2300	.05	.045	.05
East	2250	.05	.045	.05
East	2200	.05	.045	.05
East	2150	.05	.045	.05
East	2100	.05	.045	.05
East	2050	.05	.045	.05
East	2000	.05	.045	.05
East	1950	.05	.045	.05
East	1900	.05	.045	.05
East	1850	.05	.045	.05
East	1800	.05	.045	.05
East	1750	.05	.045	.05
East	1700	.05	.045	.05
East	1650	.05	.045	.05
East	1600	.05	.045	.05
East	1550	.05	.045	.05
East	1500	.05	.045	.05
East	1450	.05	.045	.05
East	1400	.05	.045	.05
East	1350	.05	.045	.05
East	1300	.05	.045	.05
East	1250	.05	.045	.05
East	1200	.05	.045	.05
East	1150	.05	.045	.05
East	1100	.05	.045	.05
East	1050	.05	.045	.05
East	1000	.05	.045	.05

SUMMARY OF REACH LENGTHS

River: Existing Channel

Reach	River Sta.	Left	Channel	Right
East	5000	53.22	50	51.12
East	4950	56.3	50	55.05

East	4900	71. 1	50	38. 94
East	4850	49. 15	50	56. 56
East	4800	61. 25	50	43. 37
East	4750	62. 73	50	41. 17
East	4700	48. 59	50	53. 31
East	4650	31. 33	50	63. 68
East	4600	31. 96	50	60. 47
East	4550	69. 03	50	28. 51
East	4500	50. 62	50	52. 59
East	4450	46. 56	50	51. 87
East	4400	61. 22	50	41. 17
East	4350	50. 69	50	48. 39
East	4300	39. 47	50	60. 56
East	4250	47. 28	50	53. 35
East	4200	34. 12	50	59. 42
East	4150	54. 56	50	47. 87
East	4100	78. 87	50	30. 41
East	4050	48. 52	50	51. 38
East	4000	53. 35	50	53. 9
East	3950	66. 9	50	63. 88
East	3900	29. 56	50	67. 78
East	3850	54. 23	50	63. 45
East	3800	51. 02	50	49. 21
East	3750	52. 26	50	46. 49
East	3700	60. 14	50	33. 53
East	3650	51. 25	50	52. 46
East	3600	62. 01	50	47. 9
East	3550	59. 06	50	53. 38
East	3500	39. 9	50	66. 73
East	3450	24. 8	50	100. 26
East	3400	54. 43	50	48. 43
East	3350	60. 4	50	46. 98
East	3300	56. 3	50	33. 79
East	3250	48. 03	50	52. 79
East	3200	50. 1	50	50. 13
East	3150	44. 23	50	56. 79
East	3100	33. 1	50	68. 21
East	3050	67. 72	50	48. 85
East	3000	64. 93	50	45. 01
East	2950	50. 79	50	51. 25
East	2900	65. 91	50	45. 14
East	2850	66. 73	50	53. 41
East	2800	67. 78	50	48. 95
East	2750	45. 41	50	50. 66

East	2700	62. 4	50	52. 53
East	2650	54. 3	50	79. 13
East	2600	60. 01	50	72. 05
East	2550	65. 45	50	93. 8
East	2500	69. 23	50	85. 3
East	2450	38. 25	50	54. 23
East	2400	62. 04	50	59. 15
East	2350	50. 75	50	50. 85
East	2300	40. 98	50	54. 76
East	2250	49. 97	50	49. 41
East	2200	53. 67	50	48. 88
East	2150	34. 58	50	63. 09
East	2100	31. 66	50	64. 9
East	2050	49. 84	50	49. 41
East	2000	47. 64	50	56. 5
East	1950	52. 36	50	54. 3
East	1900	63. 75	50	36. 61
East	1850	61. 98	50	38. 16
East	1800	50. 79	50	53. 54
East	1750	61. 55	50	50. 72
East	1700	28. 94	50	59. 09
East	1650	50. 13	50	73. 62
East	1600	77. 3	50	30. 02
East	1550	50. 69	50	49. 44
East	1500	65. 39	50	50. 26
East	1450	109. 19	50	50. 75
East	1400	51. 77	50	59. 74
East	1350	44. 72	50	60. 04
East	1300	53. 12	50	50. 07
East	1250	56. 63	50	49. 44
East	1200	46. 46	50	82. 68
East	1150	49. 8	50	49. 97
East	1100	50. 13	50	72. 83
East	1050	72. 28	50	51. 48
East	1000	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Existing Channel

Reach	River Sta.	Contr.	Expan.
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East	5000	. 1	. 3
East	4950	. 1	. 3
East	4900	. 1	. 3
East	4850	. 1	. 3
East	4800	. 1	. 3
East	4750	. 1	. 3
East	4700	. 1	. 3
East	4650	. 1	. 3
East	4600	. 1	. 3
East	4550	. 1	. 3
East	4500	. 1	. 3
East	4450	. 1	. 3
East	4400	. 1	. 3
East	4350	. 1	. 3
East	4300	. 1	. 3
East	4250	. 1	. 3
East	4200	. 1	. 3
East	4150	. 1	. 3
East	4100	. 1	. 3
East	4050	. 1	. 3
East	4000	. 1	. 3
East	3950	. 1	. 3
East	3900	. 1	. 3
East	3850	. 1	. 3
East	3800	. 1	. 3
East	3750	. 1	. 3
East	3700	. 1	. 3
East	3650	. 1	. 3
East	3600	. 1	. 3
East	3550	. 1	. 3
East	3500	. 1	. 3
East	3450	. 1	. 3
East	3400	. 1	. 3
East	3350	. 1	. 3
East	3300	. 1	. 3
East	3250	. 1	. 3
East	3200	. 1	. 3
East	3150	. 1	. 3
East	3100	. 1	. 3
East	3050	. 1	. 3
East	3000	. 1	. 3
East	2950	. 1	. 3
East	2900	. 1	. 3

East	2850	. 1	. 3
East	2800	. 1	. 3
East	2750	. 1	. 3
East	2700	. 1	. 3
East	2650	. 1	. 3
East	2600	. 1	. 3
East	2550	. 1	. 3
East	2500	. 1	. 3
East	2450	. 1	. 3
East	2400	. 1	. 3
East	2350	. 1	. 3
East	2300	. 1	. 3
East	2250	. 1	. 3
East	2200	. 1	. 3
East	2150	. 1	. 3
East	2100	. 1	. 3
East	2050	. 1	. 3
East	2000	. 1	. 3
East	1950	. 1	. 3
East	1900	. 1	. 3
East	1850	. 1	. 3
East	1800	. 1	. 3
East	1750	. 1	. 3
East	1700	. 1	. 3
East	1650	. 1	. 3
East	1600	. 1	. 3
East	1550	. 1	. 3
East	1500	. 1	. 3
East	1450	. 1	. 3
East	1400	. 1	. 3
East	1350	. 1	. 3
East	1300	. 1	. 3
East	1250	. 1	. 3
East	1200	. 1	. 3
East	1150	. 1	. 3
East	1100	. 1	. 3
East	1050	. 1	. 3
East	1000	. 1	. 3

HEC-RAS Plan: Existing River: Existing Channel Reach: East

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	5000	100-YR	43.00	6959.70	6960.86	6960.86	6961.15	0.036699	4.36	9.86	17.05	1.01
East	5000	5-YR	4.00	6959.70	6960.15	6960.15	6960.26	0.049278	2.69	1.49	6.62	1.00
East	4950	100-YR	43.00	6957.48	6958.53		6958.71	0.022577	3.43	12.52	21.61	0.80
East	4950	5-YR	4.00	6957.48	6957.89	6957.84	6957.95	0.030306	1.99	2.01	9.76	0.78
East	4900	100-YR	43.00	6956.08	6957.19	6957.14	6957.44	0.028870	3.98	10.80	17.92	0.90
East	4900	5-YR	4.00	6956.08	6956.53	6956.47	6956.59	0.024429	1.97	2.03	8.53	0.71
East	4850	100-YR	43.00	6954.44	6955.51	6955.51	6955.84	0.035476	4.60	9.35	14.50	1.01
East	4850	5-YR	4.00	6954.44	6954.77	6954.77	6954.88	0.050805	2.71	1.48	6.68	1.02
East	4800	100-YR	43.00	6953.12	6954.22		6954.33	0.009349	2.69	15.98	20.46	0.54
East	4800	5-YR	4.00	6953.12	6953.41		6953.44	0.015502	1.48	2.70	12.39	0.56
East	4750	100-YR	43.00	6952.24	6953.55		6953.73	0.015007	3.39	12.69	16.31	0.68
East	4750	5-YR	4.00	6952.24	6952.70		6952.74	0.012493	1.67	2.39	7.75	0.53
East	4700	100-YR	43.00	6951.54	6952.77		6952.96	0.016053	3.46	12.44	16.32	0.70
East	4700	5-YR	4.00	6951.54	6951.92		6951.97	0.019453	1.90	2.11	7.91	0.65
East	4650	100-YR	43.00	6950.54	6951.74	6951.65	6951.99	0.023552	3.95	10.87	15.56	0.83
East	4650	5-YR	4.00	6950.54	6951.00	6950.91	6951.06	0.017481	1.84	2.18	7.89	0.62
East	4600	100-YR	43.00	6949.23	6950.23	6950.23	6950.54	0.035718	4.46	9.64	15.79	1.01
East	4600	5-YR	4.00	6949.23	6949.53	6949.53	6949.64	0.052726	2.65	1.51	7.26	1.02
East	4550	100-YR	43.00	6947.88	6949.52		6949.60	0.006158	2.36	18.23	20.70	0.44
East	4550	5-YR	4.00	6947.88	6948.60		6948.62	0.004239	1.06	3.78	10.84	0.32
East	4500	100-YR	43.00	6947.90	6948.82		6949.04	0.024525	3.83	11.22	17.43	0.84
East	4500	5-YR	4.00	6947.90	6948.19		6948.23	0.018267	1.65	2.43	10.75	0.61
East	4450	100-YR	43.00	6946.40	6947.45	6947.40	6947.74	0.027957	4.27	10.06	14.54	0.91
East	4450	5-YR	4.00	6946.40	6946.71	6946.71	6946.81	0.050436	2.48	1.62	8.31	0.99
East	4400	100-YR	43.00	6944.96	6946.69		6946.85	0.011515	3.24	13.26	14.71	0.60
East	4400	5-YR	4.00	6944.96	6945.69		6945.73	0.009171	1.60	2.50	6.78	0.46
East	4350	100-YR	43.00	6944.46	6945.83		6946.08	0.020831	4.04	10.64	13.31	0.80
East	4350	5-YR	4.00	6944.46	6944.96	6944.89	6945.03	0.023999	2.15	1.86	6.76	0.72
East	4300	100-YR	43.00	6943.79	6945.06	6944.81	6945.23	0.013613	3.28	13.12	16.46	0.65
East	4300	5-YR	4.00	6943.79	6944.24		6944.27	0.010147	1.48	2.70	9.00	0.48

HEC-RAS Plan: Existing River: Existing Channel Reach: East (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	4250	100-YR	43.00	6942.82	6943.85	6943.85	6944.17	0.035008	4.55	9.45	14.74	1.00
East	4250	5-YR	4.00	6942.82	6943.19	6943.19	6943.28	0.053175	2.47	1.62	8.74	1.01
East	4200	100-YR	43.00	6941.68	6943.18		6943.25	0.004488	2.09	20.61	22.22	0.38
East	4200	5-YR	4.00	6941.68	6942.29		6942.30	0.001900	0.78	5.11	12.64	0.22
East	4150	100-YR	43.00	6941.65	6942.47	6942.47	6942.73	0.037587	4.09	10.52	20.50	1.01
East	4150	5-YR	4.00	6941.65	6941.96	6941.96	6942.03	0.046812	2.16	1.85	11.10	0.93
East	4100	100-YR	43.00	6940.48	6941.42		6941.50	0.008415	2.29	18.76	28.36	0.50
East	4100	5-YR	4.00	6940.48	6940.76		6940.78	0.010299	1.13	3.54	18.02	0.45
East	4050	100-YR	43.00	6939.60	6940.41	6940.41	6940.70	0.037059	4.31	9.97	17.56	1.01
East	4050	5-YR	4.00	6939.60	6939.81	6939.79	6939.88	0.039089	2.12	1.88	10.01	0.86
East	4000	100-YR	43.00	6938.49	6940.37		6940.39	0.001184	1.18	36.59	34.47	0.20
East	4000	5-YR	4.00	6938.49	6938.88		6938.91	0.011363	1.42	2.82	10.93	0.49
East	3950	100-YR	43.00	6937.94	6940.35		6940.36	0.000326	0.65	66.18	57.94	0.11
East	3950	5-YR	4.00	6937.94	6938.47		6938.49	0.006433	1.15	3.46	11.95	0.38
East	3900	100-YR	880.00	6937.13	6939.82		6940.07	0.007176	3.98	221.03	129.74	0.54
East	3900	5-YR	14.00	6937.13	6937.71	6937.67	6937.74	0.020669	1.37	10.21	65.67	0.61
East	3850	100-YR	880.00	6935.31	6938.98		6939.51	0.017110	5.86	150.07	94.14	0.82
East	3850	5-YR	14.00	6935.31	6936.24	6936.21	6936.44	0.033437	3.56	3.93	8.45	0.92
East	3800	100-YR	880.00	6934.35	6937.63	6937.63	6938.44	0.026291	7.21	121.99	76.87	1.01
East	3800	5-YR	14.00	6934.35	6935.18		6935.25	0.016913	2.19	6.40	17.38	0.64
East	3750	100-YR	880.00	6933.18	6935.97	6935.97	6936.69	0.026437	6.83	128.91	89.51	1.00
East	3750	5-YR	14.00	6933.18	6933.93	6933.90	6934.08	0.033448	3.10	4.51	12.14	0.90
East	3700	100-YR	880.00	6931.90	6935.52		6935.80	0.007109	4.18	210.53	113.85	0.54
East	3700	5-YR	14.00	6931.90	6932.80		6932.89	0.017452	2.47	5.67	13.17	0.66
East	3650	100-YR	880.00	6931.20	6934.83	6934.62	6935.26	0.016635	5.24	168.06	122.56	0.79
East	3650	5-YR	14.00	6931.20	6932.18		6932.24	0.010004	2.03	6.89	14.16	0.51
East	3600	100-YR	880.00	6930.58	6933.47	6933.47	6934.19	0.026631	6.81	129.30	90.30	1.00
East	3600	5-YR	14.00	6930.58	6931.22	6931.20	6931.34	0.040634	2.85	4.91	17.42	0.95
East	3550	100-YR	880.00	6929.49	6932.59		6932.98	0.011886	4.99	176.41	107.50	0.69
East	3550	5-YR	14.00	6929.49	6930.27		6930.31	0.011960	1.72	8.13	24.52	0.53

HEC-RAS Plan: Existing River: Existing Channel Reach: East (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	3500	100-YR	880.00	6928.80	6932.16		6932.50	0.007413	4.65	189.41	90.02	0.56
East	3500	5-YR	14.00	6928.80	6929.43		6929.50	0.022467	2.21	6.33	21.03	0.71
East	3450	100-YR	880.00	6928.01	6931.43		6931.99	0.013155	6.03	146.02	72.18	0.75
East	3450	5-YR	14.00	6928.01	6928.72		6928.76	0.010592	1.58	8.87	27.90	0.49
East	3400	100-YR	880.00	6927.47	6930.79	6930.47	6931.25	0.015329	5.49	160.35	102.84	0.77
East	3400	5-YR	14.00	6927.47	6928.12	6927.99	6928.17	0.013515	1.81	7.73	23.81	0.56
East	3350	100-YR	880.00	6926.42	6929.45	6929.42	6930.27	0.024029	7.29	120.78	70.80	0.98
East	3350	5-YR	14.00	6926.42	6926.87	6926.87	6927.00	0.047251	2.91	4.81	18.56	1.01
East	3300	100-YR	880.00	6924.78	6928.87		6929.39	0.011224	5.77	152.42	71.24	0.70
East	3300	5-YR	14.00	6924.78	6925.58		6925.65	0.012551	2.08	6.72	15.81	0.56
East	3250	100-YR	880.00	6923.75	6928.18		6928.79	0.012342	6.26	140.48	62.21	0.73
East	3250	5-YR	14.00	6923.75	6924.48	6924.45	6924.64	0.036210	3.22	4.34	11.70	0.93
East	3200	100-YR	880.00	6923.28	6927.07	6926.93	6927.98	0.020071	7.69	114.50	53.76	0.93
East	3200	5-YR	14.00	6923.28	6924.06		6924.10	0.004634	1.50	9.33	16.97	0.36
East	3150	100-YR	880.00	6923.15	6925.91	6925.91	6926.88	0.024117	7.91	111.27	57.61	1.00
East	3150	5-YR	14.00	6923.15	6923.67		6923.72	0.015644	1.63	8.57	34.37	0.58
East	3100	100-YR	880.00	6921.98	6925.26		6925.84	0.012334	6.11	144.02	66.41	0.73
East	3100	5-YR	14.00	6921.98	6922.62		6922.70	0.027686	2.16	6.48	26.20	0.77
East	3050	100-YR	880.00	6921.56	6925.08		6925.39	0.004921	4.50	200.36	93.77	0.48
East	3050	5-YR	14.00	6921.56	6921.92		6921.94	0.009235	1.31	10.66	39.99	0.45
East	3000	100-YR	880.00	6920.57	6924.42		6925.00	0.011987	6.08	146.34	80.22	0.72
East	3000	5-YR	14.00	6920.57	6921.05		6921.16	0.030929	2.64	5.31	17.30	0.84
East	2950	100-YR	880.00	6919.84	6923.24	6923.24	6924.20	0.019805	7.93	116.13	71.49	0.93
East	2950	5-YR	14.00	6919.84	6920.40		6920.45	0.007840	1.63	8.57	20.43	0.44
East	2900	100-YR	880.00	6919.31	6922.38	6922.27	6923.14	0.015667	7.14	135.67	90.41	0.83
East	2900	5-YR	14.00	6919.31	6919.57	6919.56	6919.67	0.043662	2.56	5.47	24.20	0.95
East	2850	100-YR	880.00	6917.96	6922.05		6922.48	0.008515	5.30	173.38	97.24	0.61
East	2850	5-YR	14.00	6917.96	6918.48		6918.54	0.013678	1.99	7.02	18.84	0.58
East	2800	100-YR	880.00	6917.16	6920.74	6920.74	6921.80	0.019517	8.27	110.09	67.16	0.93
East	2800	5-YR	14.00	6917.16	6917.66		6917.74	0.018761	2.23	6.28	18.08	0.67

HEC-RAS Plan: Existing River: Existing Channel Reach: East (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	2750	100-YR	880.00	6915.84	6919.79	6919.67	6920.64	0.021782	7.39	119.13	63.08	0.95
East	2750	5-YR	14.00	6915.84	6916.49		6916.60	0.027695	2.72	5.14	14.61	0.81
East	2700	100-YR	880.00	6914.78	6919.33		6919.82	0.010160	5.59	158.99	85.51	0.66
East	2700	5-YR	14.00	6914.78	6915.54	6915.40	6915.62	0.014491	2.25	6.22	14.47	0.60
East	2650	100-YR	880.00	6913.71	6917.78	6917.78	6919.01	0.022953	8.88	99.38	45.63	1.01
East	2650	5-YR	14.00	6913.71	6914.27	6914.27	6914.44	0.042538	3.32	4.22	12.34	1.00
East	2600	100-YR	880.00	6912.84	6916.95	6916.95	6917.96	0.016859	8.11	114.79	86.19	0.88
East	2600	5-YR	14.00	6912.84	6913.56		6913.61	0.008222	1.83	7.63	15.76	0.46
East	2550	100-YR	880.00	6912.38	6915.93	6915.70	6916.48	0.012350	6.15	162.55	119.51	0.73
East	2550	5-YR	14.00	6912.38	6912.88	6912.81	6912.97	0.022779	2.41	5.82	17.27	0.73
East	2500	100-YR	880.00	6911.54	6915.38		6915.78	0.013164	5.04	174.57	113.18	0.72
East	2500	5-YR	14.00	6911.54	6912.11	6911.95	6912.17	0.011681	1.96	7.15	17.50	0.54
East	2450	100-YR	880.00	6910.62	6914.10	6914.10	6914.96	0.018168	7.52	125.22	92.48	0.89
East	2450	5-YR	14.00	6910.62	6911.01	6911.01	6911.15	0.044623	3.00	4.67	16.51	0.99
East	2400	100-YR	880.00	6907.81	6912.72	6912.60	6913.72	0.020181	8.06	109.65	52.89	0.94
East	2400	5-YR	14.00	6907.81	6909.36		6909.40	0.002629	1.43	9.76	12.11	0.28
East	2350	100-YR	880.00	6908.31	6912.09	6911.78	6912.65	0.017486	6.04	145.77	92.62	0.83
East	2350	5-YR	14.00	6908.31	6909.14		6909.18	0.008051	1.71	8.17	18.46	0.45
East	2300	100-YR	880.00	6908.18	6910.90	6910.90	6911.70	0.019749	7.38	130.55	88.05	0.92
East	2300	5-YR	14.00	6908.18	6908.61		6908.65	0.014289	1.67	8.37	30.31	0.56
East	2250	100-YR	880.00	6907.30	6910.18		6910.72	0.016717	5.85	150.37	93.35	0.81
East	2250	5-YR	14.00	6907.30	6907.61		6907.68	0.028653	2.04	6.85	30.99	0.77
East	2200	100-YR	880.00	6906.18	6908.81	6908.81	6909.67	0.025344	7.41	118.78	70.62	1.01
East	2200	5-YR	14.00	6906.18	6906.56		6906.60	0.016610	1.70	8.25	32.69	0.60
East	2150	100-YR	880.00	6905.09	6907.46	6907.46	6908.33	0.025269	7.47	117.75	68.96	1.01
East	2150	5-YR	14.00	6905.09	6905.45	6905.41	6905.51	0.029664	1.88	7.47	39.40	0.76
East	2100	100-YR	880.00	6903.79	6906.44		6907.02	0.017047	6.11	143.96	84.97	0.83
East	2100	5-YR	14.00	6903.79	6904.35		6904.40	0.017075	1.83	7.63	27.49	0.61
East	2050	100-YR	880.00	6903.25	6905.91		6906.31	0.010559	5.08	173.36	94.41	0.66
East	2050	5-YR	14.00	6903.25	6903.81		6903.83	0.007776	1.25	11.24	40.15	0.41

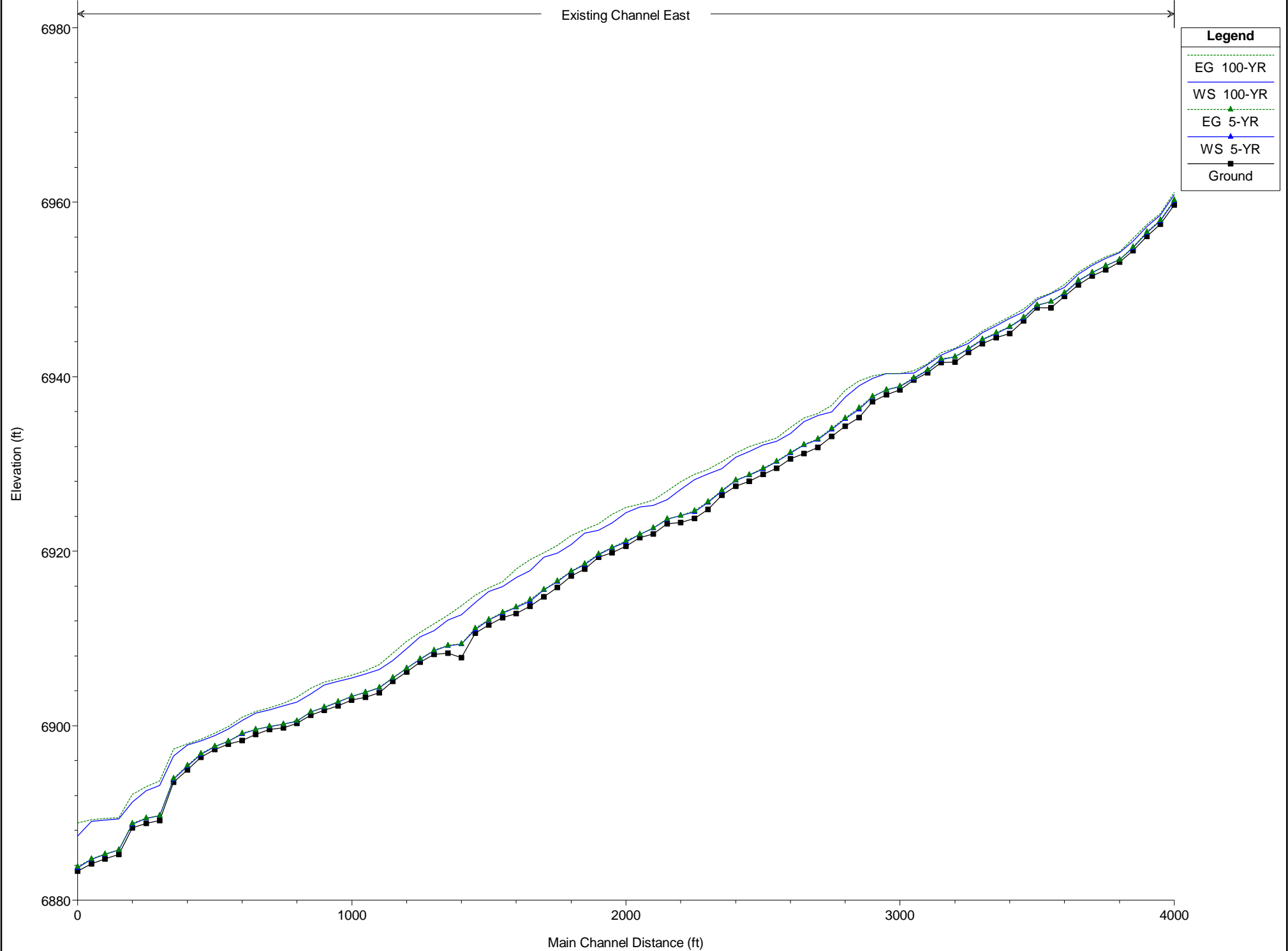
HEC-RAS Plan: Existing River: Existing Channel Reach: East (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	2000	100-YR	880.00	6902.93	6905.46		6905.81	0.008814	4.69	187.81	100.72	0.60
East	2000	5-YR	14.00	6902.93	6903.35		6903.37	0.011438	1.22	11.50	56.74	0.48
East	1950	100-YR	880.00	6902.27	6905.08		6905.38	0.007938	4.38	200.75	110.13	0.57
East	1950	5-YR	14.00	6902.27	6902.70		6902.74	0.014071	1.41	9.90	45.58	0.54
East	1900	100-YR	880.00	6901.77	6904.66		6904.97	0.008319	4.47	196.81	108.57	0.59
East	1900	5-YR	14.00	6901.77	6902.09		6902.12	0.010813	1.39	10.04	38.75	0.48
East	1850	100-YR	880.00	6901.20	6903.61	6903.53	6904.28	0.022907	6.58	133.81	88.45	0.94
East	1850	5-YR	14.00	6901.20	6901.56	6901.44	6901.59	0.010508	1.45	9.66	34.42	0.48
East	1800	100-YR	880.00	6900.25	6902.69		6903.25	0.017469	6.00	146.79	90.94	0.83
East	1800	5-YR	14.00	6900.25	6900.49	6900.49	6900.57	0.054590	2.25	6.21	39.29	1.00
East	1750	100-YR	880.00	6899.75	6902.27		6902.55	0.009309	4.22	208.72	136.86	0.60
East	1750	5-YR	14.00	6899.75	6900.16		6900.17	0.002612	0.80	17.56	54.06	0.25
East	1700	100-YR	880.00	6899.58	6901.83		6902.06	0.009474	3.91	225.10	167.64	0.59
East	1700	5-YR	14.00	6899.58	6899.89		6899.91	0.014544	1.28	10.92	59.80	0.53
East	1650	100-YR	880.00	6898.99	6901.44		6901.64	0.007234	3.55	247.56	173.70	0.52
East	1650	5-YR	14.00	6898.99	6899.54		6899.55	0.004246	0.94	14.91	51.72	0.31
East	1600	100-YR	880.00	6898.29	6900.57	6900.55	6900.97	0.029291	5.10	172.65	201.43	0.97
East	1600	5-YR	14.00	6898.29	6899.04	6898.94	6899.13	0.022796	2.39	5.85	17.54	0.73
East	1550	100-YR	880.00	6897.87	6899.60		6899.88	0.015843	4.32	203.85	192.52	0.74
East	1550	5-YR	14.00	6897.87	6898.19		6898.21	0.014518	1.14	12.29	80.18	0.51
East	1500	100-YR	880.00	6897.28	6898.85		6899.12	0.014571	4.17	210.88	196.80	0.71
East	1500	5-YR	14.00	6897.28	6897.62		6897.63	0.009372	0.89	15.66	105.95	0.41
East	1450	100-YR	880.00	6896.36	6898.24		6898.45	0.011479	3.73	243.10	234.35	0.63
East	1450	5-YR	14.00	6896.36	6896.71	6896.69	6896.78	0.039766	2.05	6.84	39.39	0.87
East	1400	100-YR	880.00	6894.94	6897.76		6897.92	0.006047	3.34	276.99	186.93	0.48
East	1400	5-YR	14.00	6894.94	6895.37	6895.29	6895.43	0.019574	1.99	7.02	24.71	0.66
East	1350	100-YR	880.00	6893.53	6896.51	6896.51	6897.30	0.026314	7.16	122.97	79.06	1.01
East	1350	5-YR	14.00	6893.53	6893.84	6893.84	6893.95	0.049736	2.64	5.30	24.69	1.00
East	1300	100-YR	880.00	6889.13	6893.14		6893.67	0.012928	5.83	150.96	76.82	0.73
East	1300	5-YR	14.00	6889.13	6889.67		6889.71	0.007983	1.54	9.07	23.82	0.44

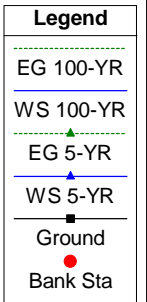
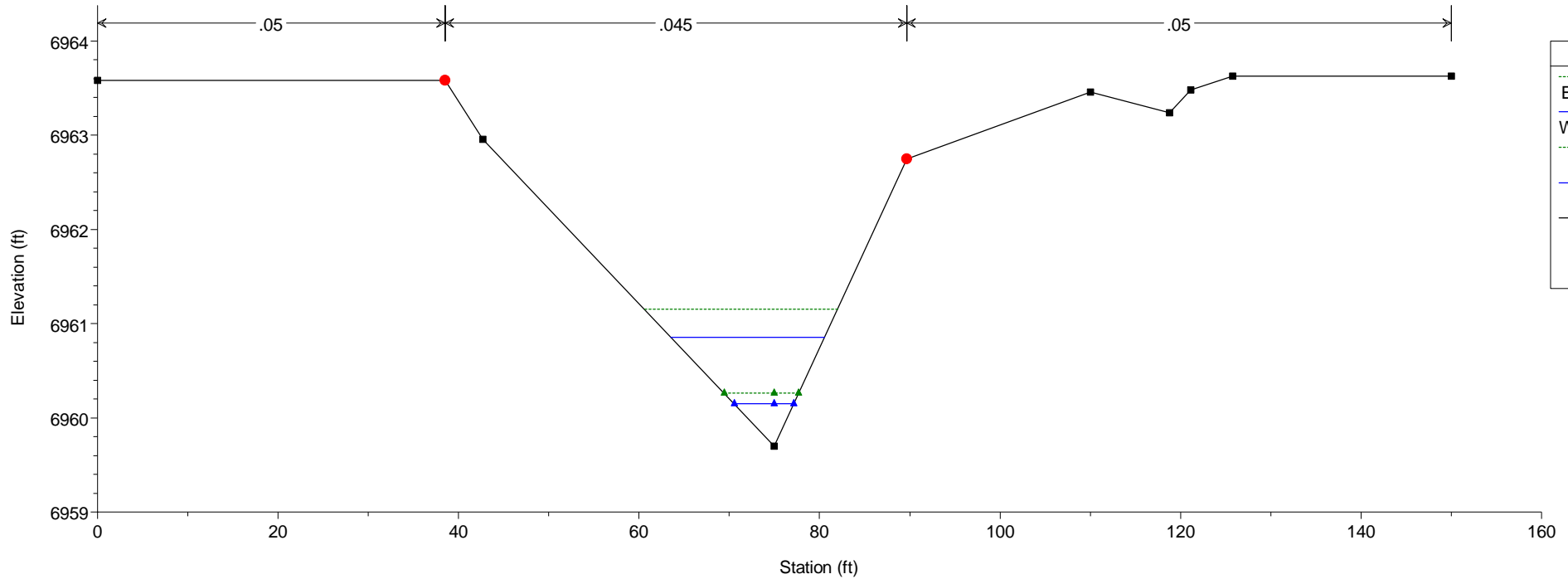
HEC-RAS Plan: Existing River: Existing Channel Reach: East (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	1250	100-YR	880.00	6888.78	6892.52	6891.92	6893.03	0.012479	5.72	153.94	78.94	0.72
East	1250	5-YR	14.00	6888.78	6889.36		6889.39	0.005136	1.33	10.54	24.88	0.36
East	1200	100-YR	880.00	6888.27	6891.21	6891.21	6892.12	0.026053	7.63	115.37	65.50	1.01
East	1200	5-YR	14.00	6888.27	6888.70	6888.70	6888.81	0.044386	2.65	5.29	22.50	0.96
East	1150	100-YR	880.00	6885.25	6889.31		6889.45	0.002445	3.04	289.00	112.95	0.34
East	1150	5-YR	14.00	6885.25	6885.74		6885.77	0.010348	1.47	9.52	32.78	0.48
East	1100	100-YR	880.00	6884.72	6889.19		6889.34	0.002046	3.16	278.35	89.62	0.32
East	1100	5-YR	14.00	6884.72	6885.26		6885.29	0.008650	1.37	10.21	34.19	0.44
East	1050	100-YR	880.00	6884.18	6889.04		6889.23	0.002327	3.47	253.67	78.02	0.34
East	1050	5-YR	14.00	6884.18	6884.70		6884.74	0.014211	1.63	8.59	32.24	0.56
East	1000	100-YR	880.00	6883.33	6887.34	6887.34	6888.83	0.022827	9.80	89.84	30.43	1.01
East	1000	5-YR	14.00	6883.33	6883.72	6883.66	6883.82	0.024726	2.53	5.54	16.13	0.76

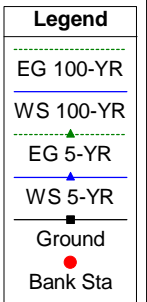
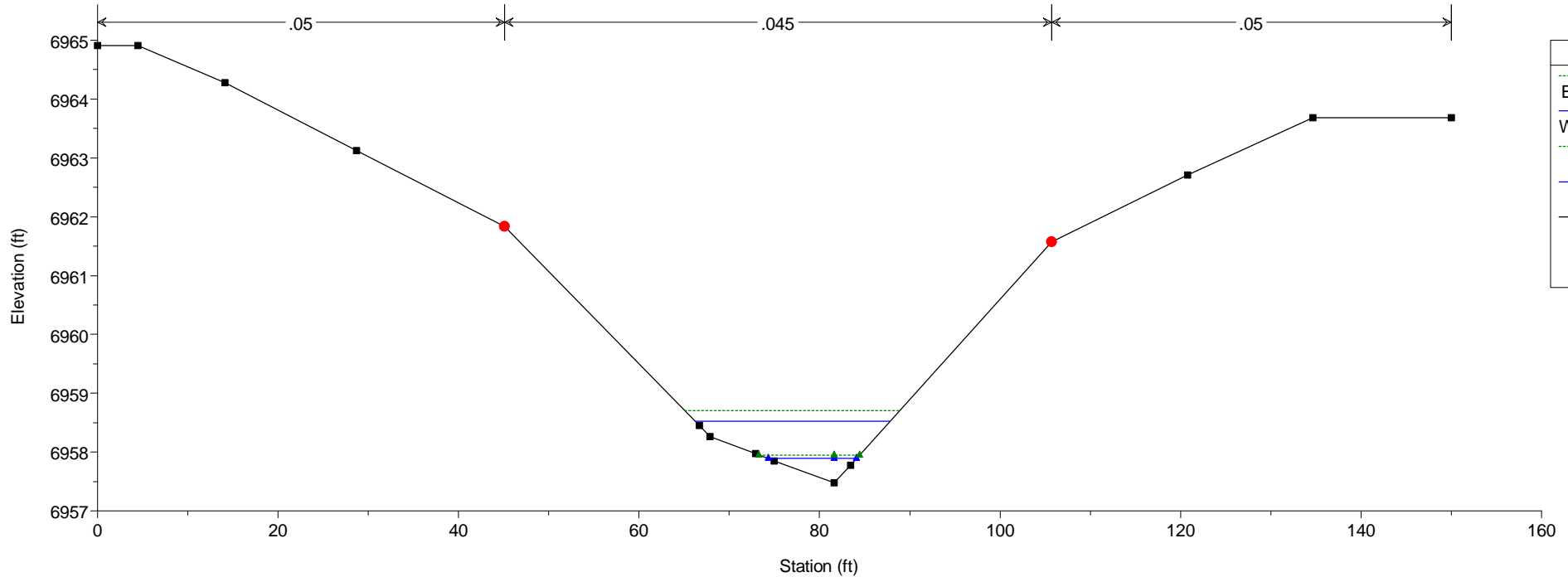
Existing Channel East



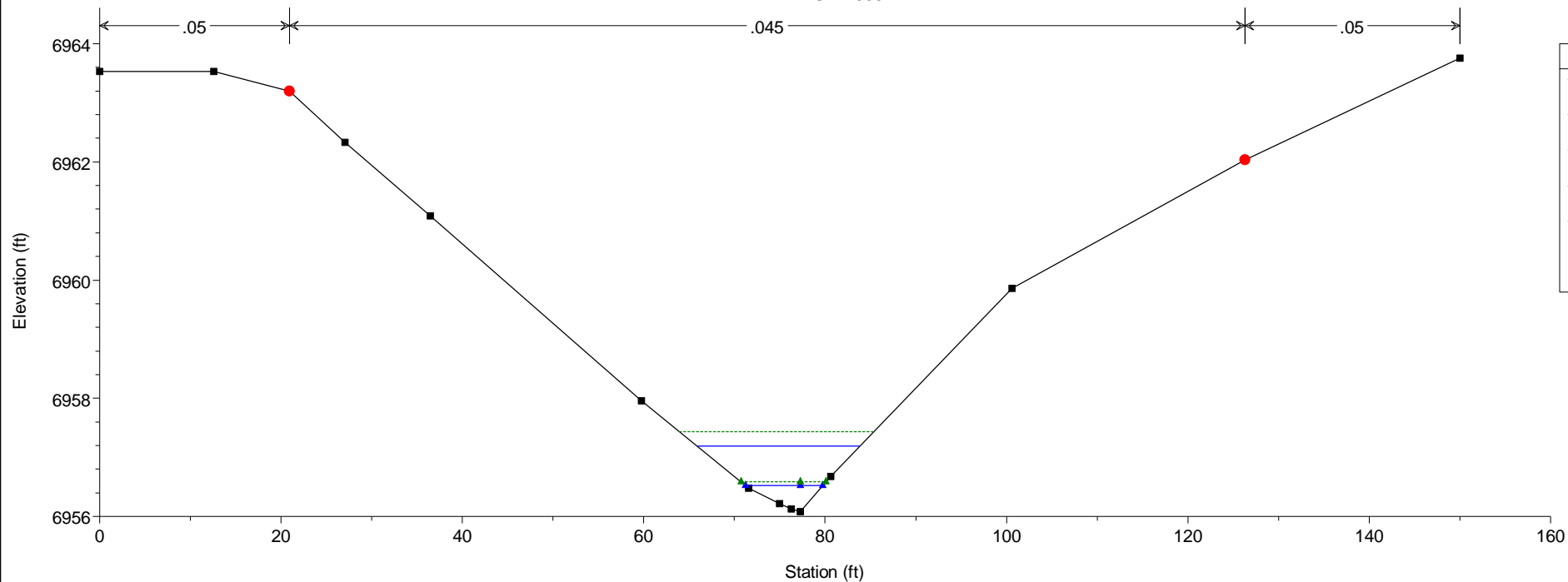
HEC-RAS Model Plan: Existing 5/21/2019
RS = 5000



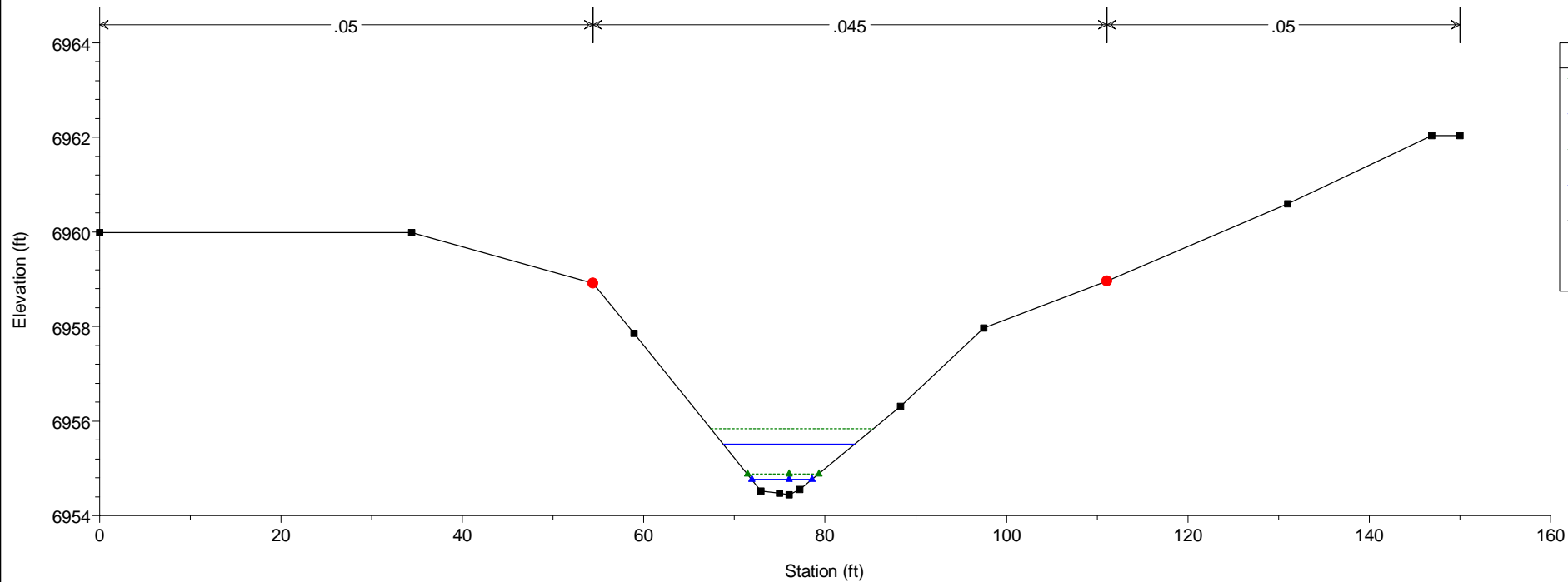
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4950



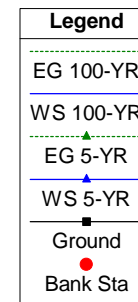
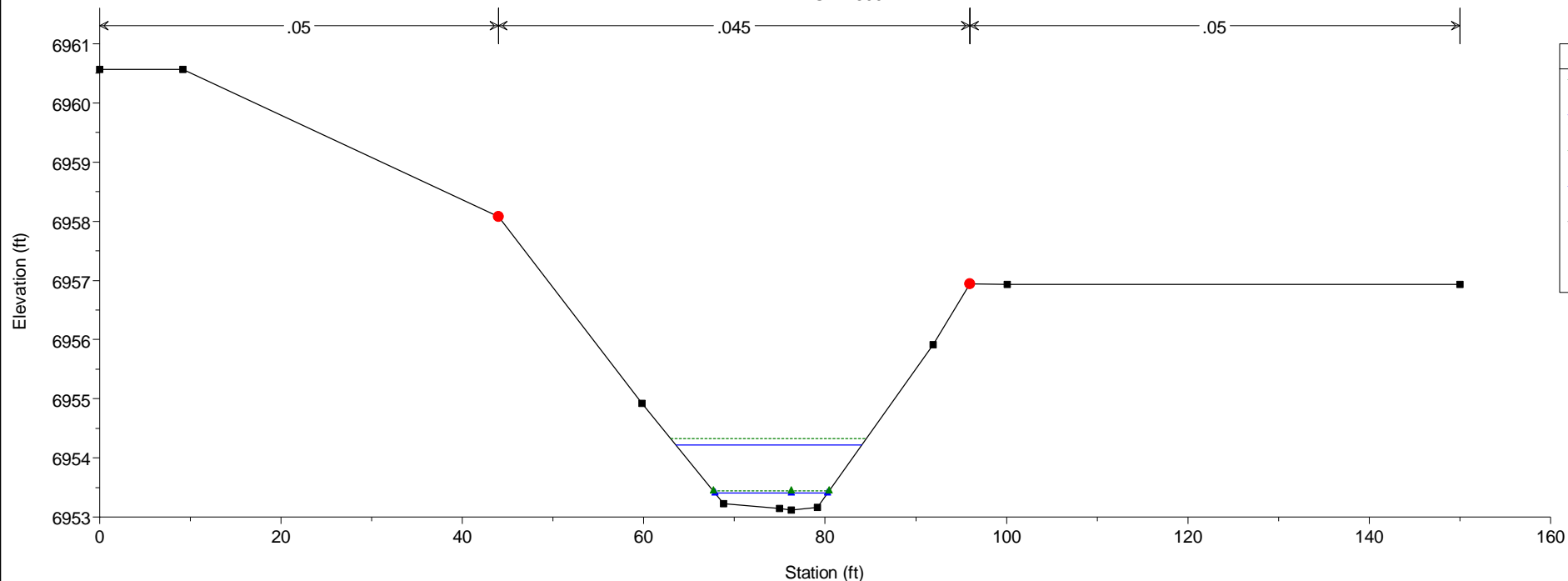
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4900



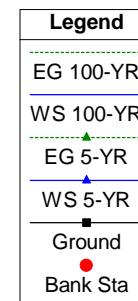
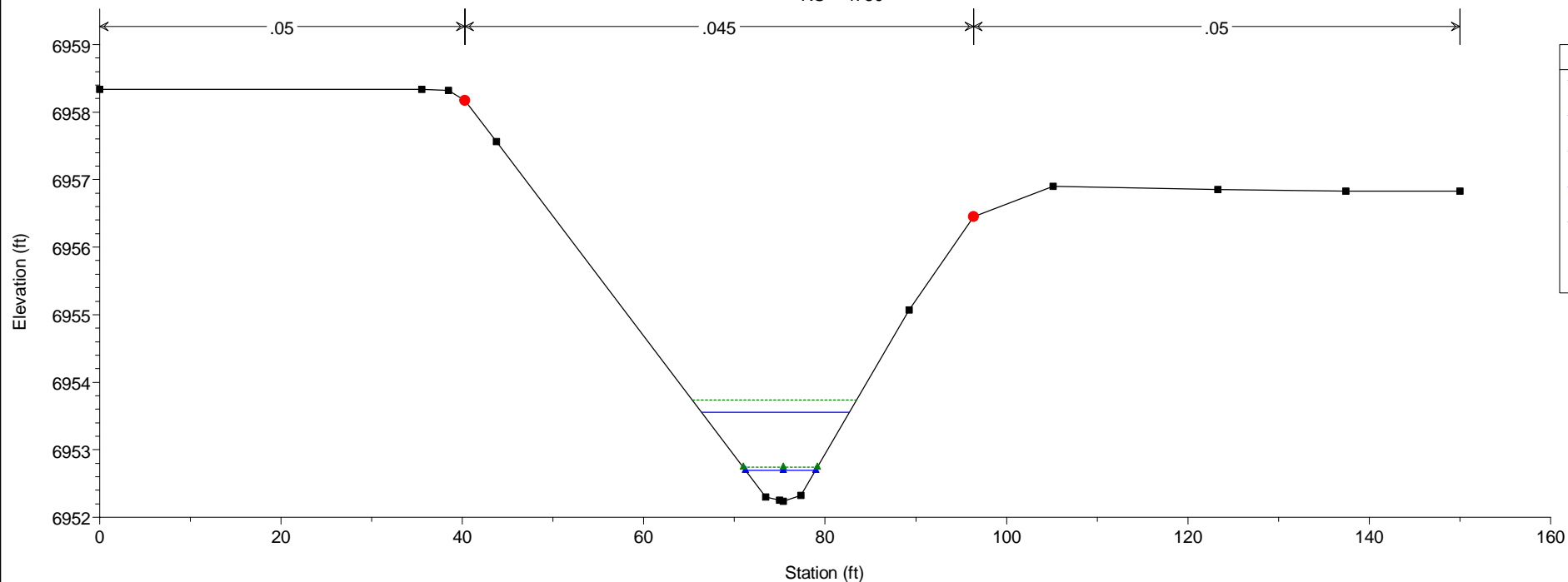
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4850



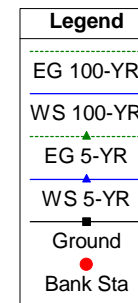
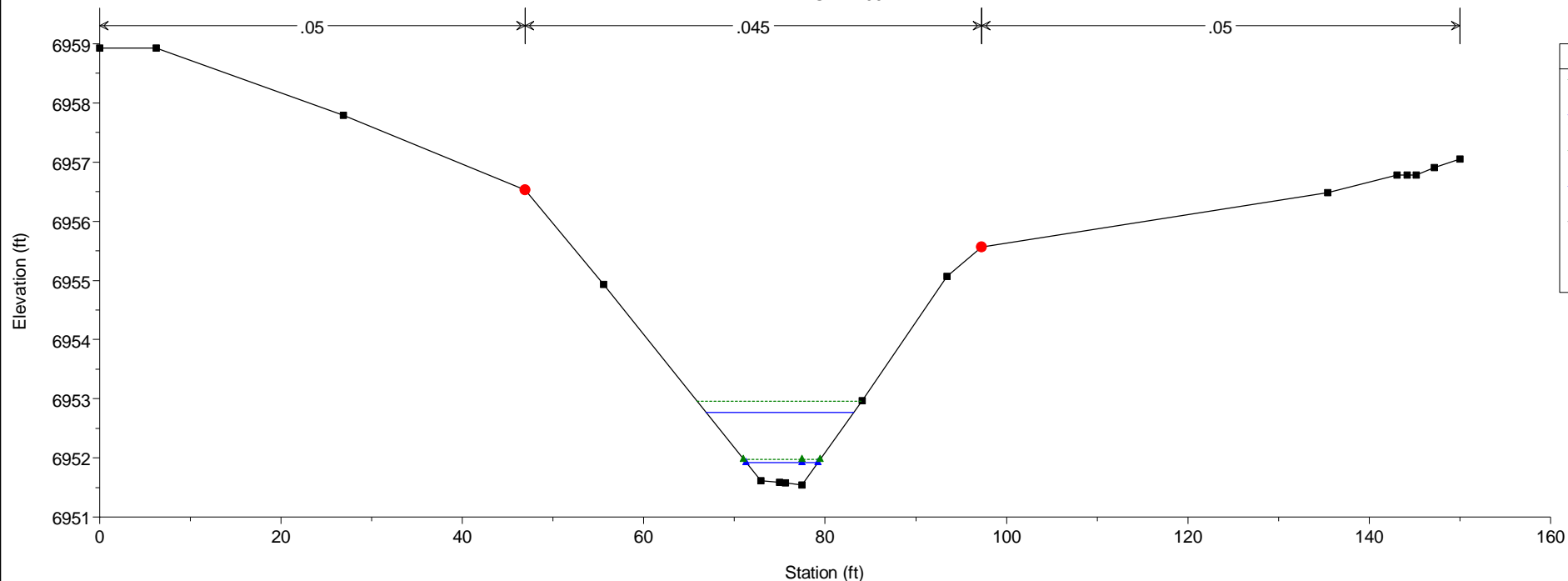
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4800



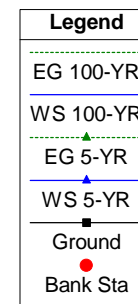
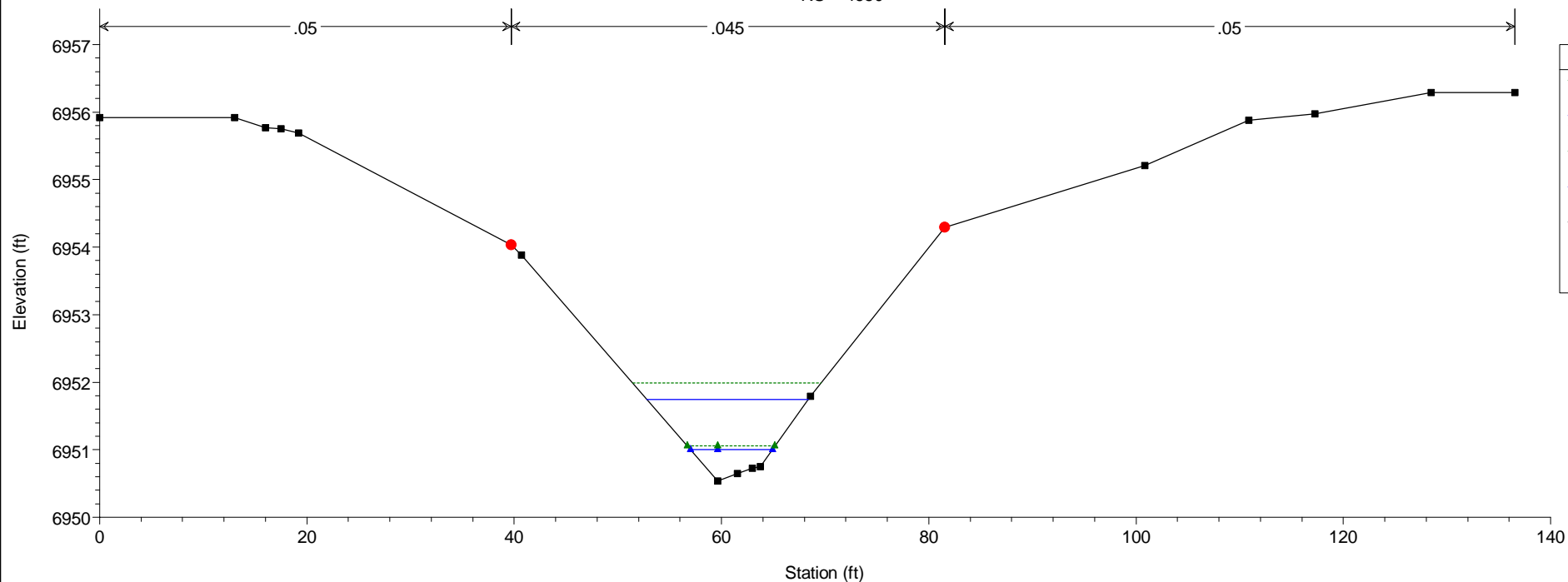
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4750



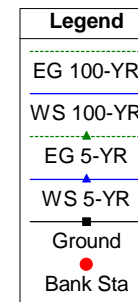
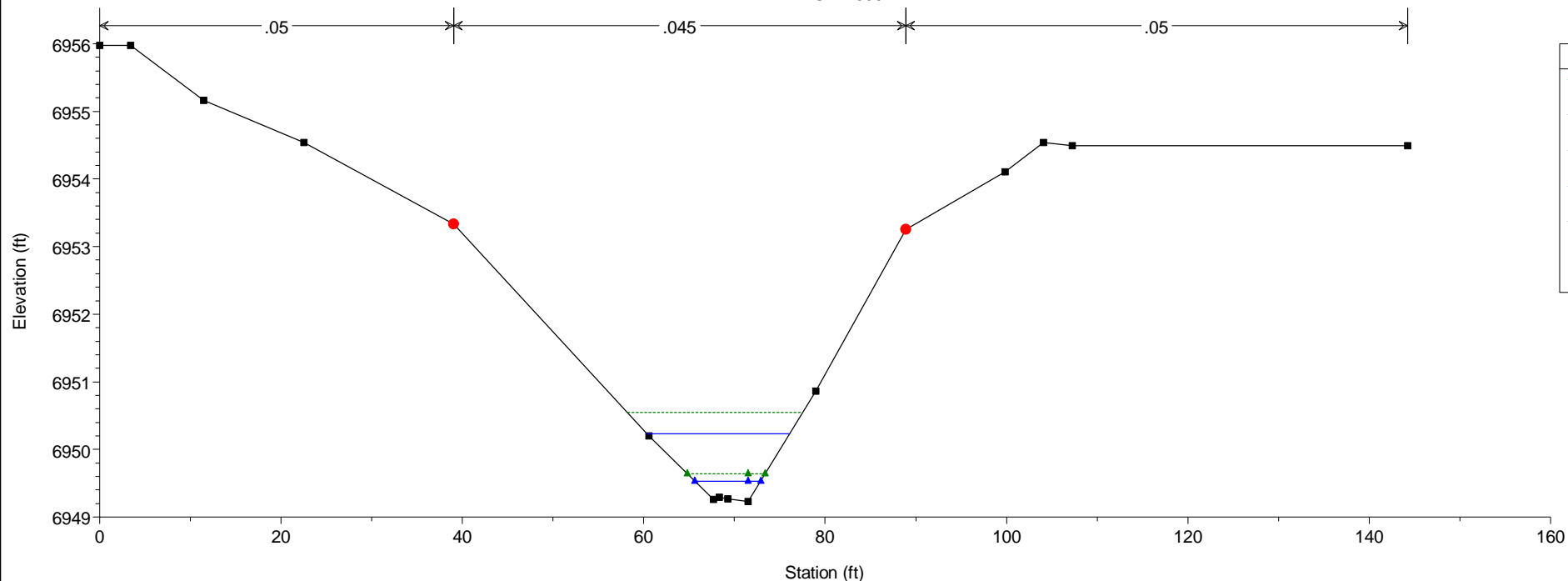
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4700



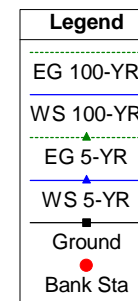
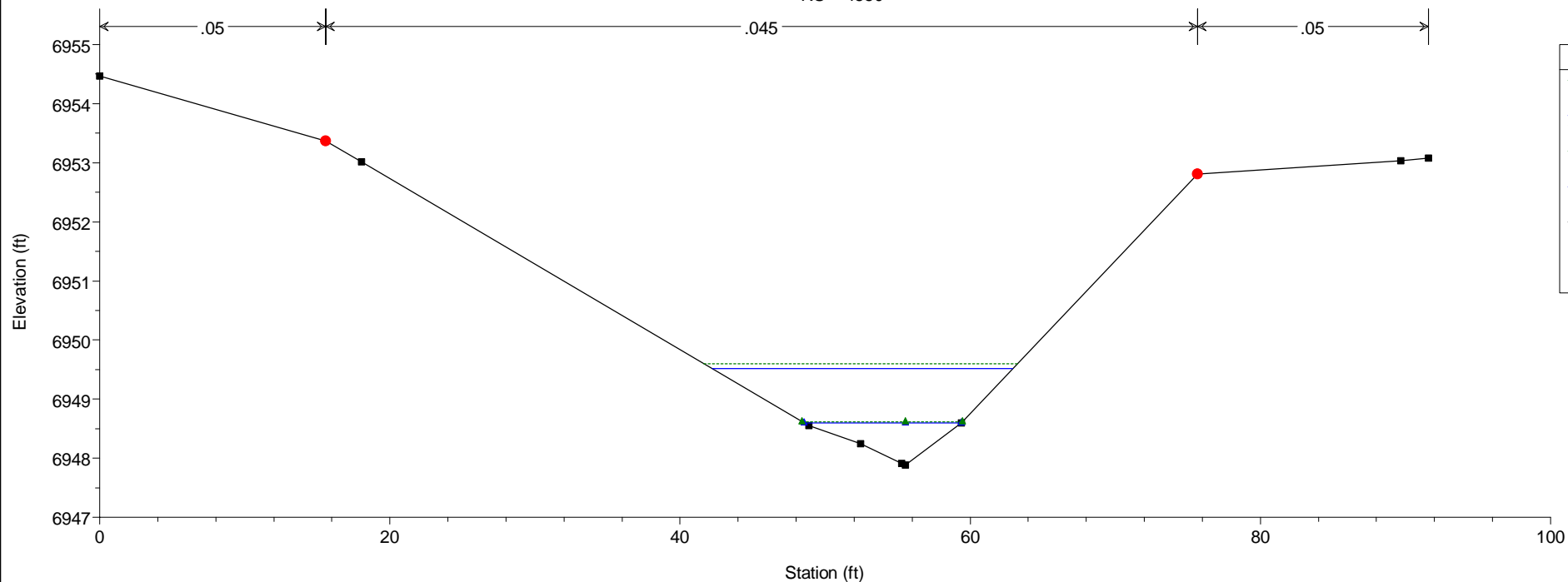
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4650



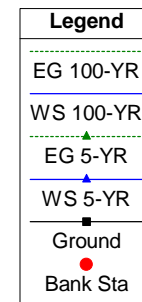
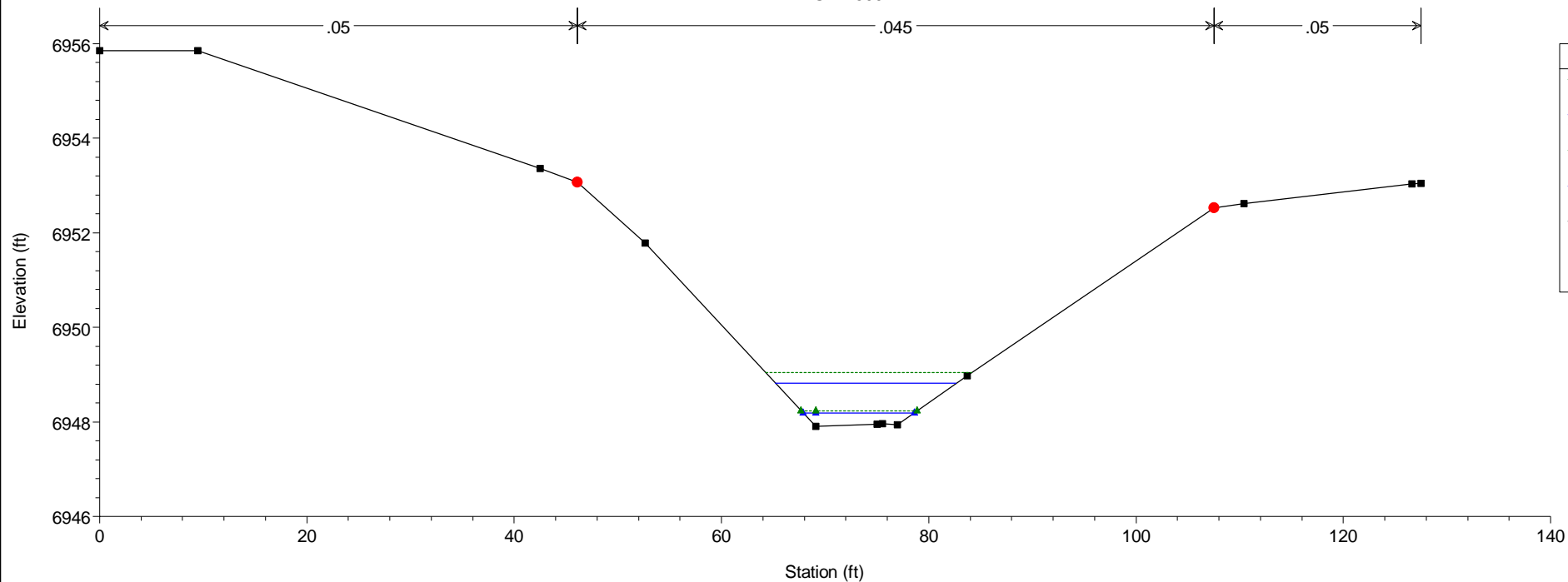
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4600



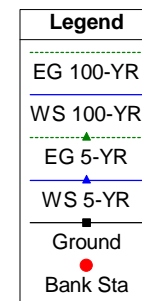
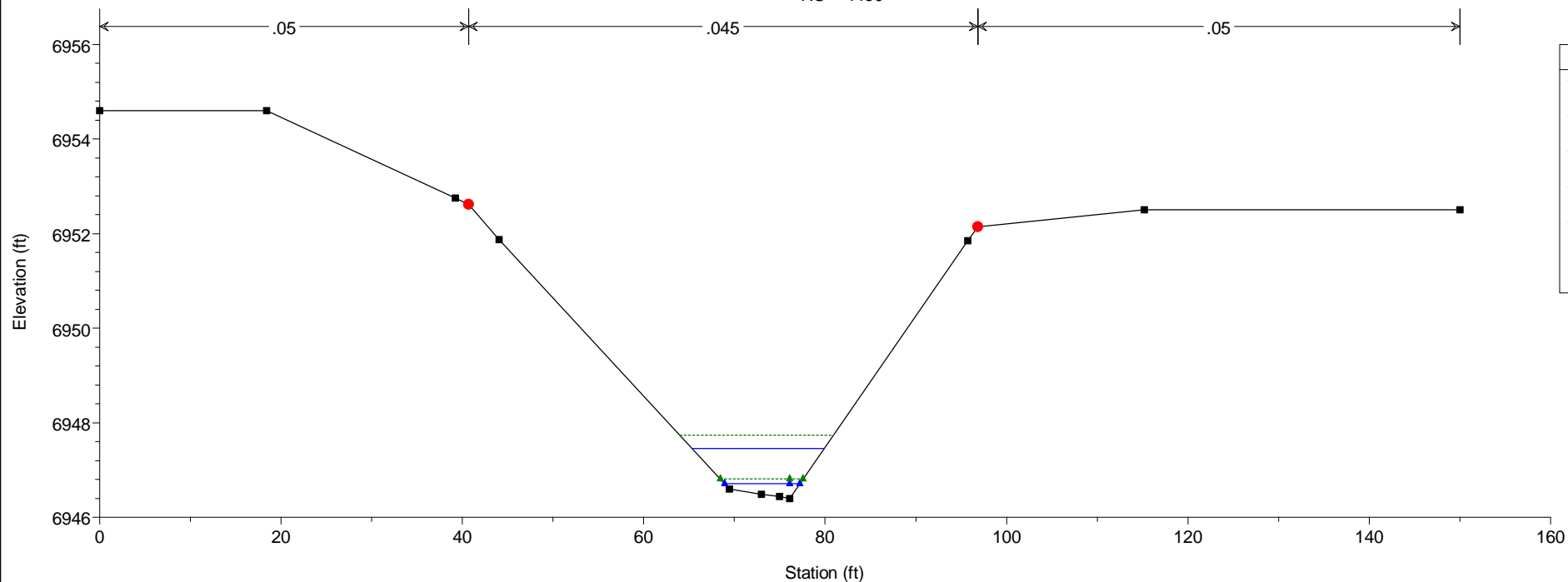
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4550



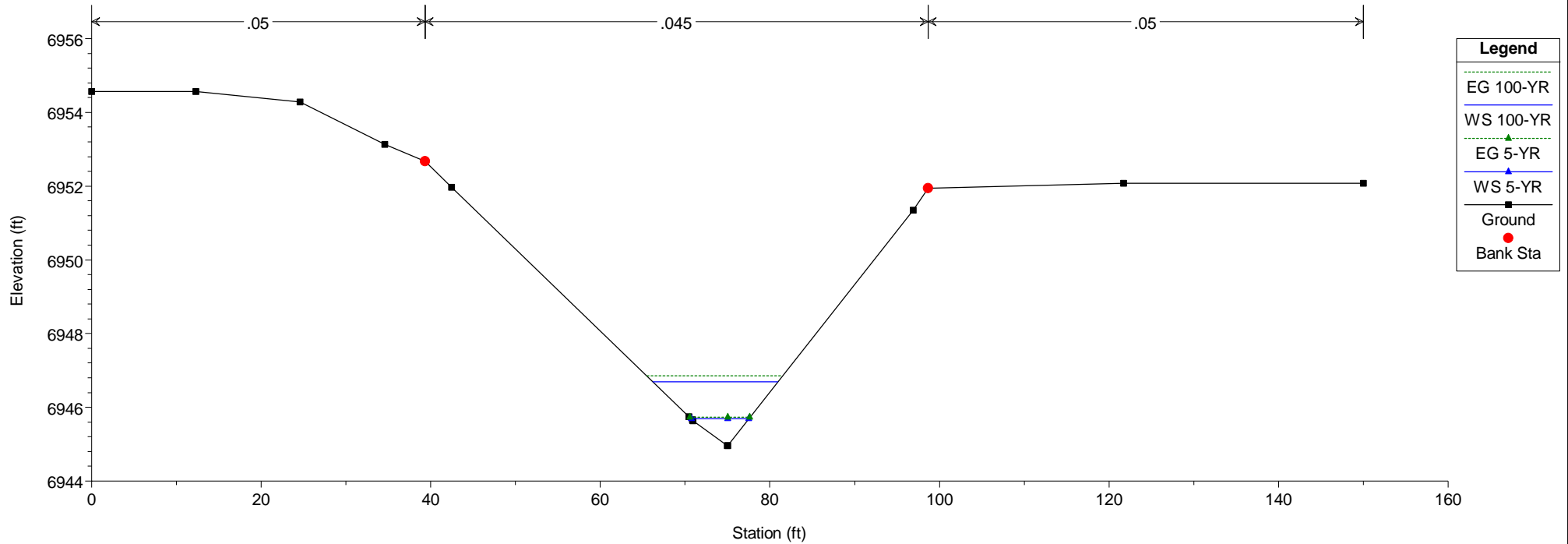
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4500



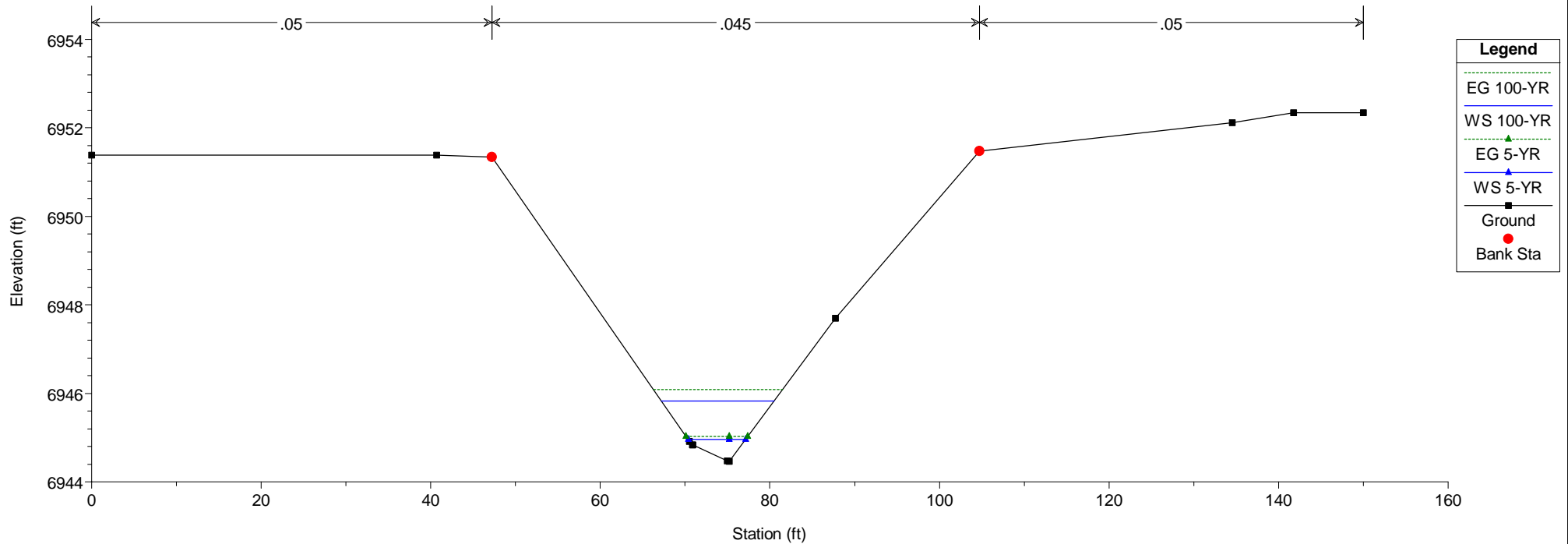
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4450



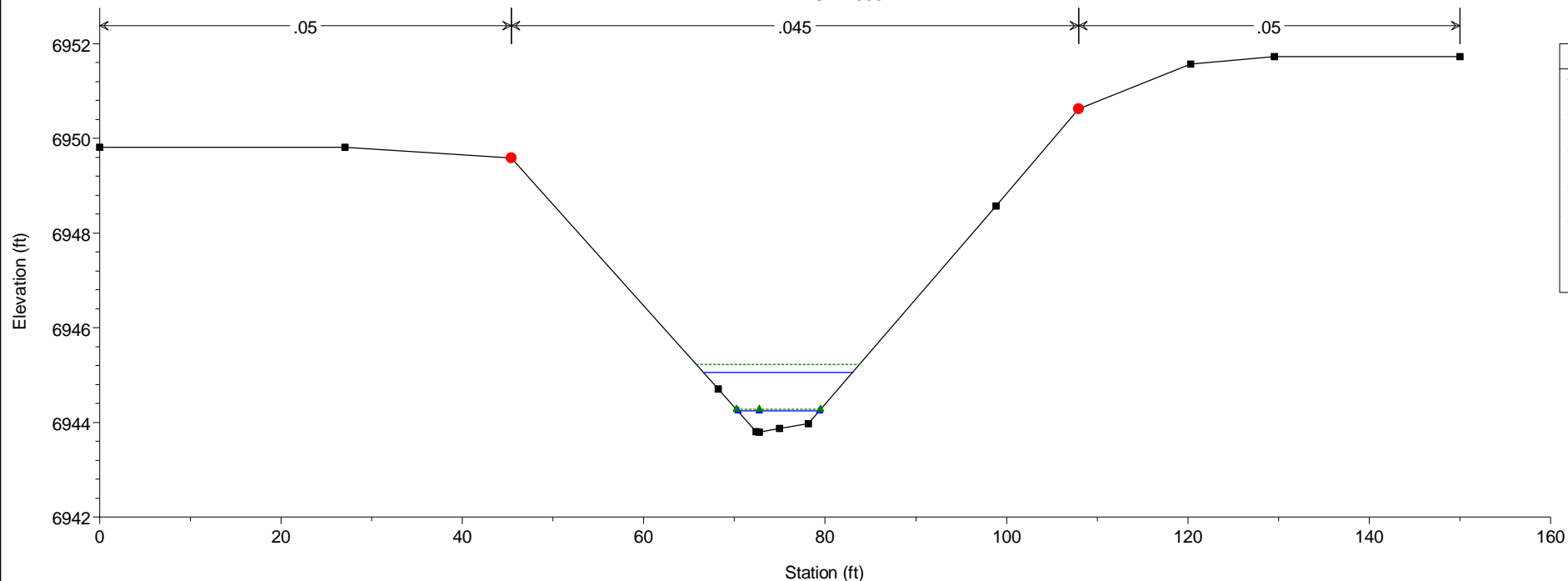
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4400



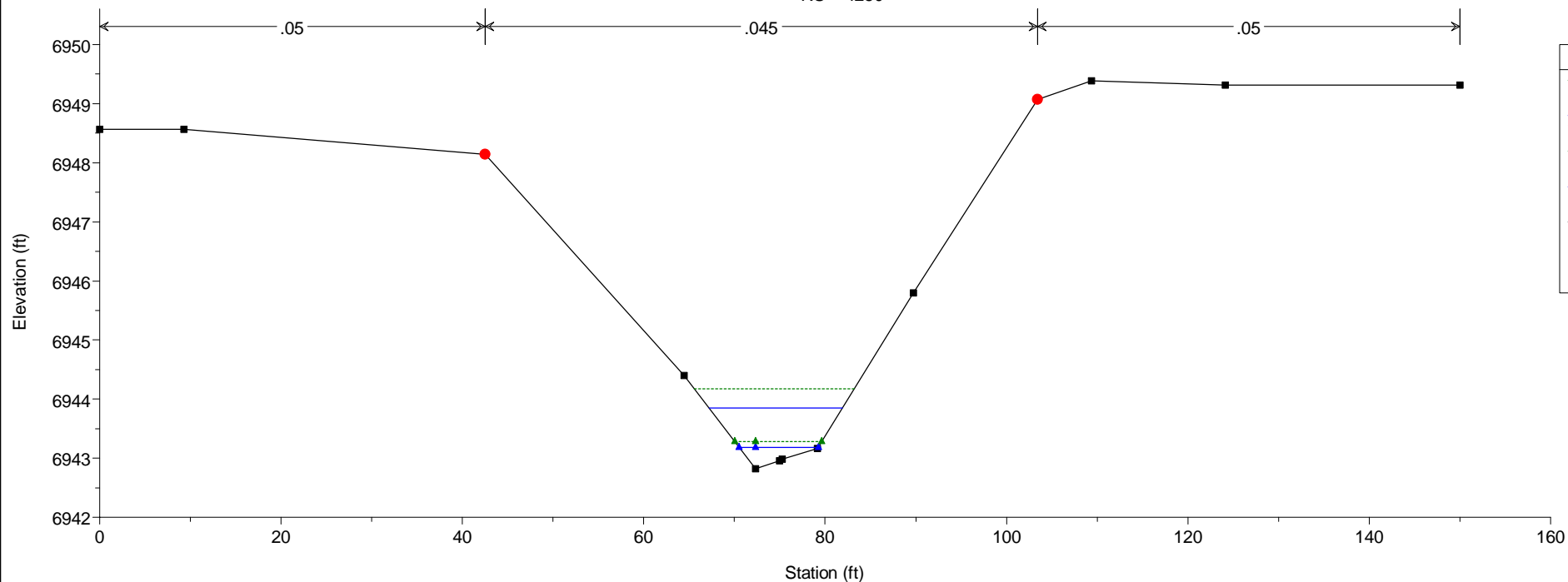
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4350



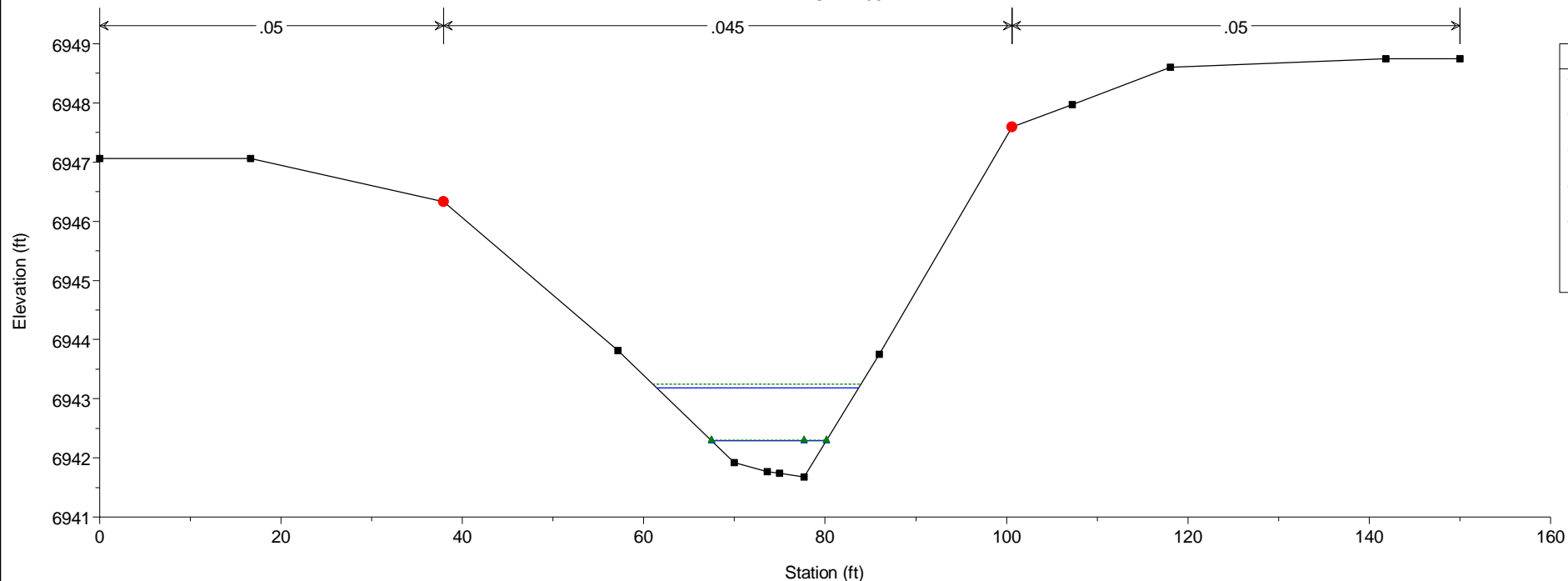
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4300



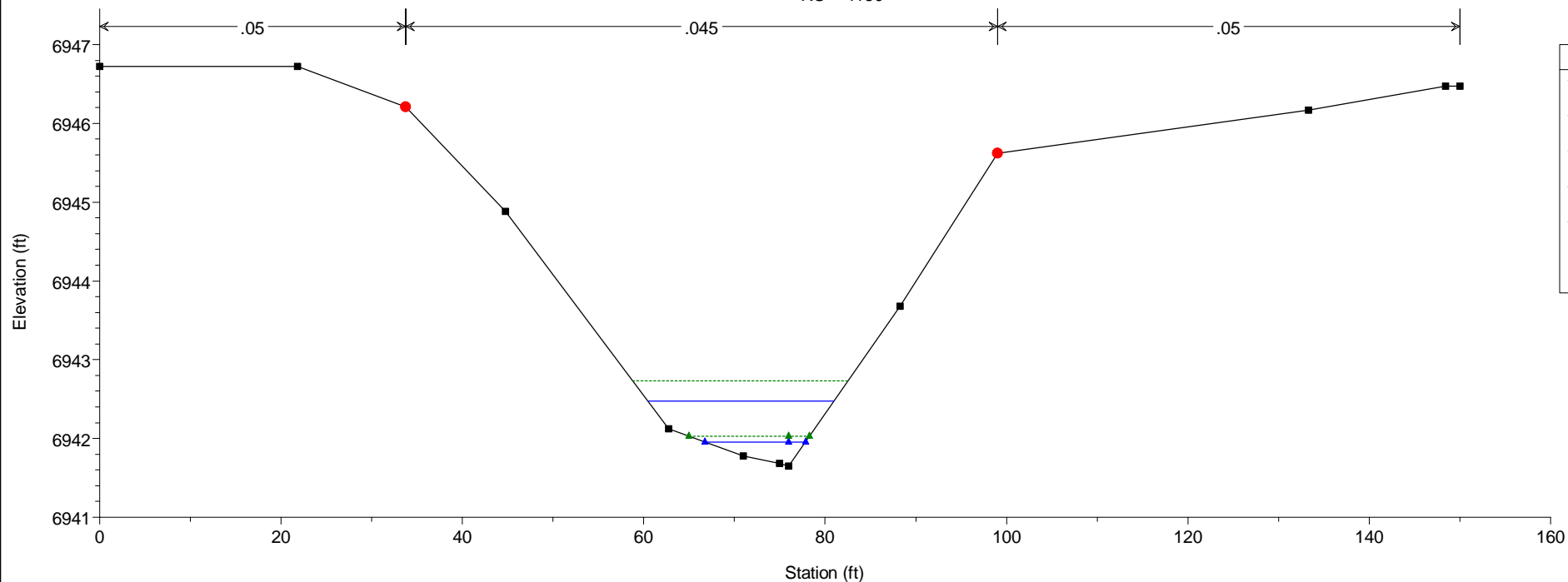
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4250



HEC-RAS Model Plan: Existing 5/21/2019
RS = 4200

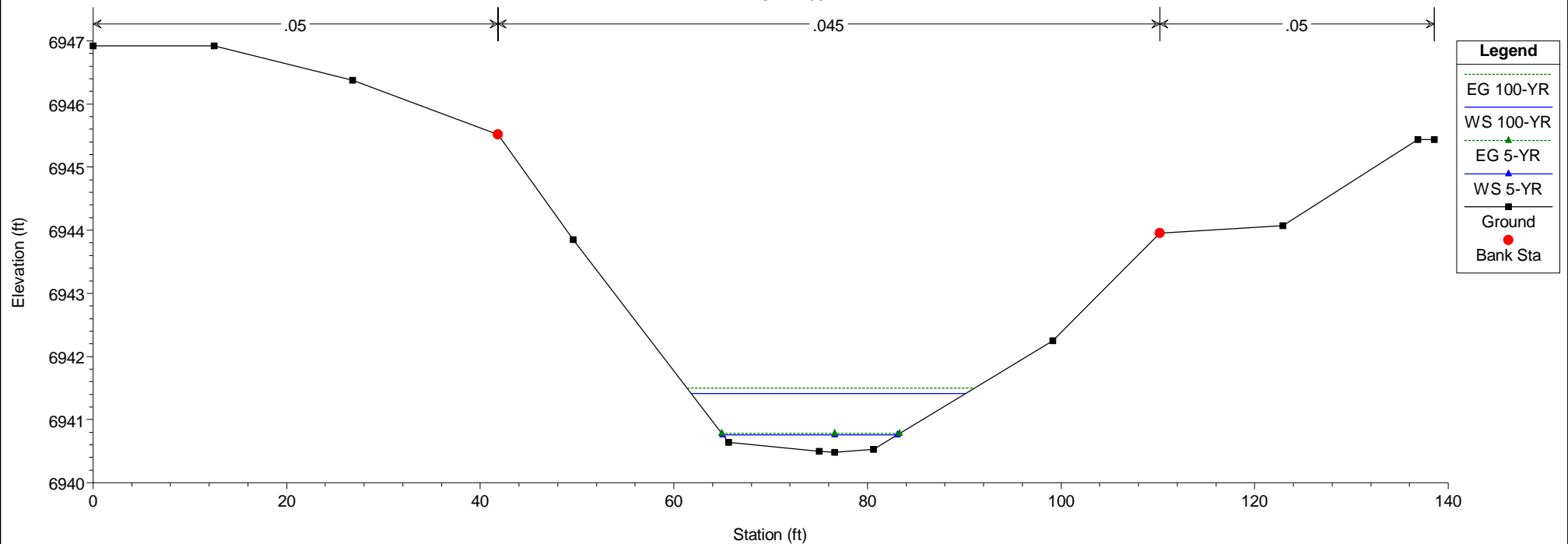


HEC-RAS Model Plan: Existing 5/21/2019
RS = 4150



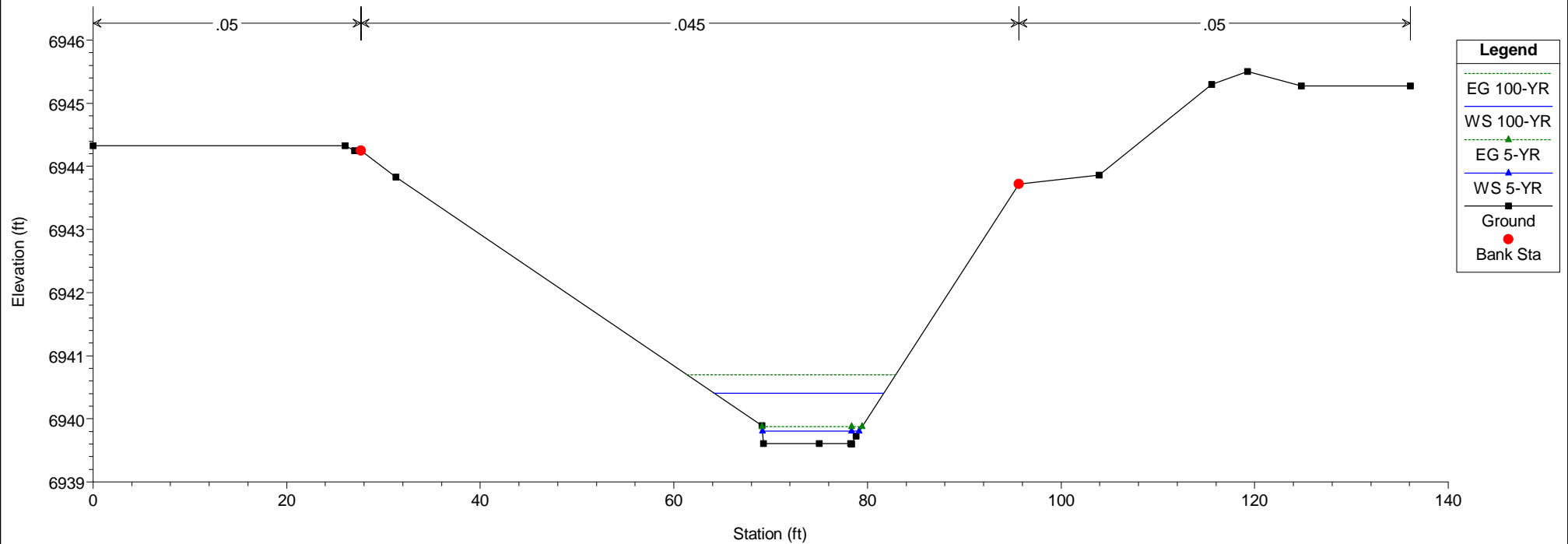
HEC-RAS Model Plan: Existing 5/21/2019

RS = 4100

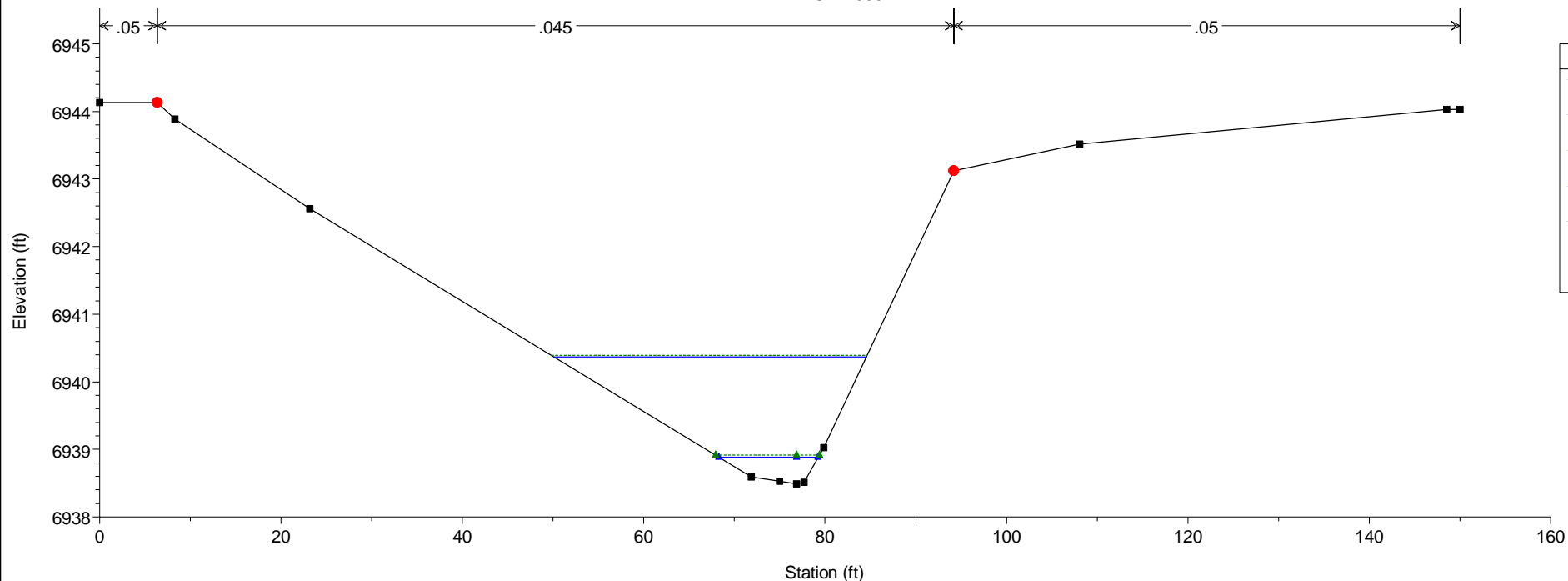


HEC-RAS Model Plan: Existing 5/21/2019

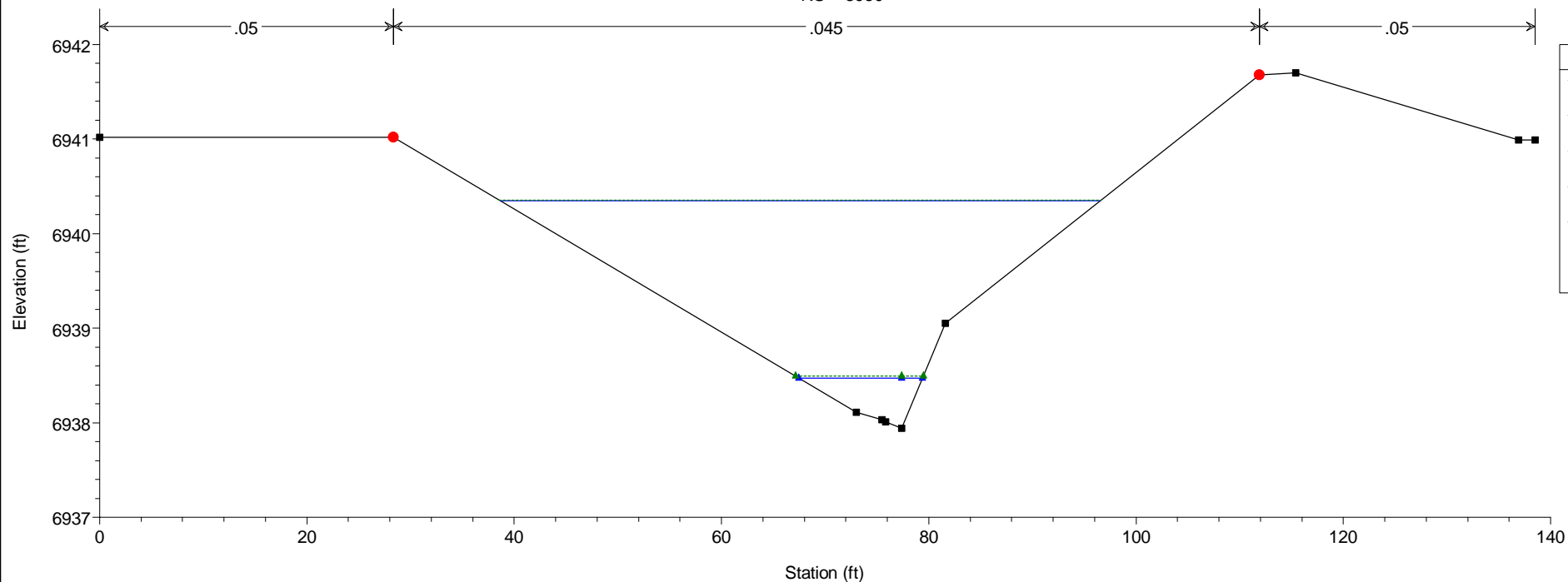
RS = 4050



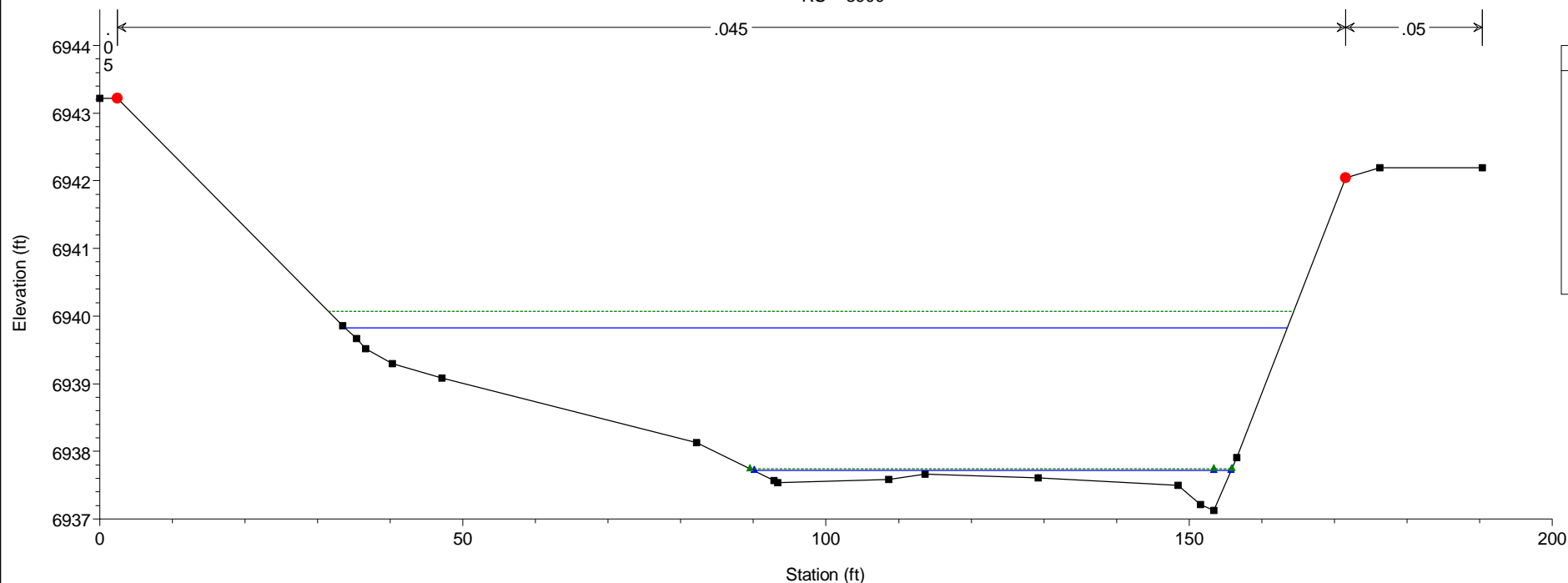
HEC-RAS Model Plan: Existing 5/21/2019
RS = 4000



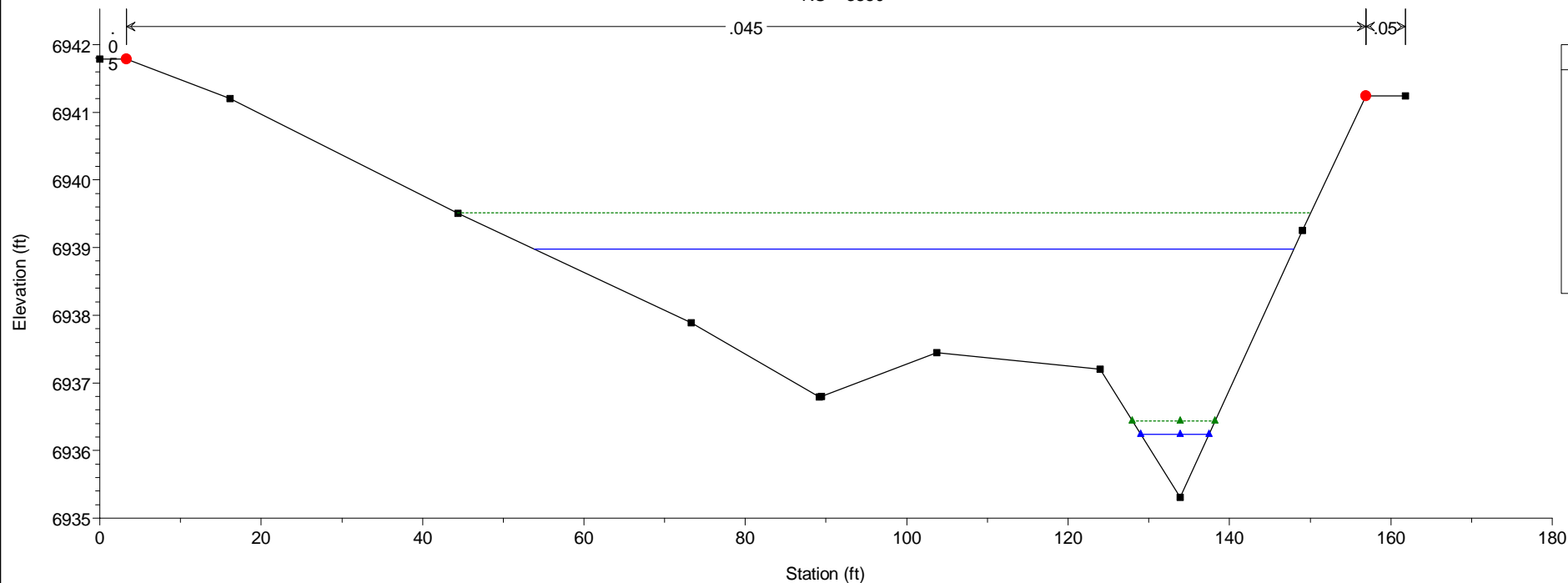
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3950



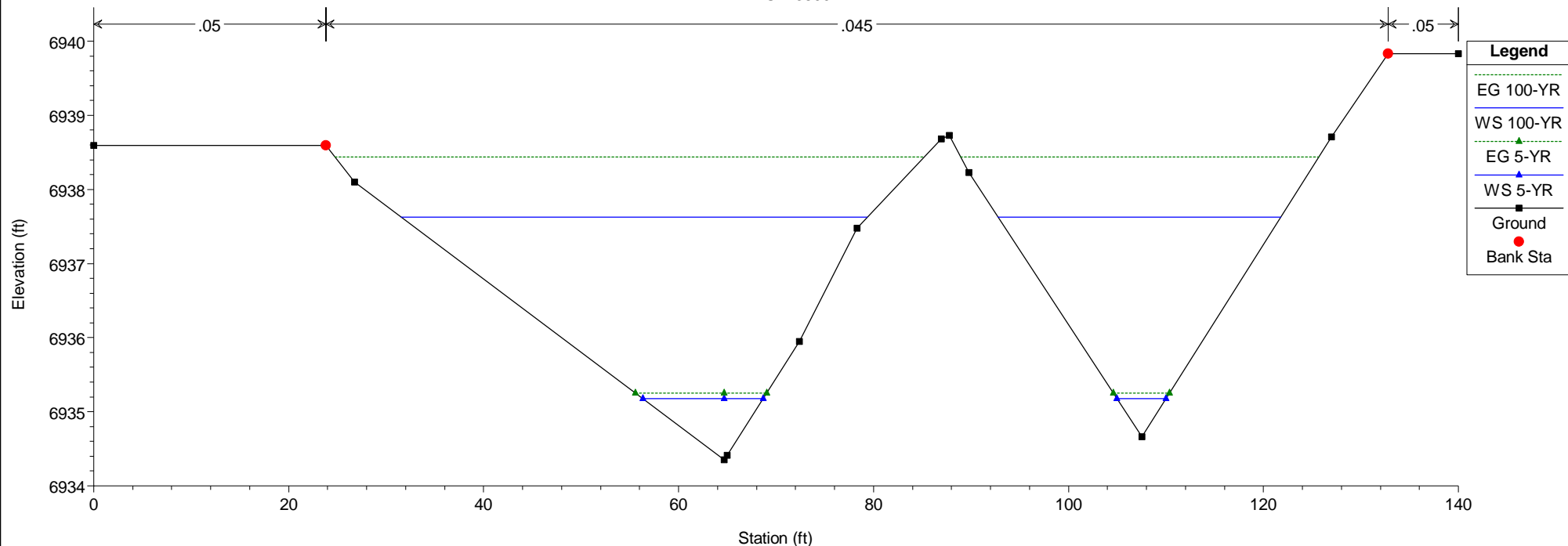
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RS = 3900



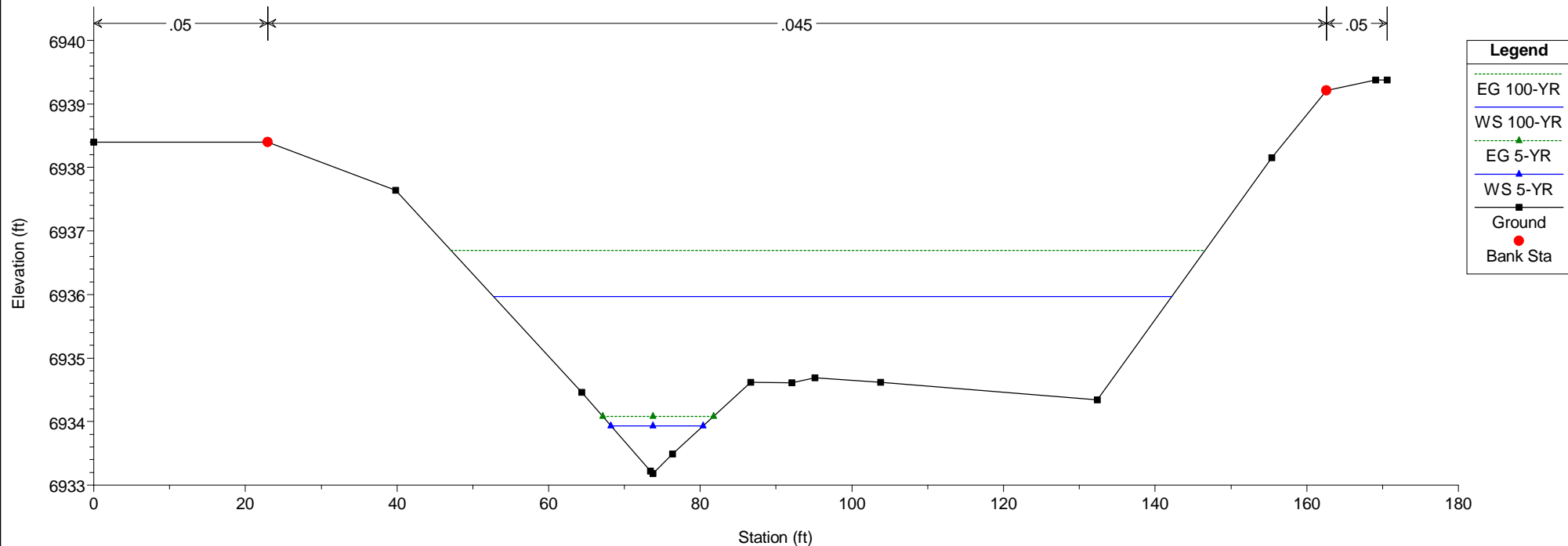
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3850



HEC-RAS Model Plan: Existing 5/21/2019
RS = 3800

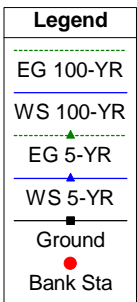
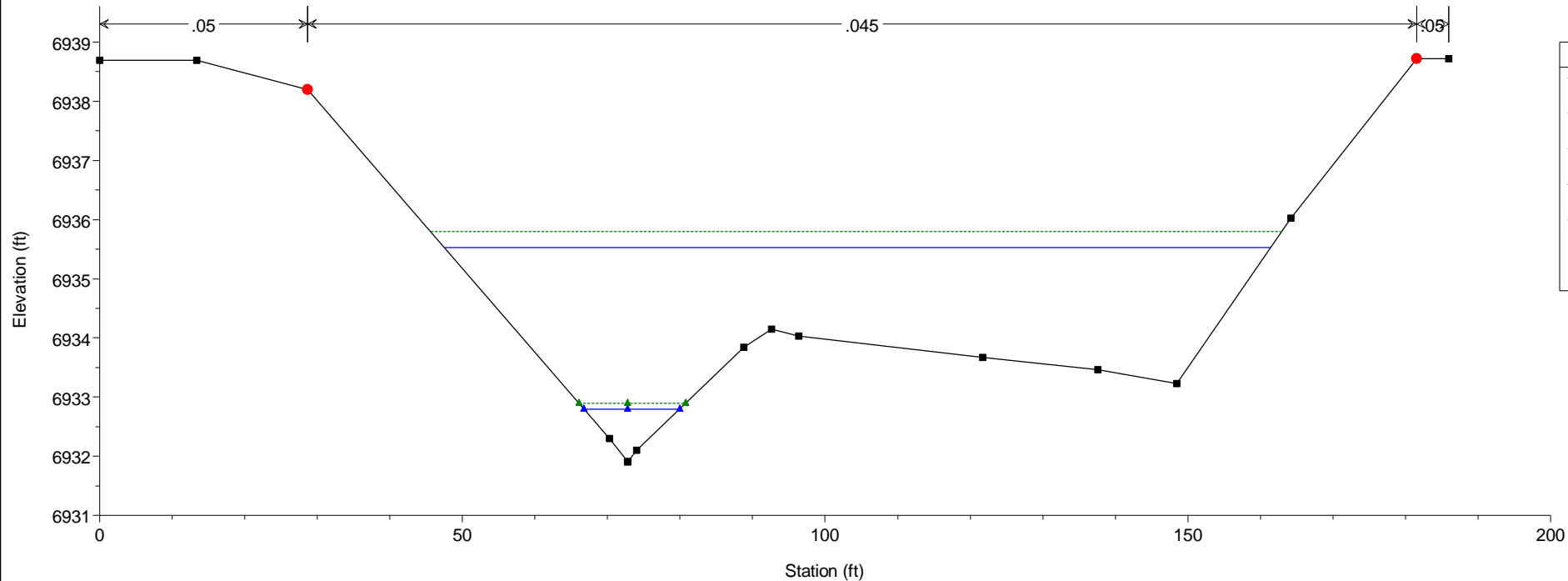


HEC-RAS Model Plan: Existing 5/21/2019
RS = 3750



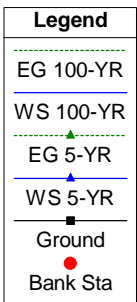
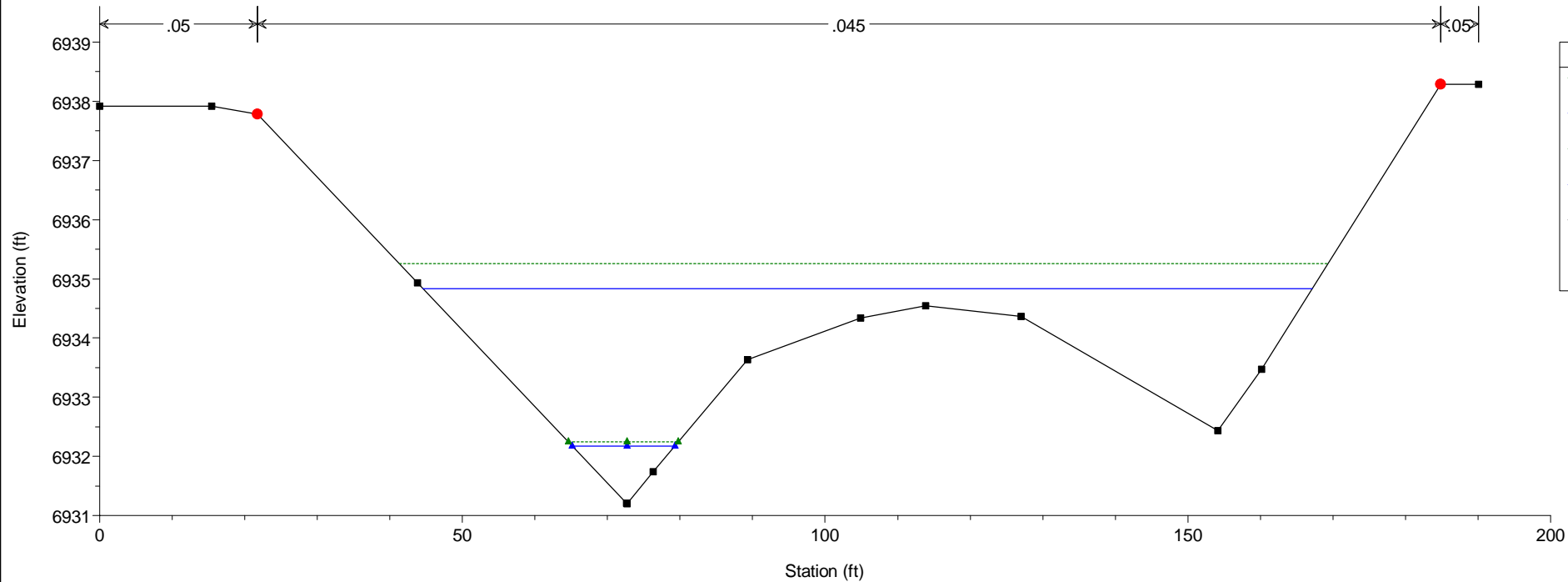
HEC-RAS Model Plan: Existing 5/21/2019

RS = 3700

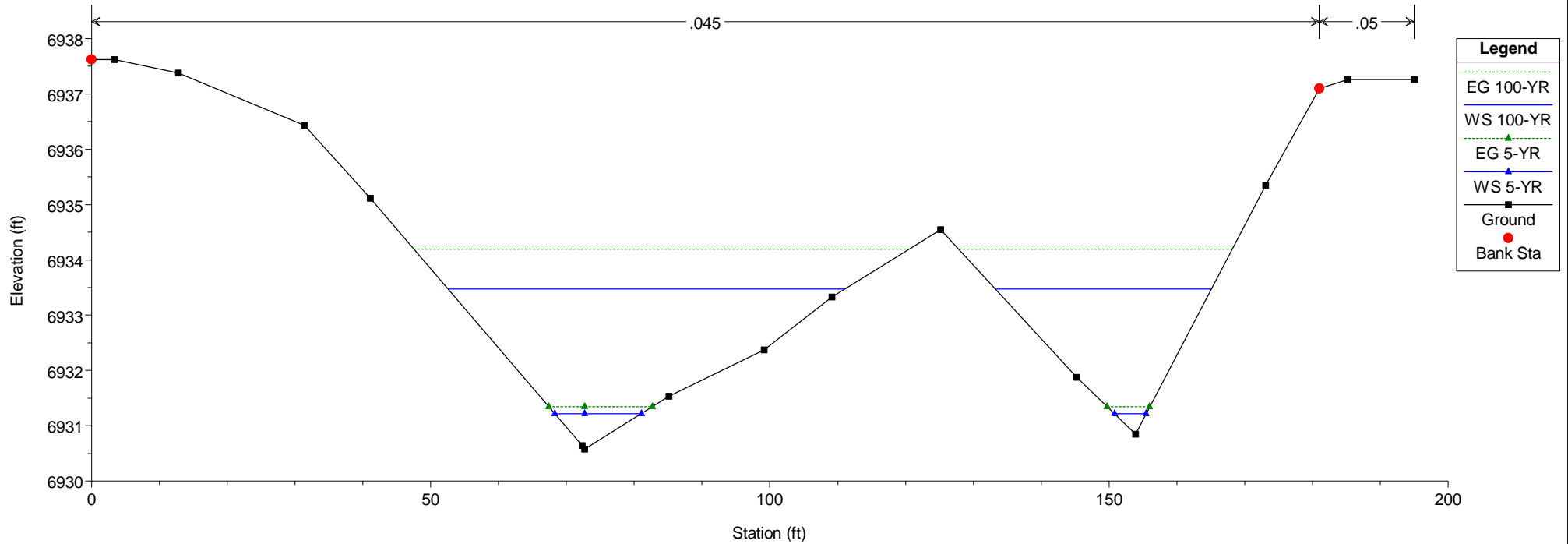


HEC-RAS Model Plan: Existing 5/21/2019

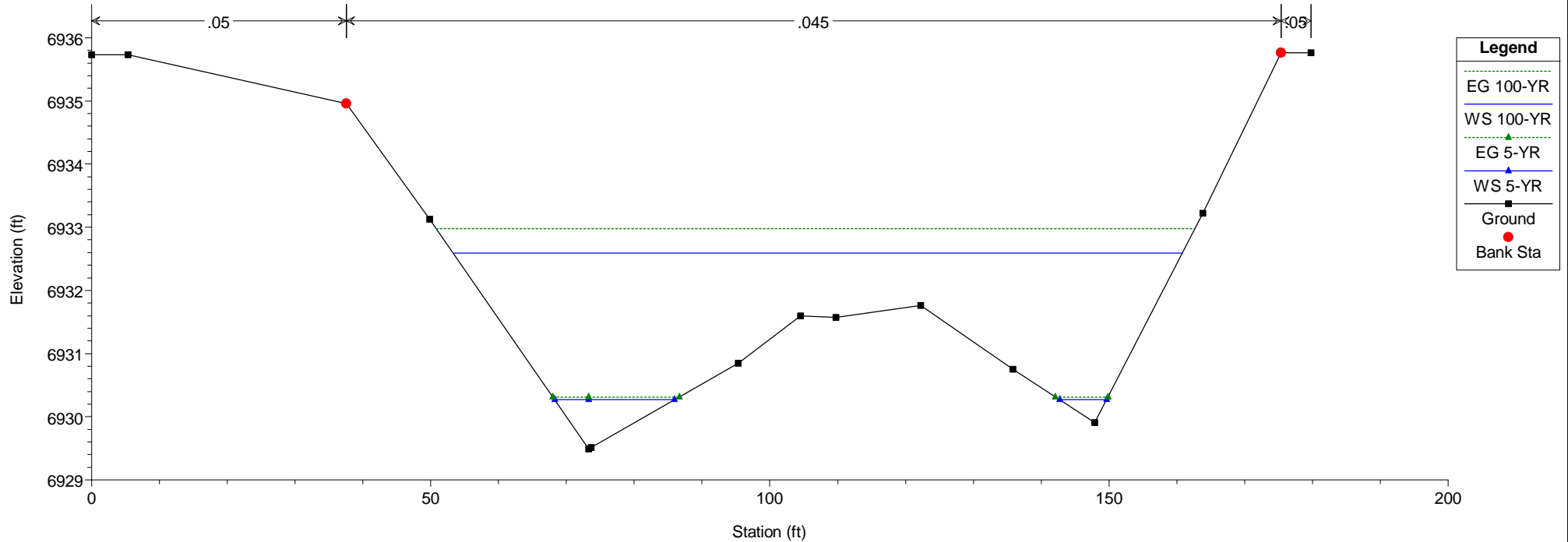
RS = 3650



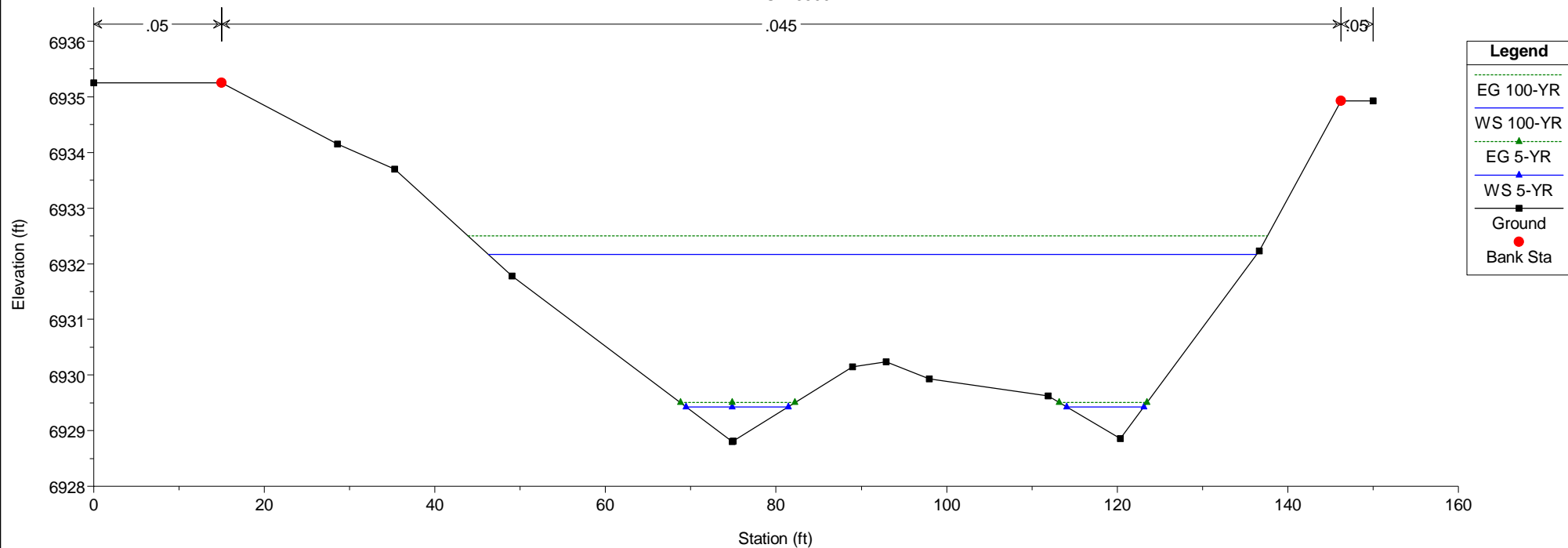
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3600



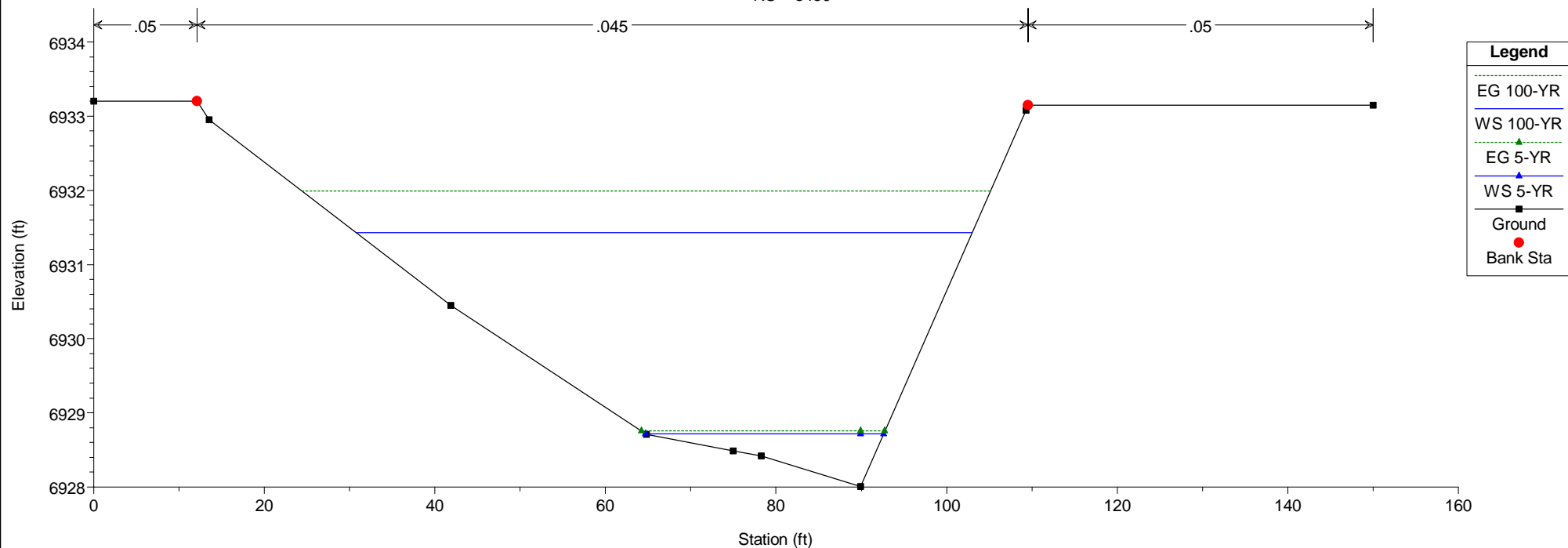
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3550



HEC-RAS Model Plan: Existing 5/21/2019
RS = 3500

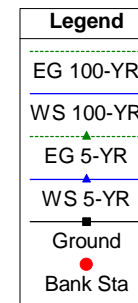
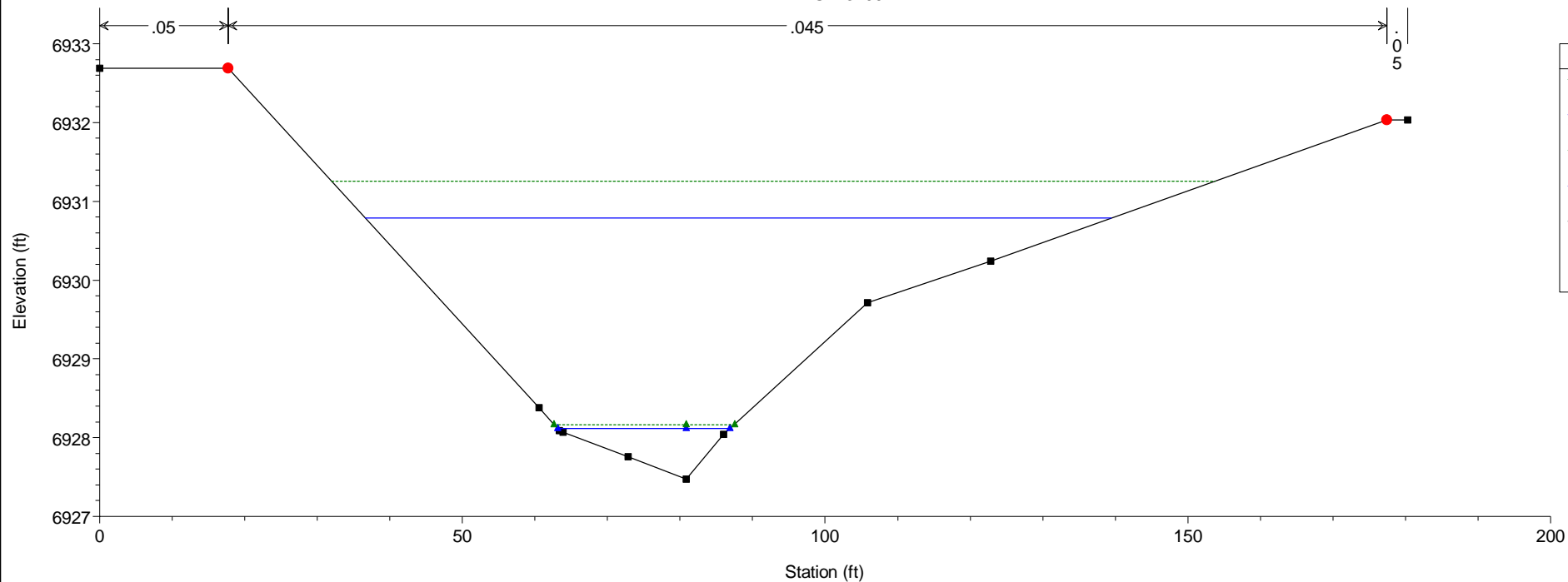


HEC-RAS Model Plan: Existing 5/21/2019
RS = 3450



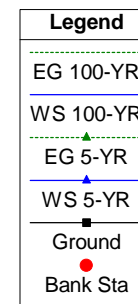
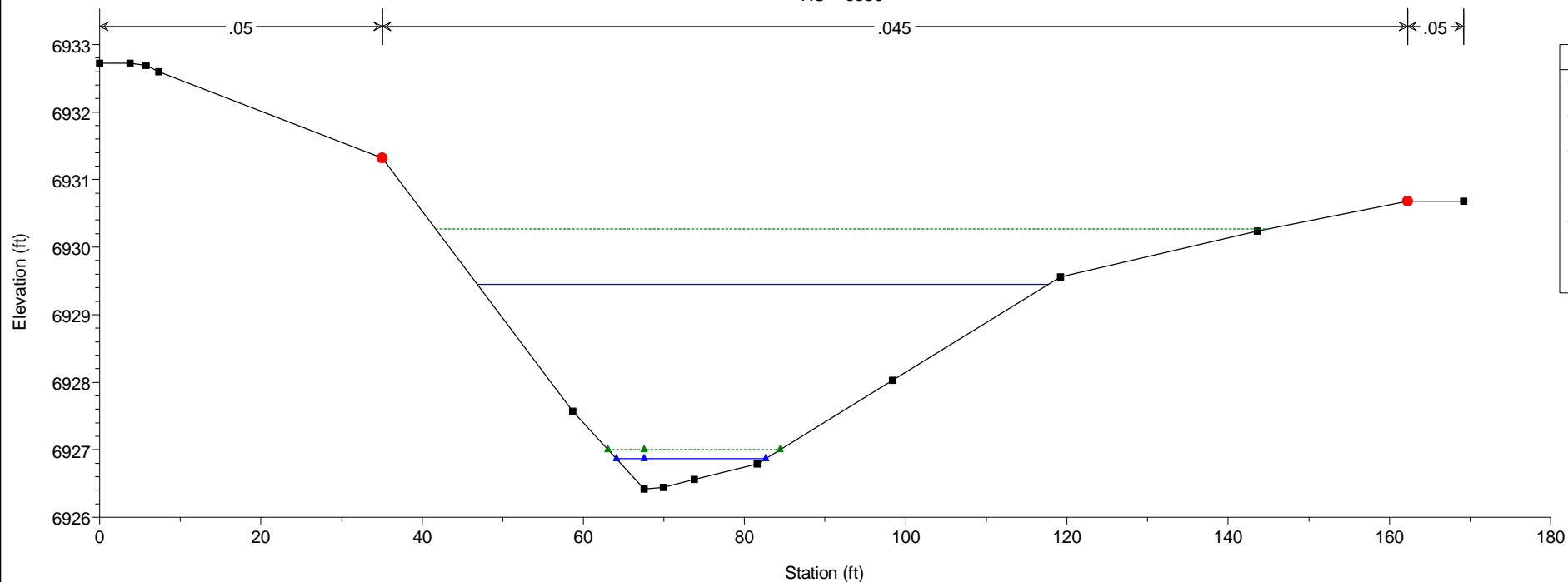
HEC-RAS Model Plan: Existing 5/21/2019

RS = 3400

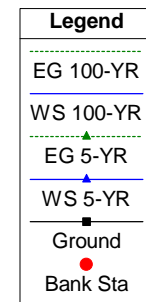
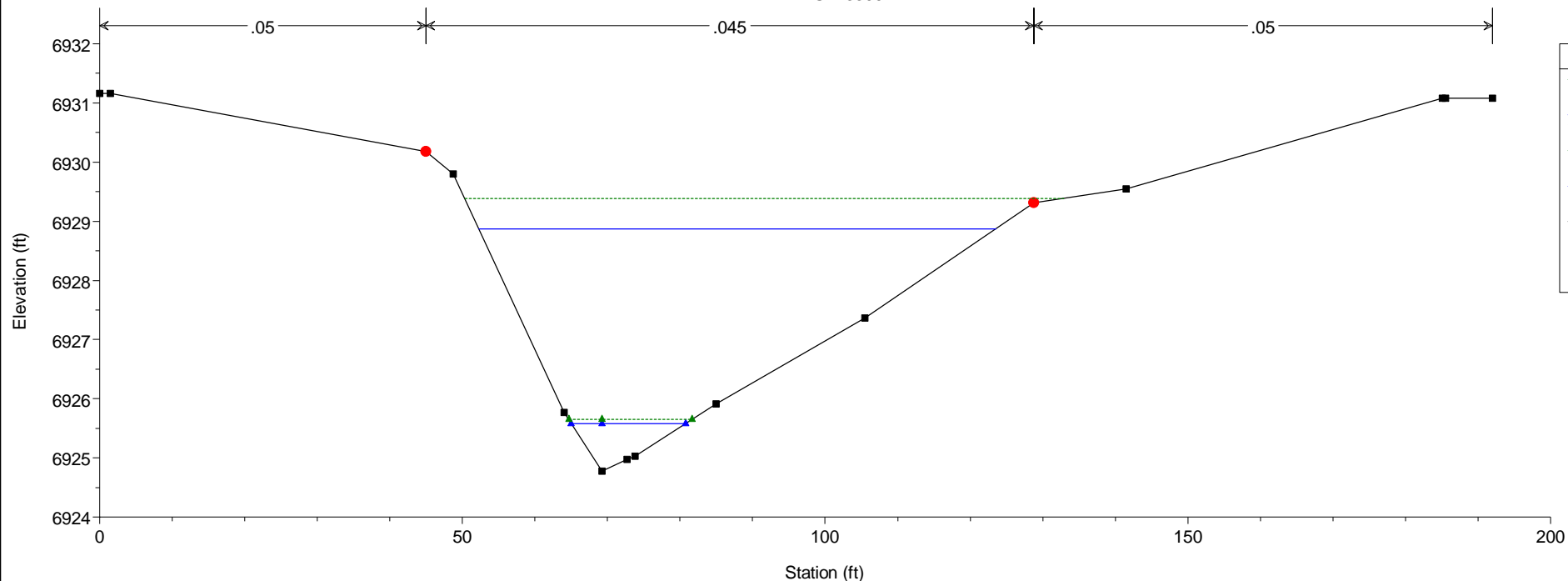


HEC-RAS Model Plan: Existing 5/21/2019

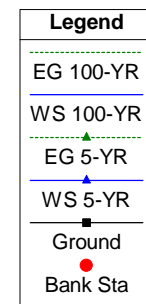
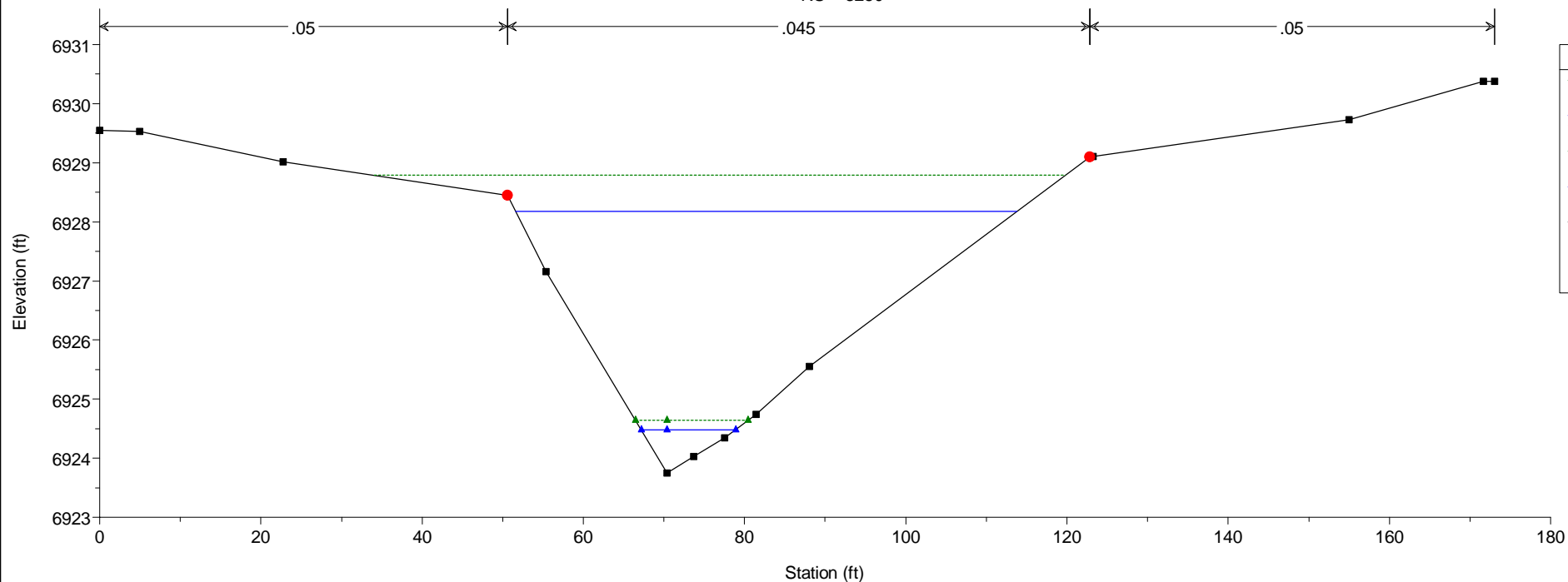
RS = 3350



HEC-RAS Model Plan: Existing 5/21/2019
RS = 3300

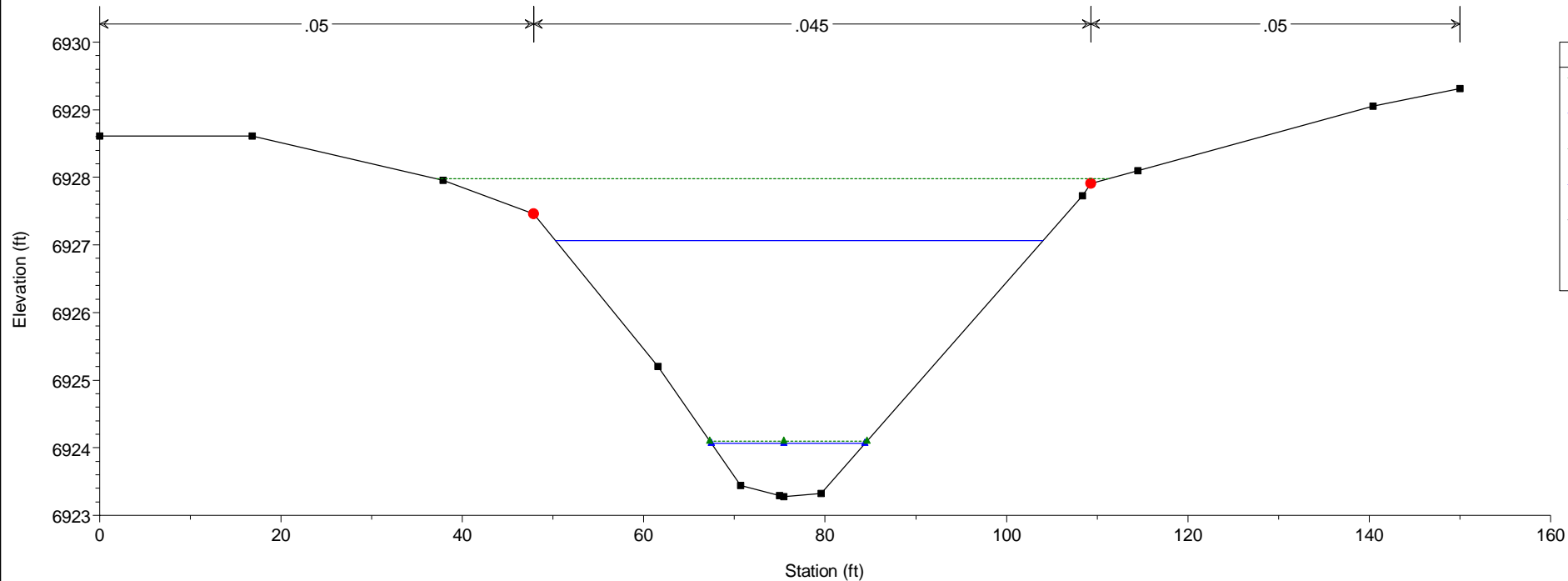


HEC-RAS Model Plan: Existing 5/21/2019
RS = 3250



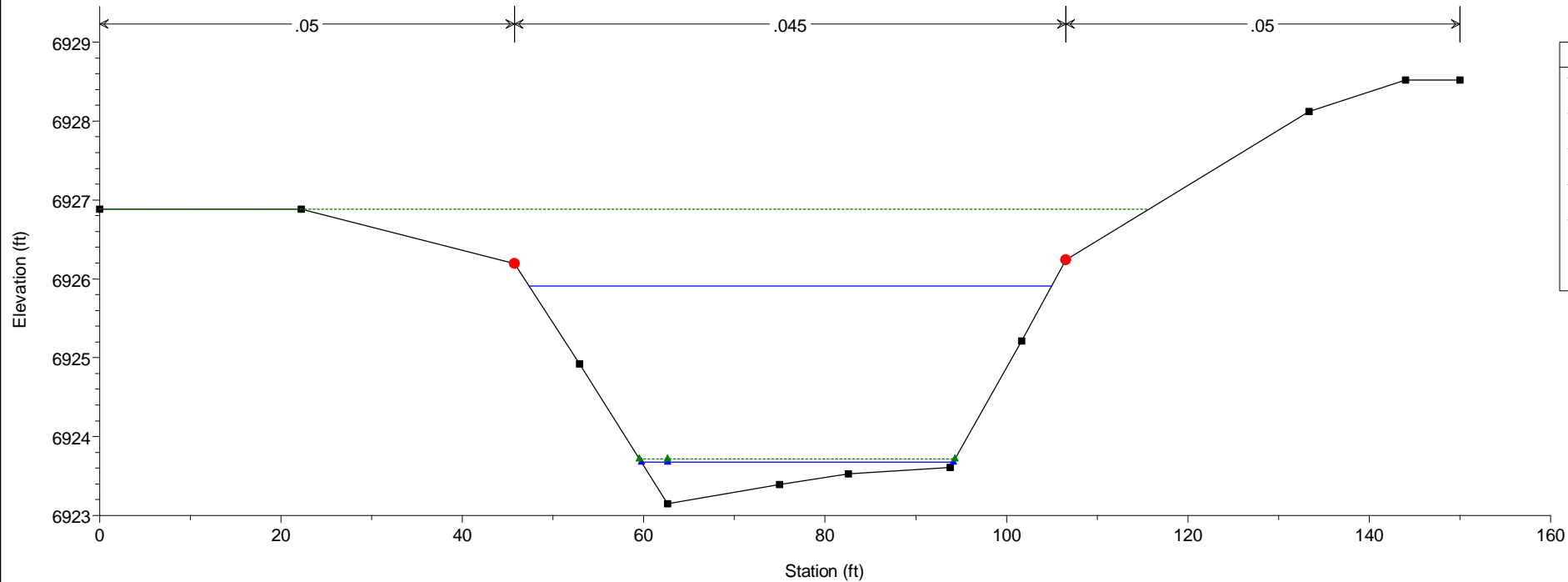
HEC-RAS Model Plan: Existing 5/21/2019

RS = 3200

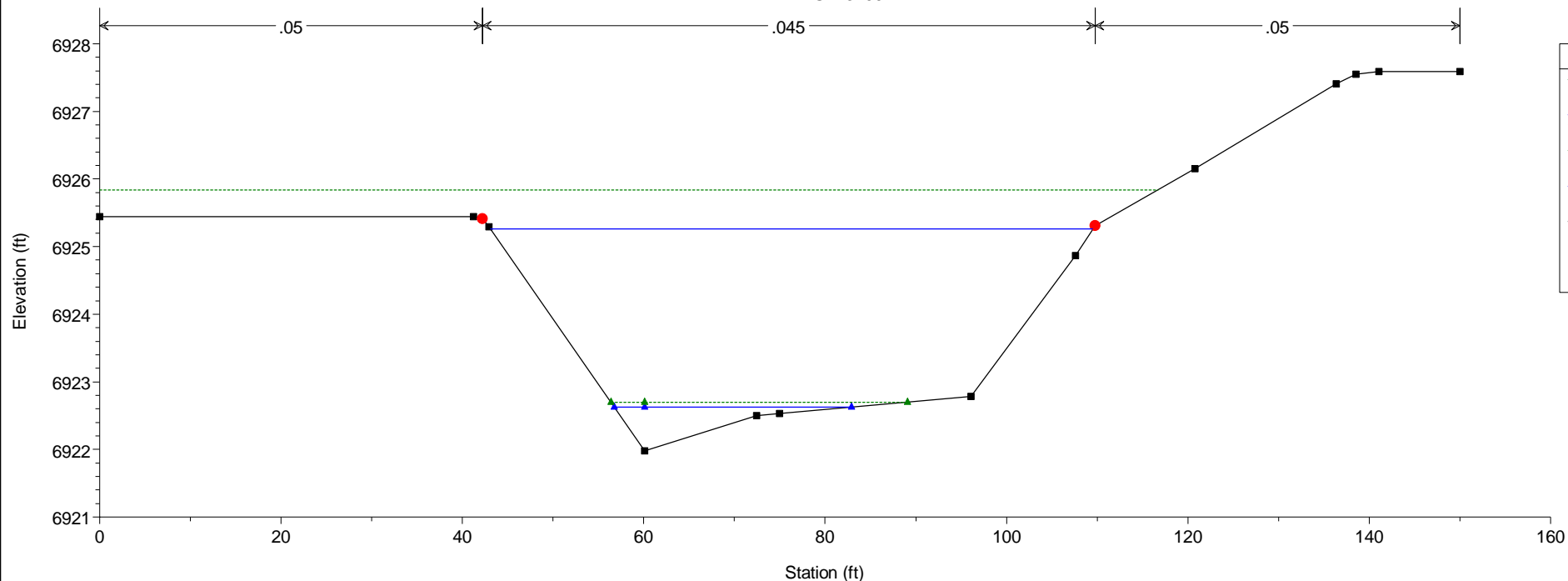


HEC-RAS Model Plan: Existing 5/21/2019

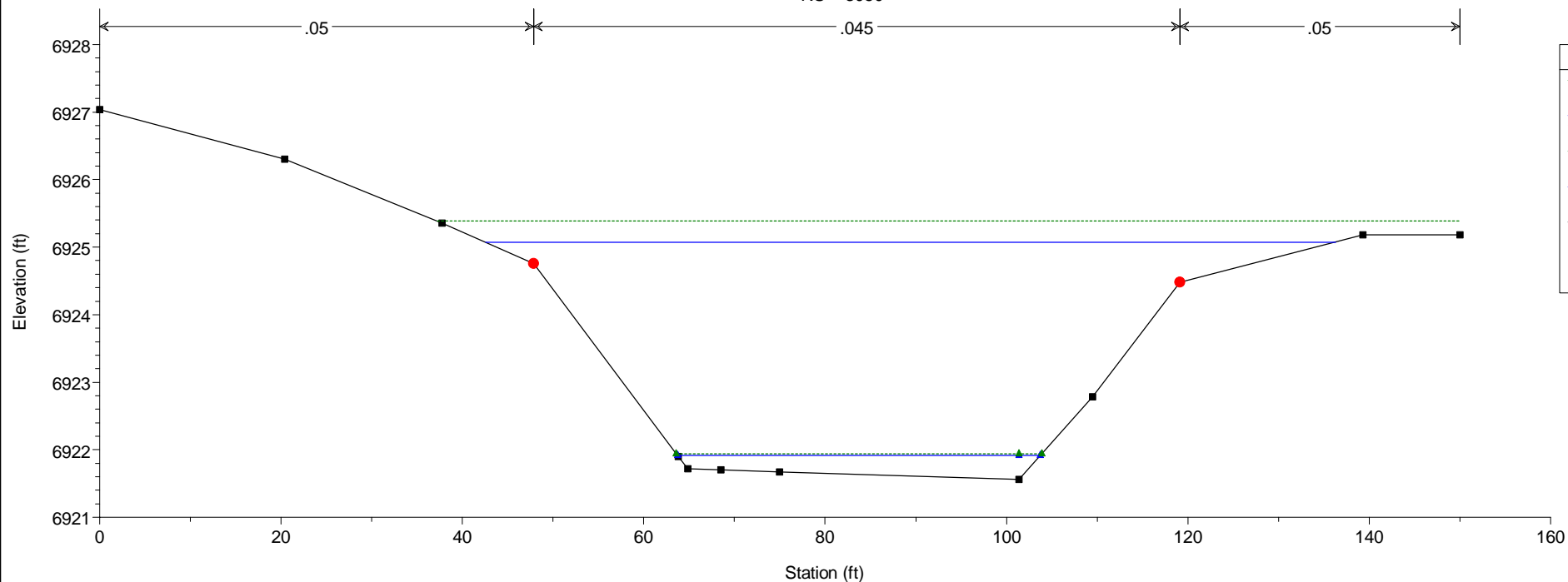
RS = 3150



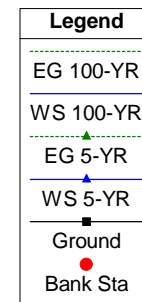
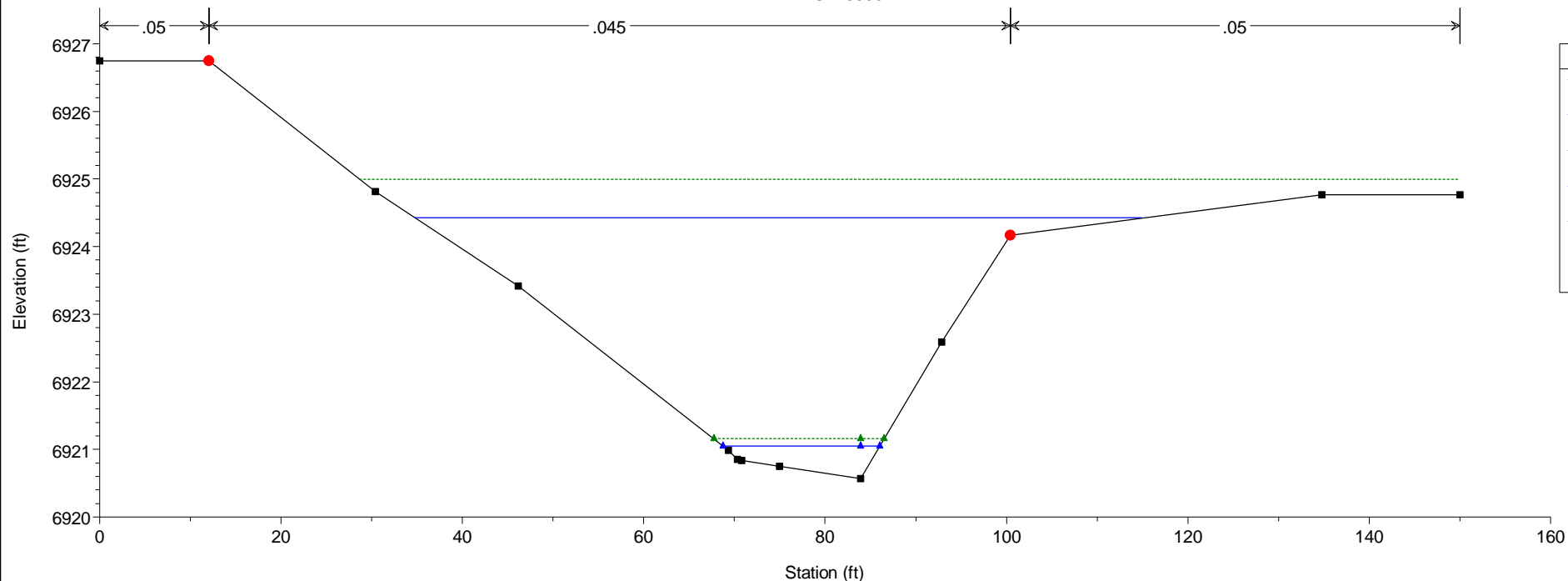
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3100



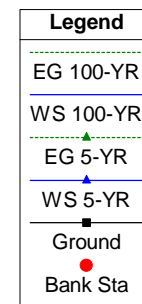
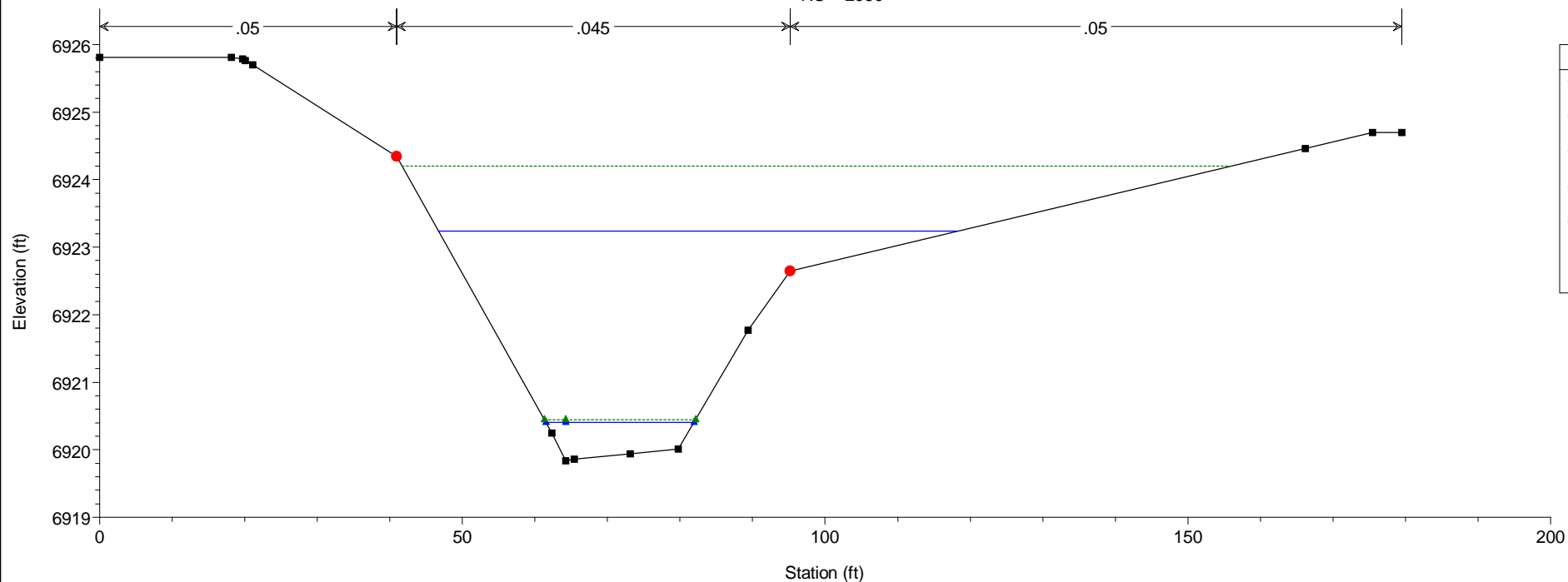
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RS = 3050



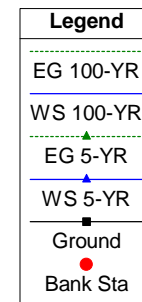
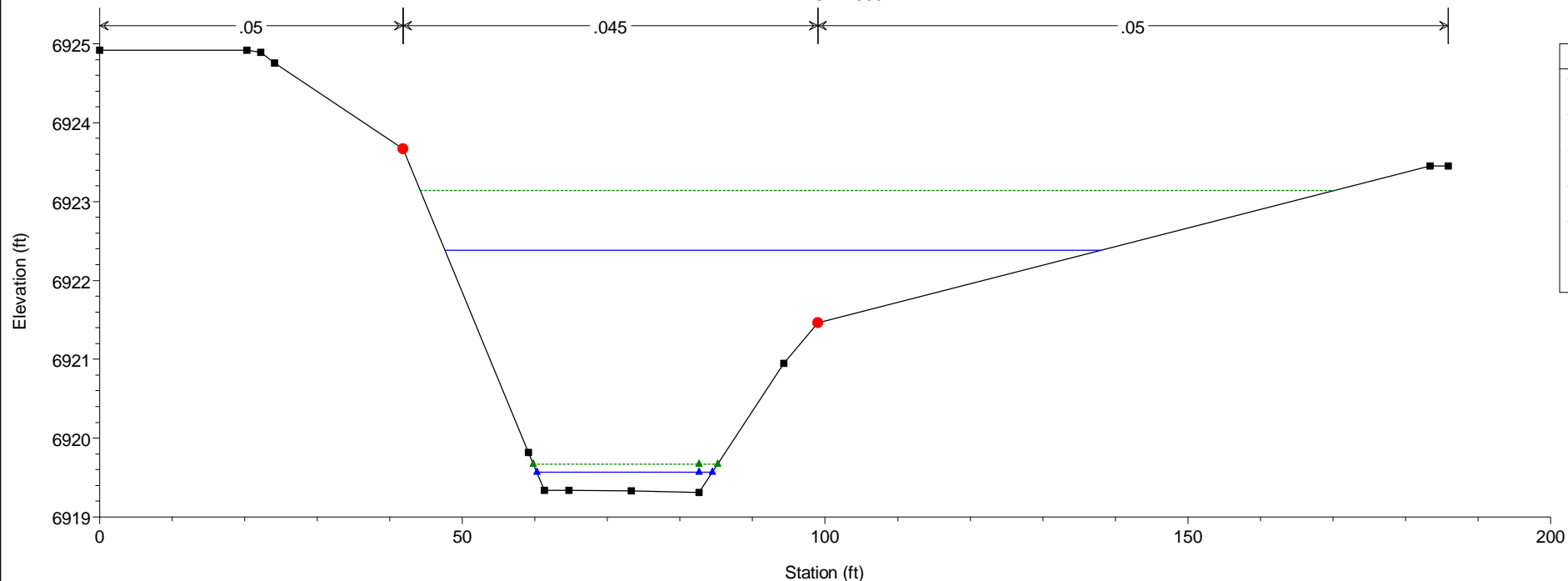
HEC-RAS Model Plan: Existing 5/21/2019
RS = 3000



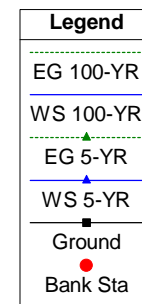
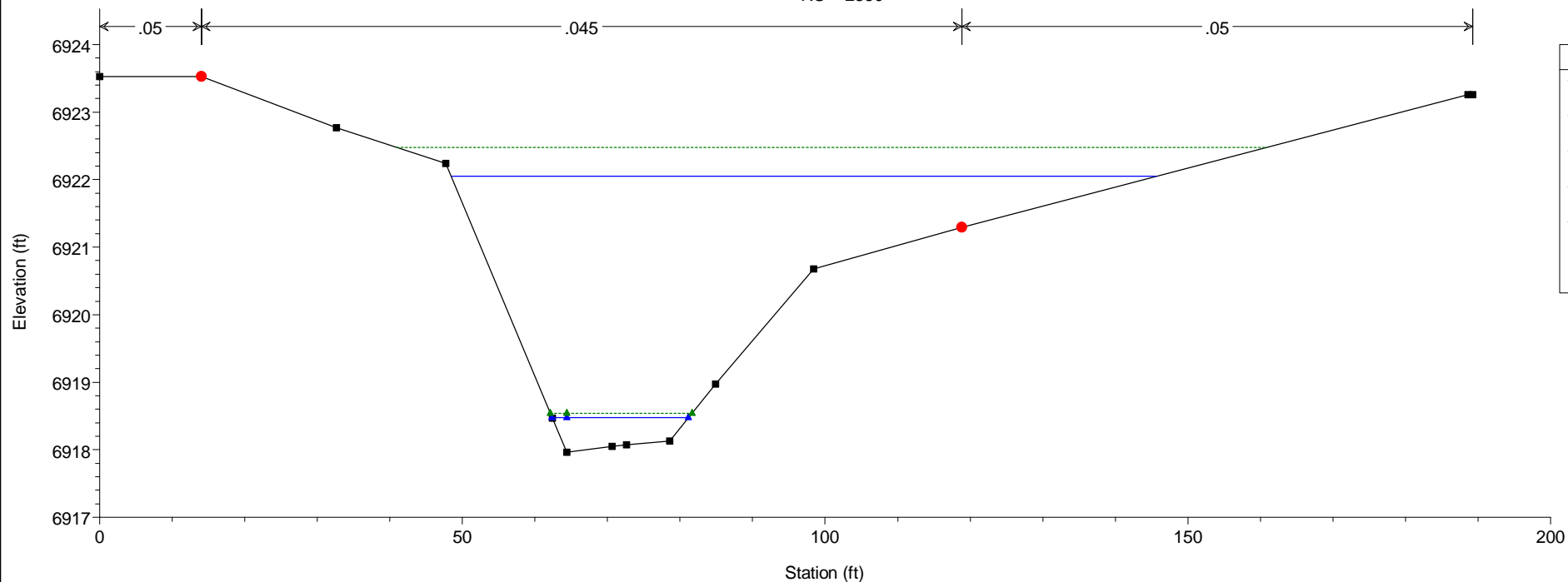
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2950



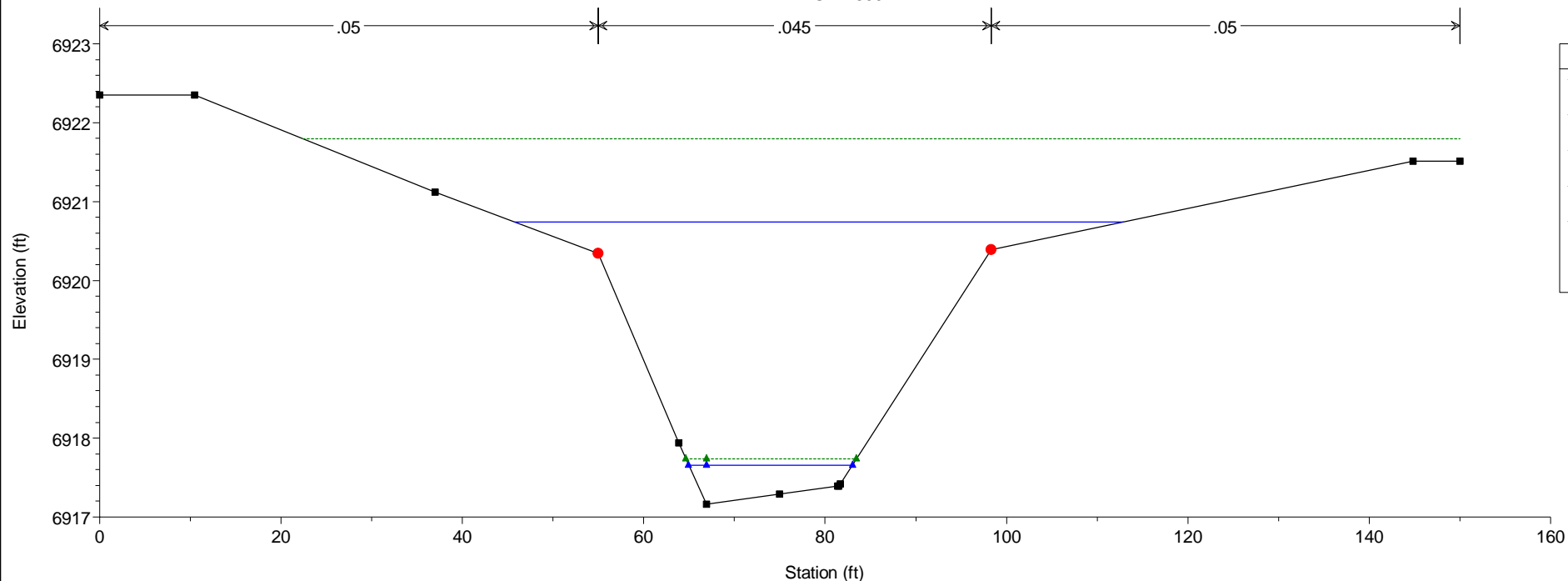
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2900



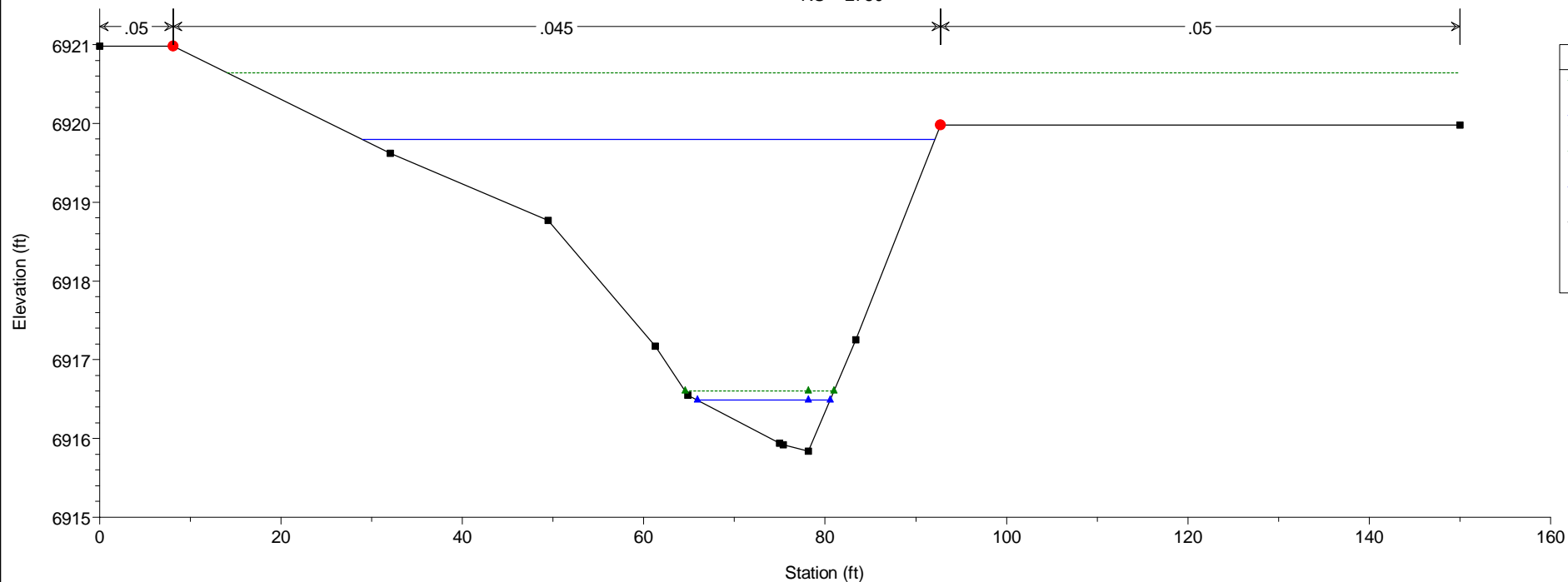
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2850



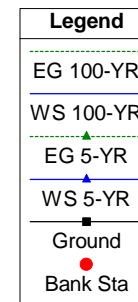
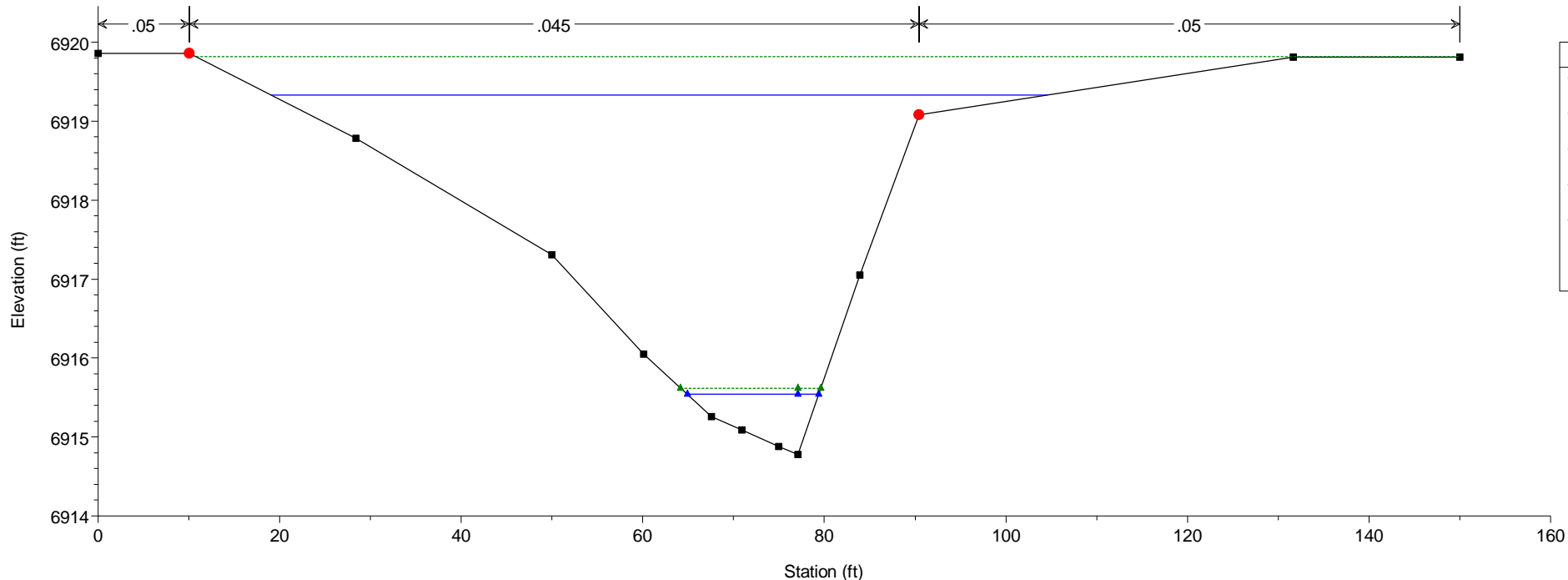
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2800



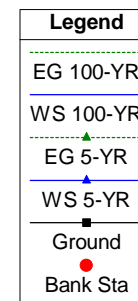
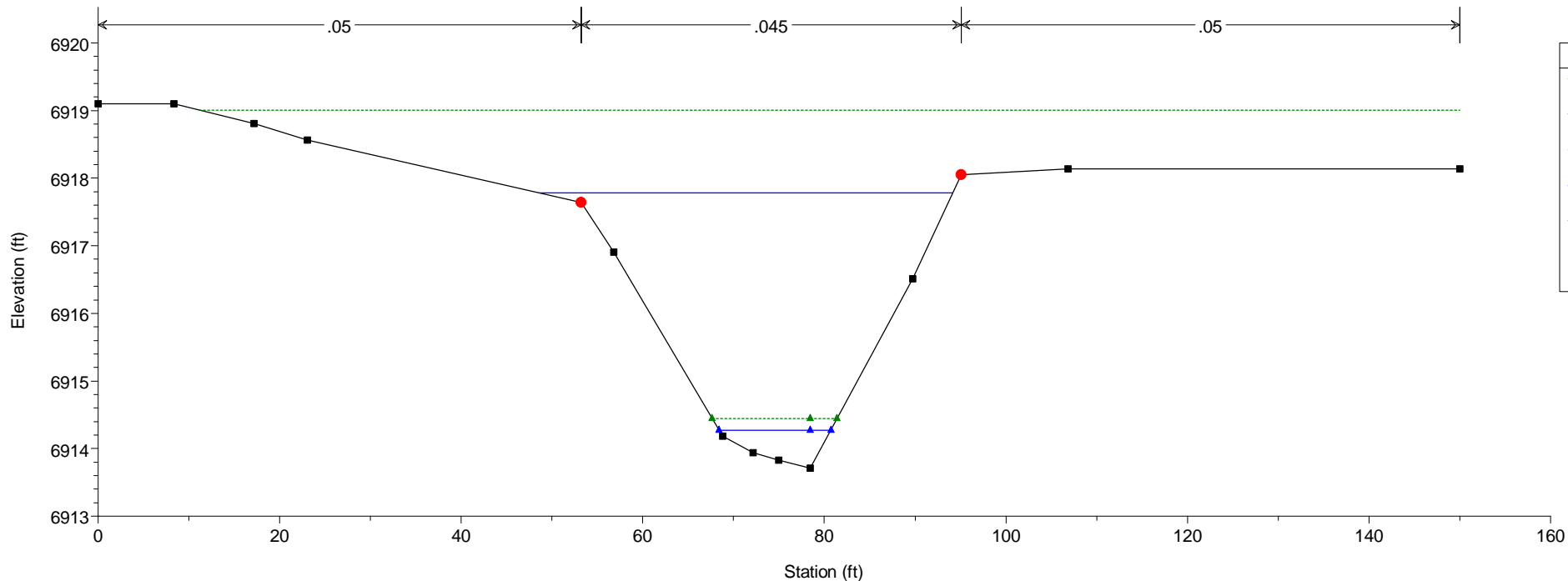
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2750



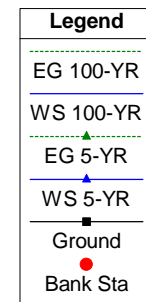
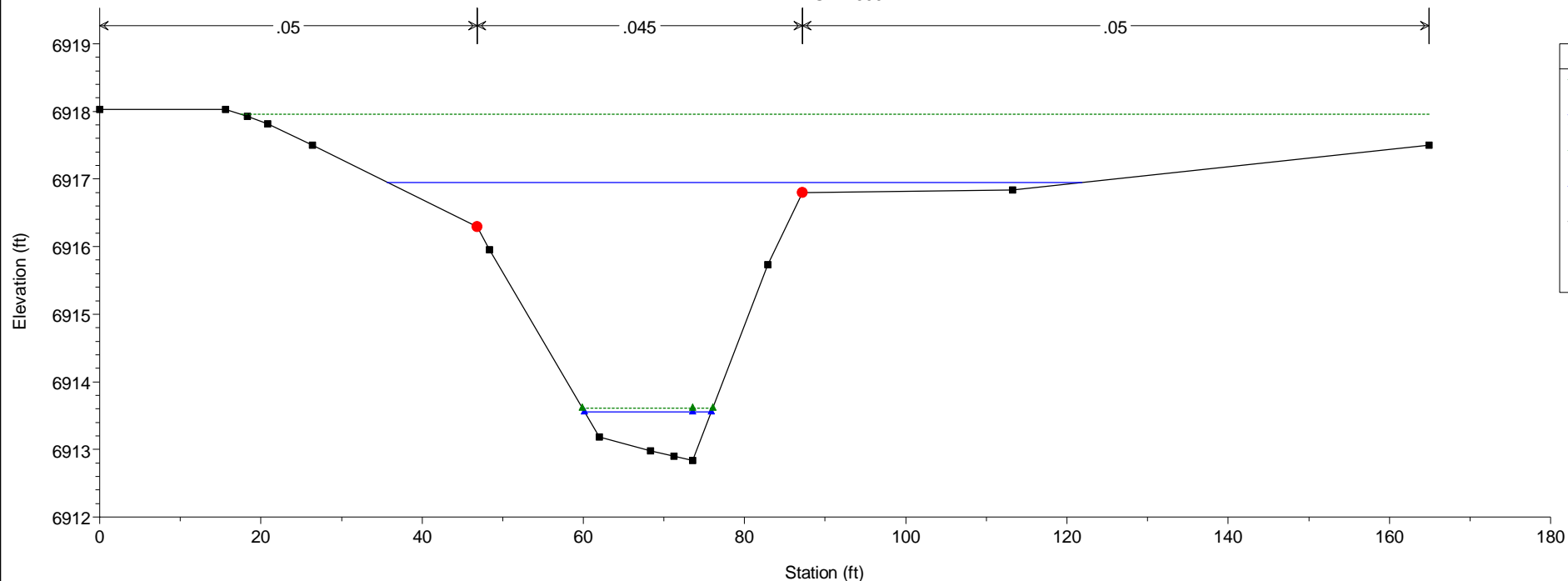
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2700



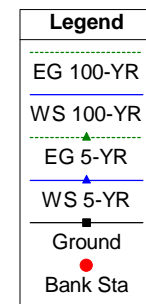
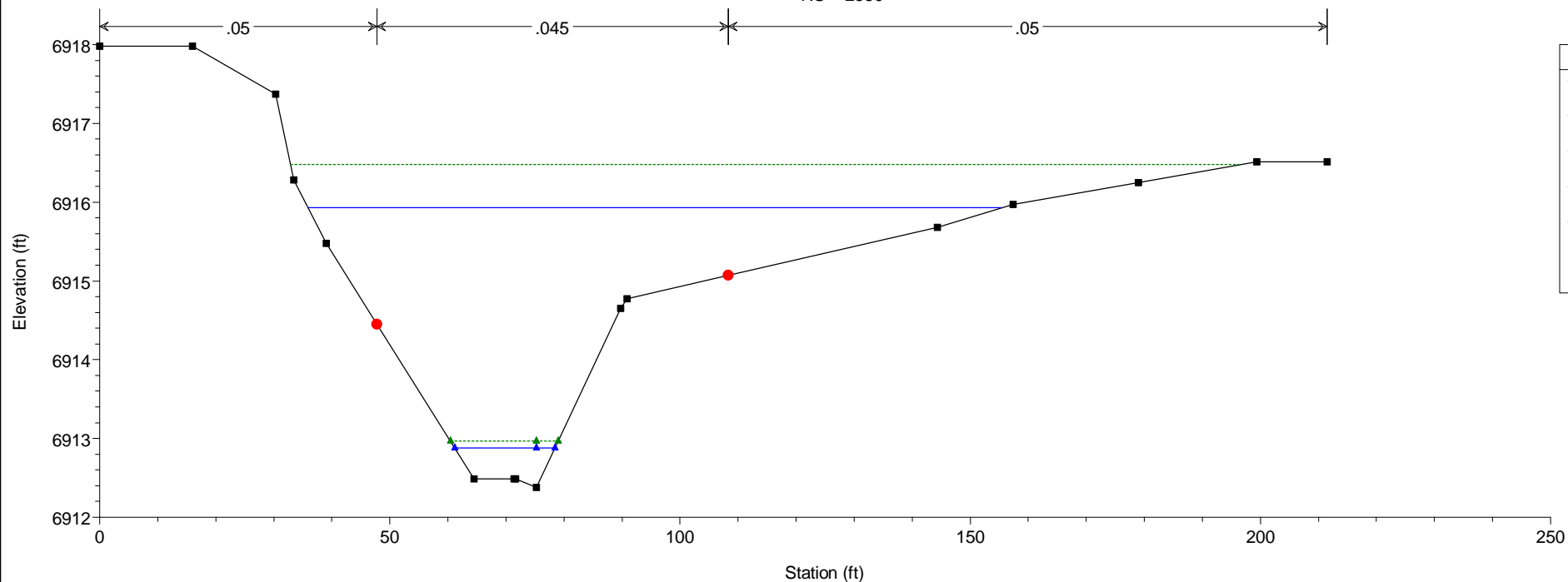
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2650



HEC-RAS Model Plan: Existing 5/21/2019
RS = 2600

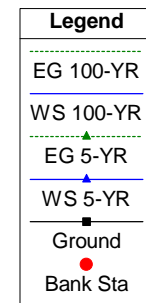
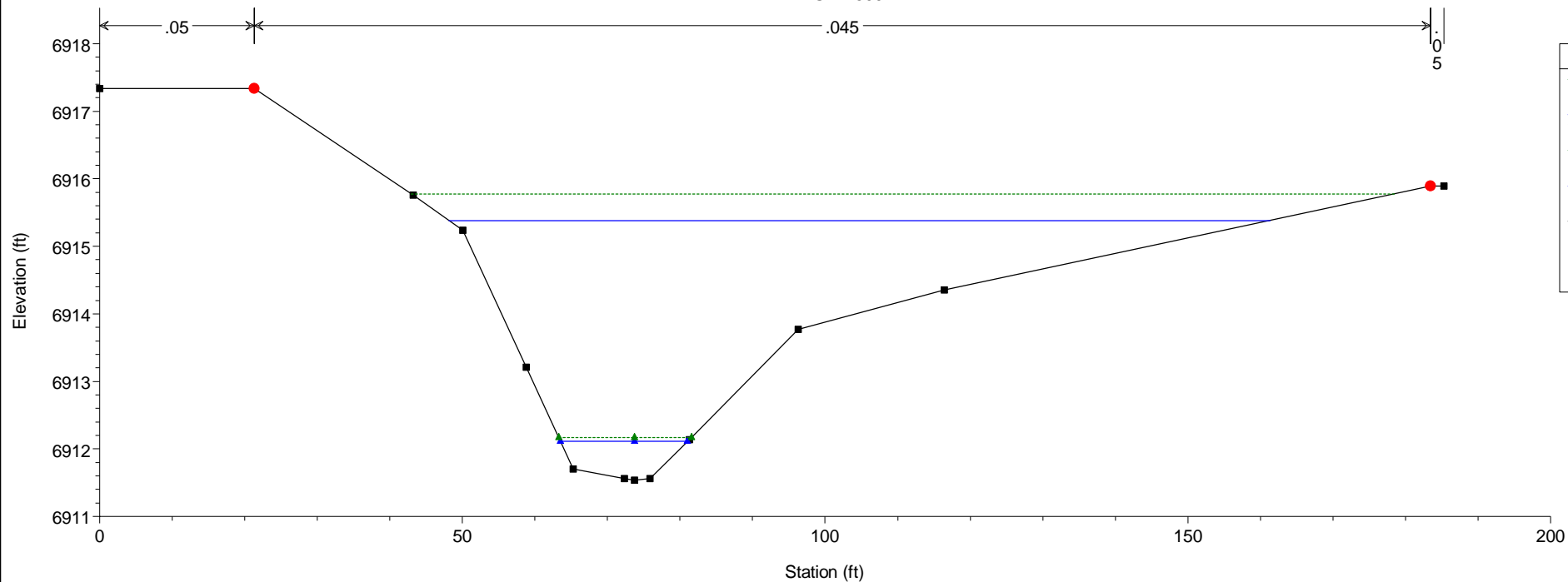


HEC-RAS Model Plan: Existing 5/21/2019
RS = 2550



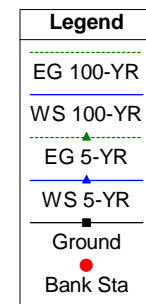
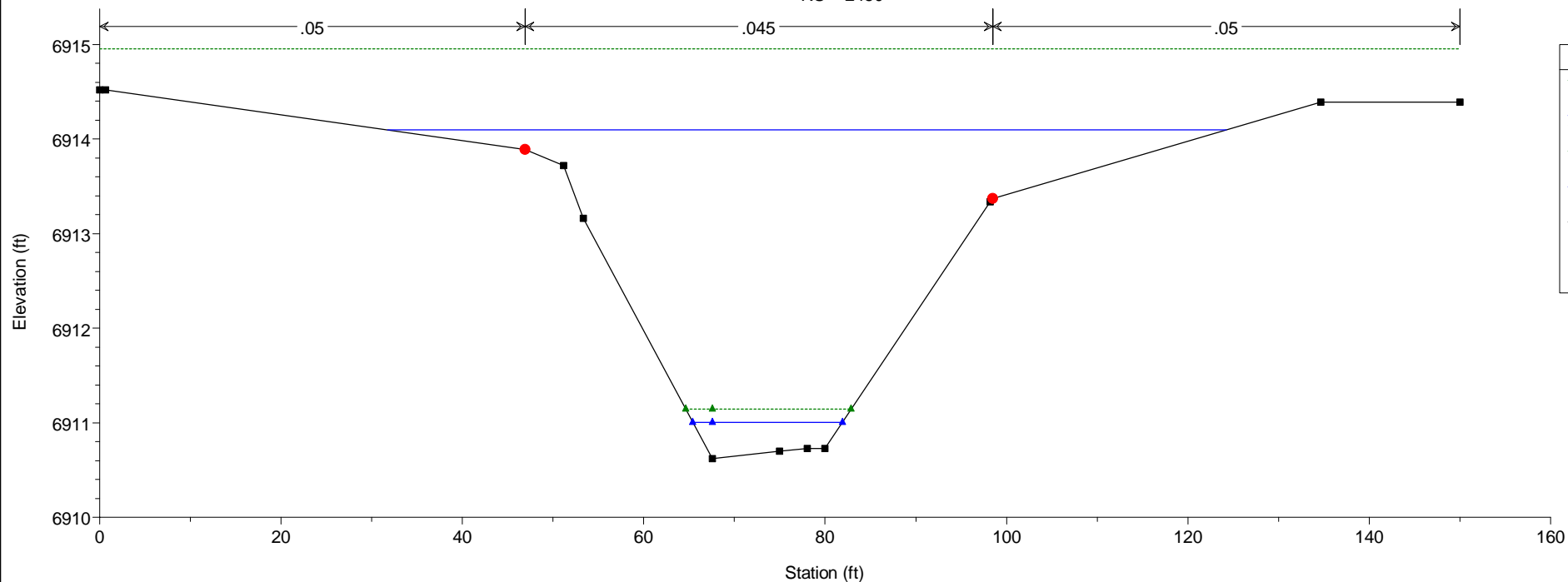
HEC-RAS Model Plan: Existing 5/21/2019

RS = 2500

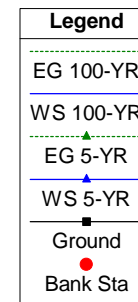
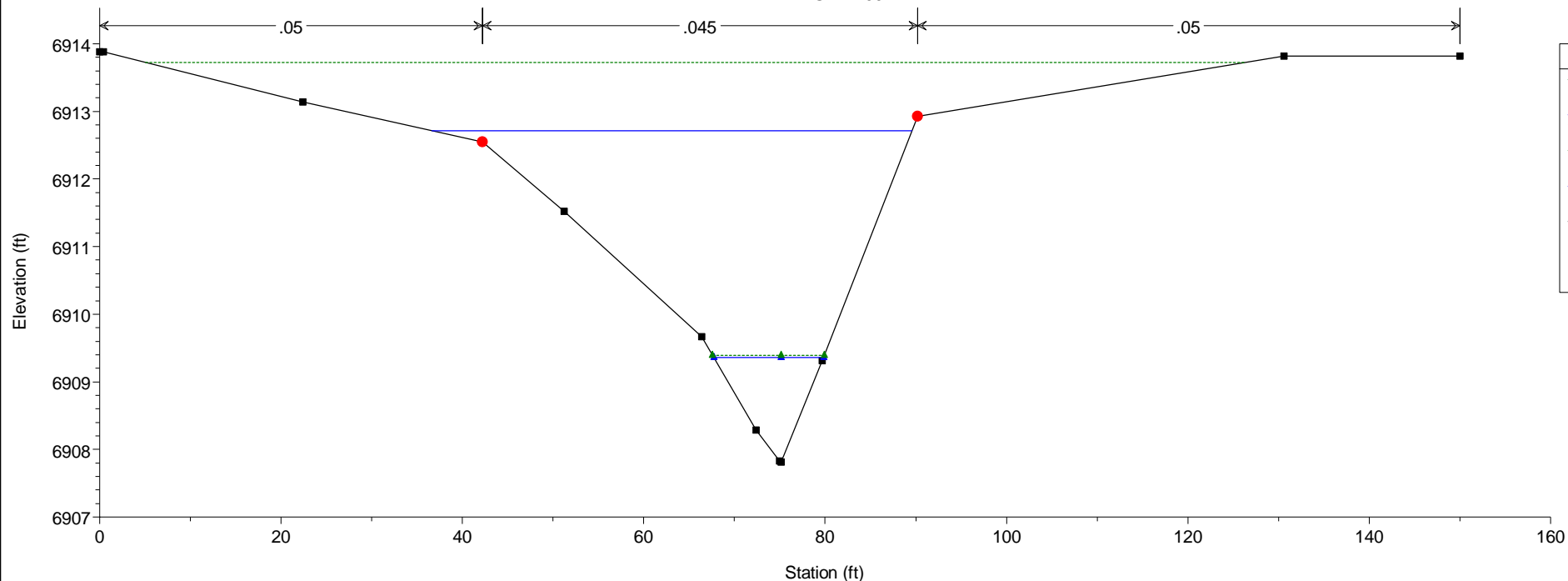


HEC-RAS Model Plan: Existing 5/21/2019

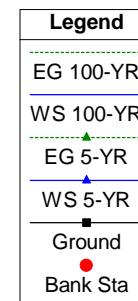
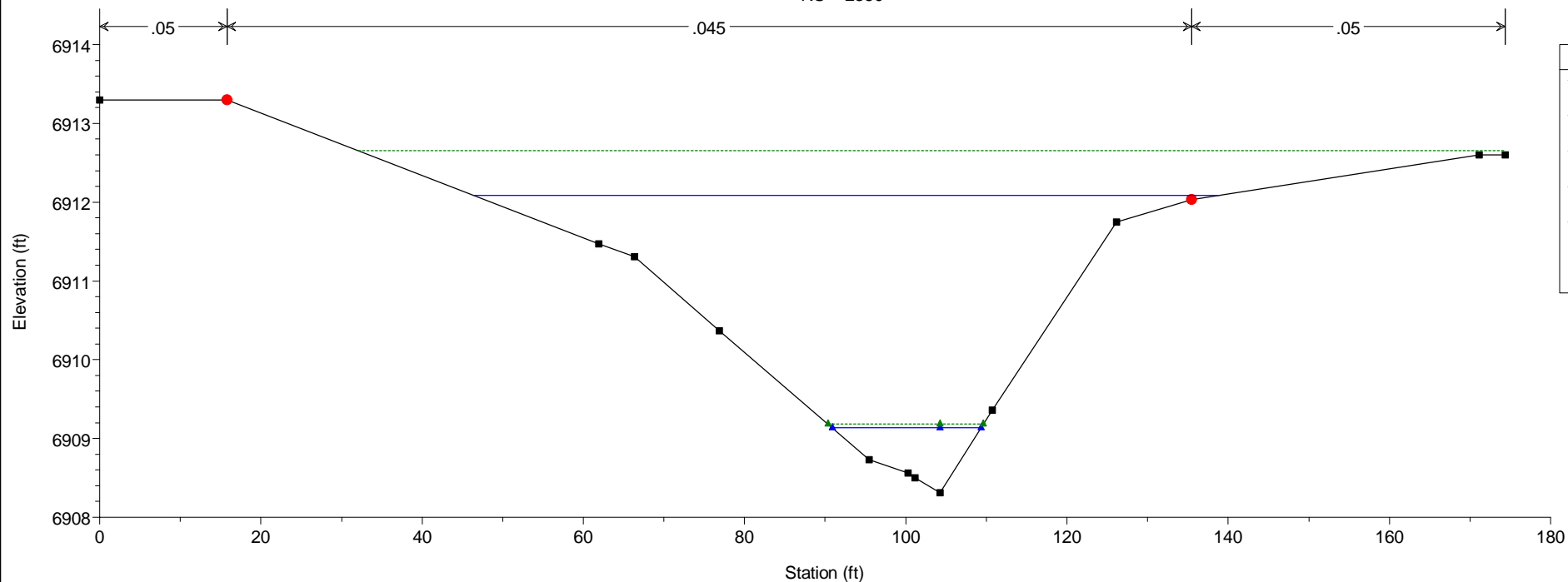
RS = 2450



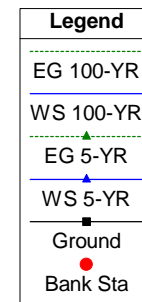
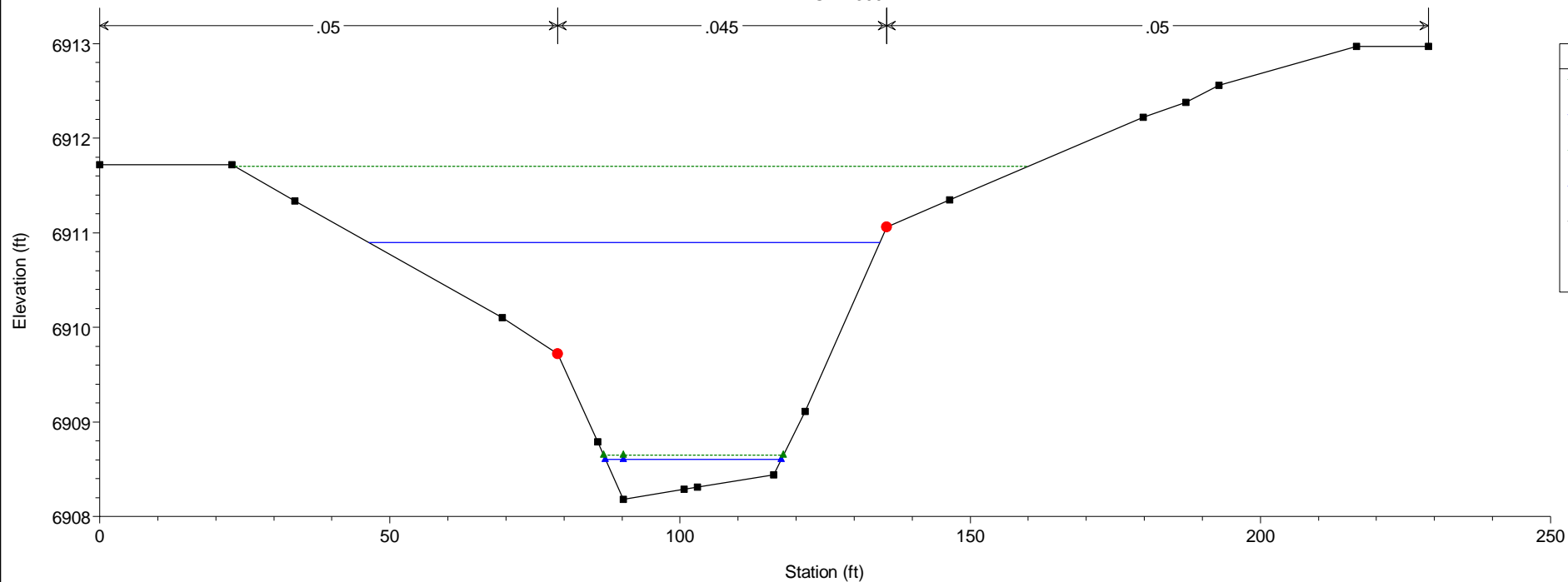
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2400



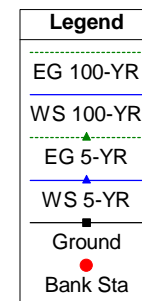
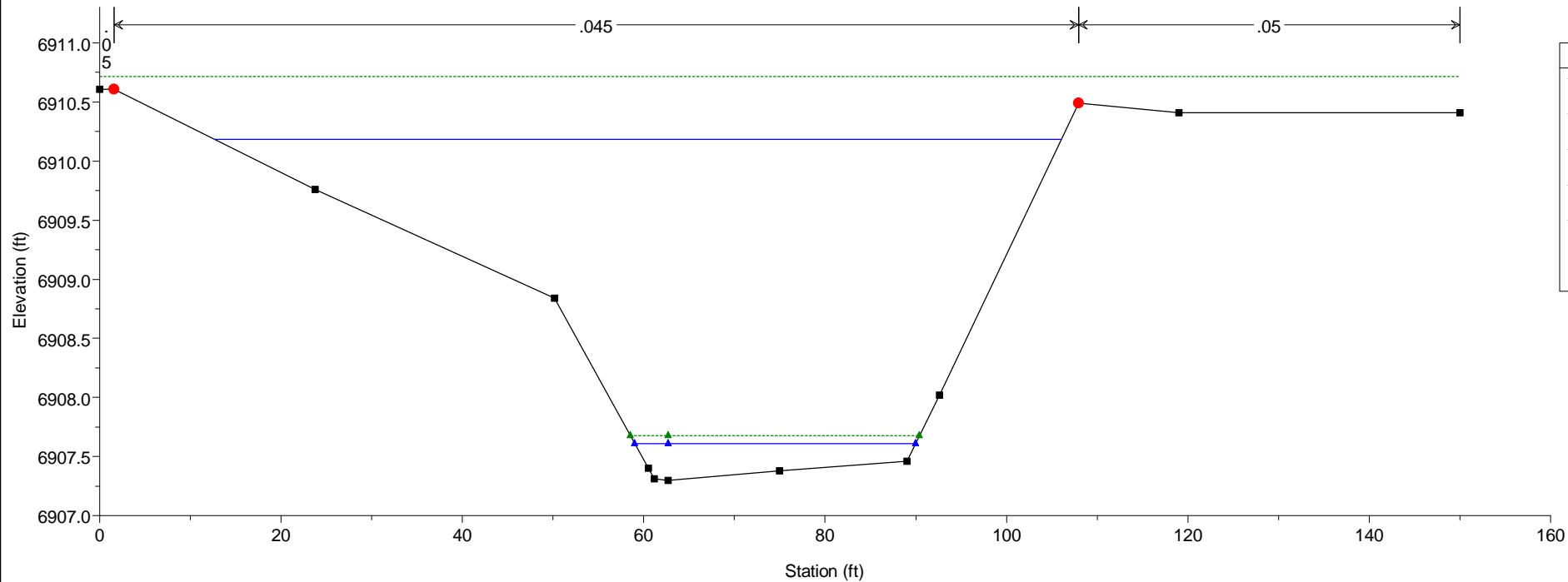
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2350



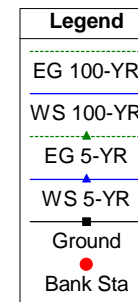
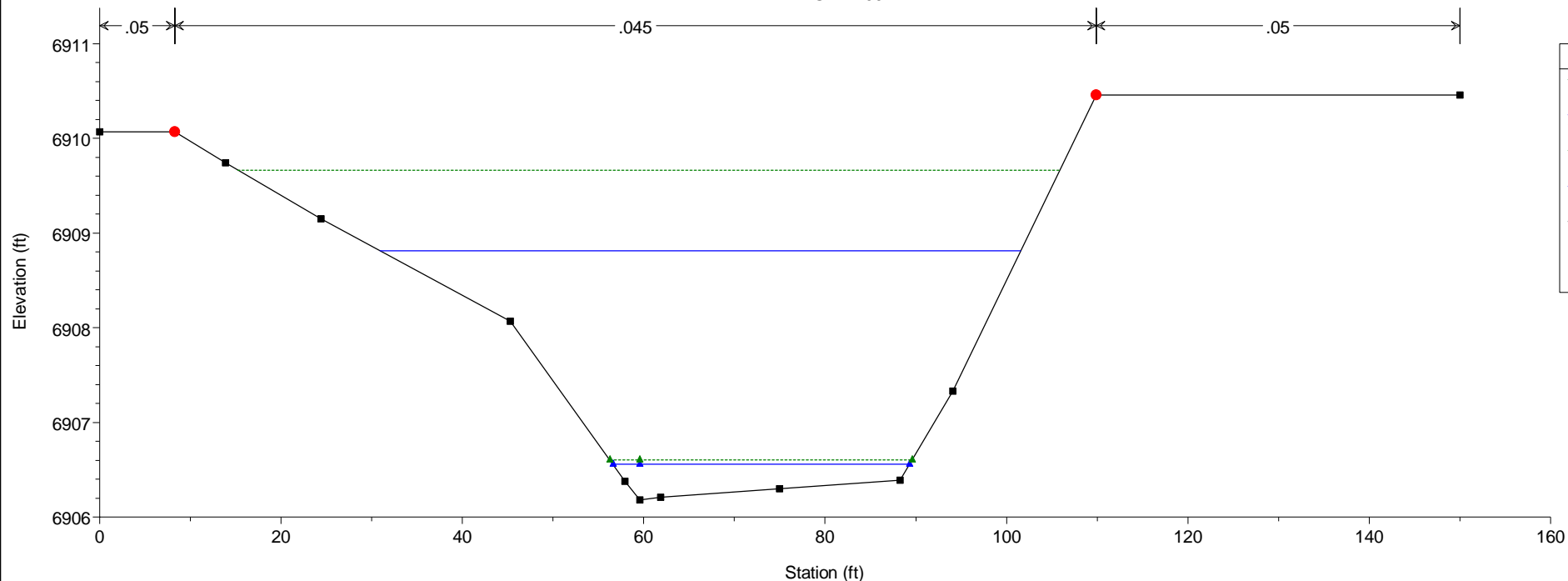
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2300



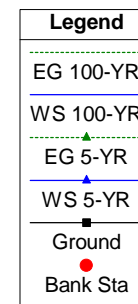
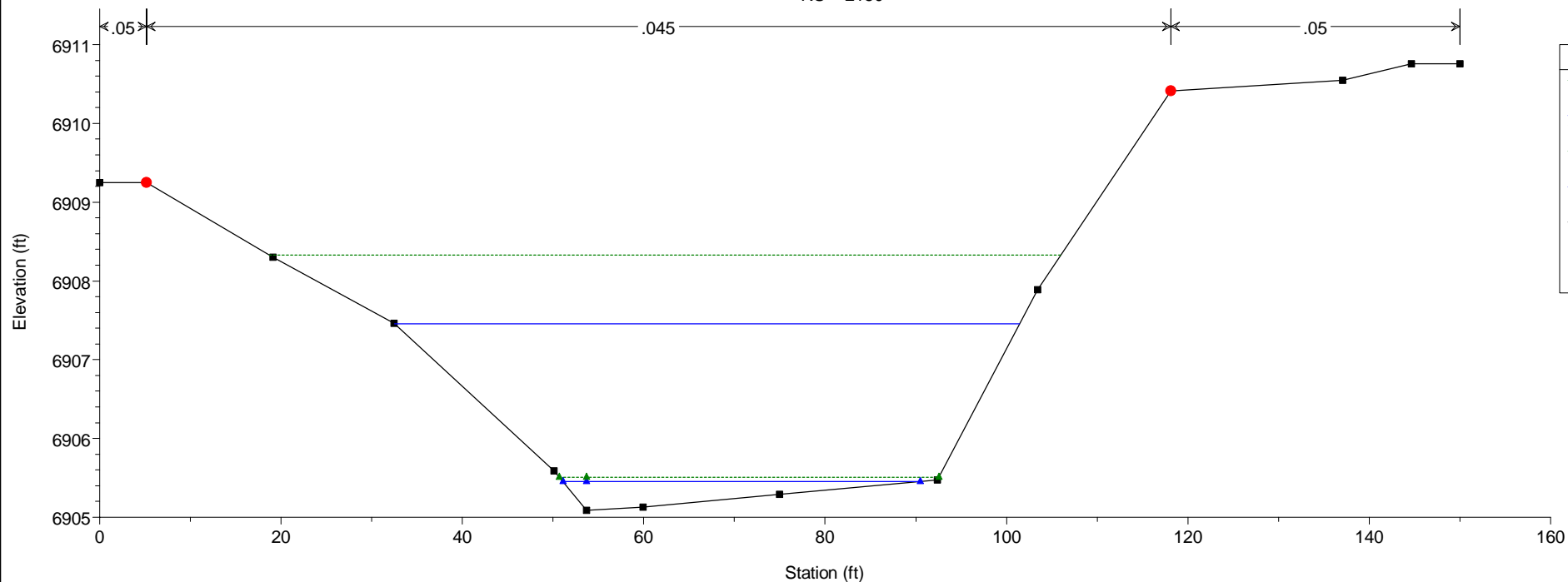
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2250



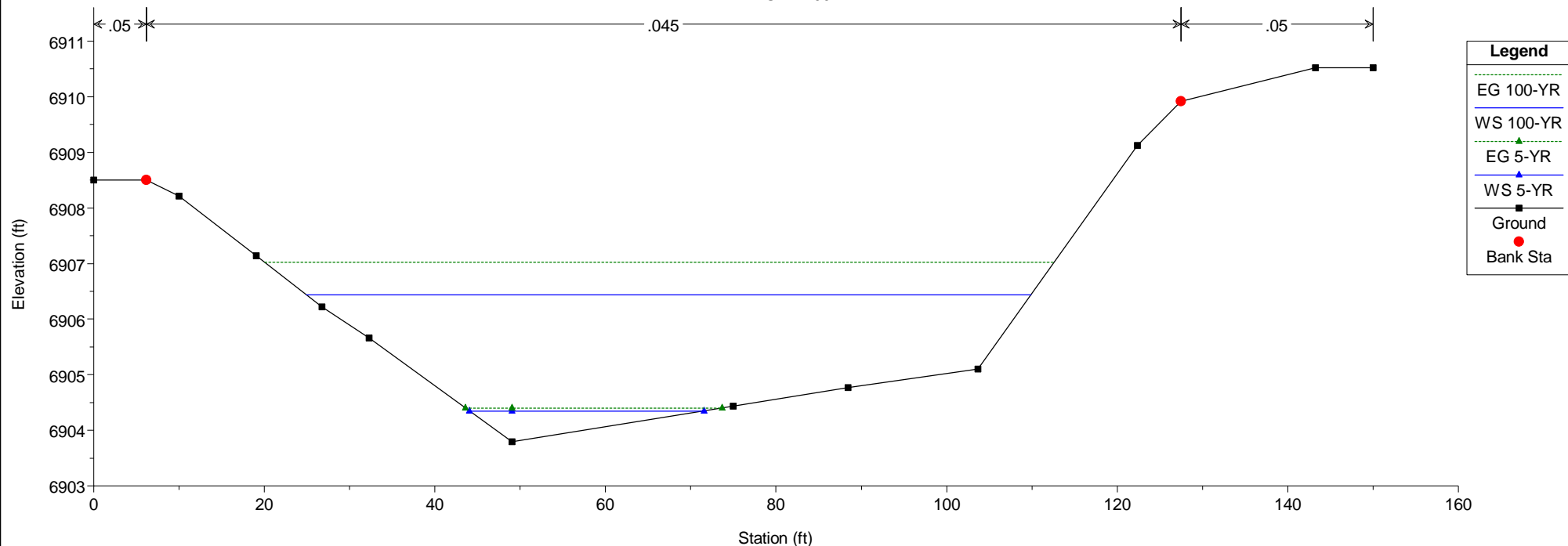
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2200



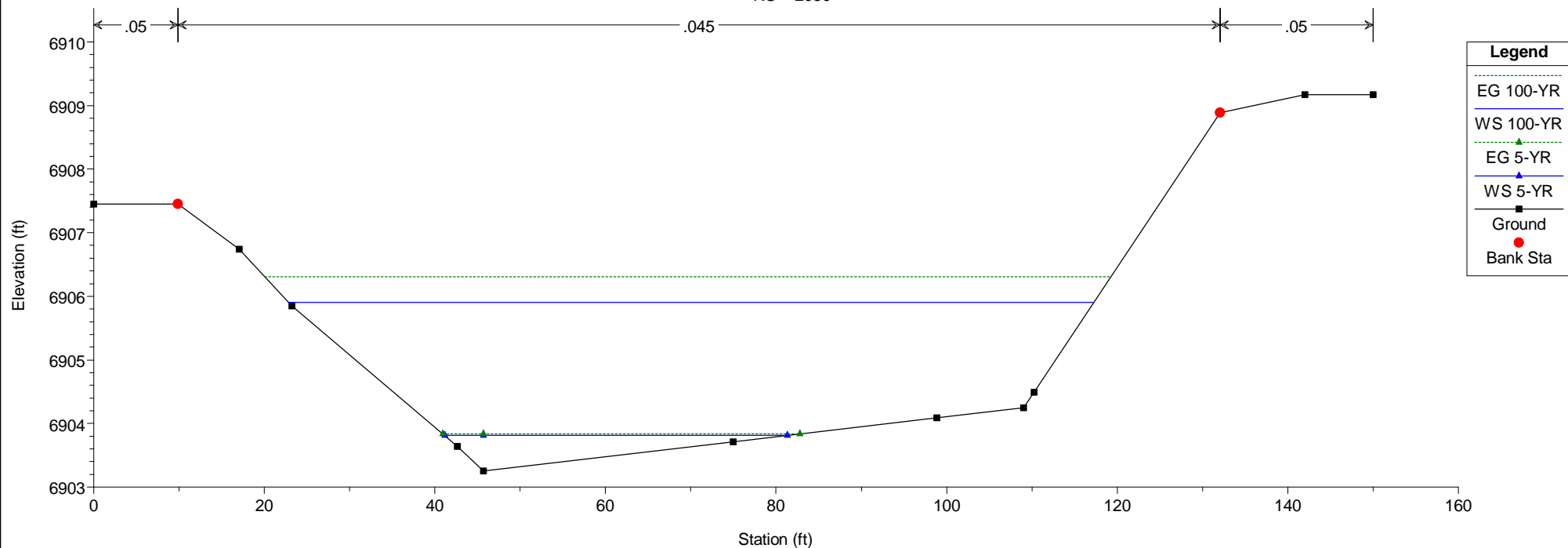
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2150



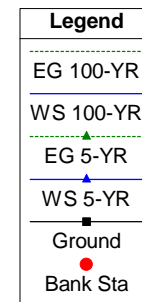
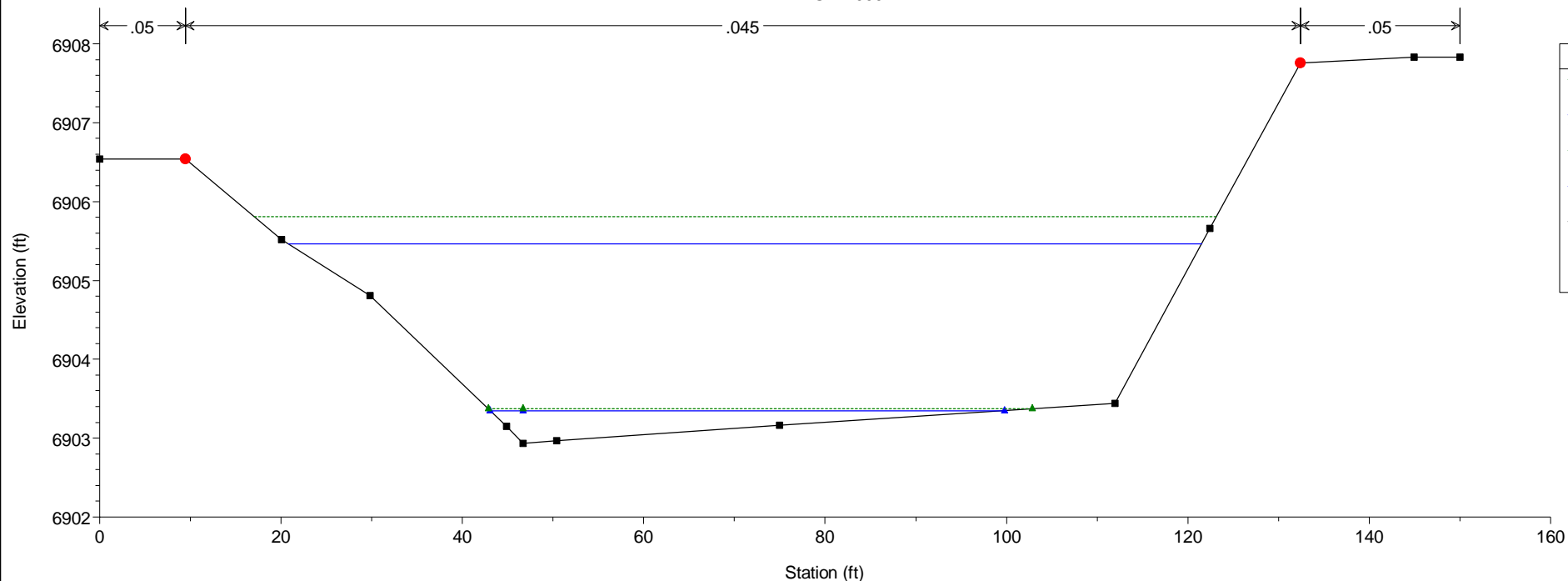
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2100



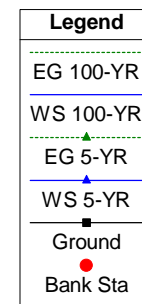
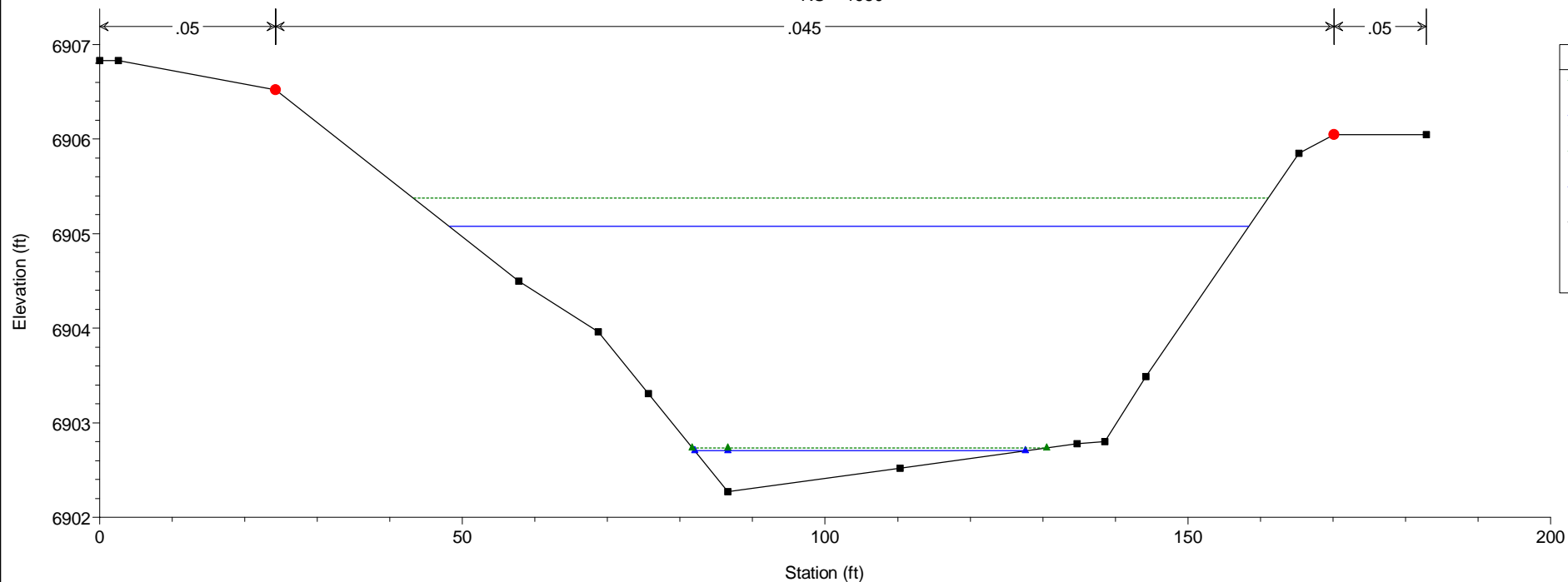
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2050



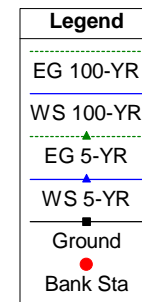
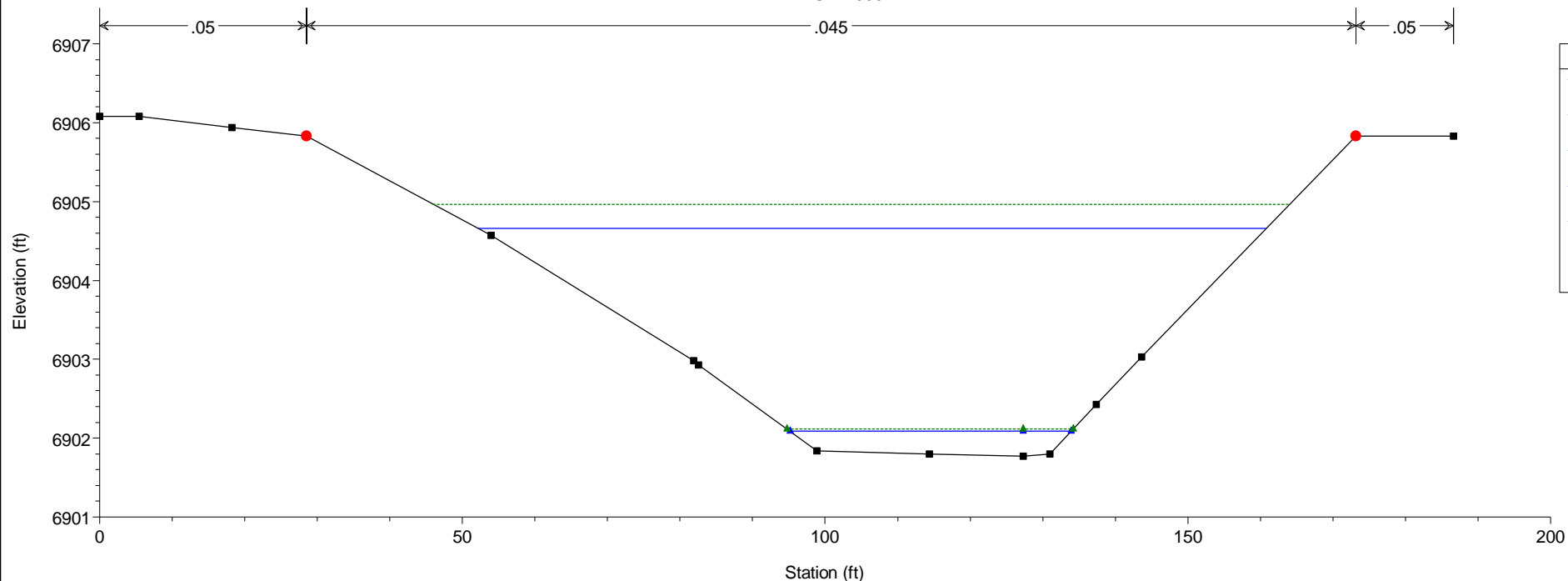
HEC-RAS Model Plan: Existing 5/21/2019
RS = 2000



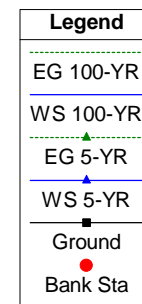
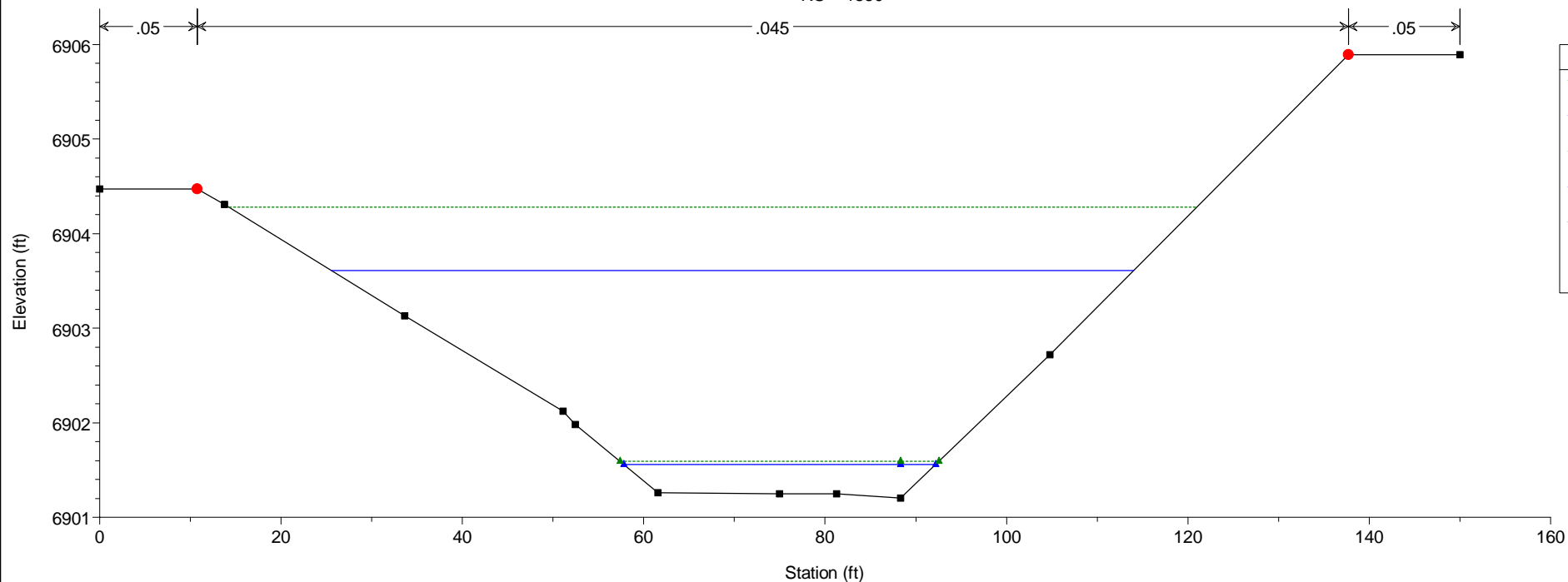
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1950



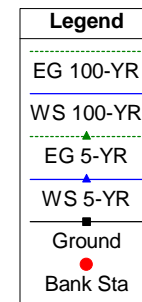
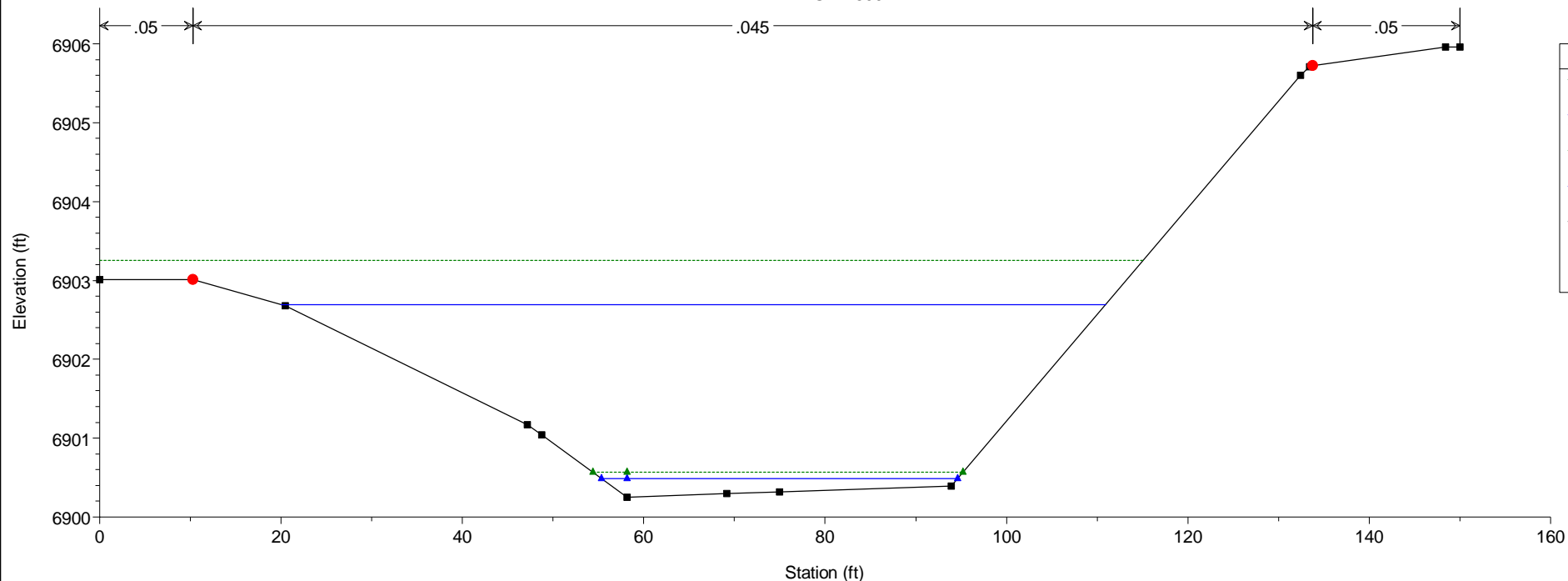
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1900



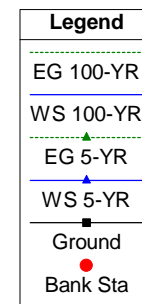
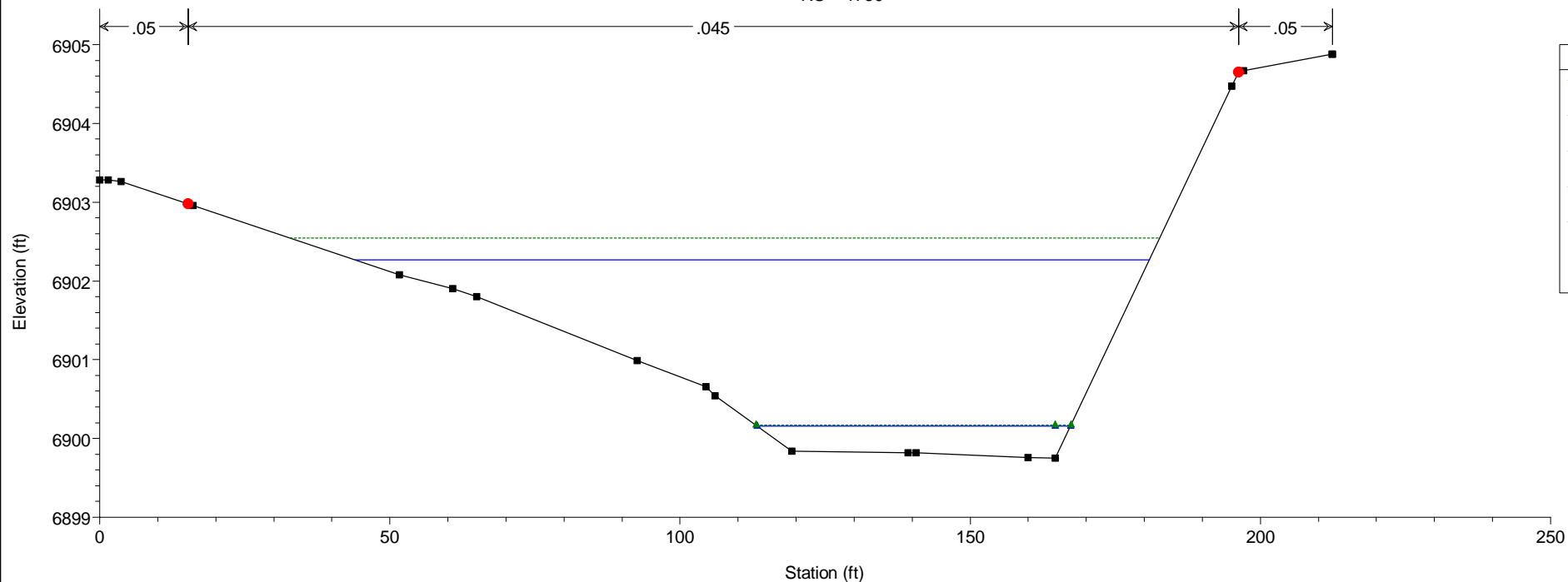
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1850



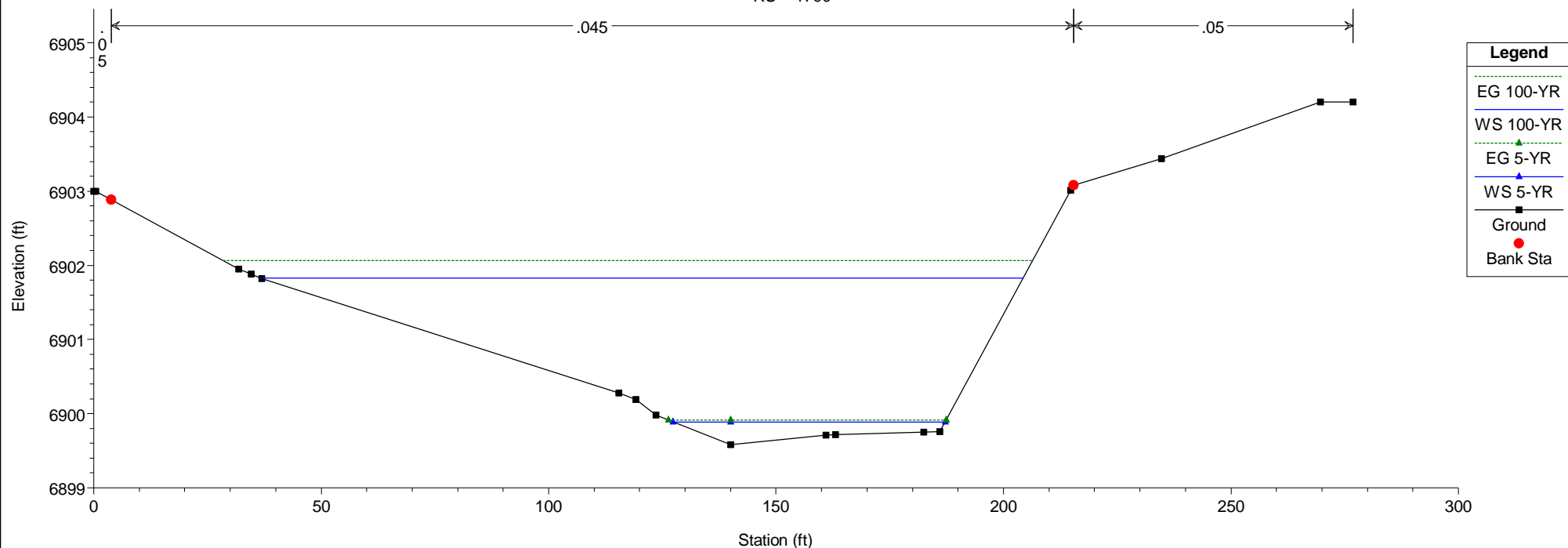
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1800



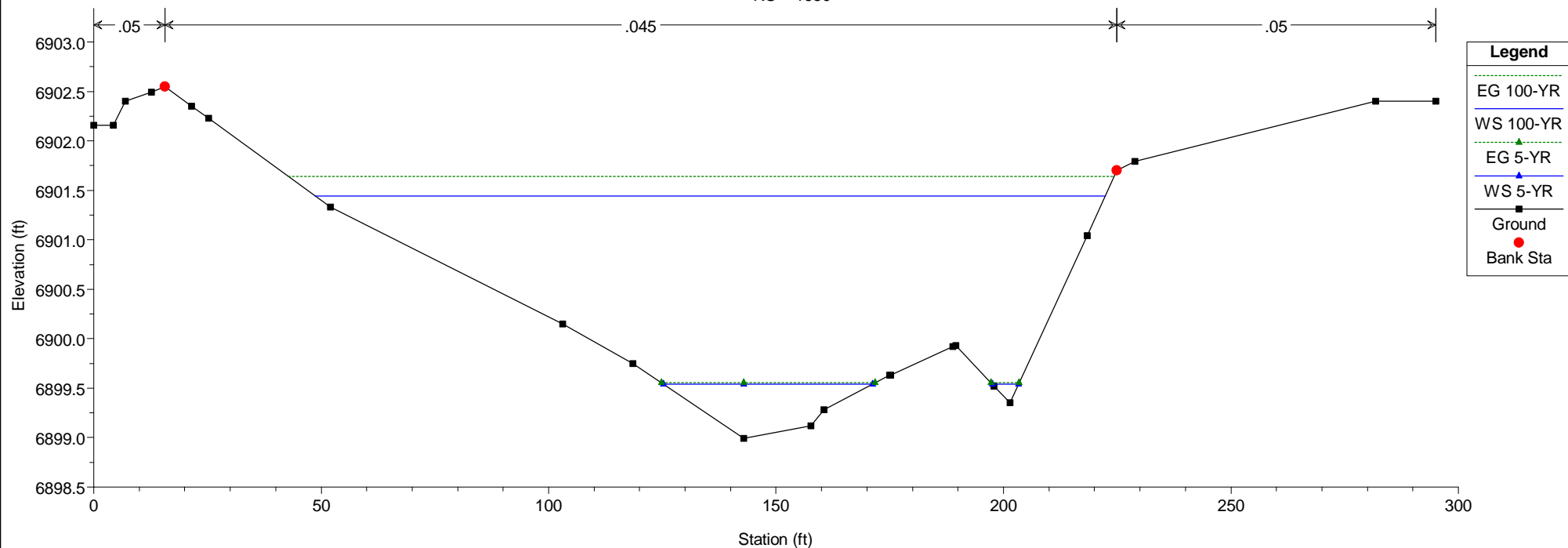
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1750



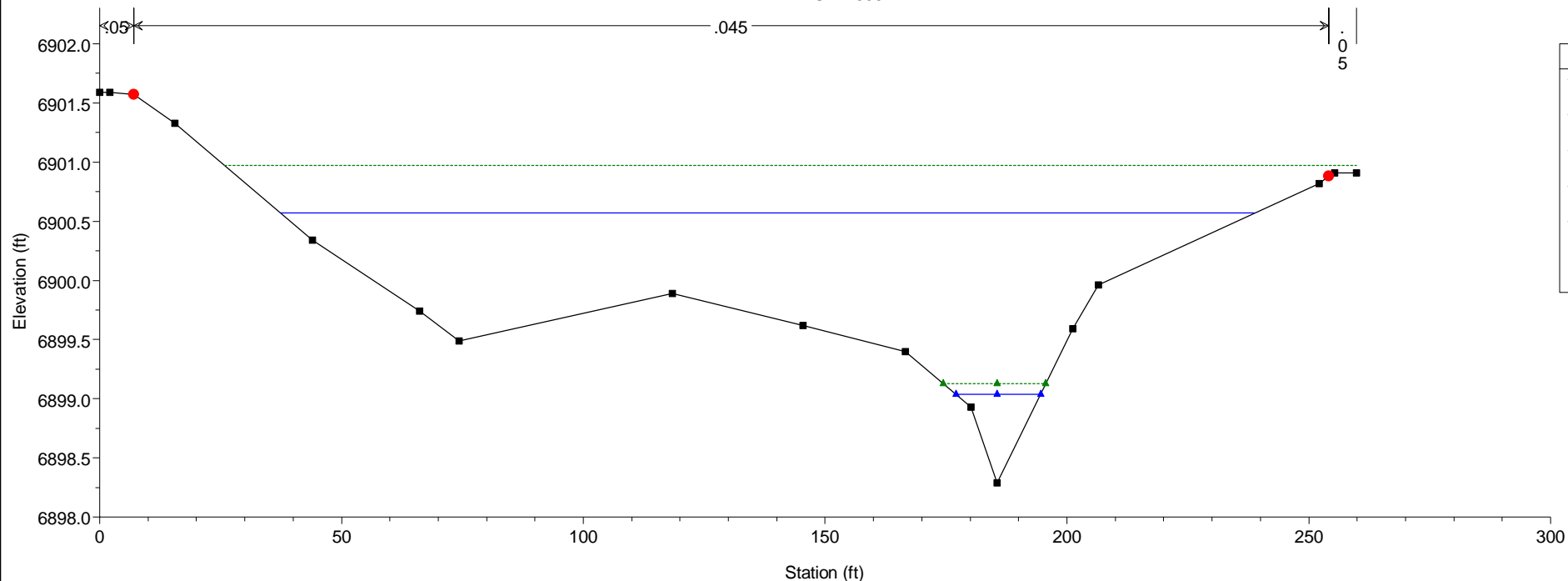
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1700



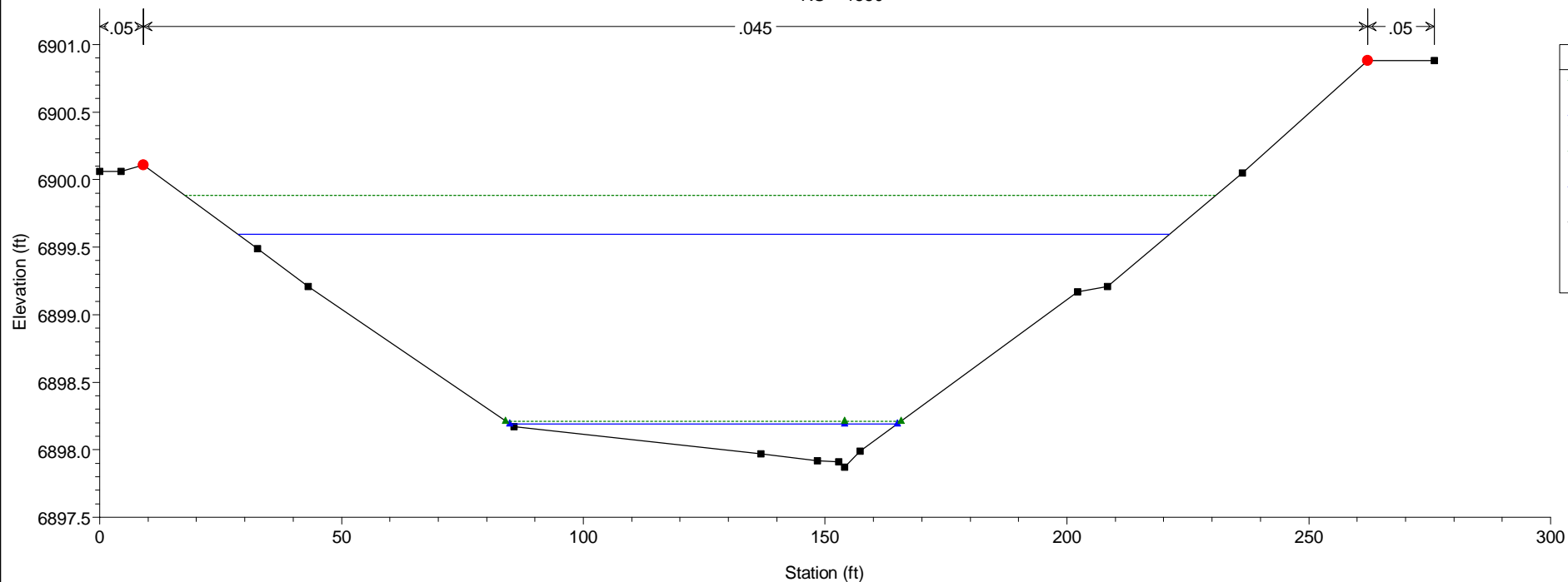
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1650



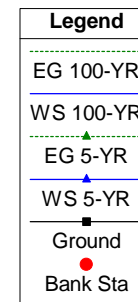
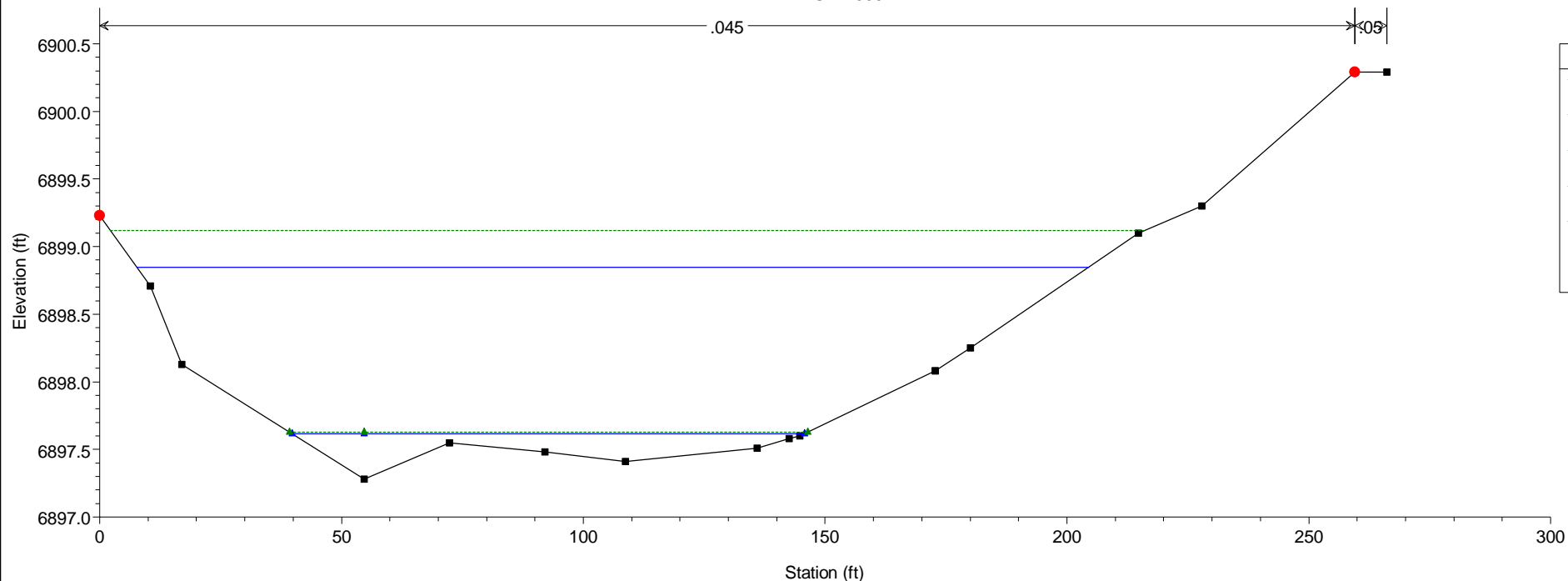
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1600



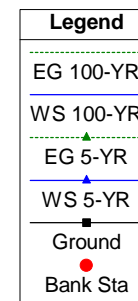
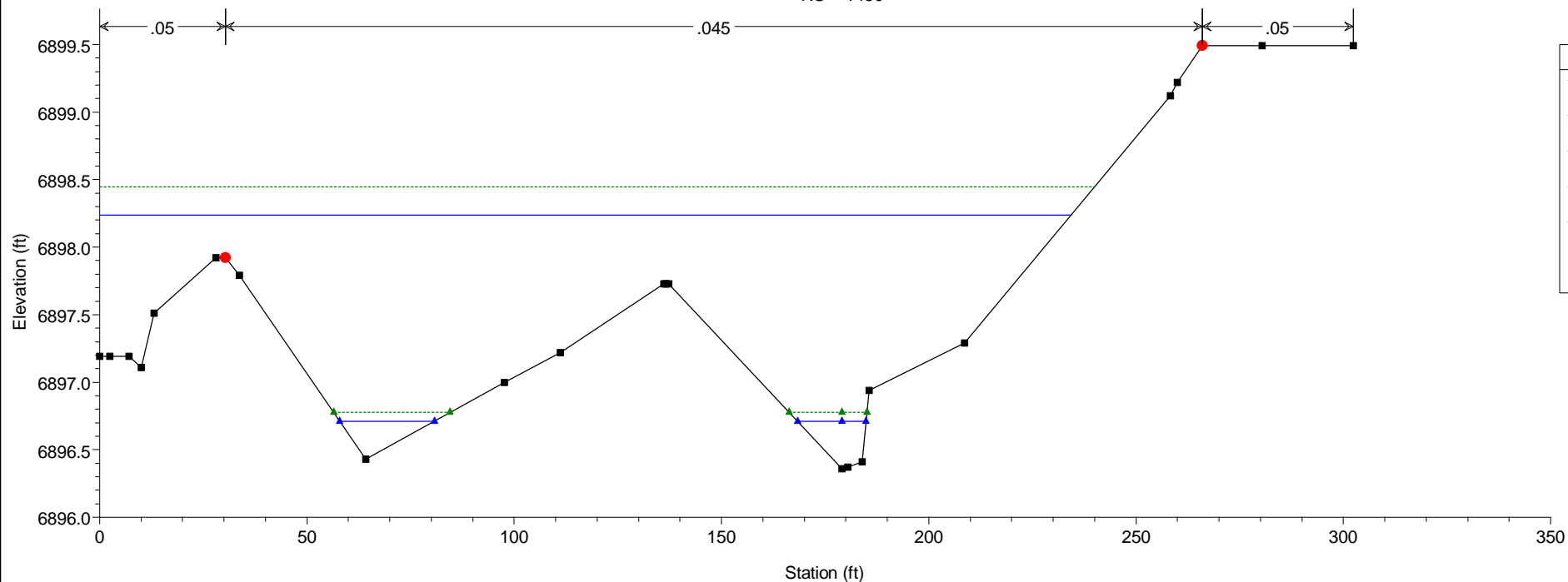
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1550



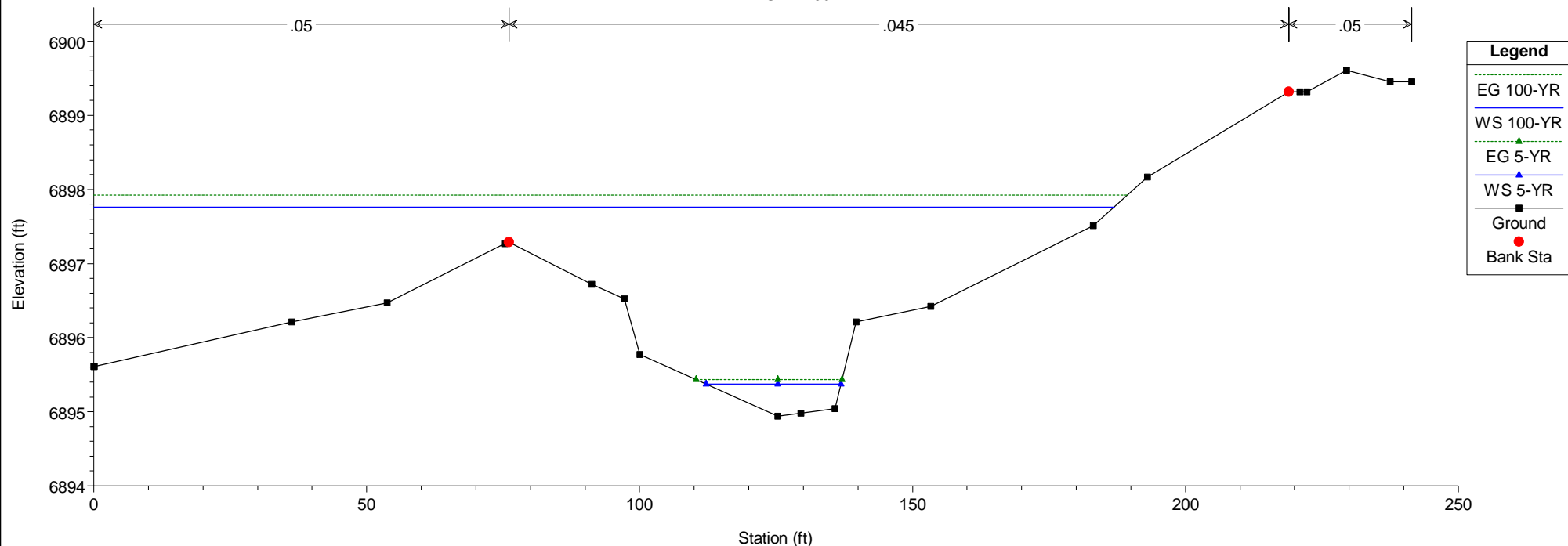
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1500



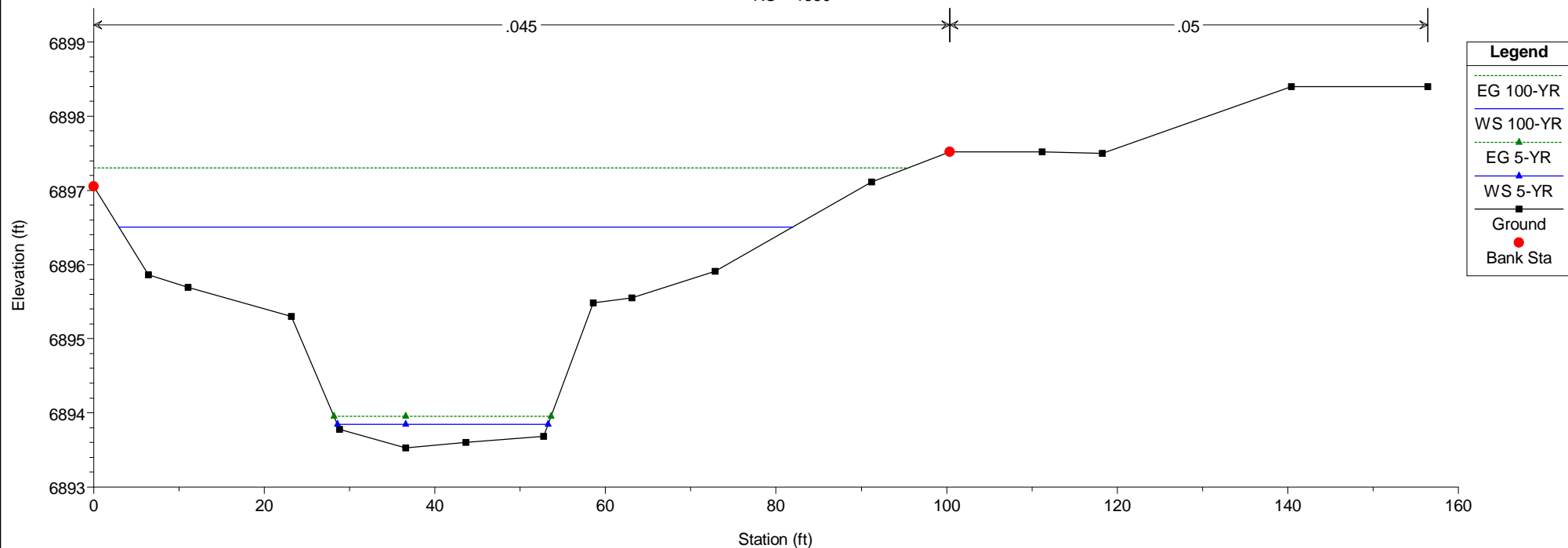
HEC-RAS Model Plan: Existing 5/21/2019
RS = 1450



HEC-RAS Model Plan: Existing 5/21/2019
RS = 1400

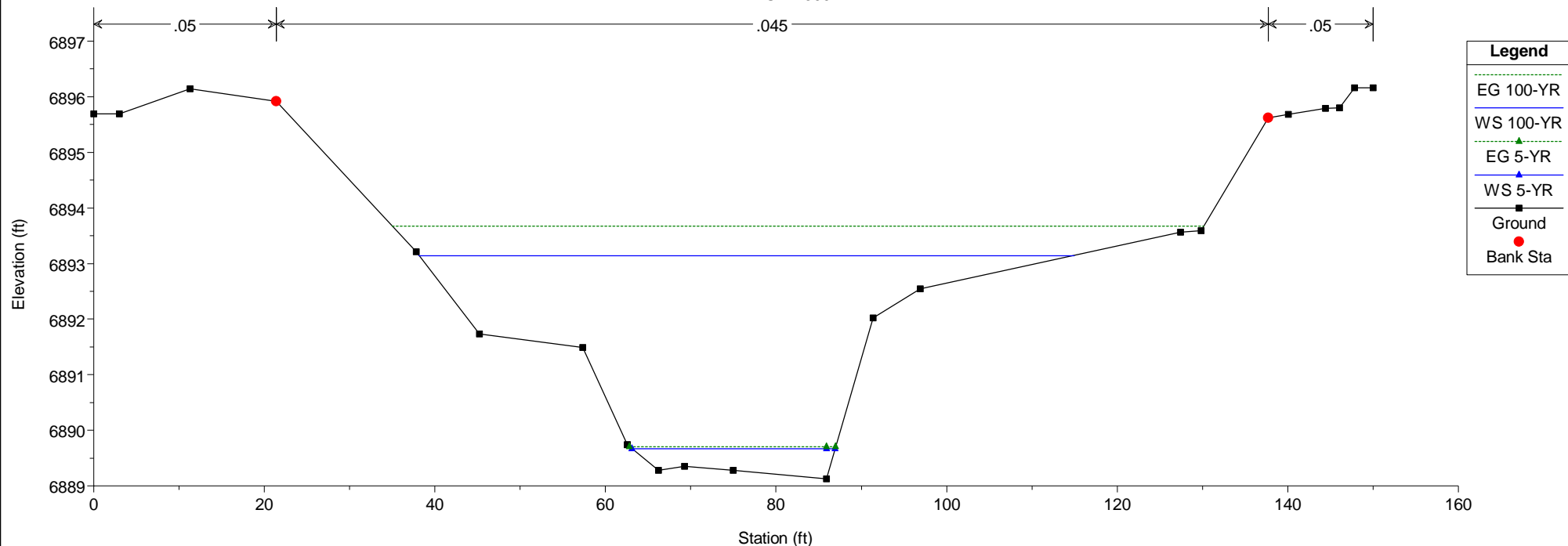


HEC-RAS Model Plan: Existing 5/21/2019
RS = 1350



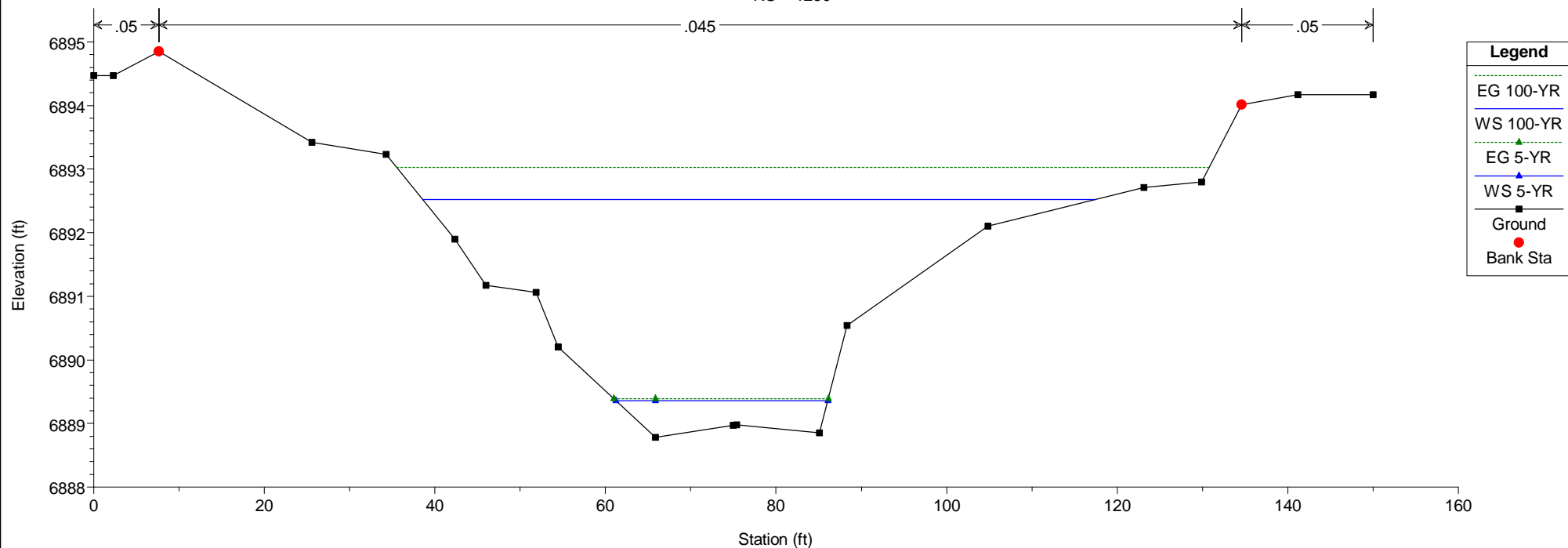
HEC-RAS Model Plan: Existing 5/21/2019

RS = 1300



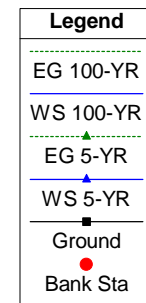
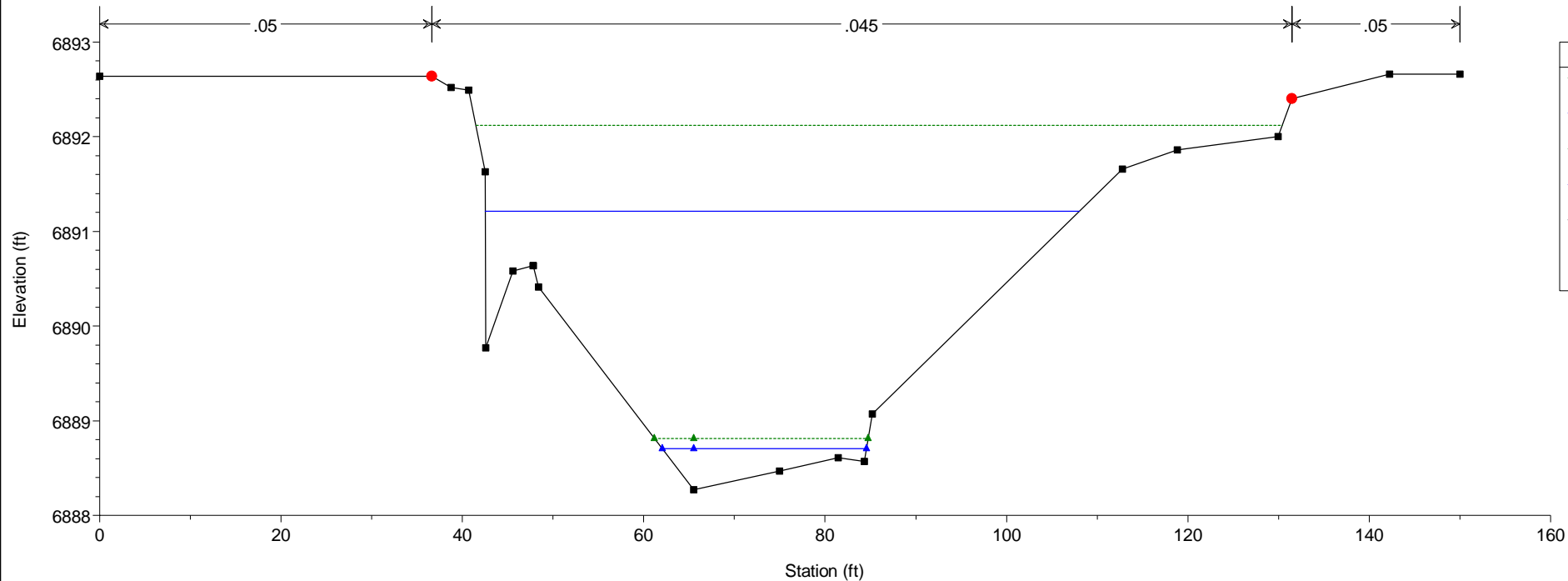
HEC-RAS Model Plan: Existing 5/21/2019

RS = 1250



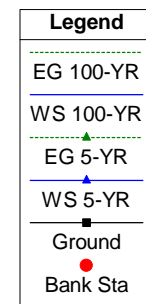
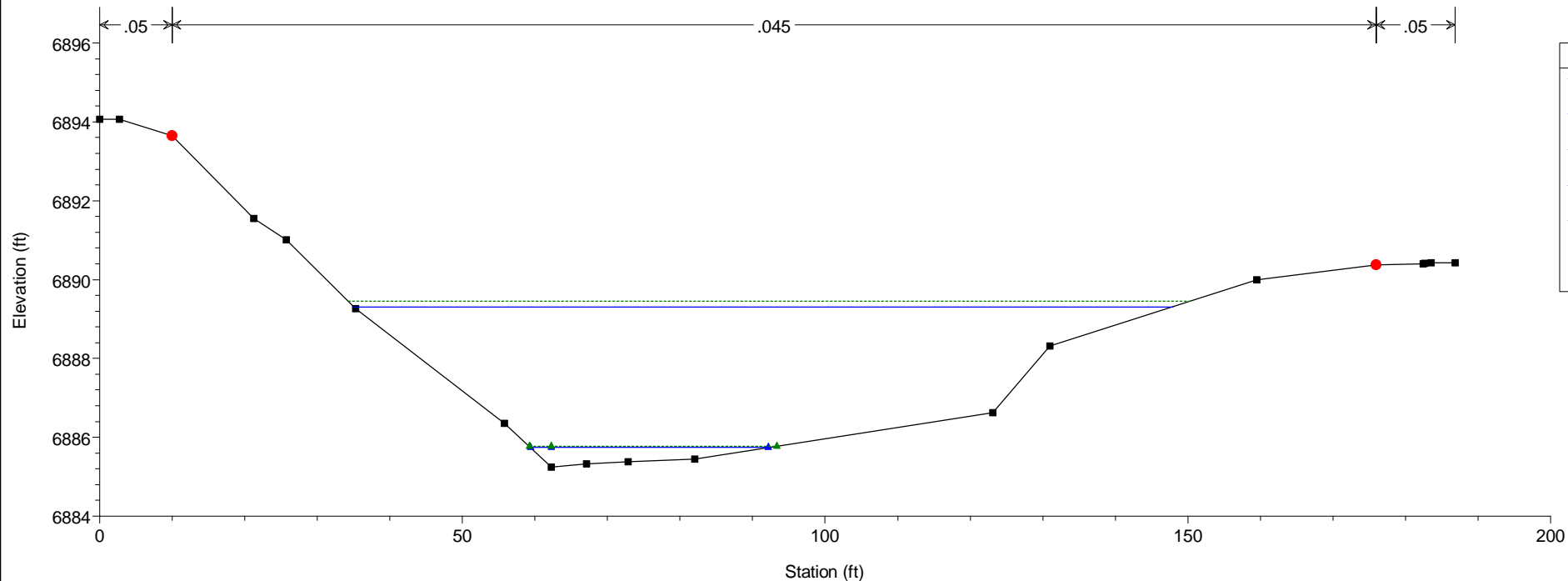
HEC-RAS Model Plan: Existing 5/21/2019

RS = 1200

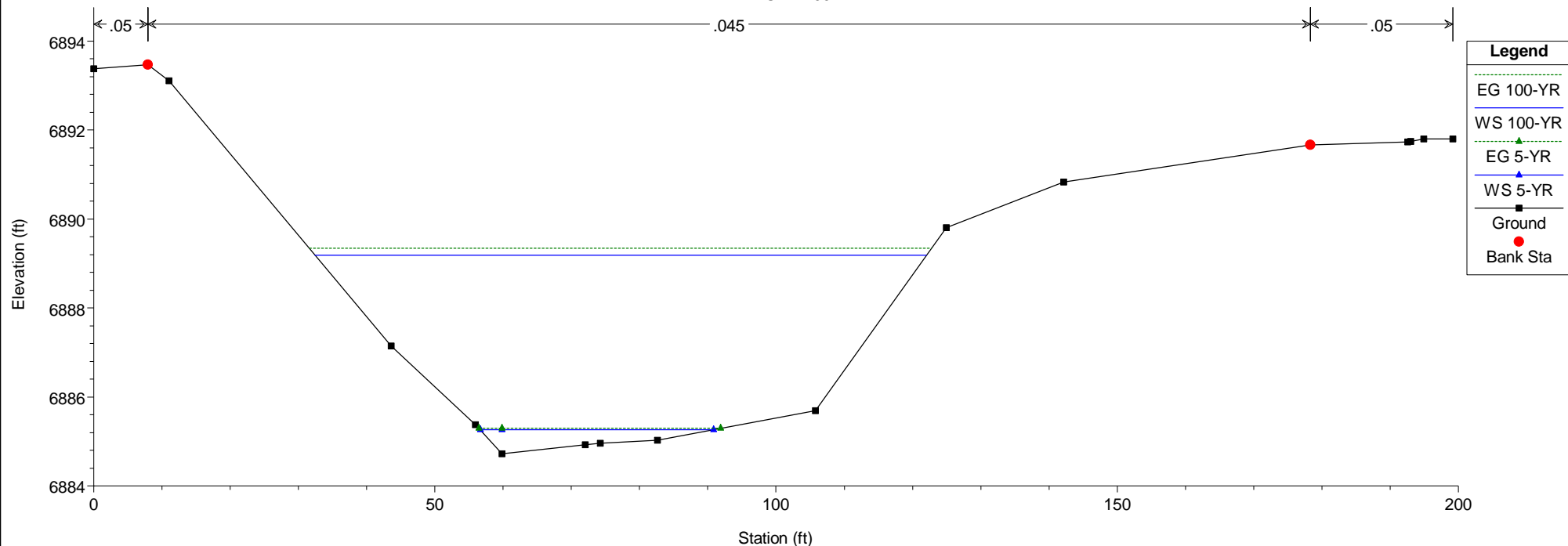


HEC-RAS Model Plan: Existing 5/21/2019

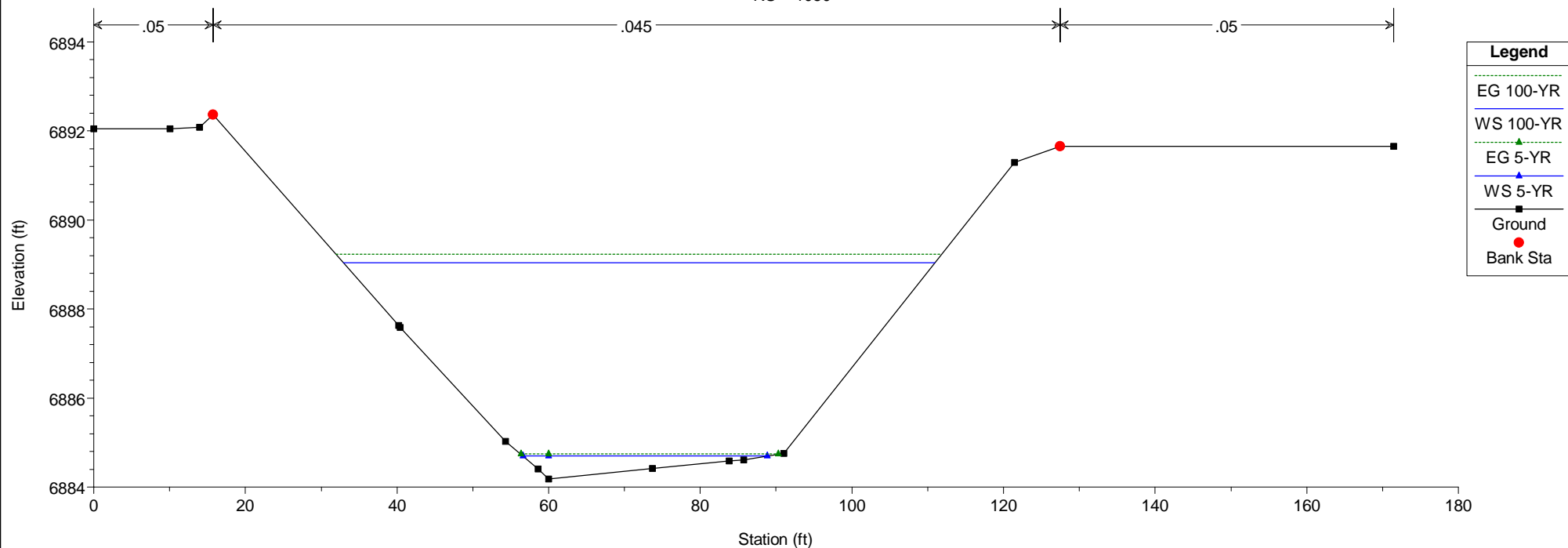
RS = 1150

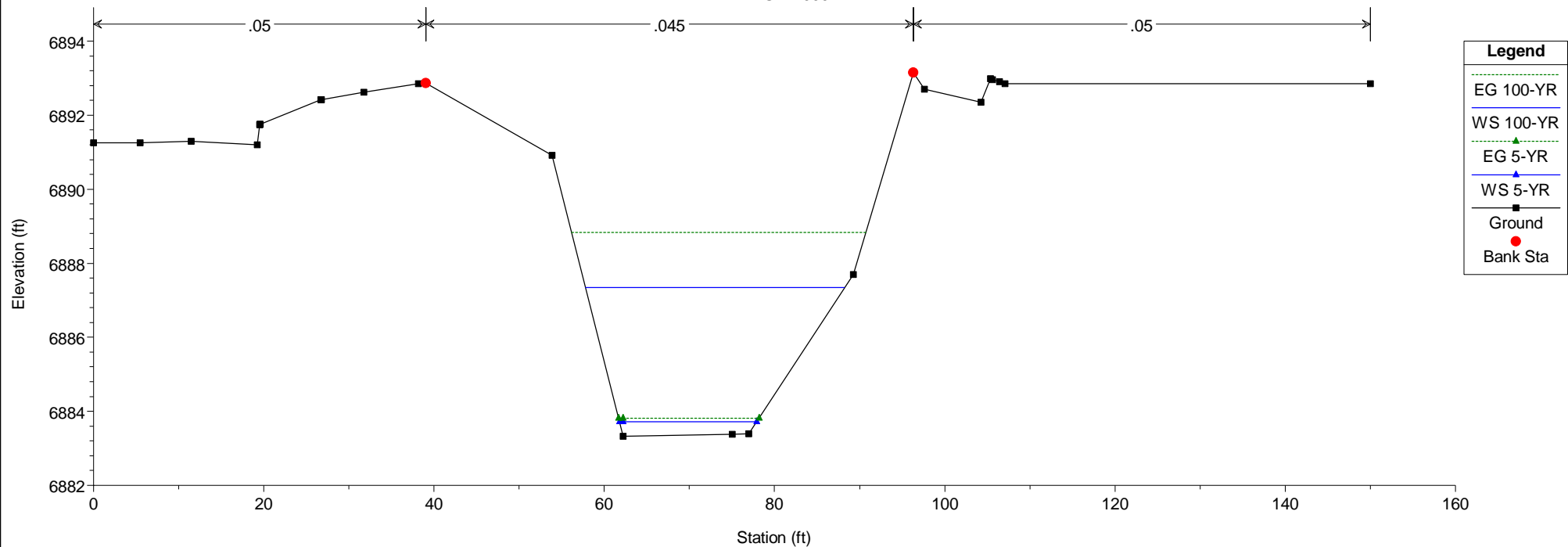


HEC-RAS Model Plan: Existing 5/21/2019
RS = 1100



HEC-RAS Model Plan: Existing 5/21/2019
RS = 1050





Proposed Conditions Model



HEC-RAS Version 4.1.0 Jan 2010
 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      X
XXXXXXXX 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      X  XXXXXX   XXXX      X  X      X  X      XXXXX

```

PROJECT DATA

Project Title: HEC-RAS Model
 Project File : CLH14.20_MDDP.prj
 Run Date and Time: 10/31/2019 9:07:01 AM

Project in English units

Project Description:

CRS Info=<Spatial Reference> <CoordinateSystem Code="3502"
 Unit="US_survey_Foot" AcadCode="" /> <Registration OffsetX="0" OffsetY="0"
 OffsetZ="0" ScaleX="1" ScaleY="1" ScaleZ="1" /></Spatial Reference>

PLAN DATA

Plan Title: Default Scenario

Plan File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04
 Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14.20_MDDP.p01

Geometry Title: Default Geometry

Geometry File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04

Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14.20_MDDP.g01

Flow Title : Default Steady Flow

Flow File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04

Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14.20_MDDP.f01

Plan Description:

Default Scenario

Plan Summary Information:

Number of:	Cross Sections =	126	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: Default Steady Flow

Flow File : H:\Challenger Homes Inc\C0, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04

Grad-Drain\3.04.2 Prop Drain Rpt\Channel Design\GeoHecRas\CLH14.20_MDDP.f01

Flow Data (cfs)

River	Reach	RS	DBPS 100-YR	DBPS 2-YR	FEMA 100-YR
UT_BSC2	NCONFL-BGM	6053.03	1000	100	1000
UT_BSC2	NCONFL-BGM	4952.37	1200	110	1482

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
UT_BSC2	NCONFL-BGM	DBPS 100-YR		Normal S = 0.024435
UT_BSC2	NCONFL-BGM	DBPS 2-YR		Normal S = 0.024435
UT_BSC2	NCONFL-BGM	FEMA 100-YR		Normal S = 0.024435

GEOMETRY DATA

Geometry Title: Default Geometry

Geometry File : H:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\3. Permit Const Docs\3.04 Grad-Drain\3.04.2 Prop Drain Rpt\Channel Desi gn\GeoHecRas\CLH14.20_MDDP.g01

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 6053.03

INPUT

Description:

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6979	2.67	6979	12.82	6978.29	16.93	6978	21.53	6977.68
31.19	6977	39.77	6976.4	46.54	6976.05	47.51	6976	52.33	6976
57.95	6976	58.47	6975.48	59.39	6975.44	59.41	6975.44	61.69	6975.33
63.28	6974.81	63.53	6974.73	69.41	6973.3	69.47	6973.29	69.65	6973.24
84.73	6970.06	86.74	6969.94	87.65	6969.7	88.34	6969.55	88.75	6969.76
89.65	6969.6	98.29	6970.26	100	6970.19	100.96	6970.15	102.78	6970.89
104.84	6971.73	108.25	6973.12	110.58	6974.16	111.36	6974.15	112.84	6974.13
113.5	6974.13	116.85	6974.14	119.93	6974.14	122.28	6974.15	123.3	6974.15
125.19	6974.15	131.61	6974.09	141.49	6974.09				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	61.69	.04	110.58	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	61. 69	110. 58		41. 96 50. 03	59. 02		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 6003

INPUT

Description:

Station	Elevation	Data	num=	38					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6978. 56	. 52	6978. 52	7. 31	6978	19. 13	6977. 1	20. 86	6977
24. 68	6976. 79	39. 04	6976	53. 11	6976	54. 94	6976	55. 14	6977. 09
55. 2	6976. 28	55. 26	6976. 03	55. 42	6975. 42	55. 43	6975. 42	55. 45	6975. 42
55. 5	6975. 42	55. 64	6975. 43	56. 14	6975. 46	57. 36	6975. 45	57. 51	6975. 45
60. 51	6975. 42	61. 49	6975. 09	61. 88	6974. 96	62. 01	6974. 92	63	6974. 59
78	6970. 84	87	6968. 59	95. 12	6968. 59	100	6968. 59	108. 12	6968. 59
113	6968. 59	128	6972. 33	137	6974. 59	138. 8	6973. 98	140. 05	6973. 57
142	6974. 48	142	6974. 49	142. 01	6974. 48				

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 045	60. 51	. 04
		137	. 045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	60. 51	137		50. 03 50. 03	50. 03		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5952. 97

INPUT

Description:

Station	Elevation	Data	num=	29				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6977. 57	10. 28	6977	12. 23	6976. 89	48. 81	6976. 84	51. 79
51. 85	6976. 95	51. 85	6976. 93	51. 87	6976. 86	51. 9	6976. 89	51. 92
								6976. 91

52.6	6976.9	55.55	6976.9	59.9	6975.45	61.53	6974.91	63.03	6974.41
74.48	6971.55	87.01	6968.41	93.7	6968.41	100	6968.41	106.93	6968.41
112.99	6968.41	126.19	6971.71	136.97	6974.41	138.22	6974	139.04	6973.72
141.97	6974.3	145.45	6973.43	145.6	6973.43	145.72	6973.42		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55.55	.04	136.97	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.55	136.97		50.04	50.04	50.04	.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5902.94

INPUT

Description:

Station Elevation Data		num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6978.15	11.14	6978.16	16.4	6978	25	6977.73	46.05	6977
50.97	6976.83	50.98	6976.83	51.04	6976.83	51.12	6976.83	51.41	6976.84
55.13	6976.86	60.19	6975.17	61.51	6974.73	63	6974.23	77.94	6970.5
87	6968.23	91.91	6968.23	100	6968.23	104.91	6968.23	113	6968.23
127.94	6971.97	137	6974.23	137.47	6974.08	138.68	6973.68	142.69	6973.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55.13	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.13	137		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5852.91

INPUT

Description:

Station Elevation Data		num=		24					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6978.16	4.89	6978	26.75	6977.25	33.85	6977	50.6	6976.42
50.61	6976.42	50.83	6976.41	50.84	6976.41	51.25	6976.4	56.42	6976.25
60.61	6974.86	61.51	6974.56	63	6974.06	77.9	6970.33	87	6968.06
91.93	6968.06	100	6968.06	104.93	6968.06	113	6968.06	127.9	6971.79
137	6974.06	137.85	6973.78	138.46	6973.57	144.5	6973.38		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56.42	.032	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56.42	137		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 5802.88

INPUT

Description:

Station Elevation Data		num=		31					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6977.9	22.13	6977.22	27.21	6977	35.43	6976.65	46.97	6976.16
49.07	6976.06	49.08	6976.06	50.23	6976.02	50.51	6976.01	50.52	6976.01
50.53	6976.01	50.54	6976.01	50.55	6976.01	50.57	6976.01	51.03	6975.99
52.96	6975.95	57.07	6975.86	60.81	6974.61	61.5	6974.38	63	6973.88
77.87	6970.17	87	6967.88	91.94	6967.88	100	6967.88	104.94	6967.88
113	6967.88	127.87	6971.6	137	6973.88	137.2	6973.95	137.68	6973.79
143.26	6973.72								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.07	.04	137.2	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.07	137.2		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 5752.85

INPUT

Description:

Station		Elevation		Data		num=		33	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6977.74	7.95	6977.4	17.34	6977	20.71	6976.86	42.92	6976
46.49	6975.85	49.62	6975.77	50.15	6975.72	50.2	6975.72	50.21	6975.72
50.22	6975.72	50.24	6975.72	50.25	6975.72	50.27	6975.72	50.29	6975.72
50.79	6975.71	52.98	6975.65	54.09	6975.62	57.6	6975.51	60.99	6974.38
61.5	6974.21	63	6973.71	77.84	6970	87	6967.71	91.96	6967.71
100	6967.71	104.96	6967.71	113	6967.71	127.84	6971.42	137	6973.71
137.04	6973.72	137.47	6973.86	143.83	6973.68				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.6	.04	137.47	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.6	137.47		50.04	50.04	50.04	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 5702.82

INPUT

Description:

Station		Elevation		Data		num=		29	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6977.42	10.93	6977	35.82	6976.04	36.88	6976	46.82	6975.59
49	6975.54	49.8	6975.51	49.81	6975.51	49.83	6975.5	49.85	6975.5
49.88	6975.5	49.98	6975.5	50.02	6975.5	50.53	6975.48	57.94	6975.22
59.89	6974.57	61.5	6974.03	63	6973.53	77.81	6969.83	87	6967.53
91.98	6967.53	100	6967.53	104.98	6967.53	113	6967.53	127.81	6971.24
137	6973.53	137.03	6973.52	137.12	6973.49	144.37	6973.31		

Manning's n Values		num=		3	
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Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.94	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.94	137		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5652.79

INPUT

Description:

Station	Elevation	Data	num=	30					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6977.29	7.89	6977	14.6	6976.75	34.6	6976	40.01	6975.66
41.34	6975.57	47.16	6975.33	48.38	6975.3	49.71	6975.38	49.72	6975.4
49.74	6975.42	50.24	6975.4	52.71	6975.29	53.78	6975.24	53.95	6975.23
57.76	6975.1	59.8	6974.42	61.49	6973.86	63	6973.36	77.78	6969.66
87	6967.36	92	6967.36	100	6967.36	105	6967.36	113	6967.36
127.78	6971.05	137	6973.36	137.18	6973.3	137.3	6973.26	144.63	6973.09

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	57.76	.04
		137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.76	137		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5602.76

INPUT

Description:

Station	Elevation	Data	num=	25					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6977.22	5.72	6977	29.07	6976.12	32.33	6976	45.93	6975.14
46.22	6975.13	47.49	6975.07	47.76	6975.07	49.47	6975.08	49.92	6975.08

57.63	6974.97	61.18	6973.79	61.51	6973.68	63	6973.18	72.25	6970.87
87	6967.18	92.01	6967.18	100	6967.18	105.01	6967.18	113	6967.18
122.25	6969.5	137	6973.18	137.02	6973.18	137.17	6973.13	144.28	6972.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.63	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.63	137		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5552.73

INPUT

Description:

Station	Elevation	Data	num=	34					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6976.94	4.51	6976.78	5.49	6976.72	17.3	6976	21.1	6975.77
33.61	6975	46.4	6974.22	46.72	6974.2	46.78	6974.2	47.77	6974.6
47.85	6974.61	48	6974.62	48.17	6974.68	48.34	6974.74	48.53	6974.81
48.74	6974.88	48.97	6974.96	49.19	6975.04	49.67	6975.03	57.66	6974.79
59.83	6974.06	61.49	6973.51	63	6973.01	72.28	6970.69	87	6967.01
92.03	6967.01	100	6967.01	105.03	6967.01	113	6967.01	122.28	6969.33
137	6973.01	137.17	6972.95	137.44	6972.86	145.55	6972.61		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.66	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.66	137		50.04 50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5502.7

INPUT

Description:

Station Elevation Data		num=		53					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6975.87	13.59	6975.04	14.19	6975	15.15	6974.94	24.49	6974.37
30.62	6974	32.46	6974	34.5	6974	38.54	6974	39.69	6973.81
40.63	6973.62	42.29	6973.44	43.54	6973.32	44.89	6973.79	45.07	6973.86
45.6	6974.07	45.64	6974.07	45.71	6974.08	45.8	6974.11	45.88	6974.14
45.98	6974.18	46.09	6974.21	46.2	6974.25	46.33	6974.3	46.47	6974.35
46.62	6974.4	46.8	6974.46	46.99	6974.53	47.21	6974.61	47.46	6974.7
47.47	6974.7	48.09	6974.91	48.27	6974.98	48.48	6975.05	48.7	6975.13
48.92	6975.2	49.33	6975.19	51.8	6975.1	56.71	6974.93	59.27	6974.08
61.51	6973.33	63	6972.83	72.32	6970.5	87	6966.83	92.05	6966.83
100	6966.83	105.05	6966.83	113	6966.83	122.32	6969.16	137	6972.83
137.15	6972.78	137.24	6972.75	145.56	6972.5				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56.71	.04	137.15	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56.71	137.15		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 5452.67

INPUT

Description:

Station Elevation Data		num=		47					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6975.5	3.4	6975.34	10.91	6975	30.59	6974.1	32.89	6974
35.04	6974	39	6974	42.89	6973.58	43.17	6973.54	43.38	6973.52
43.4	6973.53	43.42	6973.54	43.43	6973.54	43.44	6973.55	43.45	6973.55
43.47	6973.56	45.68	6974.33	45.77	6974.36	45.88	6974.4	45.99	6974.44
46.11	6974.48	46.25	6974.53	46.4	6974.58	46.57	6974.64	46.76	6974.7
46.98	6974.78	47.22	6974.87	47.51	6974.96	47.84	6975.07	48.23	6975.17
48.43	6975.22	48.64	6975.27	49	6975.26	56.03	6974.98	60.33	6973.55
61.5	6973.16	63	6972.66	72.35	6970.32	87	6966.66	92.06	6966.66
100	6966.66	105.06	6966.66	113	6966.66	122.35	6968.99	137	6972.66

138.56 6972.14 140.25 6971.57

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 56.03 .04 137 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.03 137 50.03 50.03 50.03 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 5402.64

INPUT

Description:

Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6975.39	10.15	6975	33.24	6974.11	35.99	6974	37.35	6974
38.34	6974	40.33	6973.96	40.38	6973.97	42.24	6973.81	42.33	6973.81
42.86	6973.76	43.22	6973.72	43.27	6973.74	43.28	6973.74	43.29	6973.75
43.3	6973.75	43.31	6973.75	43.32	6973.76	43.34	6973.76	45.77	6974.37
45.88	6974.4	46	6974.43	46.13	6974.46	46.28	6974.5	46.44	6974.54
46.62	6974.58	46.83	6974.63	47.06	6974.69	47.32	6974.76	47.63	6974.83
47.99	6974.92	48.36	6975.02	48.73	6975	51.2	6974.88	56.67	6974.59
60.75	6973.23	61.5	6972.98	63	6972.48	77.62	6968.83	87	6966.48
92.08	6966.48	100	6966.48	105.08	6966.48	113	6966.48	127.62	6970.14
137	6972.48	139.9	6971.52						

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 56.67 .04 137 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.67 137 50.04 50.04 50.04 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 5352.61

INPUT

Description:

Station Elevation Data		num=		48					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6975.22	5.51	6975	26.42	6974.17	30.71	6974	39.95	6973.43
40.13	6973.42	40.14	6973.42	40.15	6973.42	41.89	6973.39	42.76	6973.53
42.77	6973.53	43.05	6973.51	43.31	6973.57	43.32	6973.58	43.33	6973.58
43.34	6973.58	43.36	6973.59	43.37	6973.59	43.39	6973.59	43.41	6973.6
43.43	6973.6	43.46	6973.61	43.49	6973.62	43.53	6973.63	43.57	6973.64
43.62	6973.65	43.64	6973.65	45.28	6973.85	45.98	6973.93	48.02	6974.17
48.03	6974.17	48.04	6974.17	48.05	6974.17	48.07	6974.17	48.09	6974.17
48.54	6974.15	59.08	6973.61	61.5	6972.81	61.74	6972.73	63	6972.31
77.59	6968.66	87	6966.31	92.1	6966.31	100	6966.31	105.1	6966.31
113	6966.31	127.59	6969.95	137	6972.31				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	59.08	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.08	137		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 5302.58

INPUT

Description:

Station Elevation Data		num=		32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6974.49	10.36	6974.06	11.9	6974	15.37	6973.86	36.21	6973
42.89	6972.73	43.34	6972.78	43.93	6972.85	43.96	6972.85	45.78	6973.52
46.07	6973.63	47.69	6974.22	47.74	6974.22	47.76	6974.22	47.77	6974.22
47.78	6974.22	47.79	6974.22	47.81	6974.21	48.24	6974.19	58.22	6973.73
60.38	6973	61.49	6972.63	63	6972.13	77.56	6968.49	87	6966.13
92.11	6966.13	100	6966.13	105.11	6966.13	113	6966.13	127.56	6969.77
137	6972.13	142.03	6970.45						

Manning's n Values		num=		3	
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Sta	n Val	Sta	n Val	Sta	n Val
0	.045	58.22	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	58.22	137		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5252.55

INPUT

Description:

Station	Elevation	Data	num=	34
Sta	Elev	Sta	Elev	Sta
0	6975	18.96	6974.13	19.41
22.49	6973.97	30.83	6973.58	31.84
42.73	6973.02	43.35	6973.25	44.41
47.41	6974.69	47.51	6974.69	47.52
47.54	6974.68	47.84	6974.67	55.65
77.53	6968.32	87	6965.96	92.13
113	6965.96	127.53	6969.59	137

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	55.65	.04
		137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.65	137		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5202.52

INPUT

Description:

Station	Elevation	Data	num=	34
Sta	Elev	Sta	Elev	Sta
0	6975.12	3.57	6975	9.43
				9.73
				10.48

10. 61	6974. 82	16. 51	6974. 65	18. 52	6974. 6	18. 75	6974. 59	31. 59	6974
35. 95	6973. 79	36. 07	6973. 79	42. 54	6973. 02	42. 55	6973. 08	42. 57	6973. 5
43. 62	6973. 87	46. 37	6974. 83	46. 38	6974. 84	46. 47	6974. 86	46. 9	6974. 95
47. 15	6975. 01	47. 26	6975	47. 49	6974. 98	54. 32	6974. 68	59. 59	6972. 92
63	6971. 78	77. 5	6968. 16	87	6965. 78	92. 15	6965. 78	100	6965. 78
105. 15	6965. 78	113	6965. 78	127. 5	6969. 4	137	6971. 78		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 045	54. 32	. 04	137	. 045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54. 32	137		50. 04 50. 04	50. 04		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5152. 49

INPUT

Description:

Station	Elevation	Data	num=	44					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6974. 59	16. 13	6974	16. 41	6973. 99	16. 5	6973. 99	16. 58	6973. 99
16. 7	6973. 99	16. 75	6973. 99	18. 04	6973. 98	22. 93	6973. 98	30. 57	6973. 71
36. 83	6973. 55	37. 1	6973. 54	37. 88	6973. 52	38. 58	6973. 54	38. 71	6973. 4
38. 81	6973. 3	38. 85	6973. 3	42. 19	6972. 92	42. 22	6973. 22	43. 58	6973. 53
46. 67	6974. 21	46. 69	6974. 21	46. 7	6974. 21	46. 71	6974. 21	46. 72	6974. 21
46. 73	6974. 2	46. 75	6974. 2	46. 78	6974. 2	46. 83	6974. 2	46. 85	6974. 2
46. 99	6974. 19	47. 22	6974. 19	55. 29	6974. 18	60. 13	6972. 56	63	6971. 61
77. 46	6967. 99	87	6965. 61	92. 17	6965. 61	100	6965. 61	105. 17	6965. 61
113	6965. 61	127. 46	6969. 22	137	6971. 61	141. 4	6970. 14		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	. 045	55. 29	. 04	137	. 045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55. 29	137		50. 03 50. 03	50. 03		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 5102.46

INPUT

Description:

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6972.52	30.51	6973	32.92	6973.04	34.54	6973	40.49	6972.68
41.67	6972.83	42.51	6972.94	44.61	6973.22	44.64	6973.23	45.73	6973.31
45.75	6973.31	46.57	6973.38	46.67	6973.38	46.71	6973.37	46.98	6973.37
57.78	6973.17	61.55	6971.91	63	6971.43	72.57	6969.04	87	6965.43
92.18	6965.43	100	6965.43	105.18	6965.43	113	6965.43	122.57	6967.82
137	6971.43								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	57.78	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	57.78	137		18.35 18.35	18.35		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 5084.11

INPUT

Description:

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6971.6	25.11	6972	37.04	6972.19	38.27	6972.12	39.01	6972.22
39.09	6972.23	39.12	6972.23	41.48	6972.42	43.21	6972.56	43.27	6972.57
46.37	6972.81	46.38	6972.81	46.39	6972.81	46.4	6972.81	46.42	6972.81
46.47	6972.81	46.61	6972.8	51.27	6972.69	59.71	6972.46	61.9	6971.73
63	6971.37	77.43	6967.76	87	6965.37	92.19	6965.37	100	6965.37
105.19	6965.37	113	6965.37	127.43	6968.97	137	6971.37	140.3	6970.27

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-----	-------	-----	-------	-----	-------

0 .045 59.71 .04 137 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
59.71 137 5 5 5 .1 .3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 5079.11

INPUT

Description:

Station	Elevation	Data	num=	26						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6971.36	23.61	6971.73	37.48	6971.95	37.61	6971.96	38.08	6972	
41.42	6972.27	42.52	6972.36	42.59	6972.36	45.33	6972.58	45.35	6972.58	
45.9	6972.59	46.06	6972.59	46.13	6972.59	46.33	6972.59	46.47	6972.58	
46.58	6972.57	60.23	6972.27	60.25	6972.27	63	6971.35	63.01	6971.35	
87	6965.35	100	6965.35	113	6965.35	113.01	6965.35	137	6971.35	
139.91	6970.38									

Station	Elevation	Data	num=	3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	60.23	.04	137	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
60.23 137 10.51 10.51 10.51 .1 .3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 5068.6

INPUT

Description:

Station	Elevation	Data	num=	30					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6970.83	10.7	6971	34.28	6971.37	34.32	6971.38	39.38	6971.79
40.08	6971.84	40.16	6971.85	40.41	6971.87	41.31	6971.92	43.97	6971.94
44.8	6971.95	45.17	6971.95	46.26	6971.96	46.49	6971.96	46.51	6971.96

46.53	6971.95	47.9	6971.9	53.94	6971.74	61.5	6969.22	61.98	6969.06
63	6968.72	71.89	6966.5	87	6962.72	95.19	6962.72	100	6962.72
108.19	6962.72	113	6962.72	121.89	6964.94	137	6968.72	137.74	6968.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	53.94	.04	137	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	53.94	137		10.5 10.5	10.5		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5058.1

INPUT

Description:

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6970.22	14.18	6970.46	15.11	6970.48	30.82	6970.75	33.87	6971
36.95	6971	41.15	6971.23	41.83	6971.24	43.4	6971.25	44.1	6971.26
46.16	6971.28	46.34	6971.28	46.36	6971.28	46.38	6971.27	46.4	6971.27
46.43	6971.27	46.51	6971.27	47.54	6971.23	47.56	6971.23	47.99	6971.21
60.97	6966.93	61.76	6966.6	62.97	6966.09	70.63	6964.18	86.98	6960.1
88.58	6960.1	99.91	6960.1	99.98	6960.1	100.02	6960.1	112.32	6960.15
112.98	6960.15	114.4	6960.52	136.99	6966.26	137.16	6966.2	138.35	6966.6
139.52	6966.99	140.29	6966.98	141.61	6966.95	144.29	6966.9	146.63	6966.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	47.99	.04	139.52	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.99	139.52		5.67 5.67	5.67		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 5052.43

INPUT

Description:

Station Elevation Data		num=		43					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6968.76	.33	6969	1.43	6969.8	12.44	6970	27.9	6970.29
30.43	6970.5	30.73	6970.53	32.43	6970.67	36.3	6970.72	40.76	6970.77
42.18	6970.79	43.11	6970.8	45.82	6970.83	45.96	6970.83	45.97	6970.83
45.99	6970.83	46.01	6970.83	46.04	6970.83	46.07	6970.82	46.09	6970.82
47.99	6970.75	48.9	6970.72	52.38	6969.56	61.3	6966.58	62.83	6966.07
80.95	6961.55	86.84	6960.08	95.97	6960.08	99.84	6960.08	100	6960.08
108.46	6960.08	112.84	6960.08	127.48	6963.74	136.84	6966.08	138.35	6966.58
138.47	6966.62	140.31	6967.24	141.92	6967.2	144.79	6967.14	153.64	6967.21
156.84	6966.91	163.44	6965.88	170.99	6965.42				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	48.9	.04	140.31	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	48.9	140.31		68.24	50.03	33.83	.1 .3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 5002.4

INPUT

Description:

Station Elevation Data		num=		53					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5.1	6965.15	-3.7	6965	-2.31	6964.76	-.36	6965	.33	6965.49
1.04	6966	1.24	6966.15	1.44	6966.29	2.11	6966	3.24	6965.52
7.38	6963.76	7.87	6963.55	8.39	6963.33	8.98	6963.23	32.09	6962.99
34.42	6962.87	35.34	6962.83	36.82	6962.75	37.3	6962.73	43.53	6962.52
51.22	6962.34	54.81	6962.24	57.08	6962.19	58.97	6962.26	59.51	6962.3
70.31	6963.12	70.51	6963.13	74.59	6963.49	79.59	6964.06	79.6	6964.06
79.83	6964.09	81.59	6963.64	96.57	6959.9	108.47	6959.9	109.57	6959.9
110.87	6959.9	121.4	6959.9	122.57	6959.9	124.11	6960.28	133.13	6962.47
149.05	6966.4	150.71	6966.81	152.96	6967.43	156.67	6968.42	157.11	6968.58
157.35	6968.6	160.8	6968.64	162.74	6968.66	163.3	6968.63	176.92	6966.32

189.95 6965.39 199.48 6964.97 209.76 6964.55

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-5.1 .045 79.59 .04 157.35 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
79.59 157.35 91.77 50.04 33.17 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 4952.37

INPUT

Description:

Station Elevation Data num= 49
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 6968.57 2.92 6968.29 3.39 6968.24 11.04 6967.47 11.35 6967.44
16.51 6966.92 16.73 6966.89 20.45 6966.52 20.61 6966.5 23.42 6966.22
23.54 6966.21 25.74 6965.99 25.84 6965.98 27.6 6965.8 27.68 6965.79
60.59 6963.78 74.98 6962.17 80.59 6961.6 84.82 6961.61 87.55 6961.62
89.32 6961.62 90.39 6961.62 90.53 6961.62 97.38 6959.91 98.14 6959.72
109.52 6959.72 111.14 6959.72 112.78 6959.72 122.17 6959.72 124.14 6959.72
127.97 6960.68 143.34 6964.52 145.49 6964.64 147.52 6964.8 148.52 6964.88
149.34 6964.94 149.76 6964.97 150.05 6964.99 150.26 6965 150.74 6965.04
154.44 6966.01 155.03 6965.91 173.26 6965.58 176.56 6965.62 180.99 6965.8
182.07 6966 191.14 6965.36 203.5 6964.83 211.89 6964.49

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 23.42 .04 154.44 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
23.42 154.44 155.97 101.45 66.01 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 4850.92

INPUT

Description:

Station Elevation Data		num=		34					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6965.78	.72	6965.79	1.91	6965.82	2.91	6965.73	3.5	6965.66
34.48	6965.18	51.02	6964.87	53.25	6965.43	55	6965.86	67.47	6962.75
81	6959.36	90.11	6959.36	100	6959.36	109.11	6959.36	119	6959.36
131.47	6962.48	145	6965.86	149.39	6964.77	153.77	6963.67	154.88	6963.7
155.52	6963.72	156.18	6963.73	159.6	6963.82	159.82	6963.83	161.38	6963.86
165.19	6963.96	166.65	6964	167.94	6964.03	174.12	6964.19	176.4	6964.36
176.92	6964.49	178	6964.5	193.82	6964.08	200	6963.95		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		5	5		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 4845.92

INPUT

Description:

Station Elevation Data		num=		33					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6965.71	1.23	6965.74	2.07	6965.66	2.62	6965.59	18.71	6965.3
47.97	6964.82	50.16	6964.79	50.73	6964.78	54.94	6965.83	55	6965.85
55.43	6965.74	81	6959.35	81.32	6959.35	100	6959.35	100.32	6959.35
119	6959.35	119.43	6959.46	145	6965.85	153.3	6963.77	153.45	6963.74
155.55	6963.79	156.06	6963.8	156.59	6963.81	161.3	6963.93	161.6	6963.94
162.98	6963.98	167.89	6964.1	168.99	6964.13	169.94	6964.15	175.87	6964.3
176.63	6964.49	179.15	6964.53	200	6963.97				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		10. 12	10. 12		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4835. 8

INPUT

Description:

Station	Elevation	Data	num=	28					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6965. 54	50. 16	6964. 57	53. 8	6963. 66	55	6963. 36	61. 54	6961. 73
81	6956. 86	95. 22	6956. 86	100	6956. 86	114. 22	6956. 86	119	6956. 86
125. 54	6958. 5	145	6963. 36	147. 23	6962. 8	150. 57	6963. 64	155. 82	6963. 94
156. 9	6963. 97	157. 15	6963. 97	157. 42	6963. 98	164. 73	6964. 16	165. 19	6964. 17
166. 22	6964. 2	173. 37	6964. 38	173. 71	6964. 39	174	6964. 4	175. 82	6964. 44
176. 05	6964. 5	181. 47	6964. 59	200	6964. 09				

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	. 045	50. 16	. 04
		145	. 045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	50. 16	145		10. 12	10. 12		. 1	. 3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4825. 68

INPUT

Description:

Station	Elevation	Data	num=	17				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6965. 22	3. 17	6965. 15	18. 97	6964. 85	40. 51	6964. 45	55
81	6954. 33	100	6954. 33	119	6954. 33	145	6960. 83	158. 24
168. 16	6964. 39	168. 78	6964. 41	169. 46	6964. 43	175. 77	6964. 59	178. 13
183. 79	6964. 65	200	6964. 21					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	40.51	.04	158.24	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40.51	158.24		23.41	23.41		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4802.28

INPUT

Description:

Station Elevation Data		num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6964.44	4.65	6964.38	10.12	6964.28	13.93	6964.19	37.36	6963.75
43.47	6963.64	50.29	6961.94	55	6960.76	67.4	6957.66	81	6954.26
90.94	6954.26	100	6954.26	109.94	6954.26	119	6954.26	131.4	6957.36
145	6960.76	149.95	6962	157.34	6963.85	168.88	6964.34	175.17	6964.79
177.82	6964.89	180.96	6964.84	187.78	6964.76	189.15	6964.78	200	6964.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	43.47	.04	157.34	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	43.47	157.34		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4752.25

INPUT

Description:

Station Elevation Data		num= 26							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6962.77	25.21	6962.34	42.66	6962.06	49.63	6961.95	53.23	6961.05
55	6960.61	67.43	6957.5	81	6954.11	90.91	6954.11	100	6954.11

109.91	6954.11	119	6954.11	131.43	6957.22	145	6960.61	145.89	6960.39
147.66	6960.83	148.3	6960.88	149.01	6960.91	149.12	6960.91	149.47	6960.93
149.86	6960.94	150.23	6960.95	152.15	6960.99	174.92	6961.49	199	6961.15
200	6961.14								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	49.63	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	49.63	145		45.95 45.95	45.95		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4706.3

INPUT

Description:

Station	Elevation	Data	num=	26
Sta	Elev	Sta	Elev	Sta Elev Sta Elev Sta Elev
0	6961.27	17.45	6960.96	20.35 6960.91 22.29 6960.88 23.27 6960.86
24.22	6960.84	24.25	6960.84	29.54 6960.75 54.13 6960.32 54.87 6960.51
55	6960.47	70.93	6956.49	81 6953.97 92.64 6953.97 100 6953.97
111.64	6953.97	119	6953.97	134.93 6957.96 145 6960.47 147.42 6959.87
152.65	6958.56	153.1	6958.58	157.22 6958.76 161.56 6958.85 193.09 6958.61
200	6958.6			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		5 5	5		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4701.3

INPUT

Description:

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6961.12	.77	6961.11	13.5	6960.88	22.01	6960.72	26.29	6960.64
30.45	6960.57	30.62	6960.57	53.8	6960.16	55	6960.46	81	6953.96
100	6953.96	119	6953.96	145	6960.46	153.53	6958.33	158.07	6958.52
160.1	6958.57	174.92	6958.45	200	6958.41				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		5.84	5.84		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4695.47

INPUT

Description:

Station Elevation Data		num=		23					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6960.94	5.5	6960.84	21.68	6960.54	29.81	6960.39	37.73	6960.25
38.05	6960.24	49.64	6960.04	54.4	6958.85	55	6959	68	6955.75
81	6952.5	90.5	6952.5	100	6952.5	109.5	6952.5	119	6952.5
132	6955.75	145	6959	145.37	6958.91	149.64	6957.84	153.67	6958.01
158.34	6958.21	159.84	6958.26	200	6958.19				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	49.64	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	49.64	145		5.83	5.83		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4689.63

INPUT

Description:

Station		Elevation		Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6960.76	21.35	6960.37	33.34	6960.14	45	6959.93	45.48	6959.92
55	6957.54	81	6951.04	100	6951.04	119	6951.04	145	6957.54
145.74	6957.36	153.81	6957.7	156.37	6957.81	164.13	6958.03	200	6957.97

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	45.48	.04	145	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		45.48	145		37.44	37.44	37.44		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4652.19

INPUT

Description:

Station		Elevation		Data		num=		24	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6959.57	19.25	6959.21	34.36	6958.93	50.2	6958.63	53.47	6957.81
55	6957.43	67.5	6954.3	81	6950.93	90.86	6950.93	100	6950.93
109.86	6950.93	119	6950.93	131.5	6954.05	145	6957.43	146.57	6957.04
147.45	6956.82	148.75	6956.49	166.09	6956.45	167.17	6956.29	178.75	6956.45
181.68	6956.41	187.91	6956.47	191.61	6956.57	200	6956.56		

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	50.2	.04	145	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		50.2	145		50.04	50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4602.16

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6958.5	41.99	6958.52	50.52	6958.4	52.81	6957.83	55	6957.28
67.53	6954.15	81	6950.78	90.84	6950.78	100	6950.78	109.84	6950.78
119	6950.78	131.53	6953.91	145	6957.28	150.29	6955.96		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	50.52	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	50.52	145		28.57	28.57		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4573.58

INPUT

Description:

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6958.33	6.43	6958.41	49.03	6958.69	53.85	6957.48	55	6957.19
74.7	6952.27	81	6950.69	85.6	6950.69	100	6950.69	104.6	6950.69
119	6950.69	138.7	6955.62	145	6957.19	148.96	6956.2	152.63	6955.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	49.03	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	49.03	145		5	5		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4568.58

INPUT

Description:

Station		Elevation		Data		num=		9	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6957.34	48.63	6958.77	48.64	6958.77	55	6957.18	81	6950.68
100	6950.68	119	6950.68	145	6957.18	150	6955.93		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	48.64	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	48.64	145		10.12	10.12		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4558.46

INPUT

Description:

Station		Elevation		Data		num=		18	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6956.87	17.24	6956.71	19.44	6956.69	20.07	6956.69	42.41	6956.54
43.21	6957.6	49.58	6956	55	6954.65	71.58	6950.5	81	6948.15
93.12	6948.15	100	6948.15	112.12	6948.15	119	6948.15	135.58	6952.29
145	6954.65	146.65	6954.24	152.8	6952.7				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	43.21	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	43.21	145		10.13	10.13		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4548.35

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6956.91	4.1	6956.87	19.08	6956.71	25.76	6956.64	37.41	6956.51
55	6952.12	81	6945.62	100	6945.62	119	6945.62	145	6952.12
149.55	6950.98	149.59	6950.98	150	6950.99				

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	37.41	.04	145	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		37.41	145		46.24	46.24	46.24		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 4502.1

INPUT

Description:

Station		Elevation		Data		num=		17	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6956.79	18.86	6956.61	24.02	6956.56	30.73	6956.5	37.22	6956.42
46.65	6954.07	55	6951.98	67.6	6948.83	81	6945.48	90.79	6945.48
100	6945.48	109.79	6945.48	119	6945.48	131.6	6948.63	145	6951.98
146.95	6951.49	151.04	6950.47						

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	37.22	.04	145	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		37.22	145		50.03	50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4452.07

INPUT

Description:

Station		Elevation		Data		num=		22	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6955.96	14.43	6955.85	22.15	6955.81	22.25	6955.81	30.59	6955.33
43.84	6954.62	50.21	6953.03	55	6951.83	67.64	6948.67	81	6945.33
90.77	6945.33	100	6945.33	109.77	6945.33	119	6945.33	131.64	6948.49
145	6951.83	145.26	6951.89	146.02	6952.08	185.45	6950.91	188.12	6950.8
189.06	6950.81	200	6951.01						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	43.84	.04	146.02	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	43.84	146.02		50.04	50.04	50.04	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4402.04

INPUT

Description:

Station		Elevation		Data		num=		24	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6955.1	19.72	6955.02	21.98	6955.11	22.61	6955.1	23.68	6955.08
23.89	6955.07	24.41	6955.06	45.28	6954.11	51.52	6952.55	55	6951.68
68.33	6948.35	81	6945.18	90.74	6945.18	100	6945.18	109.74	6945.18
119	6945.18	132.33	6948.51	145	6951.68	145.24	6951.74	145.63	6951.84
176.72	6950.21	182.6	6949.92	186.36	6949.77	200	6949.95		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	45.28	.04	145.63	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.28	145.63		56.36 50.03	44.49		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4352.01

INPUT

Description:

Station	Elevation	Data	num=	27
Sta	Elev	Sta	Elev	Sta
33.38	6953.44	40.06	6953.69	40.82
46.56	6953.6	46.62	6953.6	46.72
80.16	6945.23	80.98	6945.03	99.43
118.52	6945.03	118.97	6945.03	144.57
147.05	6952.05	147.22	6952.04	154.84
164.19	6951.02	183.22	6949.99	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
33.38	.045	46.72	.04
		147.01	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46.72	147.01		59.78 50.03	41.17		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4301.98

INPUT

Description:

Station	Elevation	Data	num=	30
Sta	Elev	Sta	Elev	Sta
31.86	6951.1	32.03	6951.2	33.31
38.45	6950.31	48.78	6951.31	53.89
67.66	6948.22	81	6944.88	90.25
119	6944.88	131.66	6948.04	145

160.54	6951.13	161.5	6951.07	169.34	6950.17	172	6950.19	174.12	6950.2
179.98	6950.24	181.02	6950.25	181.27	6950.25	182.77	6950.27	200	6950.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
31.86	.045	55	.04	147.29	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	147.29		39.8 50.03	60.2		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4251.95

INPUT

Description:

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
50.09	6950.01	52.51	6950.61	54.97	6951.23	64.8	6948.77	80.97	6944.73
87.22	6944.73	99.97	6944.73	100	6944.73	105.5	6944.73	118.97	6944.73
125.51	6946.37	144.97	6951.23	146.91	6950.75	147.92	6950.5	152.04	6950.44
152.07	6950.44	152.89	6950.45	177.24	6950.64	180.36	6950.66	181.13	6950.67
182.03	6950.67	182.25	6950.68	183.68	6950.69	189.15	6950.73	194.27	6950.78
196.01	6950.8	200	6950.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
50.09	.045	54.97	.04	144.97	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.97	144.97		17.38 17.38	17.38		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4234.59

INPUT

Description:

Station Elevation Data		num= 28							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
53.83	6950.89	54.98	6951.18	75.13	6946.14	80.98	6944.68	95.95	6944.68
99.98	6944.68	99.99	6944.68	114.99	6944.68	118.97	6944.68	139.42	6949.79
144.97	6951.18	145.91	6950.94	150.73	6949.74	150.92	6949.89	153.38	6950.31
155.23	6950.33	165.98	6950.44	170.04	6950.48	175.92	6950.54	177.25	6950.55
179.79	6950.58	180.24	6950.58	181.05	6950.59	185.96	6950.63	188.91	6950.66
192.13	6950.69	196.79	6950.74	200	6950.78				

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
53.83	.045	54.98	.04
144.97	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.98	144.97		4.99	4.99		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4229.59

INPUT

Description:

Station Elevation Data		num= 20							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
48.32	6949.49	55	6951.16	80.99	6944.67	81	6944.66	99.99	6944.66
118.99	6944.66	119	6944.66	144.99	6951.16	145	6951.16	151.35	6949.58
158.51	6950.45	174.23	6950.59	175.72	6950.6	179.36	6950.64	179.44	6950.64
180.67	6950.64	188.14	6950.69	195.24	6950.73	199.14	6950.76	200	6950.77

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
48.32	.045	55	.04
144.99	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	144.99		15.3	15.3		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4214.29

INPUT

Description:

Station Elevation Data		num=		26					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
28.04	6947.89	39.21	6944.83	41.03	6945.14	42.16	6945.35	48.96	6948.85
54.99	6947.34	80.83	6940.88	81	6940.84	99.88	6940.84	100	6940.84
118.88	6940.84	119	6940.84	144.83	6947.3	145	6947.34	145.02	6947.35
155.34	6949.92	155.37	6949.92	155.39	6949.92	155.45	6949.93	172.41	6950.07
174.23	6950.09	175.06	6950.1	175.83	6950.1	180.47	6950.13	184.87	6950.16
200	6950.28								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
28.04	.045	48.96	.04	155.39	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	48.96	155.39		15.29	15.29		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4199

INPUT

Description:

Station Elevation Data		num=		24					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
29.83	6946.77	30.68	6944.38	30.92	6944.1	31.02	6944	31.2	6943.27
31.39	6943.31	31.62	6943.37	31.64	6943.37	31.67	6943.37	31.76	6943.37
32.02	6943.36	35.88	6948.29	35.89	6948.3	55	6943.52	81	6937.02
100	6937.02	119	6937.02	145	6943.52	169.1	6949.54	170.69	6949.56
170.98	6949.56	172.79	6949.57	174.51	6949.58	200	6949.78		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
29.83	.045	35.89	.04	169.1	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	35.89	169.1		47.12	47.12		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4151.89

INPUT

Description:

Station Elevation Data		num=		21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
31.94	6944.97	32.29	6945.38	33.18	6946.43	33.33	6946.6	37.6	6945.52
38.3	6947.55	47	6945.38	55	6943.38	68.15	6940.09	81	6936.88
90.39	6936.88	100	6936.88	109.39	6936.88	119	6936.88	132.15	6940.16
145	6943.38	153.26	6945.44	163.28	6947.95	179.99	6948.11	181.06	6948.12
200	6948.27								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
31.94	.045	38.3	.04	163.28	.045

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff	Contr.	Expan.
	38.3	163.28			32.73	32.73	32.73	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4101.86

INPUT

Description:

Station Elevation		Data	num=		50					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6947.59	4.83	6947.61	5.47	6947.6	11.02	6947.76	11.75	6942.79	
11.99	6944.67	12.05	6944.66	17.02	6943.15	17.52	6943.16	17.85	6943.19	
18.36	6943.25	23.79	6943.74	26.97	6944.25	30.52	6944.34	33.08	6945.59	
35.55	6946.61	35.73	6947.1	37.55	6946.65	51.03	6943.28	53.96	6942.55	
77.03	6936.78	93.89	6936.78	96.03	6936.78	112.89	6936.78	115.03	6936.78	
117.96	6937.51	141.03	6943.28	153.37	6946.36	155.25	6946.83	156.64	6946.85	
158.84	6946.87	159.22	6946.87	161.83	6946.9	163.49	6946.91	164.47	6946.92	
167.13	6946.95	169.82	6946.97	172.55	6947	175.29	6947.03	177.04	6947.04	

178.07	6947.05	180.88	6947.08	183.72	6947.11	186.59	6947.14	189.49	6947.17
191.33	6947.18	192.42	6947.19	195.39	6947.22	198.39	6947.25	200	6947.27

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	35.73	.04	155.25	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	35.73	155.25		125.84	125.84		.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	78.91	6945.63	F
114.09	200	6945.9	F

CULVERT

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 4053.63

INPUT

Description:

Distance from Upstream XS = 39.21
 Deck/Roadway Width = 47.87
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 57			
Sta	Hi Cord	Lo Cord	
-33.24	6945.32	0	
-27.64	6945.29	0	
-13.9	6945.23	0	
-6.64	6945.21	0	
-4.45	6945.2	0	
7.36	6945.19	0	
14.16	6945.19	0	
20.36	6945.2	0	
28.12	6945.22	0	
35.36	6945.25	0	
45.26	6945.29	0	
49.36	6945.32	0	
63.14	6945.42	0	
70.36	6945.49	0	

94.71	6945.73	0	95.36	6945.74	0	119.7	6945.98	0
120.36	6945.99	0	144.76	6946.23	0	145.36	6946.24	0
169.81	6946.49	0	170.36	6946.49	0	194.86	6946.74	0
195.36	6946.74	0	219.92	6946.99	0	220.36	6946.99	0
244.97	6947.24	0	245.36	6947.24	0	260.69	6947.4	0

Upstream Bridge Cross Section Data

Station Elevation Data		num=		50					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6947.59	4.83	6947.61	5.47	6947.6	11.02	6947.76	11.75	6942.79
11.99	6944.67	12.05	6944.66	17.02	6943.15	17.52	6943.16	17.85	6943.19
18.36	6943.25	23.79	6943.74	26.97	6944.25	30.52	6944.34	33.08	6945.59
35.55	6946.61	35.73	6947.1	37.55	6946.65	51.03	6943.28	53.96	6942.55
77.03	6936.78	93.89	6936.78	96.03	6936.78	112.89	6936.78	115.03	6936.78
117.96	6937.51	141.03	6943.28	153.37	6946.36	155.25	6946.83	156.64	6946.85
158.84	6946.87	159.22	6946.87	161.83	6946.9	163.49	6946.91	164.47	6946.92
167.13	6946.95	169.82	6946.97	172.55	6947	175.29	6947.03	177.04	6947.04
178.07	6947.05	180.88	6947.08	183.72	6947.11	186.59	6947.14	189.49	6947.17
191.33	6947.18	192.42	6947.19	195.39	6947.22	198.39	6947.25	200	6947.27

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	35.73	.04	155.25	.045

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	35.73	155.25		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
0	78.91	6945.63	F		
114.09	200	6945.9	F		

Downstream Deck/Roadway Coordinates

num=		57					
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord
-30.85	6945.32	0	-27.25	6945.3	0	-25.33	6945.29
-25.25	6945.29	0	-18.52	6945.26	0	-18.25	6945.25
-11.51	6945.23	0	-11.25	6945.23	0	-4.51	6945.21
-4.25	6945.21	0	-2.32	6945.2	0	-2.25	6945.2
-2.06	6945.2	0	2.75	6945.19	0	9.5	6945.19
9.75	6945.19	0	9.8	6945.19	0	11.02	6945.19
16.55	6945.19	0	16.75	6945.19	0	16.97	6945.19
22.75	6945.2	0	23.72	6945.2	0	23.75	6945.2

30.51	6945.22	0	30.75	6945.22	0	37.52	6945.24	0
37.75	6945.25	0	44.52	6945.28	0	44.75	6945.28	0
47.65	6945.29	0	47.75	6945.3	0	47.88	6945.3	0
51.75	6945.32	0	58.53	6945.37	0	58.75	6945.37	0
65.53	6945.42	0	65.75	6945.42	0	72.54	6945.49	0
72.75	6945.49	0	74.95	6945.51	0	75.02	6945.51	0
97.1	6945.73	0	97.75	6945.74	0	122.09	6945.98	0
122.75	6945.99	0	147.15	6946.23	0	147.75	6946.24	0
172.2	6946.49	0	172.75	6946.49	0	197.25	6946.74	0
197.75	6946.74	0	222.31	6946.99	0	222.75	6946.99	0
247.36	6947.24	0	247.75	6947.24	0	263.08	6947.4	0

Downstream Bridge Cross Section Data

Station Elevation Data			num= 33					
Sta	Elev		Sta	Elev		Sta	Elev	
0	6946.06		3.02	6945.92		6.73	6945.74	
15.55	6945.32		19.12	6945.15		22.48	6945.15	
31.57	6944.62		38.31	6944.5		42.64	6944.36	
51.22	6943.35		51.96	6943.27		52	6943.26	
52.81	6943.05		53.42	6942.9		65.14	6939.97	
98.42	6936.4		106.99	6936.4		117.42	6936.4	
153.08	6942.9		168.25	6942.9		200	6942.9	

Manning's n Values			num= 3		
Sta	n Val		Sta	n Val	
0	.045		51.96	.04	
			143.42	.045	

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	51.96	143.42		.3	.5

Ineffective Flow			num= 2		
Sta L	Sta R	Elev	Permanent		
0	80.85	6942.41	F		
116	200	6942.41	F		

Upstream Embankment side slope = 4 horiz. to 1.0 vertical
Downstream Embankment side slope = 4 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	120.12	.013	.013	0	.5	1

Number of Barrels = 2

Upstream Elevation = 6936.77

Centerline Stations

Sta. Sta.

87.04 106.05

Downstream Elevation = 6936.41

Centerline Stations

Sta. Sta.

88.91 107.92

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 4001.8

INPUT

Description:

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6946.06	3.02	6945.92	6.73	6945.74	7.71	6945.69	11.75	6945.5
15.55	6945.32	19.12	6945.15	22.48	6945	24.38	6944.95	28.05	6944.78
31.57	6944.62	38.31	6944.5	42.64	6944.36	43.8	6944.22	48	6943.72
51.22	6943.35	51.96	6943.27	52	6943.26	52.74	6943.07	52.75	6943.07
52.81	6943.05	53.42	6942.9	65.14	6939.97	79.42	6936.4	87.99	6936.4
98.42	6936.4	106.99	6936.4	117.42	6936.4	129.14	6939.33	143.42	6942.9
153.08	6942.9	168.25	6942.9	200	6942.9				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	51.96	.04	143.42	.045

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

51.96	143.42	41.56	41.56	41.56	.3	.5
Ineffective Flow		num=	2			
Sta L	Sta R	Elev	Permanent			
0	80.85	6942.41	F			
116	200	6942.41	F			

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3951.77

INPUT

Description:

Station	Elevation	Data	num=	23						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6946.08	1.73	6945.86	5.55	6945.4	10.2	6945.36	15.69	6945.31	
18.94	6945.28	23.05	6945.24	46.66	6943.95	47.39	6943.85	48.09	6943.79	
52.36	6943.44	53.78	6943.08	55	6942.78	67.98	6939.53	81	6936.28	
90.51	6936.28	100	6936.28	109.51	6936.28	119	6936.28	131.98	6939.52	
145	6942.78	153.36	6942.78	180.03	6942.78					

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	52.36	.04
		145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	52.36	145		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3901.74

INPUT

Description:

Station	Elevation	Data	num=	25						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6945.12	.69	6945.01	2.98	6944.7	4.69	6944.47	8.35	6944.47	
10.92	6944.47	12.12	6944.47	15.55	6944.47	17.79	6944.44	23.59	6944.19	
42.66	6943.36	51.8	6943.01	52.71	6942.94	53.99	6942.88	54.72	6942.7	

55	6942.63	68.02	6939.37	81	6936.13	90.49	6936.13	100	6936.13
109.49	6936.13	119	6936.13	132.02	6939.38	145	6942.63	150	6942.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	53.99	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	53.99	145		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3851.71

INPUT

Description:

Station	Elevation	Data	num=	20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6943.54	1.96	6943.1	3.17	6943.11	14.52	6943.22	15.72	6943.24
23.09	6943.33	37.34	6943.16	50.57	6943.06	54.33	6942.64	54.87	6942.51
55	6942.48	67.95	6939.24	81	6935.98	90.46	6935.98	100	6935.98
109.46	6935.98	119	6935.98	131.95	6939.21	145	6942.48	150.36	6942.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	54.33	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.33	145		49.01 49.01	49.01		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3802.7

INPUT

Description:

Station	Elevation	Data	num=	20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	6941.95	1.07	6941.94	10.86	6941.84	14.01	6941.91	14.3	6941.91
22.44	6941.93	26.65	6941.95	45.11	6942.08	52.79	6941.79	54.96	6942.34
55	6942.33	73.15	6937.79	81	6935.83	94.26	6935.83	100	6935.83
113.26	6935.83	119	6935.83	137.15	6940.37	145	6942.33	148.49	6942.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		5 5	5		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 3797.7

INPUT

Description:

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.81	5.43	6941.75	10.1	6941.7	10.68	6941.71	12.59	6941.72
22.1	6941.81	40.89	6941.94	51.89	6941.54	55	6942.31	81	6935.81
100	6935.81	119	6935.81	145	6942.31	153.77	6941.88		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		6.13 6.13	6.13		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 3791.57

INPUT

Description:

Station	Elevation	Data	num=	23
---------	-----------	------	------	----

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.68	.06	6941.68	2.36	6941.67	5.19	6941.65	6.21	6941.64
6.44	6941.64	10.62	6941.61	12.18	6941.58	21.58	6941.68	35.71	6941.77
43.98	6941.47	51.68	6941.18	54.15	6940.57	55	6940.78	62.12	6939
81	6934.28	86.2	6934.28	100	6934.28	105.2	6934.28	119	6934.28
126.12	6936.06	145	6940.78	150	6940.78				

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.045	55	.04
		145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		6.13	6.13		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3785.44

INPUT

Description:

Station	Elevation	Data	num=	18
Sta	Elev	Sta	Elev	Sta
0	6941.61	1.82	6941.6	2.31
21.05	6941.54	30.53	6941.6	36.08
48.18	6940.95	55	6939.25	81
145	6939.25	145.02	6939.25	150

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.045	48.17	.04
		145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	48.17	145		28.74	33.8		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3751.65

INPUT

Description:

Station Elevation Data		num=		22					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.15	1.48	6941.14	12.21	6941.07	16.27	6941	20.11	6941.03
36.15	6940.3	36.75	6940.28	41.83	6940.05	50.83	6939.64	53.53	6939.52
54.04	6939.39	55.02	6939.15	72.26	6934.84	81.02	6932.65	93.89	6932.65
100	6932.65	100.02	6932.65	112.95	6932.65	119.01	6932.65	126.2	6934.44
145.01	6939.15	154.53	6939.15						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	53.53	.04	145.01	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	53.53	145.01		46.23	50.03	53.71	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 3701.62

INPUT

Description:

Station Elevation Data		num=		26					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6940.42	.8	6940.38	2.88	6940.23	13.76	6940.15	14.19	6940.15
14.28	6940.15	14.3	6940.15	14.31	6940.15	14.39	6940.15	14.44	6940.14
15.41	6940.14	21.52	6940.1	21.56	6940.11	23.66	6940.03	54.55	6939.11
54.97	6939.01	55	6939	68.15	6935.71	81	6932.5	90.39	6932.5
100	6932.5	109.39	6932.5	119	6932.5	132.15	6935.79	145	6939
150	6939								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	54.55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.55	145		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM

RS: 3651.59

INPUT

Description:

Station		Elevation		Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6939.26	2.72	6939.11	5.02	6939	12.41	6938.89	12.58	6938.89
12.6	6938.89	12.87	6938.9	19.39	6939.11	22.71	6939.07	54.24	6938.66
54.98	6938.84	55	6938.85	67.71	6935.67	81	6932.35	90.71	6932.35
100	6932.35	109.71	6932.35	119	6932.35	131.71	6935.53	145	6938.85
150	6937.6								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff	Contr.	Expan.
	55	145			50.04	50.04	50.04	.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM

RS: 3601.56

INPUT

Description:

Station		Elevation		Data		num=		25	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6938.4	3.99	6938.23	5.05	6938.22	5.46	6938.22	5.91	6938.22
6.33	6938.22	6.58	6938.21	8.01	6938.21	14.55	6938.18	14.88	6938.19
24.09	6938.25	40.53	6938.39	44.21	6938.37	52.82	6938.15	54.16	6938.49
55	6938.7	68.22	6935.39	81	6932.2	90.34	6932.2	100	6932.2
109.34	6932.2	119	6932.2	132.22	6935.5	145	6938.7	150	6937.45

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		51.53 51.53	51.53		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3550.03

INPUT

Description:

Station	Elevation	Data	num=	20
Sta	Elev	Sta	Elev	Sta
0	6937.26	2.56	6937.11	4.74
7.42	6937.18	41.93	6937.09	49.08
74.24	6933.73	81	6932.04	85.94
119	6932.04	138.24	6936.86	145

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	55	.04
		145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		5 5	5		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3545.03

INPUT

Description:

Station	Elevation	Data	num=	17
Sta	Elev	Sta	Elev	Sta
0	6937.11	2.42	6936.97	4.41
6.51	6937.06	6.9	6937.09	7.5
48.71	6936.96	55	6938.53	81
145	6938.53	153.4	6936.43	100

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
		145	.045

0 .045 55 .04 145 .045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		10.13 10.13	10.13		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 3534.9

INPUT

Description:

Station	Elevation	Data	num=	21
Sta	Elev	Sta	Elev	Sta
0	6936.85	2.13	6936.74	2.33
17.39	6936.79	25.49	6936.78	45.81
55	6936	62.85	6934.04	81
105.73	6929.5	119	6929.5	126.85
154.58	6933.6			

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	145		10.12 10.12	10.12		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 3524.78

INPUT

Description:

Station	Elevation	Data	num=	17
Sta	Elev	Sta	Elev	Sta
0	6937.1	1.85	6937	7.73
42.9	6936.49	42.91	6936.49	55
99.99	6926.97	100	6926.97	118.99
145	6933.47	150	6932.22	

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.045	42.9	.04
		144.99	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.9	144.99		23.28	23.28		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3501.5

INPUT

Description:

Station Elevation Data		num= 21	
Sta	Elev	Sta	Elev
0	6937.18	2.83	6937.2
		9.25	6937.27
26.68	6936.01	27.79	6935.96
		29.37	6935.89
50.63	6934.49	55	6933.4
		68.29	6930.08
100	6926.9	109.29	6926.9
		119	6926.9
150	6932.15	132.29	6930.22
		145	6933.4

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.045	45.23	.04
		145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.23	145		51.21	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3451.47

INPUT

Description:

Station Elevation Data		num= 32	
Sta	Elev	Sta	Elev
0	6936.44	3.41	6936.46
		5.59	6936.25
		6.02	6936.22
		6.68	6936.17

7.02	6936.14	8.4	6936.04	11.51	6935.8	23.58	6934.88	25.59	6934.87
27.27	6934.86	28.64	6934.85	29.08	6934.85	30.15	6934.84	37.59	6934.78
43.62	6934.73	45.7	6934.72	46.55	6934.72	49.14	6934.7	50.96	6934.25
54.94	6933.25	73.37	6928.64	80.94	6926.75	94.2	6926.75	99.94	6926.75
100	6926.75	106.09	6926.75	118.94	6926.75	127.72	6928.95	144.94	6933.25
148.29	6932.41	154.07	6930.97						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	49.14	.04	144.94	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	49.14	144.94		50.79	46.38	42.39	.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3405.1

INPUT

Description:

Station	Elevation	Data	num=	32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6935.1	14.27	6933.81	14.36	6933.8	14.41	6933.8	16.53	6933.8
18.16	6933.8	19.11	6933.79	20.5	6933.79	21.37	6933.79	21.97	6933.79
28.91	6933.79	28.98	6933.79	29.1	6933.79	29.11	6933.79	31.31	6933.78
35.37	6933.75	43.49	6933.71	43.72	6933.71	52.8	6933.67	54.45	6933.25
55.01	6933.11	73.14	6928.58	81.01	6926.61	94.21	6926.61	100.01	6926.61
100.04	6926.61	106.11	6926.61	119.01	6926.61	127.45	6928.72	145.01	6933.11
146.79	6932.4	150.01	6931.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	52.8	.04	145.01	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	52.8	145.01		5	5	5	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 3400.1

INPUT

Description:

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6934.82	2.07	6934.64	8.99	6934.03	13.04	6933.67	13.93	6933.67
16.23	6933.67	17.66	6933.67	18.64	6933.67	29.97	6933.67	30.08	6933.67
30.27	6933.67	30.29	6933.67	33.83	6933.65	40.35	6933.61	53.21	6933.54
53.22	6933.54	53.26	6933.53	55	6933.1	80.44	6926.74	81	6926.6
81.45	6926.6	100	6926.6	100.07	6926.6	100.45	6926.6	119	6926.6
119.62	6926.75	145	6933.1	145.31	6932.97	150.49	6930.91		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	53.26	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	53.26	145		14.57 10.12	9.22		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 3389.98

INPUT

Description:

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6934.37	1.93	6934.14	3.28	6934.02	6.35	6933.75	10.18	6933.41
11.61	6933.41	31.93	6933.42	32.12	6933.42	32.46	6933.42	32.5	6933.42
38.72	6933.39	43.88	6933.36	50.78	6931.62	55.01	6930.57	69.03	6927.08
81.01	6924.07	91.2	6924.08	100.01	6924.07	100.02	6924.07	110.21	6924.08
119.01	6924.07	133.07	6927.61	145.01	6930.57	146.27	6930.25	150.01	6929.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	43.88	.04	145.01	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
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43.88 145.01 14.4 10.12 9.51 .1 .3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 3379.85

INPUT

Description:

Station	Elevation	Data	num=	27							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6934	6.81	6933.19	7.05	6933.16	7.11	6933.16	7.17	6933.16		
7.26	6933.17	17.91	6933.16	33.64	6933.17	33.91	6933.17	34.41	6933.17		
34.46	6933.17	34.99	6933.17	53.86	6928.45	55	6928.04	81	6921.54		
100	6921.54	100.06	6921.54	119	6921.54	145	6928.04	147.39	6928.63		
147.67	6928.61	154.21	6928.04	157.42	6927.75	175.77	6927.48	176.22	6927.48		
176.86	6927.52	200	6929.6								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	34.99	.04	147.39	.045

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	34.99	147.39	32.35	28.45	25.82		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 3351.41

INPUT

Description:

Station	Elevation	Data	num=	34							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6932.58	1.98	6932.57	8.46	6932.57	12.64	6932.56	15.56	6932.56		
17.72	6932.56	24.58	6932.53	30.5	6932.52	30.66	6932.52	36.89	6932.44		
36.96	6932.44	54.89	6927.96	54.93	6927.95	55	6927.93	61.35	6926.35		
80.93	6921.45	81.1	6921.45	99.94	6921.45	100	6921.45	100.28	6921.45		
118.94	6921.45	119.68	6921.64	144.94	6927.95	145.06	6927.92	149.14	6926.9		
149.25	6926.9	150.61	6926.93	160.82	6927.18	161.95	6927.22	162.4	6927.24		

162.58 6927.25 165.14 6927.45 196.43 6929.58 200 6929.66

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 36.96 .04 144.94 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
36.96 144.94 56.56 50.03 45.6 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3301.38

INPUT

Description:

Station Elevation Data num= 22
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 6931.45 6.92 6931.34 42.16 6930.99 42.18 6930.99 53.12 6928.25
54.94 6927.8 58.98 6926.79 80.94 6921.3 83.66 6921.3 99.94 6921.3
100 6921.3 116.68 6921.3 118.94 6921.3 142.24 6927.13 144.94 6927.8
145.32 6927.71 148.74 6926.85 152.22 6927.11 167.46 6928.2 175.99 6928.81
184.62 6929.47 200 6929.97

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 42.16 .04 144.94 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
42.16 144.94 54.86 50.03 46.13 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3251.35

INPUT

Description:

Station Elevation Data num= 27
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0	6930.3	42.65	6929.72	43.78	6929.71	43.81	6929.71	43.85	6929.71
43.94	6929.71	44.16	6929.7	44.35	6929.7	46.82	6929.7	52.38	6928.3
55	6927.65	64.2	6925.35	81	6921.15	87.73	6921.15	100	6921.15
106.73	6921.15	119	6921.15	128.2	6923.45	145	6927.65	145.68	6927.48
147.02	6927.14	154.15	6927.87	155.41	6927.97	158.28	6928.2	170.38	6929.18
194.78	6929.66	200	6929.86						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	46.82	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46.82	145		50.13 50.04	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3201.32

INPUT

Description:

Station	Elevation	Data	num=	22					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6929.19	14.43	6928.98	39.53	6928.77	41.52	6928.76	45.33	6928.75
50.06	6928.74	51.99	6928.25	55	6927.5	72.31	6923.17	81	6921
93.65	6921	100	6921	112.65	6921	119	6921	136.31	6925.33
145	6927.5	145.79	6927.3	147.45	6926.89	151.08	6927.36	156.63	6928.19
171.67	6928.76	200	6929.55						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	50.06	.04	145	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	50.06	145		43.08 50.03	56.82		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 3151.29

INPUT

Description:

Station Elevation Data		num=		25					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6928.46	10.92	6928.39	34.43	6928.12	37.53	6927.97	52.22	6927.55
54.2	6927.49	54.49	6927.48	54.87	6927.39	55.02	6927.35	68.4	6924.01
81.02	6920.85	89.02	6920.85	100	6920.85	100.02	6920.85	110.84	6920.85
119.01	6920.85	134.25	6924.66	145.01	6927.35	146.56	6926.96	149.69	6926.18
150.08	6926.26	151.18	6926.49	173.9	6928.01	189.03	6928.57	200	6928.71

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	54.2	.04	145.01	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	54.2	145.01		42.39	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 3101.26

INPUT

Description:

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6928.11	31.07	6927.57	37.66	6927.24	51.64	6926.76	53.07	6926.71
54.38	6927.04	55.01	6927.2	72.18	6922.91	81.01	6920.7	94.33	6920.7
100	6920.7	100.01	6920.7	113.84	6920.7	119.01	6920.7	138.58	6925.59
145.02	6927.2	146.99	6926.7	151.45	6925.59				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	55.01	.04	145.02	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.01	145.02		42.32	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 3051.23

INPUT

Description:

Station	Elevation	Data	num=	28						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6927.03	4.5	6926.83	9.01	6926.65	13.04	6926.53	16.96	6926.47	
21.12	6926.46	24.2	6926.47	28.42	6926.52	30.51	6926.55	38.56	6926.68	
39.76	6926.71	41.42	6926.61	48.27	6926.12	50.76	6925.99	54.23	6926.86	
55.01	6927.05	59.94	6925.82	81.01	6920.55	83.85	6920.55	100	6920.55	
100.01	6920.55	102.29	6920.55	119.02	6920.55	121.38	6921.14	145.02	6927.05	
145.64	6926.89	146.83	6926.6	150.89	6925.58					

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	55.01	.04
		145.02	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.01	145.02		42.39 50.03	57.55		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 3001.2

INPUT

Description:

Station	Elevation	Data	num=	18						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
39.85	6925.92	41.38	6926.03	45.84	6925.58	46.38	6925.53	48.62	6925.31	
49.26	6925.46	55.01	6926.9	80.36	6920.56	81.01	6920.4	91.08	6920.4	
99.55	6920.4	100	6920.4	100.01	6920.4	117.65	6920.4	119.01	6920.4	
141.68	6926.06	145.01	6926.9	150.01	6925.65					

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
39.85	.045	55.01	.04
		145.01	.045

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

55.01 145.01 5.06 5.06 5.06 .1 .3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2996.14

INPUT

Description:

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
34.36	6926.68	34.81	6926.71	34.97	6926.7	37.61	6926.42	38.56	6926.33
49.04	6925.41	54.92	6926.88	55.01	6926.88	80.98	6920.39	81	6920.38
99.96	6920.38	100	6920.38	100.01	6920.38	118.95	6920.38	119	6920.41
144.82	6926.86	149.46	6925.7						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
34.36	.045	55.01	.04	144.82	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	55.01	144.82		53.64 44.97	48.33	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2951.17

INPUT

Description:

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6926.45	5.22	6926.4	11.37	6926.3	39.65	6925.84	46.25	6925.73
48	6925.62	52.4	6925.36	67.1	6924.35	82.36	6921.43	90.01	6919.8
94.86	6919.86	100	6919.92	106.25	6919.98	113.76	6921.35	121.69	6922.56
175.09	6923.91	194.07	6924.39	200	6924.53				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	67.1	.04	121.69	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	67.1	121.69		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2901.14

INPUT

Description:

Station	Elevation	Data	num=	17
Sta	Elev	Sta	Elev	Sta
-8.32	6925.56	5.22	6925.39	37.07
59.01	6923.62	76.06	6919.82	78.51
99.59	6919.27	109.1	6920.6	116.3
209.41	6923.55	215.74	6923.48	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
-8.32	.045	59.01	.04
		116.3	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.01	116.3		50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2851.11

INPUT

Description:

Station	Elevation	Data	num=	15
Sta	Elev	Sta	Elev	Sta
0	6923.7	9.77	6923.69	23.11
75.43	6922.05	88.34	6918.75	91.71
105.74	6918.05	117.91	6919.68	125.61

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val

0 .045 75.43 .04 125.61 .045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	75.43	125.61		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2801.08

INPUT

Description:

Station	Elevation	Data	num=	15
Sta	Elev	Sta	Elev	Sta
0	6922.7	9.7	6922.73	19.91
79.97	6920.24	90.96	6917.28	91.72
106.45	6917.29	110.96	6918.23	123.04
				6920.39
				156.08
				6921.18
				200
				6922.1

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	79.97	.04
		123.04	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	79.97	123.04		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2751.05

INPUT

Description:

Station	Elevation	Data	num=	16
Sta	Elev	Sta	Elev	Sta
0	6921.5	7.69	6921.53	14.97
74.02	6918.68	88.81	6916.66	89.79
102.9	6915.73	104.63	6916.2	117.41
				6919.94
				168.07
				6921.02
				191.52
				6921.47
				200
				6921.43

Manning's n	Values	num=	3
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Sta	n Val	Sta	n Val	Sta	n Val
0	.045	32.94	.04	117.41	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	32.94	117.41		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 2701.02

INPUT

Description:

Station	Elevation	Data	num=	17						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6920.45	3.55	6920.44	4.69	6920.45	5.51	6920.43	35.36	6919.78	
57.9	6918.45	75.24	6917.27	88.87	6915.57	92.77	6915.16	94.51	6915.07	
100	6914.79	101.78	6914.7	105.95	6916.09	115.34	6919	150.1	6919.62	
180.04	6920.17	200	6920.05							

Manning's	n Values	num=	3							
Sta	n Val	Sta	n Val	Sta	n Val					
0	.045	35.36	.04	115.34	.045					

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	35.36	115.34		42.84	42.84		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 2650.99

INPUT

Description:

Station	Elevation	Data	num=	26						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-87.15	6919.85	-56.98	6918.95	-55.31	6918.89	-54.19	6918.85	-36.42	6918.3	
-18.87	6917.72	-17.76	6917.52	-3.29	6914.22	1.3	6913.88	2.82	6913.82	
6.03	6913.71	21.6	6917.58	23.5	6918.13	27.65	6918.16	84.62	6918.91	
138.9	6918.44	146.1	6918.37	147.19	6918.22	156.43	6917.1	164.87	6918.01	

168.2	6918.41	173.71	6918.57	200	6918.88	212.85	6919.07	213.88	6919.08
216.58	6919.11								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-87.15	.045	-18.87	.04	23.5	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-18.87	23.5		57.58	57.58		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2600.96

INPUT

Description:

Station Elevation Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev
-23.92	6919.36	-13.96	6919.46	-10.8	6919.32
48.79	6916.1	51.99	6915.71	64.63	6913.14
76.11	6912.82	83.19	6915.02	89.85	6916.68
193.22	6916.94	220.97	6916.94	223.35	6916.47
239.54	6916.29			230.95	6915.12
				233.96	6915.52

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-23.92	.045	19.4	.04	89.85	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	19.4	89.85		49.68	49.68		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2550.93

INPUT

Description:

Station Elevation Data		num=		17	
------------------------	--	------	--	----	--

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6918.37	2.12	6918.44	17	6918.88	18.77	6918.82	38.2	6918.16
59.87	6917.23	62.54	6916.3	72.81	6914.84	92.94	6912.47	98.6	6912.47
100	6912.43	103.73	6912.32	115.73	6914.19	119.93	6914.68	166.78	6915.47
182.59	6915.82	200	6916.05						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	59.87	.04	119.93	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.87	119.93		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2500.9

INPUT

Description:

Station	Elevation	Data	num=	15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6917.2	19.07	6917.14	47.65	6917.25	73.05	6915.41	78.07	6915.03
84.5	6913.55	92.65	6911.63	99.29	6911.5	100	6911.51	103.42	6911.55
114.04	6912.69	123.66	6913.73	136.56	6914.1	182.54	6914.1	200	6915.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	47.65	.04	123.66	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.65	123.66		50.04 50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2450.87

INPUT

Description:

Station Elevation Data		num= 17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6914.49	10.18	6914.48	11.39	6914.48	21.22	6914.38	72.07	6913.68
73.9	6913.66	74.71	6913.54	91.94	6910.46	100	6910.55	101.84	6910.57
103.39	6910.62	104.45	6910.85	121.25	6913.32	129.58	6913.56	162.48	6914.49
180.54	6914.49	200	6915.49						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	73.9	.04	121.25	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	73.9	121.25		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2400.84

INPUT

Description:

Station Elevation Data		num= 19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6914.31	8.19	6914.28	10.45	6914.28	15.17	6914.12	17.05	6914.05
21.09	6913.9	35.59	6913.41	65.24	6912.53	78.72	6910.98	91.49	6909.42
99.68	6907.55	99.71	6907.55	99.83	6907.58	100	6907.64	115.26	6912.89
148.96	6913.63	171.63	6914.05	179.72	6914.2	200	6914.83		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	65.24	.04	115.26	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	65.24	115.26		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 2350.81

INPUT

Description:

Station Elevation Data		num=		15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6913.38	14.66	6913.21	64.25	6911.24	65.86	6911.18	66.54	6911.11
93.6	6908.74	100	6908.5	101.76	6908.44	103.19	6908.35	105.54	6908.72
124.69	6911.7	136.36	6912.05	165.98	6912.52	188.21	6912.86	200	6913.13

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	14.66	.04	124.69	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	14.66	124.69		50.04	50.04	50.04	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2300.78

INPUT

Description:

Station Elevation Data		num=		15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6911.72	19.82	6911.63	73.45	6909.76	75.67	6909.68	77.26	6909.46
86.74	6908.15	100	6908.29	109.35	6908.39	113.85	6908.43	115.44	6908.63
132.83	6911.04	168.41	6911.97	180.14	6912.23	189.28	6912.52	200	6912.7

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	19.82	.04	132.83	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	19.82	132.83		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2250.75

INPUT

Description:

Station	Elevation	Data	num=	15						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6910.64	11.14	6910.54	26.95	6910.58	57.99	6909.39	75.05	6908.8	
83.48	6907.62	86.1	6907.26	100	6907.34	103.55	6907.36	113.74	6907.42	
114.63	6907.56	133.17	6910.55	146.54	6910.45	186.41	6911.65	200	6911.86	

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	26.95	.04	133.17	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	26.95	133.17		50.03	50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2200.72

INPUT

Description:

Station	Elevation	Data	num=	17						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	6909.73	18.34	6909.85	33.23	6910.03	40.88	6909.58	55.21	6908.78	
69.8	6908.03	83.19	6906.24	84.31	6906.09	97.49	6906.17	100	6906.18	
113.61	6906.27	114.7	6906.45	134.86	6910.44	169.79	6910.81	183.77	6910.97	
188.05	6911.1	200	6911.5							

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	33.23	.04	134.86	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	33.23	134.86		50.03	50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2150.69

INPUT

Description:

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6908.93	13.22	6909.09	29.67	6909.19	47.32	6907.99	56.58	6907.41
76.83	6905.25	78.22	6905.06	80.6	6905.07	100	6905.28	117.49	6905.46
124.55	6907.01	144.39	6910.41	160.27	6910.53	172.5	6910.86	196.67	6911.56
197.02	6911.57	200	6911.67						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	29.67	.04	144.39	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	29.67	144.39		50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 2100.66

INPUT

Description:

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6908.39	15.48	6908.41	31.5	6908.44	33.51	6908.29	38.22	6907.73
51.3	6906.17	60.73	6905.21	73.92	6903.74	100	6904.38	120.67	6904.9
129.14	6905.08	150.18	6909.61	151.79	6909.86	161.64	6910.24	169.67	6910.55
194.68	6911.35	200	6911.42						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	31.5	.04	151.79	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	31.5	151.79		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 2050.63

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6908.02	16.65	6907.96	36.27	6907.35	44.24	6906.56	49.11	6905.86
64.49	6904.11	71.3	6903.23	100	6903.68	128.72	6904.13	134.84	6904.2
137.58	6904.74	157.75	6908.81	171.07	6909.19	188.36	6909.73	188.68	6909.74
200	6909.97								

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	36.27	.04	157.75	.045

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	36.27	157.75		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 2000.6

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6907.2	19.15	6906.98	34.27	6906.53	43.6	6905.64	55.54	6904.77
70.74	6903.09	72.32	6902.91	75.08	6902.93	100	6903.12	114.48	6903.23
137.69	6903.41	139.84	6903.86	157.9	6907.65	168.95	6907.71	190.89	6908.16
200	6908.39								

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	34.27	.04	157.9	.045

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	34.27	157.9		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1950.57

INPUT

Description:

Station		Elevation		Data		num=		13	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6906.7	12.62	6906.52	40.78	6904.82	59.44	6903.91	71.16	6902.8
77.36	6902.21	100	6902.45	114.46	6902.6	128.33	6902.76	130.3	6902.95
155.62	6905.79	163.33	6906.11	200	6906.9				

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	12.62	.04	155.62	.045		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	12.62	155.62		50.04	50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1900.54

INPUT

Description:

Station		Elevation		Data		num=		14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6905.94	16.42	6905.76	38.19	6904.68	63.46	6903.25	69.18	6902.94
73.87	6902.64	85.96	6901.83	100	6901.8	112.44	6901.77	117.06	6901.74
119.48	6901.96	160.38	6905.83	182.97	6906.38	200	6906.82		

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	16.42	.04	160.38	.045		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	16.42	160.38		50.03	50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1850.51

INPUT

Description:

Station		Elevation		Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6904.79	36.51	6904.42	36.74	6904.42	37.33	6904.39	76.86	6902.1
80.36	6901.76	87.03	6901.23	100	6901.22	109.6	6901.21	113.98	6901.18
124.25	6902.13	163.34	6905.89	188.56	6906.63	193.49	6906.76	200	6906.7

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	0	.04	163.34	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		0	163.34		50.03	50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1800.48

INPUT

Description:

Station		Elevation		Data		num=		14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6903.35	10.25	6903.12	34.22	6902.95	47.67	6902.51	71.74	6901.15
76.47	6900.77	83.06	6900.22	90.77	6900.26	100	6900.29	119.42	6900.36
151.67	6904.72	158.44	6905.67	172.04	6905.89	200	6906.15		

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	0	.04	158.44	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
		0	158.44		50.04	50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1750.45

INPUT

Description:

Station		Elevation		Data		num=		15	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4.37	6902.66	19.73	6902.07	32.59	6901.82	38.42	6901.67	74.26	6900.62
75.33	6900.57	89.43	6899.82	104.51	6899.81	110.31	6899.79	134.77	6899.73
158.92	6903.48	166.24	6904.57	170.95	6904.67	183.76	6904.84	209.29	6904.97

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-4.37	.045	-4.37	.04	166.24	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.37	166.24		50.03	50.03	50.03		.1		.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM

RS: 1700.42

INPUT

Description:

Station		Elevation		Data		num=		17	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12.52	6902.55	9.33	6901.81	9.65	6901.8	10.3	6901.79	19.85	6901.6
91.63	6900.2	93.1	6900.16	94.81	6900.08	114.41	6899.6	132.18	6899.71
135.07	6899.72	160.55	6899.76	184.77	6902.5	189.54	6903	192.05	6903.04
208.52	6903.35	231.75	6903.85						

Manning's n		Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-12.52	.045	-12.52	.04	189.54	.045		

Bank	Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-12.52	189.54		50.03	50.03	50.03		.1		.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1650.39

INPUT

Description:

Station		Elevation		Data		num=		17	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-7.19	6901.95	2.13	6901.64	71.46	6899.95	78.47	6899.75	101.54	6898.98
115.44	6899.14	119.32	6899.33	131.26	6899.64	143.13	6899.95	144.17	6899.98
145.44	6900	149.71	6899.65	160.14	6899.11	166.03	6899.64	183.82	6901.34
198.87	6901.57	228.57	6901.79						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-7.19	.045	-7.19	.04	183.82	.045

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-7.19	183.82		50.03	50.03	50.03	.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1600.36

INPUT

Description:

Station		Elevation		Data		num=		16	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-23.65	6901.35	-16.1	6901.13	-.91	6900.57	28.13	6899.74	37.49	6899.43
78.41	6899.89	102.97	6899.55	125.15	6899.24	144.2	6898.5	146.47	6898.24
151.78	6898.67	166.69	6899.62	187.07	6899.92	209.68	6900.45	226.62	6900.89
239.04	6901.03								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-23.65	.045	-23.65	.04	239.04	.045

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-23.65	239.04						

-23. 65 239. 04 50. 03 50. 03 50. 03 . 1 . 3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1550. 33

INPUT

Description:

Station		Elevation		Data		num=		16			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6899. 84	5. 11	6900. 05	8. 06	6900. 08	34. 22	6899. 4	42. 11	6899. 18		
86. 75	6898. 09	135. 5	6897. 9	150. 4	6897. 84	151. 35	6897. 85	151. 65	6897. 86		
152. 15	6897. 87	201. 55	6899. 16	208. 56	6899. 21	234. 35	6899. 99	262. 24	6900. 88		
263. 83	6900. 9										

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	. 045	8. 06	. 04	262. 24	. 045

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff	Contr.	Expan.
	8. 06	262. 24			50. 04	50. 04	50. 04	. 1	. 3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1500. 3

INPUT

Description:

Station		Elevation		Data		num=		21			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-9. 82	6897. 39	-3. 26	6897. 25	7. 77	6897. 42	16. 77	6897. 55	33. 51	6897. 49		
51. 56	6897. 42	81. 13	6897. 52	85. 47	6897. 57	87. 33	6897. 58	111. 38	6898		
111. 41	6898	111. 47	6898	116. 37	6898. 06	118. 18	6898. 13	158. 81	6899. 12		
171. 04	6899. 31	200. 36	6900. 23	200. 39	6900. 23	229. 84	6900. 55	247. 49	6900. 32		
252. 95	6900. 38										

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val

-9.82 .045 16.77 .04 200.36 .045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	16.77	200.36		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 1450.27

INPUT

Description:

Station	Elevation	Data	num=	18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6896.69	20.09	6897.03	30.53	6897.2	51.67	6897.64	51.8	6897.64
55.96	6897.72	56.4	6897.71	56.58	6897.7	56.66	6897.68	98.73	6896.3
100	6896.31	103.78	6896.35	105.6	6896.91	128.14	6897.25	177.01	6899.05
179.03	6899.18	186.37	6899.5	200	6899.51				

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.045	55.96	.04
		186.37	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55.96	186.37		50.03 50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 1400.24

INPUT

Description:

Station	Elevation	Data	num=	22				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	6896.06	9.97	6896.23	24.12	6896.43	44.62	6897.2	46.31
46.59	6897.27	46.62	6897.27	46.71	6897.26	62.12	6896.68	68.37
71.31	6895.69	95.87	6894.89	100	6894.93	106.61	6894.99	110.47
123.81	6896.38	152.75	6897.45	163.09	6898.12	188.28	6899.25	190.64
192.17	6899.24	200	6899.56					

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	46.59	.04	163.09	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46.59	163.09		50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 1350.21

INPUT

Description:

Station Elevation Data			num= 23		
Sta	Elev	Sta	Elev	Sta	Elev
0	6895.55	1.24	6895.57	17.95	6895.9
39.53	6896.78	56.97	6897.04	63.65	6895.8
85.97	6893.71	93.01	6893.48	100	6893.54
119.48	6895.52	128.48	6895.85	147.15	6897.07
174.12	6897.43	194.79	6898.27	200	6898.46

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56.97	.04	155.67	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56.97	155.67		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 1300.18

INPUT

Description:

Station Elevation Data			num= 25		
Sta	Elev	Sta	Elev	Sta	Elev
0	6894.86	17.4	6894.99	29.36	6895.68
				36.27	6896.06
				47.29	6895.82

48.5	6895.62	63.38	6893.16	70.65	6891.71	82.52	6891.47	87.64	6889.76
87.65	6889.76	91.61	6889.26	94.9	6889.34	100	6889.27	111.28	6889.12
116.67	6891.96	122.64	6892.53	152.65	6893.53	155.23	6893.56	162.98	6895.56
165.52	6895.62	170.18	6895.73	171.95	6895.74	173.83	6896.13	200	6896.51

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	47.29	.04	162.98	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	47.29	162.98		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 1250.15

INPUT

Description:

Station	Elevation	Data	num=	25					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6893.95	17.77	6893.93	28.44	6894.48	33	6894.81	51.84	6893.31
60.18	6893.13	67.91	6891.85	71.4	6891.15	77.09	6891.04	79.55	6890.22
91.26	6888.76	100	6888.95	101	6888.97	110.48	6888.84	113.6	6890.49
130.55	6892.08	148.37	6892.68	155.29	6892.77	159.89	6893.95	166.62	6894.11
178.96	6894.42	183.63	6894.45	187.56	6895.26	188.63	6895.48	200	6895.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	33	.04	159.89	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	33	159.89		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM RS: 1200.12

INPUT

Description:

Station Elevation Data		num=		24					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6894.11	24.84	6894.17	57.24	6892.9	61.43	6892.65	65.39	6892.6
68.98	6890.87	69.01	6890.25	70.01	6890.52	74.24	6890.64	74.25	6890.64
75.4	6890.19	90.91	6888.25	100	6888.45	107.11	6888.6	109.68	6888.56
110.53	6889.01	138.47	6891.64	144.09	6891.83	155.35	6891.97	156.8	6892.34
167.71	6892.6	187.73	6893.1	195.32	6893.15	200	6894.11		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	65.39	.04	156.8	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	65.39	156.8		50.04	50.04		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM RS: 1150.09

INPUT

Description:

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6893.87	14.46	6893.84	14.56	6893.84	30.76	6894.05	37.65	6893.64
47.9	6891.73	48.28	6891.66	53.16	6891.08	63.42	6889.2	83.71	6886.32
90.07	6885.23	95.19	6885.32	100	6885.36	109.94	6885.43	150.46	6886.59
158.69	6888.36	186.85	6890.02	200	6890.32				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	30.76	.032	158.69	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	30.76	158.69		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1100.06

INPUT

Description:

Station		Elevation		Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6893.03	7.38	6893.15	7.76	6893.15	29.68	6893.37	29.97	6893.38
30.24	6893.39	30.37	6893.39	36.84	6893.46	39.31	6893.17	50.06	6891.2
72.53	6887.08	84.7	6885.35	88.52	6884.7	100	6884.9	103.15	6884.95
111.37	6885.01	133.97	6885.66	153.5	6889.86	170.39	6890.85	185.41	6891.2
200	6891.54								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	36.84	.04	153.5	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	36.84	153.5		50.03	50.03		.1	.3

CROSS SECTION

RIVER: UT_BSC2

REACH: NCONFL-BGM

RS: 1050.03

INPUT

Description:

Station		Elevation		Data		num=		19	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6892.27	8.83	6892.24	40.85	6892.04	41.12	6892.03	42.98	6892.33
51.55	6890.67	68.42	6887.4	68.59	6887.35	81.65	6884.95	85.69	6884.38
86.96	6884.17	100	6884.39	111.1	6884.58	112.81	6884.59	117.48	6884.72
145.15	6890.67	148.31	6891.35	153.94	6891.68	200	6892.76		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	42.98	.04	148.31	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.98	148.31		46.95	46.95		.1	.3

CROSS SECTION

RIVER: UT_BSC2
 REACH: NCONFL-BGM

RS: 1000

INPUT

Description:

Station		Elevation		Data		num=		29	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6892.6	63.9	6892.6	64.53	6892.65	65.62	6892.74	65.81	6892.75
66.72	6892.25	75.21	6892.7	76.26	6893.06	80.42	6889.86	85.38	6886.04
92.79	6883.44	100	6883.41	112.36	6883.36	119.48	6889.86	120.23	6890.54
137.68	6892.84	138.73	6892.81	143.23	6892.65	146.7	6892.51	146.72	6892.51
154.84	6891.77	154.91	6891.76	154.92	6891.75	155.19	6891.13	164.01	6891.24
166.96	6891.22	177.69	6891.57	198.49	6891.65	200	6891.66		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	76.26	.04	137.68	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	76.26	137.68		63.78	0	48.46	.1	.3

SUMMARY OF MANNING'S N VALUES

River: UT_BSC2

Reach	River Sta.	n1	n2	n3
NCONFL-BGM	6053.03	.045	.04	.045
NCONFL-BGM	6003	.045	.04	.045
NCONFL-BGM	5952.97	.045	.04	.045
NCONFL-BGM	5902.94	.045	.04	.045
NCONFL-BGM	5852.91	.045	.032	.045
NCONFL-BGM	5802.88	.045	.04	.045
NCONFL-BGM	5752.85	.045	.04	.045
NCONFL-BGM	5702.82	.045	.04	.045
NCONFL-BGM	5652.79	.045	.04	.045
NCONFL-BGM	5602.76	.045	.04	.045
NCONFL-BGM	5552.73	.045	.04	.045

NCONFL-BGM	5502. 7	. 045	. 04	. 045
NCONFL-BGM	5452. 67	. 045	. 04	. 045
NCONFL-BGM	5402. 64	. 045	. 04	. 045
NCONFL-BGM	5352. 61	. 045	. 04	. 045
NCONFL-BGM	5302. 58	. 045	. 04	. 045
NCONFL-BGM	5252. 55	. 045	. 04	. 045
NCONFL-BGM	5202. 52	. 045	. 04	. 045
NCONFL-BGM	5152. 49	. 045	. 04	. 045
NCONFL-BGM	5102. 46	. 045	. 04	. 045
NCONFL-BGM	5084. 11	. 045	. 04	. 045
NCONFL-BGM	5079. 11	. 045	. 04	. 045
NCONFL-BGM	5068. 6	. 045	. 04	. 045
NCONFL-BGM	5058. 1	. 045	. 04	. 045
NCONFL-BGM	5052. 43	. 045	. 04	. 045
NCONFL-BGM	5002. 4	. 045	. 04	. 045
NCONFL-BGM	4952. 37	. 045	. 04	. 045
NCONFL-BGM	4850. 92	. 045	. 04	. 045
NCONFL-BGM	4845. 92	. 045	. 04	. 045
NCONFL-BGM	4835. 8	. 045	. 04	. 045
NCONFL-BGM	4825. 68	. 045	. 04	. 045
NCONFL-BGM	4802. 28	. 045	. 04	. 045
NCONFL-BGM	4752. 25	. 045	. 04	. 045
NCONFL-BGM	4706. 3	. 045	. 04	. 045
NCONFL-BGM	4701. 3	. 045	. 04	. 045
NCONFL-BGM	4695. 47	. 045	. 04	. 045
NCONFL-BGM	4689. 63	. 045	. 04	. 045
NCONFL-BGM	4652. 19	. 045	. 04	. 045
NCONFL-BGM	4602. 16	. 045	. 04	. 045
NCONFL-BGM	4573. 58	. 045	. 04	. 045
NCONFL-BGM	4568. 58	. 045	. 04	. 045
NCONFL-BGM	4558. 46	. 045	. 04	. 045
NCONFL-BGM	4548. 35	. 045	. 04	. 045
NCONFL-BGM	4502. 1	. 045	. 04	. 045
NCONFL-BGM	4452. 07	. 045	. 04	. 045
NCONFL-BGM	4402. 04	. 045	. 04	. 045
NCONFL-BGM	4352. 01	. 045	. 04	. 045
NCONFL-BGM	4301. 98	. 045	. 04	. 045
NCONFL-BGM	4251. 95	. 045	. 04	. 045
NCONFL-BGM	4234. 59	. 045	. 04	. 045
NCONFL-BGM	4229. 59	. 045	. 04	. 045
NCONFL-BGM	4214. 29	. 045	. 04	. 045
NCONFL-BGM	4199	. 045	. 04	. 045

NCONFL-BGM	4151.89	.045	.04	.045
NCONFL-BGM	4101.86	.045	.04	.045
NCONFL-BGM	4053.63	Cul vert		
NCONFL-BGM	4001.8	.045	.04	.045
NCONFL-BGM	3951.77	.045	.04	.045
NCONFL-BGM	3901.74	.045	.04	.045
NCONFL-BGM	3851.71	.045	.04	.045
NCONFL-BGM	3802.7	.045	.04	.045
NCONFL-BGM	3797.7	.045	.04	.045
NCONFL-BGM	3791.57	.045	.04	.045
NCONFL-BGM	3785.44	.045	.04	.045
NCONFL-BGM	3751.65	.045	.04	.045
NCONFL-BGM	3701.62	.045	.04	.045
NCONFL-BGM	3651.59	.045	.04	.045
NCONFL-BGM	3601.56	.045	.04	.045
NCONFL-BGM	3550.03	.045	.04	.045
NCONFL-BGM	3545.03	.045	.04	.045
NCONFL-BGM	3534.9	.045	.04	.045
NCONFL-BGM	3524.78	.045	.04	.045
NCONFL-BGM	3501.5	.045	.04	.045
NCONFL-BGM	3451.47	.045	.04	.045
NCONFL-BGM	3405.1	.045	.04	.045
NCONFL-BGM	3400.1	.045	.04	.045
NCONFL-BGM	3389.98	.045	.04	.045
NCONFL-BGM	3379.85	.045	.04	.045
NCONFL-BGM	3351.41	.045	.04	.045
NCONFL-BGM	3301.38	.045	.04	.045
NCONFL-BGM	3251.35	.045	.04	.045
NCONFL-BGM	3201.32	.045	.04	.045
NCONFL-BGM	3151.29	.045	.04	.045
NCONFL-BGM	3101.26	.045	.04	.045
NCONFL-BGM	3051.23	.045	.04	.045
NCONFL-BGM	3001.2	.045	.04	.045
NCONFL-BGM	2996.14	.045	.04	.045
NCONFL-BGM	2951.17	.045	.04	.045
NCONFL-BGM	2901.14	.045	.04	.045
NCONFL-BGM	2851.11	.045	.04	.045
NCONFL-BGM	2801.08	.045	.04	.045
NCONFL-BGM	2751.05	.045	.04	.045
NCONFL-BGM	2701.02	.045	.04	.045
NCONFL-BGM	2650.99	.045	.04	.045
NCONFL-BGM	2600.96	.045	.04	.045

NCONFL-BGM	2550.93	.045	.04	.045
NCONFL-BGM	2500.9	.045	.04	.045
NCONFL-BGM	2450.87	.045	.04	.045
NCONFL-BGM	2400.84	.045	.04	.045
NCONFL-BGM	2350.81	.045	.04	.045
NCONFL-BGM	2300.78	.045	.04	.045
NCONFL-BGM	2250.75	.045	.04	.045
NCONFL-BGM	2200.72	.045	.04	.045
NCONFL-BGM	2150.69	.045	.04	.045
NCONFL-BGM	2100.66	.045	.04	.045
NCONFL-BGM	2050.63	.045	.04	.045
NCONFL-BGM	2000.6	.045	.04	.045
NCONFL-BGM	1950.57	.045	.04	.045
NCONFL-BGM	1900.54	.045	.04	.045
NCONFL-BGM	1850.51	.045	.04	.045
NCONFL-BGM	1800.48	.045	.04	.045
NCONFL-BGM	1750.45	.045	.04	.045
NCONFL-BGM	1700.42	.045	.04	.045
NCONFL-BGM	1650.39	.045	.04	.045
NCONFL-BGM	1600.36	.045	.04	.045
NCONFL-BGM	1550.33	.045	.04	.045
NCONFL-BGM	1500.3	.045	.04	.045
NCONFL-BGM	1450.27	.045	.04	.045
NCONFL-BGM	1400.24	.045	.04	.045
NCONFL-BGM	1350.21	.045	.04	.045
NCONFL-BGM	1300.18	.045	.04	.045
NCONFL-BGM	1250.15	.045	.04	.045
NCONFL-BGM	1200.12	.045	.04	.045
NCONFL-BGM	1150.09	.045	.032	.045
NCONFL-BGM	1100.06	.045	.04	.045
NCONFL-BGM	1050.03	.045	.04	.045
NCONFL-BGM	1000	.045	.04	.045

SUMMARY OF REACH LENGTHS

Ri ver: UT_BSC2

Reach	Ri ver Sta.	Left	Channel	Ri ght
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NCONFL-BGM	6053.03	41.96	50.03	59.02
NCONFL-BGM	6003	50.03	50.03	50.03
NCONFL-BGM	5952.97	50.04	50.04	50.04
NCONFL-BGM	5902.94	50.03	50.03	50.03
NCONFL-BGM	5852.91	50.03	50.03	50.03
NCONFL-BGM	5802.88	50.03	50.03	50.03
NCONFL-BGM	5752.85	50.04	50.04	50.04
NCONFL-BGM	5702.82	50.03	50.03	50.03
NCONFL-BGM	5652.79	50.03	50.03	50.03
NCONFL-BGM	5602.76	50.03	50.03	50.03
NCONFL-BGM	5552.73	50.04	50.04	50.04
NCONFL-BGM	5502.7	50.03	50.03	50.03
NCONFL-BGM	5452.67	50.03	50.03	50.03
NCONFL-BGM	5402.64	50.04	50.04	50.04
NCONFL-BGM	5352.61	50.03	50.03	50.03
NCONFL-BGM	5302.58	50.03	50.03	50.03
NCONFL-BGM	5252.55	50.03	50.03	50.03
NCONFL-BGM	5202.52	50.04	50.04	50.04
NCONFL-BGM	5152.49	50.03	50.03	50.03
NCONFL-BGM	5102.46	18.35	18.35	18.35
NCONFL-BGM	5084.11	5	5	5
NCONFL-BGM	5079.11	10.51	10.51	10.51
NCONFL-BGM	5068.6	10.5	10.5	10.5
NCONFL-BGM	5058.1	5.67	5.67	5.67
NCONFL-BGM	5052.43	68.24	50.03	33.83
NCONFL-BGM	5002.4	91.77	50.04	33.17
NCONFL-BGM	4952.37	155.97	101.45	66.01
NCONFL-BGM	4850.92	5	5	5
NCONFL-BGM	4845.92	10.12	10.12	10.12
NCONFL-BGM	4835.8	10.12	10.12	10.12
NCONFL-BGM	4825.68	23.41	23.41	23.41
NCONFL-BGM	4802.28	50.03	50.03	50.03
NCONFL-BGM	4752.25	45.95	45.95	45.95
NCONFL-BGM	4706.3	5	5	5
NCONFL-BGM	4701.3	5.84	5.84	5.84
NCONFL-BGM	4695.47	5.83	5.83	5.83
NCONFL-BGM	4689.63	37.44	37.44	37.44
NCONFL-BGM	4652.19	50.04	50.04	50.04
NCONFL-BGM	4602.16	28.57	28.57	28.57
NCONFL-BGM	4573.58	5	5	5
NCONFL-BGM	4568.58	10.12	10.12	10.12
NCONFL-BGM	4558.46	10.13	10.13	10.13

NCONFL-BGM	4548.35	46.24	46.24	46.24
NCONFL-BGM	4502.1	50.03	50.03	50.03
NCONFL-BGM	4452.07	50.04	50.04	50.04
NCONFL-BGM	4402.04	56.36	50.03	44.49
NCONFL-BGM	4352.01	59.78	50.03	41.17
NCONFL-BGM	4301.98	39.8	50.03	60.2
NCONFL-BGM	4251.95	17.38	17.38	17.38
NCONFL-BGM	4234.59	4.99	4.99	4.99
NCONFL-BGM	4229.59	15.3	15.3	15.3
NCONFL-BGM	4214.29	15.29	15.29	15.29
NCONFL-BGM	4199	47.12	47.12	47.12
NCONFL-BGM	4151.89	32.73	32.73	32.73
NCONFL-BGM	4101.86	125.84	125.84	125.84
NCONFL-BGM	4053.63	Cul vert		
NCONFL-BGM	4001.8	41.56	41.56	41.56
NCONFL-BGM	3951.77	50.03	50.03	50.03
NCONFL-BGM	3901.74	50.03	50.03	50.03
NCONFL-BGM	3851.71	49.01	49.01	49.01
NCONFL-BGM	3802.7	5	5	5
NCONFL-BGM	3797.7	6.13	6.13	6.13
NCONFL-BGM	3791.57	6.13	6.13	6.13
NCONFL-BGM	3785.44	28.74	33.8	38.94
NCONFL-BGM	3751.65	46.23	50.03	53.71
NCONFL-BGM	3701.62	50.03	50.03	50.03
NCONFL-BGM	3651.59	50.04	50.04	50.04
NCONFL-BGM	3601.56	51.53	51.53	51.53
NCONFL-BGM	3550.03	5	5	5
NCONFL-BGM	3545.03	10.13	10.13	10.13
NCONFL-BGM	3534.9	10.12	10.12	10.12
NCONFL-BGM	3524.78	23.28	23.28	23.28
NCONFL-BGM	3501.5	51.21	50.03	49.15
NCONFL-BGM	3451.47	50.79	46.38	42.39
NCONFL-BGM	3405.1	5	5	5
NCONFL-BGM	3400.1	14.57	10.12	9.22
NCONFL-BGM	3389.98	14.4	10.12	9.51
NCONFL-BGM	3379.85	32.35	28.45	25.82
NCONFL-BGM	3351.41	56.56	50.03	45.6
NCONFL-BGM	3301.38	54.86	50.03	46.13
NCONFL-BGM	3251.35	50.13	50.04	50.03
NCONFL-BGM	3201.32	43.08	50.03	56.82
NCONFL-BGM	3151.29	42.39	50.03	57.58
NCONFL-BGM	3101.26	42.32	50.04	57.58

NCONFL-BGM	3051. 23	42. 39	50. 03	57. 55
NCONFL-BGM	3001. 2	5. 06	5. 06	5. 06
NCONFL-BGM	2996. 14	53. 64	44. 97	48. 33
NCONFL-BGM	2951. 17	50. 03	50. 03	50. 03
NCONFL-BGM	2901. 14	50. 04	50. 04	50. 04
NCONFL-BGM	2851. 11	50. 03	50. 03	50. 03
NCONFL-BGM	2801. 08	50. 03	50. 03	50. 03
NCONFL-BGM	2751. 05	50. 03	50. 03	50. 03
NCONFL-BGM	2701. 02	42. 84	42. 84	42. 84
NCONFL-BGM	2650. 99	57. 58	57. 58	57. 58
NCONFL-BGM	2600. 96	49. 68	49. 68	49. 68
NCONFL-BGM	2550. 93	50. 03	50. 03	50. 03
NCONFL-BGM	2500. 9	50. 04	50. 04	50. 04
NCONFL-BGM	2450. 87	50. 03	50. 03	50. 03
NCONFL-BGM	2400. 84	50. 03	50. 03	50. 03
NCONFL-BGM	2350. 81	50. 04	50. 04	50. 04
NCONFL-BGM	2300. 78	50. 03	50. 03	50. 03
NCONFL-BGM	2250. 75	50. 03	50. 03	50. 03
NCONFL-BGM	2200. 72	50. 03	50. 03	50. 03
NCONFL-BGM	2150. 69	50. 04	50. 04	50. 04
NCONFL-BGM	2100. 66	50. 03	50. 03	50. 03
NCONFL-BGM	2050. 63	50. 03	50. 03	50. 03
NCONFL-BGM	2000. 6	50. 03	50. 03	50. 03
NCONFL-BGM	1950. 57	50. 04	50. 04	50. 04
NCONFL-BGM	1900. 54	50. 03	50. 03	50. 03
NCONFL-BGM	1850. 51	50. 03	50. 03	50. 03
NCONFL-BGM	1800. 48	50. 04	50. 04	50. 04
NCONFL-BGM	1750. 45	50. 03	50. 03	50. 03
NCONFL-BGM	1700. 42	50. 03	50. 03	50. 03
NCONFL-BGM	1650. 39	50. 03	50. 03	50. 03
NCONFL-BGM	1600. 36	50. 03	50. 03	50. 03
NCONFL-BGM	1550. 33	50. 04	50. 04	50. 04
NCONFL-BGM	1500. 3	50. 03	50. 03	50. 03
NCONFL-BGM	1450. 27	50. 03	50. 03	50. 03
NCONFL-BGM	1400. 24	50. 04	50. 04	50. 04
NCONFL-BGM	1350. 21	50. 03	50. 03	50. 03
NCONFL-BGM	1300. 18	50. 03	50. 03	50. 03
NCONFL-BGM	1250. 15	50. 03	50. 03	50. 03
NCONFL-BGM	1200. 12	50. 04	50. 04	50. 04
NCONFL-BGM	1150. 09	50. 03	50. 03	50. 03
NCONFL-BGM	1100. 06	50. 03	50. 03	50. 03
NCONFL-BGM	1050. 03	46. 95	46. 95	46. 95

NCONFL-BGM	1000	63.78	0	48.46
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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: UT_BSC2

Reach	River Sta.	Contr.	Expan.
NCONFL-BGM	6053.03	.1	.3
NCONFL-BGM	6003	.1	.3
NCONFL-BGM	5952.97	.1	.3
NCONFL-BGM	5902.94	.1	.3
NCONFL-BGM	5852.91	.1	.3
NCONFL-BGM	5802.88	.1	.3
NCONFL-BGM	5752.85	.1	.3
NCONFL-BGM	5702.82	.1	.3
NCONFL-BGM	5652.79	.1	.3
NCONFL-BGM	5602.76	.1	.3
NCONFL-BGM	5552.73	.1	.3
NCONFL-BGM	5502.7	.1	.3
NCONFL-BGM	5452.67	.1	.3
NCONFL-BGM	5402.64	.1	.3
NCONFL-BGM	5352.61	.1	.3
NCONFL-BGM	5302.58	.1	.3
NCONFL-BGM	5252.55	.1	.3
NCONFL-BGM	5202.52	.1	.3
NCONFL-BGM	5152.49	.1	.3
NCONFL-BGM	5102.46	.1	.3
NCONFL-BGM	5084.11	.1	.3
NCONFL-BGM	5079.11	.1	.3
NCONFL-BGM	5068.6	.1	.3
NCONFL-BGM	5058.1	.1	.3
NCONFL-BGM	5052.43	.1	.3
NCONFL-BGM	5002.4	.1	.3
NCONFL-BGM	4952.37	.1	.3
NCONFL-BGM	4850.92	.1	.3
NCONFL-BGM	4845.92	.1	.3
NCONFL-BGM	4835.8	.1	.3
NCONFL-BGM	4825.68	.1	.3

NCONFL-BGM	4802.28	.1	.3
NCONFL-BGM	4752.25	.1	.3
NCONFL-BGM	4706.3	.1	.3
NCONFL-BGM	4701.3	.1	.3
NCONFL-BGM	4695.47	.1	.3
NCONFL-BGM	4689.63	.1	.3
NCONFL-BGM	4652.19	.1	.3
NCONFL-BGM	4602.16	.1	.3
NCONFL-BGM	4573.58	.1	.3
NCONFL-BGM	4568.58	.1	.3
NCONFL-BGM	4558.46	.1	.3
NCONFL-BGM	4548.35	.1	.3
NCONFL-BGM	4502.1	.1	.3
NCONFL-BGM	4452.07	.1	.3
NCONFL-BGM	4402.04	.1	.3
NCONFL-BGM	4352.01	.1	.3
NCONFL-BGM	4301.98	.1	.3
NCONFL-BGM	4251.95	.1	.3
NCONFL-BGM	4234.59	.1	.3
NCONFL-BGM	4229.59	.1	.3
NCONFL-BGM	4214.29	.1	.3
NCONFL-BGM	4199	.1	.3
NCONFL-BGM	4151.89	.1	.3
NCONFL-BGM	4101.86	.3	.5
NCONFL-BGM	4053.63	Cul vert	
NCONFL-BGM	4001.8	.3	.5
NCONFL-BGM	3951.77	.1	.3
NCONFL-BGM	3901.74	.1	.3
NCONFL-BGM	3851.71	.1	.3
NCONFL-BGM	3802.7	.1	.3
NCONFL-BGM	3797.7	.1	.3
NCONFL-BGM	3791.57	.1	.3
NCONFL-BGM	3785.44	.1	.3
NCONFL-BGM	3751.65	.1	.3
NCONFL-BGM	3701.62	.1	.3
NCONFL-BGM	3651.59	.1	.3
NCONFL-BGM	3601.56	.1	.3
NCONFL-BGM	3550.03	.1	.3
NCONFL-BGM	3545.03	.1	.3
NCONFL-BGM	3534.9	.1	.3
NCONFL-BGM	3524.78	.1	.3
NCONFL-BGM	3501.5	.1	.3

NCONFL-BGM	3451.47	.1	.3
NCONFL-BGM	3405.1	.1	.3
NCONFL-BGM	3400.1	.1	.3
NCONFL-BGM	3389.98	.1	.3
NCONFL-BGM	3379.85	.1	.3
NCONFL-BGM	3351.41	.1	.3
NCONFL-BGM	3301.38	.1	.3
NCONFL-BGM	3251.35	.1	.3
NCONFL-BGM	3201.32	.1	.3
NCONFL-BGM	3151.29	.1	.3
NCONFL-BGM	3101.26	.1	.3
NCONFL-BGM	3051.23	.1	.3
NCONFL-BGM	3001.2	.1	.3
NCONFL-BGM	2996.14	.1	.3
NCONFL-BGM	2951.17	.1	.3
NCONFL-BGM	2901.14	.1	.3
NCONFL-BGM	2851.11	.1	.3
NCONFL-BGM	2801.08	.1	.3
NCONFL-BGM	2751.05	.1	.3
NCONFL-BGM	2701.02	.1	.3
NCONFL-BGM	2650.99	.1	.3
NCONFL-BGM	2600.96	.1	.3
NCONFL-BGM	2550.93	.1	.3
NCONFL-BGM	2500.9	.1	.3
NCONFL-BGM	2450.87	.1	.3
NCONFL-BGM	2400.84	.1	.3
NCONFL-BGM	2350.81	.1	.3
NCONFL-BGM	2300.78	.1	.3
NCONFL-BGM	2250.75	.1	.3
NCONFL-BGM	2200.72	.1	.3
NCONFL-BGM	2150.69	.1	.3
NCONFL-BGM	2100.66	.1	.3
NCONFL-BGM	2050.63	.1	.3
NCONFL-BGM	2000.6	.1	.3
NCONFL-BGM	1950.57	.1	.3
NCONFL-BGM	1900.54	.1	.3
NCONFL-BGM	1850.51	.1	.3
NCONFL-BGM	1800.48	.1	.3
NCONFL-BGM	1750.45	.1	.3
NCONFL-BGM	1700.42	.1	.3
NCONFL-BGM	1650.39	.1	.3
NCONFL-BGM	1600.36	.1	.3

NCONFL-BGM	1550. 33	. 1	. 3
NCONFL-BGM	1500. 3	. 1	. 3
NCONFL-BGM	1450. 27	. 1	. 3
NCONFL-BGM	1400. 24	. 1	. 3
NCONFL-BGM	1350. 21	. 1	. 3
NCONFL-BGM	1300. 18	. 1	. 3
NCONFL-BGM	1250. 15	. 1	. 3
NCONFL-BGM	1200. 12	. 1	. 3
NCONFL-BGM	1150. 09	. 1	. 3
NCONFL-BGM	1100. 06	. 1	. 3
NCONFL-BGM	1050. 03	. 1	. 3
NCONFL-BGM	1000	. 1	. 3

Run FEMA-100-year as well
unless a LOMR has been
completed reducing FEMA flows.

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
NCONFL-BGM	6053.03	DBPS 100-YR	1000.00	6969.55	6973.72	6973.72	6975.04	0.018044	9.22	108.40	41.88	1.01
NCONFL-BGM	6053.03	DBPS 2-YR	100.00	6969.55	6970.95	6970.95	6971.38	0.025668	5.27	18.99	22.41	1.01
NCONFL-BGM	6003	DBPS 100-YR	1000.00	6968.59	6973.18		6973.55	0.003720	4.91	203.70	62.74	0.48
NCONFL-BGM	6003	DBPS 2-YR	100.00	6968.59	6969.90		6970.00	0.003715	2.43	41.08	36.53	0.40
NCONFL-BGM	5952.97	DBPS 100-YR	1000.00	6968.41	6972.99		6973.37	0.003767	4.93	202.72	62.58	0.48
NCONFL-BGM	5952.97	DBPS 2-YR	100.00	6968.41	6969.71		6969.81	0.003826	2.46	40.66	36.40	0.41
NCONFL-BGM	5902.94	DBPS 100-YR	1000.00	6968.23	6972.80		6973.18	0.003802	4.95	202.09	62.52	0.49
NCONFL-BGM	5902.94	DBPS 2-YR	100.00	6968.23	6969.51		6969.61	0.004039	2.50	39.94	36.25	0.42
NCONFL-BGM	5852.91	DBPS 100-YR	1000.00	6968.06	6972.65		6973.03	0.002378	4.91	203.76	62.73	0.48
NCONFL-BGM	5852.91	DBPS 2-YR	100.00	6968.06	6969.36		6969.45	0.002473	2.47	40.54	36.40	0.41
NCONFL-BGM	5802.88	DBPS 100-YR	1000.00	6967.88	6972.51		6972.88	0.003591	4.85	206.29	63.06	0.47
NCONFL-BGM	5802.88	DBPS 2-YR	100.00	6967.88	6969.22		6969.31	0.003477	2.38	41.98	36.69	0.39
NCONFL-BGM	5752.85	DBPS 100-YR	1000.00	6967.71	6972.33		6972.70	0.003625	4.86	205.60	62.97	0.47
NCONFL-BGM	5752.85	DBPS 2-YR	100.00	6967.71	6969.04		6969.13	0.003529	2.39	41.78	36.67	0.40
NCONFL-BGM	5702.82	DBPS 100-YR	1000.00	6967.53	6972.15		6972.52	0.003639	4.87	205.30	62.93	0.48
NCONFL-BGM	5702.82	DBPS 2-YR	100.00	6967.53	6968.87		6968.96	0.003467	2.38	42.02	36.70	0.39
NCONFL-BGM	5652.79	DBPS 100-YR	1000.00	6967.36	6971.96		6972.33	0.003678	4.89	204.53	62.84	0.48
NCONFL-BGM	5652.79	DBPS 2-YR	100.00	6967.36	6968.69		6968.78	0.003523	2.39	41.81	36.69	0.39
NCONFL-BGM	5602.76	DBPS 100-YR	1000.00	6967.18	6971.78		6972.15	0.003714	4.91	203.80	62.74	0.48
NCONFL-BGM	5602.76	DBPS 2-YR	100.00	6967.18	6968.52		6968.61	0.003481	2.38	41.97	36.69	0.39
NCONFL-BGM	5552.73	DBPS 100-YR	1000.00	6967.01	6971.58		6971.96	0.003778	4.94	202.56	62.59	0.48
NCONFL-BGM	5552.73	DBPS 2-YR	100.00	6967.01	6968.34		6968.43	0.003534	2.39	41.77	36.66	0.40
NCONFL-BGM	5502.7	DBPS 100-YR	1000.00	6966.83	6971.39		6971.77	0.003824	4.96	201.68	62.47	0.49
NCONFL-BGM	5502.7	DBPS 2-YR	100.00	6966.83	6968.17		6968.26	0.003484	2.38	41.96	36.71	0.39
NCONFL-BGM	5452.67	DBPS 100-YR	1000.00	6966.66	6971.19		6971.58	0.003924	5.00	199.81	62.24	0.49
NCONFL-BGM	5452.67	DBPS 2-YR	100.00	6966.66	6967.99		6968.08	0.003550	2.40	41.71	36.67	0.40
NCONFL-BGM	5402.64	DBPS 100-YR	1000.00	6966.48	6970.98		6971.38	0.004028	5.05	197.92	61.98	0.50

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	5402.64	DBPS 2-YR	100.00	6966.48	6967.82		6967.90	0.003508	2.39	41.86	36.67	0.39
NCONFL-BGM	5352.61	DBPS 100-YR	1000.00	6966.31	6970.76		6971.17	0.004186	5.12	195.23	61.65	0.51
NCONFL-BGM	5352.61	DBPS 2-YR	100.00	6966.31	6967.64		6967.73	0.003601	2.41	41.51	36.62	0.40
NCONFL-BGM	5302.58	DBPS 100-YR	1000.00	6966.13	6970.54		6970.96	0.004372	5.20	192.20	61.50	0.52
NCONFL-BGM	5302.58	DBPS 2-YR	100.00	6966.13	6967.46		6967.55	0.003607	2.41	41.48	36.60	0.40
NCONFL-BGM	5252.55	DBPS 100-YR	1000.00	6965.96	6970.29		6970.73	0.004682	5.33	187.51	60.64	0.53
NCONFL-BGM	5252.55	DBPS 2-YR	100.00	6965.96	6967.27		6967.36	0.003778	2.45	40.85	36.48	0.41
NCONFL-BGM	5202.52	DBPS 100-YR	1000.00	6965.78	6970.01		6970.48	0.005123	5.51	181.54	59.84	0.56
NCONFL-BGM	5202.52	DBPS 2-YR	100.00	6965.78	6967.07		6967.17	0.003937	2.48	40.28	36.34	0.42
NCONFL-BGM	5152.49	DBPS 100-YR	1000.00	6965.61	6969.67		6970.20	0.006003	5.83	171.53	58.50	0.60
NCONFL-BGM	5152.49	DBPS 2-YR	100.00	6965.61	6966.85		6966.96	0.004553	2.60	38.39	35.93	0.44
NCONFL-BGM	5102.46	DBPS 100-YR	1000.00	6965.43	6969.18		6969.84	0.008136	6.50	153.84	56.01	0.69
NCONFL-BGM	5102.46	DBPS 2-YR	100.00	6965.43	6966.55		6966.68	0.006543	2.94	34.04	34.94	0.52
NCONFL-BGM	5084.11	DBPS 100-YR	1000.00	6965.37	6968.84	6968.40	6969.65	0.010989	7.23	138.26	53.77	0.79
NCONFL-BGM	5084.11	DBPS 2-YR	100.00	6965.37	6966.34		6966.53	0.010643	3.45	29.01	33.78	0.66
NCONFL-BGM	5079.11	DBPS 100-YR	1000.00	6965.35	6968.38	6968.38	6969.54	0.018353	8.67	115.29	50.20	1.01
NCONFL-BGM	5079.11	DBPS 2-YR	100.00	6965.35	6966.09	6966.09	6966.43	0.026814	4.65	21.49	31.94	1.00
NCONFL-BGM	5068.6	DBPS 100-YR	1000.00	6962.72	6965.76	6965.76	6966.91	0.018136	8.64	115.77	50.28	1.00
NCONFL-BGM	5068.6	DBPS 2-YR	100.00	6962.72	6963.46	6963.46	6963.80	0.026893	4.66	21.47	31.93	1.00
NCONFL-BGM	5058.1	DBPS 100-YR	1000.00	6960.10	6964.39		6964.85	0.004984	5.46	183.02	59.81	0.55
NCONFL-BGM	5058.1	DBPS 2-YR	100.00	6960.10	6961.42		6961.52	0.003780	2.45	40.76	36.29	0.41
NCONFL-BGM	5052.43	DBPS 100-YR	1000.00	6960.08	6964.36		6964.82	0.004872	5.41	184.88	60.31	0.54
NCONFL-BGM	5052.43	DBPS 2-YR	100.00	6960.08	6961.41		6961.50	0.003606	2.41	41.49	36.61	0.40
NCONFL-BGM	5002.4	DBPS 100-YR	1000.00	6959.90	6964.37		6964.57	0.002425	3.94	304.38	134.86	0.39
NCONFL-BGM	5002.4	DBPS 2-YR	100.00	6959.90	6961.23		6961.32	0.003597	2.41	41.58	36.74	0.40
NCONFL-BGM	4952.37	DBPS 100-YR	1200.00	6959.72	6963.80		6964.32	0.006912	5.78	207.59	80.21	0.63
NCONFL-BGM	4952.37	DBPS 2-YR	110.00	6959.72	6960.96		6961.09	0.005444	2.85	38.54	35.95	0.49

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	4850.92	DBPS 100-YR	1200.00	6959.36	6962.63	6962.18	6963.43	0.010618	7.19	167.00	64.12	0.78
NCONFL-BGM	4850.92	DBPS 2-YR	110.00	6959.36	6960.21		6960.36	0.009847	3.13	35.17	44.79	0.62
NCONFL-BGM	4845.92	DBPS 100-YR	1200.00	6959.35	6962.17	6962.17	6963.33	0.018237	8.65	138.68	60.52	1.01
NCONFL-BGM	4845.92	DBPS 2-YR	110.00	6959.35	6959.97	6959.97	6960.27	0.028179	4.36	25.22	42.98	1.00
NCONFL-BGM	4835.8	DBPS 100-YR	1200.00	6956.86	6959.67	6959.67	6960.84	0.018301	8.66	138.49	60.48	1.01
NCONFL-BGM	4835.8	DBPS 2-YR	110.00	6956.86	6957.48	6957.48	6957.78	0.028171	4.36	25.23	42.97	1.00
NCONFL-BGM	4825.68	DBPS 100-YR	1200.00	6954.33	6958.38		6958.85	0.004834	5.46	219.67	70.42	0.55
NCONFL-BGM	4825.68	DBPS 2-YR	110.00	6954.33	6955.48		6955.56	0.003495	2.24	49.03	47.21	0.39
NCONFL-BGM	4802.28	DBPS 100-YR	1200.00	6954.26	6958.24		6958.73	0.005149	5.58	214.87	69.87	0.56
NCONFL-BGM	4802.28	DBPS 2-YR	110.00	6954.26	6955.40		6955.48	0.003668	2.28	48.27	47.08	0.40
NCONFL-BGM	4752.25	DBPS 100-YR	1200.00	6954.11	6957.88		6958.44	0.006342	6.01	199.78	68.12	0.62
NCONFL-BGM	4752.25	DBPS 2-YR	110.00	6954.11	6955.18		6955.27	0.004495	2.43	45.21	46.55	0.44
NCONFL-BGM	4706.3	DBPS 100-YR	1200.00	6953.97	6957.24	6956.79	6958.04	0.010641	7.19	166.88	64.12	0.79
NCONFL-BGM	4706.3	DBPS 2-YR	110.00	6953.97	6954.82		6954.97	0.009905	3.13	35.10	44.78	0.62
NCONFL-BGM	4701.3	DBPS 100-YR	1200.00	6953.96	6956.78	6956.78	6957.94	0.018174	8.64	138.84	60.54	1.01
NCONFL-BGM	4701.3	DBPS 2-YR	110.00	6953.96	6954.59	6954.59	6954.88	0.027871	4.35	25.31	43.00	1.00
NCONFL-BGM	4695.47	DBPS 100-YR	1200.00	6952.50	6955.32	6955.32	6956.48	0.018185	8.64	138.81	60.54	1.01
NCONFL-BGM	4695.47	DBPS 2-YR	110.00	6952.50	6953.13	6953.13	6953.42	0.027871	4.35	25.31	43.00	1.00
NCONFL-BGM	4689.63	DBPS 100-YR	1200.00	6951.04	6955.08		6955.55	0.004875	5.48	219.02	70.34	0.55
NCONFL-BGM	4689.63	DBPS 2-YR	110.00	6951.04	6952.19		6952.27	0.003521	2.25	48.92	47.19	0.39
NCONFL-BGM	4652.19	DBPS 100-YR	1200.00	6950.93	6954.85		6955.35	0.005476	5.71	210.31	69.37	0.58
NCONFL-BGM	4652.19	DBPS 2-YR	110.00	6950.93	6952.04		6952.13	0.003910	2.33	47.29	46.92	0.41
NCONFL-BGM	4602.16	DBPS 100-YR	1200.00	6950.78	6954.42		6955.03	0.007211	6.28	191.03	67.08	0.66
NCONFL-BGM	4602.16	DBPS 2-YR	110.00	6950.78	6951.80		6951.90	0.005343	2.57	42.76	46.13	0.47
NCONFL-BGM	4573.58	DBPS 100-YR	1200.00	6950.69	6953.96	6953.51	6954.76	0.010667	7.20	166.75	64.11	0.79
NCONFL-BGM	4573.58	DBPS 2-YR	110.00	6950.69	6951.54		6951.69	0.009867	3.13	35.14	44.78	0.62

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	4568.58	DBPS 100-YR	1200.00	6950.68	6953.50	6953.50	6954.66	0.018050	8.62	139.17	60.59	1.00
NCONFL-BGM	4568.58	DBPS 2-YR	110.00	6950.68	6951.31	6951.31	6951.60	0.027871	4.35	25.31	43.00	1.00
NCONFL-BGM	4558.46	DBPS 100-YR	1200.00	6948.15	6950.96	6950.96	6952.13	0.018266	8.66	138.62	60.54	1.01
NCONFL-BGM	4558.46	DBPS 2-YR	110.00	6948.15	6948.77	6948.77	6949.07	0.028315	4.37	25.19	42.98	1.01
NCONFL-BGM	4548.35	DBPS 100-YR	1200.00	6945.62	6949.98		6950.36	0.003693	4.97	241.46	72.85	0.48
NCONFL-BGM	4548.35	DBPS 2-YR	110.00	6945.62	6946.82		6946.89	0.003074	2.15	51.11	47.56	0.37
NCONFL-BGM	4502.1	DBPS 100-YR	1200.00	6945.48	6949.79		6950.19	0.003839	5.04	238.19	72.49	0.49
NCONFL-BGM	4502.1	DBPS 2-YR	110.00	6945.48	6946.67		6946.74	0.003100	2.16	50.97	47.54	0.37
NCONFL-BGM	4452.07	DBPS 100-YR	1200.00	6945.33	6949.58		6949.99	0.004060	5.14	233.54	71.98	0.50
NCONFL-BGM	4452.07	DBPS 2-YR	110.00	6945.33	6946.52		6946.59	0.003166	2.17	50.63	47.48	0.37
NCONFL-BGM	4402.04	DBPS 100-YR	1200.00	6945.18	6949.34		6949.78	0.004375	5.27	227.49	71.30	0.52
NCONFL-BGM	4402.04	DBPS 2-YR	110.00	6945.18	6946.35		6946.43	0.003290	2.20	50.00	47.37	0.38
NCONFL-BGM	4352.01	DBPS 100-YR	1200.00	6945.03	6949.08		6949.54	0.004857	5.47	219.30	70.37	0.55
NCONFL-BGM	4352.01	DBPS 2-YR	110.00	6945.03	6946.18		6946.26	0.003520	2.25	48.92	47.19	0.39
NCONFL-BGM	4301.98	DBPS 100-YR	1200.00	6944.88	6948.75		6949.27	0.005746	5.80	206.77	68.94	0.59
NCONFL-BGM	4301.98	DBPS 2-YR	110.00	6944.88	6945.98		6946.07	0.004067	2.36	46.69	46.81	0.42
NCONFL-BGM	4251.95	DBPS 100-YR	1200.00	6944.73	6948.26		6948.92	0.008048	6.53	183.87	66.23	0.69
NCONFL-BGM	4251.95	DBPS 2-YR	110.00	6944.73	6945.70		6945.82	0.006224	2.70	40.72	45.77	0.50
NCONFL-BGM	4234.59	DBPS 100-YR	1200.00	6944.68	6947.93	6947.50	6948.74	0.010912	7.25	165.47	63.97	0.79
NCONFL-BGM	4234.59	DBPS 2-YR	110.00	6944.68	6945.52		6945.67	0.010367	3.18	34.60	44.69	0.64
NCONFL-BGM	4229.59	DBPS 100-YR	1200.00	6944.66	6947.48	6947.48	6948.64	0.018243	8.65	138.65	60.51	1.01
NCONFL-BGM	4229.59	DBPS 2-YR	110.00	6944.66	6945.28	6945.28	6945.58	0.028361	4.37	25.17	42.95	1.01
NCONFL-BGM	4214.29	DBPS 100-YR	1200.00	6940.84	6943.66	6943.66	6944.82	0.018178	8.64	138.83	60.54	1.01
NCONFL-BGM	4214.29	DBPS 2-YR	110.00	6940.84	6941.46	6941.46	6941.76	0.027932	4.35	25.30	43.01	1.00
NCONFL-BGM	4199	DBPS 100-YR	1200.00	6937.02	6942.91		6943.08	0.001173	3.31	362.93	85.15	0.28
NCONFL-BGM	4199	DBPS 2-YR	110.00	6937.02	6938.21		6938.28	0.003100	2.16	50.97	47.54	0.37
NCONFL-BGM	4151.89	DBPS 100-YR	1200.00	6936.88	6942.87		6943.03	0.001103	3.24	370.91	85.89	0.27

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	4151.89	DBPS 2-YR	110.00	6936.88	6938.06		6938.14	0.003179	2.18	50.57	47.48	0.37
NCONFL-BGM	4101.86	DBPS 100-YR	1200.00	6936.78	6942.35	6940.07	6942.93	0.002753	6.12	195.95	82.55	0.46
NCONFL-BGM	4101.86	DBPS 2-YR	110.00	6936.78	6937.87	6937.44	6938.00	0.005271	2.86	38.44	46.75	0.48
NCONFL-BGM	4053.63		Culvert									
NCONFL-BGM	4001.8	DBPS 100-YR	1200.00	6936.40	6940.29	6939.73	6941.49	0.009145	8.78	136.64	69.10	0.79
NCONFL-BGM	4001.8	DBPS 2-YR	110.00	6936.40	6937.58	6937.08	6937.69	0.004063	2.65	41.55	47.46	0.43
NCONFL-BGM	3951.77	DBPS 100-YR	1200.00	6936.28	6940.41		6940.85	0.004520	5.33	224.94	71.03	0.53
NCONFL-BGM	3951.77	DBPS 2-YR	110.00	6936.28	6937.45		6937.52	0.003342	2.21	49.76	47.34	0.38
NCONFL-BGM	3901.74	DBPS 100-YR	1200.00	6936.13	6940.12		6940.60	0.005103	5.57	215.58	69.97	0.56
NCONFL-BGM	3901.74	DBPS 2-YR	110.00	6936.13	6937.27		6937.35	0.003641	2.27	48.39	47.11	0.40
NCONFL-BGM	3851.71	DBPS 100-YR	1200.00	6935.98	6939.76		6940.31	0.006244	5.97	200.89	68.27	0.61
NCONFL-BGM	3851.71	DBPS 2-YR	110.00	6935.98	6937.06		6937.15	0.004411	2.42	45.49	46.61	0.43
NCONFL-BGM	3802.7	DBPS 100-YR	1200.00	6935.83	6939.07	6938.65	6939.89	0.010927	7.26	165.38	63.95	0.80
NCONFL-BGM	3802.7	DBPS 2-YR	110.00	6935.83	6936.67		6936.82	0.010425	3.18	34.54	44.69	0.64
NCONFL-BGM	3797.7	DBPS 100-YR	1200.00	6935.81	6938.62	6938.62	6939.79	0.018310	8.67	138.49	60.50	1.01
NCONFL-BGM	3797.7	DBPS 2-YR	110.00	6935.81	6936.44	6936.44	6936.73	0.027871	4.35	25.31	43.00	1.00
NCONFL-BGM	3791.57	DBPS 100-YR	1200.00	6934.28	6937.10	6937.10	6938.26	0.018186	8.65	138.81	60.54	1.01
NCONFL-BGM	3791.57	DBPS 2-YR	110.00	6934.28	6934.91	6934.91	6935.20	0.027872	4.35	25.31	43.00	1.00
NCONFL-BGM	3785.44	DBPS 100-YR	1200.00	6932.75	6937.02		6937.43	0.003966	5.10	235.47	72.19	0.50
NCONFL-BGM	3785.44	DBPS 2-YR	110.00	6932.75	6933.94		6934.01	0.003122	2.16	50.86	47.52	0.37
NCONFL-BGM	3751.65	DBPS 100-YR	1200.00	6932.65	6936.88		6937.29	0.004139	5.17	231.96	71.80	0.51
NCONFL-BGM	3751.65	DBPS 2-YR	110.00	6932.65	6933.83		6933.91	0.003194	2.18	50.49	47.46	0.37
NCONFL-BGM	3701.62	DBPS 100-YR	1200.00	6932.50	6936.63		6937.07	0.004496	5.33	225.33	71.06	0.53
NCONFL-BGM	3701.62	DBPS 2-YR	110.00	6932.50	6933.67		6933.74	0.003333	2.21	49.79	47.34	0.38
NCONFL-BGM	3651.59	DBPS 100-YR	1200.00	6932.35	6936.35		6936.83	0.005061	5.55	216.18	70.02	0.56
NCONFL-BGM	3651.59	DBPS 2-YR	110.00	6932.35	6933.49		6933.57	0.003620	2.27	48.48	47.11	0.39

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	3601.56	DBPS 100-YR	1200.00	6932.20	6936.00		6936.55	0.006129	5.93	202.20	68.43	0.61
NCONFL-BGM	3601.56	DBPS 2-YR	110.00	6932.20	6933.28		6933.37	0.004343	2.41	45.72	46.65	0.43
NCONFL-BGM	3550.03	DBPS 100-YR	1200.00	6932.04	6935.31	6934.86	6936.11	0.010639	7.19	166.90	64.12	0.79
NCONFL-BGM	3550.03	DBPS 2-YR	110.00	6932.04	6932.89		6933.04	0.009905	3.13	35.10	44.78	0.62
NCONFL-BGM	3545.03	DBPS 100-YR	1200.00	6932.03	6934.85	6934.85	6936.01	0.018185	8.64	138.81	60.54	1.01
NCONFL-BGM	3545.03	DBPS 2-YR	110.00	6932.03	6932.66	6932.66	6932.95	0.027871	4.35	25.31	43.00	1.00
NCONFL-BGM	3534.9	DBPS 100-YR	1200.00	6929.50	6932.32	6932.32	6933.48	0.018194	8.65	138.79	60.54	1.01
NCONFL-BGM	3534.9	DBPS 2-YR	110.00	6929.50	6930.12	6930.12	6930.42	0.028018	4.35	25.27	42.99	1.00
NCONFL-BGM	3524.78	DBPS 100-YR	1200.00	6926.97	6931.02		6931.49	0.004831	5.46	219.72	70.42	0.54
NCONFL-BGM	3524.78	DBPS 2-YR	110.00	6926.97	6928.12		6928.20	0.003494	2.24	49.04	47.21	0.39
NCONFL-BGM	3501.5	DBPS 100-YR	1200.00	6926.90	6930.89		6931.37	0.005140	5.58	215.00	69.89	0.56
NCONFL-BGM	3501.5	DBPS 2-YR	110.00	6926.90	6928.04		6928.12	0.003663	2.28	48.29	47.08	0.40
NCONFL-BGM	3451.47	DBPS 100-YR	1200.00	6926.75	6930.52		6931.08	0.006322	6.00	199.99	68.14	0.62
NCONFL-BGM	3451.47	DBPS 2-YR	110.00	6926.75	6927.82		6927.91	0.004467	2.43	45.30	46.57	0.43
NCONFL-BGM	3405.1	DBPS 100-YR	1200.00	6926.61	6929.88	6929.43	6930.68	0.010662	7.19	166.79	64.12	0.79
NCONFL-BGM	3405.1	DBPS 2-YR	110.00	6926.61	6927.46		6927.61	0.009847	3.13	35.17	44.79	0.62
NCONFL-BGM	3400.1	DBPS 100-YR	1200.00	6926.60	6929.42	6929.42	6930.58	0.018126	8.63	138.97	60.57	1.00
NCONFL-BGM	3400.1	DBPS 2-YR	110.00	6926.60	6927.22	6927.22	6927.52	0.028294	4.37	25.20	42.99	1.00
NCONFL-BGM	3389.98	DBPS 100-YR	1200.00	6924.07	6926.90	6926.90	6928.05	0.018076	8.63	139.01	60.48	1.00
NCONFL-BGM	3389.98	DBPS 2-YR	110.00	6924.07	6924.70	6924.70	6924.99	0.028381	4.37	25.17	42.98	1.01
NCONFL-BGM	3379.85	DBPS 100-YR	1200.00	6921.54	6926.06		6926.41	0.003225	4.74	253.27	74.14	0.45
NCONFL-BGM	3379.85	DBPS 2-YR	110.00	6921.54	6922.74		6922.81	0.003039	2.14	51.30	47.59	0.36
NCONFL-BGM	3351.41	DBPS 100-YR	1200.00	6921.45	6925.97		6926.31	0.003233	4.74	253.03	74.10	0.45
NCONFL-BGM	3351.41	DBPS 2-YR	110.00	6921.45	6922.65		6922.72	0.003003	2.14	51.50	47.61	0.36
NCONFL-BGM	3301.38	DBPS 100-YR	1200.00	6921.30	6925.80		6926.15	0.003275	4.76	251.89	73.98	0.45
NCONFL-BGM	3301.38	DBPS 2-YR	110.00	6921.30	6922.50		6922.57	0.003002	2.14	51.51	47.62	0.36
NCONFL-BGM	3251.35	DBPS 100-YR	1200.00	6921.15	6925.63		6925.99	0.003328	4.79	250.48	73.83	0.46

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	3251.35	DBPS 2-YR	110.00	6921.15	6922.35		6922.42	0.003006	2.14	51.49	47.62	0.36
NCONFL-BGM	3201.32	DBPS 100-YR	1200.00	6921.00	6925.46		6925.82	0.003393	4.82	248.76	73.64	0.46
NCONFL-BGM	3201.32	DBPS 2-YR	110.00	6921.00	6922.20		6922.27	0.003018	2.14	51.42	47.61	0.36
NCONFL-BGM	3151.29	DBPS 100-YR	1200.00	6920.85	6925.28		6925.65	0.003479	4.87	246.58	73.40	0.47
NCONFL-BGM	3151.29	DBPS 2-YR	110.00	6920.85	6922.05		6922.12	0.003037	2.14	51.31	47.58	0.36
NCONFL-BGM	3101.26	DBPS 100-YR	1200.00	6920.70	6925.09		6925.47	0.003581	4.92	244.09	73.15	0.47
NCONFL-BGM	3101.26	DBPS 2-YR	110.00	6920.70	6921.90		6921.97	0.003061	2.15	51.18	47.57	0.37
NCONFL-BGM	3051.23	DBPS 100-YR	1200.00	6920.55	6924.90		6925.29	0.003711	4.98	241.05	72.81	0.48
NCONFL-BGM	3051.23	DBPS 2-YR	110.00	6920.55	6921.74		6921.81	0.003098	2.16	50.98	47.54	0.37
NCONFL-BGM	3001.2	DBPS 100-YR	1200.00	6920.40	6924.70		6925.10	0.003881	5.06	237.31	72.41	0.49
NCONFL-BGM	3001.2	DBPS 2-YR	110.00	6920.40	6921.58		6921.66	0.003169	2.17	50.62	47.49	0.37
NCONFL-BGM	2996.14	DBPS 100-YR	1200.00	6920.38	6924.67		6925.07	0.003924	5.08	236.29	72.22	0.49
NCONFL-BGM	2996.14	DBPS 2-YR	110.00	6920.38	6921.57		6921.64	0.003175	2.18	50.53	47.35	0.37
NCONFL-BGM	2951.17	DBPS 100-YR	1200.00	6919.80	6923.76	6923.76	6924.72	0.012881	8.10	167.40	99.13	0.87
NCONFL-BGM	2951.17	DBPS 2-YR	110.00	6919.80	6921.14		6921.38	0.011688	3.92	28.07	28.87	0.70
NCONFL-BGM	2901.14	DBPS 100-YR	1200.00	6919.27	6922.71	6922.71	6923.61	0.012990	7.92	175.99	110.68	0.87
NCONFL-BGM	2901.14	DBPS 2-YR	110.00	6919.27	6920.15	6920.15	6920.52	0.026370	4.85	22.68	31.30	1.00
NCONFL-BGM	2851.11	DBPS 100-YR	1200.00	6917.89	6922.10	6921.88	6922.93	0.010039	7.55	181.43	99.86	0.78
NCONFL-BGM	2851.11	DBPS 2-YR	110.00	6917.89	6919.27		6919.52	0.012075	3.97	27.69	28.59	0.71
NCONFL-BGM	2801.08	DBPS 100-YR	1200.00	6917.08	6921.39	6921.39	6922.38	0.010929	8.25	171.62	111.83	0.82
NCONFL-BGM	2801.08	DBPS 2-YR	110.00	6917.08	6918.30	6918.26	6918.70	0.022252	5.10	21.57	24.16	0.95
NCONFL-BGM	2751.05	DBPS 100-YR	1200.00	6915.73	6920.15	6920.15	6921.16	0.018049	8.08	149.44	81.14	0.99
NCONFL-BGM	2751.05	DBPS 2-YR	110.00	6915.73	6917.33	6917.23	6917.68	0.018304	4.77	23.04	24.58	0.87
NCONFL-BGM	2701.02	DBPS 100-YR	1200.00	6914.70	6919.12	6919.12	6920.18	0.018529	8.25	145.78	75.71	1.00
NCONFL-BGM	2701.02	DBPS 2-YR	110.00	6914.70	6916.28	6916.23	6916.69	0.021540	5.11	21.53	23.40	0.94
NCONFL-BGM	2650.99	DBPS 100-YR	1200.00	6913.71	6919.00	6919.00	6919.60	0.006418	6.76	263.38	266.43	0.64
NCONFL-BGM	2650.99	DBPS 2-YR	110.00	6913.71	6915.29	6915.25	6915.75	0.022046	5.44	20.23	20.34	0.96

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
NCONFL-BGM	2600.96	DBPS 100-YR	1200.00	6912.82	6917.44	6917.44	6917.97	0.010193	6.45	247.69	213.02	0.75
NCONFL-BGM	2600.96	DBPS 2-YR	110.00	6912.82	6914.41		6914.72	0.013713	4.50	24.42	22.80	0.77
NCONFL-BGM	2550.93	DBPS 100-YR	1200.00	6912.32	6916.18	6916.18	6916.87	0.011351	7.20	203.76	136.58	0.81
NCONFL-BGM	2550.93	DBPS 2-YR	110.00	6912.32	6913.69		6913.97	0.015942	4.24	25.93	29.97	0.80
NCONFL-BGM	2500.9	DBPS 100-YR	1200.00	6911.50	6915.24	6915.24	6915.95	0.012282	7.51	199.36	124.33	0.84
NCONFL-BGM	2500.9	DBPS 2-YR	110.00	6911.50	6912.84	6912.72	6913.15	0.016894	4.44	24.79	27.93	0.83
NCONFL-BGM	2450.87	DBPS 100-YR	1200.00	6910.46	6914.73	6914.73	6915.41	0.008306	7.08	226.86	185.21	0.71
NCONFL-BGM	2450.87	DBPS 2-YR	110.00	6910.46	6911.70	6911.70	6912.12	0.025073	5.21	21.13	25.18	1.00
NCONFL-BGM	2400.84	DBPS 100-YR	1200.00	6907.55	6913.04	6913.04	6914.24	0.015576	8.83	139.85	74.00	0.95
NCONFL-BGM	2400.84	DBPS 2-YR	110.00	6907.55	6910.41		6910.60	0.006413	3.46	31.82	24.66	0.54
NCONFL-BGM	2350.81	DBPS 100-YR	1200.00	6908.35	6912.22	6912.22	6913.09	0.017805	7.49	164.07	107.77	0.97
NCONFL-BGM	2350.81	DBPS 2-YR	110.00	6908.35	6909.88		6910.13	0.014537	4.00	27.49	32.36	0.77
NCONFL-BGM	2300.78	DBPS 100-YR	1200.00	6908.15	6911.34	6911.19	6912.03	0.015811	6.68	181.14	116.13	0.90
NCONFL-BGM	2300.78	DBPS 2-YR	110.00	6908.15	6909.18		6909.39	0.014583	3.68	29.88	40.08	0.75
NCONFL-BGM	2250.75	DBPS 100-YR	1200.00	6907.26	6910.28	6910.28	6911.13	0.019905	7.38	162.54	96.85	1.00
NCONFL-BGM	2250.75	DBPS 2-YR	110.00	6907.26	6908.08	6908.08	6908.40	0.027480	4.57	24.08	37.60	1.01
NCONFL-BGM	2200.72	DBPS 100-YR	1200.00	6906.09	6909.17	6909.17	6910.13	0.019222	7.87	152.40	80.17	1.01
NCONFL-BGM	2200.72	DBPS 2-YR	110.00	6906.09	6906.99	6906.89	6907.22	0.017861	3.92	28.04	39.78	0.82
NCONFL-BGM	2150.69	DBPS 100-YR	1200.00	6905.06	6907.86	6907.86	6908.83	0.019151	7.87	152.54	80.19	1.01
NCONFL-BGM	2150.69	DBPS 2-YR	110.00	6905.06	6905.85	6905.84	6906.12	0.027912	4.16	26.44	48.08	0.99
NCONFL-BGM	2100.66	DBPS 100-YR	1200.00	6903.74	6906.62	6906.53	6907.44	0.016933	7.28	164.75	88.74	0.94
NCONFL-BGM	2100.66	DBPS 2-YR	110.00	6903.74	6904.91		6905.08	0.015411	3.23	34.01	57.84	0.74
NCONFL-BGM	2050.63	DBPS 100-YR	1200.00	6903.23	6906.11		6906.70	0.010984	6.17	194.36	96.96	0.77
NCONFL-BGM	2050.63	DBPS 2-YR	110.00	6903.23	6904.31		6904.42	0.010861	2.66	41.38	72.62	0.62
NCONFL-BGM	2000.6	DBPS 100-YR	1200.00	6902.91	6905.69		6906.18	0.008784	5.58	214.98	105.53	0.69
NCONFL-BGM	2000.6	DBPS 2-YR	110.00	6902.91	6903.72		6903.84	0.012407	2.74	40.09	74.18	0.66

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

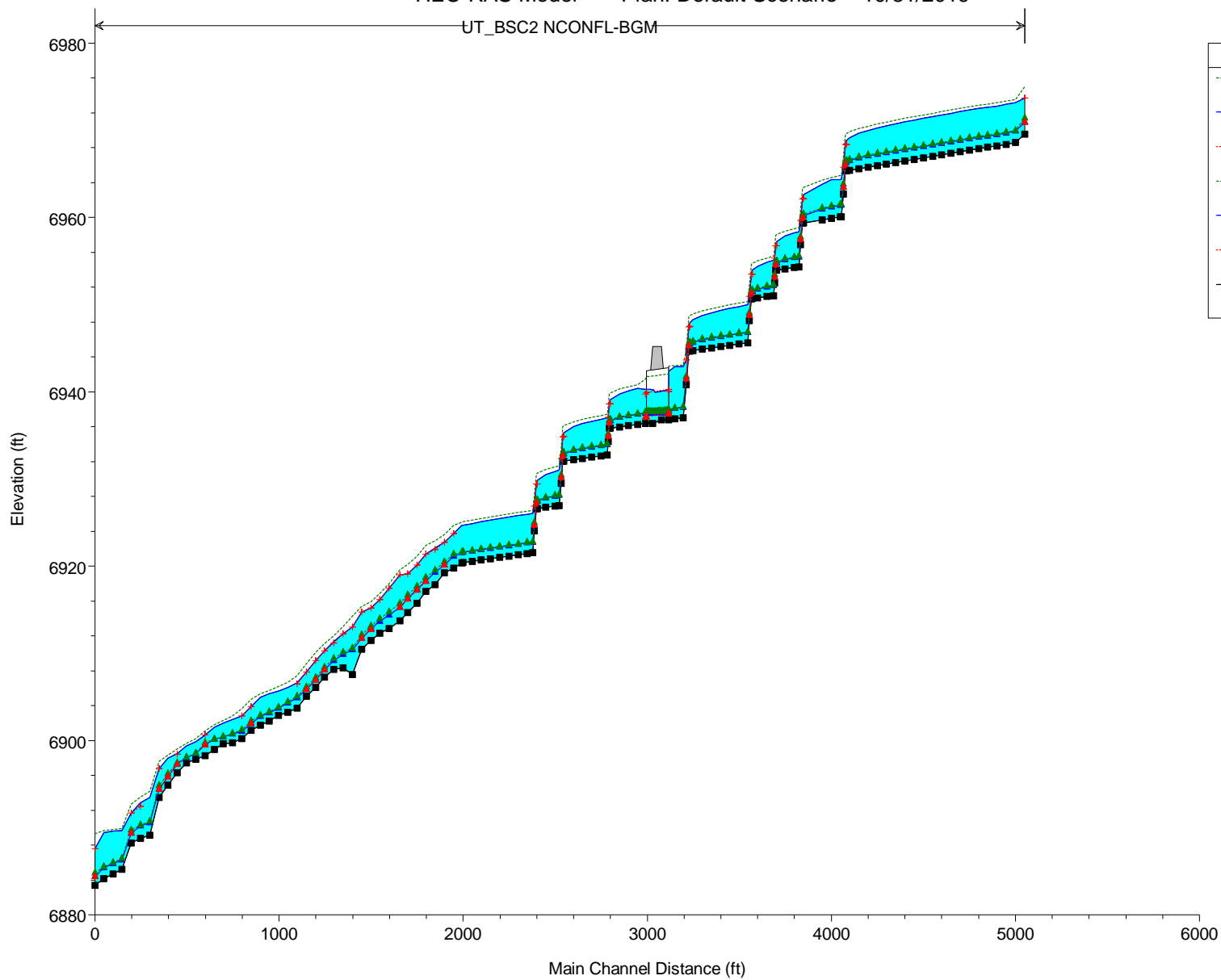
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	1950.57	DBPS 100-YR	1200.00	6902.21	6905.36		6905.75	0.007188	4.99	240.28	120.06	0.62
NCONFL-BGM	1950.57	DBPS 2-YR	110.00	6902.21	6903.18		6903.29	0.009527	2.67	41.20	65.12	0.59
NCONFL-BGM	1900.54	DBPS 100-YR	1200.00	6901.74	6904.97		6905.38	0.007690	5.12	234.59	118.98	0.64
NCONFL-BGM	1900.54	DBPS 2-YR	110.00	6901.74	6902.75		6902.86	0.007434	2.64	41.72	55.77	0.54
NCONFL-BGM	1850.51	DBPS 100-YR	1200.00	6901.18	6903.89	6903.89	6904.75	0.020051	7.41	161.98	96.70	1.01
NCONFL-BGM	1850.51	DBPS 2-YR	110.00	6901.18	6901.96	6901.93	6902.23	0.024876	4.16	26.41	44.01	0.95
NCONFL-BGM	1800.48	DBPS 100-YR	1200.00	6900.22	6902.83	6902.82	6903.66	0.019975	7.31	164.11	99.60	1.00
NCONFL-BGM	1800.48	DBPS 2-YR	110.00	6900.22	6901.02		6901.21	0.016203	3.45	31.85	50.95	0.77
NCONFL-BGM	1750.45	DBPS 100-YR	1200.00	6899.73	6902.43		6902.83	0.010007	5.09	235.98	147.16	0.71
NCONFL-BGM	1750.45	DBPS 2-YR	110.00	6899.73	6900.73		6900.79	0.004375	2.05	53.72	70.52	0.41
NCONFL-BGM	1700.42	DBPS 100-YR	1200.00	6899.60	6901.97		6902.32	0.009991	4.74	253.18	175.39	0.70
NCONFL-BGM	1700.42	DBPS 2-YR	110.00	6899.60	6900.39		6900.48	0.009465	2.41	45.73	84.17	0.58
NCONFL-BGM	1650.39	DBPS 100-YR	1200.00	6898.98	6901.51		6901.84	0.008945	4.57	263.20	187.57	0.66
NCONFL-BGM	1650.39	DBPS 2-YR	110.00	6898.98	6900.13		6900.18	0.003921	1.68	65.62	107.14	0.38
NCONFL-BGM	1600.36	DBPS 100-YR	1200.00	6898.24	6900.62	6900.62	6901.12	0.024474	5.68	211.23	218.43	1.02
NCONFL-BGM	1600.36	DBPS 2-YR	110.00	6898.24	6899.52	6899.52	6899.73	0.031690	3.69	29.77	71.22	1.01
NCONFL-BGM	1550.33	DBPS 100-YR	1200.00	6897.84	6899.89		6900.19	0.010449	4.43	271.14	216.53	0.70
NCONFL-BGM	1550.33	DBPS 2-YR	110.00	6897.84	6898.48		6898.58	0.014411	2.50	43.97	104.65	0.68
NCONFL-BGM	1500.3	DBPS 100-YR	1200.00	6897.42	6899.40		6899.71	0.008884	4.35	271.25	183.85	0.65
NCONFL-BGM	1500.3	DBPS 2-YR	110.00	6897.42	6898.00		6898.06	0.007366	1.84	58.09	121.49	0.49
NCONFL-BGM	1450.27	DBPS 100-YR	1200.00	6896.30	6898.47	6898.42	6899.03	0.021166	6.18	201.27	161.38	0.98
NCONFL-BGM	1450.27	DBPS 2-YR	110.00	6896.30	6897.30	6897.25	6897.44	0.023135	3.22	37.38	96.56	0.86
NCONFL-BGM	1400.24	DBPS 100-YR	1200.00	6894.89	6897.94		6898.30	0.009356	5.03	253.55	160.25	0.69
NCONFL-BGM	1400.24	DBPS 2-YR	110.00	6894.89	6895.84	6895.84	6896.16	0.027497	4.52	24.35	38.62	1.00
NCONFL-BGM	1350.21	DBPS 100-YR	1200.00	6893.48	6896.76	6896.76	6897.59	0.019906	7.54	173.20	121.57	1.01
NCONFL-BGM	1350.21	DBPS 2-YR	110.00	6893.48	6894.42	6894.42	6894.81	0.026170	5.01	21.97	28.69	1.01
NCONFL-BGM	1300.18	DBPS 100-YR	1200.00	6889.12	6893.46		6894.16	0.012968	6.68	179.52	89.15	0.83

HEC-RAS Plan: Default Scenario River: UT_BSC2 Reach: NCONFL-BGM (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	1300.18	DBPS 2-YR	110.00	6889.12	6890.53		6890.71	0.007492	3.43	32.07	28.60	0.57
NCONFL-BGM	1250.15	DBPS 100-YR	1200.00	6888.76	6892.86	6892.46	6893.51	0.012332	6.46	185.73	93.87	0.81
NCONFL-BGM	1250.15	DBPS 2-YR	110.00	6888.76	6890.18		6890.34	0.006935	3.16	34.76	33.17	0.54
NCONFL-BGM	1200.12	DBPS 100-YR	1200.00	6888.25	6891.67	6891.67	6892.71	0.019279	8.19	146.57	72.03	1.01
NCONFL-BGM	1200.12	DBPS 2-YR	110.00	6888.25	6889.35	6889.35	6889.71	0.026904	4.84	22.74	31.96	1.01
NCONFL-BGM	1150.09	DBPS 100-YR	1200.00	6885.23	6889.68		6889.89	0.001363	3.74	331.98	120.26	0.37
NCONFL-BGM	1150.09	DBPS 2-YR	110.00	6885.23	6886.29		6886.44	0.008749	3.16	34.83	56.08	0.71
NCONFL-BGM	1100.06	DBPS 100-YR	1200.00	6884.70	6889.58		6889.81	0.002110	3.81	314.64	93.33	0.37
NCONFL-BGM	1100.06	DBPS 2-YR	110.00	6884.70	6885.87		6886.00	0.008882	2.82	39.03	53.92	0.58
NCONFL-BGM	1050.03	DBPS 100-YR	1200.00	6884.17	6889.41		6889.69	0.002540	4.26	281.85	81.20	0.40
NCONFL-BGM	1050.03	DBPS 2-YR	110.00	6884.17	6885.37		6885.53	0.009625	3.22	34.20	41.08	0.62
NCONFL-BGM	1000	DBPS 100-YR	1200.00	6883.36	6887.59	6887.59	6889.30	0.017178	10.48	114.48	33.63	1.00
NCONFL-BGM	1000	DBPS 2-YR	110.00	6883.36	6884.37	6884.36	6884.81	0.024474	5.30	20.77	23.33	0.99

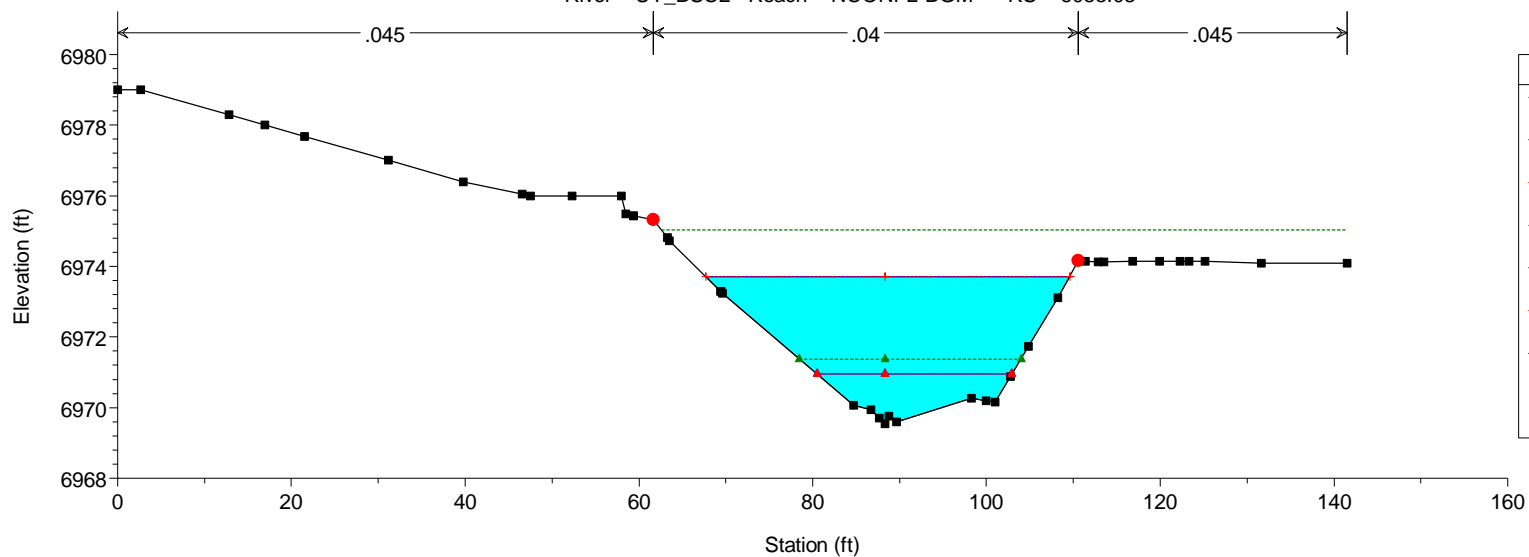
HEC-RAS Model Plan: Default Scenario 10/31/2019

UT_BSC2 NCONFL-BGM



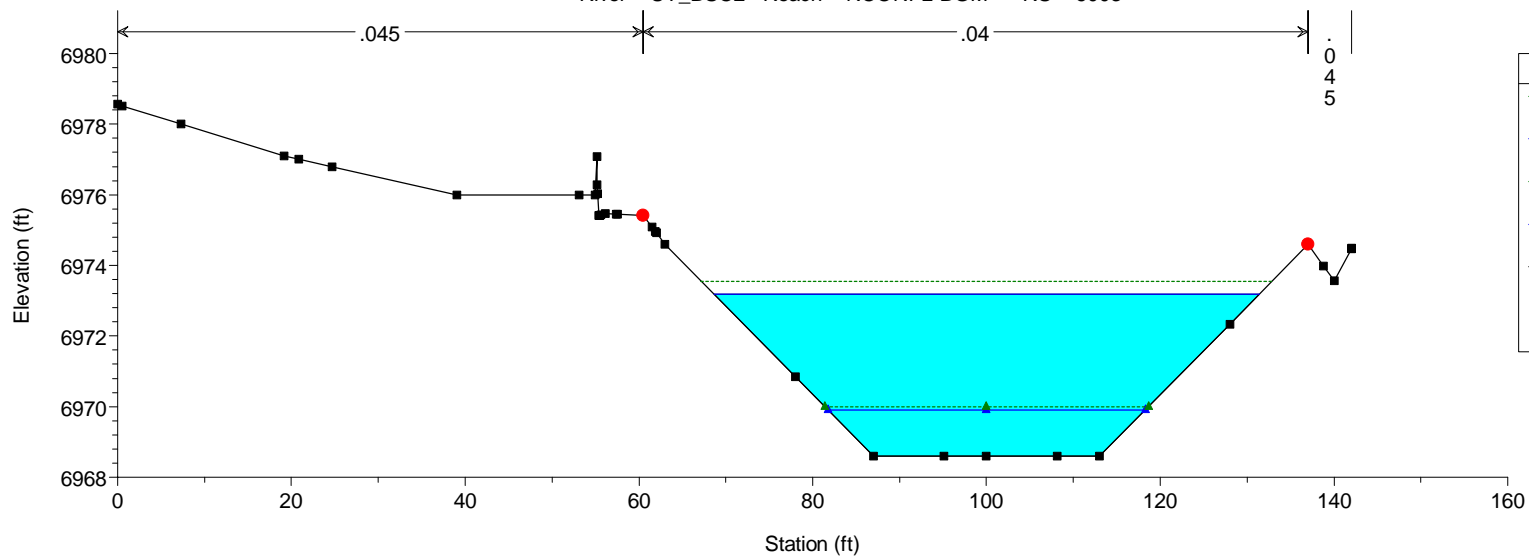
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 6053.03



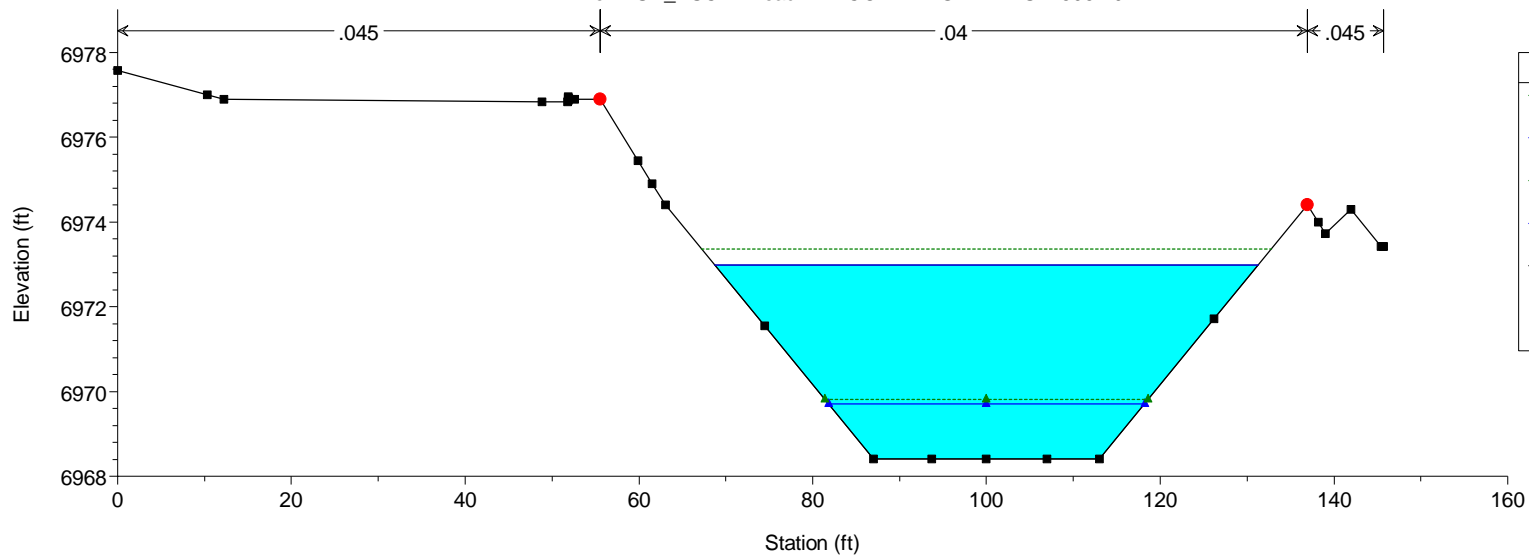
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 6003



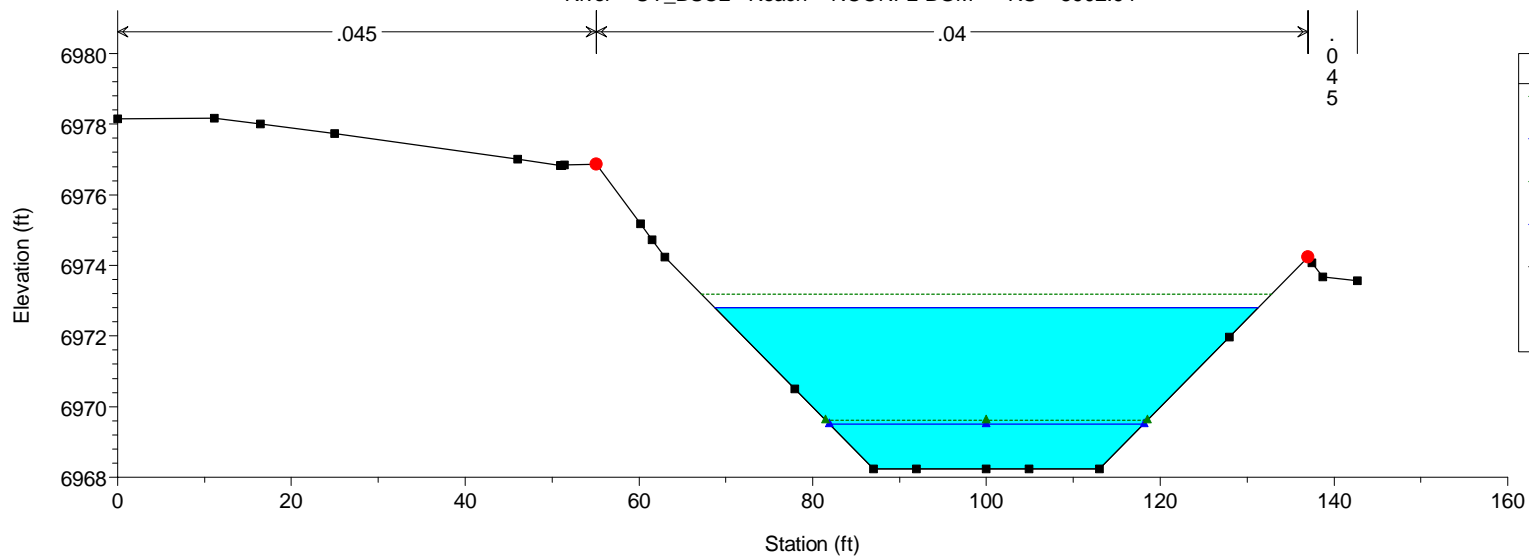
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5952.97



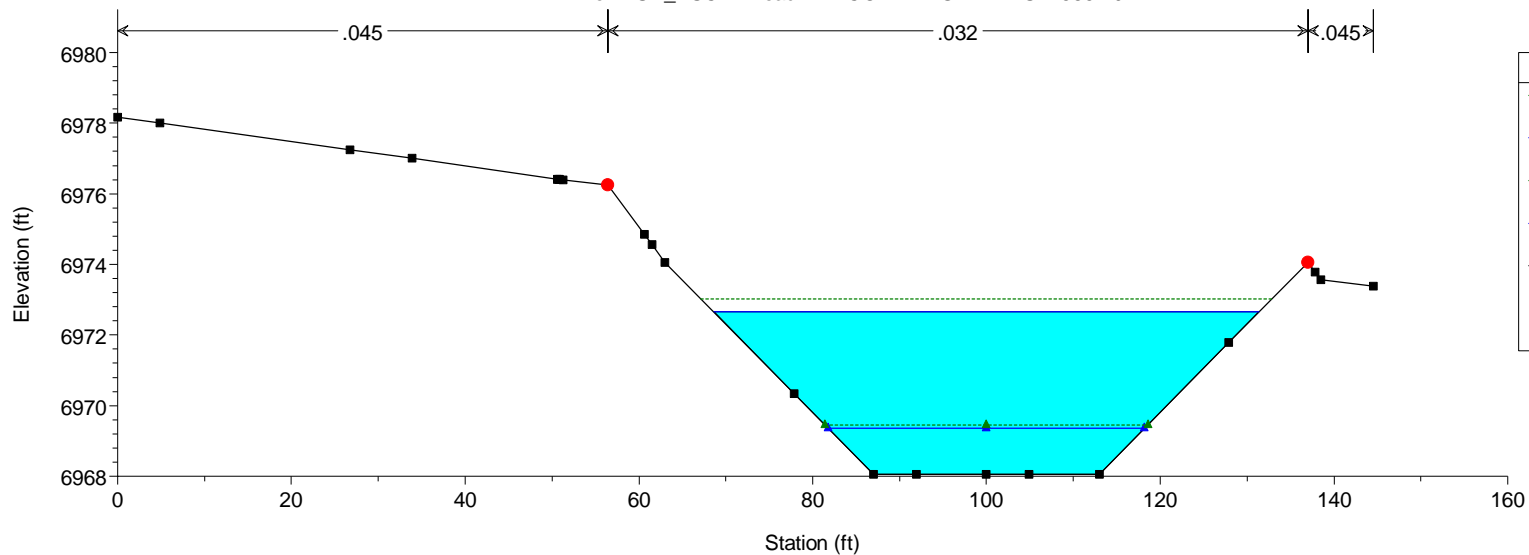
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5902.94



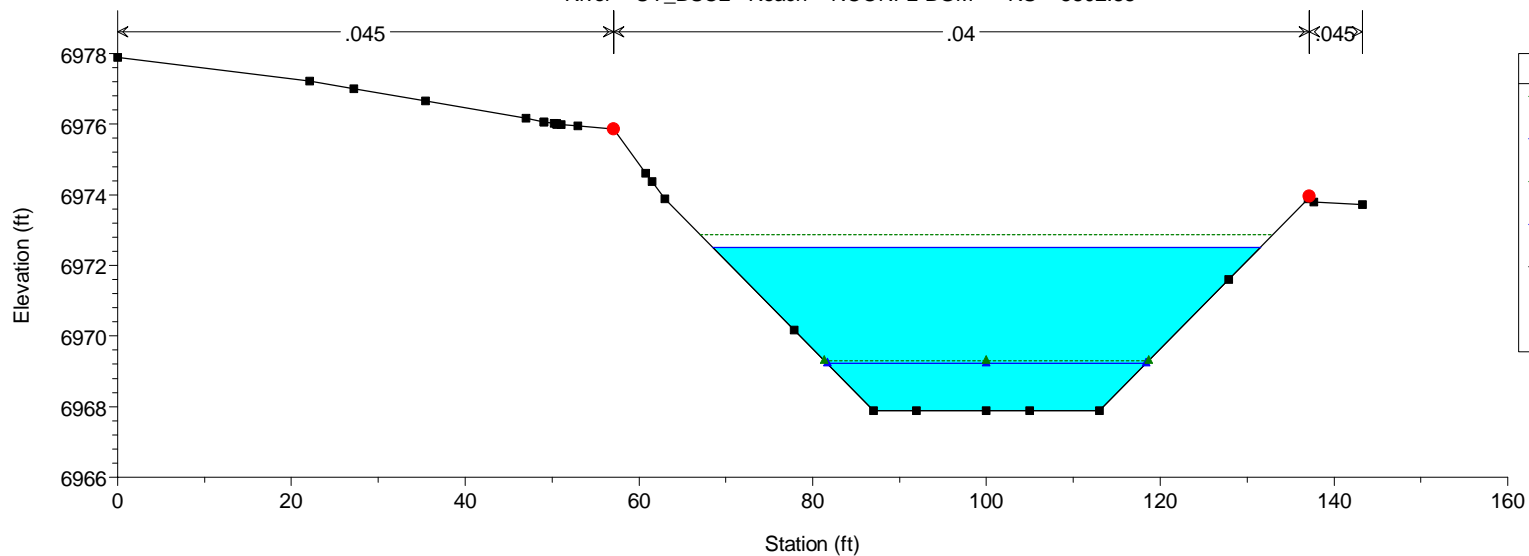
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5852.91



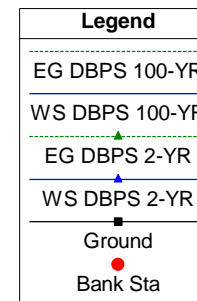
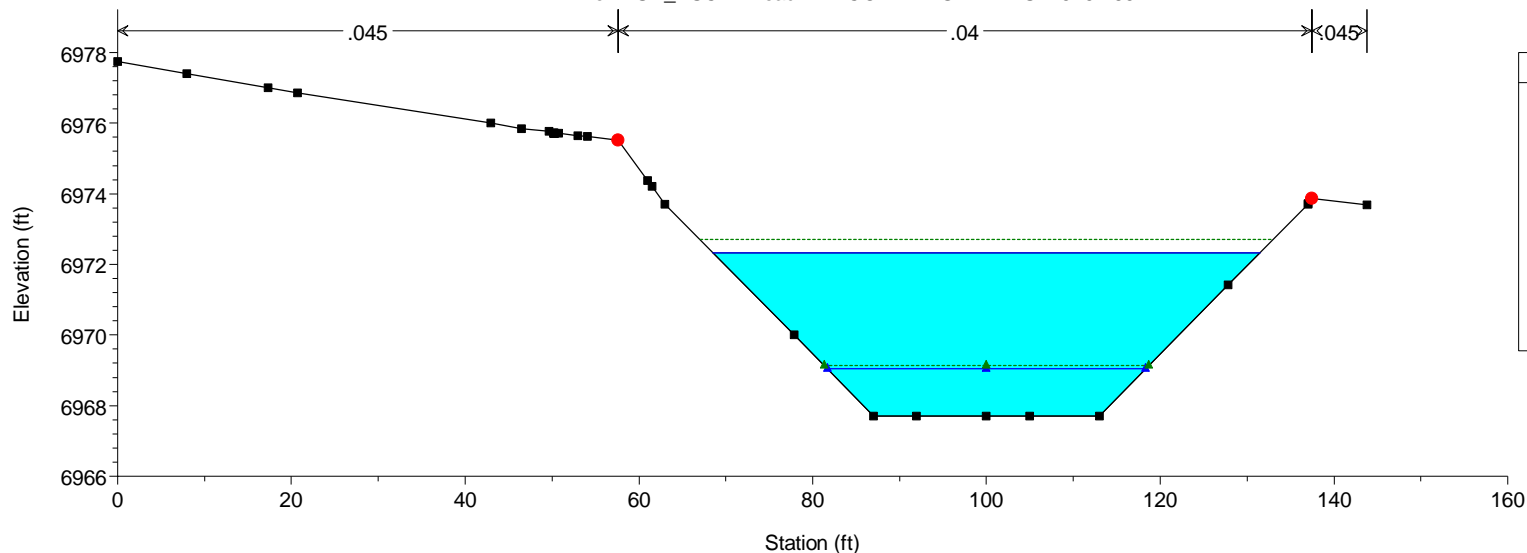
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5802.88



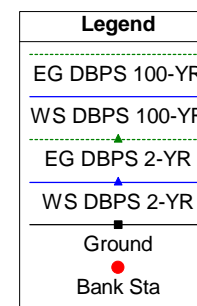
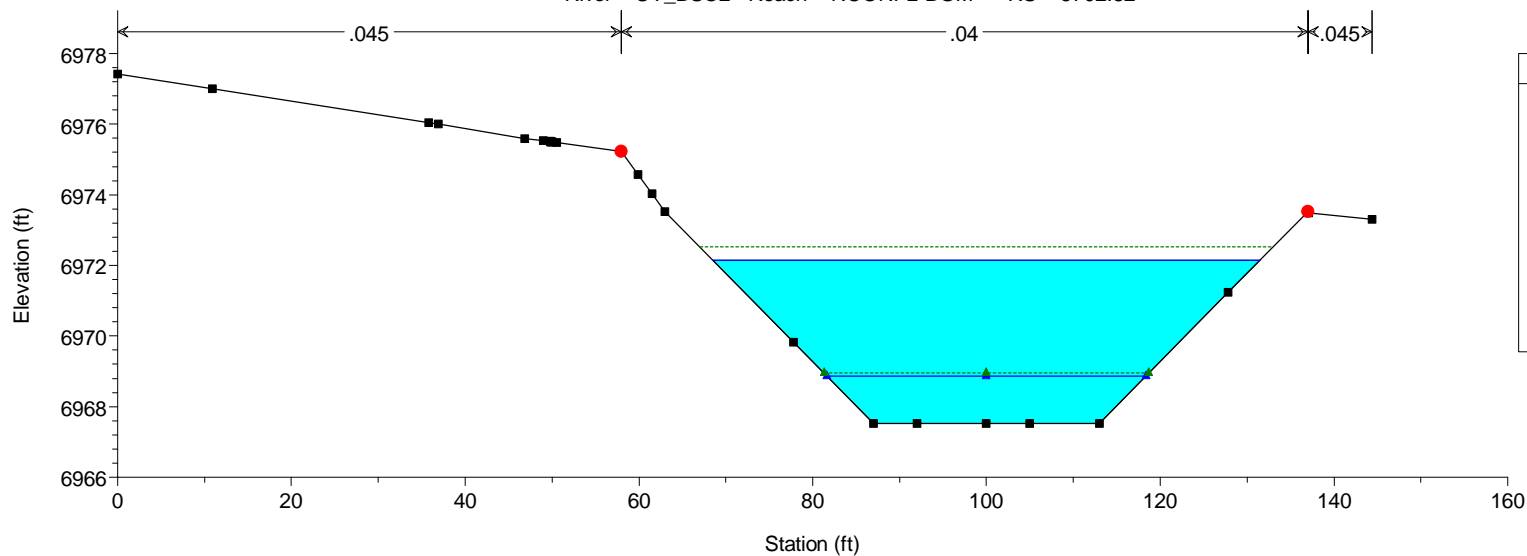
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5752.85



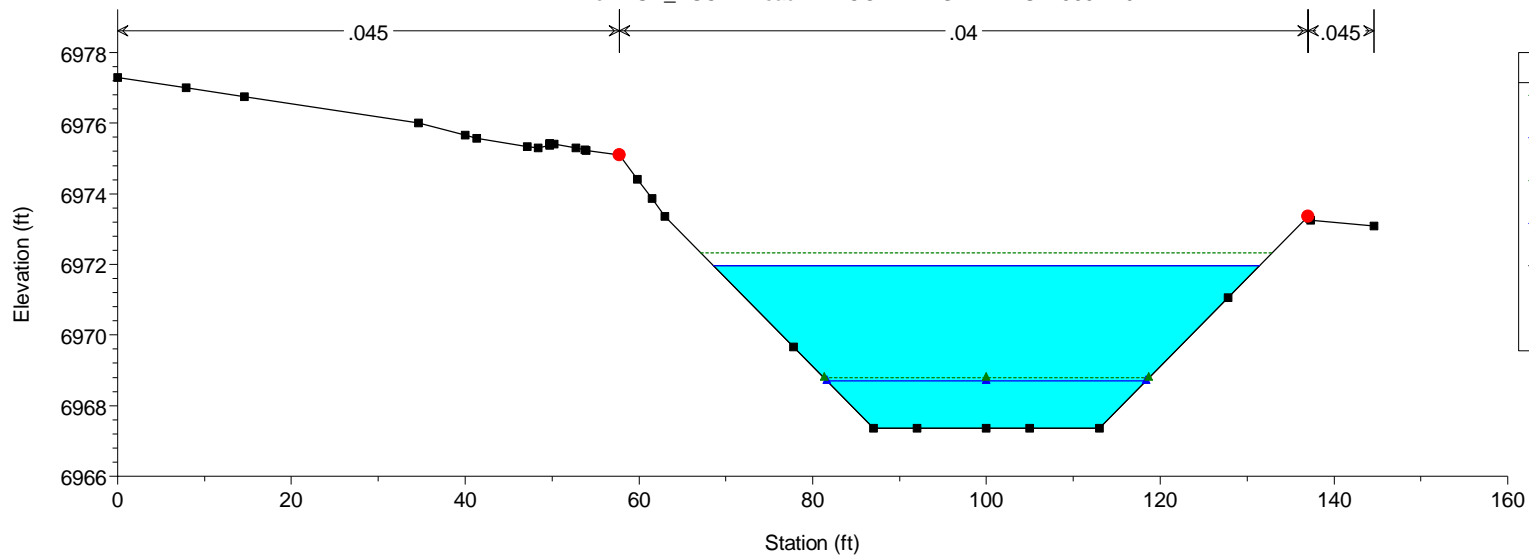
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5702.82



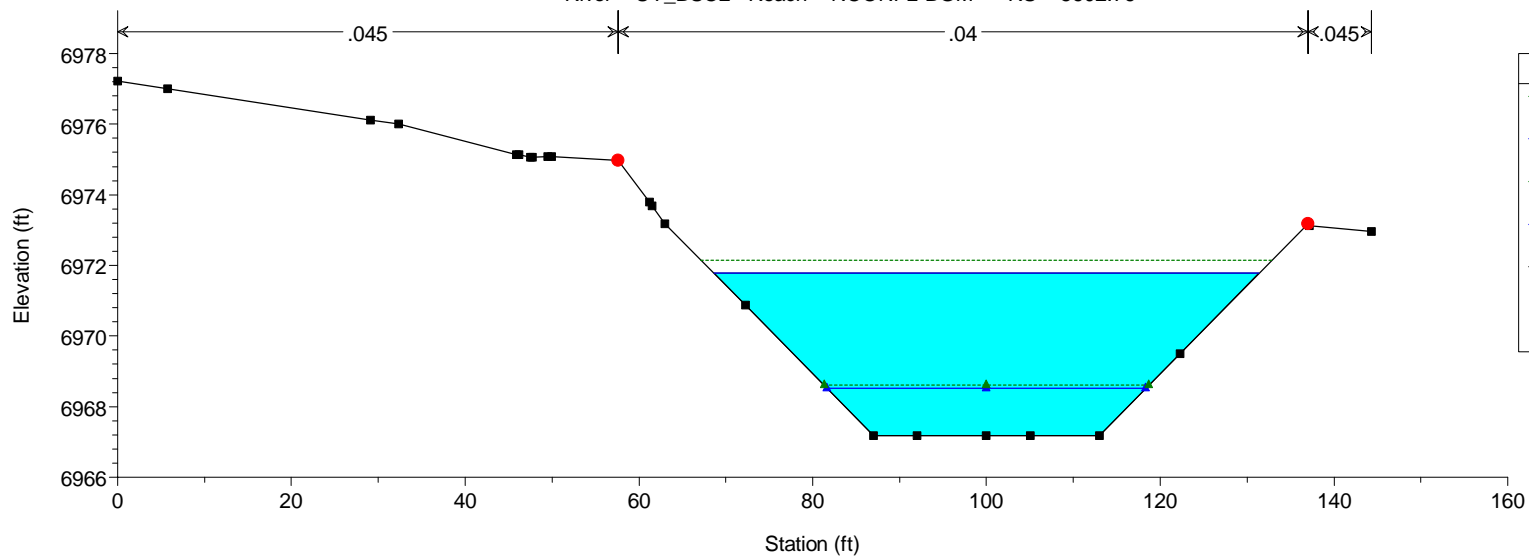
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5652.79



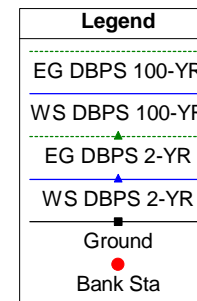
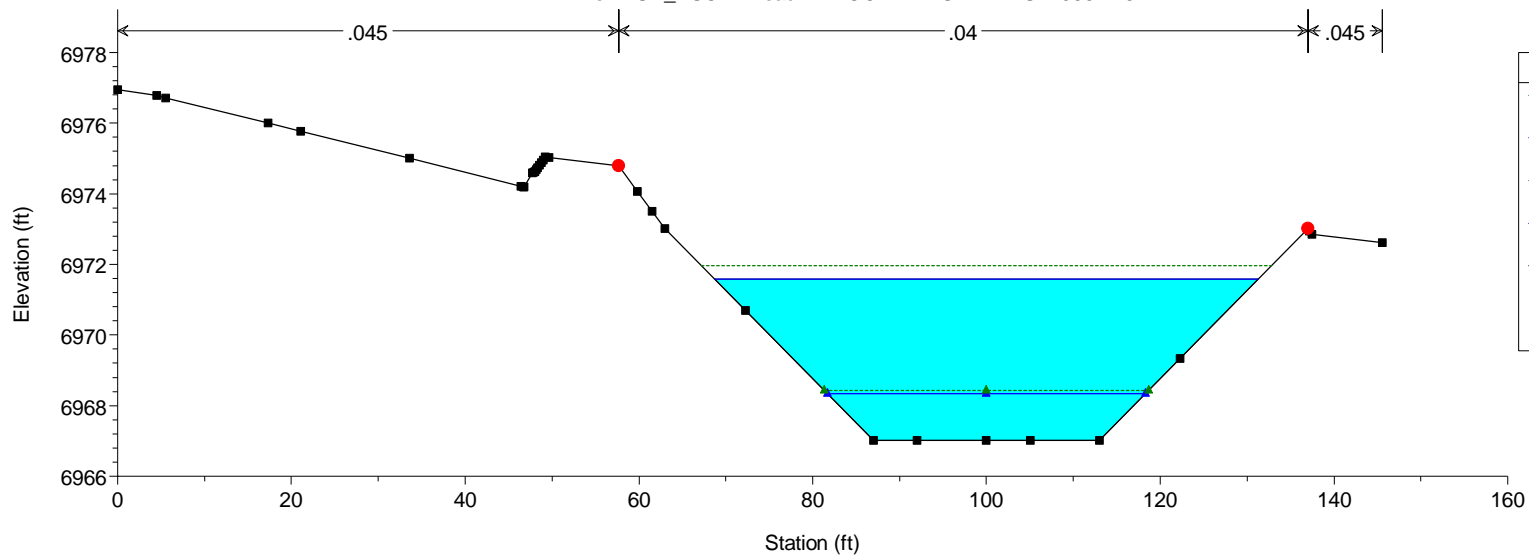
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5602.76



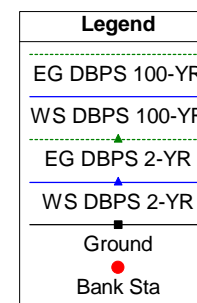
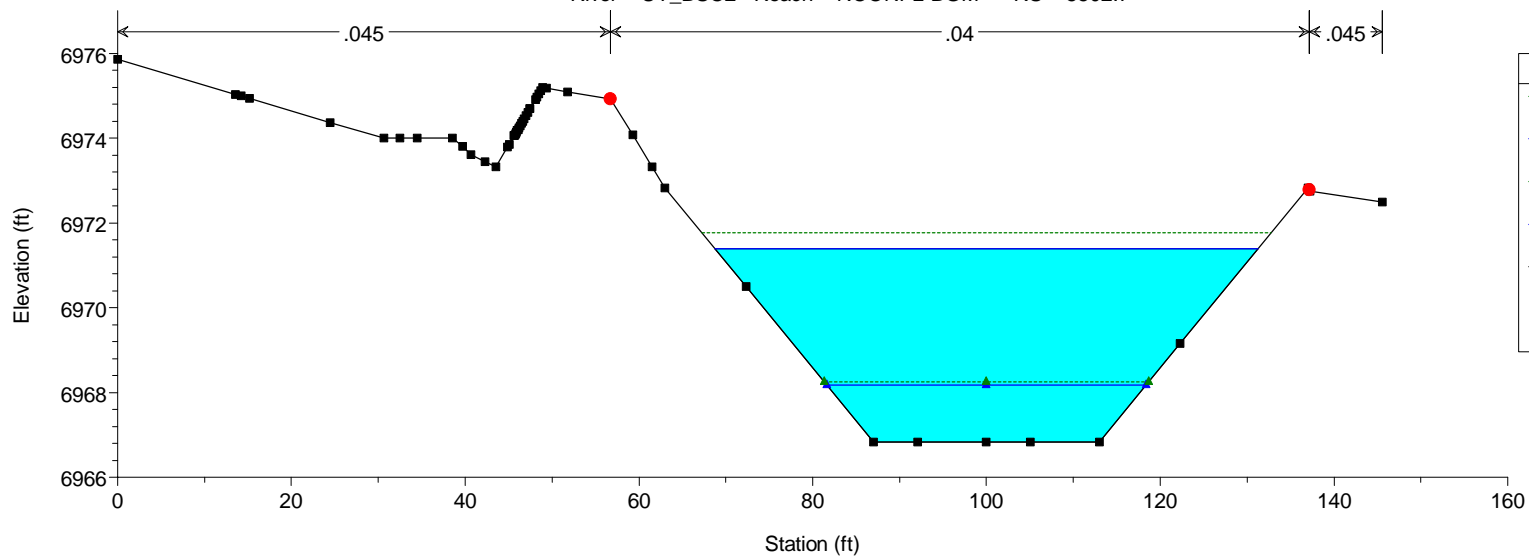
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5552.73



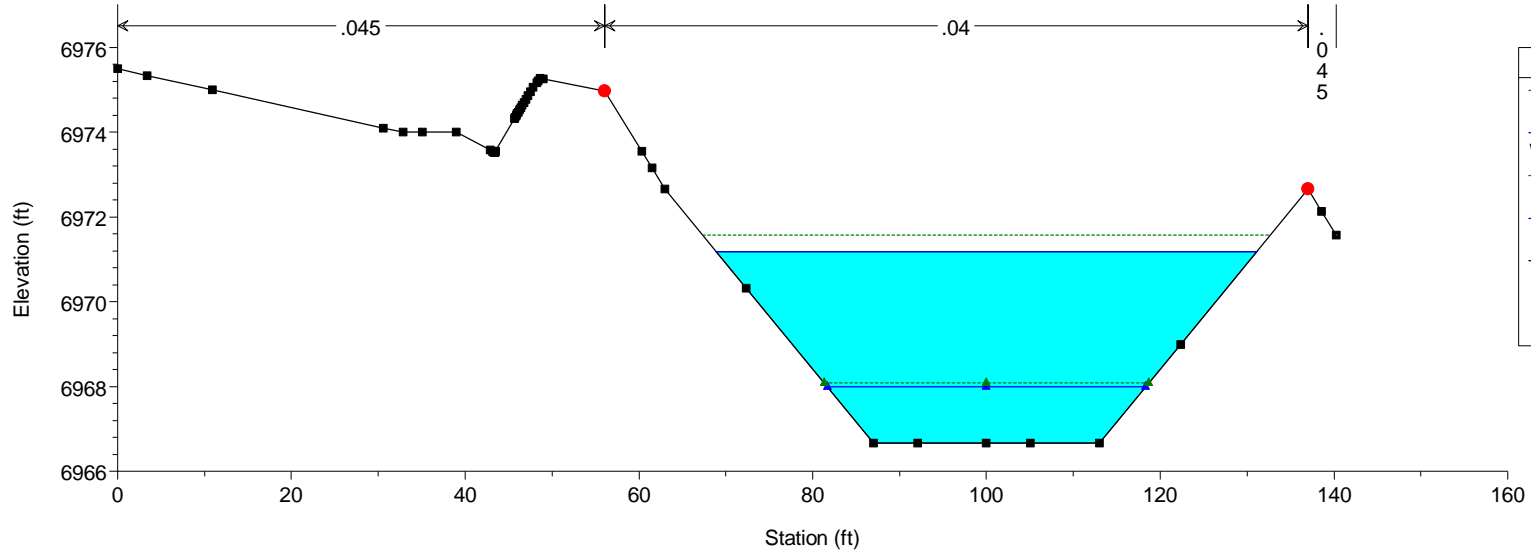
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5502.7



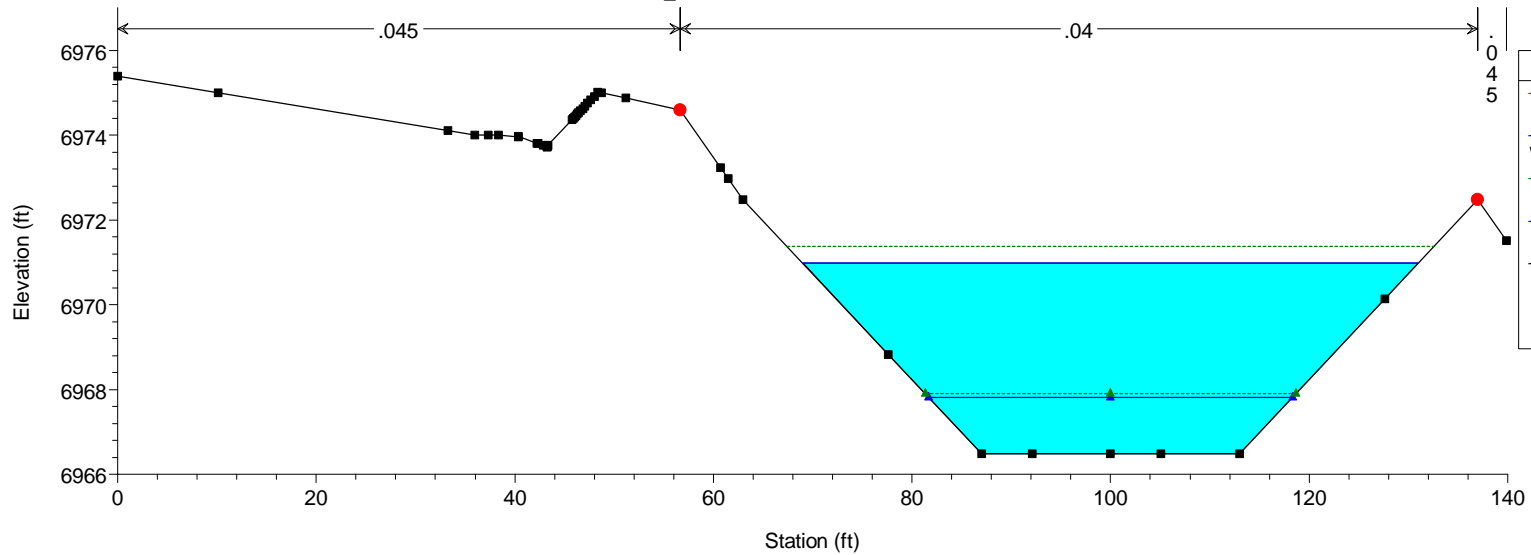
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5452.67



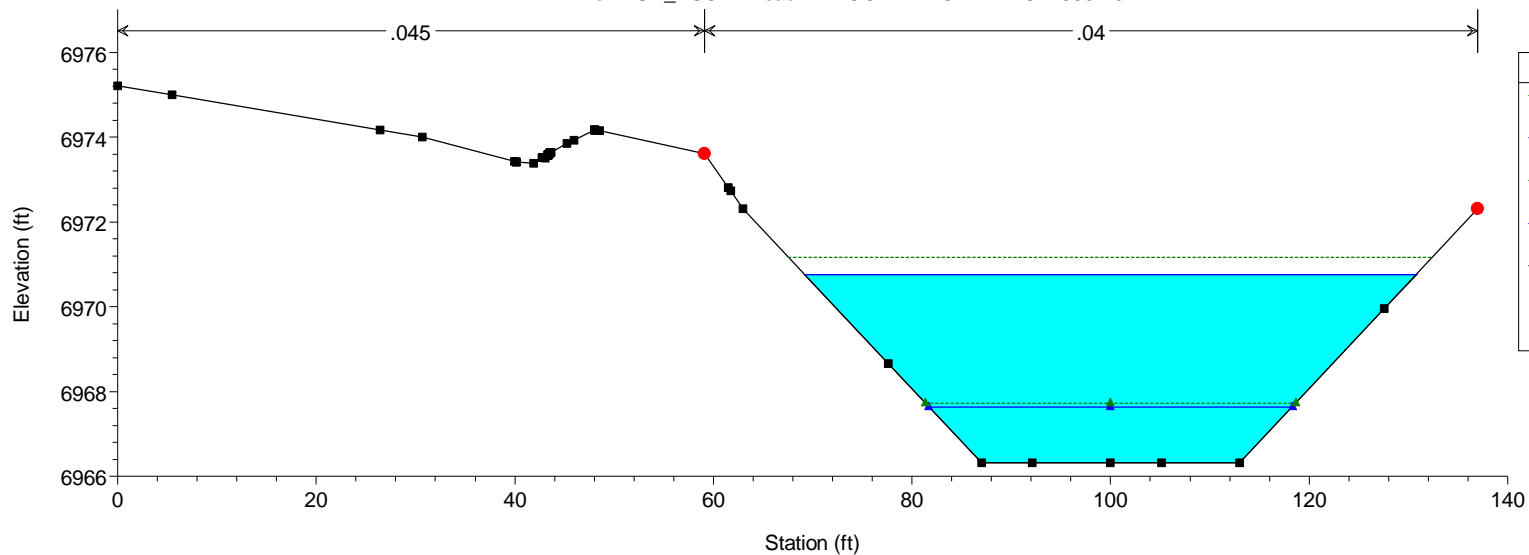
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5402.64



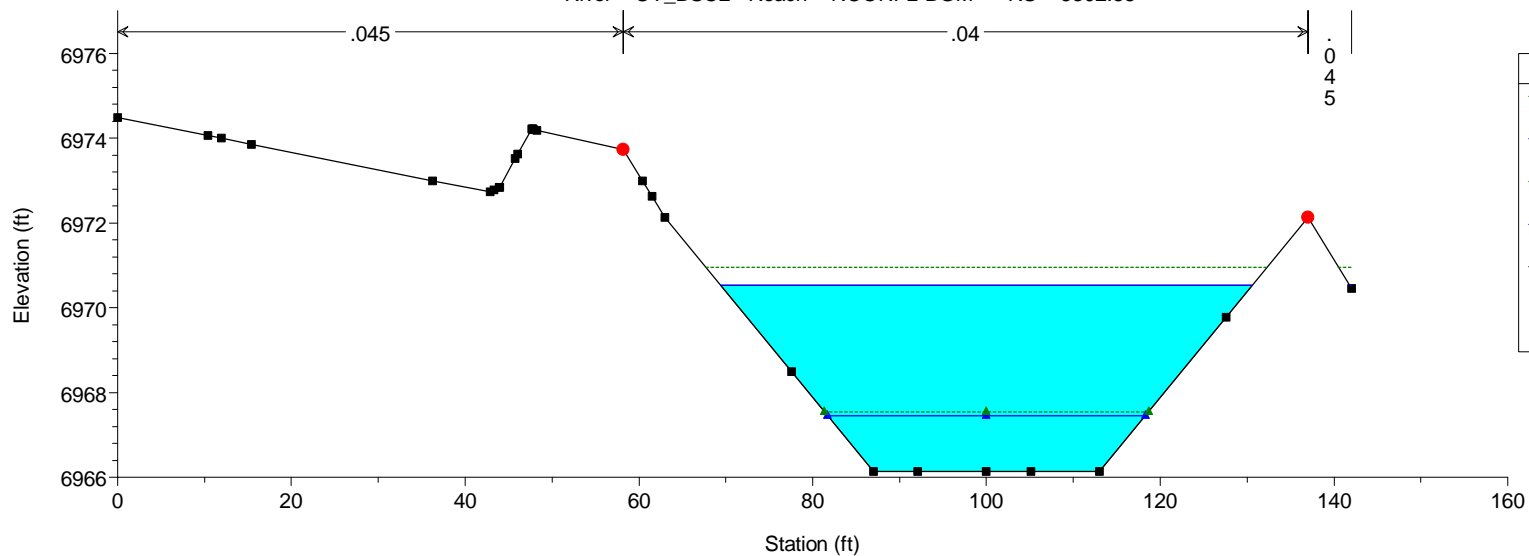
HEC-RAS Model Plan: Default Scenario 10/31/2019

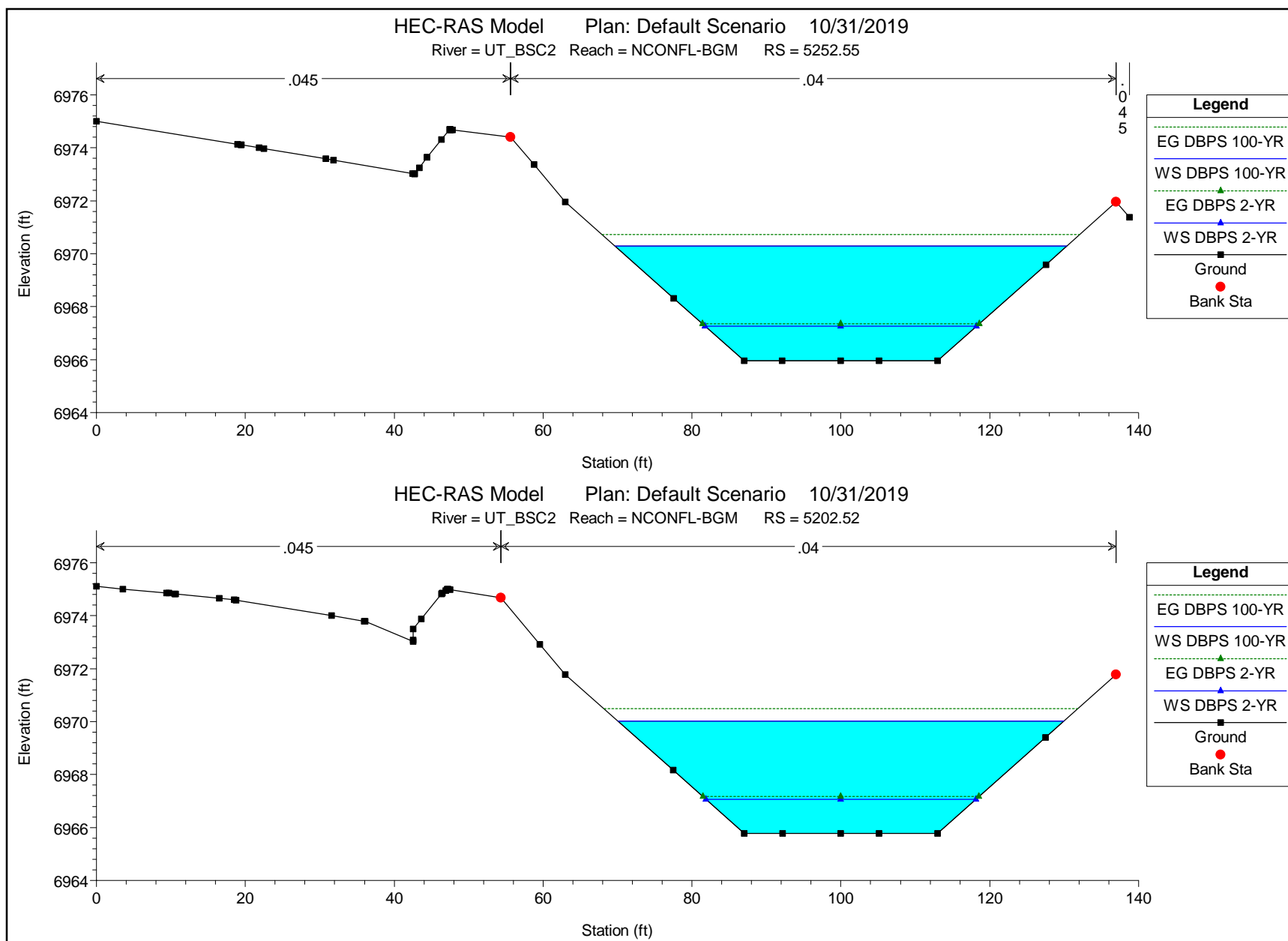
River = UT_BSC2 Reach = NCONFL-BGM RS = 5352.61



HEC-RAS Model Plan: Default Scenario 10/31/2019

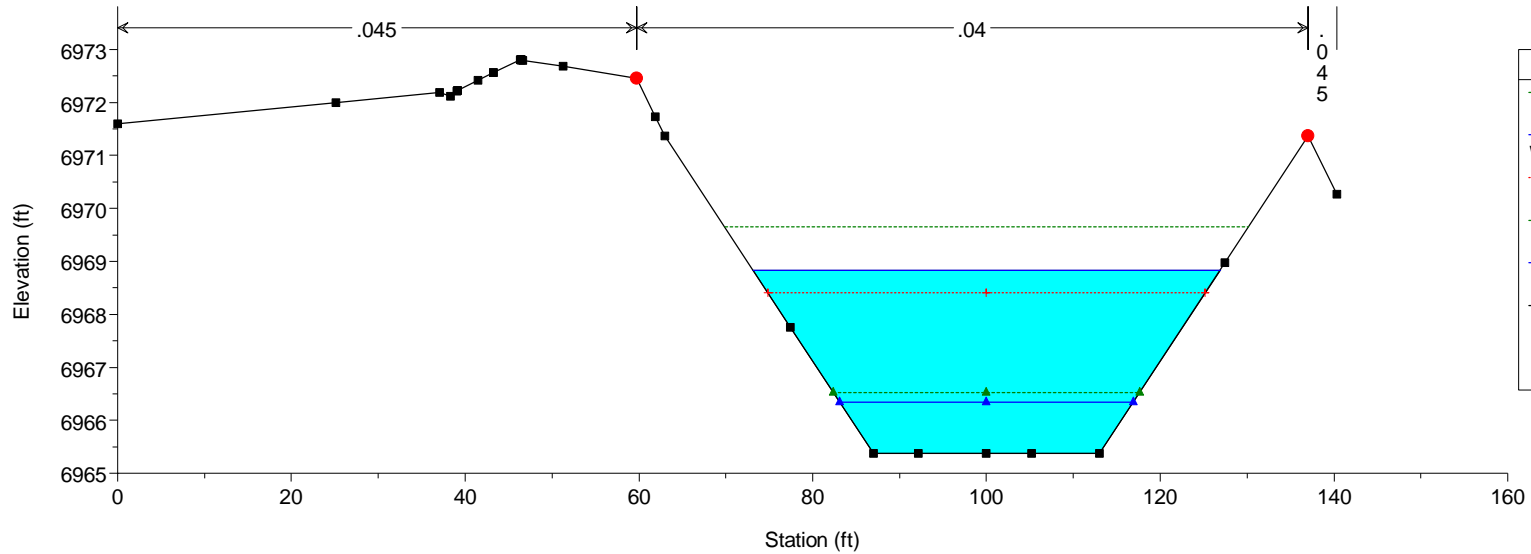
River = UT_BSC2 Reach = NCONFL-BGM RS = 5302.58





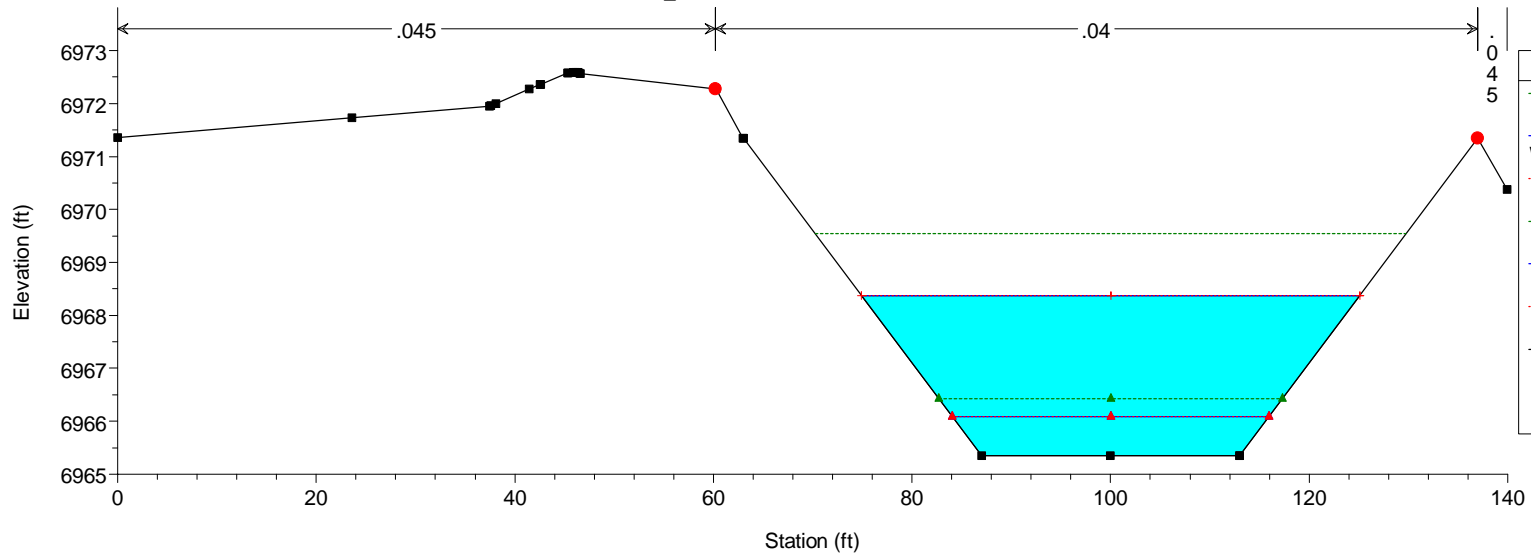
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5084.11



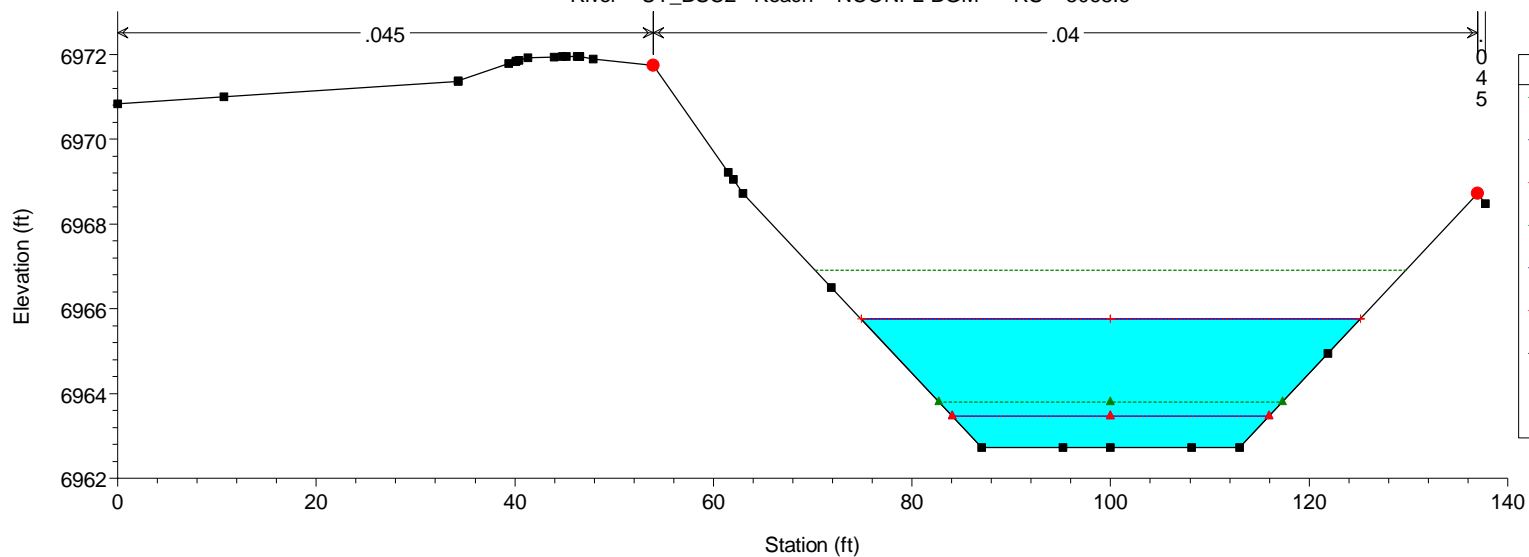
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 5079.11



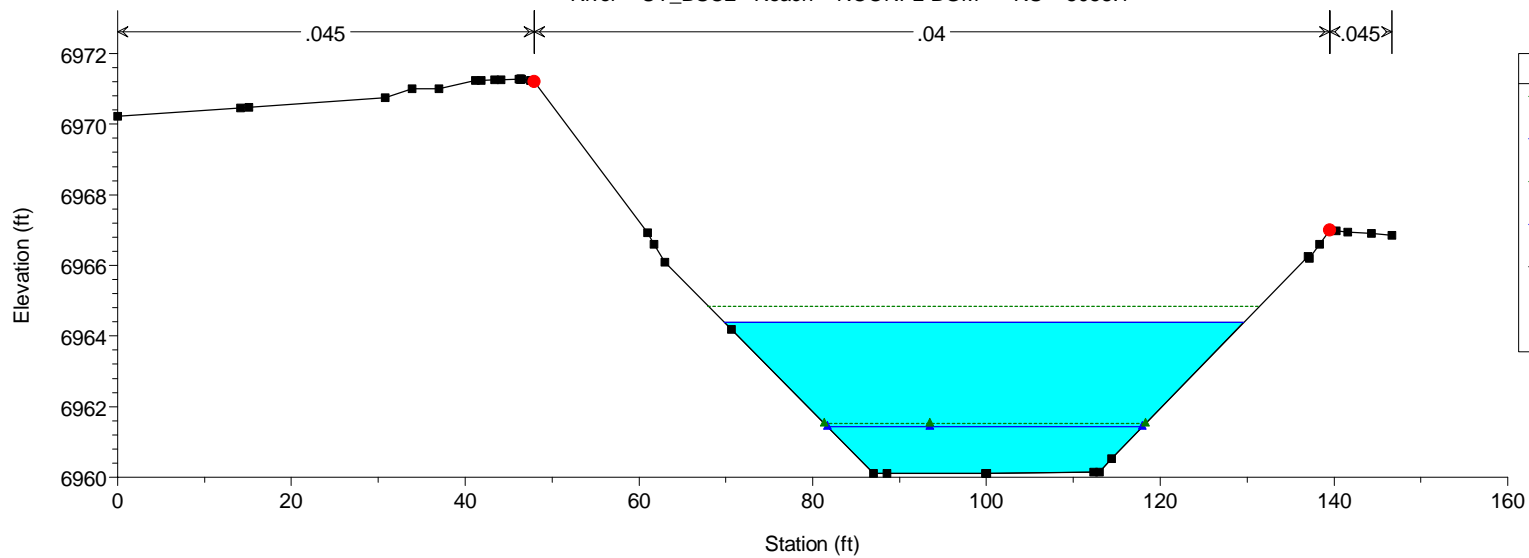
HEC-RAS Model Plan: Default Scenario 10/31/2019

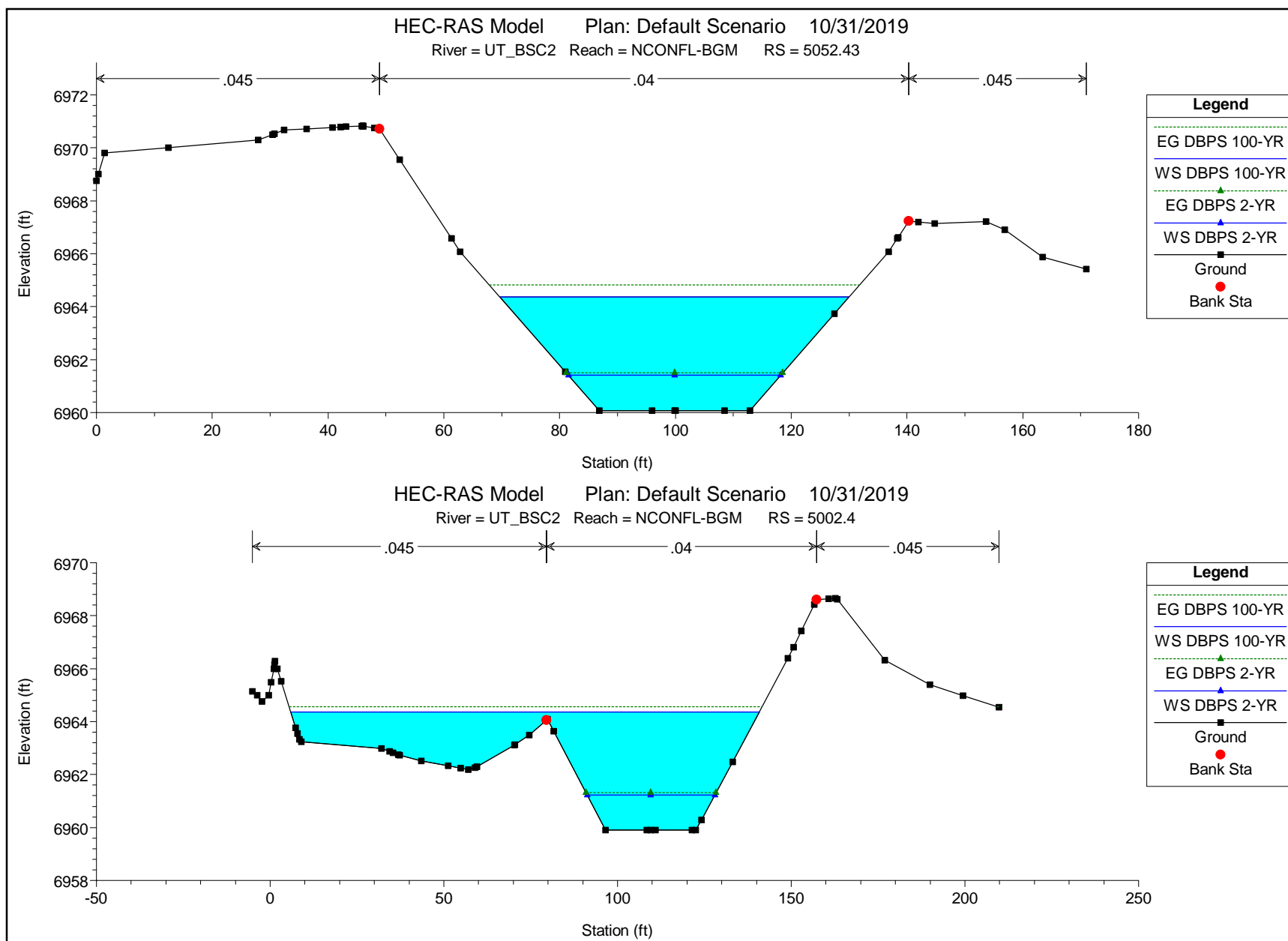
River = UT_BSC2 Reach = NCONFL-BGM RS = 5068.6



HEC-RAS Model Plan: Default Scenario 10/31/2019

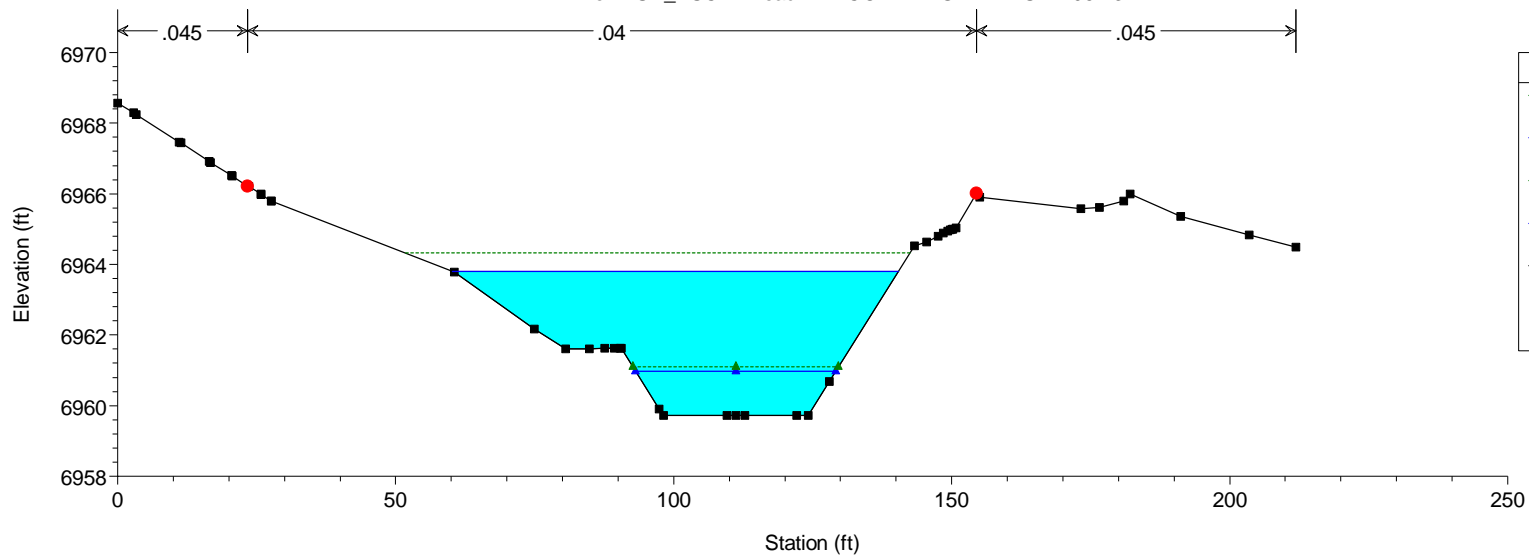
River = UT_BSC2 Reach = NCONFL-BGM RS = 5058.1





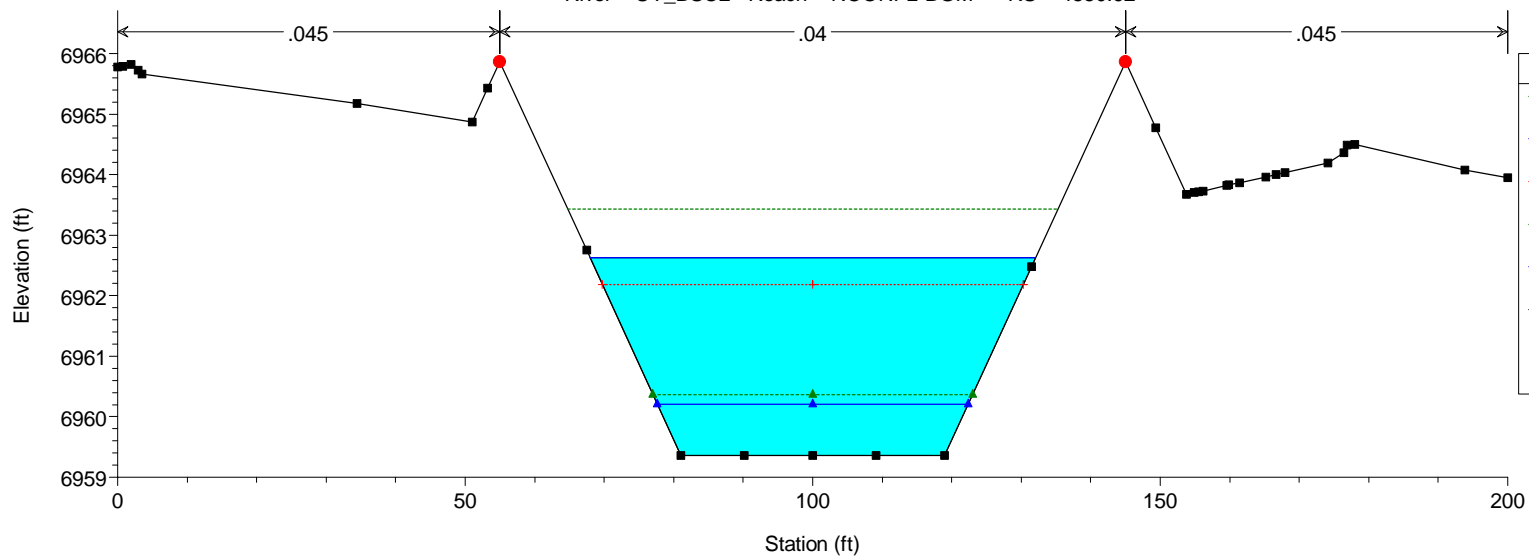
HEC-RAS Model Plan: Default Scenario 10/31/2019

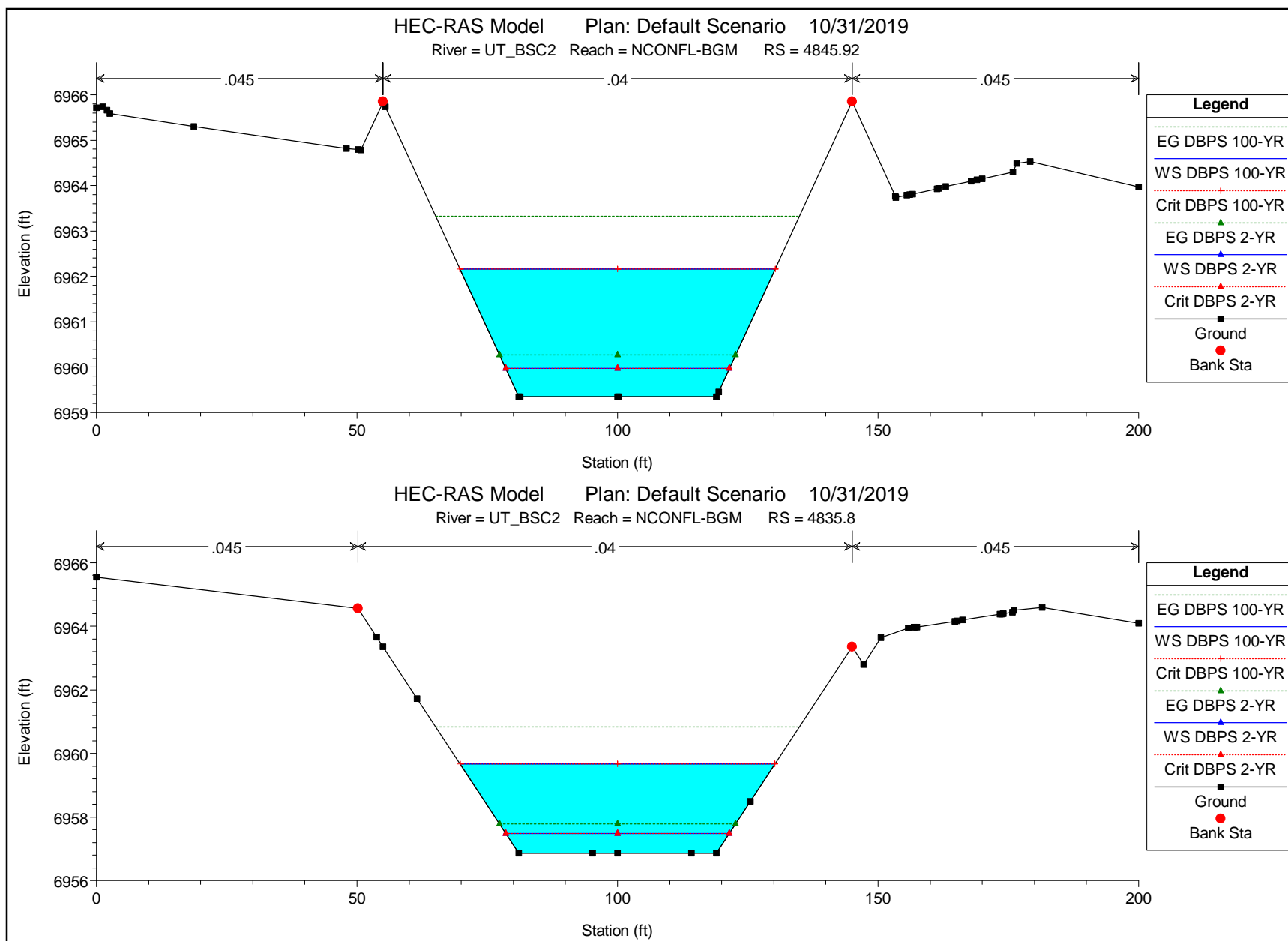
River = UT_BSC2 Reach = NCONFL-BGM RS = 4952.37



HEC-RAS Model Plan: Default Scenario 10/31/2019

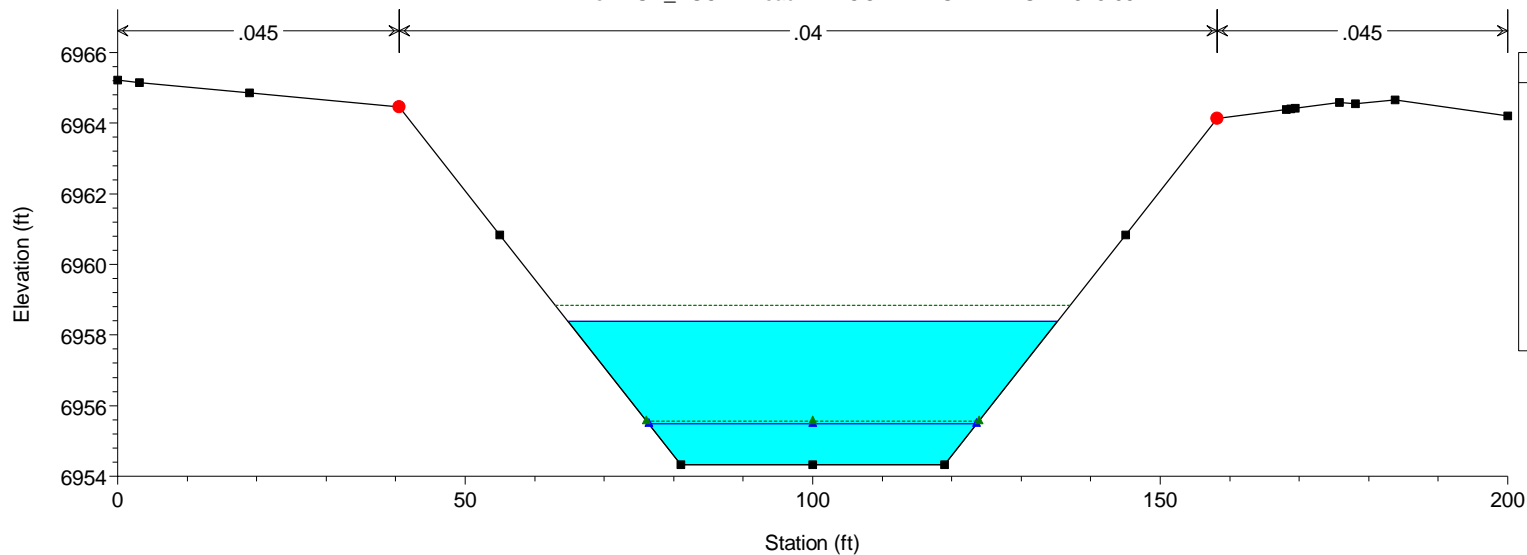
River = UT_BSC2 Reach = NCONFL-BGM RS = 4850.92





HEC-RAS Model Plan: Default Scenario 10/31/2019

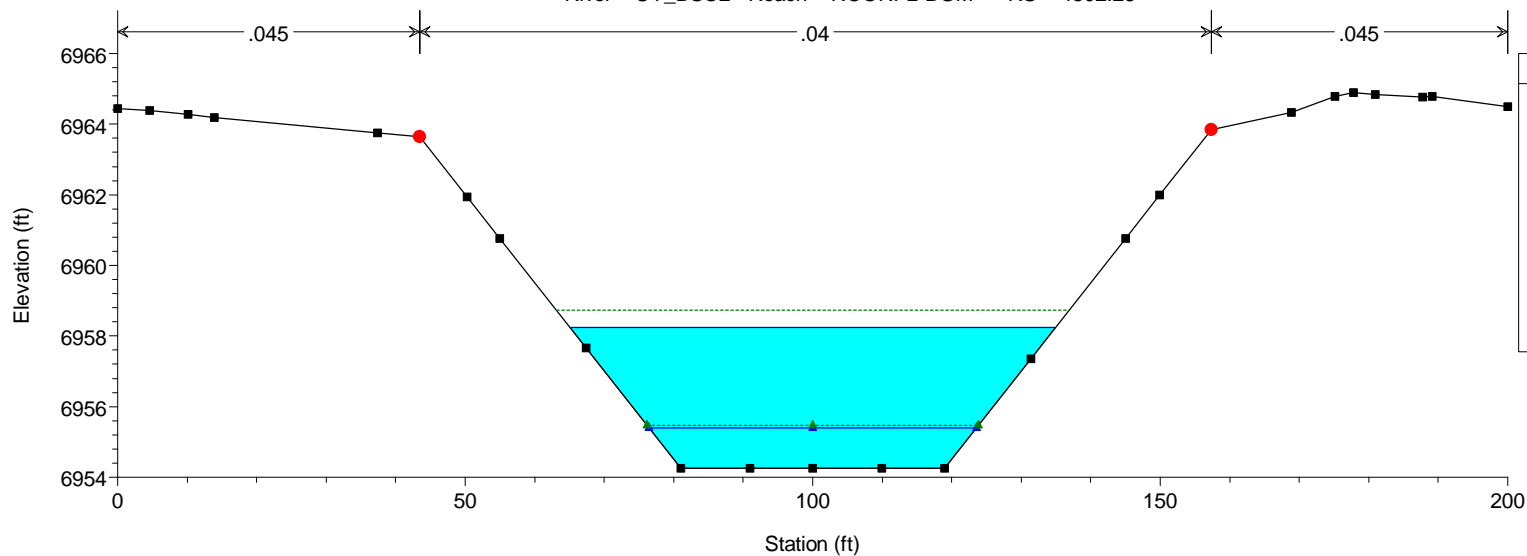
River = UT_BSC2 Reach = NCONFL-BGM RS = 4825.68



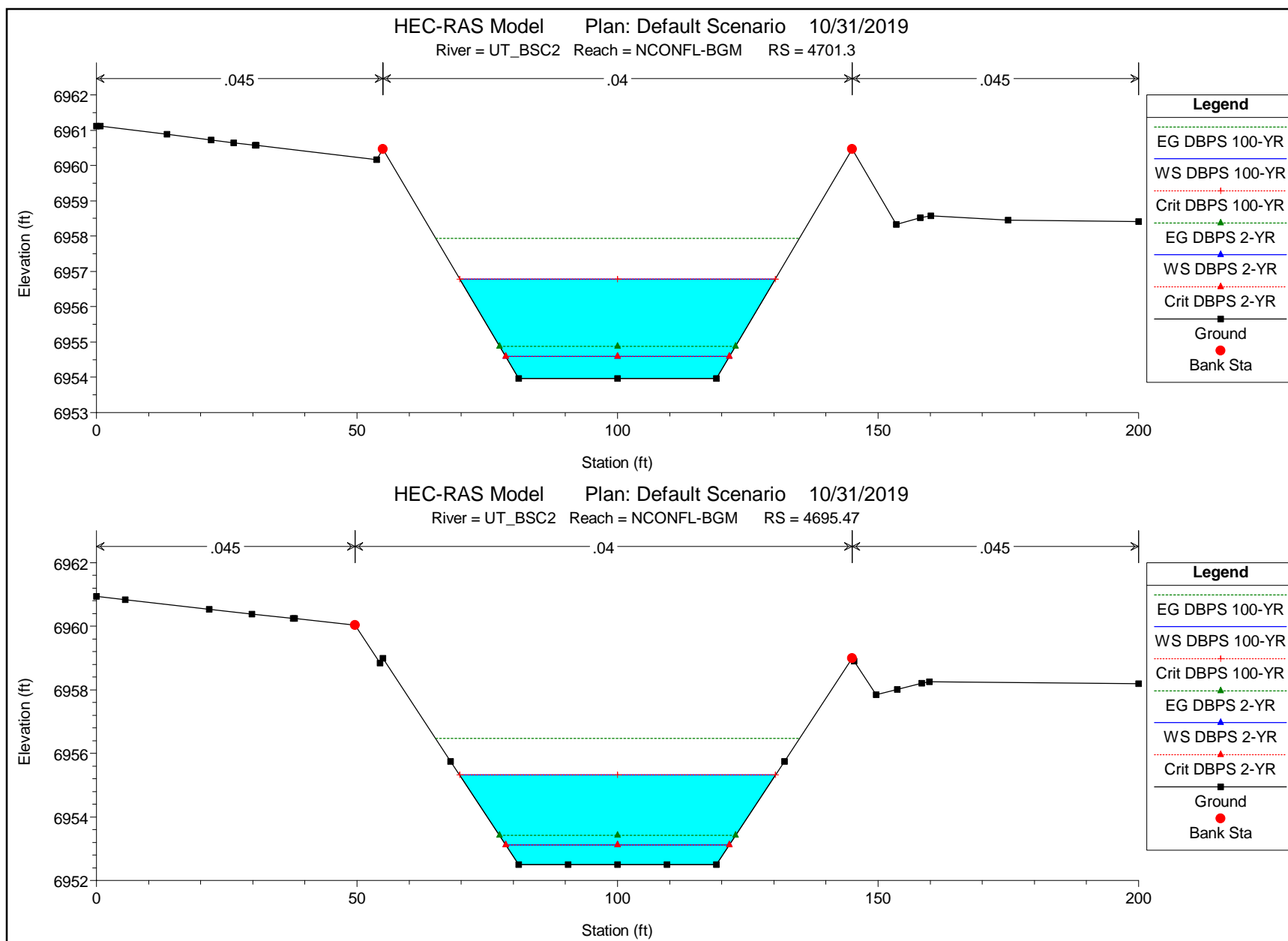
Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4802.28

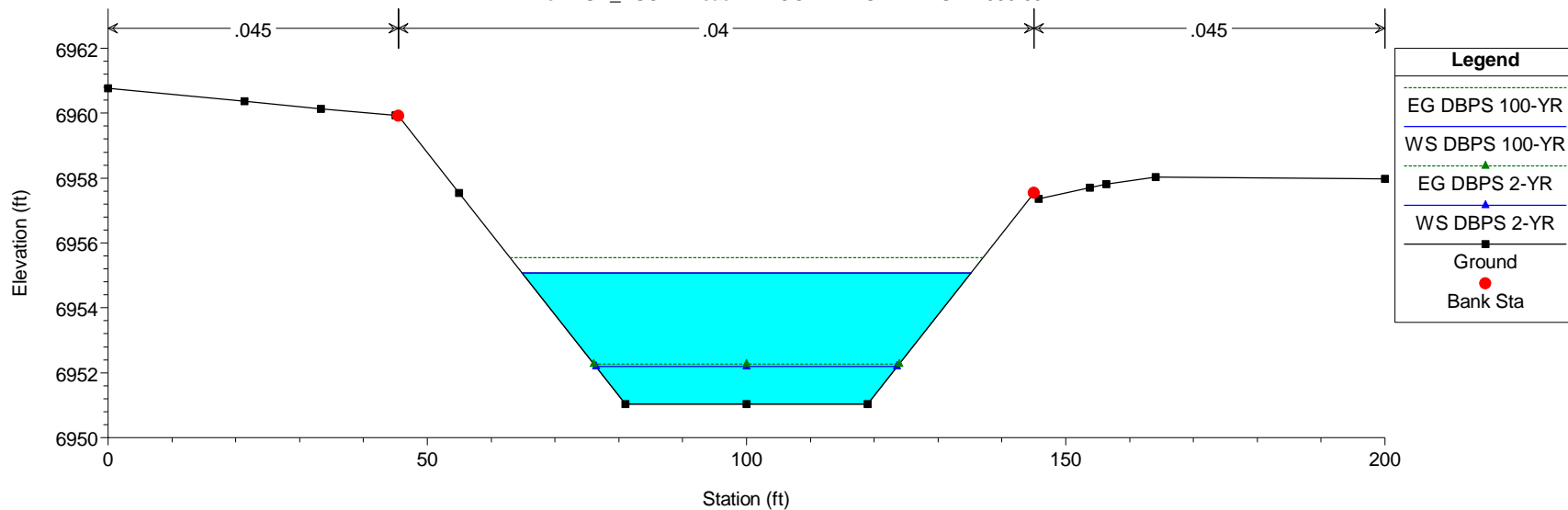


Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	



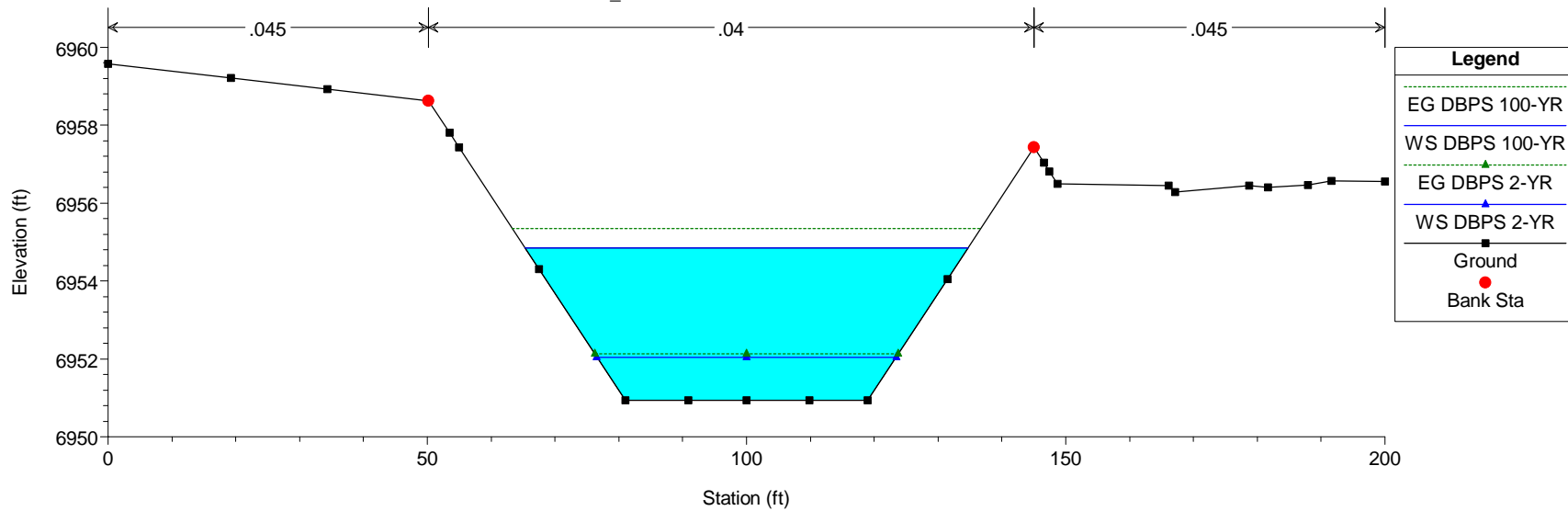
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4689.63



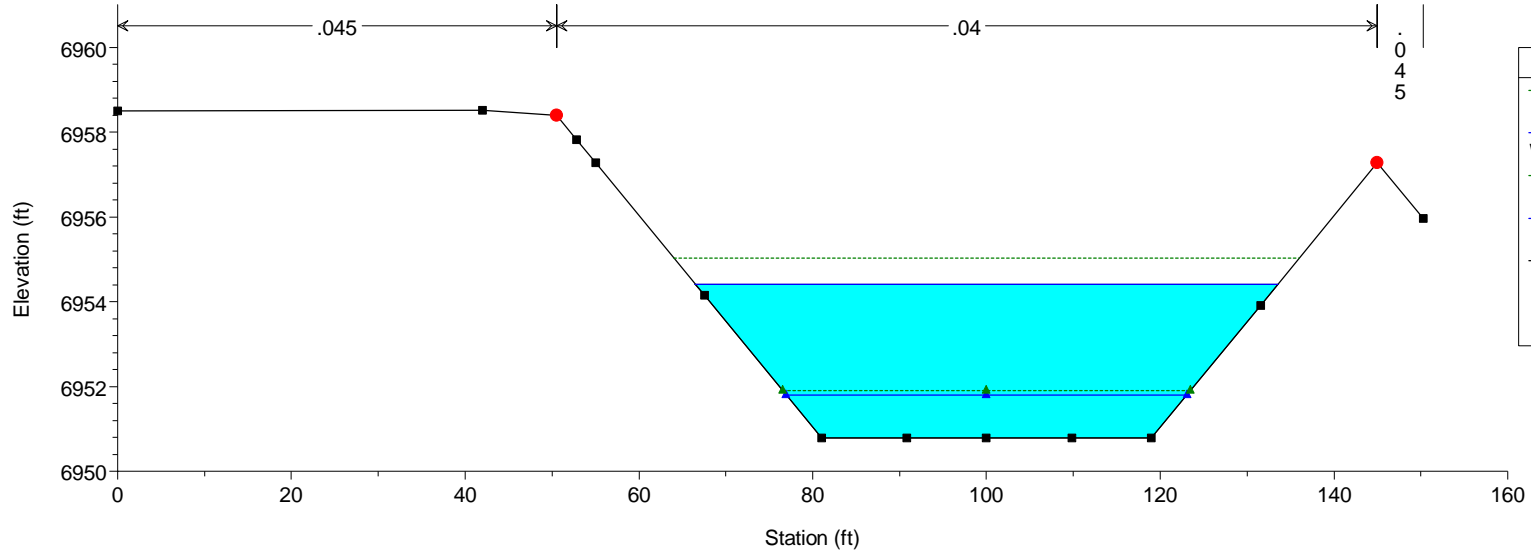
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4652.19



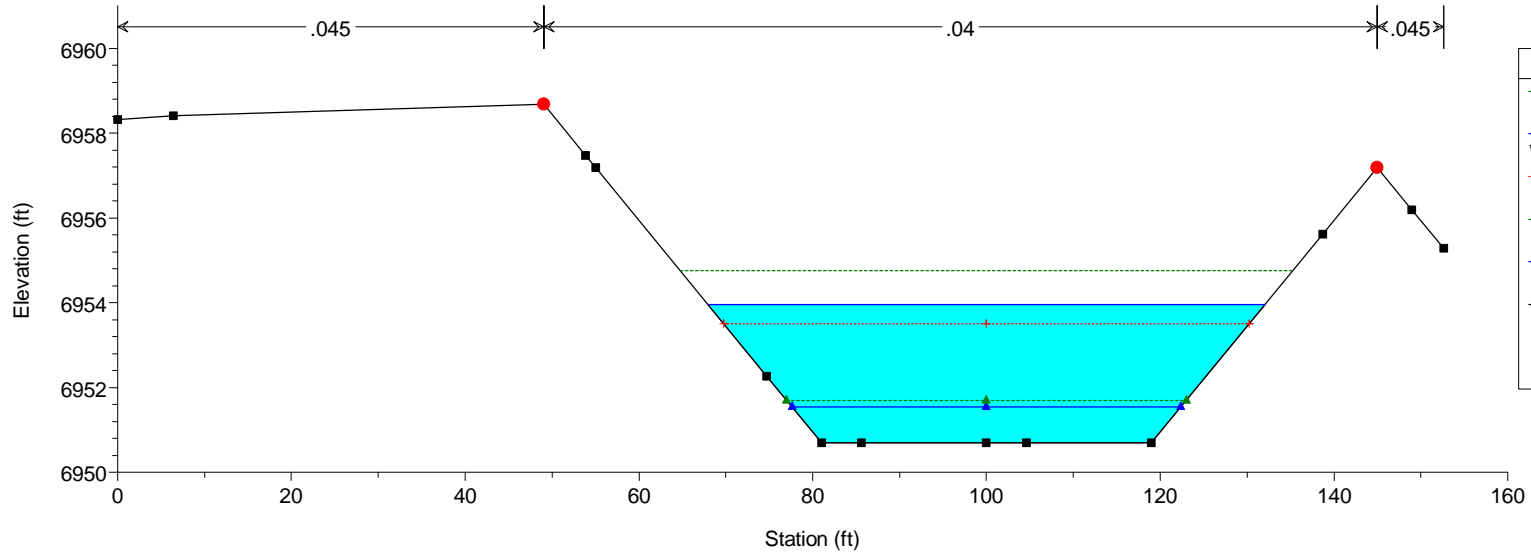
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4602.16



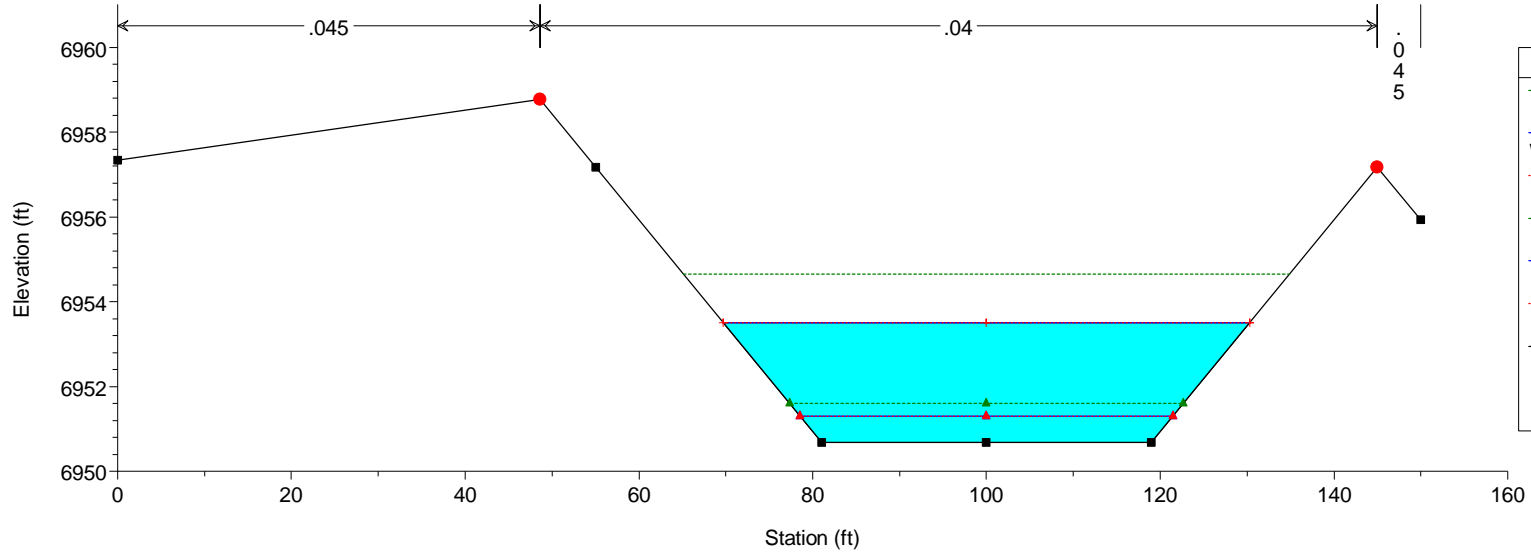
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4573.58



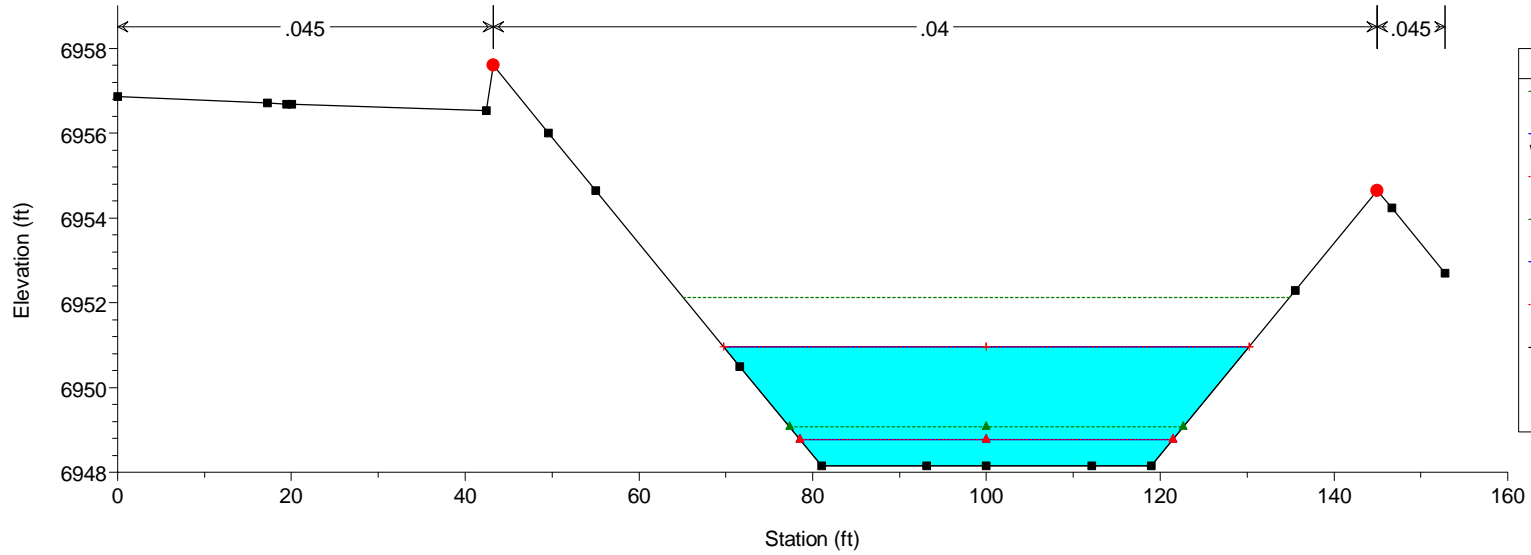
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4568.58



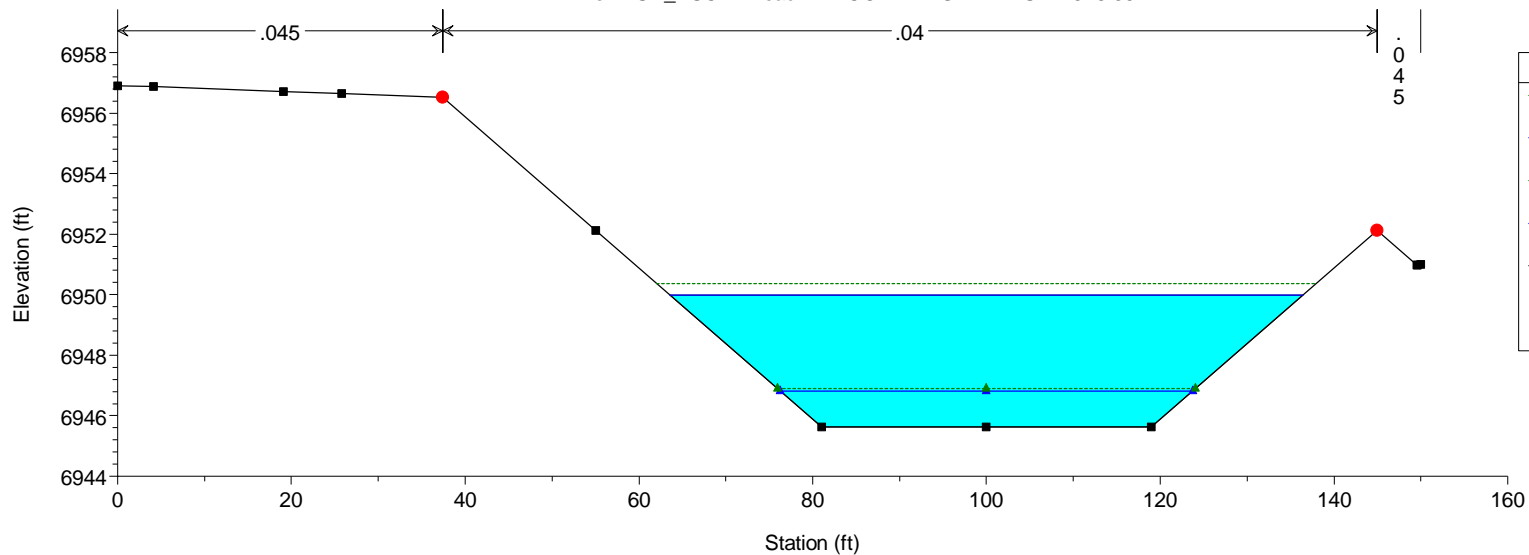
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4558.46



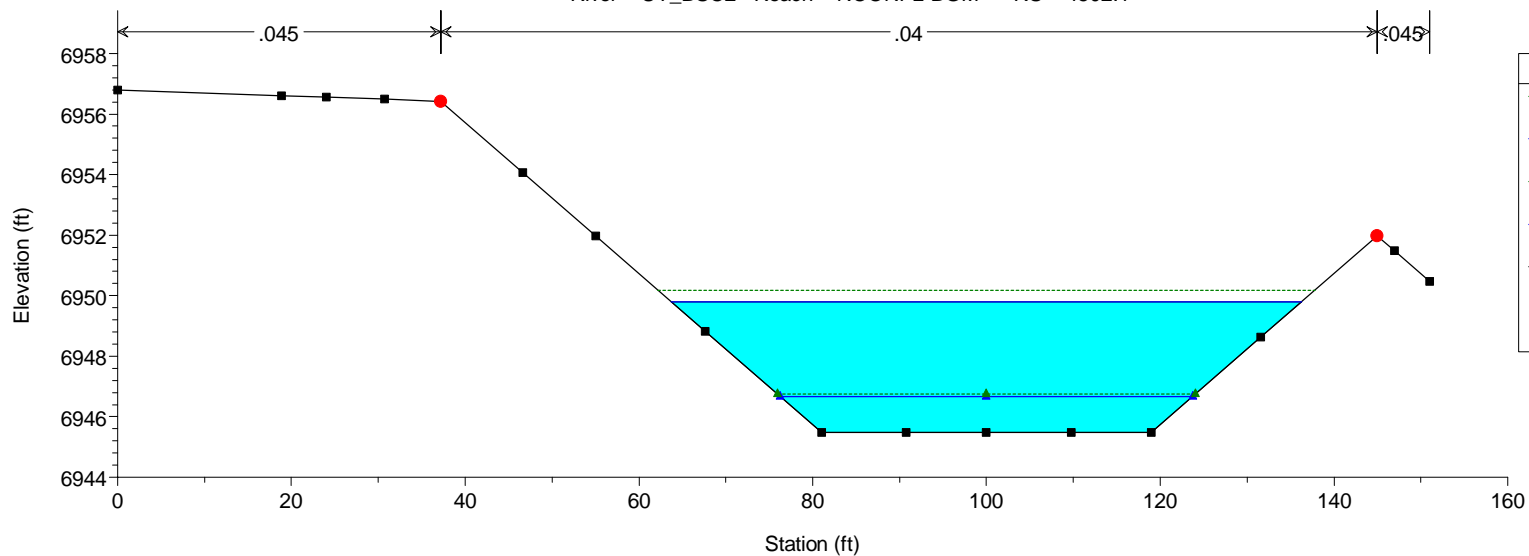
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4548.35



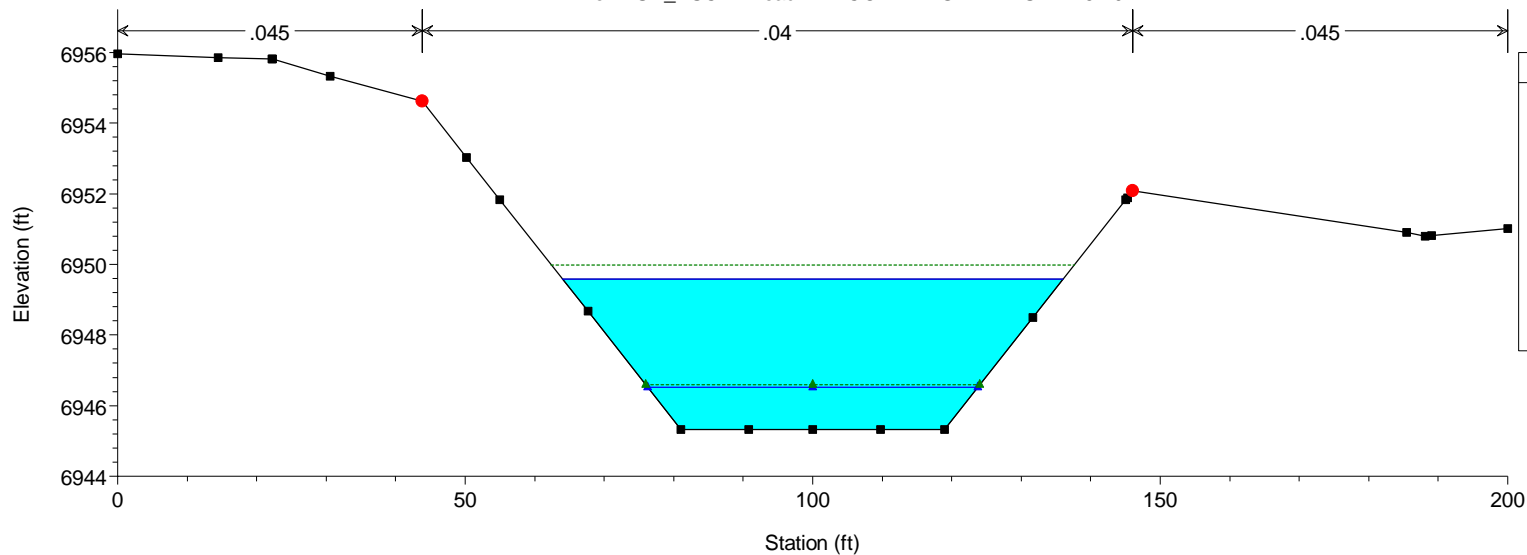
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4502.1



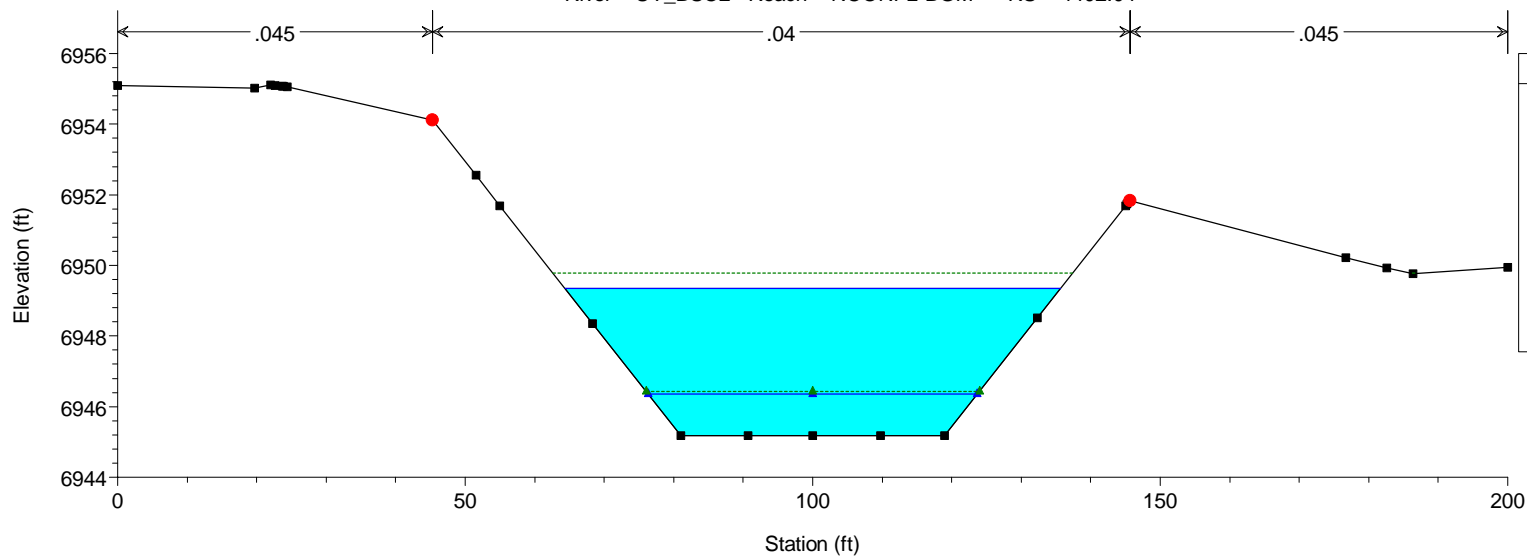
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4452.07



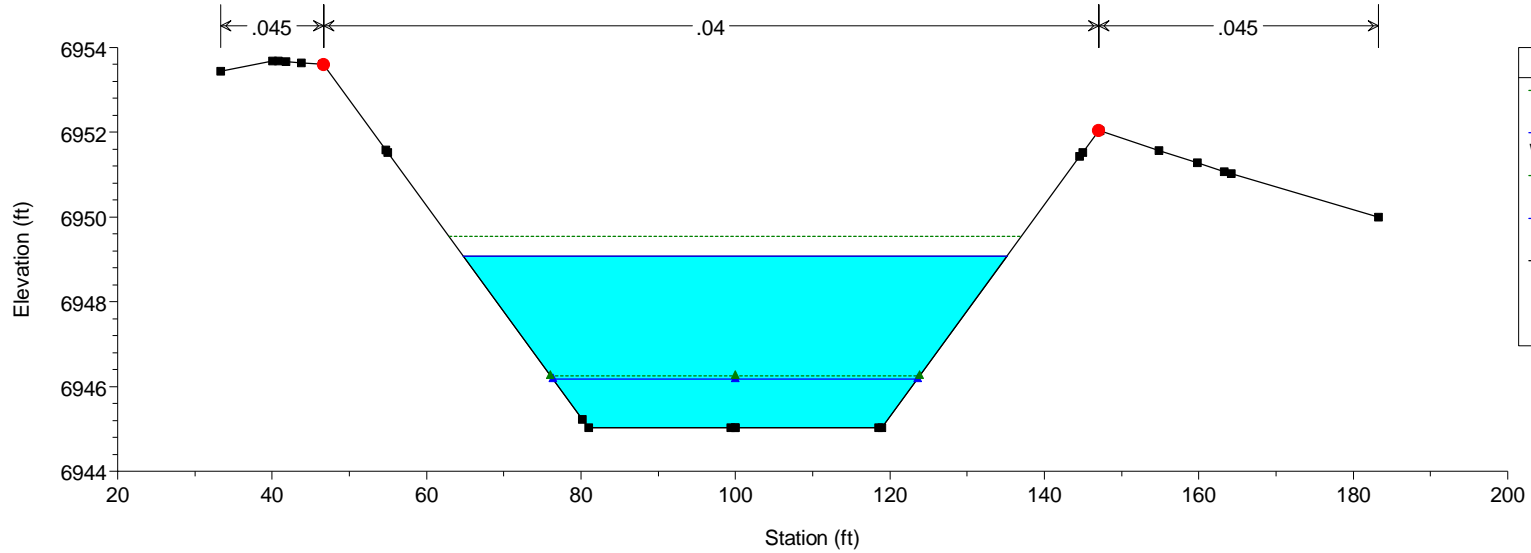
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4402.04



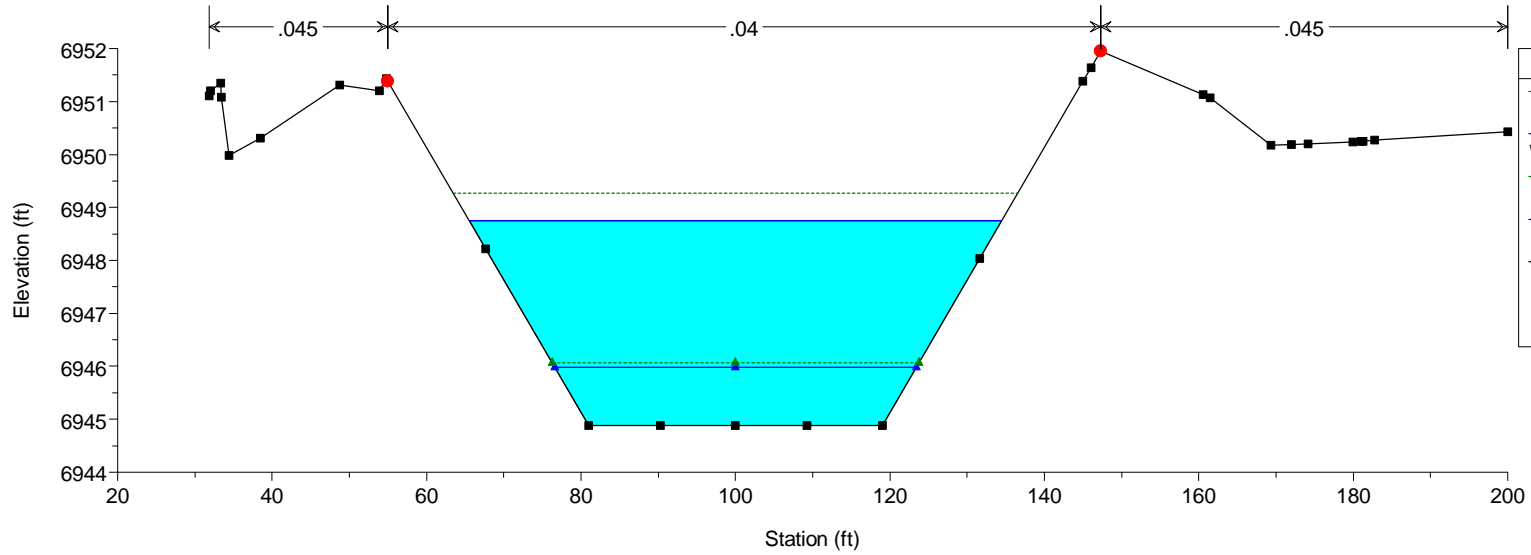
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4352.01



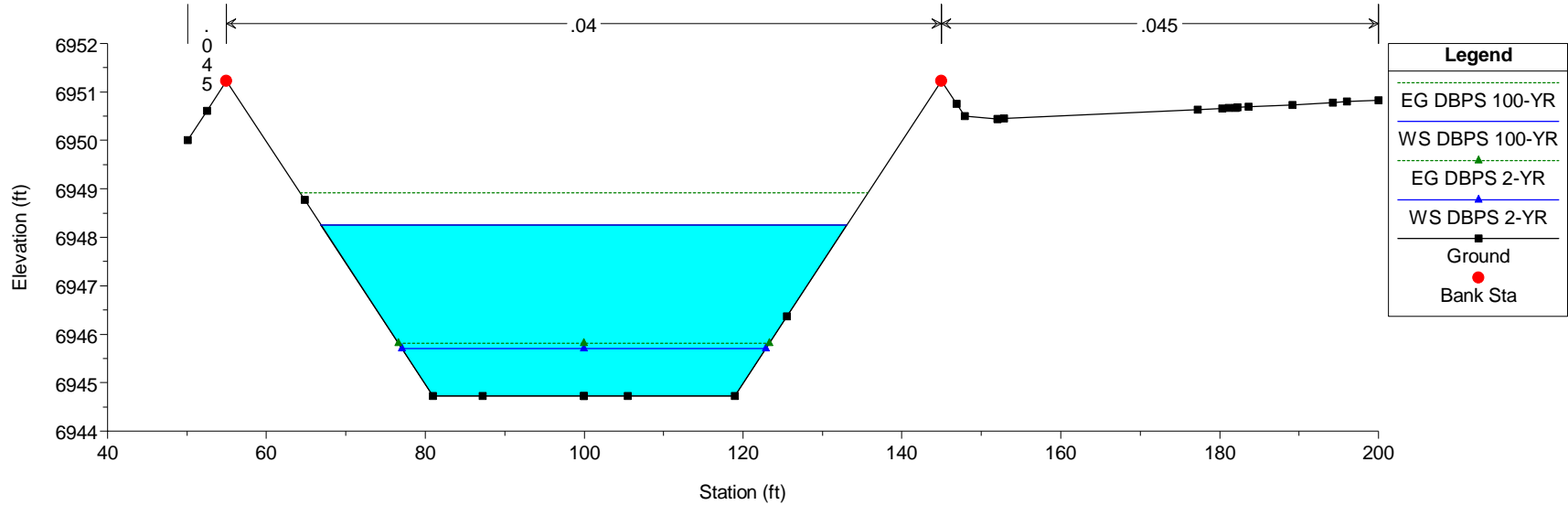
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4301.98



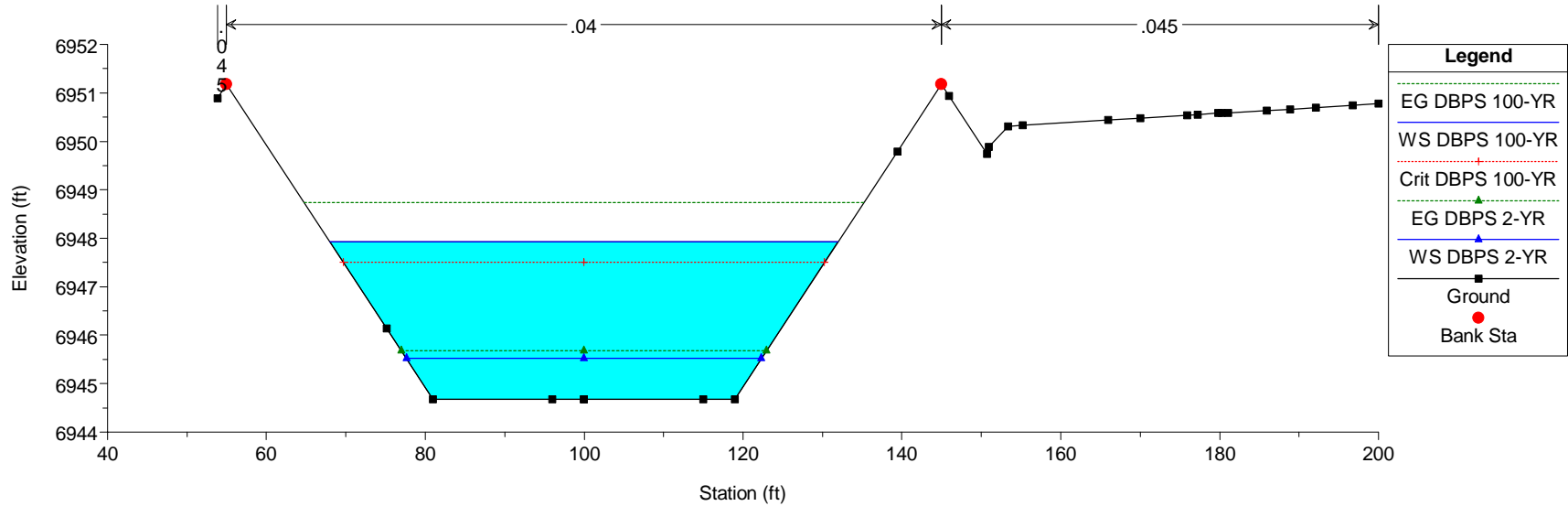
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4251.95



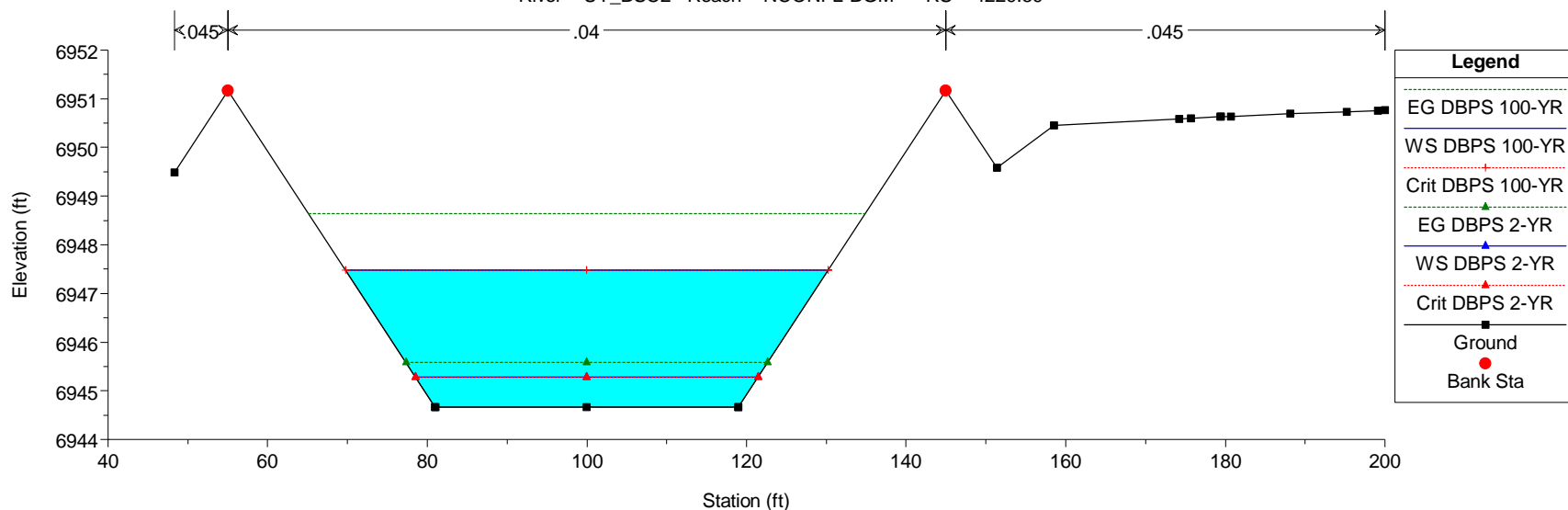
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4234.59



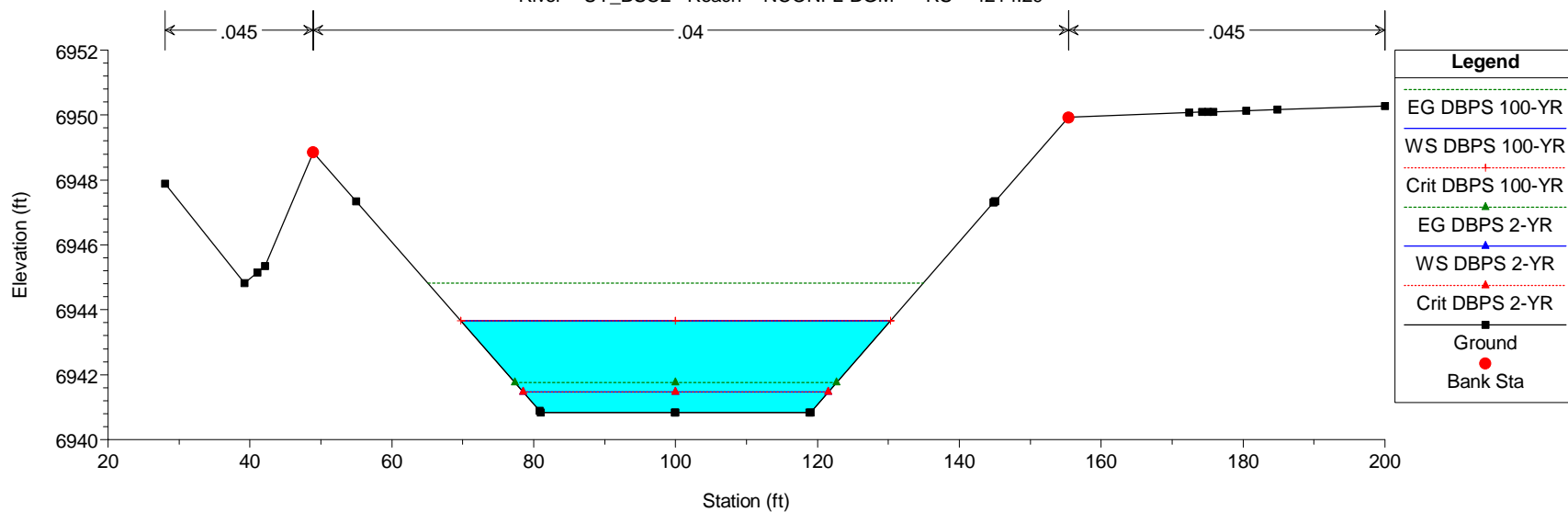
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4229.59



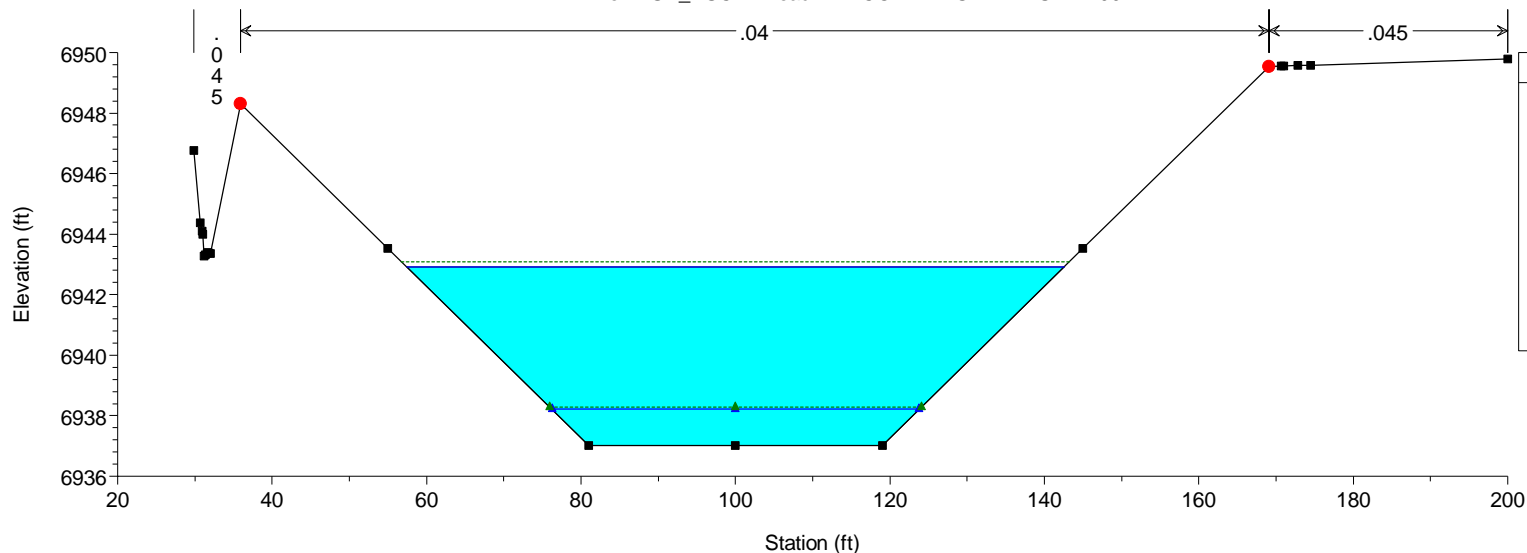
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4214.29



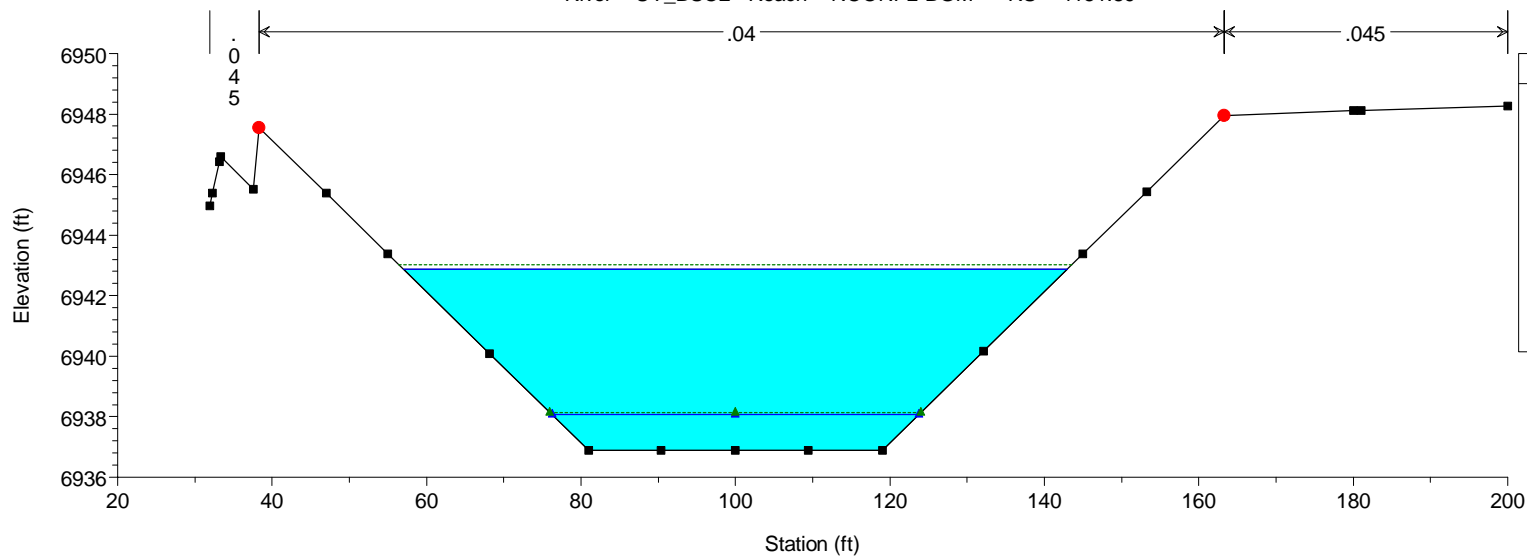
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4199



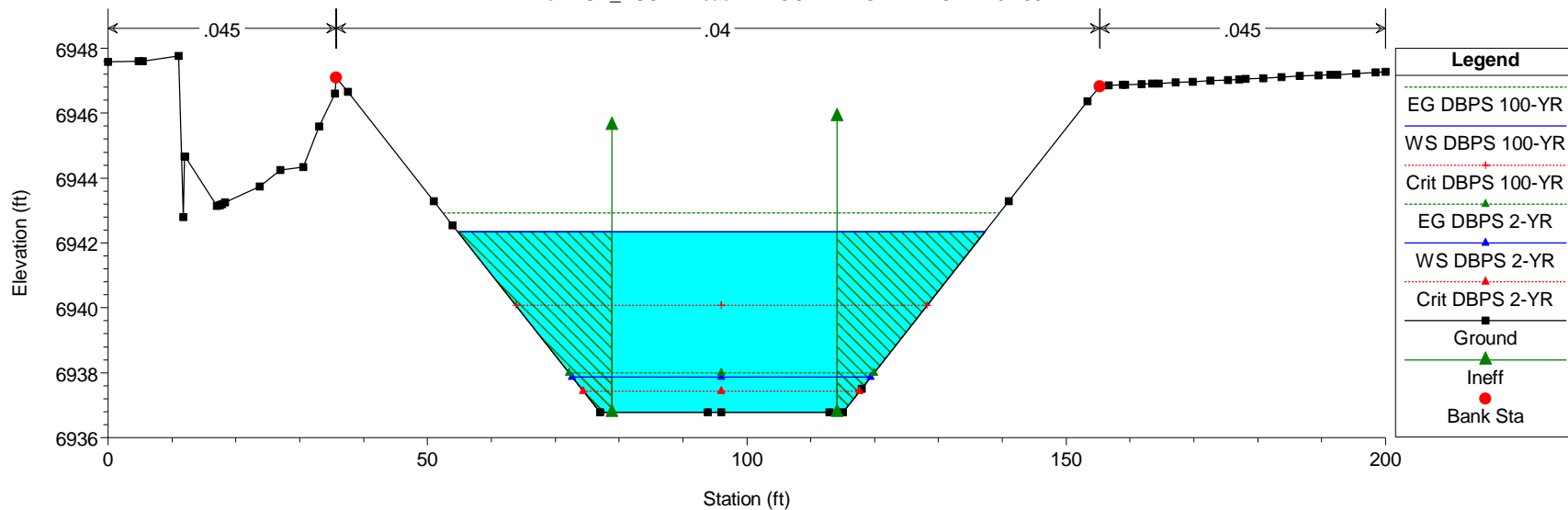
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4151.89



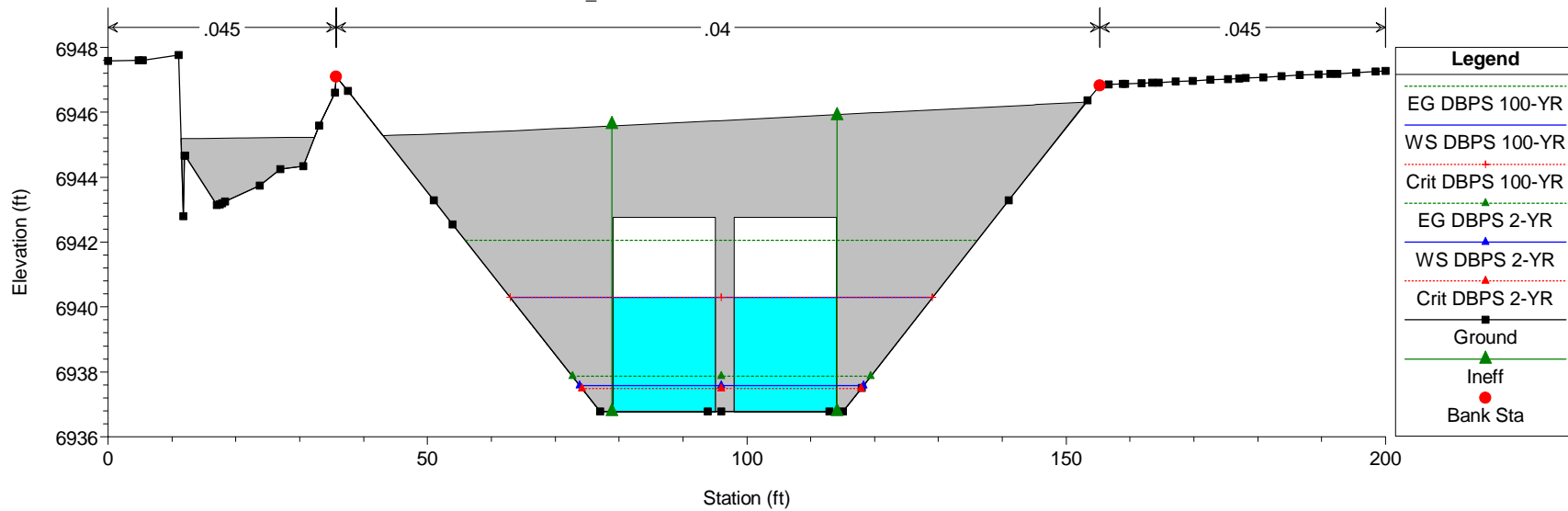
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4101.86



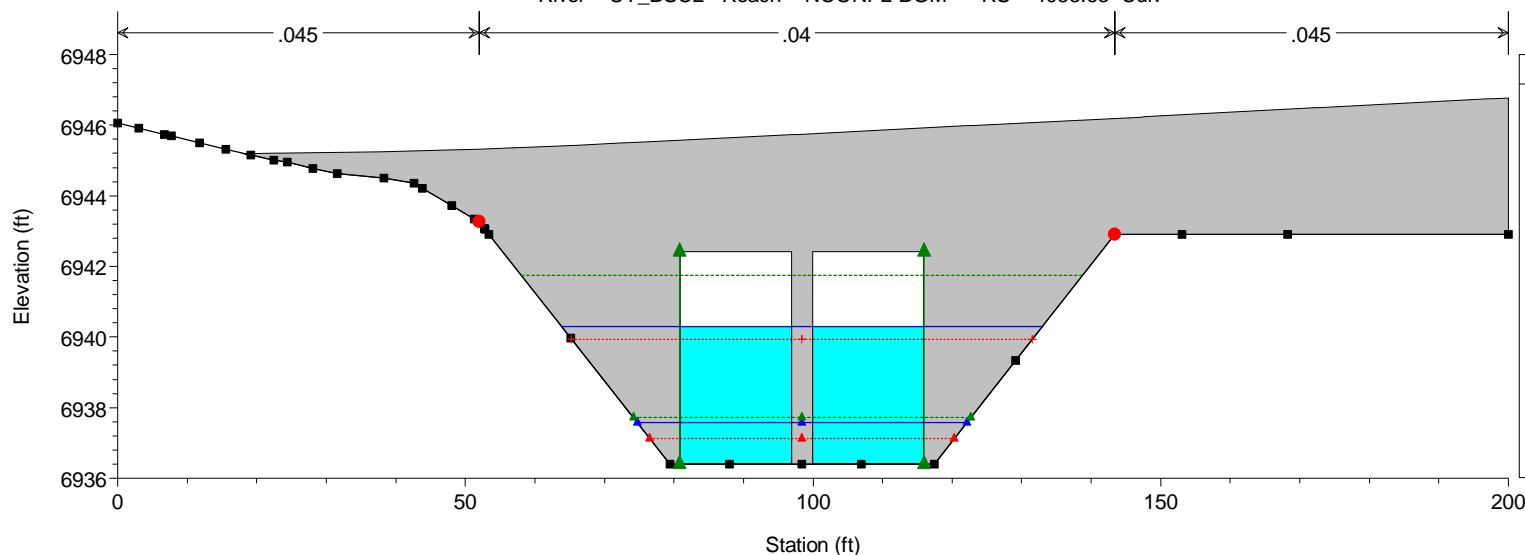
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 4053.63 Culv



HEC-RAS Model Plan: Default Scenario 10/31/2019

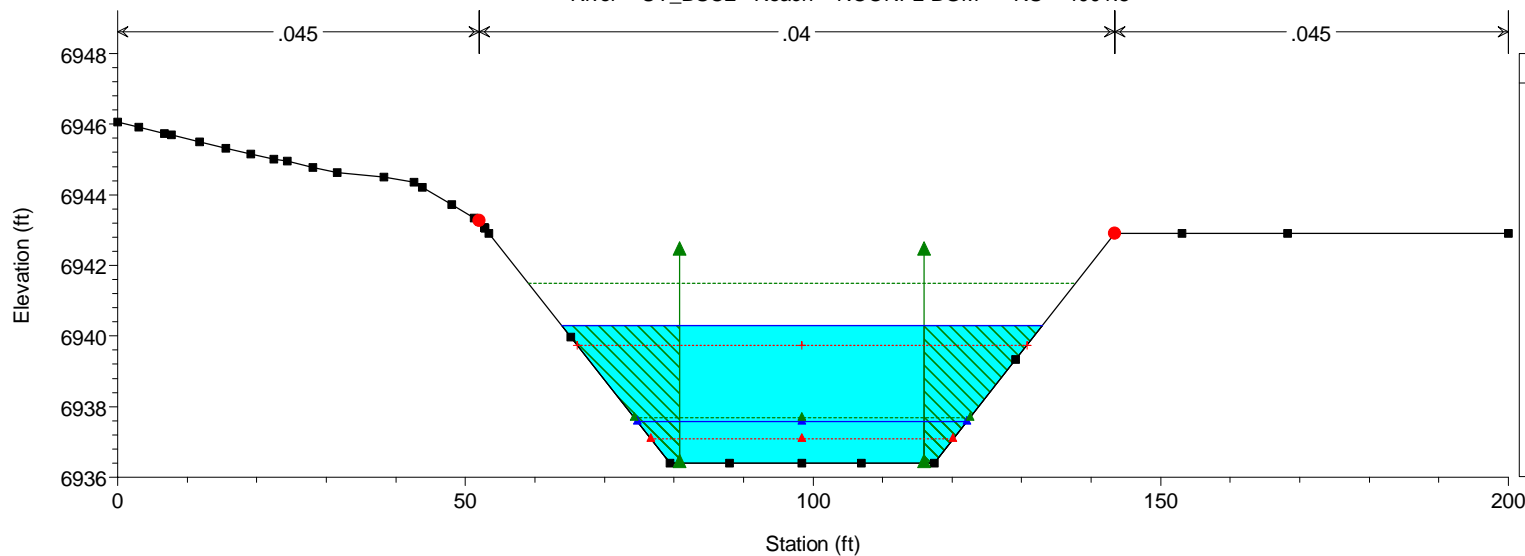
River = UT_BSC2 Reach = NCONFL-BGM RS = 4053.63 Culv



Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
EG DBPS 2-YR
WS DBPS 2-YR
Crit DBPS 2-YR
Ground
Ineff
Bank Sta

HEC-RAS Model Plan: Default Scenario 10/31/2019

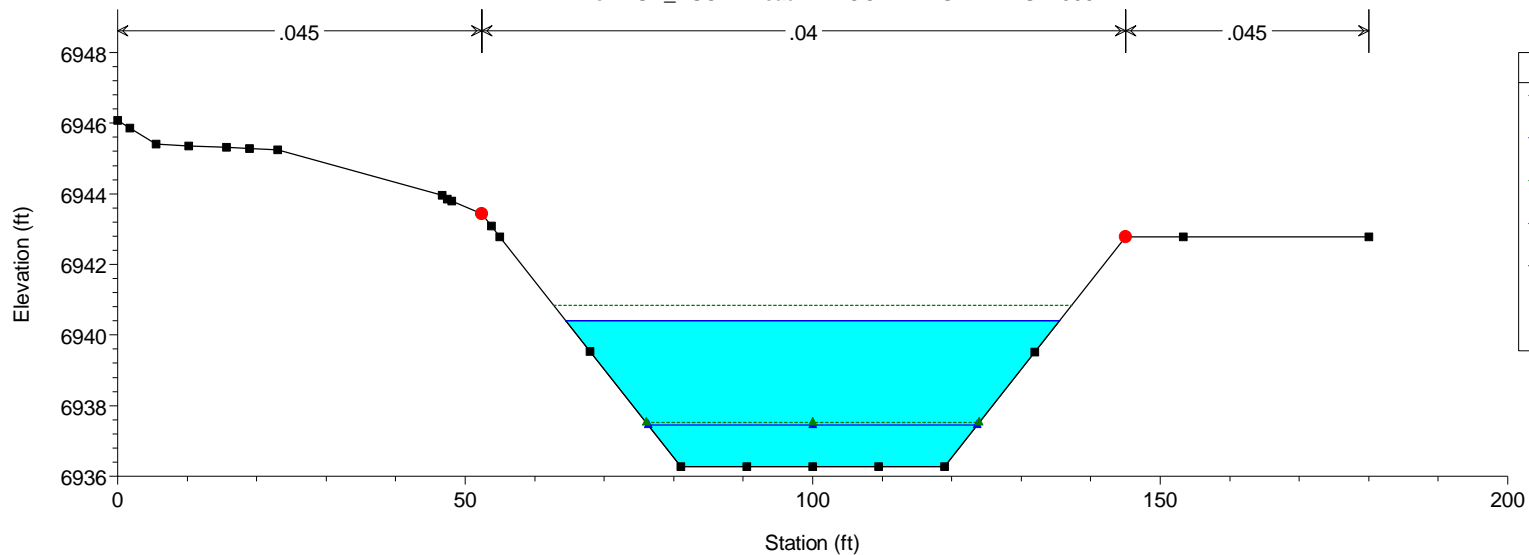
River = UT_BSC2 Reach = NCONFL-BGM RS = 4001.8



Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
EG DBPS 2-YR
WS DBPS 2-YR
Crit DBPS 2-YR
Ground
Ineff
Bank Sta

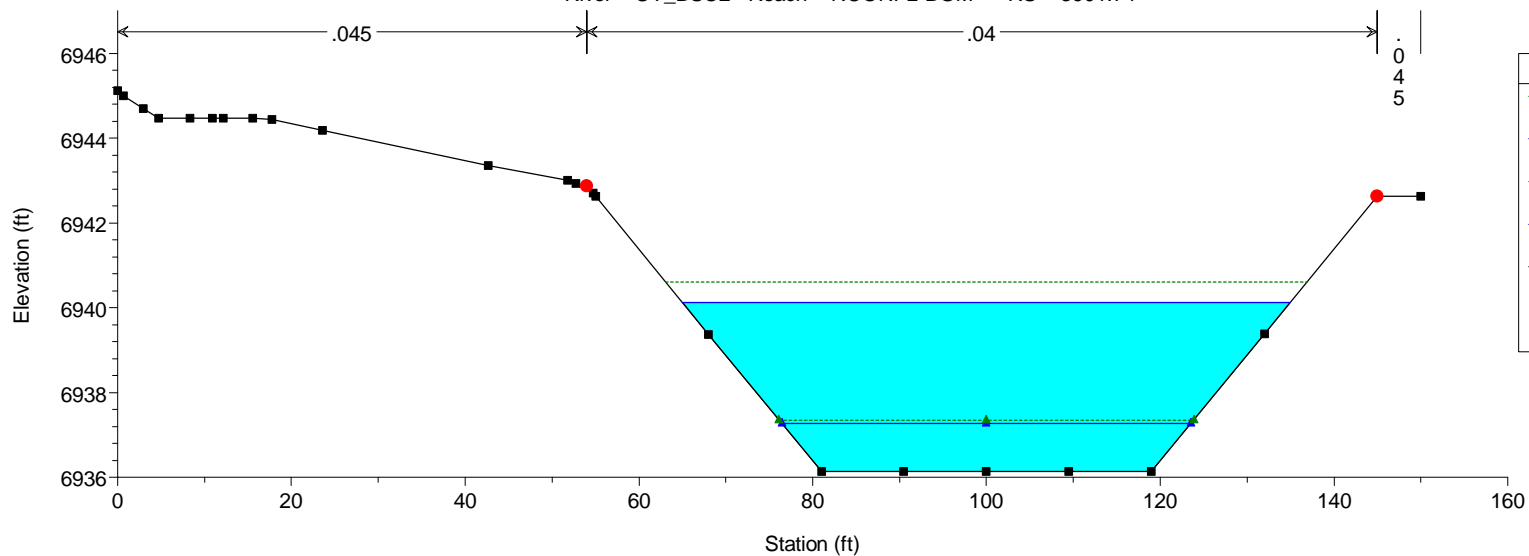
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3951.77



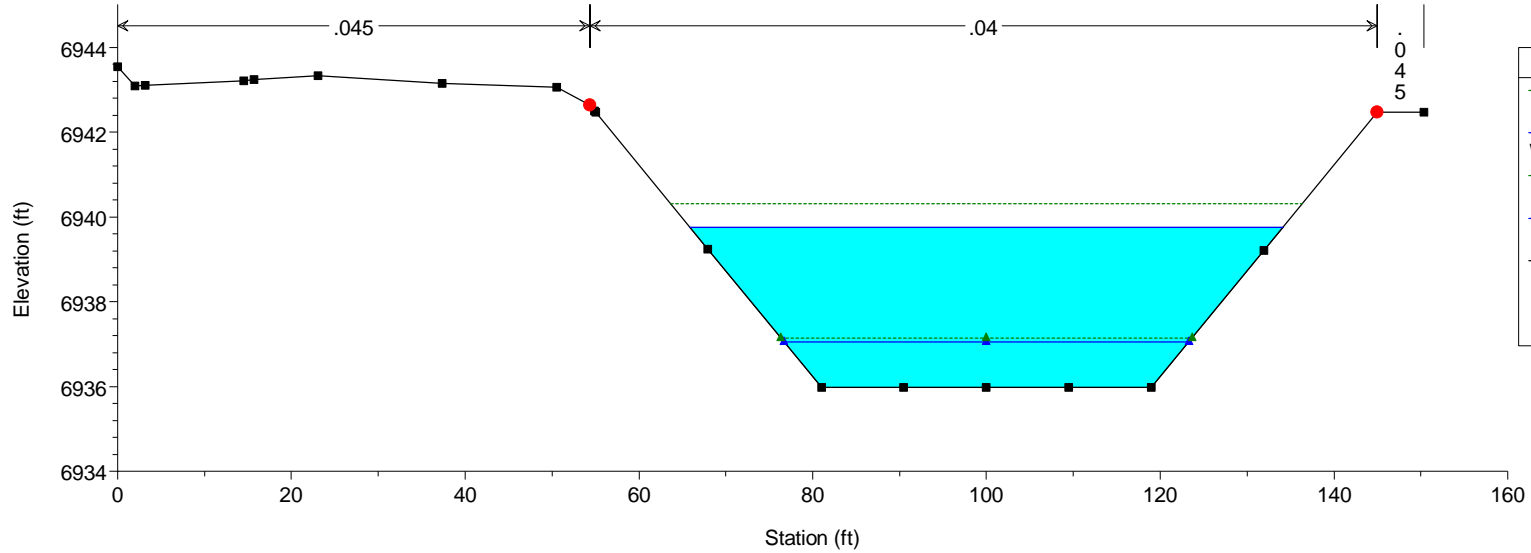
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3901.74



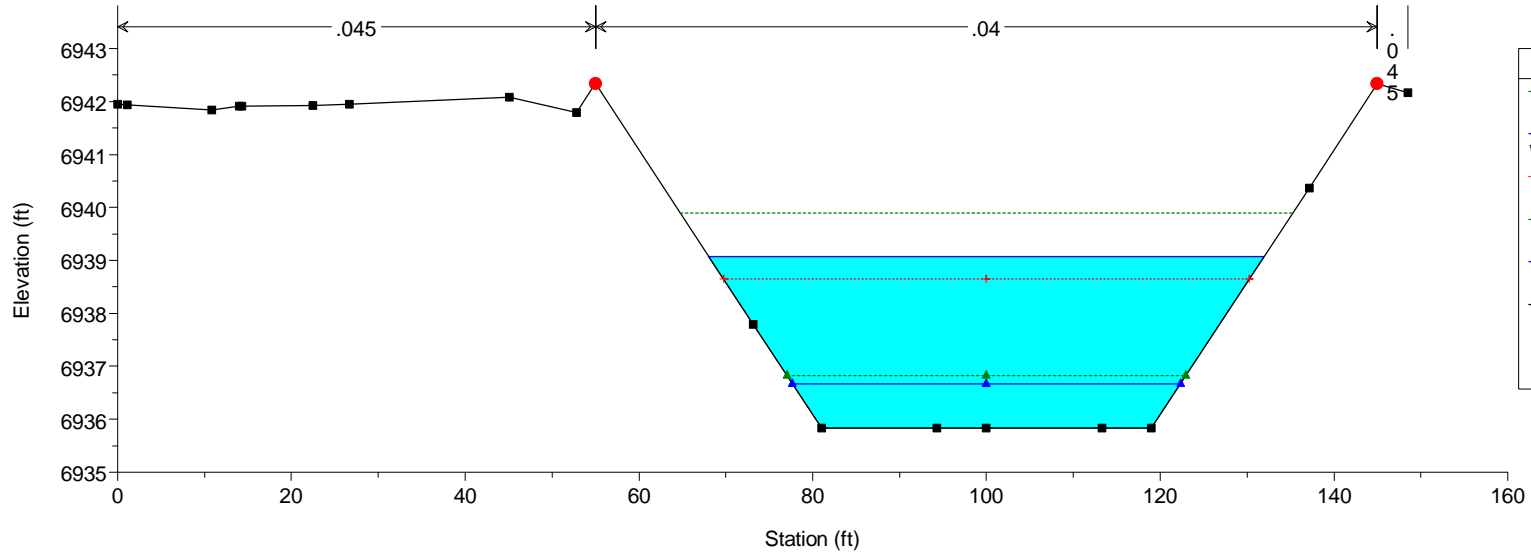
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3851.71



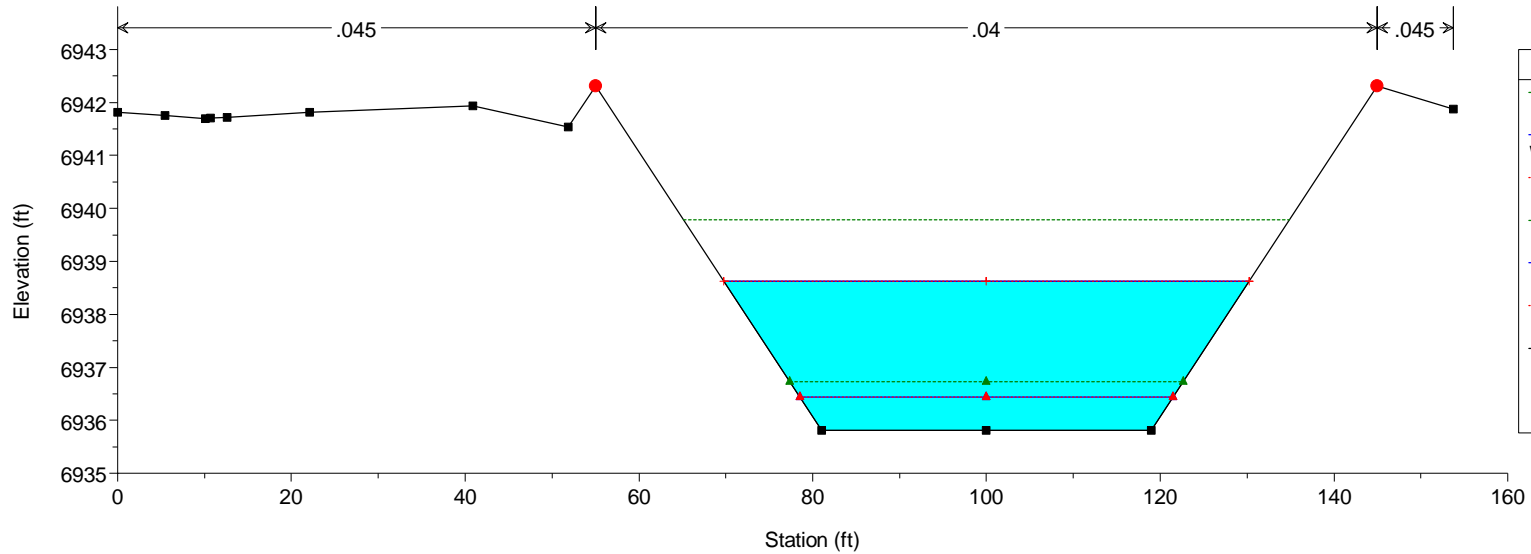
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3802.7



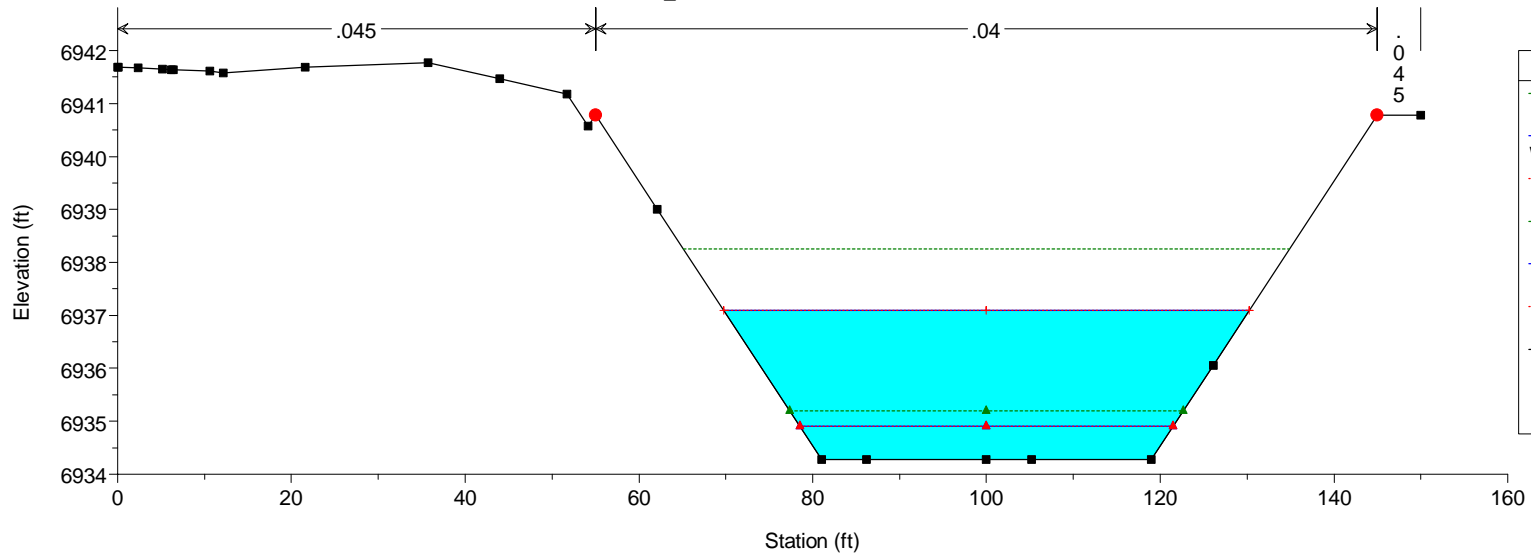
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3797.7



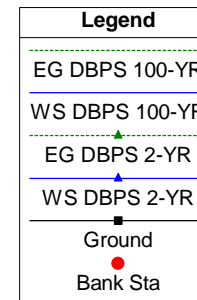
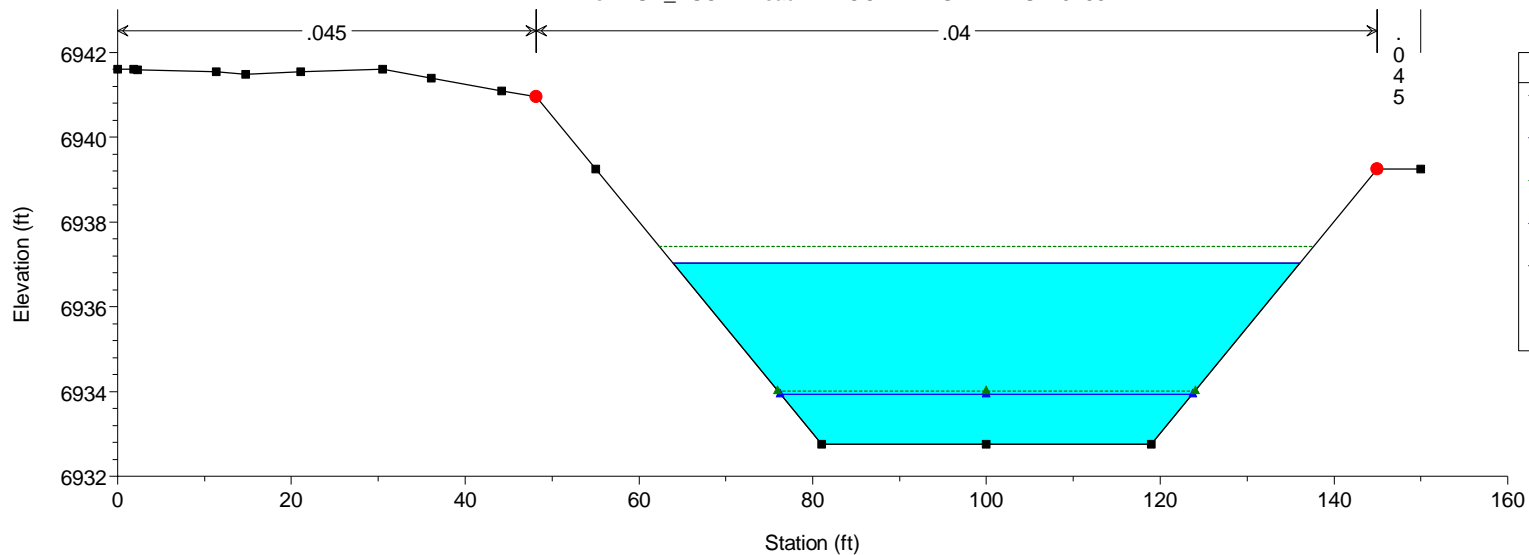
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3791.57



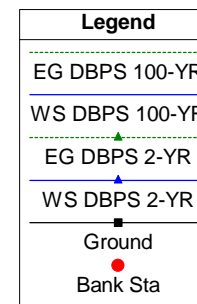
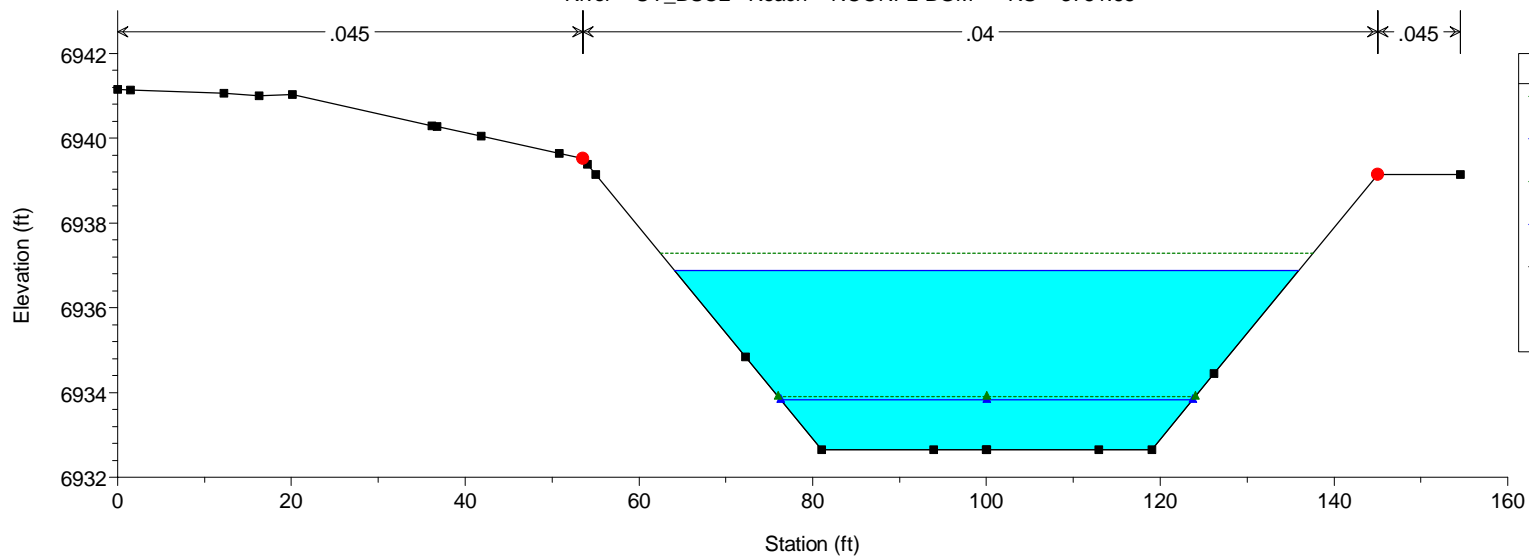
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3785.44



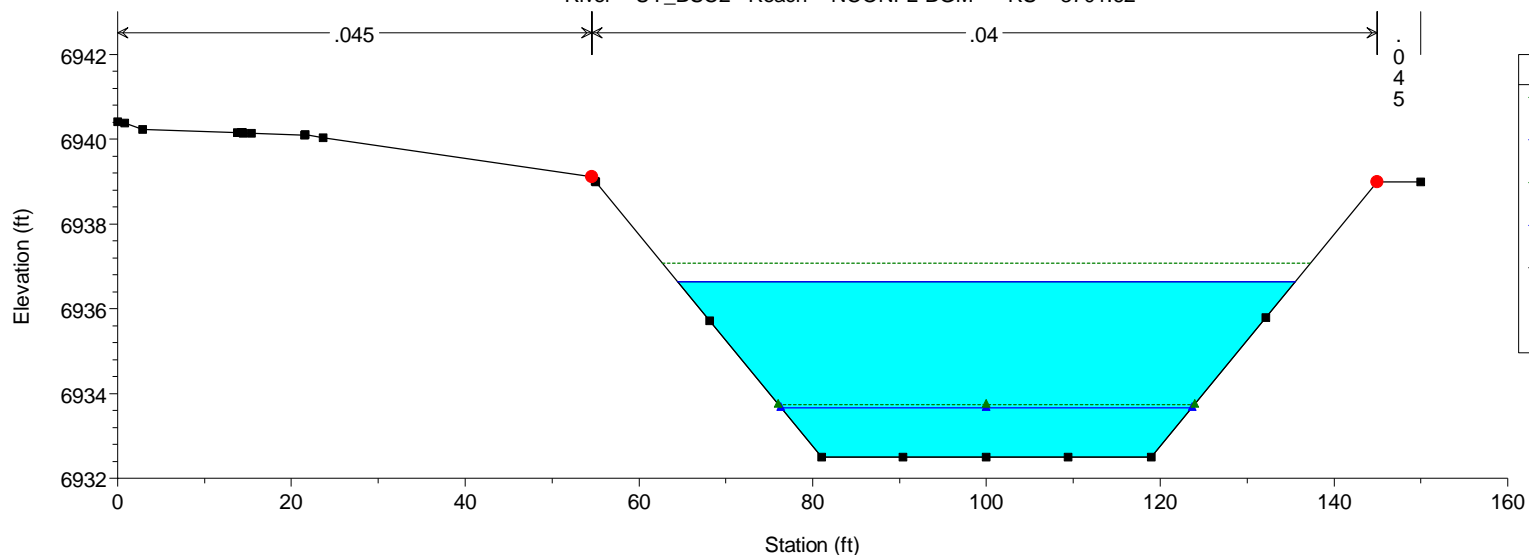
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3751.65



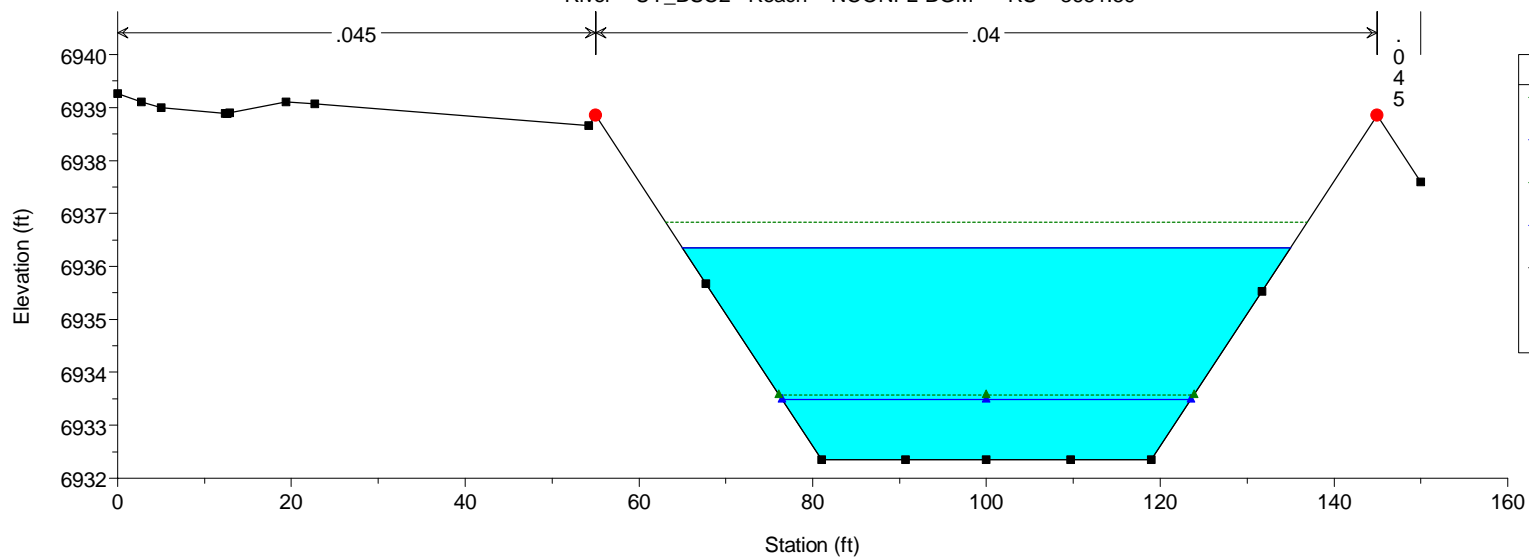
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3701.62



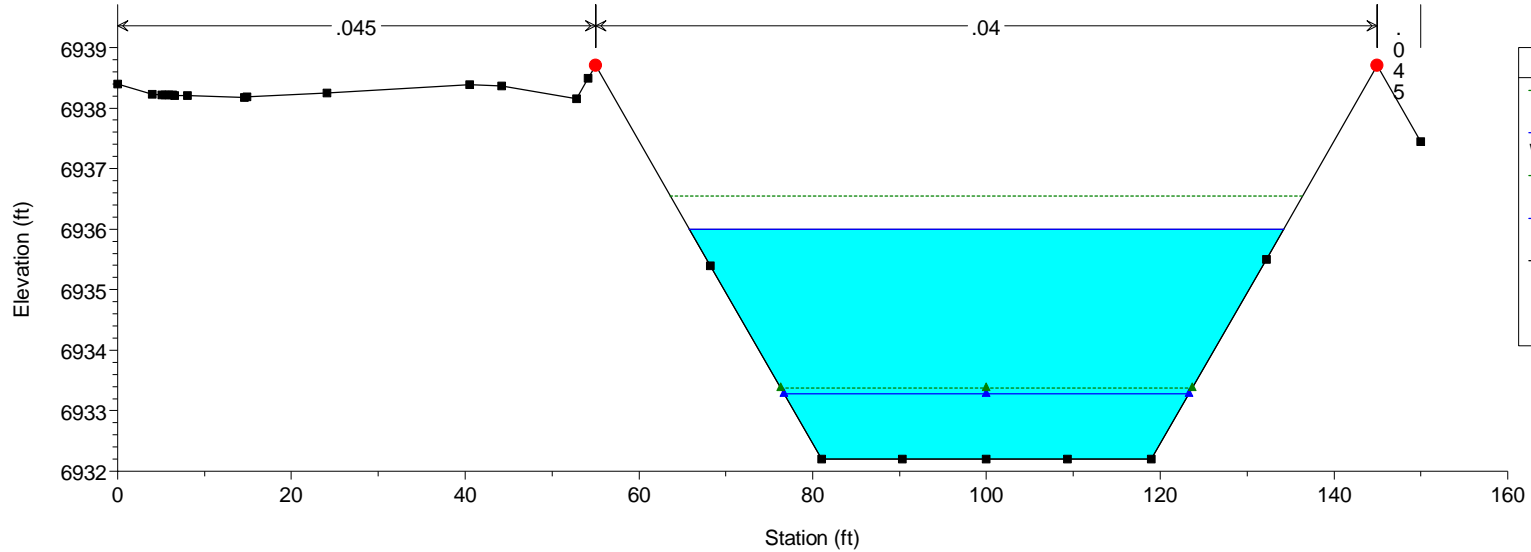
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3651.59



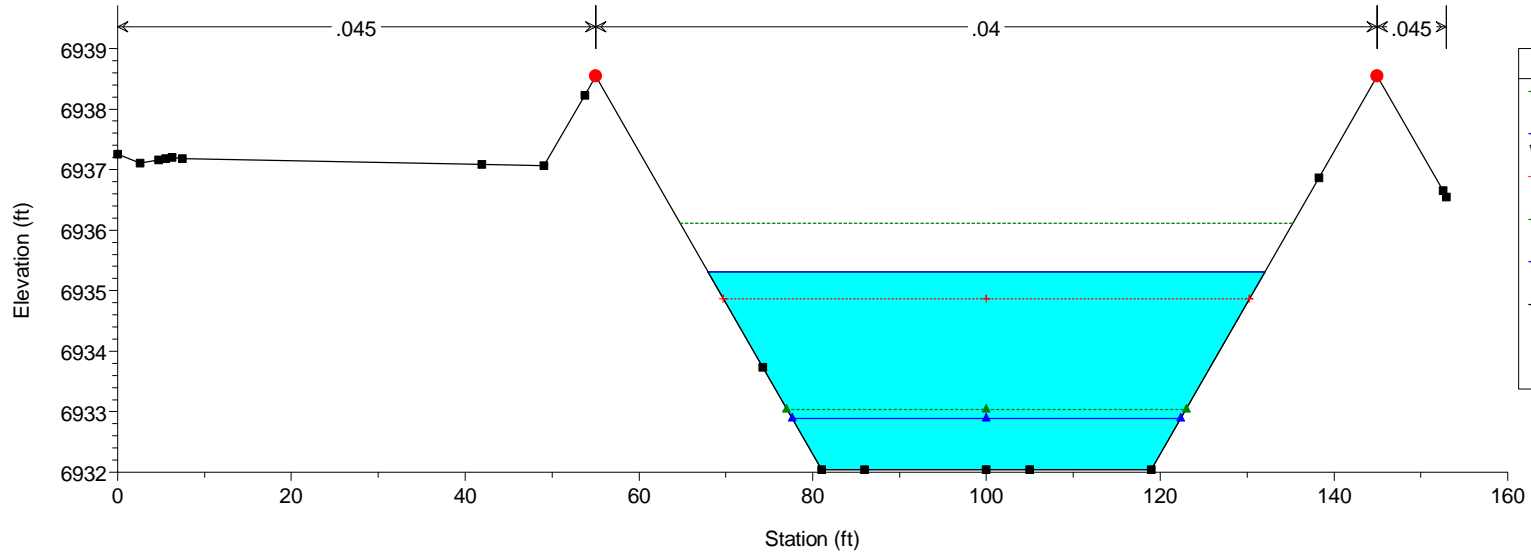
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3601.56



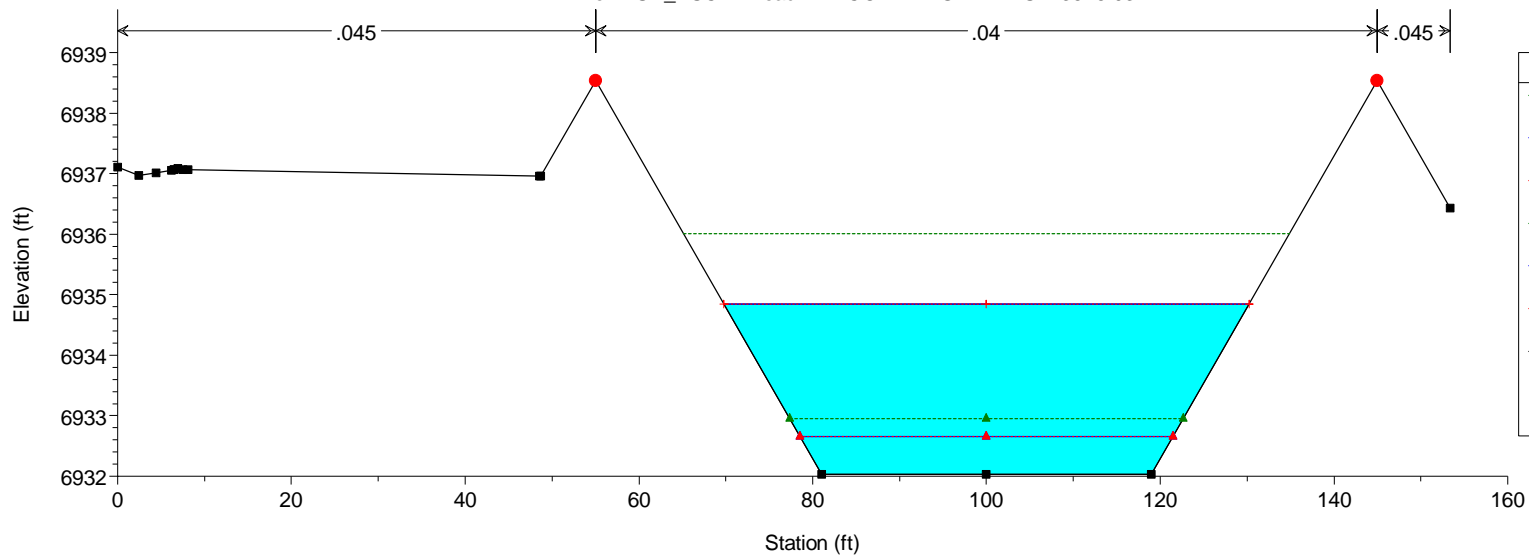
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3550.03



HEC-RAS Model Plan: Default Scenario 10/31/2019

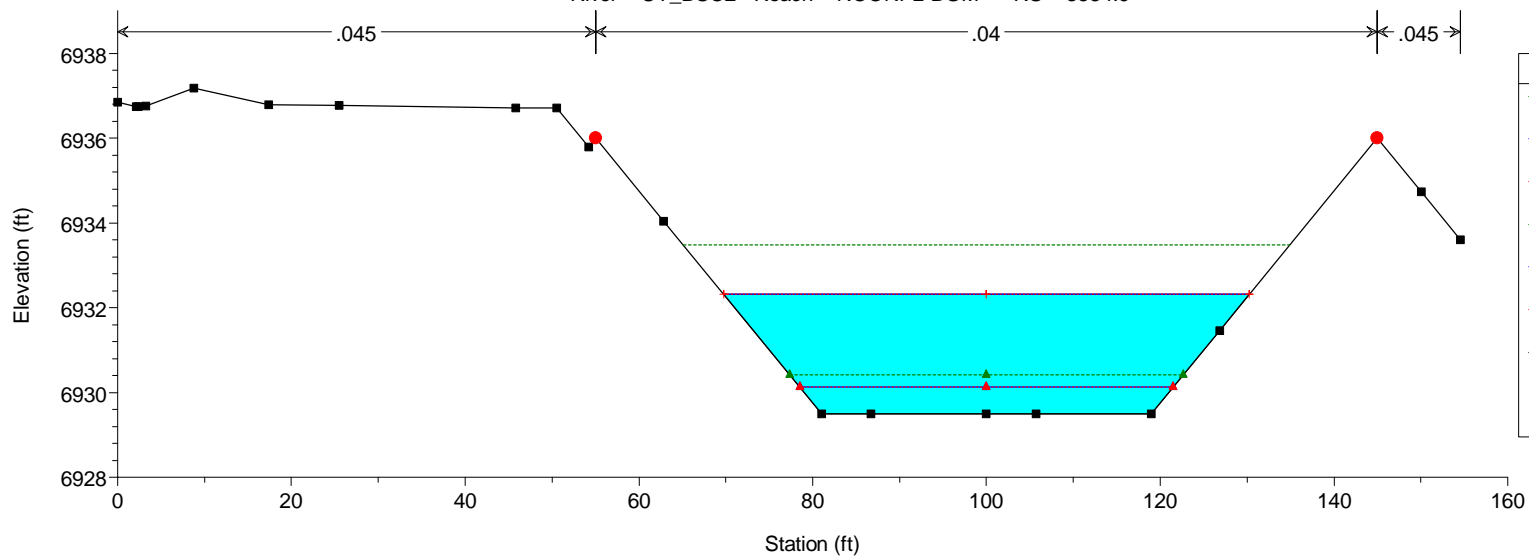
River = UT_BSC2 Reach = NCONFL-BGM RS = 3545.03



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

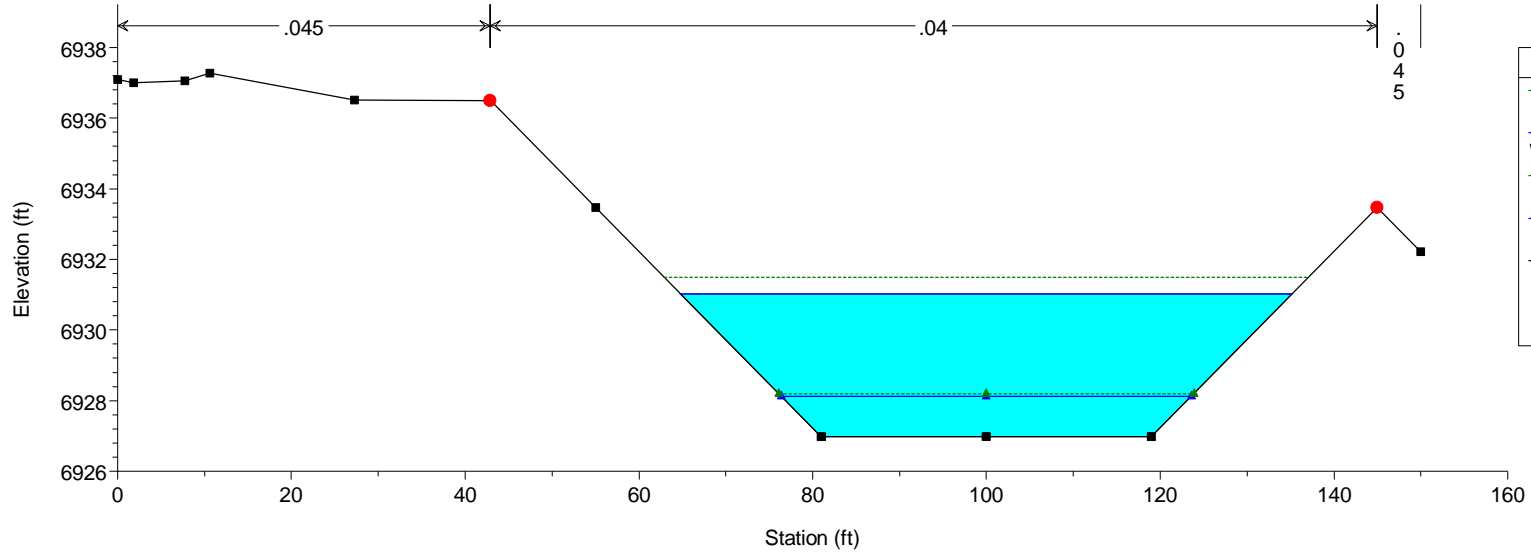
River = UT_BSC2 Reach = NCONFL-BGM RS = 3534.9



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

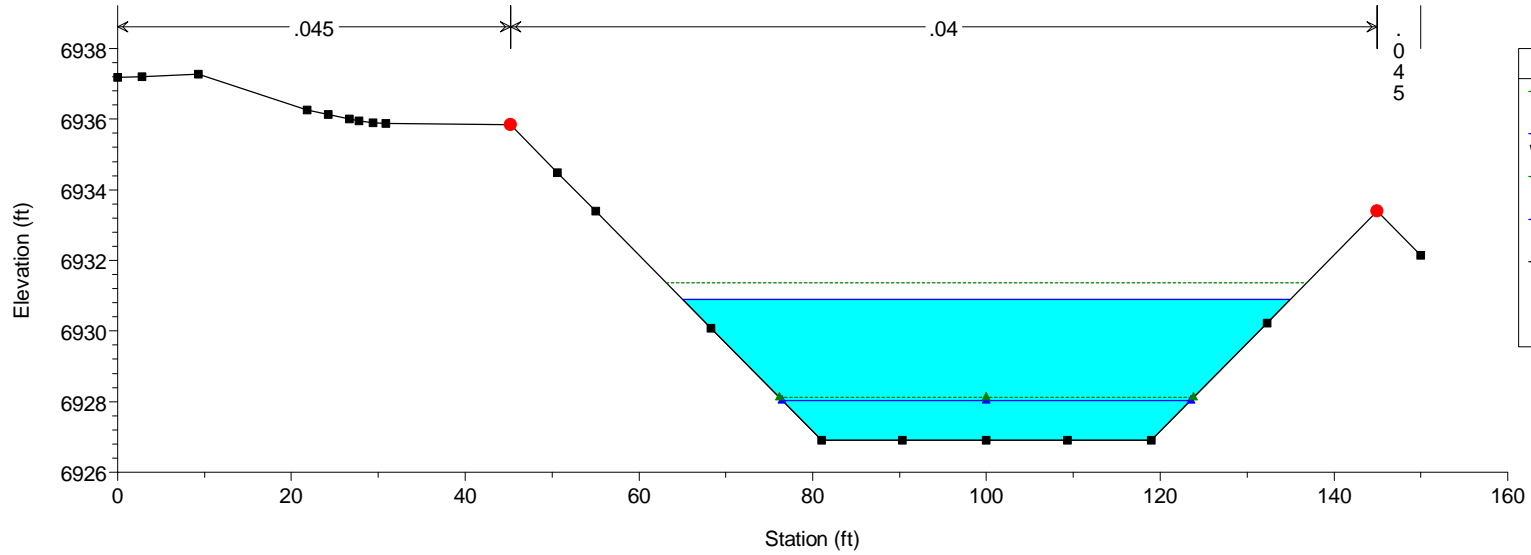
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3524.78



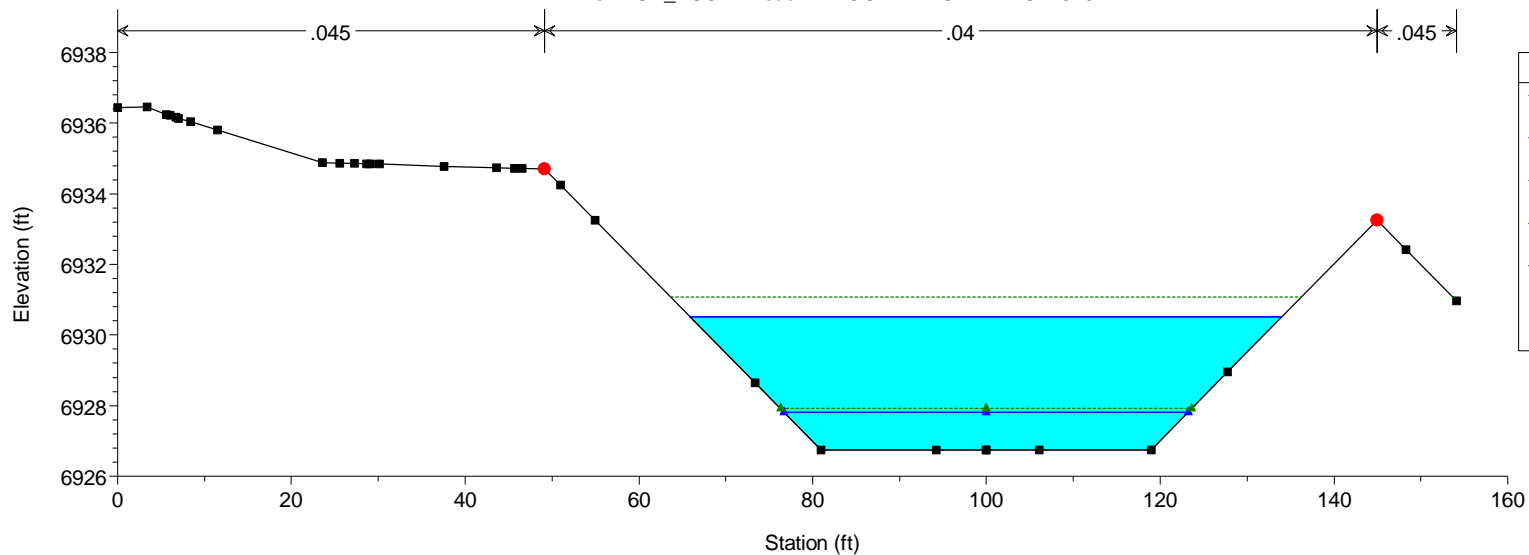
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3501.5



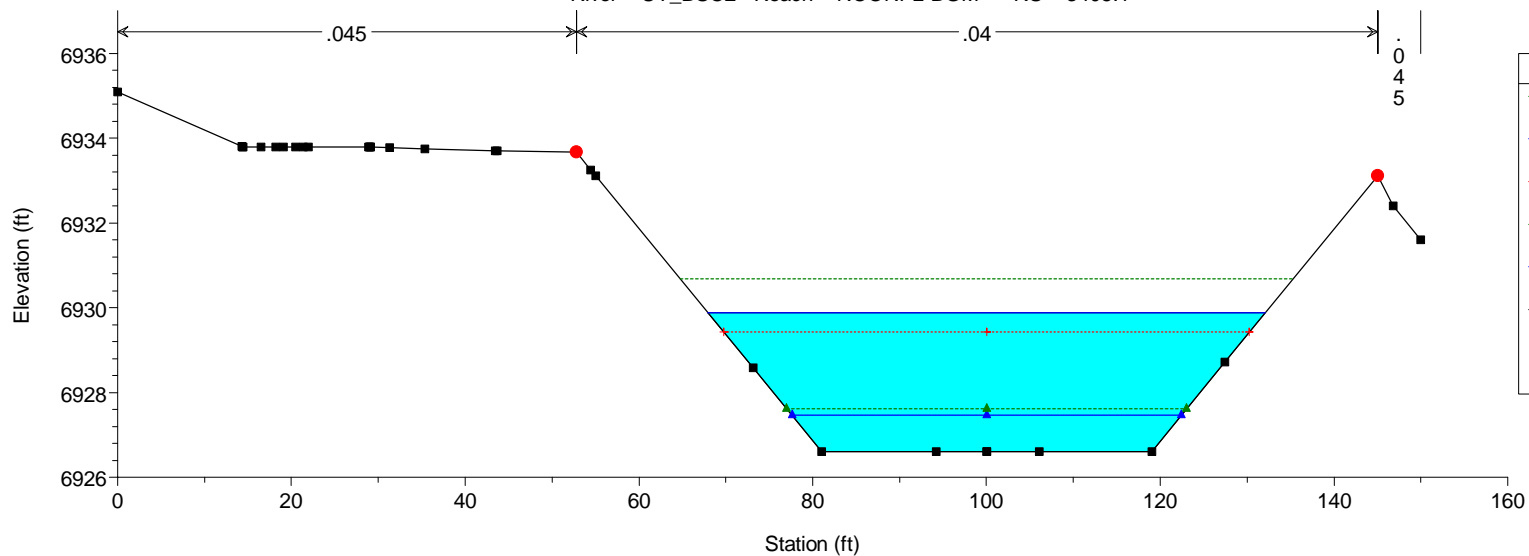
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3451.47



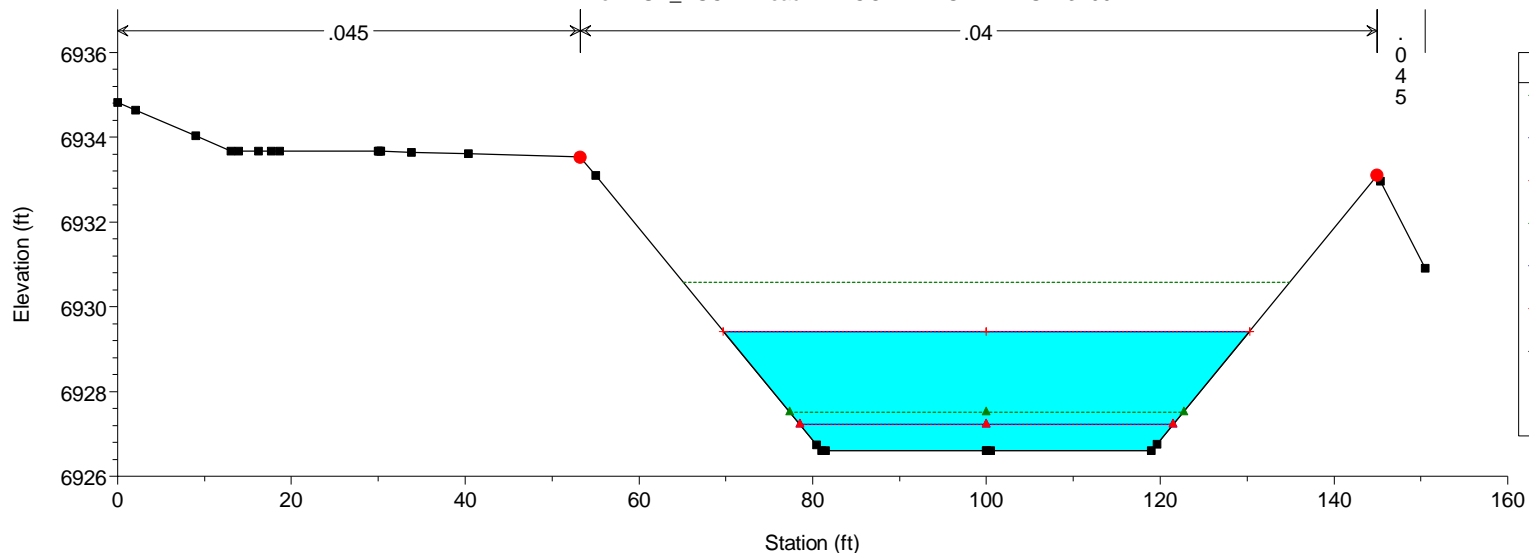
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3405.1



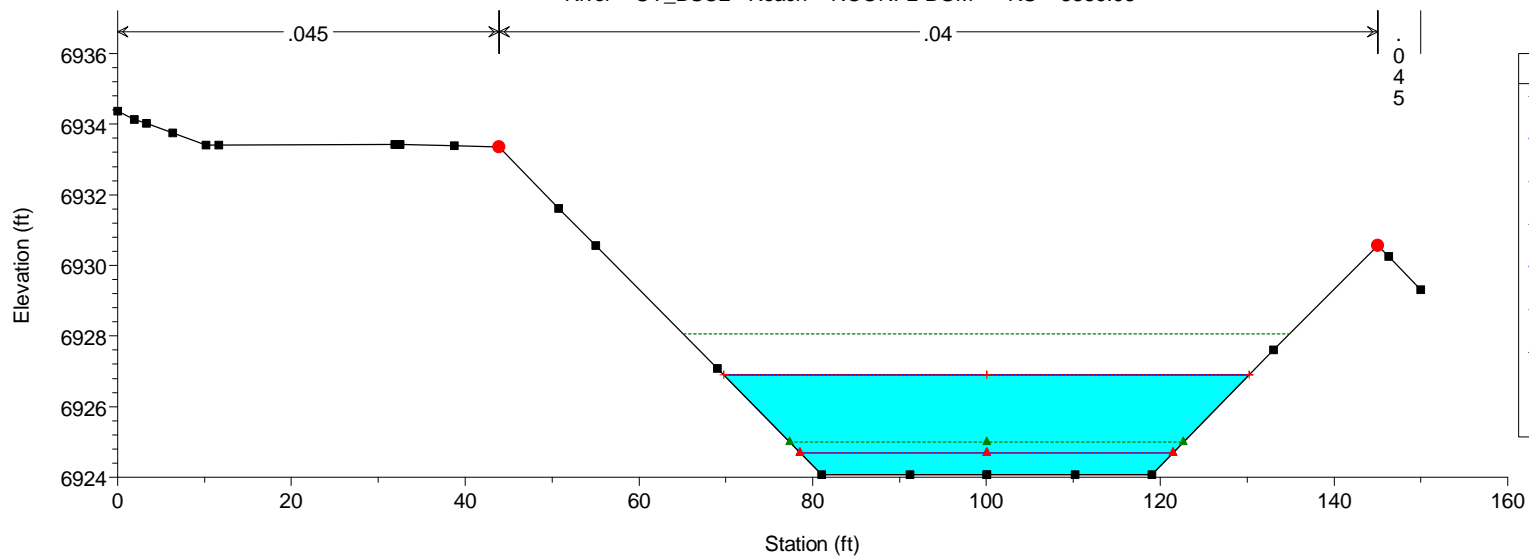
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3400.1



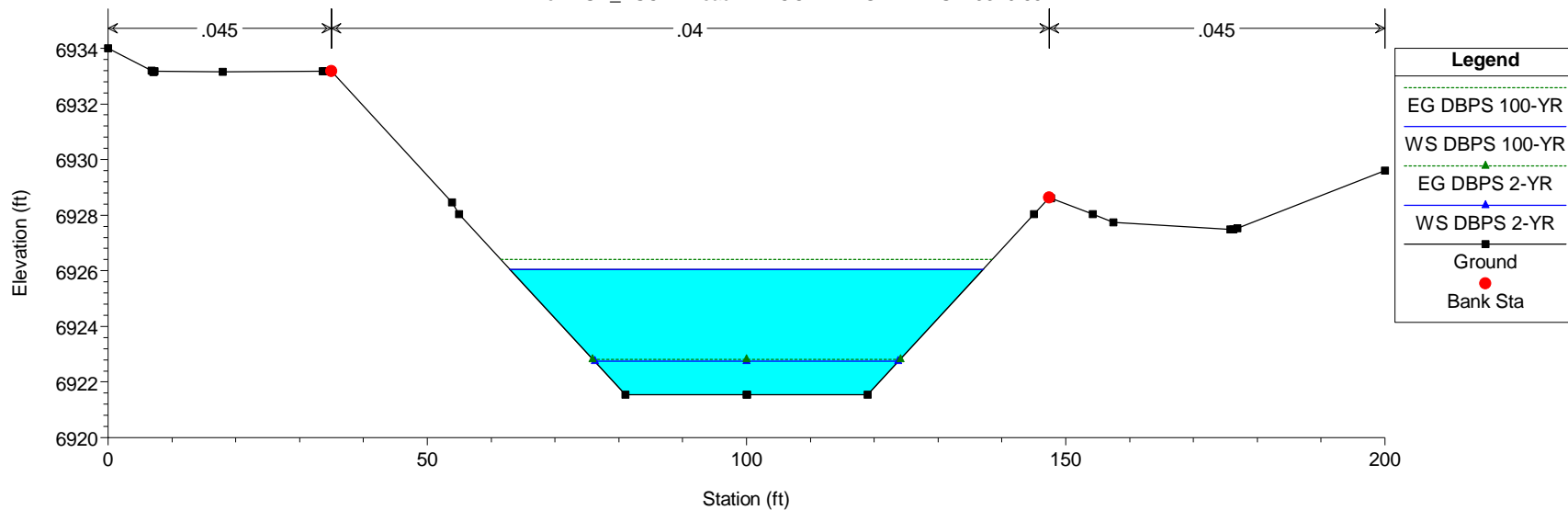
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3389.98



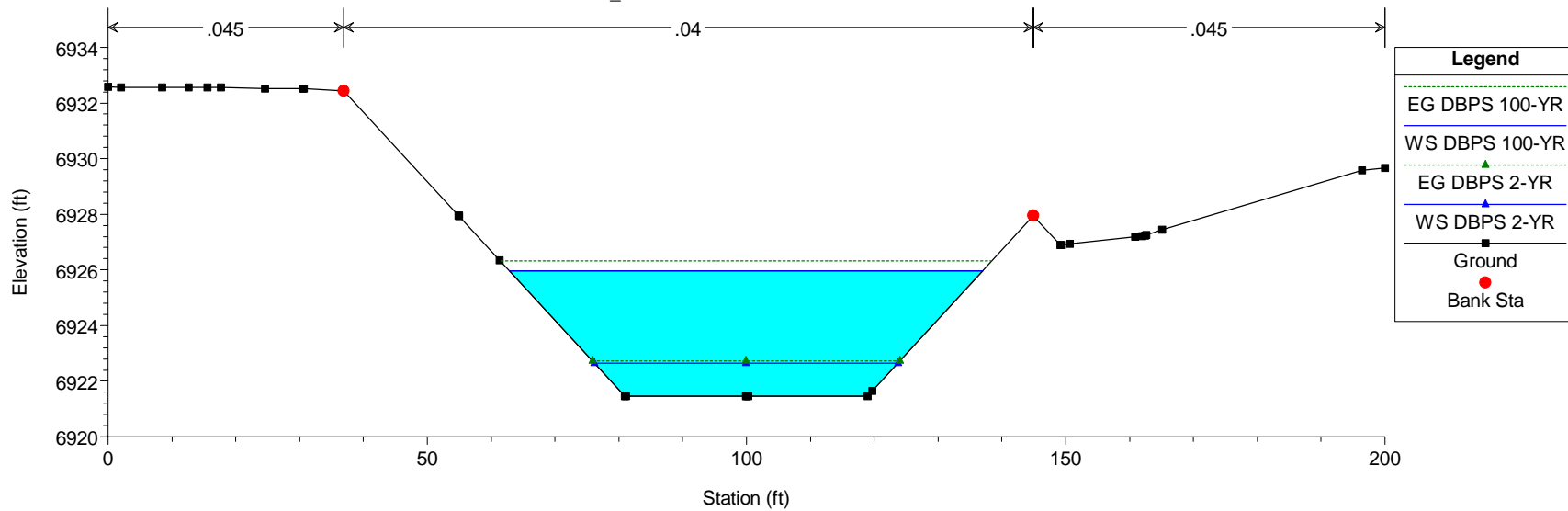
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3379.85



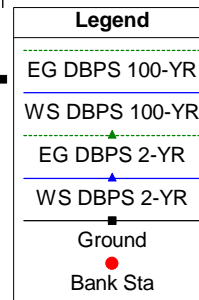
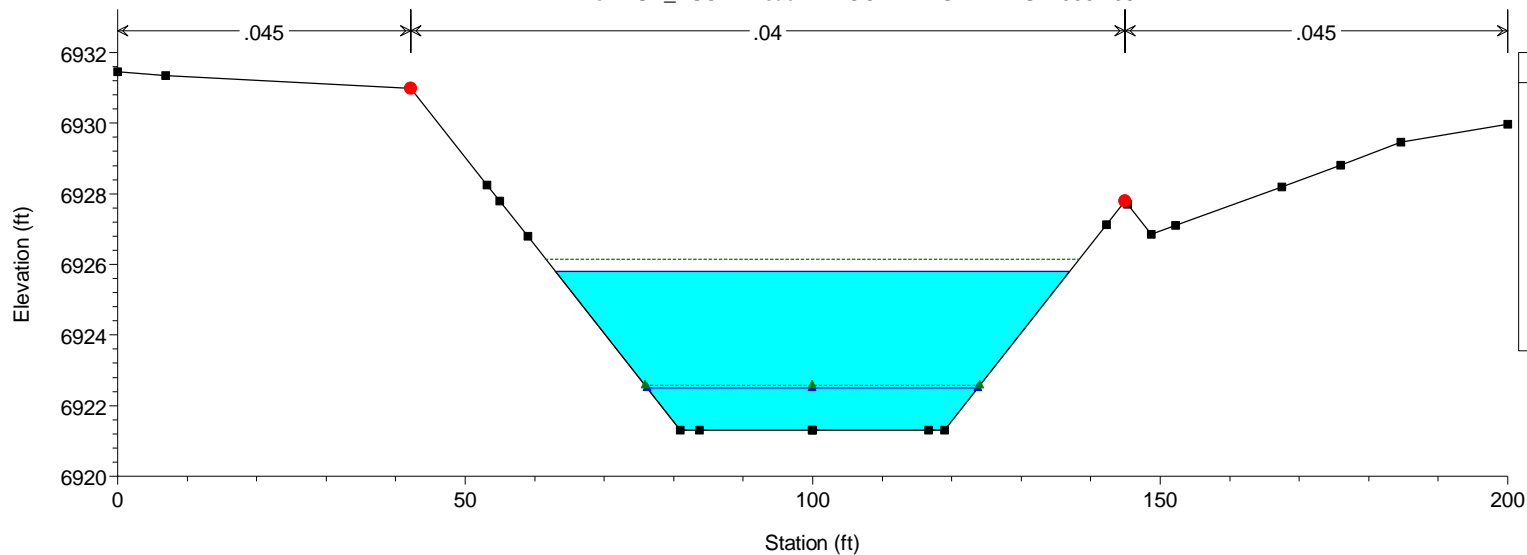
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3351.41



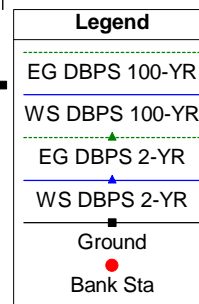
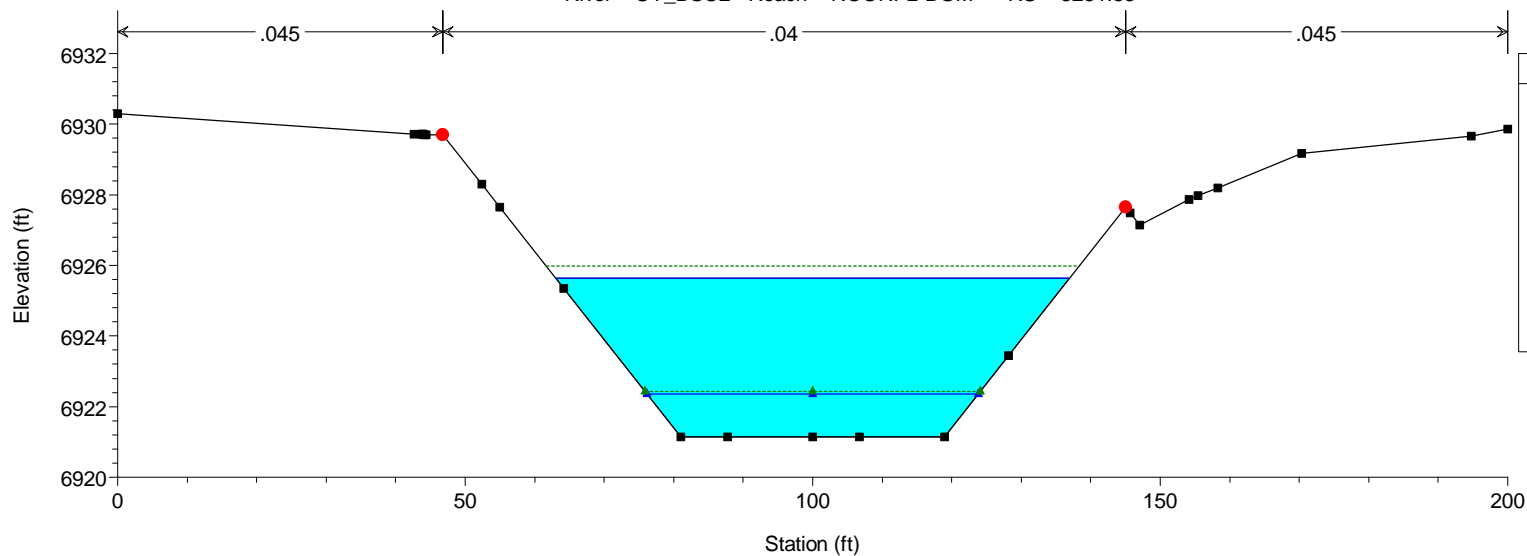
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3301.38



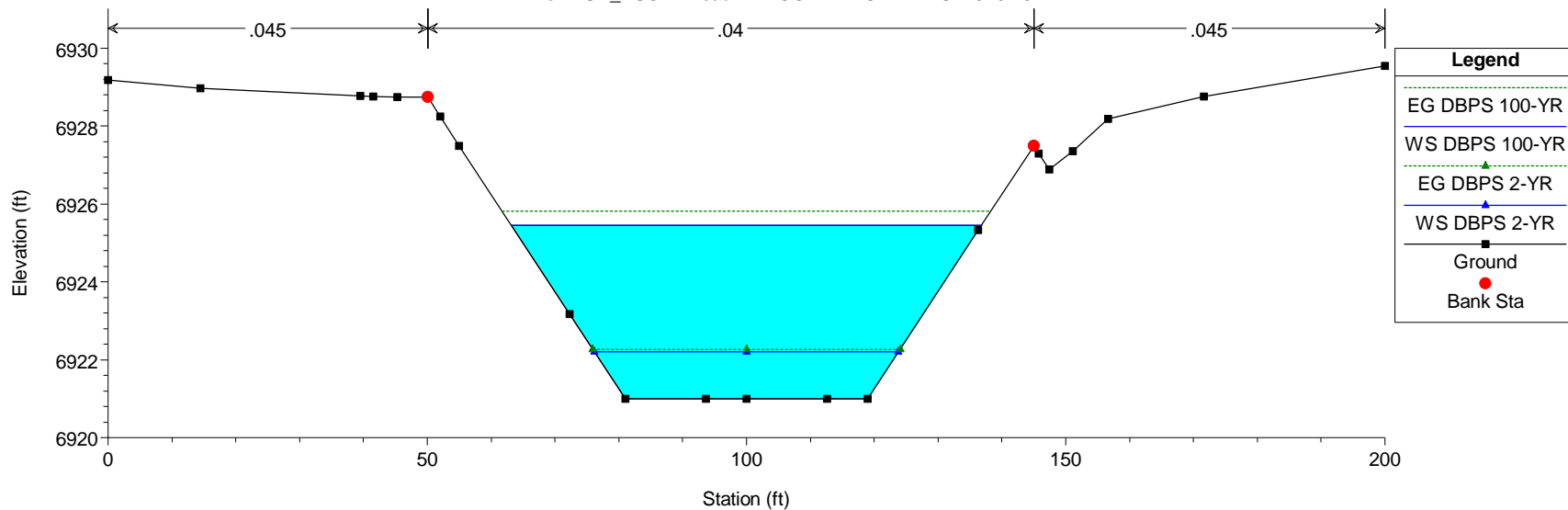
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3251.35



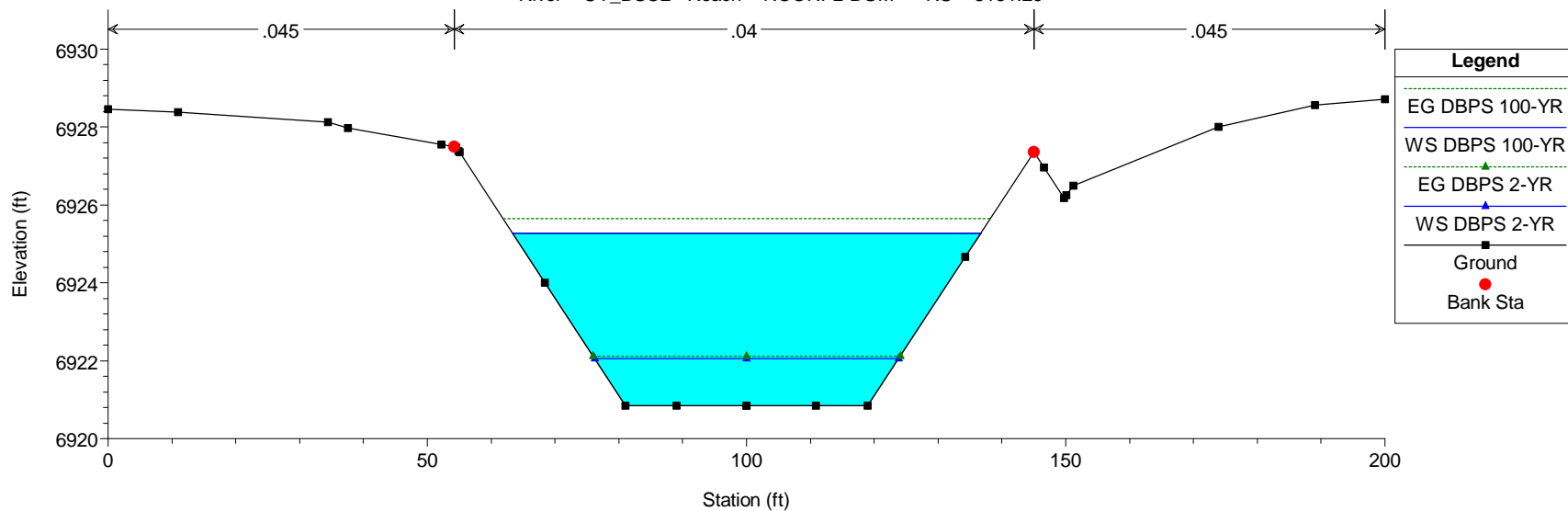
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3201.32



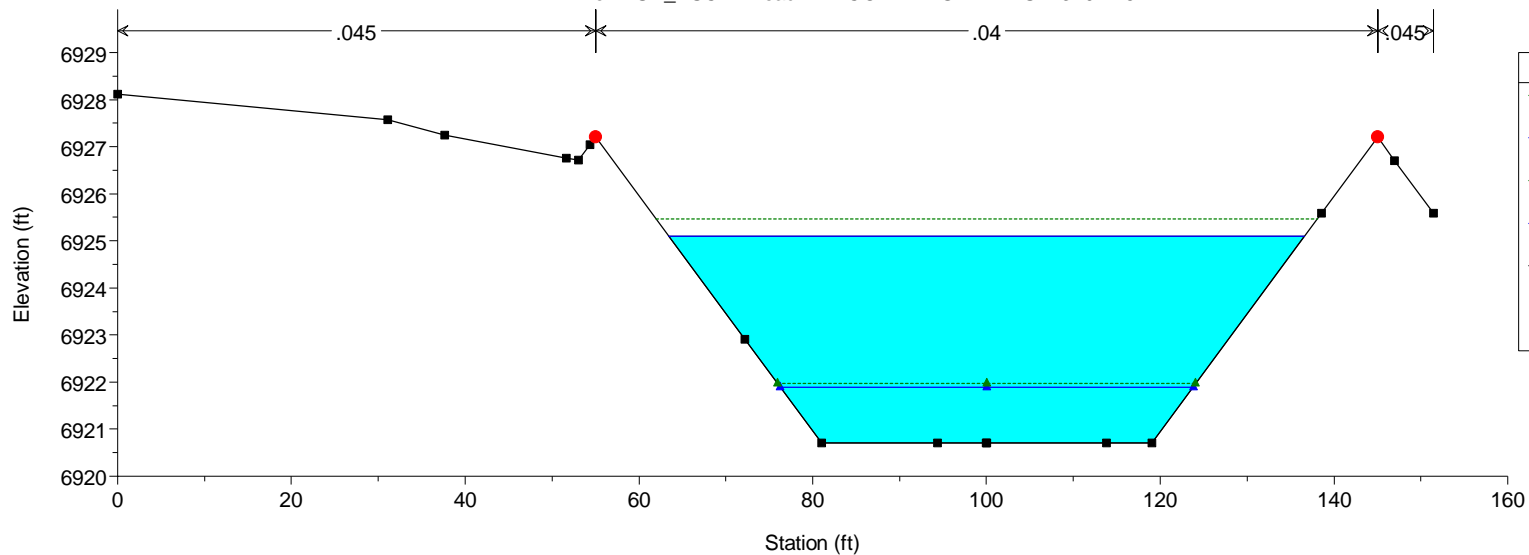
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3151.29



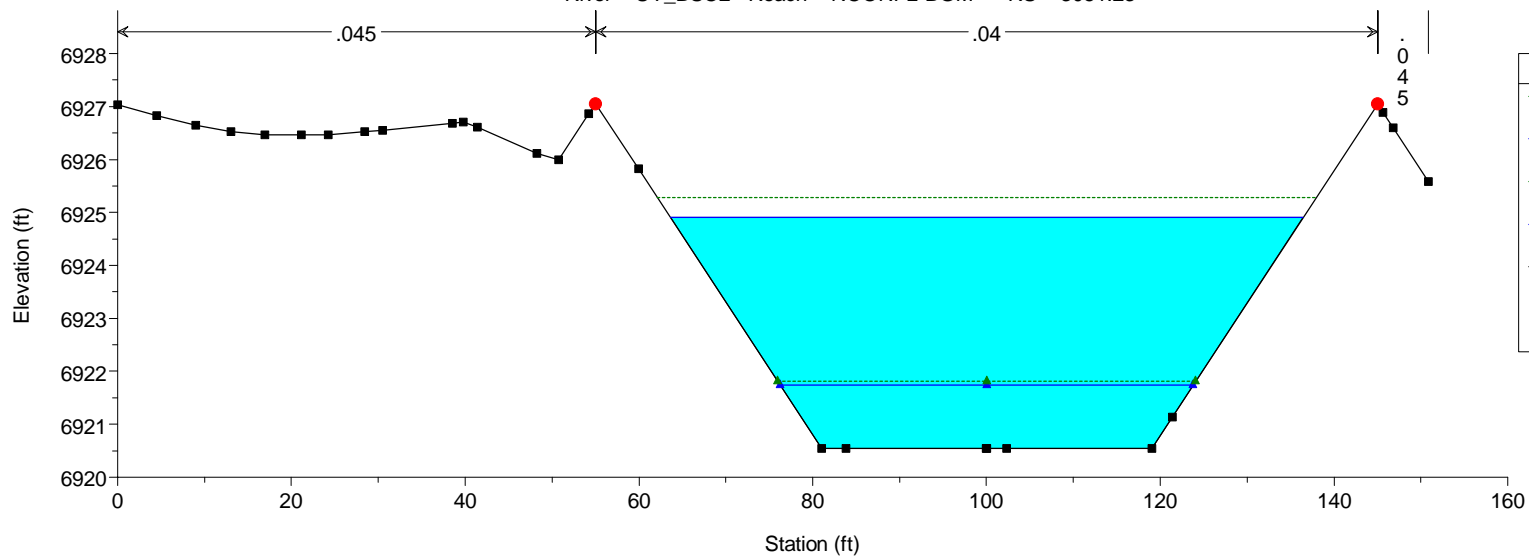
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3101.26



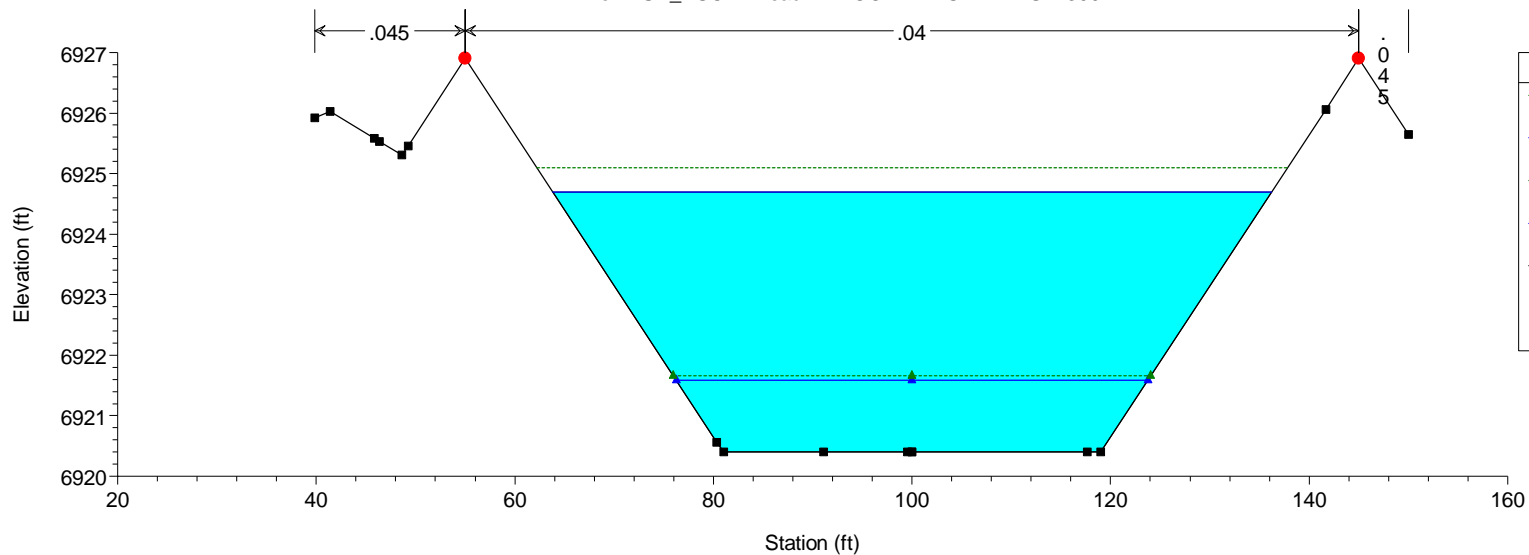
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3051.23



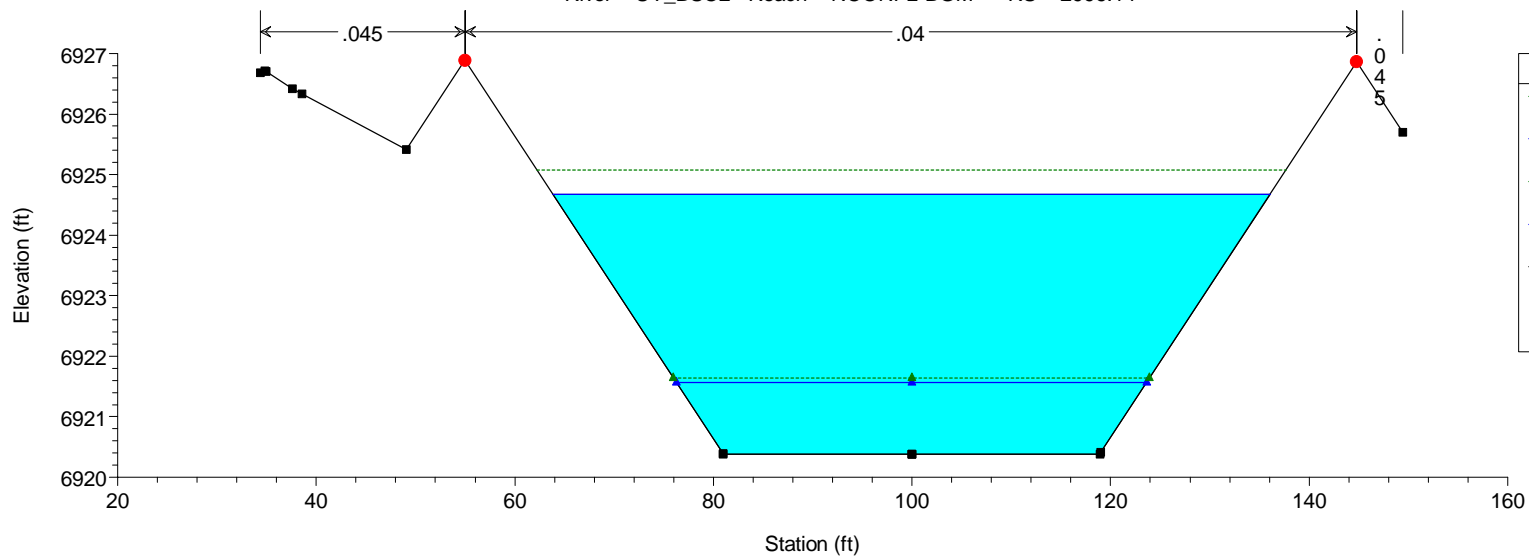
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 3001.2



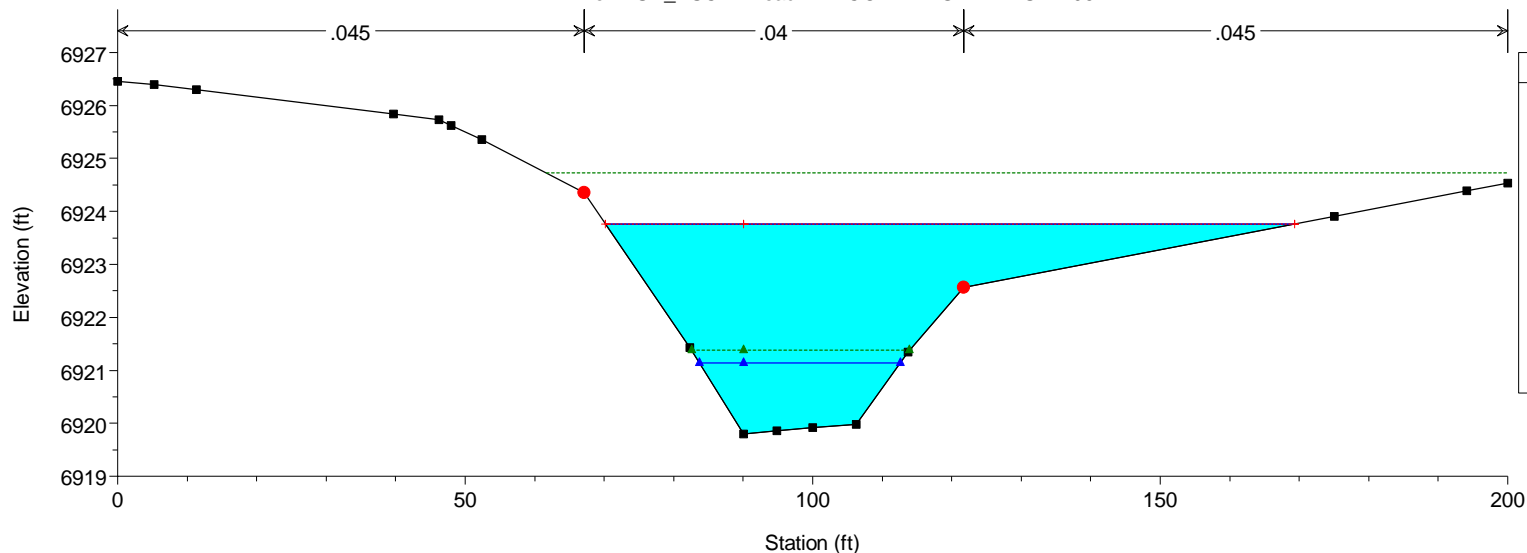
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2996.14



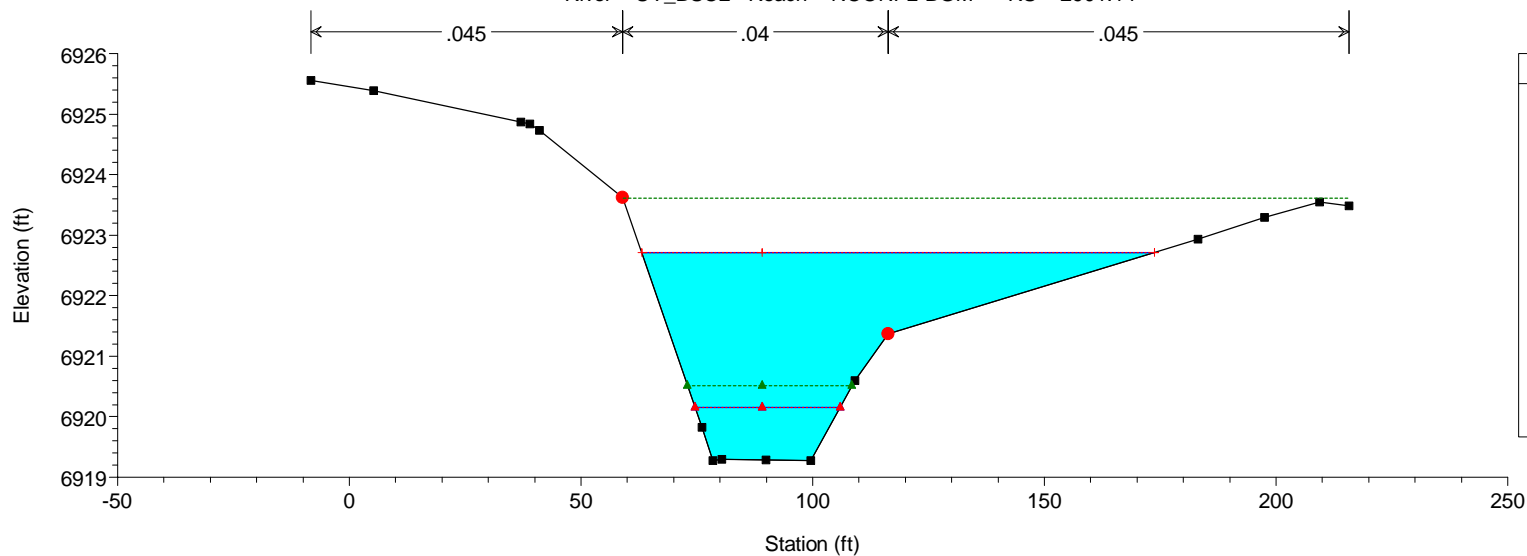
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2951.17



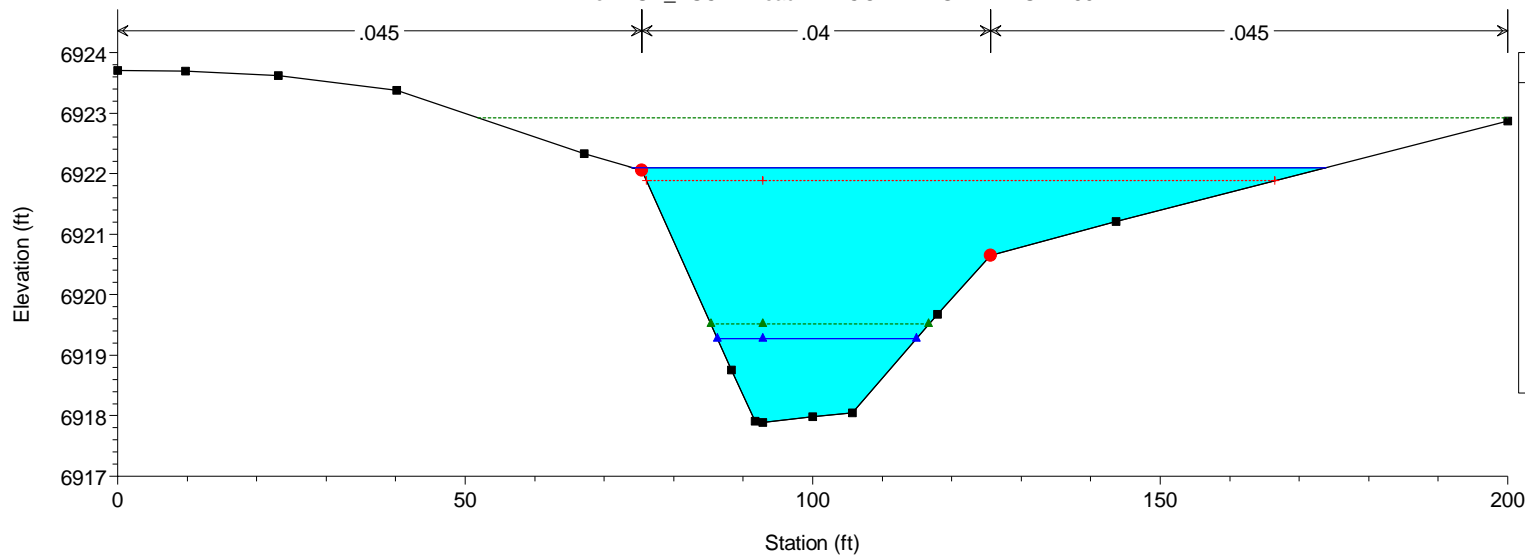
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2901.14



HEC-RAS Model Plan: Default Scenario 10/31/2019

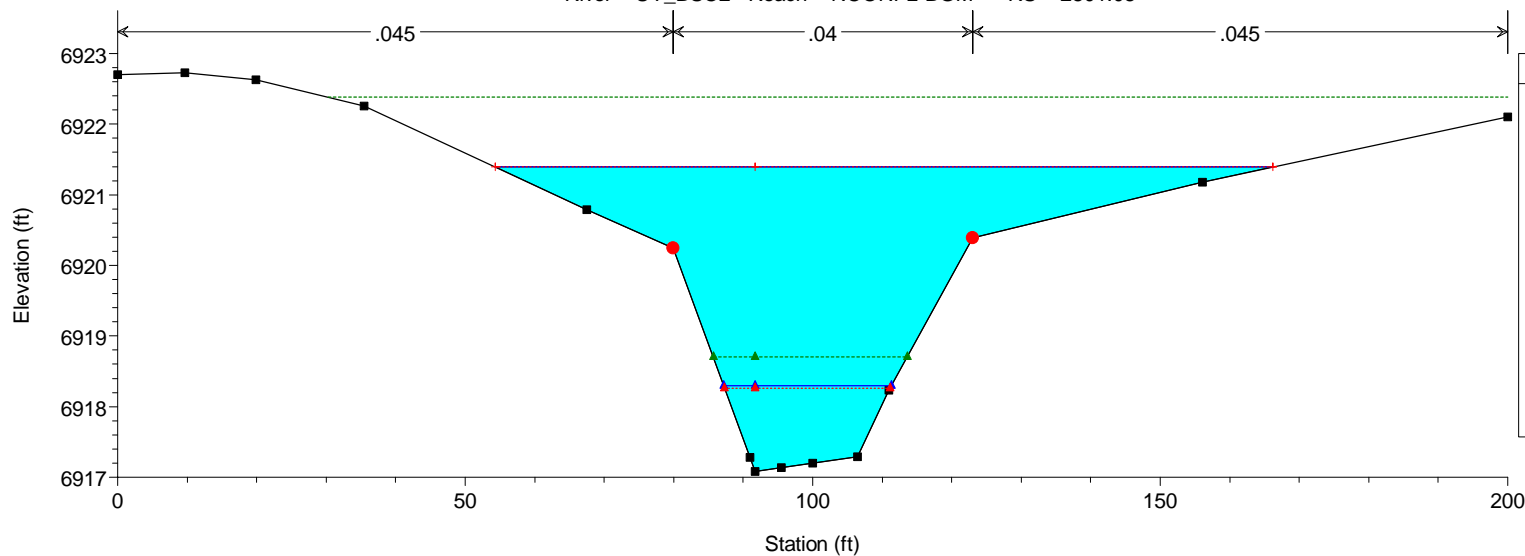
River = UT_BSC2 Reach = NCONFL-BGM RS = 2851.11



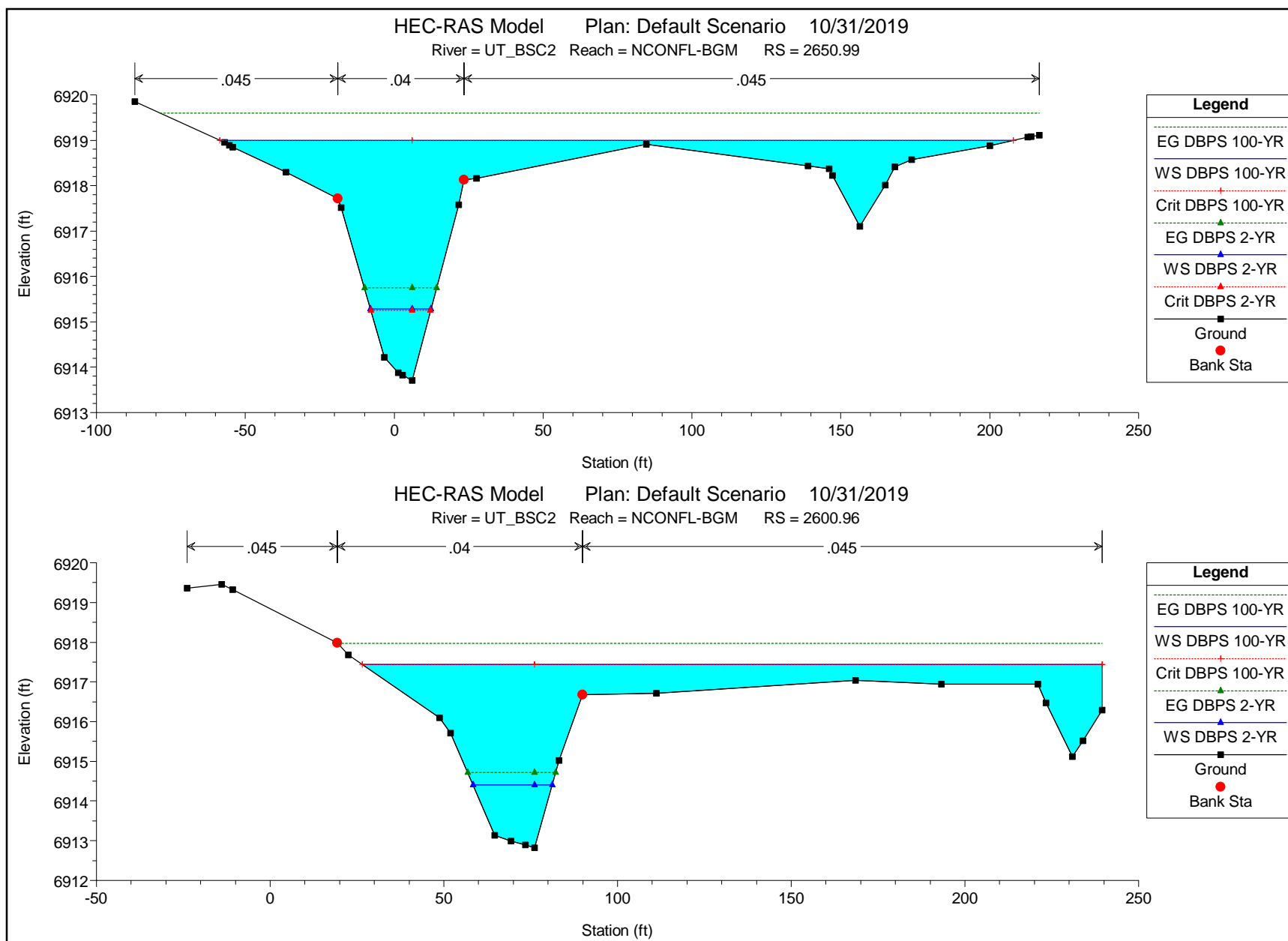
Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2801.08

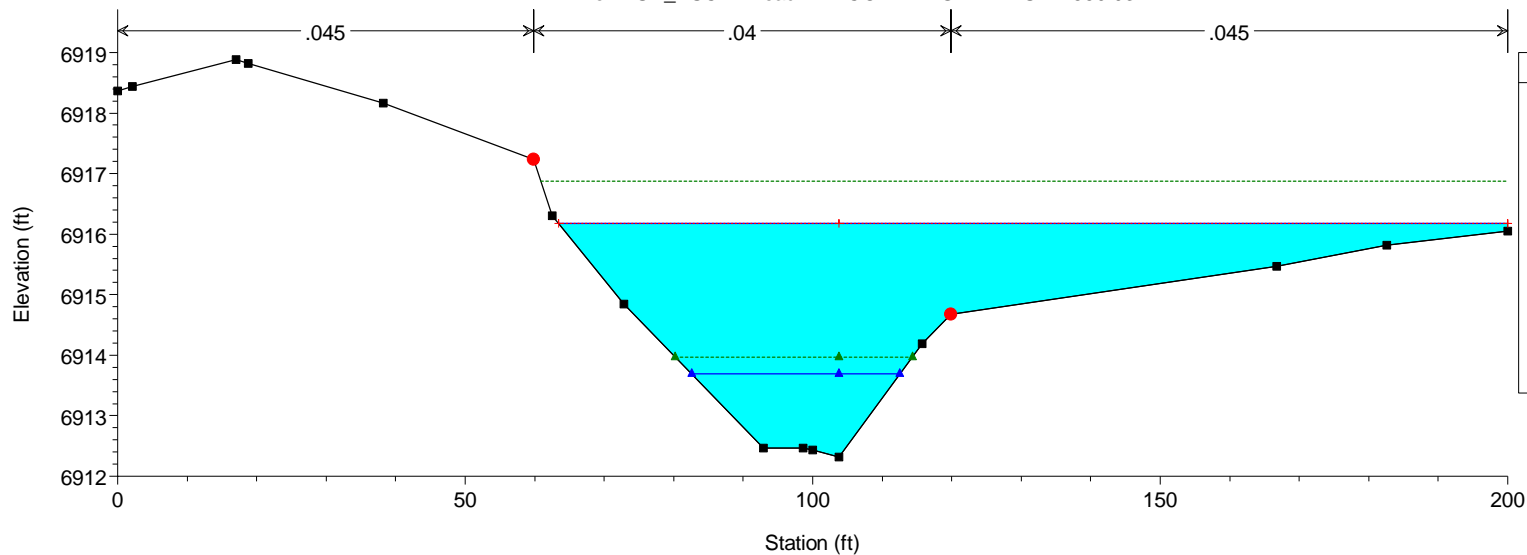


Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	



HEC-RAS Model Plan: Default Scenario 10/31/2019

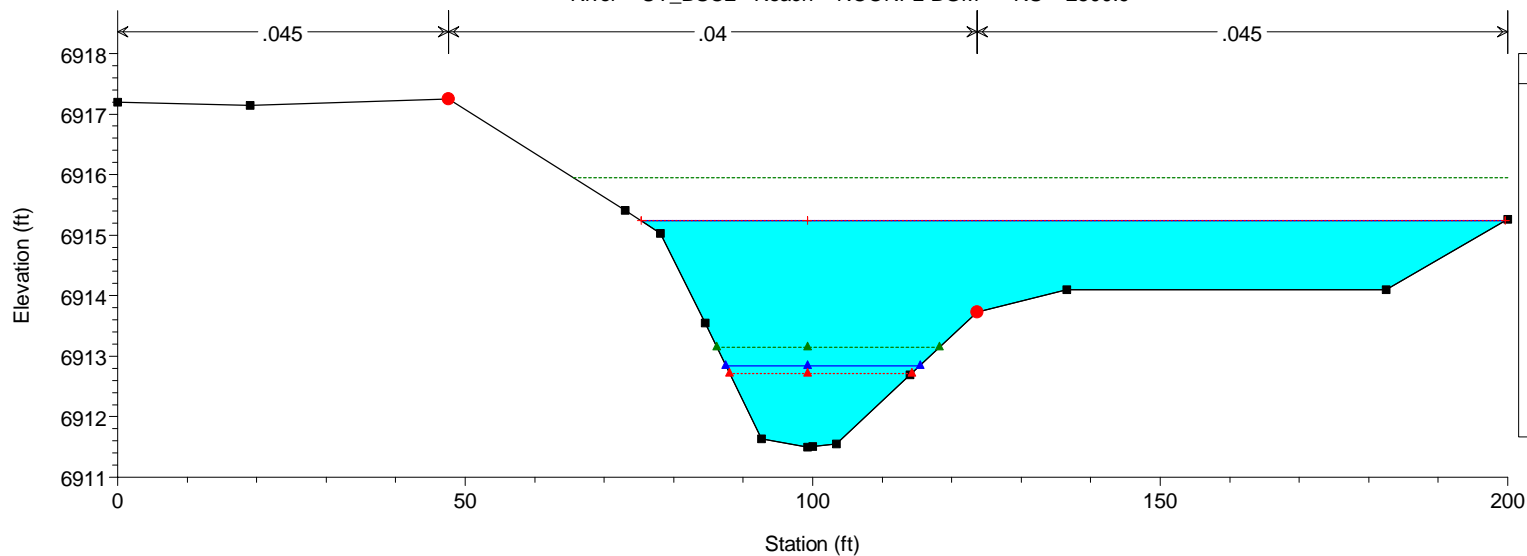
River = UT_BSC2 Reach = NCONFL-BGM RS = 2550.93



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

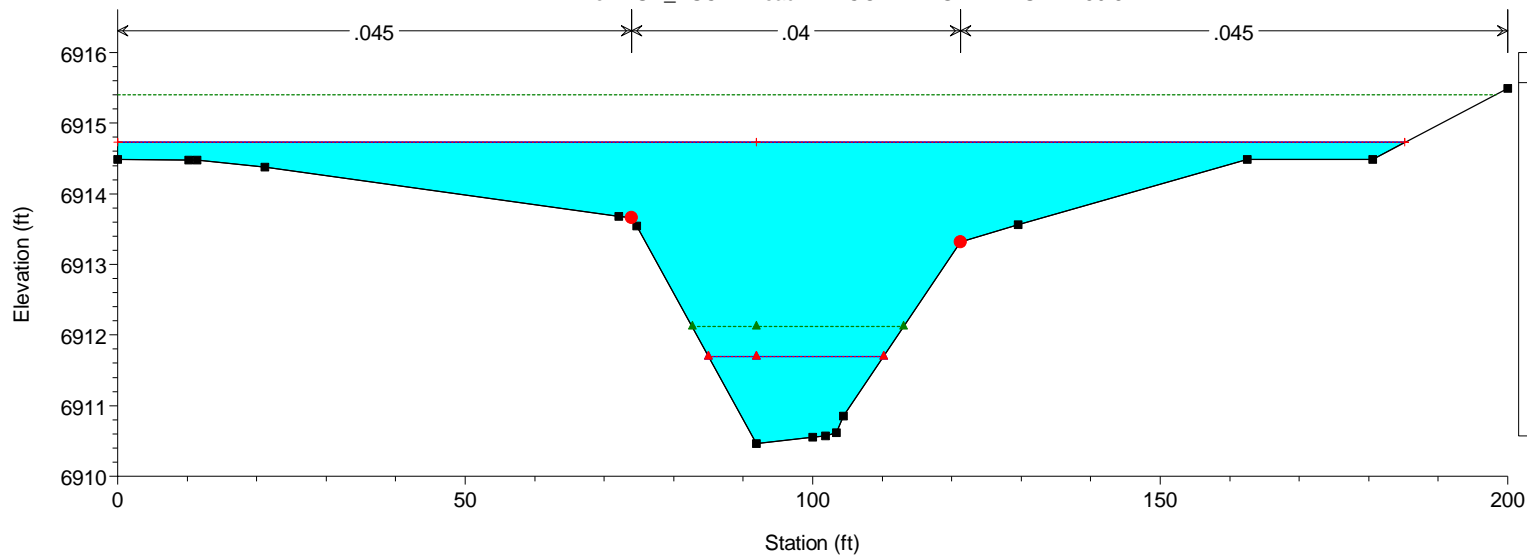
River = UT_BSC2 Reach = NCONFL-BGM RS = 2500.9



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

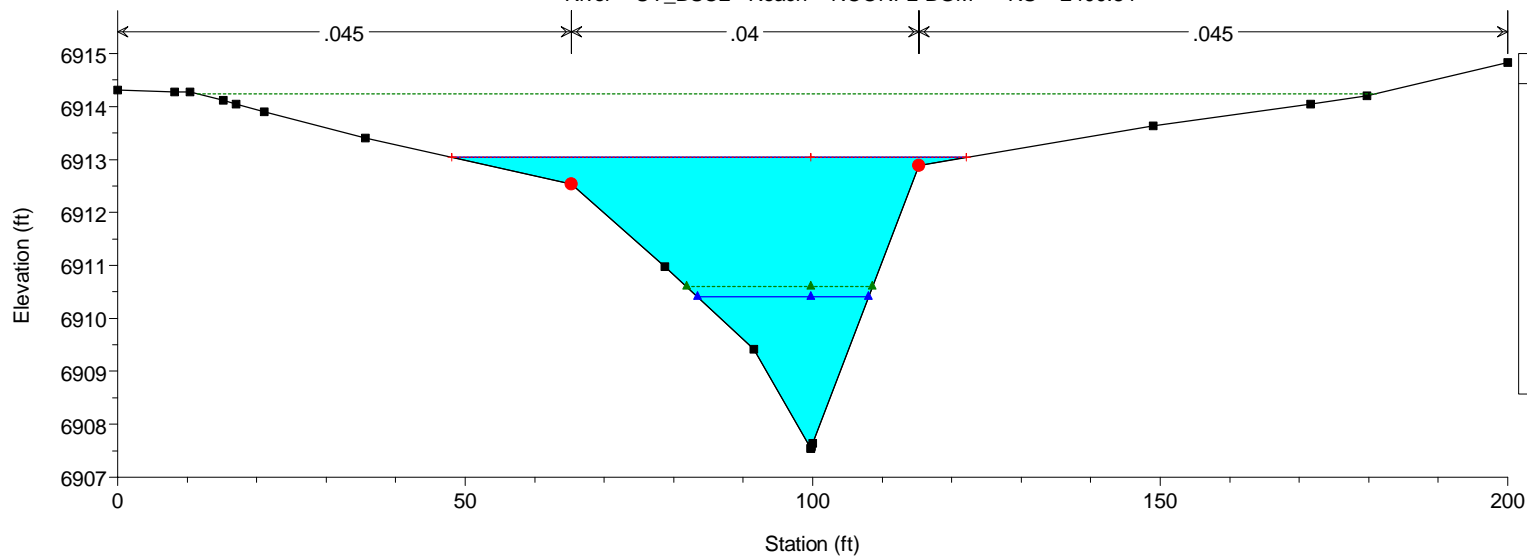
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2450.87



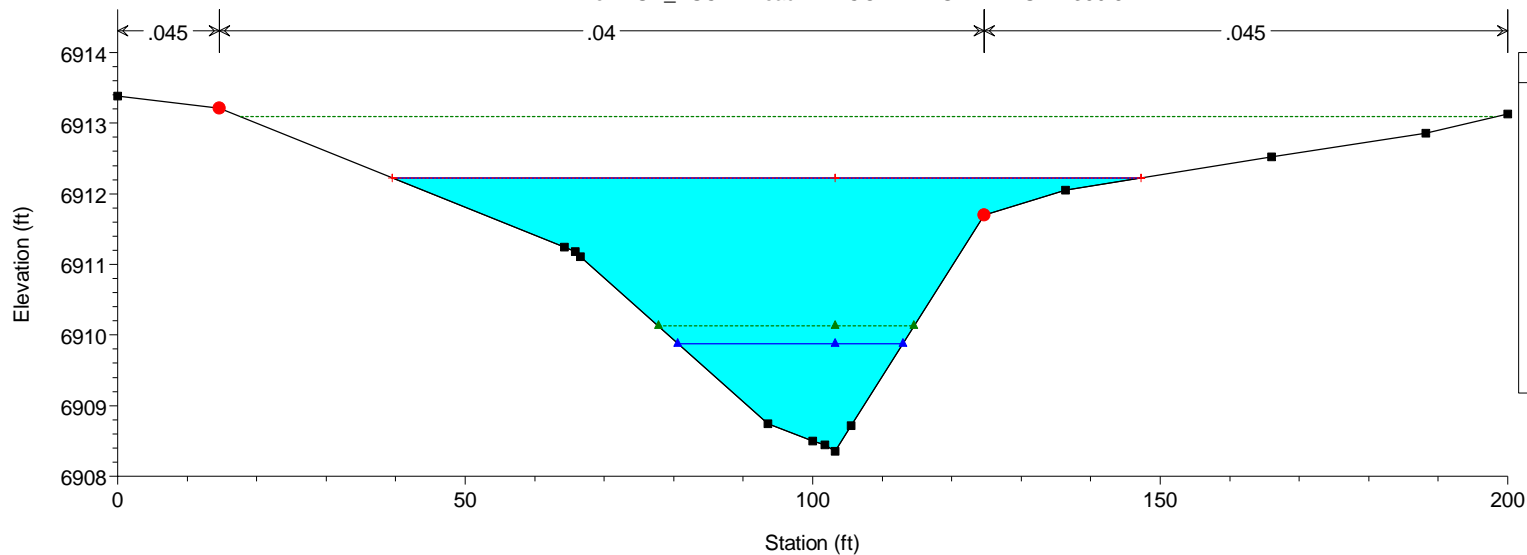
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2400.84



HEC-RAS Model Plan: Default Scenario 10/31/2019

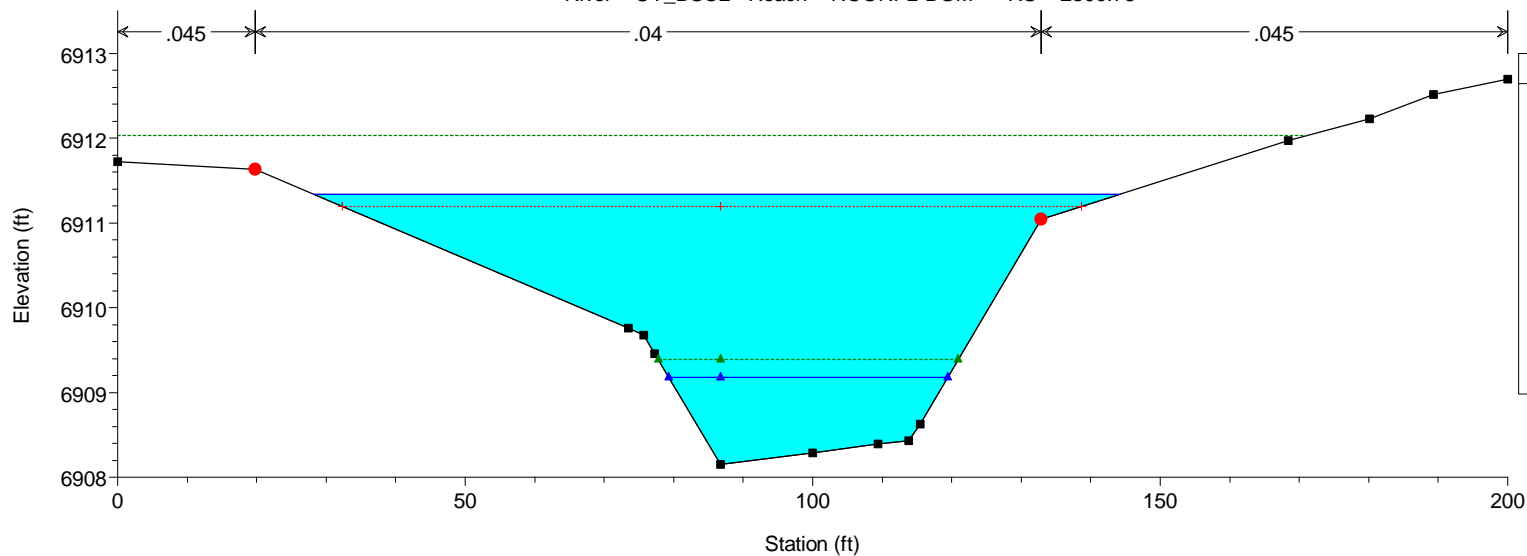
River = UT_BSC2 Reach = NCONFL-BGM RS = 2350.81



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

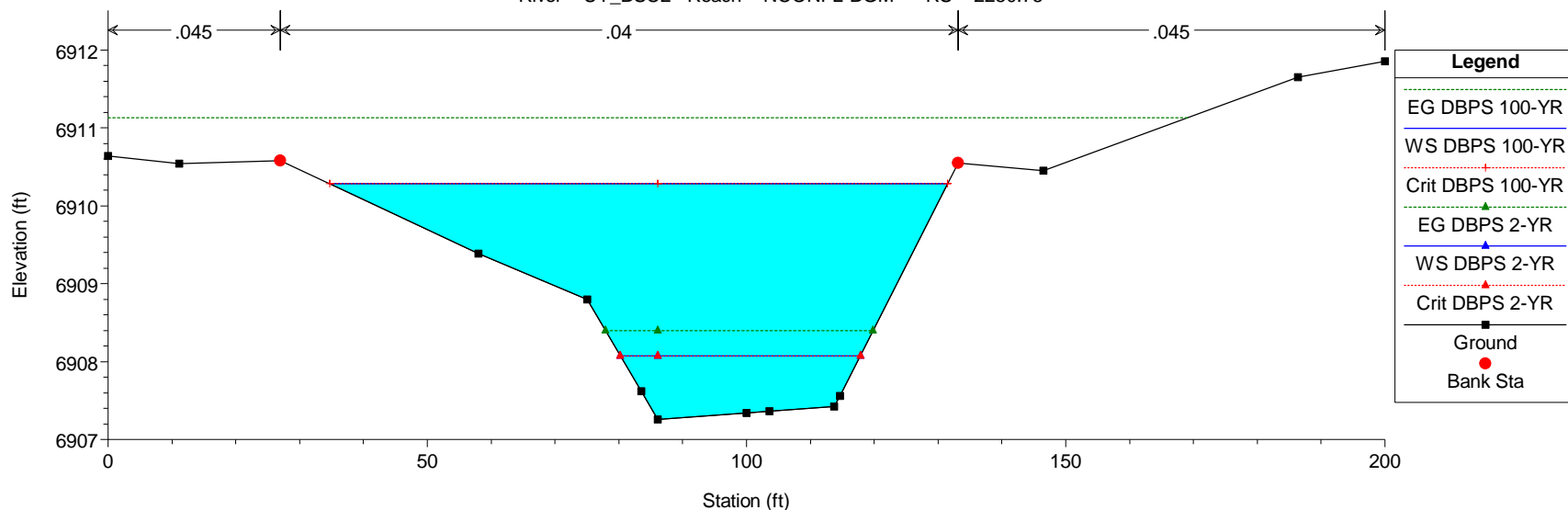
River = UT_BSC2 Reach = NCONFL-BGM RS = 2300.78



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

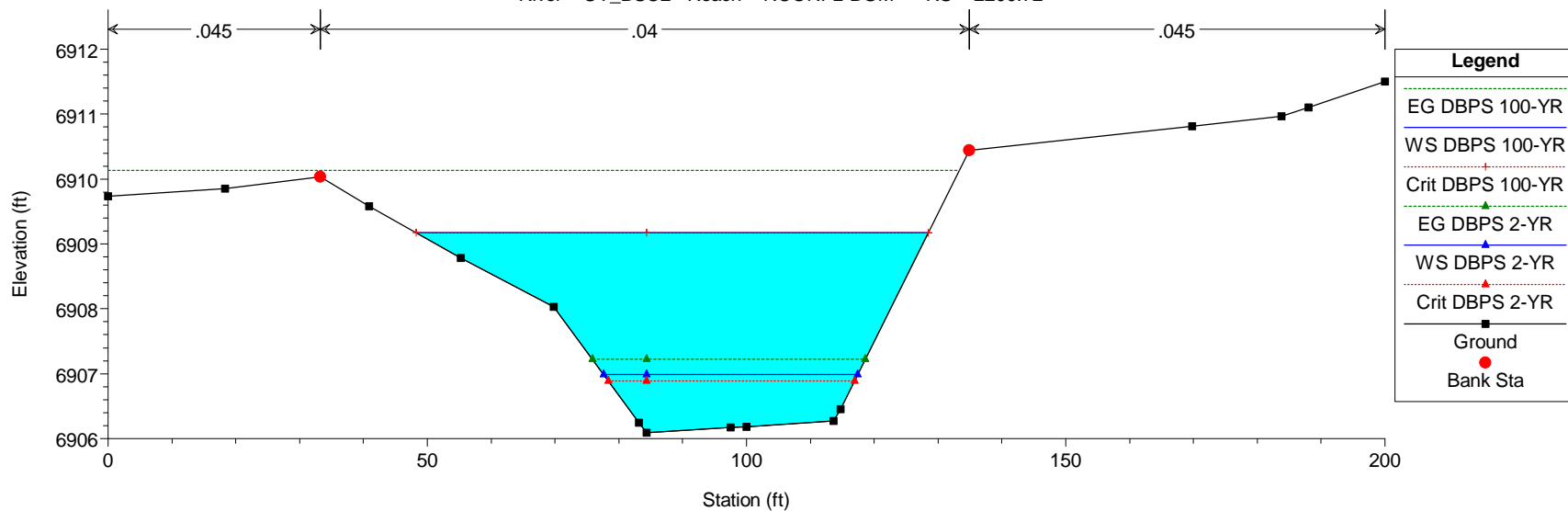
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2250.75



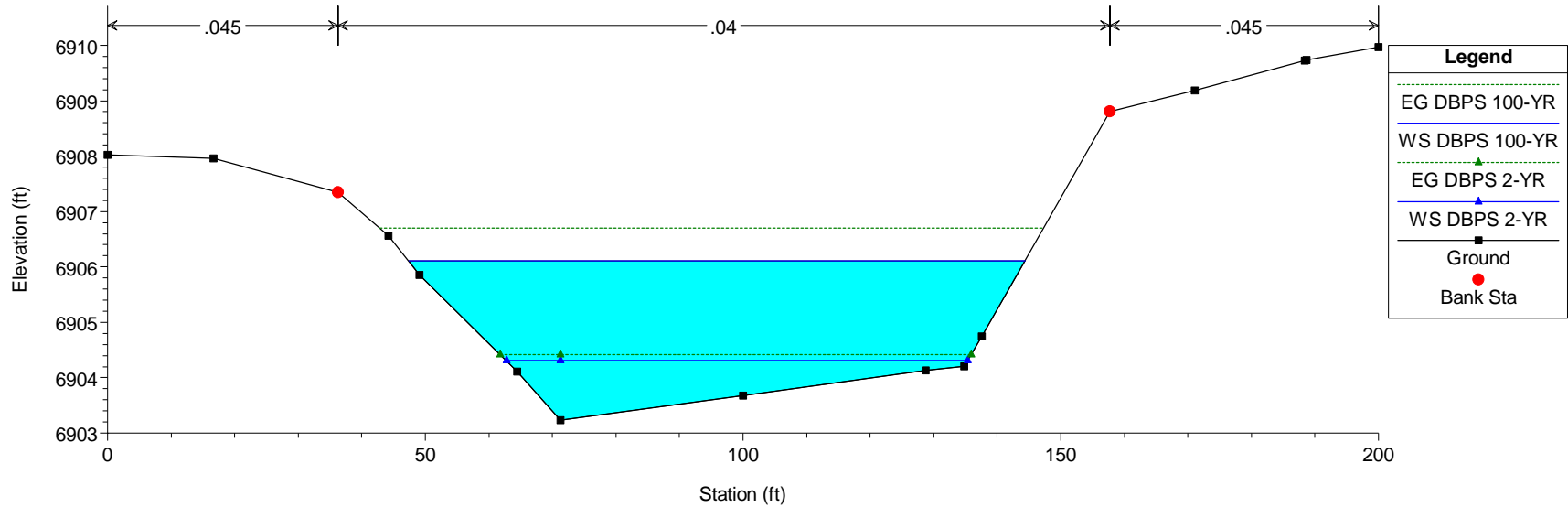
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2200.72



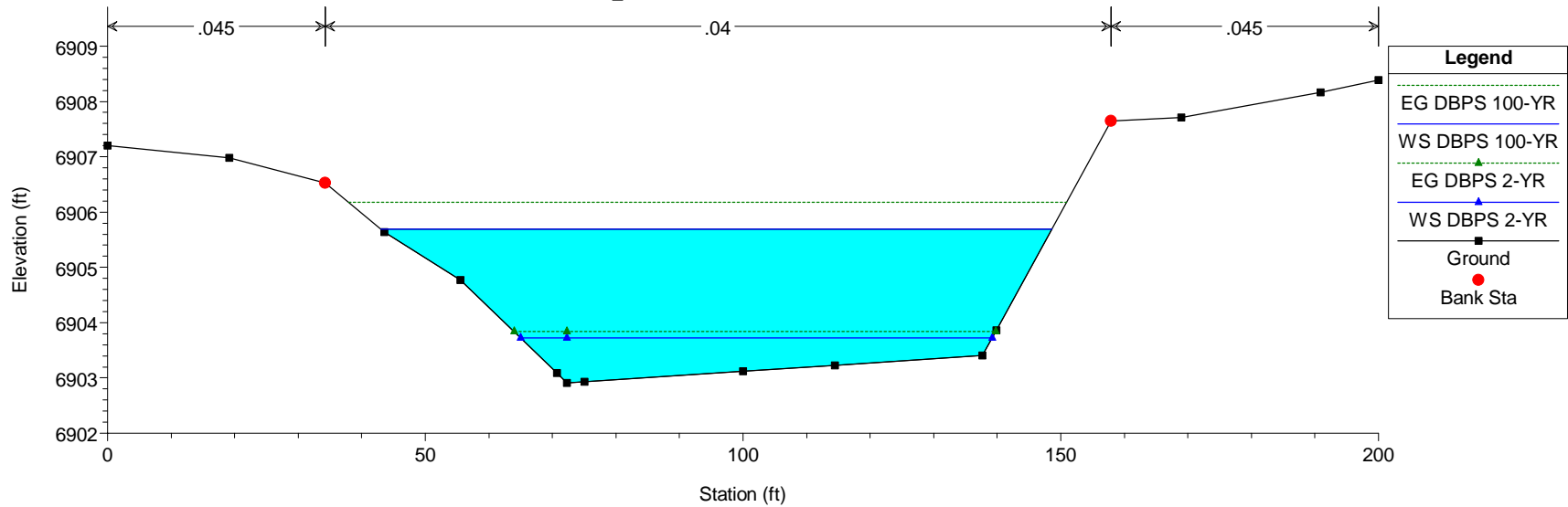
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2050.63



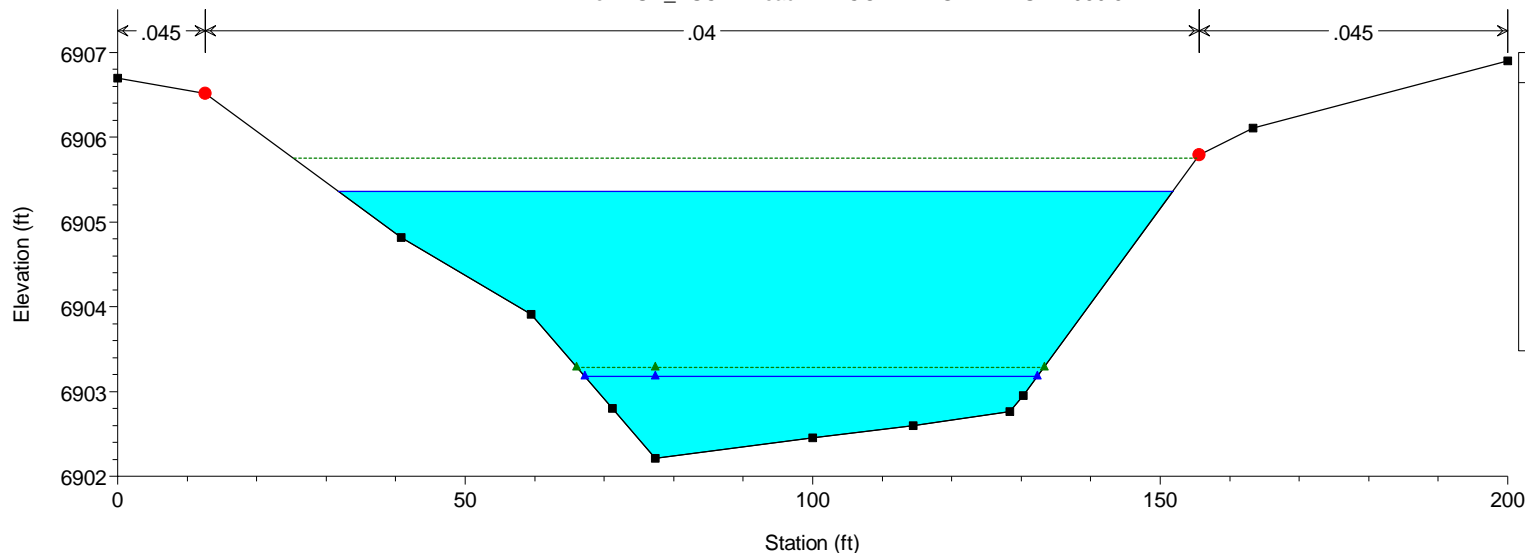
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 2000.6



HEC-RAS Model Plan: Default Scenario 10/31/2019

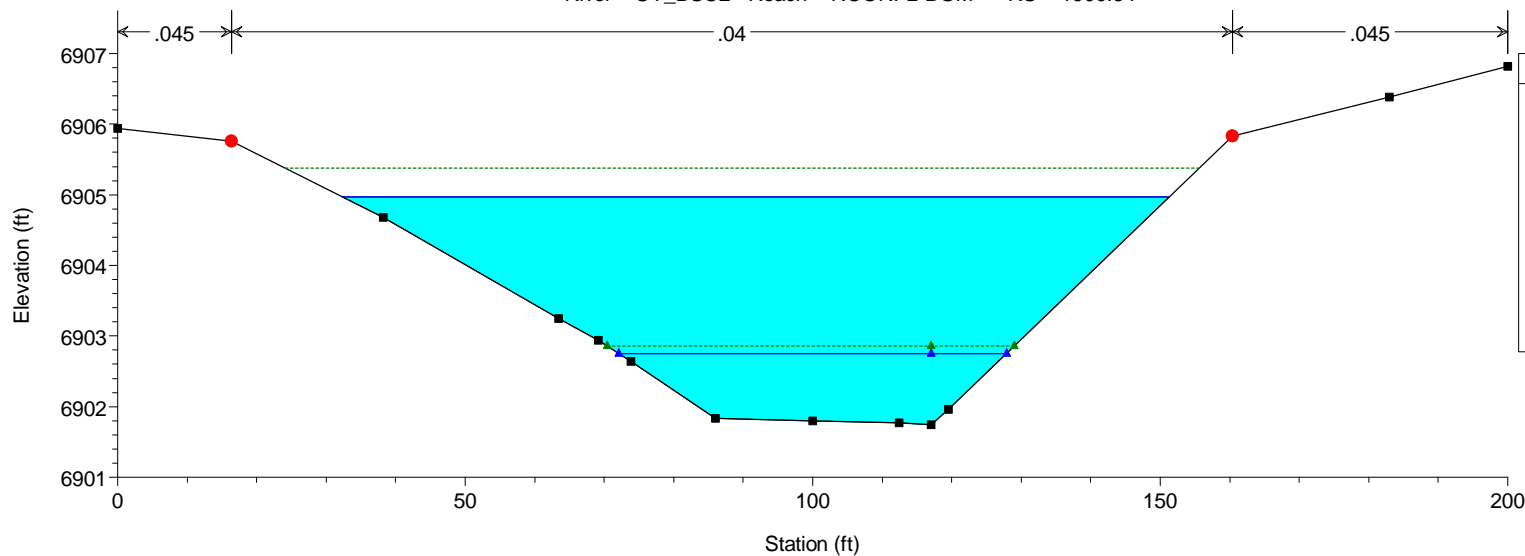
River = UT_BSC2 Reach = NCONFL-BGM RS = 1950.57



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

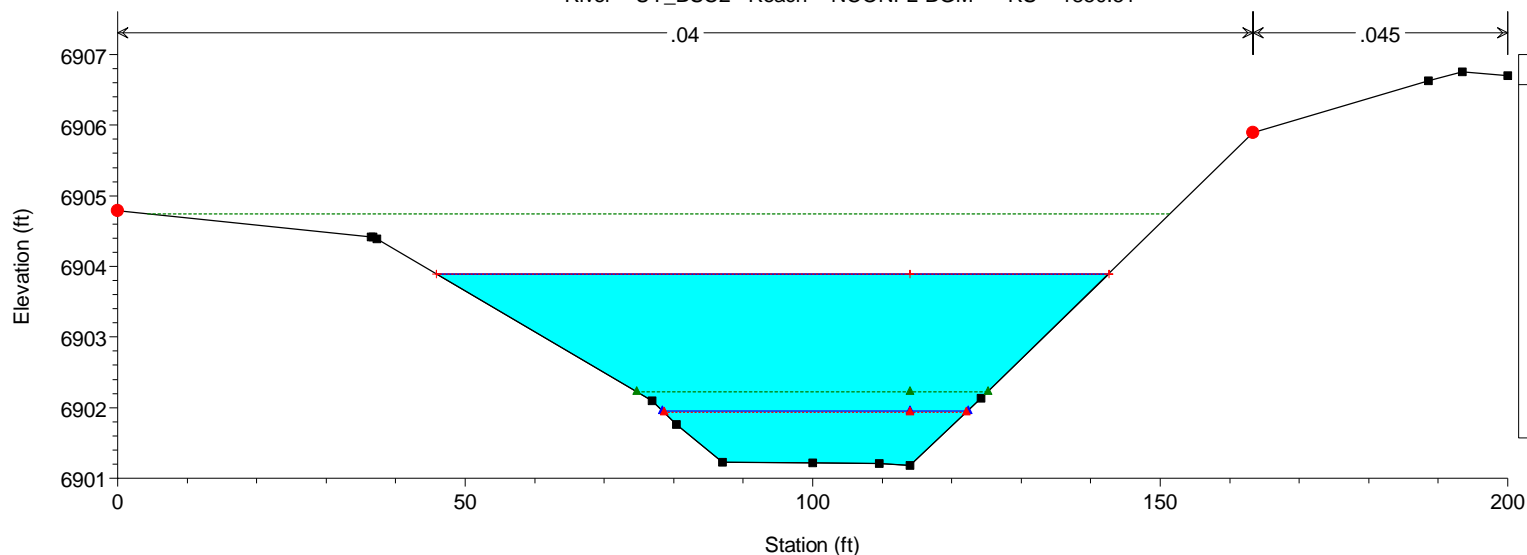
River = UT_BSC2 Reach = NCONFL-BGM RS = 1900.54



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

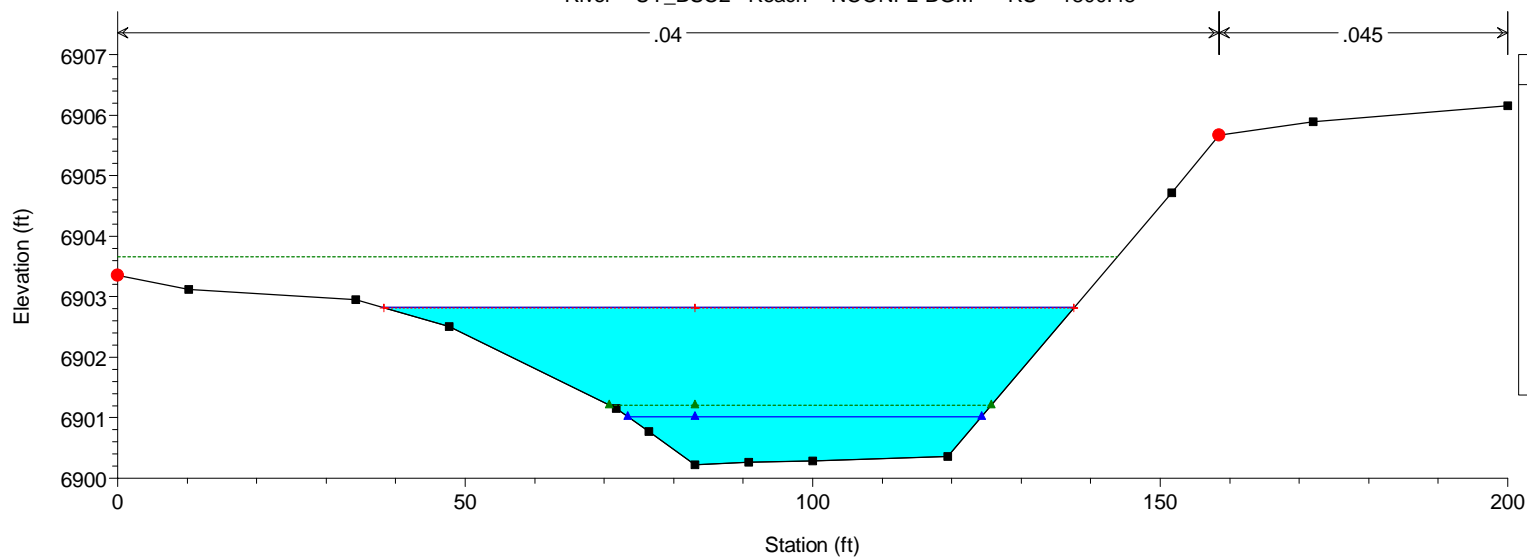
River = UT_BSC2 Reach = NCONFL-BGM RS = 1850.51



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

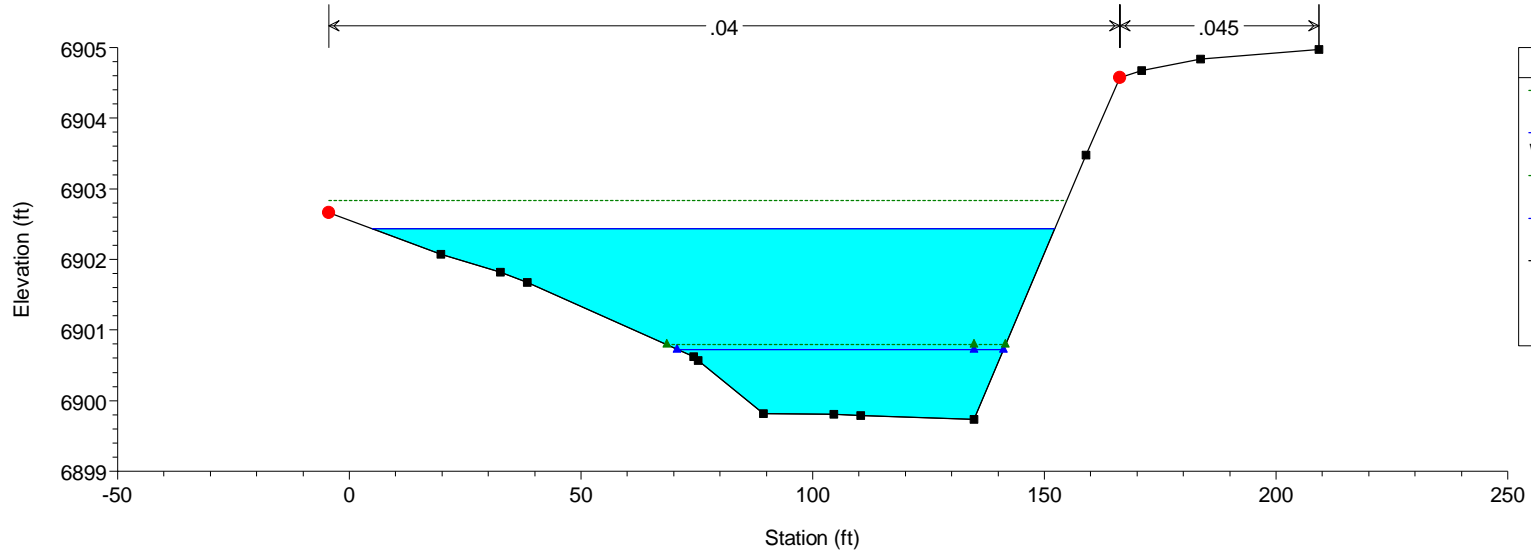
River = UT_BSC2 Reach = NCONFL-BGM RS = 1800.48



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

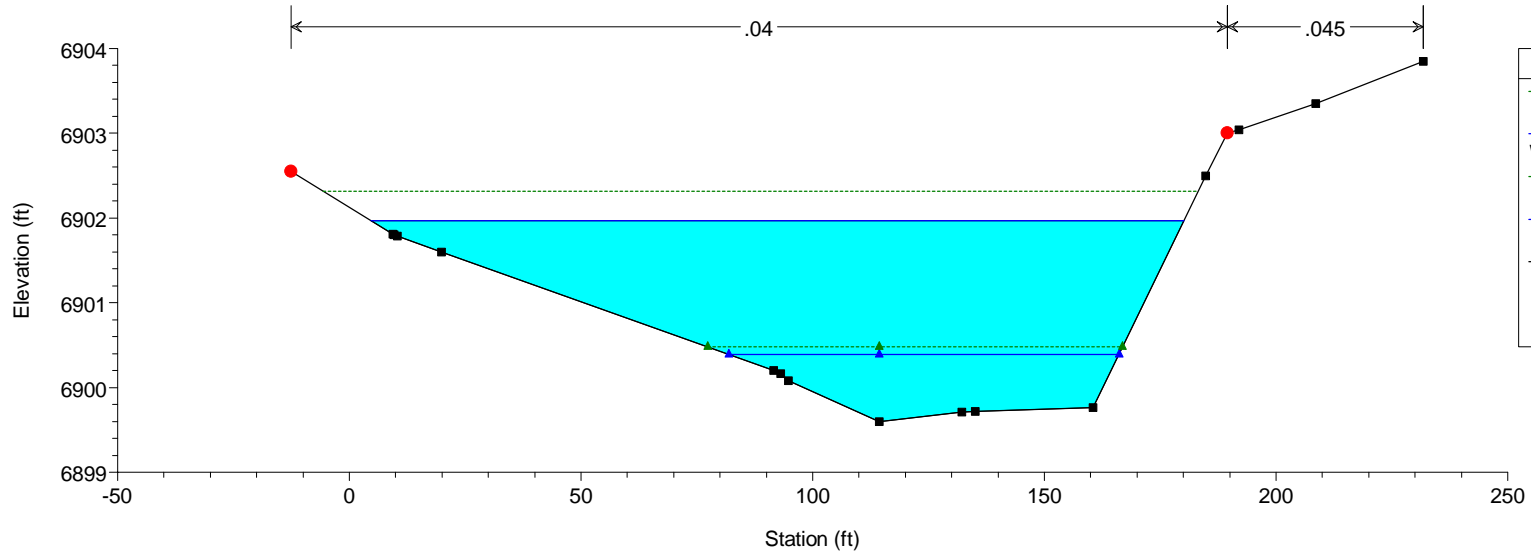
River = UT_BSC2 Reach = NCONFL-BGM RS = 1750.45



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

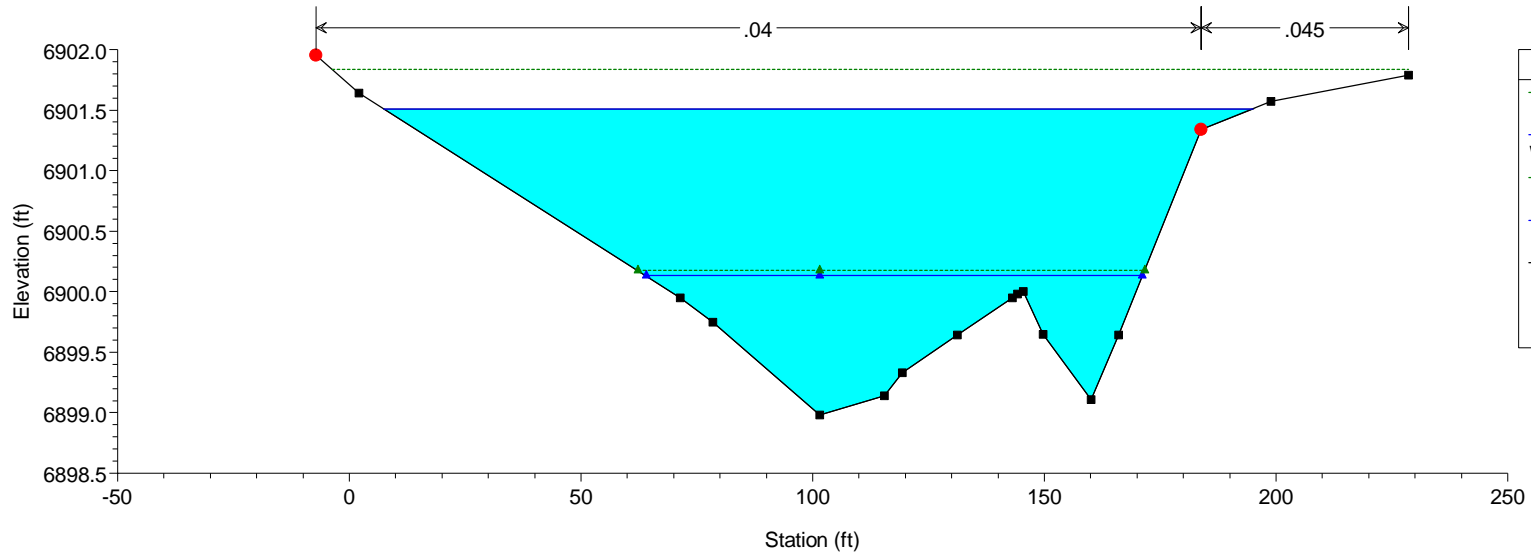
River = UT_BSC2 Reach = NCONFL-BGM RS = 1700.42



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

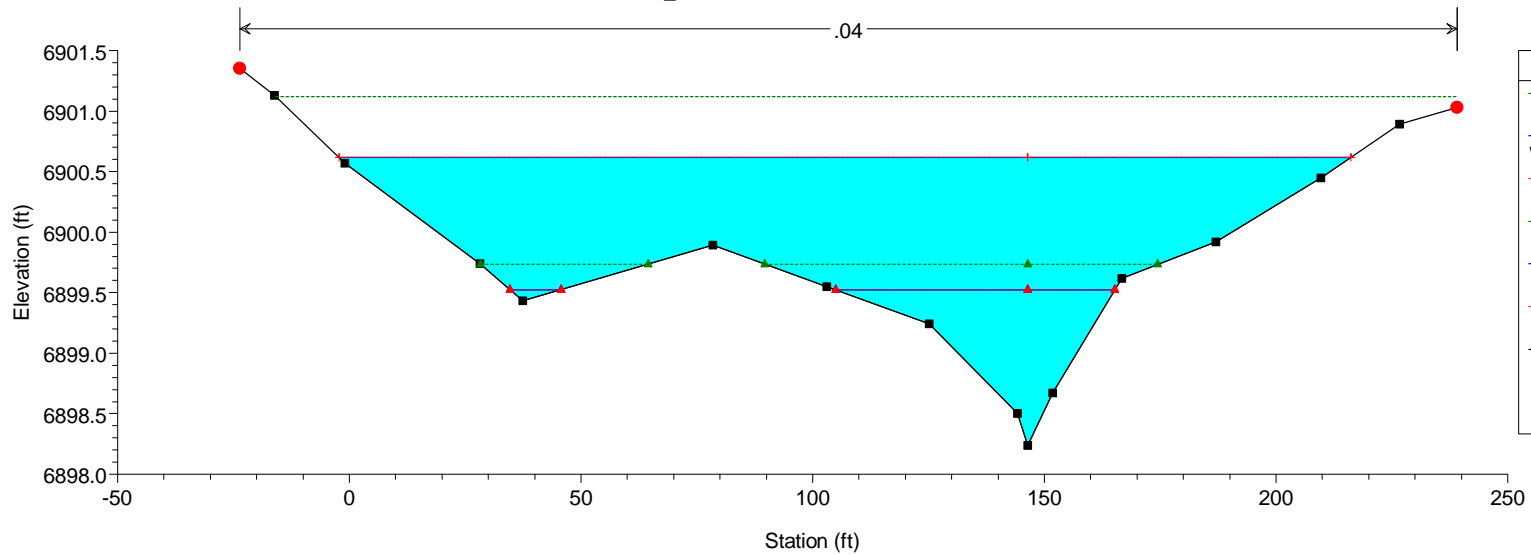
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1650.39



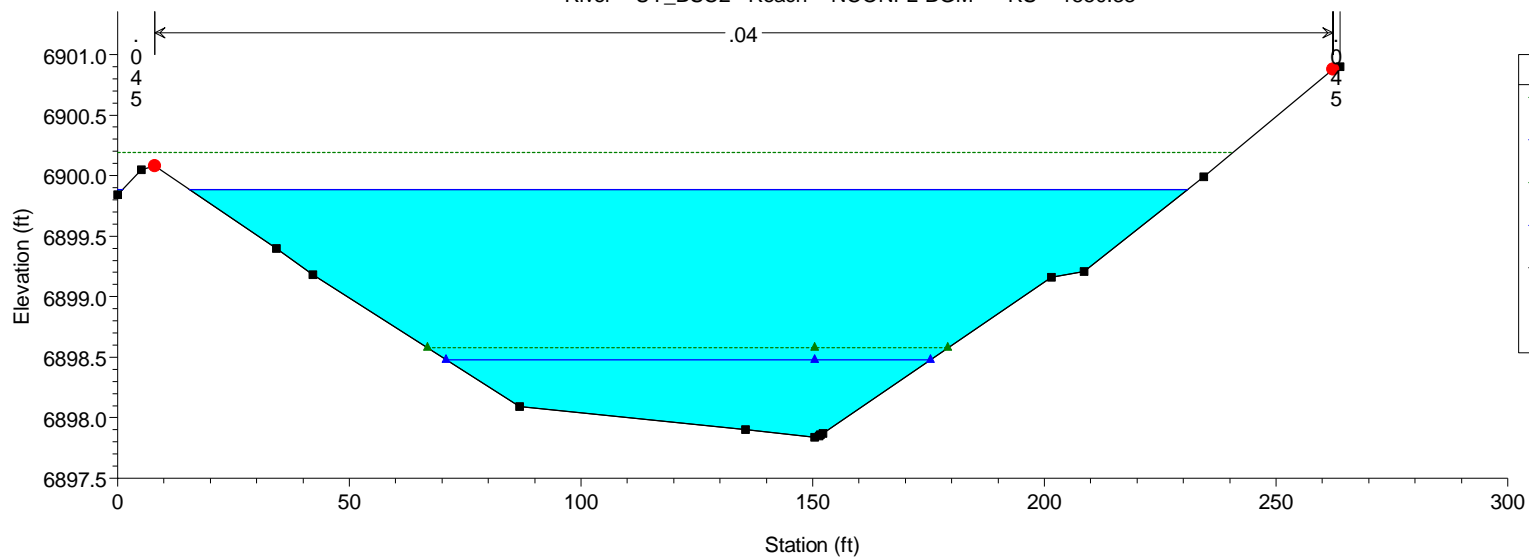
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1600.36



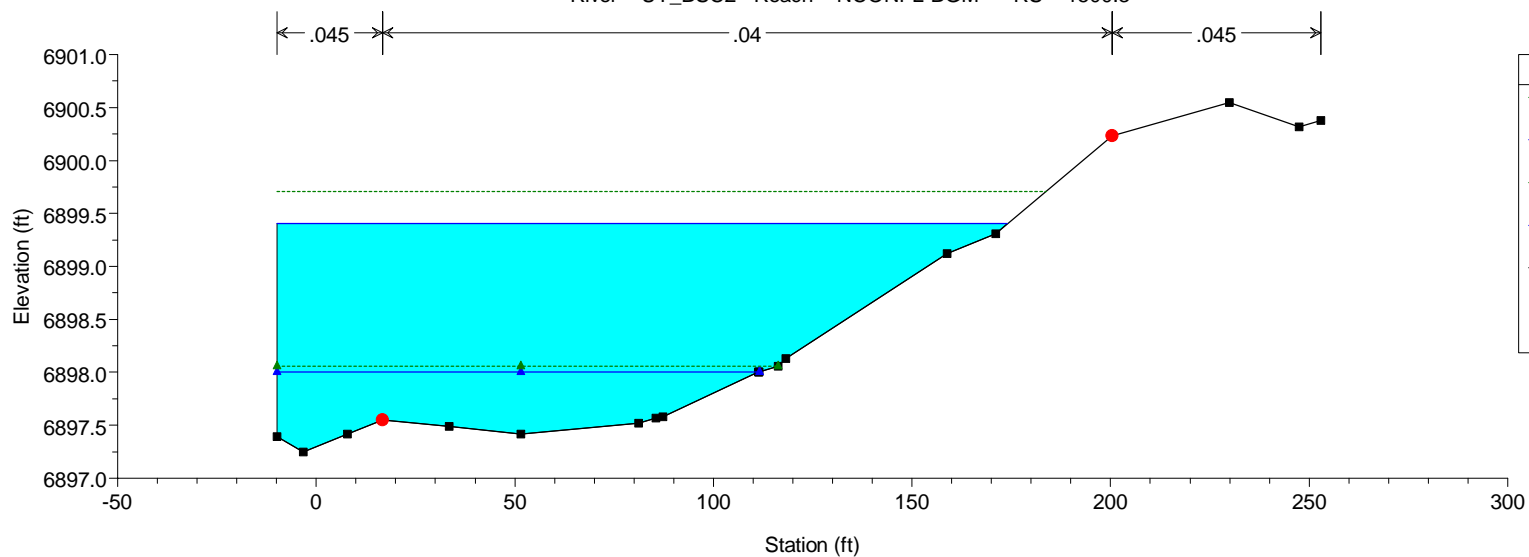
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1550.33



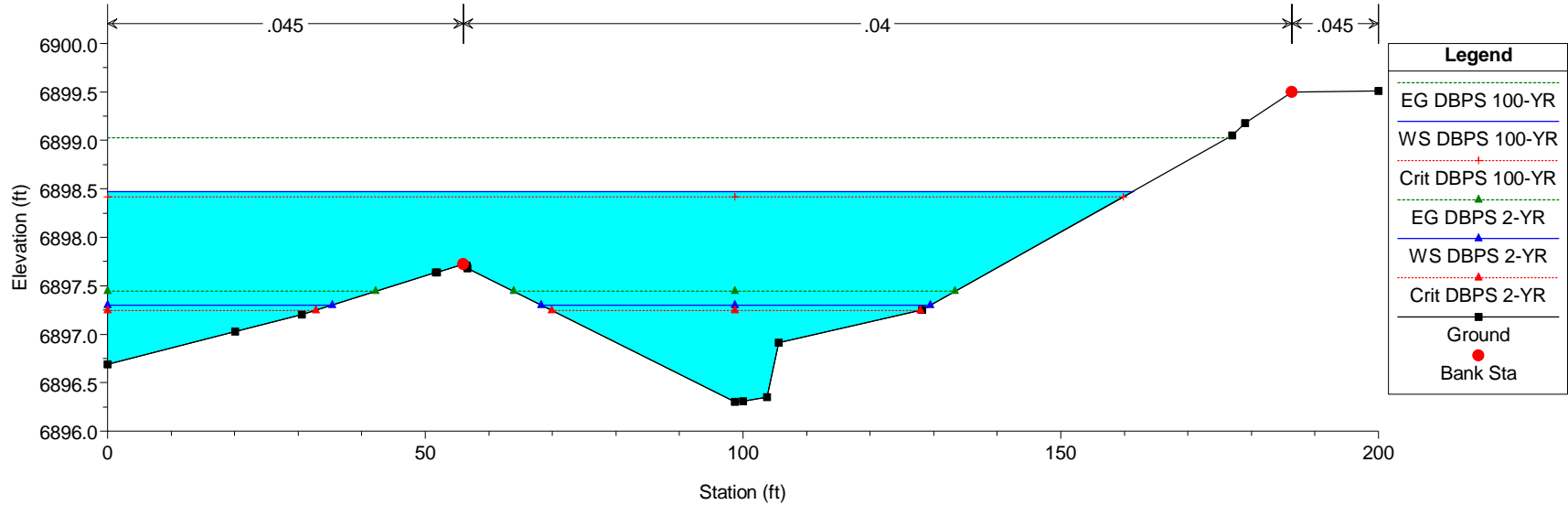
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1500.3



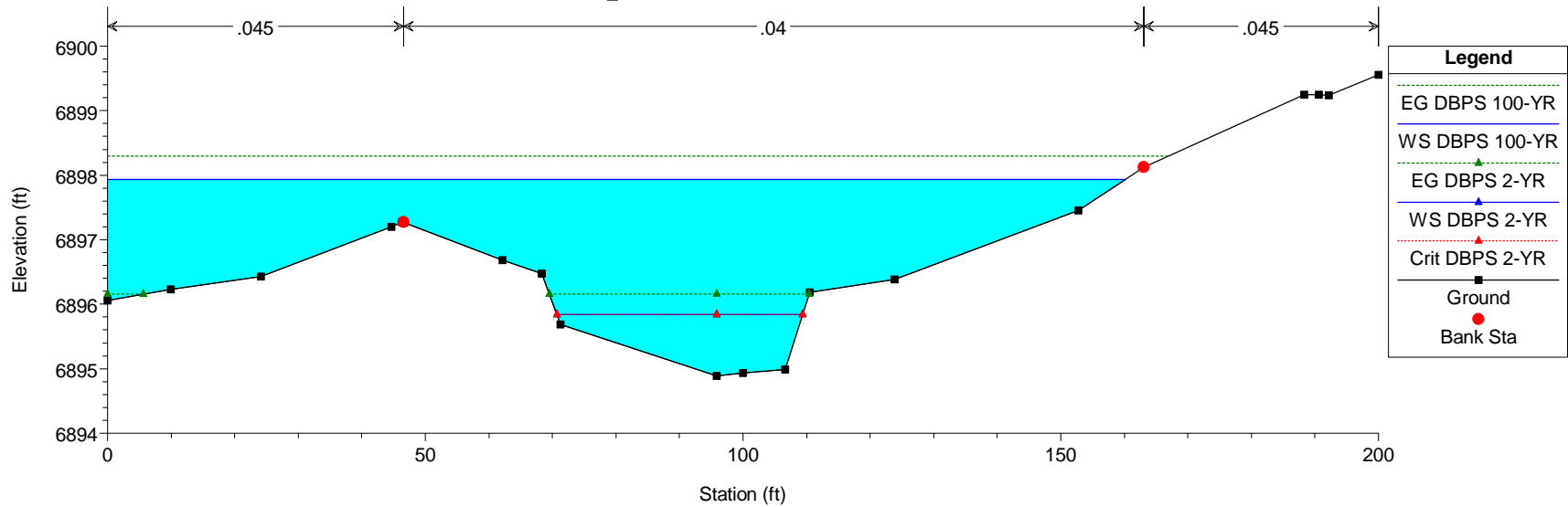
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1450.27



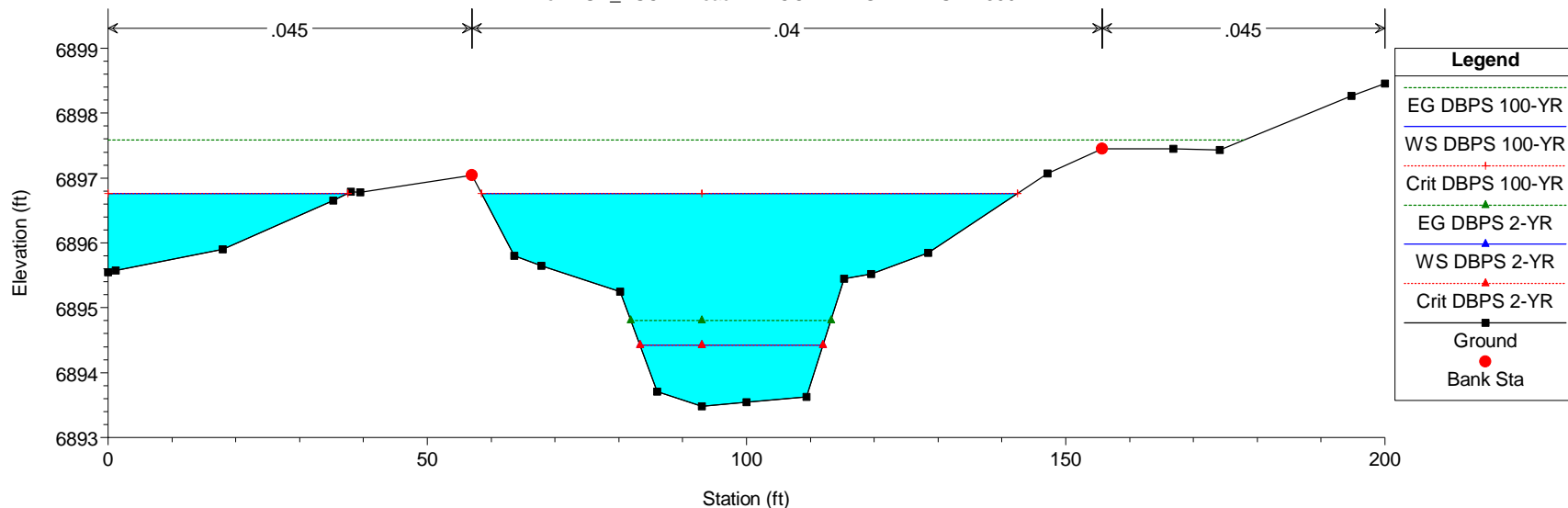
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1400.24



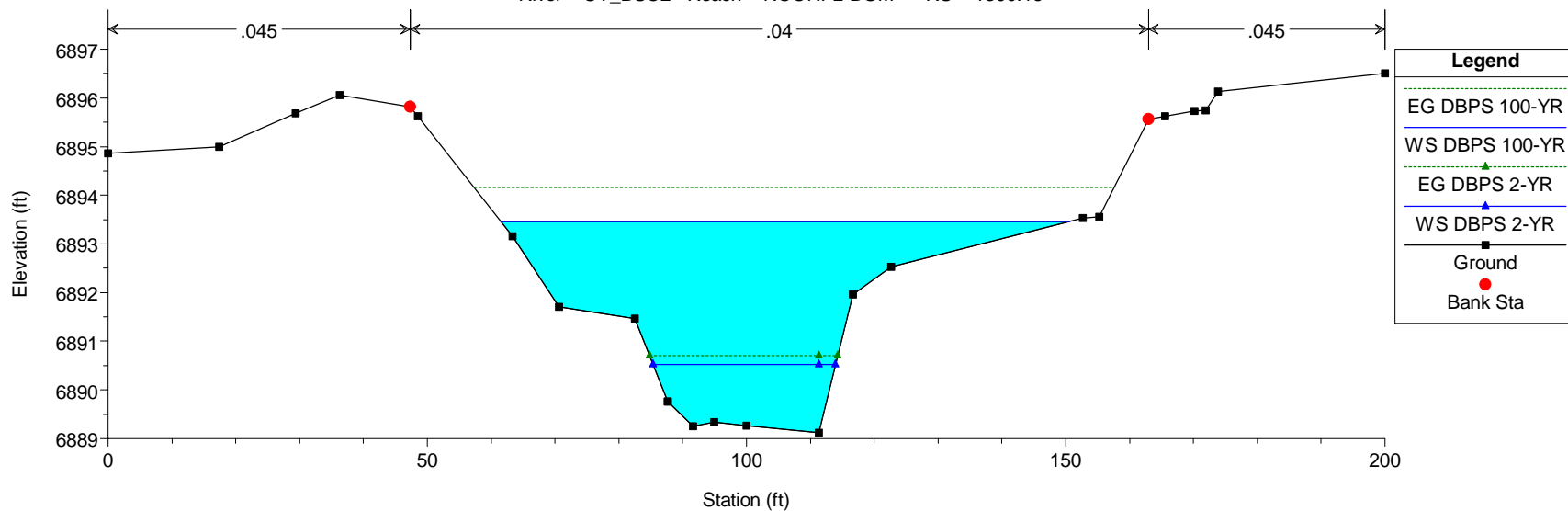
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1350.21



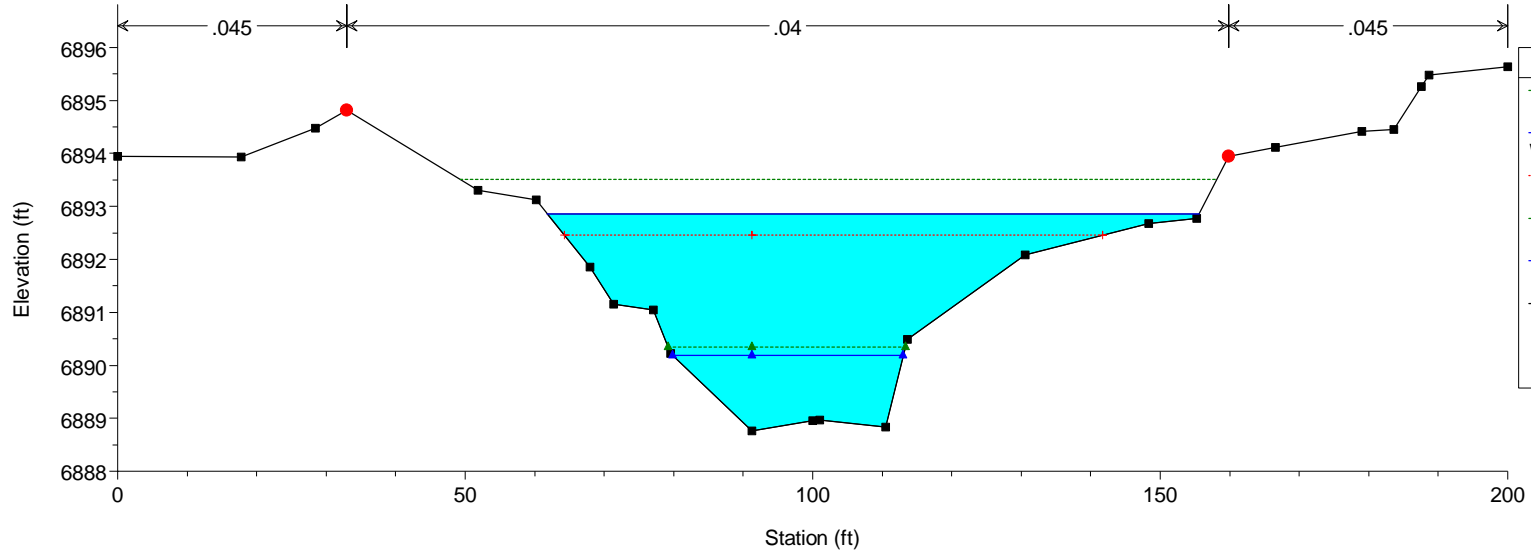
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1300.18



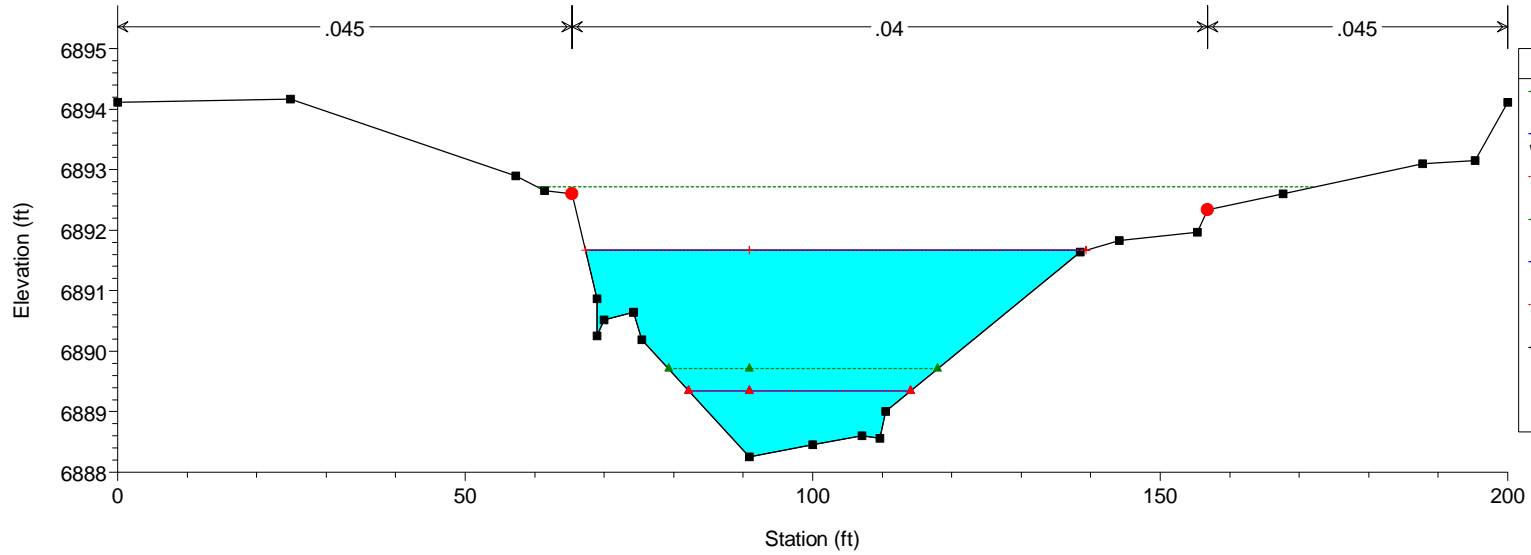
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1250.15



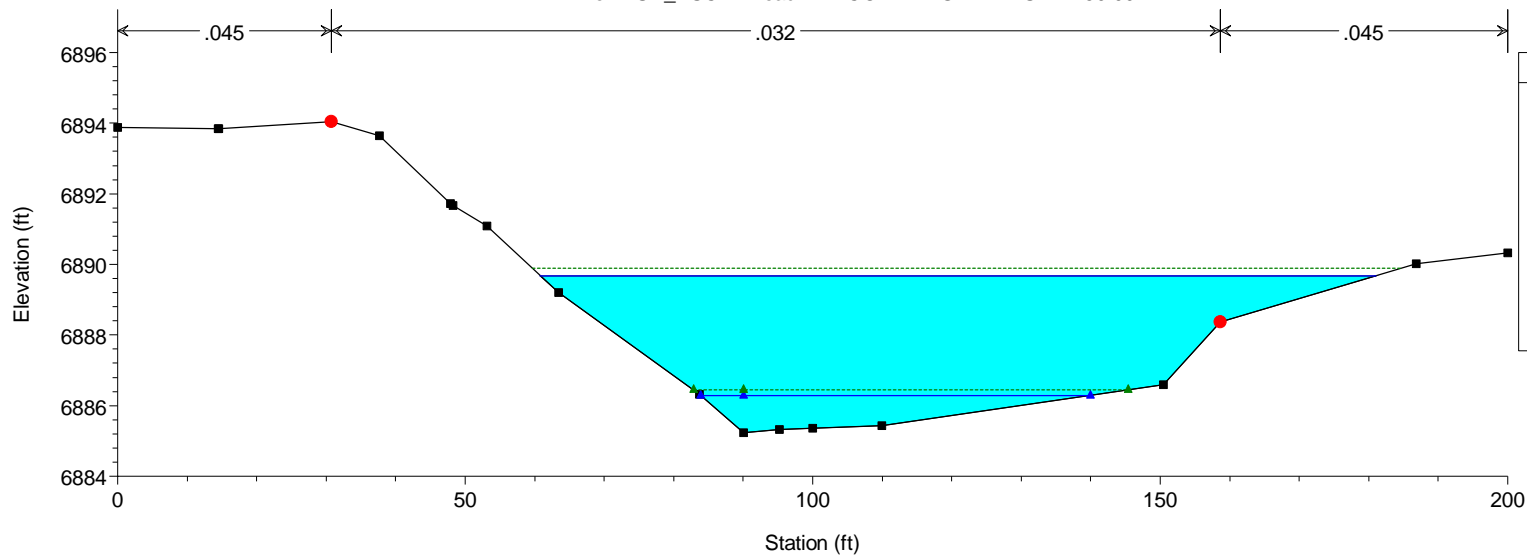
HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1200.12



HEC-RAS Model Plan: Default Scenario 10/31/2019

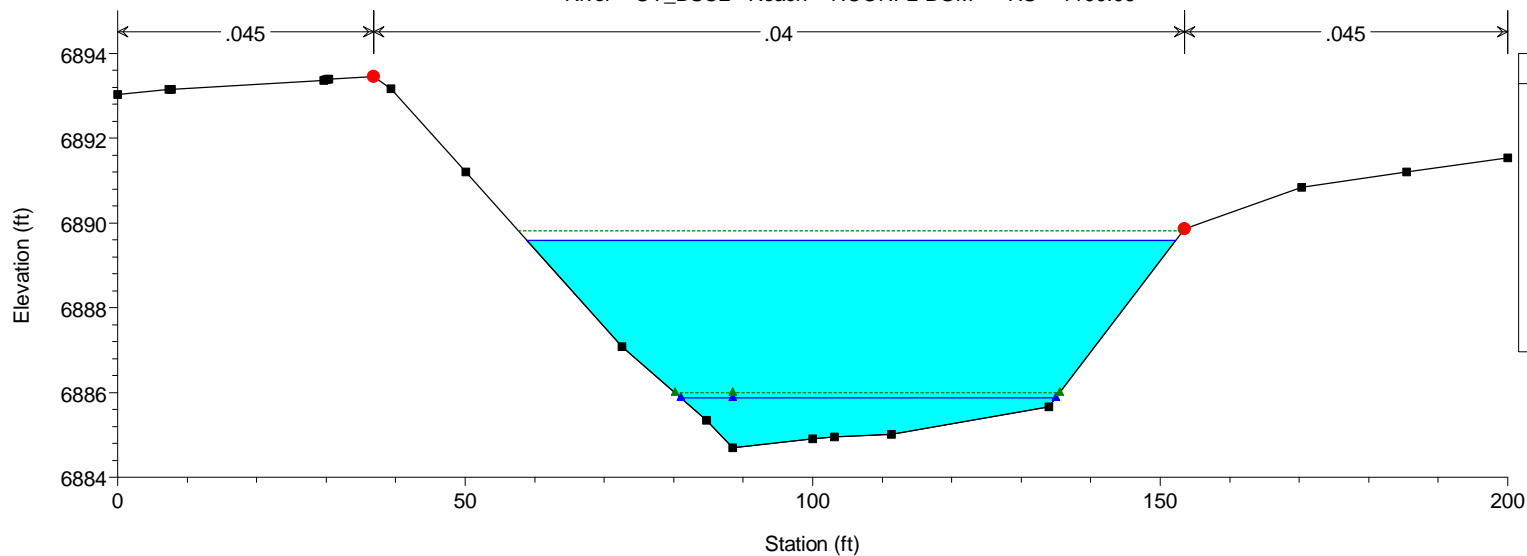
River = UT_BSC2 Reach = NCONFL-BGM RS = 1150.09



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

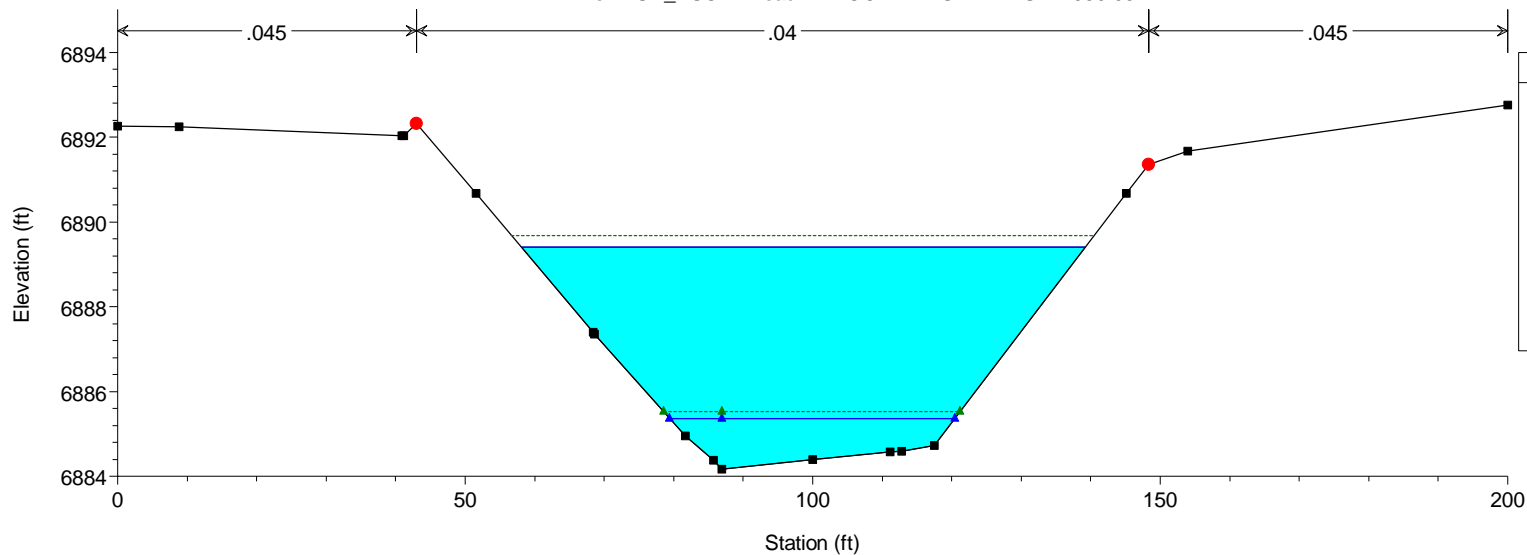
River = UT_BSC2 Reach = NCONFL-BGM RS = 1100.06



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

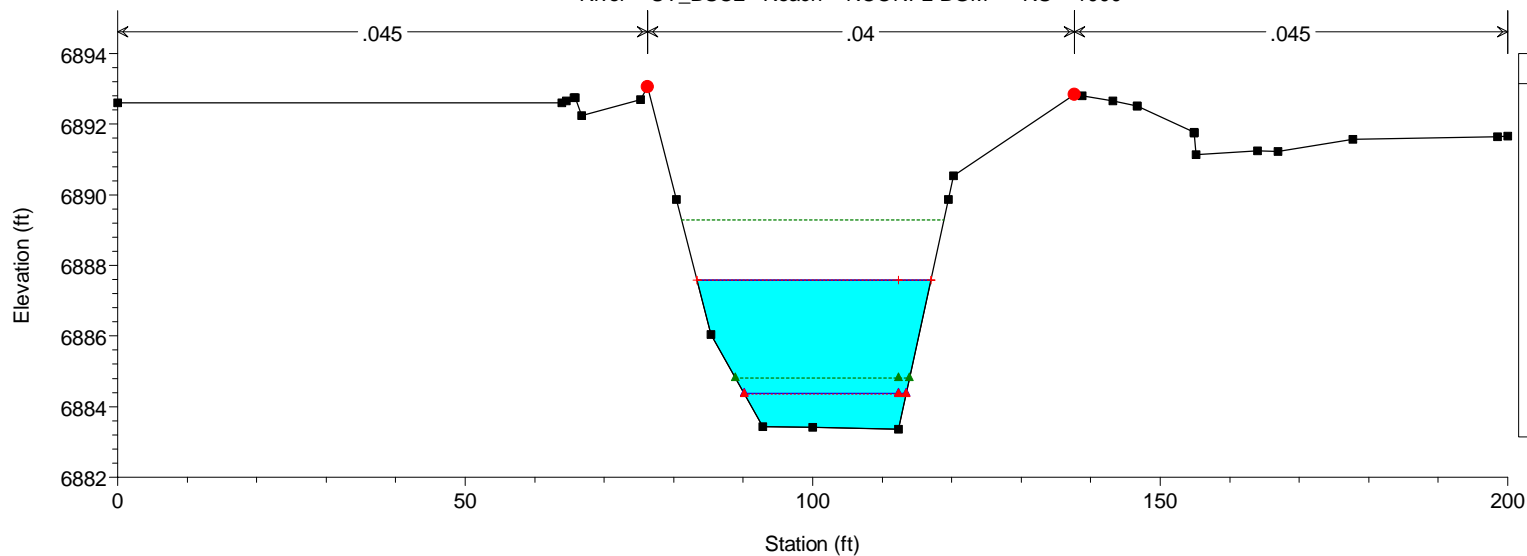
River = UT_BSC2 Reach = NCONFL-BGM RS = 1050.03



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Ground	
Bank Sta	

HEC-RAS Model Plan: Default Scenario 10/31/2019

River = UT_BSC2 Reach = NCONFL-BGM RS = 1000



Legend	
EG DBPS 100-YR	
WS DBPS 100-YR	
Crit DBPS 100-YR	
EG DBPS 2-YR	
WS DBPS 2-YR	
Crit DBPS 2-YR	
Ground	
Bank Sta	

APPENDIX D

Preliminary Pond Design

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:

$$WQCV = a(0.91I^3 - 1.19I^2 + 0.78I) \quad (\text{Equation 3-1})$$

Where:

a = Coefficient corresponding to WQCV drain time

I = Imperviousness (%/100)

Drain Time = 40 hrs

WQCV = 0.051 Inches

BMP Storage Volume, V:

$$V = (WQCV/12)A \quad (\text{Equation 3-3})$$

Where:

A = Tributary area (acres)

V = 9.764 acre-ft

*Reference Section 3.0 of UDFCD Volume 3, August 2011

UD-Detention, Version 3.07 (February 2017)

Basin ID: Detention and Water Quality Pond WU

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
Excess Urban Runoff Volume (EURV) =	11,312	acre-feet
2-yr Runoff Volume (P1 = 0.84 in.) =	5,157	acre-feet
5-yr Runoff Volume (P1 = 1.12 in.) =	7,503	acre-feet
10-yr Runoff Volume (P1 = 1.36 in.) =	10,464	acre-feet
25-yr Runoff Volume (P1 = 1.72 in.) =	17,753	acre-feet
50-yr Runoff Volume (P1 = 2.01 in.) =	37,566	acre-feet
100-yr Runoff Volume (P1 = 2.31 in.) =	82,799	acre-feet
500-yr Runoff Volume (P1 = 3.07 in.) =	201,813	acre-feet
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

Optional User Override 1-hr Precipitation

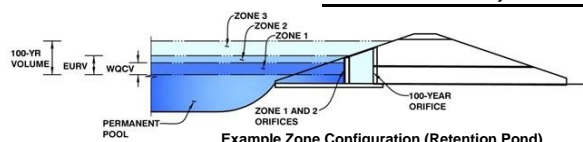
[illegible][illegible]

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Thompson Thrift

Basin ID: Detention and Water Quality Pond



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	5.64	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 = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = 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 = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

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)

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

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

Overflow Weir Front Edge Height, H_o = 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

Height of Grate Upper Edge, H₁ = feet
Over Flow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = should be ≥ 4
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

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

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

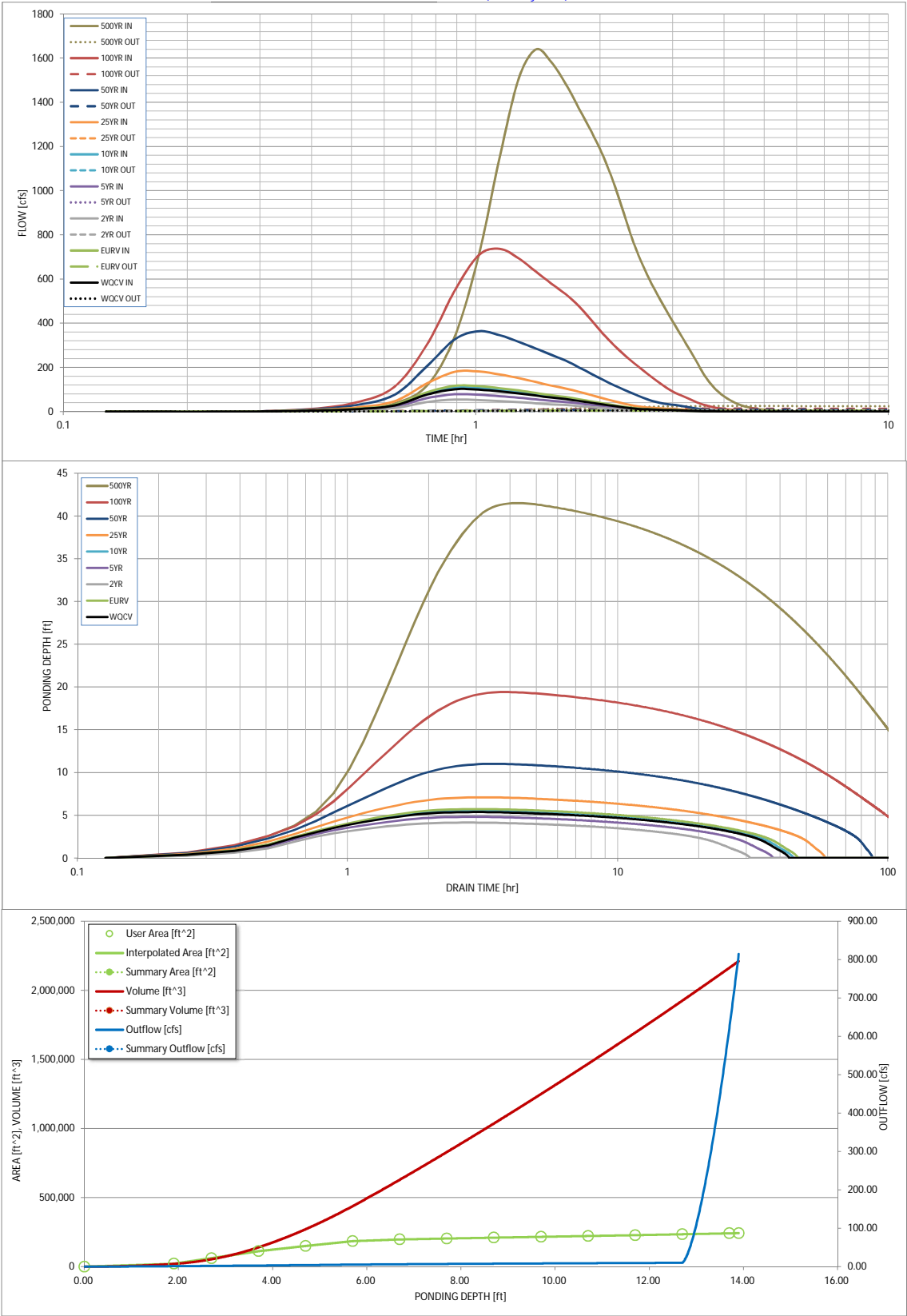
	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	0.84	1.12	1.36	1.72	2.01	2.31	3.07
Calculated Runoff Volume (acre-ft) =	9.764	11.312	5.157	7.503	10.464	17.753	37.566	82.799	201.813
OPTIONAL Override Runoff 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) =	5.1	5.5	3.6	4.3	5.3	6.7	9.2	13.7	25.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.4	0.2	0.0	0.0	0.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Plate	Plate	N/A	N/A
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) =	37	40	27	32	38	50	75	115	177
Time to Drain 99% of Inflow Volume (hours) =	40	43	29	35	41	54	81	124	>120
Maximum Ponding Depth (ft) =	5.37	5.72	4.14	4.81	5.53	7.10	11.01	19.41	41.50
Area at Maximum Ponding Depth (acres) =	3.98	4.25	2.95	3.53	4.10	4.59	5.14	5.57	5.57
Maximum Volume Stored (acre-ft) =	8.703	10.143	4.429	6.602	9.349	16.262	35.297	50.761	50.761

Is no flow going through the outlet box weir?

Address HEC-HMS calculated flows for the proposed improvements

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			

Weir Report

5-yr Weir

Trapezoidal Weir

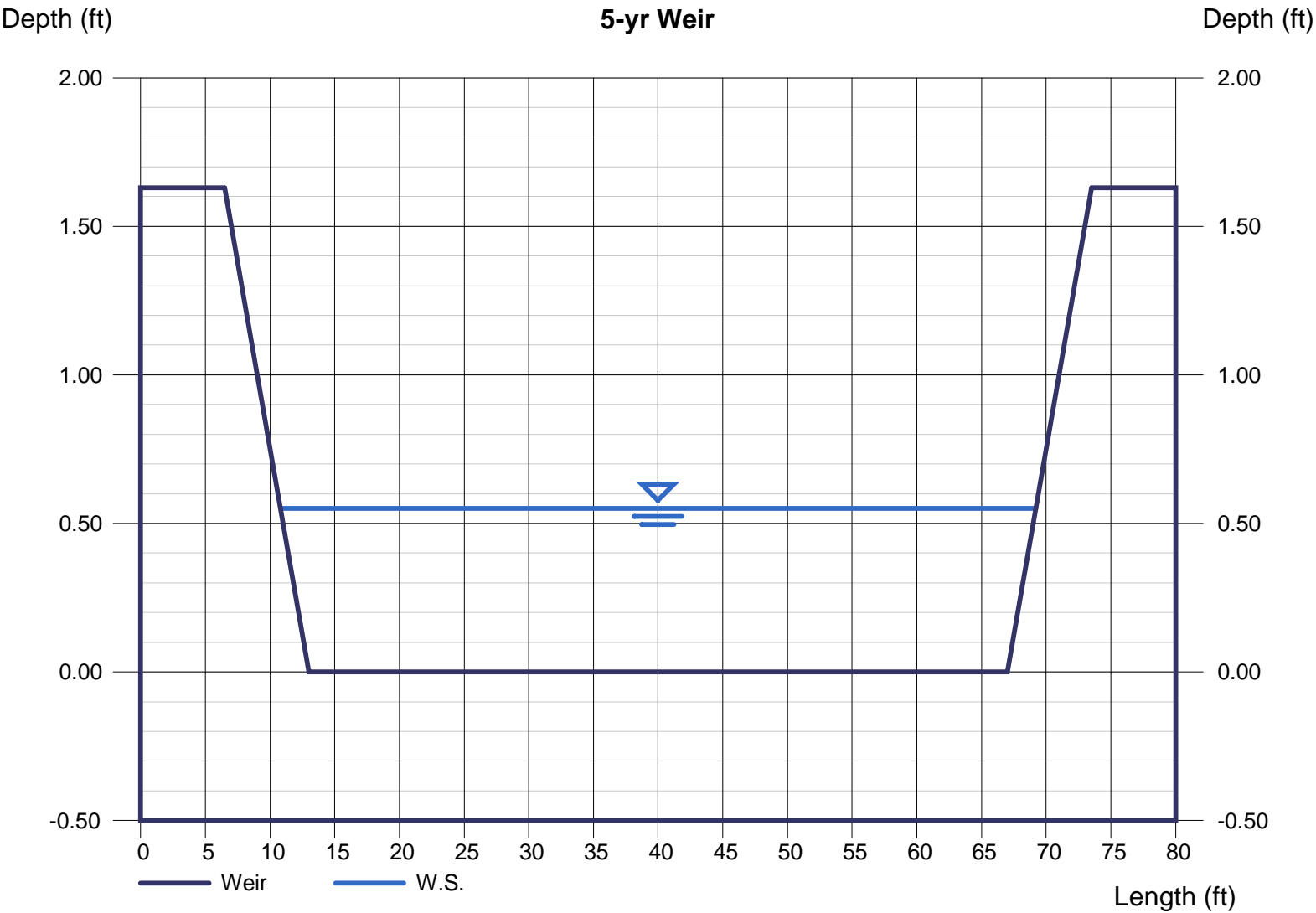
Crest = Sharp
Bottom Length (ft) = 54.00
Total Depth (ft) = 1.63
Side Slope (z:1) = 4.00

Highlighted

Depth (ft) = 0.55
Q (cfs) = 70.00
Area (sqft) = 30.91
Velocity (ft/s) = 2.26
Top Width (ft) = 58.40

Calculations

Weir Coeff. Cw = 3.10
Compute by: Known Q
Known Q (cfs) = 70.00



Rock Chute Design - Plan Sheet

(Version 4.02 - 11/04/09, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASAE, 1998)

Project: Pond WU - Riprap Weir
 Designer: Aaron Johnston
 Date: 5/20/2019

County: 0.00
 Checked by: _____
 Date: _____

Design Values

Angular D_{50} dia. = **19.1** in.
 Rock_{chute} thickness = **38.3** in.
 Inlet apron length = **19** ft.
 Outlet apron length = **24** ft.
 Radius = **53** ft.

Rock Gradation Envelope

% Passing	Diameter, in. (weight, lbs.)
D_{100} -----	29 - 38 (1714 - 4062)
D_{85} -----	25 - 34 (1116 - 2961)
D_{50} -----	19 - 29 (508 - 1714)
D_{10} -----	15 - 25 (260 - 1116)

Quantities^a

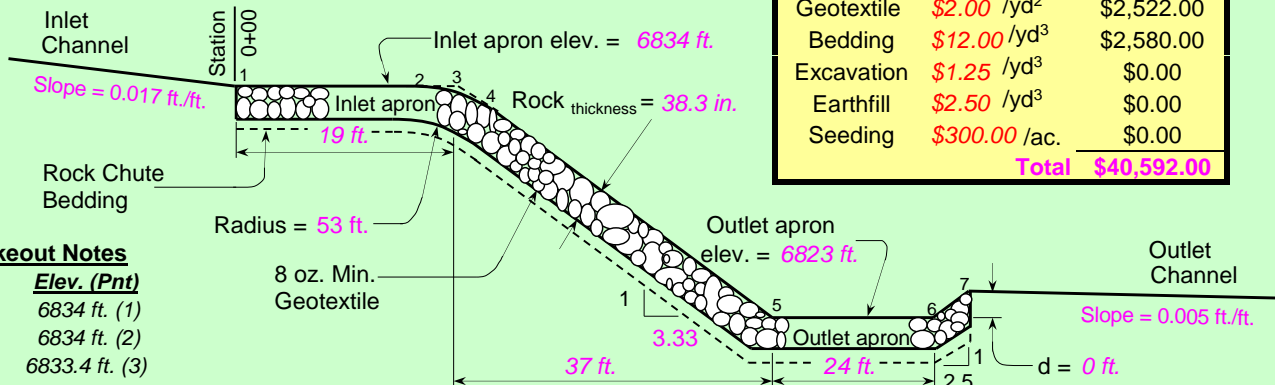
Angular Rock = **1183** yd³
 Geotextile (8 oz.)^b = **1261** yd²
 Bedding (6 in.) = **215** yd³
 Excavation = **0** yd³
 Earthfill = **0** yd³
 Seeding = **0.0** acres

Will bedding be used? **Yes** ----- Depth (in.) = **6.0**

Notes: ^a Rock, bedding, and geotextile quantities are determined from the x-section below (neglect radius).
^b Geotextile shall be overlapped (18-in. min.) and anchored (18-in. min. along sides and 24-in. min. on the ends).

Rock Chute Cost Estimate

Unit	Unit Cost	Cost
Rock	\$30.00 /yd ³	\$35,490.00
Geotextile	\$2.00 /yd ²	\$2,522.00
Bedding	\$12.00 /yd ³	\$2,580.00
Excavation	\$1.25 /yd ³	\$0.00
Earthfill	\$2.50 /yd ³	\$0.00
Seeding	\$300.00 /ac.	\$0.00
Total		\$40,592.00

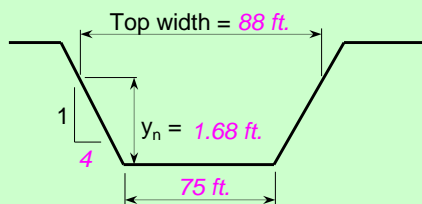


Profile Along Centerline of Rock Chute

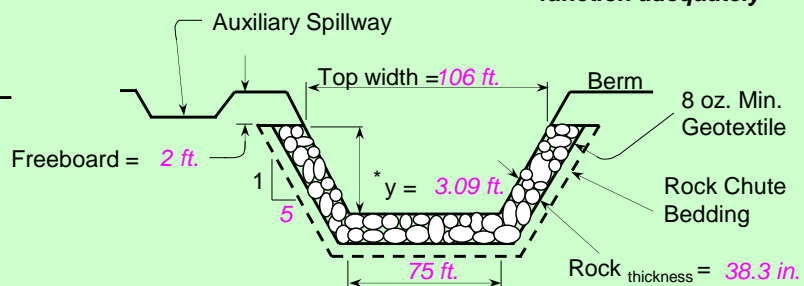
****Note:** The outlet **will not** function adequately

Stakeout Notes

Sta.	Elev. (Pnt)
0+00	6834 ft. (1)
0+11.2	6834 ft. (2)
0+19	6833.4 ft. (3)
0+26.5	6831.8 ft. (4)
0+56	6823 ft. (5)
0+80	6823 ft. (6)
0+80	6823 ft. (7)

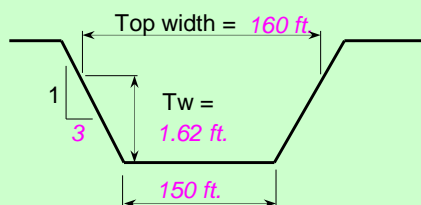


Inlet Channel Cross Section



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

Drawing No.

Checked: _____

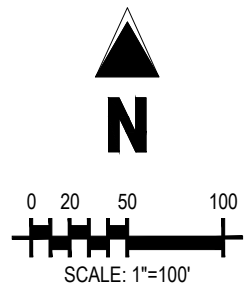
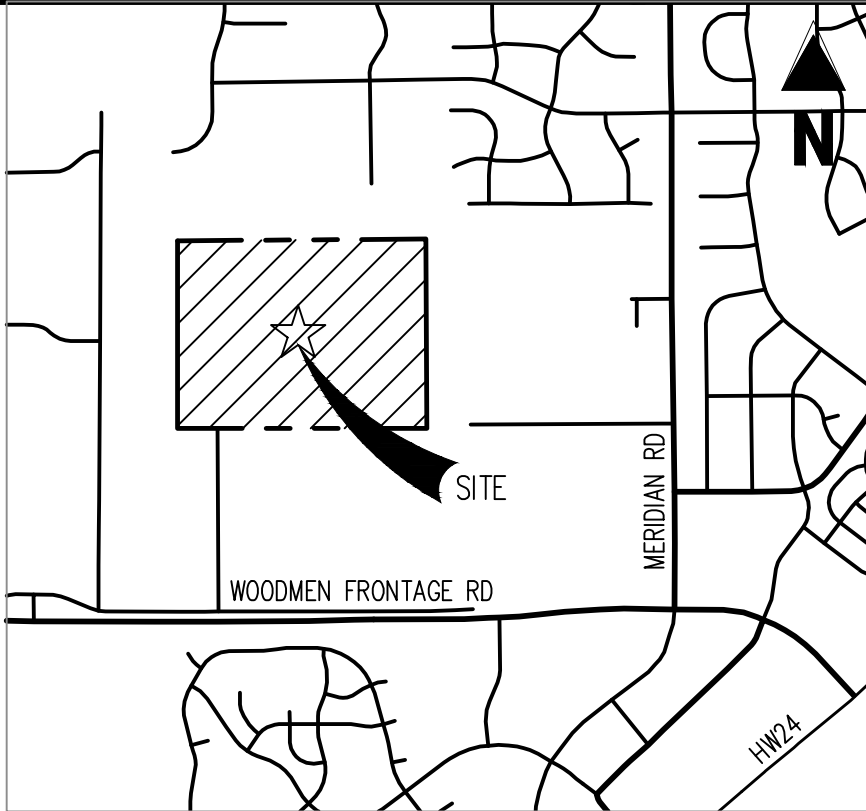
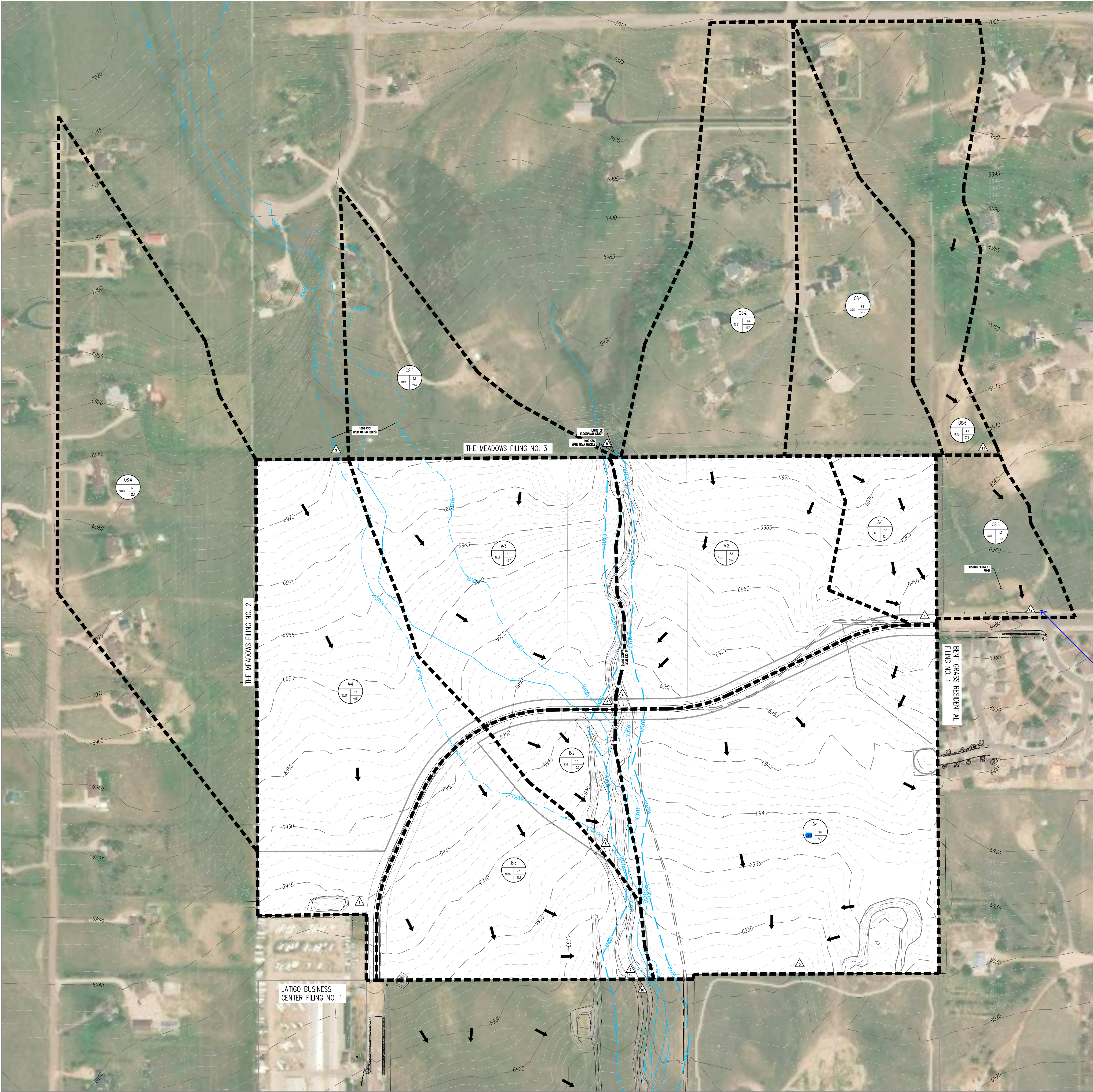
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APPENDIX D

Drainage Map

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DRAINAGE LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- BASIN BOUNDARY LINE
- FEMA EFFECTIVE 100-YR FLOODPLAIN
- CENTERLINE OF STREAM
- BASIN DESIGNATION
- 5-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- BASIN AREA IN ACRES
- DIRECTION OF RUNOFF

DESIGN POINT SUMMARY TABLE

Design Point	Qs (cfs)	Q100 (cfs)
1	0.0	0.0
2	0.0	0.0
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
11	4.9	27.8
12	1.9	12.2

RUNOFF SUMMARY TABLE

Basin ID	Qs (cfs)	Q100 (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-3	5.4	23.4
OS-4	12.0	55.4
OS-5	4.9	27.8
OS-6	1.9	12.8

Galloway

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CHALLENGER HOMES

BENT GRASS RESIDENTIAL FILING NO. 2 DRAINAGE PLAN

**BENT GRASS MEADOWS DRIVE
COLORADO SPRINGS, COLORADO**

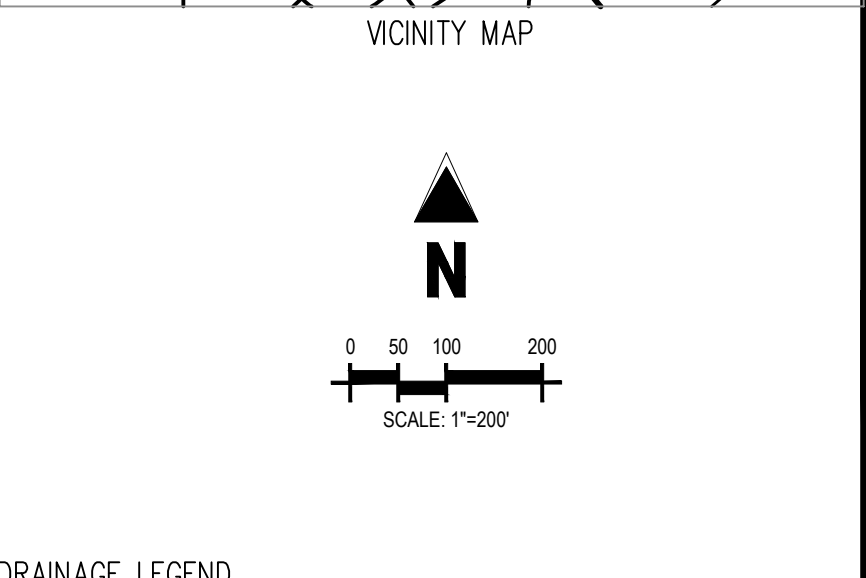
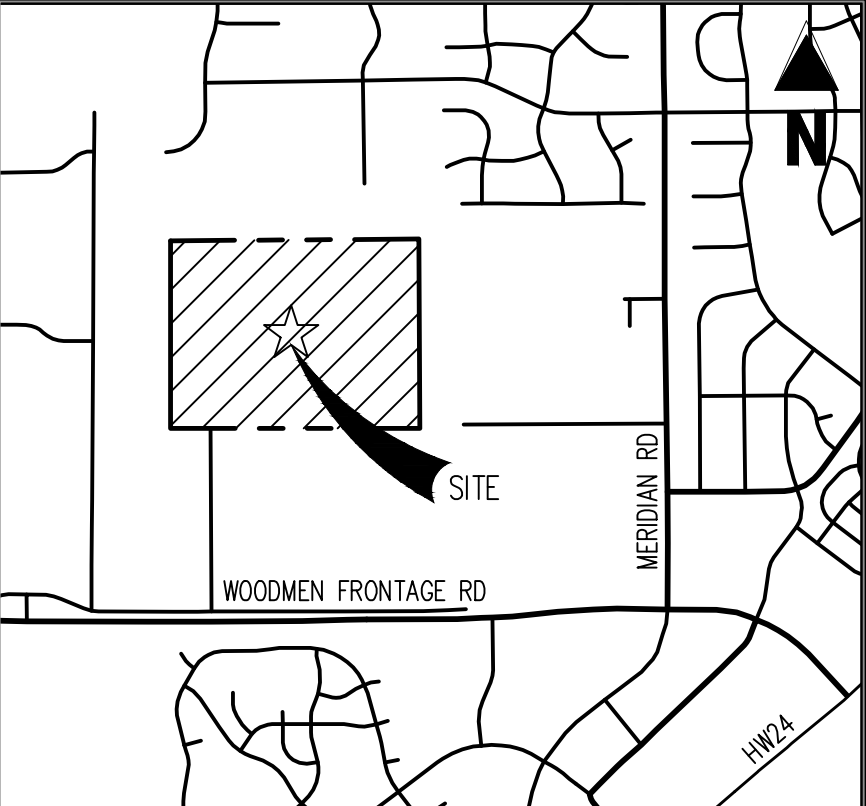
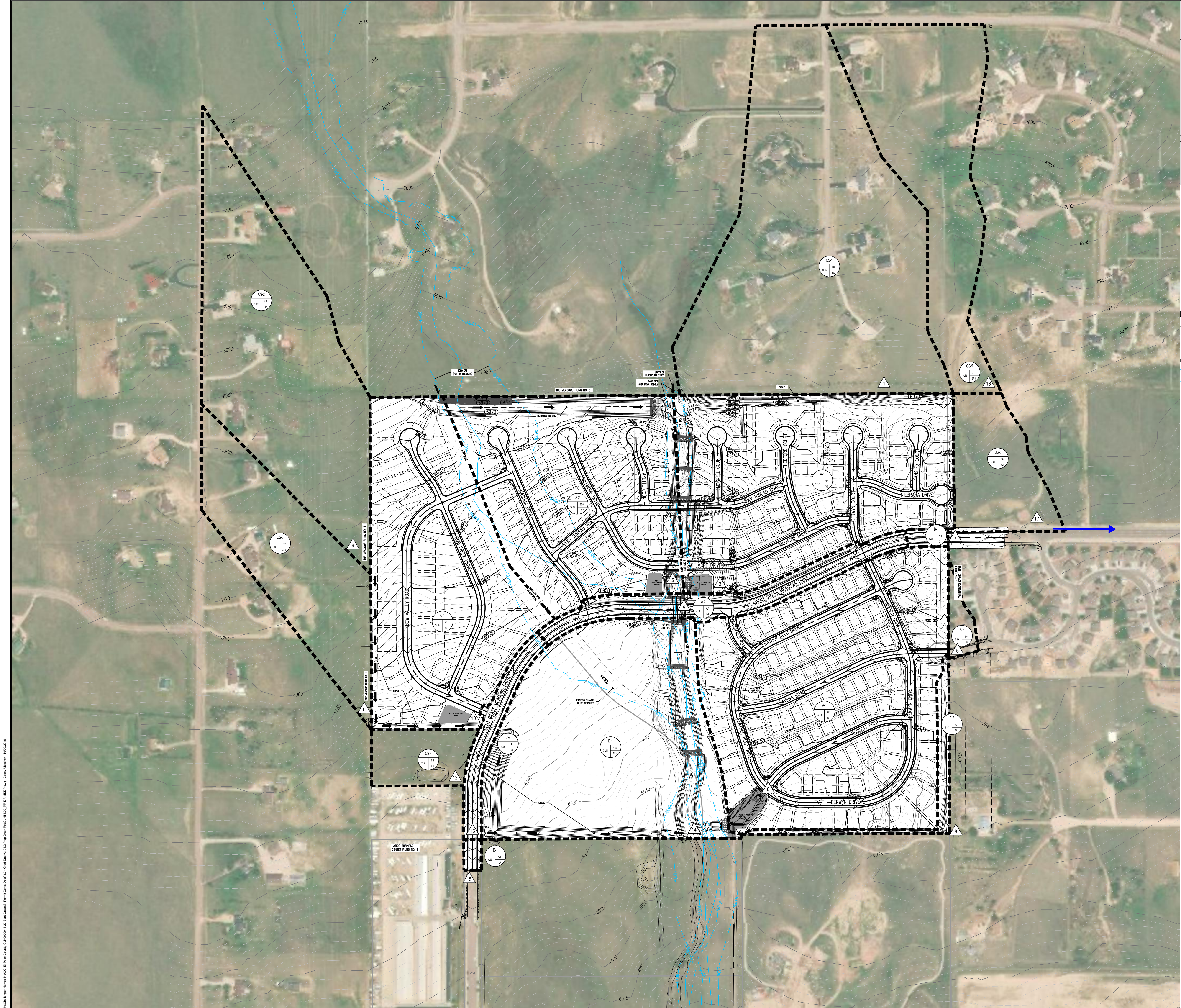
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Project No: CLH000014.20
Drawn By: CMWJ
Checked By: SMB
Date: OCTOBER 2019

EXISTING DRAINAGE MAP

DR-1

Sheet 1 of 3



- DRAINAGE LEGEND**
- PROPERTY LINE
 - EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - BASIN BOUNDARY LINE
 - FEMA EFFECTIVE 100-YR FLOODPLAIN
 - CENTERLINE OF STREAM
 - 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
 - WATER QUALITY CONTROL VOLUME DETENTION POND

RUNOFF SUMMARY TABLE

Basin ID	Qs (cfs)	Q100 (cfs)
A-1	29.5	70.3
A-2	25.6	61.2
A-3	6.7	15.6
A-4	39.3	86.4
A-5	1.6	3.6
B-1	1.0	2.1
B-2	3.2	7.0
C-1	23.2	58.0
C-2	4.1	9.0
D-1	33.8	74.3
E-1	1.0	1.9
OS-1	16.0	68.2
OS-2	9.3	43.4
OS-3	5.2	24.3
OS-4	0.9	6.0
OS-5	4.9	27.8
OS-6	8.8	19.4

DESIGN POINT SUMMARY TABLE

Design Point	Qs (cfs)	Q100 (cfs)
1	16.1	68.2
2	29.5	70.3
3	25.6	61.2
4	71.9	201.4
5	1.6	3.6
6	40.4	88.9
7	1.0	2.1
8	3.2	7.0
9	9.3	43.4
10	32.6	101.4
11	5.3	24.3
12	0.9	6.0
13	36.5	113.4
14	33.8	74.3
15	1.0	1.8
16	4.9	27.8
17	8.8	19.3

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BENT GRASS RESIDENTIAL FILING NO. 2 DRAINAGE PLAN

BENT GRASS MEADOWS DRIVE COLORADO SPRINGS, COLORADO

#	Date	Issue / Description	Init.
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PROPOSED DRAINAGE MAP - MDDP

