Floodplain Mapping Update in the City of St. Catharines

FINAL REPORT

October 30, 2019

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Sign-off Sheet

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Abbreviations

CN	Curve Number
DEM	Digital Elevation Model
DPSI	Depression Storage
GIS	Geographic Information System
ha	Hectares
HEC-RAS	Hydrologic Engineering Center's River Analysis System
IA	Initial Abstraction
LGI	Overland Flow Length of Pervious Area
masl	Meters Above Sea Level
MECP	The Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
NPCA	Niagara Peninsula Conservation Authority
RMSE	root mean square error
SCS	Soil Conservation Service
SLPI	Average Slope of Impervious Area
SLPP	Average Slope of Pervious Area
TIMP	Total Imperviousness Percentage
Tp	Time to Peak
VO5	Visual OTTHYMO 5
XIMP	Ratio of Total Area Directly Connected to Impervious Area

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by the Niagara Peninsula Conservation Authority (NPCA) to undertake floodplain modelling and mapping update of two watersheds in the City of St. Catharines.

The objective of the project was to assist the NPCA with fulfilling its mandate to keep the public safe from flooding and erosion by updating the floodplain mapping of Walker and Beamer Creeks utilizing the most up-to-date digital mapping, modelling techniques and climate data sets.

Stantec has conducted hydrologic and hydraulic analysis for Walker and Beamer Creeks in the City of St. Catharines and generated the 100-year return period flood lines. Previous floodplain mapping was conducted by the NPCA in 1987 using the hydraulic model HEC2. Over the 30 years since the previous model was completed the climate and land use in the watershed have changed High-resolution DEM of the City of St. Catharines has also become available. The upstream limits of the updated floodplain mapping are the same as the 1987 Walker Creek and Beamer Creek floodplain mapping (NPCA, 1987).

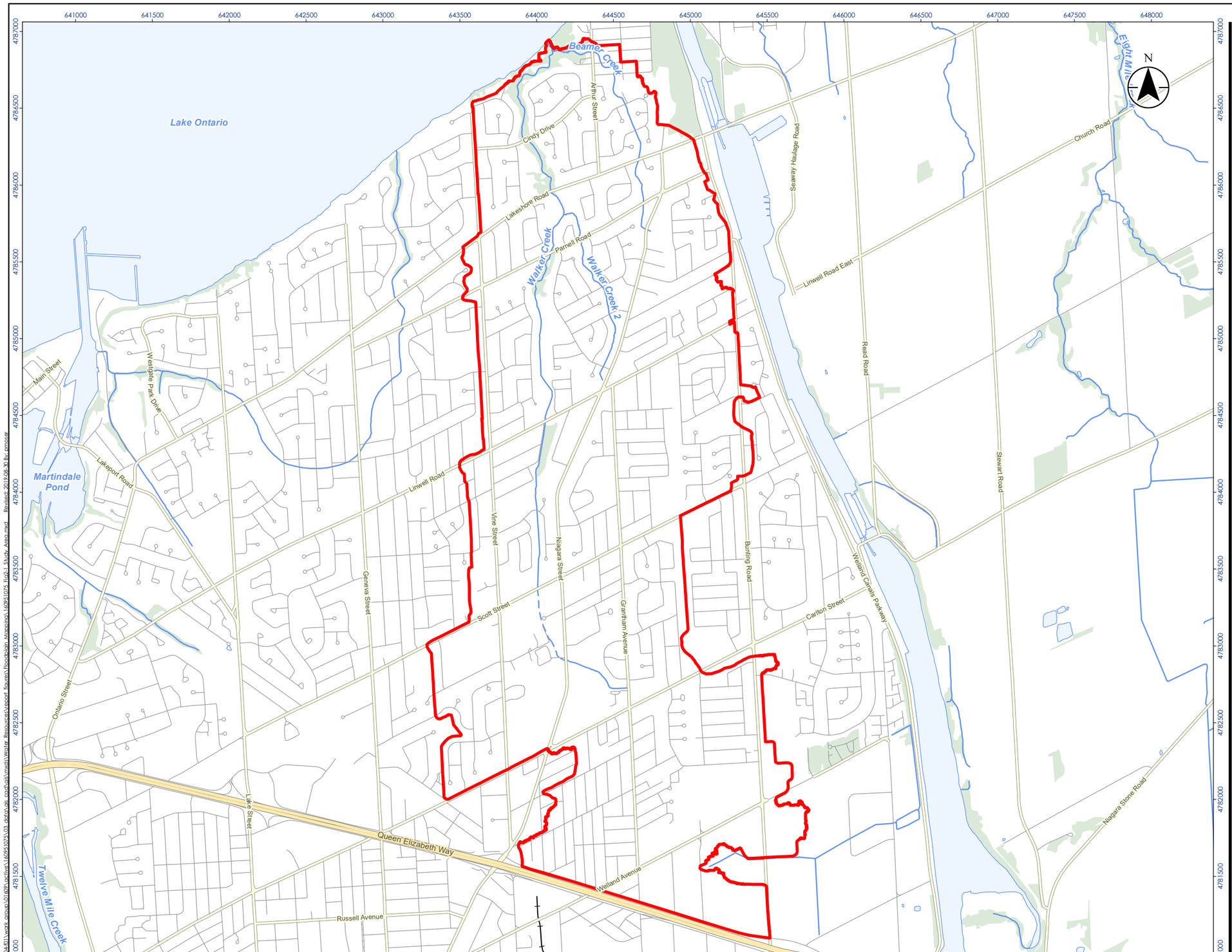
This floodplain modelling and analysis is consistent with the Ministry of Natural Resources and Forestry (MNRF) procedures and standards (MNRF, 2002) as well as Environment Canada's Flood Damage Reduction Program requirements (Environment Canada, 2010).

2.0 BACKGROUND

The Walker and Beamer Creek watersheds form a combined watershed located along the south shore of Lake Ontario on the north-east side of the City of St. Catharines (**Figure 2-1**). With a catchment area of nearly 8 km^2, the watershed is largely dominated by residential properties but also has many parks and recreational green spaces located along the watercourses. Walker's Creek Trail runs adjacent to Walker Creek through much of the watershed, providing residents with easy access to the natural watercourse and urban green space.

The channels of both creeks are generally trapezoidal in shape with the immediate floodplain of the creeks being heavily vegetated with large, well developed trees and grassy vegetation throughout. This natural vegetation is beneficial in maintaining the integrity of the channels and in reducing the impacts of local flooding. Due to the urban characteristics of the watershed, the creeks pass through many culverts and bridges associated with roads and other infrastructure.

Several large floods have been observed in Walker and Beamer Creeks over last few decades. The most recent large flood was observed in September of 2018. The approximately 100-year storm event caused flooding at several locations including some residential properties' backyards adjacent to the creeks. **Figure 2-2** shows the 2018 flooding extent along Walker Creek and McDermid Road. This flood was one of several validation events used in the hydrologic and hydraulic modelling presented in this report.



Stantec

Legend

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Storm Sewer
- Waterbody
- Wooded Area
- Study Area

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

Project Location
City of St. Catahrines, Ontario

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Prepared by PRM on 2019-08-30
Technical Review by NK on 2019-08-30

Client/Project
NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.
2-1

Title
Study Area

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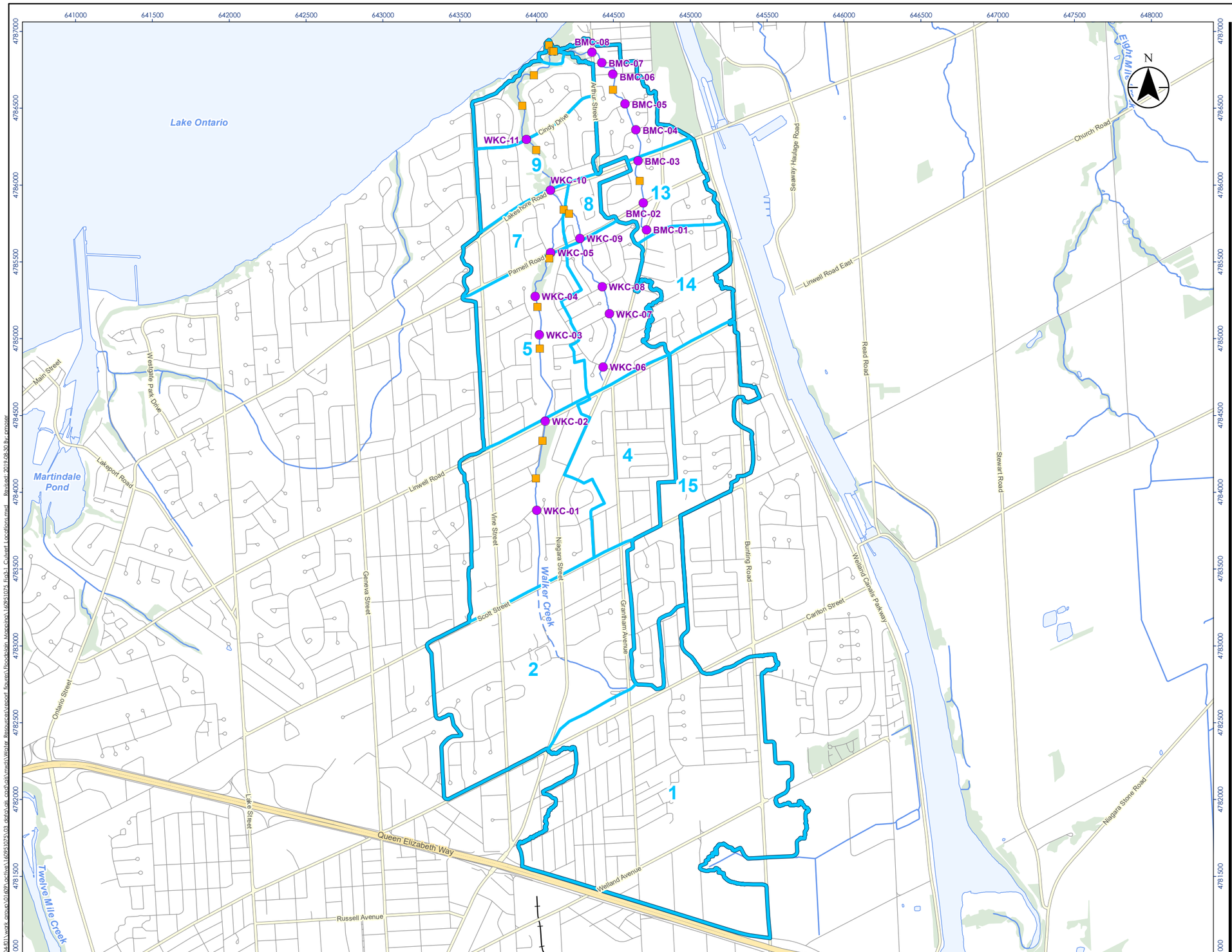
Figure 2-2: Flooding Event Along McDermid Road (September 3, 2018)

3.0 FIELD SURVEY

Stantec and J.D. Barnes conducted a field survey in October 2018 to collect the essential data to build hydrologic and hydraulic models of the study area. The purpose of the field survey was to collect the creeks' bathymetric data and combine it with the available Digital Elevation Model (DEM) to satisfy accuracy requirements of model input data. Thirty-four (34) road crossings (i.e., hydraulic structures) and cross sections were surveyed within the study area. For road crossings, upstream and downstream cross sections were surveyed as well as the required culverts' data including material, geometry, invert elevations, and road elevation. **Figure 3-1** presents survey locations within the study area. A photo log of water crossings is presented in **Appendix A.** The cross section and culvert data are presented in Section 5.2.



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Legend

- Culvert Location
- Survey Cross-Section Location
- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Storm Sewer
- Waterbody
- Wooded Area
- Subcatchment Boundary
- Catchment Boundary

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3-1

Title
Culvert Locations

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4.0 HYDROLOGICAL MODELLING

4.1 MODEL SELECTION

Several hydrological models were considered for this project. As a result of consultation with the NPCA and comparing benefits, usability, and local applicability it was decided to proceed with Visual OTTHYMO. Visual OTTHYMO 5.1 (VO5) is the latest update to Visual OTTHYMO 4.0 (VO4) and has well established rural and urban catchment routines to simulate both rural and urban hydrology. VO5 has been widely used for watershed studies, sub-watershed studies, master drainage plans, functional stormwater management plans, site plans, and stormwater management pond design in Ontario.

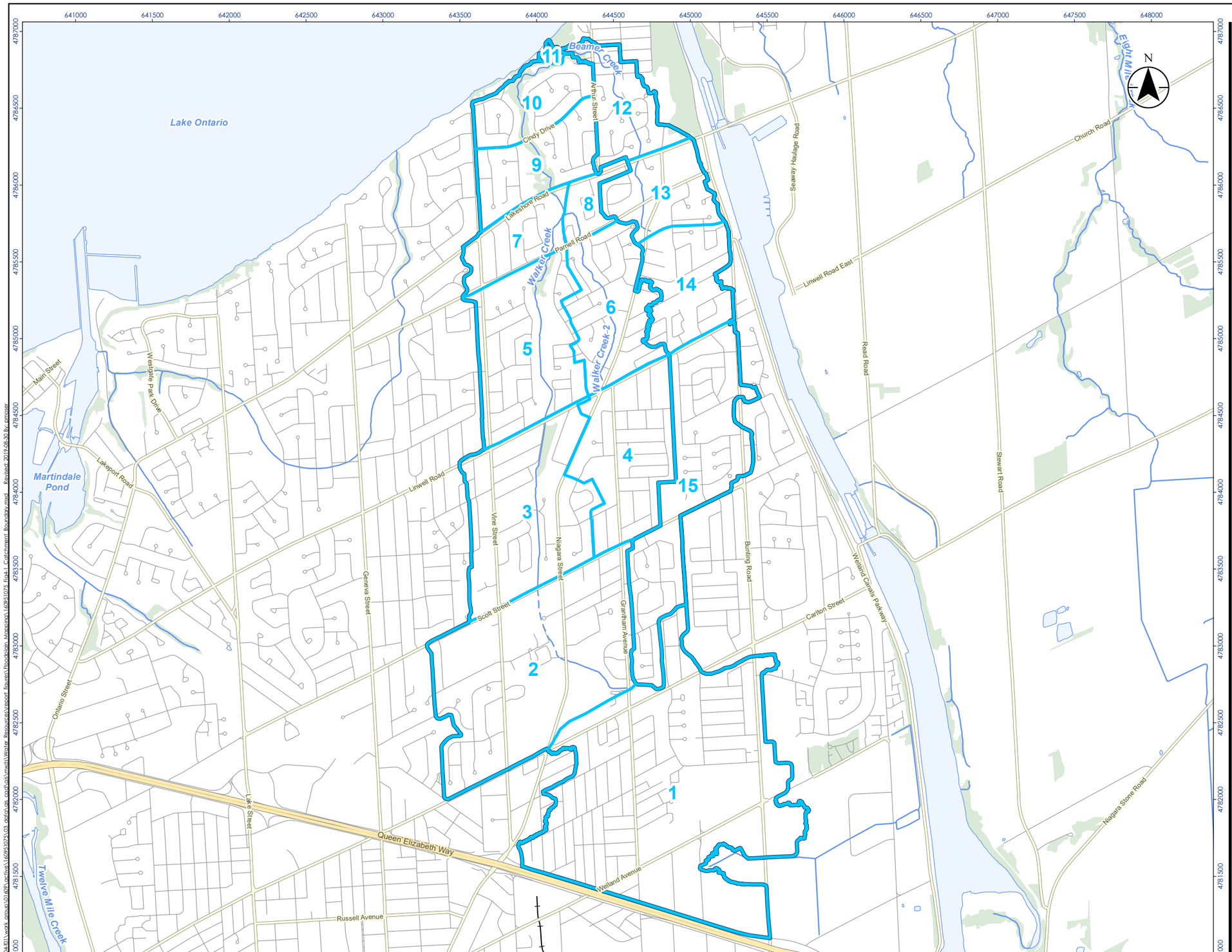
VO5 primarily uses the HYMO model engine developed by J.R. Williams in 1973. This engine was further developed at the University of Ottawa, where it was named OTTHYMO 83. The first graphical interface was developed by the founder of Civica in 1998 (Visual OTTHYMO 1.0). VO is currently being developed by Civica Infrastructure, and additional features and commands continue to be added. The continuous version of VO (5.0) was released in 2017 with the ability to simulate snow melt, infiltration, evapotranspiration and groundwater infiltration.

VO5 has been accepted as a valid hydrologic model by most municipalities, the Ministry of Natural Resources and Forestry (MNRF), the Ministry of the Environment, Conservation and Parks (MECP), and the Ministry of Transportation. Therefore, VO5 is a suitable hydrologic model to conduct the City of St. Catharines floodplain mapping update.

4.2 WATERSHED DELINEATION

Watershed delineation is an important step in developing any hydrologic model, in particular, modelling of urban watersheds. An accurate watershed delineation and discretization is required to generate accurate flows. The study area consists of two watersheds: Walker Creek and Beamer Creek. NPCA's 2015 DEM was used in ArcGIS to create watershed boundaries. The City of St. Catharines stormwater network GIS layer was used to adjust the watershed boundaries to account for city sewersheds and the location of stormwater outfalls. The Walker Creek and Beamer Creek watershed areas were calculated to be 703.7 hectares (ha) and 182.2 ha, respectively.

The Walker Creek and Beamer Creek watersheds were discretized into 11 and 4 sub-watersheds, respectively. The watershed discretization was based on land use, topography, location of hydraulic structures, and stormwater network. **Figure 4-1** presents the watersheds and sub-watersheds of the study area.



Stantec

Legend

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Storm Sewer
- Waterbody
- Wooded Area
- Subcatchment Boundary
- Catchment Boundary

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Figure No.
4-1

Title
Walker Creek and Beamer Creek Catchment Boundary

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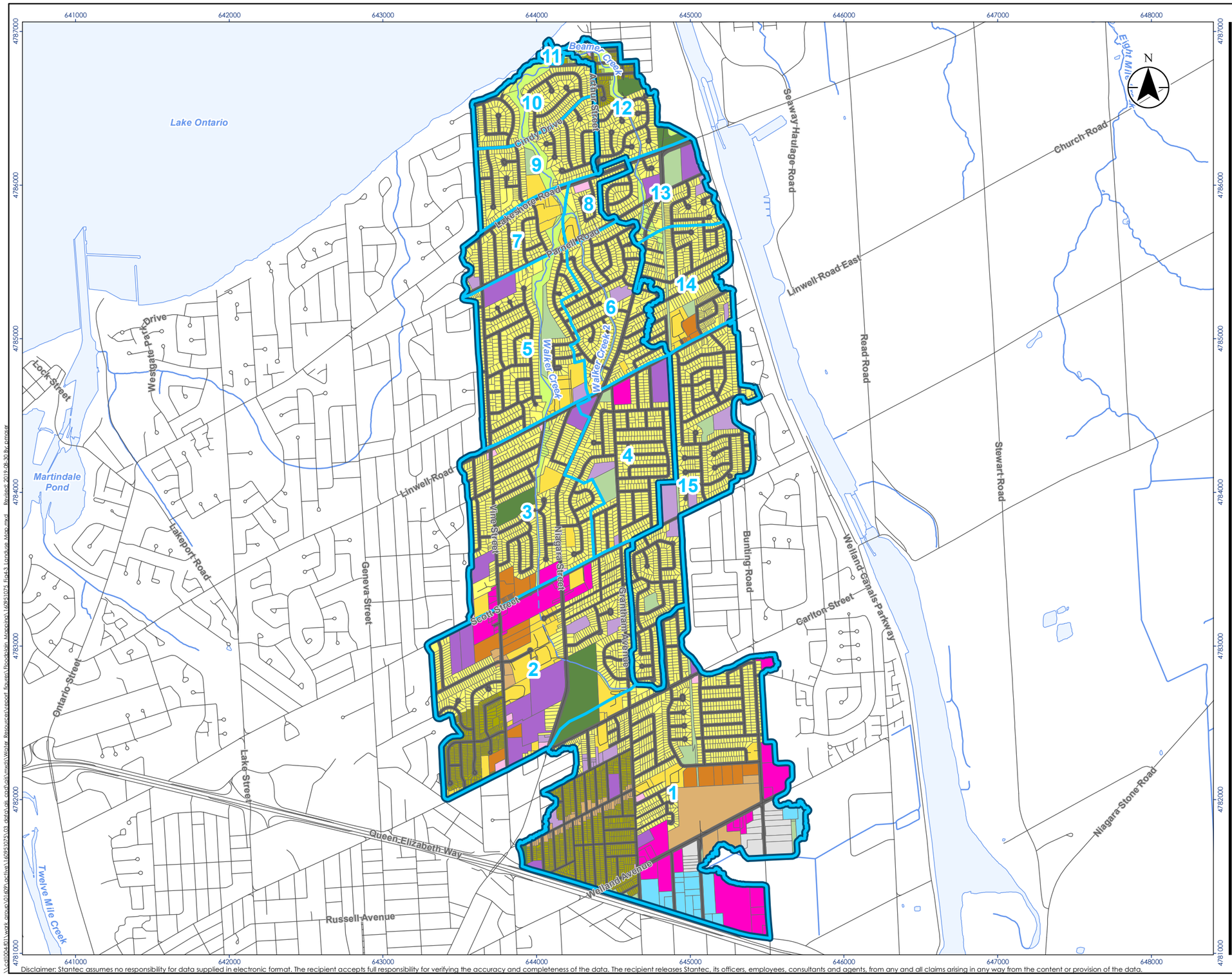
4.3 Land Use

NPCA's land cover data and the City of St. Catharines zoning map were used to create land cover and land use maps for the study area. The land use map represents the zoning map provided the city. **Figure 4-2** presents land use maps for the study area. The land use map was used to define important parameters of hydrologic modelling such as curve number (CN) and total imperviousness percentage (TIMP). Soil information was obtained from the soil database of the Ontario Ministry of Agriculture.



Stantec

Legend

- Road
- Watercourse
- Storm Sewer
- Waterbody
- Subcatchment Boundary
- Catchment Boundary

Zoning

- Low Density Residential -Suburban Neighbourhood (R1)
- Low Density Residential -Traditional Neighbourhood (R2)
- Medium Density Residential (R3)
- High Density Residential (R4)
- Local Convenience Commercial (C1)
- Community Commercial (C2)
- Business Commercial Employment (E1)
- General Employment (E2)
- Medium Density Mixed Use (M1)
- Conservation / Natural Area (G1)
- Minor Green Space (G2)
- Major Green Space (G3)
- Local Neighbourhood Institutional (I1)
- Community Institutional (I2)
- Transportation

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Notes

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3. Zoning By-Law, City of St. Catharines (December 16, 2013)

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4-2

Title
Landuse Map

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4.4 UNIT HYDROGRAPH SELECTION

VO5 uses StandHyd and NashHyd unit hydrographs to generate flow within urban and rural watersheds, respectively (Civica Infrastructure Inc., 2018a). StandHyd and NashHyd hydrographs were applied to sub-watersheds with TIMP larger than 20% and less than 20%, respectively. The first step of unit hydrograph selection was to calculate TIMP for each sub-watershed. **Table 4-1** presents VO5's recommended TIMP and a ratio of total area directly connected to impervious area (XIMP) for each land use (Civica Infrastructure Inc., 2018b).

Table 4-1: TIMP and XIMP Values for Different Land Use

Land use	TIMP	XIMP
Commercial	85%	85%
Low Density Residential (e.g. single units)	50%	25%
Medium Density Residential (e.g. semi-detached units)	55%	35%
High Density Residential and Institutional (townhouse units, condos, school)	60%	50%
Parks	0%	0%
Roads	100%	100%

Recommended values in **Table 4-1** and results of the watershed delineation were used to calculate the average weighted TIMP, XIMP, and CN for each sub-watershed and assign the appropriate unit hydrograph to each sub-watershed. **Table 4-2** provides a summary of each sub-watershed characteristics. As shown in the table, all sub-watersheds except sub-watershed 11 near the creek's mouth in Lake Ontario were classified as an urban sub-watershed. Therefore, a StandHyd unit hydrograph was assigned to fourteen sub-watersheds and a NashHyd unit hydrograph was assigned to one sub-watershed.

Table 4-2: Model Input Parameters

Sub-Watershed ID	Area (ha)	TIMP	XIMP	CN	VO5 Unit Hydrograph
1	216.42	67%	55%	87	StandHyd
2	130.19	60%	47%	87	StandHyd
3	82.07	59%	44%	87	StandHyd
4	58.61	63%	47%	88	StandHyd
5	65.75	54%	38%	85	StandHyd
6	47.55	60%	43%	87	StandHyd
7	25.94	61%	45%	87	StandHyd
8	11.67	61%	46%	87	StandHyd
9	34.70	61%	46%	87	StandHyd
10	29.36	39%	19%	81	StandHyd
11	1.41	9%	9%	72	NashHyd
12	29.80	49%	36%	84	StandHyd

Table 4-2: Model Input Parameters

Sub-Watershed ID	Area (ha)	TIMP	XIMP	CN	VO5 Unit Hydrograph
13	32.56	55%	42%	85	StandHyd
14	39.13	58%	40%	86	StandHyd
15	80.67	60%	44%	87	StandHyd

4.5 Channel Routing

Channel routing was required to simulate flood wave travel times and reduction in peak flow as flows propagate downstream along a reach. VO5 routes hydrographs through typical channel cross-sections using the variable storage coefficient method. The open channel cross-section in VO5 is described with X and Y coordinates. Other inputs are longitudinal slope and the variation of Manning's roughness coefficient across the width. DEM and field survey information were used to derive the required channel input parameters for VO5. **Table 4-3** provides a summary of the channels input parameter which were derived from field survey. Floodplain length was assumed the same as channel length in the model as the reaches within each sub-watershed are relatively straight.

Table 4-3: Channel Routing Input Parameters

Sub-Watershed ID	DT (min)	Channel Length (m)	Channel Slope (%)	Floodplain Slope (%)
2	10	1007	0.4	0.4
3	10	1110	0.8	0.8
5	10	1158	0.6	0.6
6	10	1008	0.5	0.5
7	10	483	2.5	2.5
8	10	265	0.5	0.5
9	10	362	1.4	1.4
10	10	721	1.7	1.7
11	10	164	9.6	9.6
12	10	1076	0.8	0.8
13	10	537	1.7	1.7

4.6 STORM SELECTION

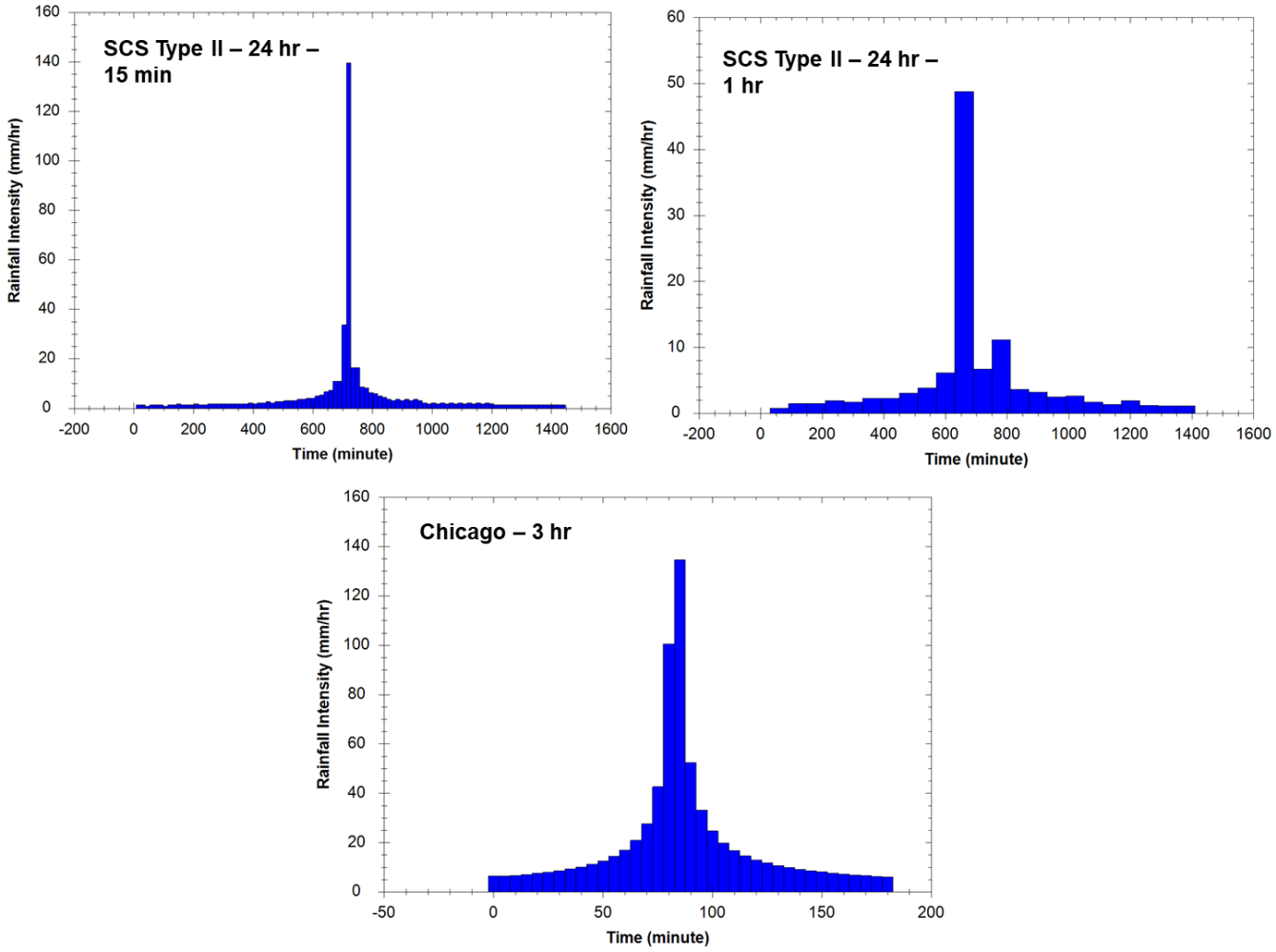
The Regulatory Flood event within the City of St. Catharines is the 100-year flood event (NPCA, 2018). The 100-year storm characteristics were selected based on the City of St. Catharines Engineering Standards Manual (2015) recommendations. Total rainfall depth for various storm durations and return periods was obtained from the Engineering Standards Manual and summarized in **Table 4-4**.

Table 4-4: City of St. Catharines Rainfall Depth in mm for Various Storm Duration and Return Frequencies

Storm Duration (hr)	2 year (mm)	5 year (mm)	10 year (mm)	25 year (mm)	50 year (mm)	100 year (mm)
1	25	30	33	39	43	47
2	31	37	41	48	52	58
3	35	41	46	53	59	65
4	37	44	50	58	64	70
6	42	49	56	65	71	79
12	50	59	67	78	86	95
24	60	71	80	94	104	114

The Engineering Standards Manual *(*2015) recommends that the Chicago storm distribution is the most common design storm for urban areas within the City of St. Catharines. However, the manual also indicates that the 24 hr SCS type II storm distribution can be used for storage facilities design in urban area and floodplain mapping studies. Therefore, in accordance with the Engineering Standards Manual recommendations, both the 3 hr Chicago and 24 hr SCS type II were used to generate the 100-year flood event based on the St. Catharines IDF curves. The 24 hr SCS Type II storm with a time step of 15 min and 1 hr was used. According to **Table 4-4**, total rainfall depths of 65 mm and 114 mm were used to generate the 100-year storm using the 3 hr Chicago and 24 hr SCS type II distributions, respectively. The storm which generated the largest peak flow was conservatively used to create floodplain maps. **Figure 4-3** shows the 100-year storm distributions. Section 4.8 provides a summary of flood flows generated using various 100-year storm distributions. The 24 SCS type II storm with a time step of 15 min generated the greatest 100-year peak flow.

Figure 4-3: 100-Year Chicago and SCS Type II Storm Distributions for St. Catharines



4.7 MODEL SETUP

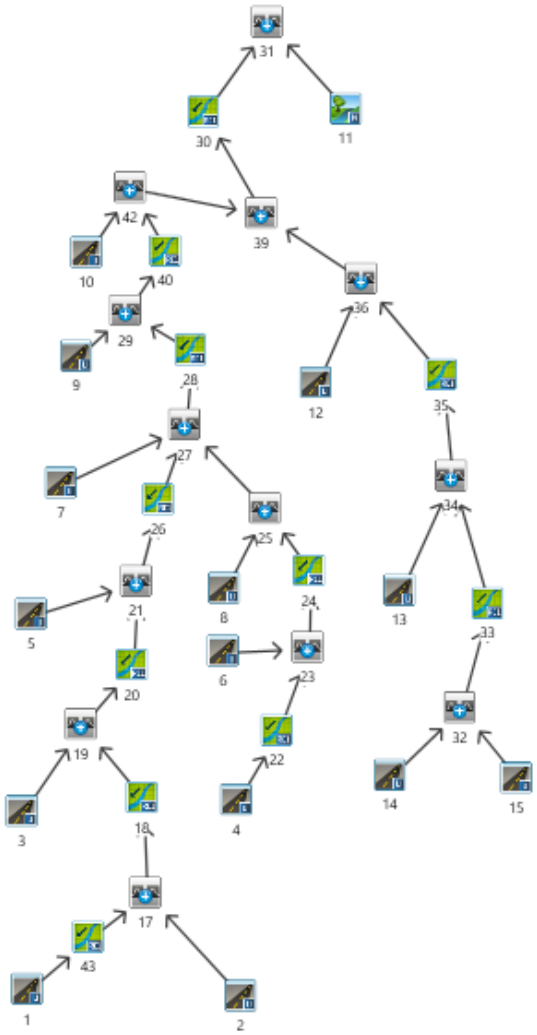
4.7.1 Model Parameters

VO5 has two groups of input parameters, physical and process parameters. Physical parameters define watershed area, watershed slope, channel geometry, and channel slope. Physical parameters are calculated in ArcGIS using available physical information and do not change during model calibration.

Process parameters are defined based on the hydrograph type. StandHyd has the following parameters: TIMP, XIMP, available depression storage (DPSI), average slope of impervious area (SLPI), average slope of pervious area (SLPP), overland flow length of pervious area (LGP), Manning number for pervious surfaces (MNP and MNI). NashHyd has three variable parameters: CN, initial abstraction (IA), time to peak (Tp). Initial values of process parameters are defined based on available watershed information and then modified, within a prescribed range, during calibration.

Figure 4-4 shows an overview of the VO5 model for the study area with 15 sub-watersheds and associated unit hydrographs and channel routing.

Figure 4-4: Schematic of Walker Creek and Beamer Creek VO5 Model



4.7.2 Model Calibration and Validation

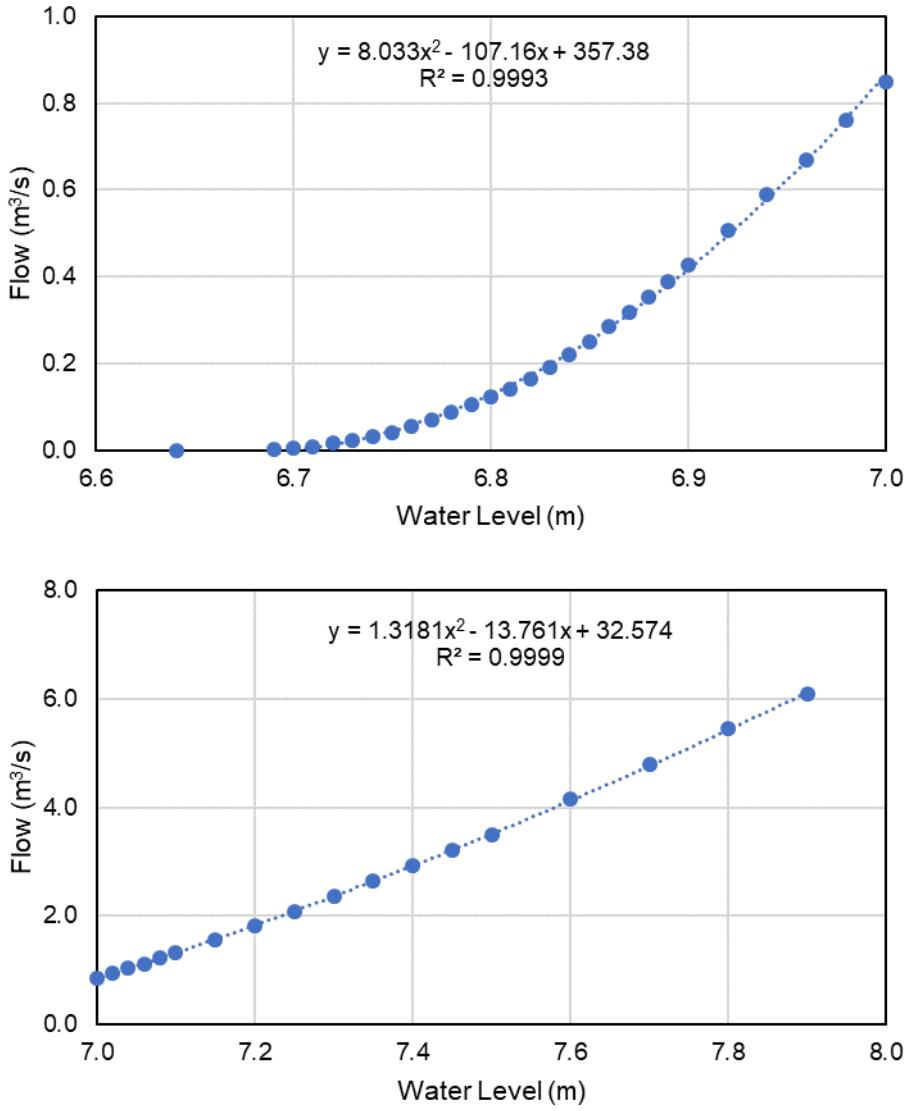
An important step in developing a hydrological model is to calibrate and validate it using historical stream flows and rainfall data. The calibration and validation process assist in the selection of an optimal set of model parameters so the model can accurately predict flows at different model nodes. Since this study was focused on the 100-year flood event, the event based calibration and validation were conducted based on observed peak flows within the study area.

4.7.2.1 Precipitation and Streamflow Data

The Water Survey of Canada (WSC) station 02HA027 on Walker Creek monitored flows for the period of 1991 – 1995. Since 1996 the NPCA has been monitoring continuous water levels at this station. This station was located downstream of Walker Creek near the Walker Creek crossing on Cindy Drive which is an optimal location to calibrate the VO5 hydrologic model. Continuous precipitation data was recorded at NPCA's climate station at Port Dalhousie located 3 km south west from station 02HA027 for the period of 1998 – 2018.

The NPCA has a continuous water level gauge near the WSC station which was used to create a rating curve for the measured flows and water levels at this station. Stantec utilized the NPCA's rating curve to find a relationship between water levels and flows at this station. Two separate rating curve equations (for low and high flows) were developed to calculate flows based on observed water levels at this station. The NPCA has an assumed water level datum at this station. **Figure 4-5** shows the rating curves for water levels between 6.64 m – 7.00 m and 7.00 m – 8.00 m. Both rating curves have very good fit, with R^2 of almost 1 between observed flows and water levels.

Figure 4-5: Walker Creek Rating Curve at WSC Station 02HA027



The rating curve equations were used to calculate the Walker Creek flow at the NPCA's water level gauge near the Cindy Drive road crossing for the period of 2009 – 2018 at a 5 minutes interval. **Figure 4-6** shows a time series of flow for the period of 2009 – 2018 which indicates an increasing trend in observed flows from 2009 to 2018. The two highest peak flows were observed in 2017; 5.3 m^3/s on May 1, 2017 and 6.1 m^3/s on October 9, 2017. Four peak flows including the two high flow events in 2017 were selected to calibrate the hydrologic model. **Table 4-5** summarizes the selected peak flow events for model calibration and validation.

Figure 4-6: Time Series of Flow in Walker Creek at WSC Station 02HA027

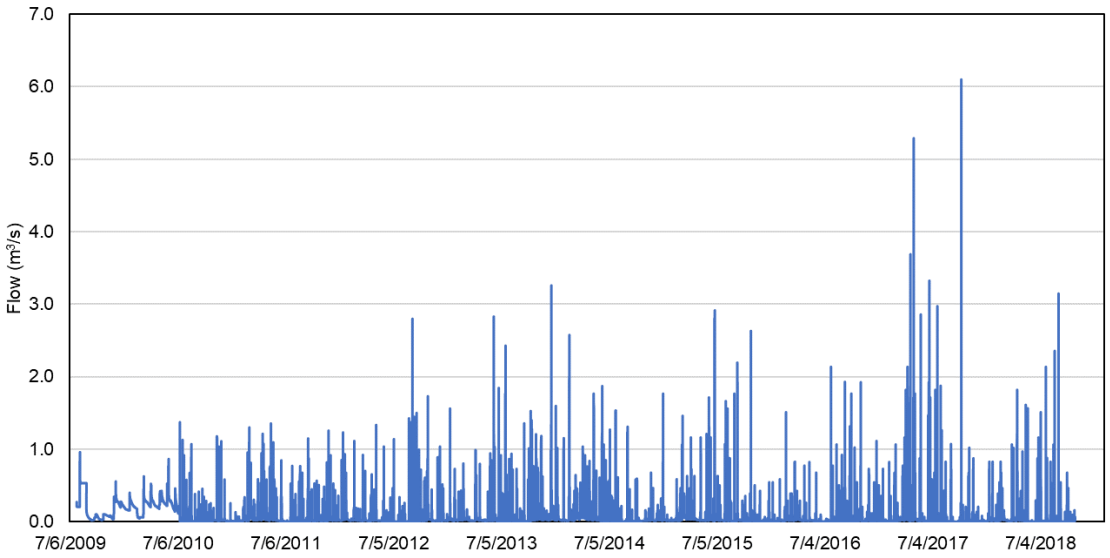


Table 4-5: Hydrologic Model Calibration and Validation Events

Date	Flow (m^3/s)	Event
2015-09-02	1.77	Calibration
2016-07-25	2.14	Calibration
2017-05-01	5.30	Calibration
2017-10-09	6.10	Calibration
2012-09-08	2.80	Validation
2015-06-27	2.42	Validation

Figure 4-7 presents the results of model calibration for four calibration events. As shown on the figure, the observed and simulated flows match well showing an R^2 value of 0.93. In addition, the slope of the fitted linear trendline to simulated and observed peak flows is close to 1 which is an evidence of a well calibrated model.

Figure 4-7: VO5 Model Calibration Results

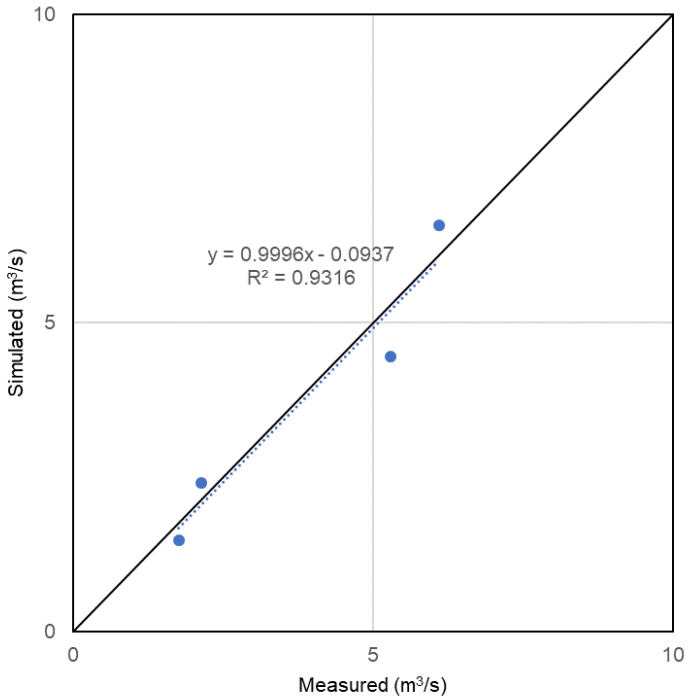


Table 4-6 provides a summary of statistics for calibration and validation events. For calibration events the absolute error varies between 8% and 16% and the root mean square error (RMSE) is 14%. For validation events the absolute error varies between 14% and 18% and RMSE is 16%. An overview of the results indicates that the model accuracy is consistent for the validation events.

Table 4-7 and **Table 4-8** provide a complete list of the final calibrated hydrologic model input parameters.

Table 4-6: Summary of Model Performance for Calibration and Validation Events

Date	Observed Flow (m^3/s)	Simulated Flow (m^3/s)	Event	RMSE	Absolute Error
2015-09-02	1.77	1.48	Calibration	14%	16%
2016-07-25	2.14	2.41			13%
2017-05-01	5.3	4.46			16%
2017-10-09	6.1	6.58			8%
2012-09-08	2.8	3.2	Validation	16%	14%
2015-06-27	2.42	2.85			18%

Table 4-7: StandHYD Final Calibrated Model Parameters

Sub-watershed ID	Area (ha)	TIMP (%)	XIMP (%)	SLPP (%)	SLPI (%)	LGP (m)	MNP	DPSI (mm)	LGI (m)	MNI	DT (min)
1	216.4	31%	25%	0.8%	0.8%	40	0.4	4	1201.1	0.03	10
2	130.2	27%	21%	0.8%	0.8%	40	0.4	4	931.7	0.03	10
3	82.1	27%	20%	0.9%	0.9%	40	0.4	4	739.8	0.03	10
4	58.6	29%	21%	0.8%	0.8%	40	0.4	4	625.0	0.03	10
5	65.8	25%	17%	1.1%	1.1%	40	0.4	4	662.3	0.03	10
6	47.5	27%	20%	1.1%	1.1%	40	0.4	4	562.7	0.03	10
7	25.9	28%	21%	1.2%	1.2%	40	0.4	4	415.5	0.03	10
8	11.7	28%	21%	1.2%	1.2%	40	0.4	4	279.3	0.03	10
9	34.7	28%	21%	1.3%	1.3%	40	0.4	4	481.0	0.03	10
10	29.36	18%	9%	1.3%	1.3%	40	0.4	4	442.4	0.03	10
12	29.8	22%	16%	1.4%	1.4%	40	0.4	4	445.7	0.03	10
13	32.6	25%	19%	1.0%	1.0%	40	0.4	4	466.2	0.03	10
14	39.1	27%	18%	1.0%	1.0%	40	0.4	4	510.6	0.03	10
15	80.7	27%	20%	0.9%	0.9%	40	0.4	4	733.5	0.03	10

Table 4-8: NashHYD Final Calibrated Model Parameters

Sub-watershed ID	Area (ha)	CN	IA (mm)	Tp (hr)	DT (min)
11	1.4	52	2.5	0.2	10

4.8 HYDROLOGIC MODEL RESULTS

The calibrated hydrologic model was run for the 100-year Chicago and SCS Type II storm distributions. **Table 4-9** provides the hydrologic model results for each storm. Results indicate that the 24 hr SCS Type II storm with a time step of 15 min generates larger peak flows compared to other two storm distributions and, therefore, the peak flows from this storm were used to develop a floodplain map of the study area.

Table 4-9: Flow Rates (m^3/s) for Different Storm Distributions at 100-year Flow

Sub-Watershed ID	SCS II 24 hr (1 hr)	SCS II 24 hr (15 min)	Chicago (3 hr)
1	6.3	11.1	8.2
2	7.9	11.6	7.4
3	9.4	11.7	8.7
5	9.9	12.2	8.7
7	10.2	14.0	10.1
4	1.8	3.9	2.7
6	2.9	5.0	3.3
8	3.2	5.2	3.9
Confluence of Walker Creek (7 & 8)	13.3	16.6	11.2
9	13.8	17.7	11.7
Confluence of Beamer Creek and Walker Creek (10)	13.9	17.6	12.4
11	18.0	24.4	17.0
12	3.9	7.2	4.7
13	3.9	7.2	4.7
14	3.1	7.0	4.0

5.0 HYDRAULIC MODELLING

5.1 MODEL SELECTION

The Unites States Army Corps of Engineers' Hydrologic Engineering Center River Analysis System (HEC-RAS) was used to build a hydraulic model of Walker Creek and Beamer Creek. HEC-RAS simulates one-dimensional steady and unsteady flow river hydraulics, water surface profile calculations and inundation mapping. HEC-RAS is comprised of a graphical user interface, separate hydraulic analysis components, data storage and management capacities, graphics and reporting features.

5.2 MODEL SETUP

The hydraulic model was georeferenced in NAD83-UTM 17 coordinate system. The following sections describe step by step model development.

5.2.1 Cross Sections

The field survey data was used to create 34 cross sections within the study area. In addition, an interpolation was performed between each surveyed cross section to establish a maximum distance of 100 m between each cross section. The DEM was used to generate additional cross-sections. **Appendix B** presents the surveyed cross sections. For cross sections located downstream and upstream of the culverts, expansion and contraction coefficients of 0.6 and 0.8 were used (Chow, 1959). For cross sections located between hydraulic structures expansion and contraction coefficients of 0.1 and 0.3 were used. Manning's roughness coefficient (n) was 0.08 for channel and 0.15 for floodplain, it was estimated based on model calibration. The selected expansion and contraction coefficients and Manning's n were further evaluated during model calibration and validation.

5.2.2 Culverts

Culverts' material, geometry, invert elevations, and road elevations were collected during the field survey. In addition, culvert inlet and outlet conditions were defined based on field observations. **Table 5-1** provides a summary of culverts' information that was used in the HEC-RAS model. The culvert modelling was performed based on the assumption of no damage and no blockage due to debris accumulation or sedimentation. Regular maintenance is recommended to maintain hydraulic structures in working conditions.

Table 5-1: Culverts' Input Parameters

ID	Material	Shape	n	No.	H (m)	W (m)	L (m)	US Invert Elevation	DS Invert Elevation	Road Elevation	Note
WKC-01	Concrete	Box	0.013	1	1.80	3.90	21.5	88.68	88.65	91.31	Regent Drive
WKC-02	Concrete	Box	0.013	1	2.14	3.12	24.0	86.77	86.74	89.61	Linwell Road
WKC-03	CSP	Arch	0.027	2	1.01	1.80	3.4	84.01	83.99	85.57	Keistan Drive
WKC-04	CSP	Arch	0.027	2	1.20	1.80	4.5	83.64	83.54	85.08	Costen Boulevard
WKC-05	CSP	Arch	0.027	1	2.52	3.90	24.4	82.40	82.09	86.36	Parnell Road
WKC-06	Concrete	Box	0.013	1	1.25	1.83	18.0	88.00	87.89	89.87	Richelieu Road
WKC-07	Concrete	Box	0.013	1	1.30	1.85	20.0	85.94	85.83	88.41	Oxford Road
WKC-08	CSP	Arch	0.027	1	2.00	2.00	23.4	84.81	84.66	88.11	Trelawne Drive
WKC-09	CSP	Arch	0.027	1	1.85	2.56	29.7	82.93	82.89	86.01	Parnell Road
WKC-10	Concrete	Box	0.013	1	1.60	3.00	14.0	81.30	81.25	84.08	Lakeshore Road
WKC-11	CSP	Arch	0.027	1	2.30	3.60	35.0	79.27	79.20	83.89	Cindy Drive
BMC-01	Concrete	Box	0.013	1	1.04	2.45	12.0	83.80	83.77	85.61	Niagara Street
BMC-02	CSP	Arch	0.027	1	1.78	2.56	50.0	83.34	83.16	85.49	Parnell Road
BMC-03	Concrete	Box	0.013	1	1.55	3.33	16.5	82.34	82.29	85.02	Lakeshore Road
BMC-04	Concrete	Box	0.013	1	2.27	3.35	20.0	81.12	80.87	84.07	Croydon Drive
BMC-05	Concrete	Box	0.013	1	2.00	3.33	21.0	80.29	79.95	83.20	Croydon Drive
BMC-06	CSP	Pipe	0.027	2	1.30	1.50	25.0	78.00	77.88	82.55	Wildwood Road
BMC-07	CSP	Arch	0.027	2	1.22	1.84	30.0	77.76	77.67	82.80	Melody Trail
BMC-08	Concrete	Box	0.013	1	2.03	2.43	42.8	77.17	77.14	80.77	Arthur Street

5.2.3 Boundary Conditions and Steady Flow Change Locations

Flow change locations were added at each major road crossing (a boundary of each sub-watershed) and where the stormwater discharges into the creek (i.e., stormwater outfall). In addition, the observed Lake Ontario water level at WSC station 02HA018 was used as the downstream boundary condition. **Figure 5-1** shows historical records of the Lake Ontario's water levels at WSC station 02HA018 for the period of 1956 – 2018. The minimum and maximum daily water level were 73.69 meters above sea level (masl) and 75.941 masl which were observed on February 3, 1965 and May 28, 2017. As suggested by the NPCA staff, For the 100-year floodplain modelling purposes, the average observed Lake Ontario water level of 75.15 masl was used as the downstream boundary condition. This assumption is considered a conservative approach as it is expected that high water levels at the downstream boundary would result in a larger flooded area due to backwater effects. **Table 5-2** provides downstream boundary conditions for each modelling scenario including calibration, validation, and the 100-year event.

Figure 5-1: Lake Ontario Daily Water Level at WSC Station 02HA018 (1956 – 2018)

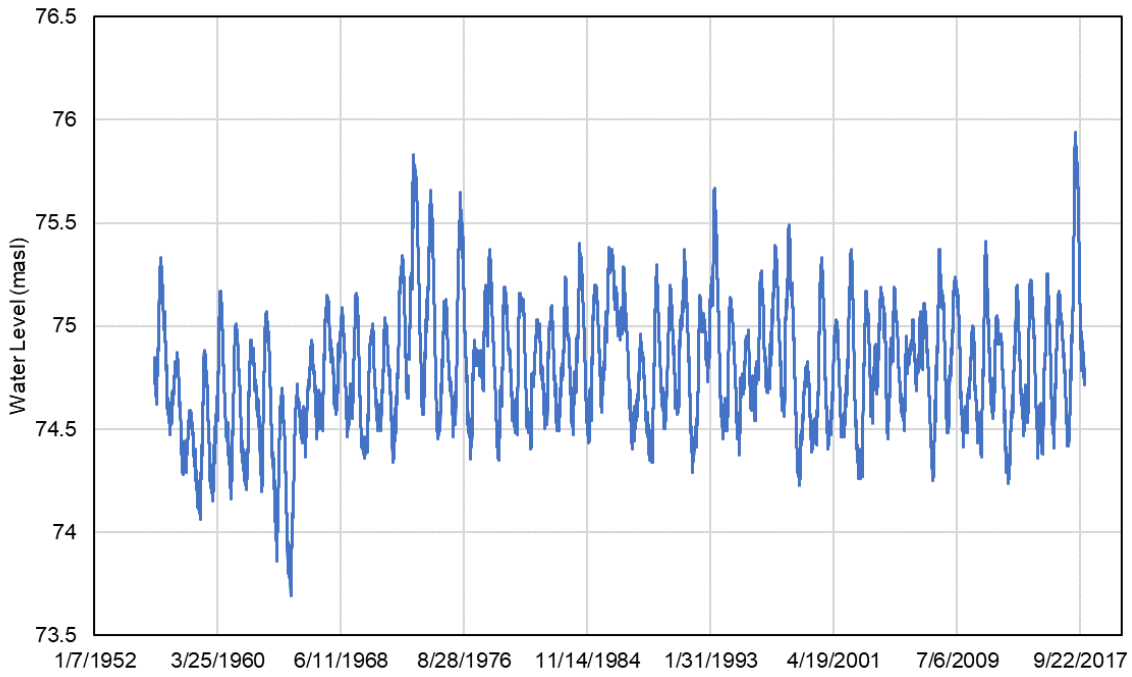


Table 5-2: HEC-RAS Model Downstream Boundary Conditions

Modelling Scenario	Downstream Water Level (m)
2015-09-02	75.005
2016-07-25	74.930
2017-05-01	75.569
2017-10-09	74.935
2012-09-08	74.700
2015-06-27	75.195
100 year event	75.15

Peak flows from **Table 4-9** were used as flow boundary conditions for studied sub-watersheds.

5.3 MODEL CALIBRATION AND VALIDATION

HEC-RAS model was calibrated to observed water levels at the NPCA's water level gauge on Cindy Drive. Manning's n of 0.08 and 0.15 were used for channel and floodplain, respectively. **Figure 5-2** presents results of model calibration for four calibration events. As shown in Figure 5-3, the calibrated HEC-RAS model shows good performance for the four calibration peak flow events with R^2=0.96. In addition, a fitted linear trendline to simulated and observed peak flows was almost 1 which is an evidence of a well calibrated model.

Figure 5-2: HEC-RAS Model Calibration Result for 4 Events

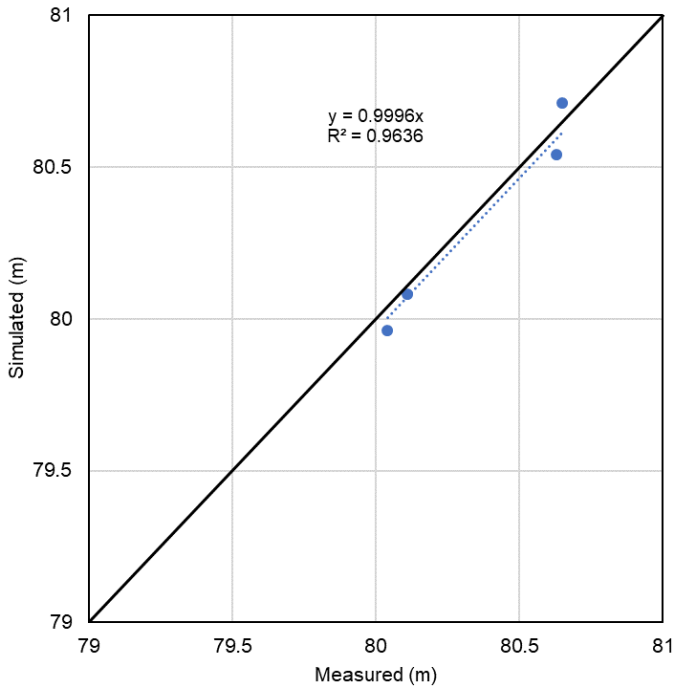


Table 5-3 provides a summary of statistics for calibration and validation events. For calibration events the absolute error varies between 0.01 m and 0.09 m and the root mean square error (RMSE) is 0.07 m; which indicates a good calibration. For validation events the absolute error varies between 0.01 m and 0.06 m and RMSE was 0.04 m. In absolute values the difference between observed and model simulated varies from 0.01 m to 0.09 m. An overview of the results indicates that the model accuracy is consistent for the validation events and the HEC-RAS model is sufficiently calibrated for floodplain modelling.

Table 5-3: HEC-RAS Model Performance for Calibration and Validation Events

Date	Measured WSE (m)	Simulated WSE (m)	Event	RMSE (m)	Absolute Error (m)
2015-09-02	80.04	79.96	Calibration	0.07	0.08
2016-07-25	80.11	80.08			0.03
2017-05-01	80.63	80.59			0.09
2017-10-09	80.65	80.74			0.06
2012-09-08	80.16	80.24	Validation	0.04	0.06
2015-06-27	80.15	80.19			0.01

5.4 HYDRAULIC MODELLING RESULTS AND FLOODPLAIN MAPPING

The calibrated HEC-RAS model was run for the 100-year flood event. HEC-RAS model results were exported and processed in ArcGIS to prepare a floodplain map of the study area. Figures 5-4 to 5-8 present the 100-year floodplain map of the study area including the 100-year flood level at each cross section. **Table 5-4** provides a summary of the 100-year water level and average channel velocity upstream and downstream of each culvert crossing. HEC-RAS model results for each cross section are presented in **Appendix B**.

In order to validate the floodplain map, the September 2018 flood events were analyzed. On September 3, 2018, a precipitation event with a duration of one hour (between 14:10 pm and 15:10) with total depth of 51 mm was observed. According to the City of St. Catharines total precipitation depth (**Table 4-4**), this event is almost equivalent to a 100-year storm event. Walker Creek was overtopped along McDermid Road and backyards along this road were flooded (**Figure 2-2**). The updated floodplain map also shows that this area is flooded during a 100-year storm event. This verification is based on photos provided by the residents and it indicates that the updated floodplain map represents actual conditions during a 100-year storm.

A review the HEC-RAS modelling results indicates that culverts WKC-03, WKC-04, WKC-06, and WKC-10 on Walker Creek and culvert BMC-01 on Beamer Creek will be overtopped during the 100-year flood event. In addition, culverts WKC-01 and WKC-07 on Walker Creek and BMC-2, BMC-6, and BMC-7 on Beamer Creek will be operating under a headwater condition.

A few local and access roads along the creeks including McDermid Road, Silver Drive, Richelieu Drive, Lakeshore Road at Walker Creek, and Walker Creek trail are vulnerable during the 100-year flood.

An analysis of private property lines indicates that 169 private land parcels will be partially flooded during the 100-year flood event. **Table 5-5** provides the number of private parcels affected by the 100-year flood for each reach. In addition, **Table 5-6** summarizes a list of public institutions and parks and businesses that may partially be affected by the 100-year flood event. **Table 5-7** provides a list of habitable structures that my be affected by the 100-year flood event.

Table 5-4: 100-Year Flood Level and Average Channel Velocity

River	Reach	River Station	100-year WSE (m)	Average Channel Velocity (m/s)	Note	Street
Walker & Beamer	1	16	75.26	3.31		
Walker Creek	2	1567	84.43	1.05		
Walker Creek	2	1582			Culvert-WKC-09	Parnell Rd
Walker Creek	2	1598	84.67	0.81		
Walker Creek	2	1940	85.7	2.24		
Walker Creek	2	1950			Culvert-WKC-08	Trelawne Dr
Walker Creek	2	1961	86.52	1.62		
Walker Creek	2	2131	87.28	1.5		
Walker Creek	2	2146			Culvert-WKC-07	Oxford Rd
Walker Creek	2	2161	87.65	0.75		
Walker Creek	2	2491	89.39	0.31		
Walker Creek	2	2504			Culvert-WKC-06	Richelieu Rd
Walker Creek	2	2517	89.79	0.76		
Walker Creek	3	724	80.82	1.3		
Walker Creek	3	745			Culvert-WKC-11	Cindy Dr
Walker Creek	3	766	82.08	1.16		
Walker Creek	3	1125	82.69	1.89		
Walker Creek	3	1155			Culvert-WKC-10	Lakeshore Rd
Walker Creek	3	1159	84.09	0.53		
Walker Creek	4	1538	84.53	0.78		
Walker Creek	4	1567			Culvert-WKC-05	Parnell Rd
Walker Creek	4	1597	84.9	0.88		
Walker Creek	4	1899	85.2	0.62		
Walker Creek	4	1912			Culvert-WKC-04	Costen Blvd
Walker Creek	4	1924	85.35	1.01		
Walker Creek	4	2144	86.26	0.68		
Walker Creek	4	2164			Culvert-WKC-03	Keistan Dr
Walker Creek	4	2173	86.33	1.05		

Table 5-4: 100-Year Flood Level and Average Channel Velocity

River	Reach	River Station	100-year WSE (m)	Average Channel Velocity (m/s)	Note	Street
Walker Creek	4	2725	88.41	0.79		
Walker Creek	4	2750			Culvert-WKC-02	Linewell Rd
Walker Creek	4	2774	88.81	1.12		
Walker Creek	4	3322	90.71	0.96		
Walker Creek	4	3342			Culvert-WKC-01	Regent Dr
Walker Creek	4	3362	90.92	0.78		
Beamer Creek	5	236	78.91	1.07		
Beamer Creek	5	247			Culvert-BMC-08	Arthur St
Beamer Creek	5	277	79.12	0.83		
Beamer Creek	5	354	79.21	0.63		
Beamer Creek	5	360			Culvert-BMC-07	Melody Trail
Beamer Creek	5	378	79.87	0.59		
Beamer Creek	5	494	79.98	0.81		
Beamer Creek	5	507			Culvert-BMC-06	Wildwood Dr
Beamer Creek	5	514	80.65	0.6		
Beamer Creek	5	714	81.14	1.02		
Beamer Creek	5	722			Culvert-BMC-05	Corydon Dr
Beamer Creek	5	745	81.57	0.83		
Beamer Creek	5	904	82.32	1.3		
Beamer Creek	5	916			Culvert-BMC-04	Corydon Dr
Beamer Creek	5	928	82.47	1.16		
Beamer Creek	5	1105	83.46	1.25		
Beamer Creek	5	1121			Culvert-BMC-03	Lakeshore Rd
Beamer Creek	5	1138	83.71	0.92		
Beamer Creek	5	1392	84.73	1.38		
Beamer Creek	5	1405			Culvert-BMC-02	Parmell Rd
Beamer Creek	5	1445	85.39	0.84		
Beamer Creek	5	1597	85.56	0.52		
Beamer Creek	5	1615			Culvert-BMC-01	Niagara St
Beamer Creek	5	1633	85.87	0.77		

Table 5-5: Affected Private Properties by 100-Year Flood Along Walker Creek and Beamer Creek

Reach	Number of Affected Private Land Parcels
Walker Creek Between Cindy Drive and mouth of the Creek	4
Walker Creek Between Lake Shore Road and Cindy Drive	5
Walker Creek Between Parnell Drive and Lake Shore Road	9
Walker Creek Between Linwell Road and Parnel Drive	76
Walker Creek Between Scott Street and Linwell Road	35
Beamer creek Between Lake Shore Road and mouth of the creek	21
Beamer Creek Between Parnell Road and Lakeshore Road	8
Beamer creek Between Niagara Street and Parnell Road	11

Table 5-6: List of Potentially Affected Public Parks, Institutions and Businesses by 100-Year Flood

Public or Business Name	Reach
Realty Park	Walker Creek Between Scott Street and Linwell Road
Cherie Road Park	Walker and Beamer Creek Near Lake Ontario
Arthur Street Park	Beamer Creek Between Melody Trail and Arthur Street
Bogart Street Park	Beamer Creek Between Corydon Drive and Wildwood Road

Table 5-7: List of Habitable Structures Potentially Affected by 100-Year Flood

Reach	Number of habitable structures
Walker Creek Between Scott Street and Linwell Road	5
Walker Creek Between Richelieu Drive and Parnell Road	3
Beamer Creek Between Niagara Street and Lakeshore Road	10

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NIAGARA PENINSULA CONSERVATION AUTHORITY

Legend

- Road
- Watercourse
- Storm Sewer
- Ownership Parcel
- Floodplain
- Subcatchment Boundary
- Catchment Boundary

0 0.5 1 km

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Notes
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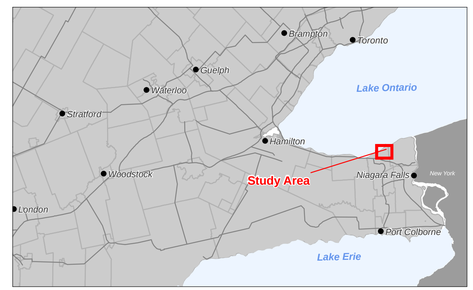

Project Location

City of St. Catahrines, Ontario

160951075 REVA

Prepared by PRM on 2019-11-01
Technical Review by NK on 2019-11-01

Client/Project

NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.

5-3

Title

Walker Creek and Beamer Creek Floodplain Map

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NIAGARA PENINSULA CONSERVATION AUTHORITY

Legend

- 2161 River Station
- 8586 Water Surface Elevation (100 Year Flood)
- HEC-RAS Cross Section
- Road
- Watercourse
- Storm Sewer
- Ownership Parcel
- Floodplain
- Subcatchment Boundary
- Catchment Boundary

0 100 200 metres

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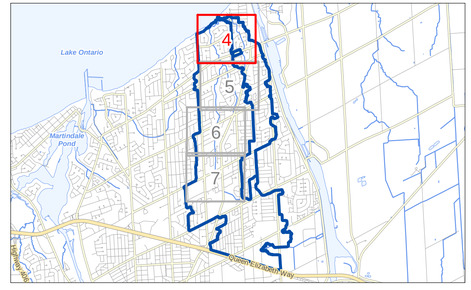

Project Location

City of St. Catahrines, Ontario

160951075 REVA

Prepared by PRM on 2019-11-01
Technical Review by NK on 2019-10-31

Client/Project

NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.

5-4

Title

Walker Creek and Beamer Creek Floodplain Map

Stantec

NIAGARA PENINSULA CONSERVATION AUTHORITY

Legend

- 2161 River Station
- 85.86 Water Surface Elevation (100 Year Flood)
- HEC-RAS Cross Section
- Road
- Watercourse
- Storm Sewer
- Ownership Parcel
- Floodplain
- Subcatchment Boundary
- Catchment Boundary

0 100 200 metres

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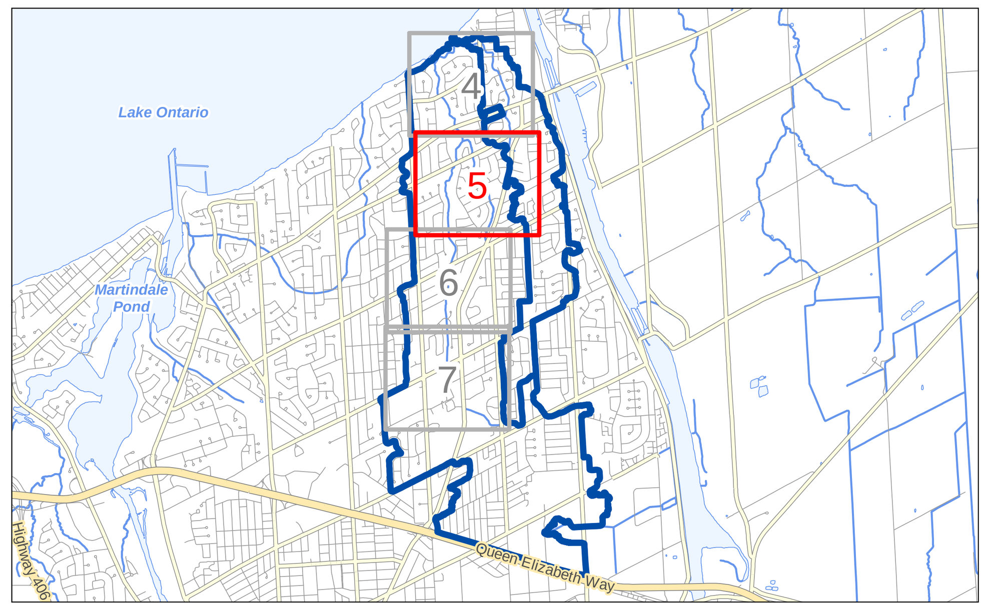


Project Location

City of St. Catahrines, Ontario

160951075 REVA

Prepared by PRM on 2019-11-01
Technical Review by NK on 2019-10-31

Client/Project

NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.

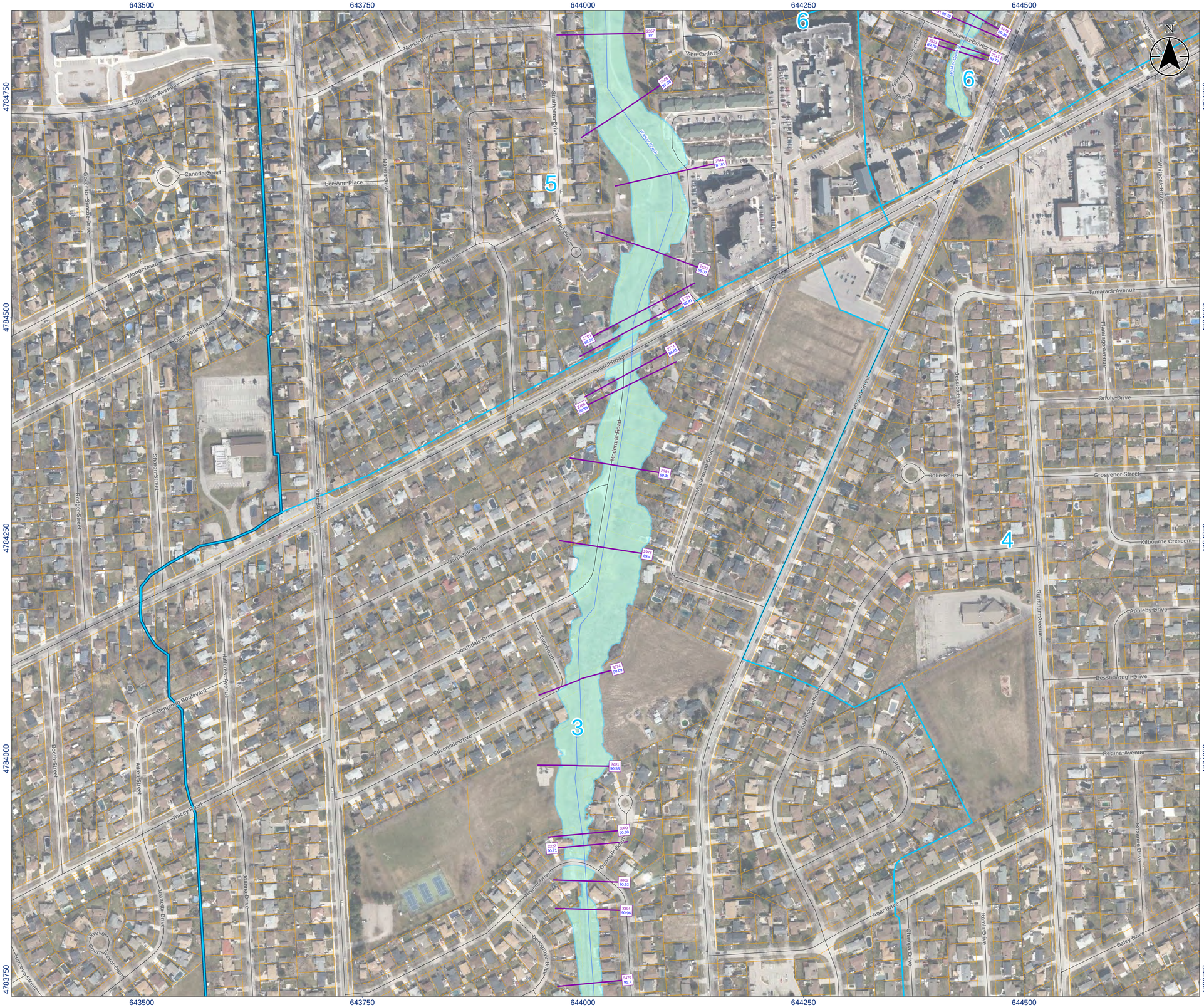
5-5

Title

Walker Creek and Beamer Creek Floodplain Map

643500 643750 644000 644250 644500

4784750 4784500 4784250 4784000 4783750



Legend

- 2161 River Station
- 8586 Water Surface Elevation (100 Year Flood)
- HEC-RAS Cross Section
- Road
- Watercourse
- Storm Sewer
- Ownership Parcel
- Floodplain
- Subcatchment Boundary
- Catchment Boundary

0 100 200 metres

1:2,000 (At original document size of 34x44)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
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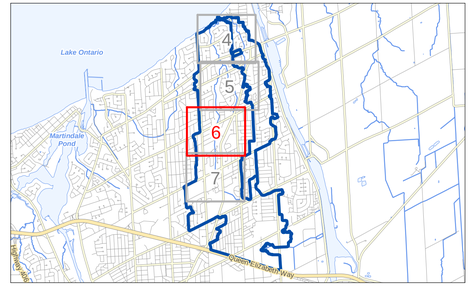

Project Location

City of St. Catahrines, Ontario

160951075 REVA

Prepared by PRM on 2019-11-01
Technical Review by NK on 2019-10-31

Client/Project

NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.

5-6

Title

Walker Creek and Beamer Creek Floodplain Map

I:\2016\04\Civil\...\Figure 5-6 Floodplain Schedule Mapping.mxd (last plotted Monday, November 04, 2019 10:50:51 by jmoore)

643500 643750 644000 644250 644500

4783750 4783500 4783250 4783000 4782750

N

Legend

- 2161 River Station
- 8586 Water Surface Elevation (100 Year Flood)
- HEC-RAS Cross Section
- Road
- Watercourse
- Storm Sewer
- Ownership Parcel
- Floodplain
- Subcatchment Boundary
- Catchment Boundary

0 100 200 metres

1:2,000 (At original document size of 34x44)

Notes
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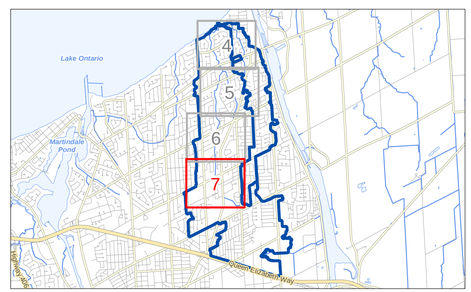

Project Location
City of St. Catahrines, Ontario

160951075 REVA
Prepared by PRM on 2019-11-01
Technical Review by NK on 2019-10-31

Client/Project
NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.
5-7

Title
Walker Creek and Beamer Creek Floodplain Map

5.5 FUTURE SCENARIO

In order to evaluate the effects of potential changes in land use and climate conditions, a future scenario was determined in consultation with the NPCA. The 100-year flows in the HEC-RAS model were increased by 20% to evaluate changes in the 100-year flood levels. **Table 5-8** provides a summary of changes in the 100-year flood levels and average channel velocity. Results indicate that a 20% increase in the flood flows will result in increasing flood levels between 0.04 m and 0.73 m with an average of 0.2 m.

Table 5-8: Comparison Between 100-Year and Future Scenario Flood Level and Velocity

River	Reach	River Station	100-yr Flood WSE (m)	Future Scenario WSE (m)	Increase in WSE (m)	100-yr Average Channel Velocity (m/s)	Future Scenario Average Channel Velocity (m/s)	Note	Street
Walker & Beamer	1	16	75.26	75.4	0.14	3.31	3.52		
Walker & Beamer	1	47	76.35	76.54	0.19	1.81	1.94		
Walker Creek	2	1346	84.21	84.31	0.1	0.24	0.26		
Walker Creek	2	1419	84.21	84.31	0.1	0.26	0.29		
Walker Creek	2	1493	84.24	84.35	0.11	0.7	0.76		
Walker Creek	2	1552	84.36	84.47	0.11	1.12	1.24		
Walker Creek	2	1567	84.43	84.55	0.12	1.05	1.16		
Walker Creek	2	1582						Culvert-WKC-09	Parnell Rd
Walker Creek	2	1598	84.67	84.88	0.21	0.81	0.87		
Walker Creek	2	1609	84.69	84.9	0.21	0.8	0.86		
Walker Creek	2	1683	84.86	85.05	0.19	0.74	0.71		
Walker Creek	2	1769	85.16	85.28	0.12	1.52	1.68		
Walker Creek	2	1855	85.66	85.81	0.15	0.76	0.79		
Walker Creek	2	1930	85.74	85.88	0.14	0.25	0.26		
Walker Creek	2	1940	85.7	85.84	0.14	2.24	2.39		
Walker Creek	2	1950						Culvert-WKC-08	Trelawne Dr
Walker Creek	2	1961	86.52	86.73	0.21	1.62	1.74		
Walker Creek	2	1970	86.59	86.8	0.21	1.56	1.67		
Walker Creek	2	2050	86.95	87.13	0.18	0.66	0.61		
Walker Creek	2	2120	87.12	87.23	0.11	1.71	1.87		
Walker Creek	2	2131	87.28	87.42	0.14	1.5	1.64		
Walker Creek	2	2146						Culvert-WKC-07	Oxford Rd
Walker Creek	2	2161	87.65	87.95	0.3	0.75	0.77		
Walker Creek	2	2169	87.67	87.98	0.31	0.63	0.6		

Table 5-8: Comparison Between 100-Year and Future Scenario Flood Level and Velocity

River	Reach	River Station	100-yr Flood WSE (m)	Future Scenario WSE (m)	Increase in WSE (m)	100-yr Average Channel Velocity (m/s)	Future Scenario Average Channel Velocity (m/s)	Note	Street
Walker Creek	2	2241	87.88	88.12	0.24	1.34	1.23		
Walker Creek	2	2320	88.46	88.59	0.13	1.19	1.28		
Walker Creek	2	2400	88.96	89.1	0.14	1.36	1.42		
Walker Creek	2	2479	89.36	89.49	0.13	0.67	0.71		
Walker Creek	2	2491	89.39	89.53	0.14	0.31	0.33		
Walker Creek	2	2504						Culvert-WKC-06	Richelieu Rd
Walker Creek	2	2517	89.79	89.91	0.12	0.76	0.77		
Walker Creek	2	2523	89.78	89.89	0.11	1.63	1.35		
Walker Creek	3	43	76.91	77.09	0.18	2.36	2.49		
Walker Creek	3	129	77.79	77.95	0.16	1.36	1.38		
Walker Creek	3	215	78.26	78.38	0.12	1.2	1.2		
Walker Creek	3	296	78.61	78.72	0.11	1.05	1.11		
Walker Creek	3	376	79.01	79.11	0.1	0.98	1.02		
Walker Creek	3	457	79.43	79.53	0.1	1.23	1.3		
Walker Creek	3	538	79.75	79.87	0.12	1.02	1.08		
Walker Creek	3	631	80.19	80.32	0.13	1.38	1.43		
Walker Creek	3	708	80.71	80.83	0.12	1.34	1.4		
Walker Creek	3	724	80.82	80.94	0.12	1.3	1.44		
Walker Creek	3	745						Culvert-WKC-11	Cindy Dr
Walker Creek	3	766	82.08	82.63	0.55	1.16	1.14		
Walker Creek	3	767	82.14	82.69	0.55	0.52	0.44		
Walker Creek	3	781	82.18	82.71	0.53	0.61	0.53		
Walker Creek	3	946	82.28	82.76	0.48	0.91	0.72		
Walker Creek	3	1036	82.45	82.84	0.39	0.64	0.51		
Walker Creek	3	1106	82.6	82.89	0.29	1.6	1.59		
Walker Creek	3	1125	82.69	82.96	0.27	1.89	1.93		
Walker Creek	3	1155						Culvert-WKC-10	Lakeshore Rd
Walker Creek	3	1159	84.09	84.17	0.08	0.53	0.6		
Walker Creek	3	1181	84.09	84.18	0.09	0.53	0.6		
Walker Creek	3	1244	84.17	84.27	0.1	0.54	0.59		
Walker Creek	4	1325.5	84.19	84.29	0.1	0.43	0.48		
Walker Creek	4	1397	84.23	84.34	0.11	0.67	0.74		

Table 5-8: Comparison Between 100-Year and Future Scenario Flood Level and Velocity

River	Reach	River Station	100-yr Flood WSE (m)	Future Scenario WSE (m)	Increase in WSE (m)	100-yr Average Channel Velocity (m/s)	Future Scenario Average Channel Velocity (m/s)	Note	Street
Walker Creek	4	1467	84.31	84.43	0.12	0.7	0.76		
Walker Creek	4	1527	84.4	84.52	0.12	1.39	1.53		
Walker Creek	4	1538	84.53	84.67	0.14	0.78	0.86		
Walker Creek	4	1567						Culvert-WKC-05	Parnell Rd
Walker Creek	4	1597	84.9	85.21	0.31	0.88	0.93		
Walker Creek	4	1613	84.96	85.26	0.3	0.57	0.51		
Walker Creek	4	1698	85.03	85.31	0.28	0.58	0.56		
Walker Creek	4	1798	85.1	85.37	0.27	0.41	0.39		
Walker Creek	4	1888	85.18	85.42	0.24	0.63	0.55		
Walker Creek	4	1899	85.2	85.43	0.23	0.62	0.55		
Walker Creek	4	1912						Culvert-WKC-04	Costen Blvd
Walker Creek	4	1924	85.35	85.42	0.07	1.01	0.98		
Walker Creek	4	1933	85.4	85.46	0.06	1.33	1.44		
Walker Creek	4	1997	85.75	85.84	0.09	0.76	0.81		
Walker Creek	4	2070	85.95	86.05	0.1	0.79	0.85		
Walker Creek	4	2132	86.15	86.28	0.13	1.17	1.31		
Walker Creek	4	2144	86.26	86.41	0.15	0.68	0.73		
Walker Creek	4	2164						Culvert-WKC-03	Keistan Dr
Walker Creek	4	2173	86.33	86.42	0.09	1.05	1.19		
Walker Creek	4	2184	86.6	86.73	0.13	1.06	1.09		
Walker Creek	4	2265	86.67	86.81	0.14	1.08	1.12		
Walker Creek	4	2357	87	87.13	0.13	1	1.08		
Walker Creek	4	2449	87.38	87.53	0.15	1.4	1.41		
Walker Creek	4	2541	87.81	87.94	0.13	0.85	0.92		
Walker Creek	4	2633	88.07	88.2	0.13	0.94	0.98		
Walker Creek	4	2710	88.35	88.48	0.13	0.84	0.88		
Walker Creek	4	2725	88.41	88.53	0.12	0.79	0.84		
Walker Creek	4	2750						Culvert-WKC-02	Linewell Rd
Walker Creek	4	2774	88.81	89.04	0.23	1.12	1.21		
Walker Creek	4	2788	88.89	89.12	0.23	0.75	0.73		
Walker Creek	4	2884	89.11	89.3	0.19	0.83	0.79		
Walker Creek	4	2978	89.4	89.53	0.13	0.85	0.83		

Table 5-8: Comparison Between 100-Year and Future Scenario Flood Level and Velocity

River	Reach	River Station	100-yr Flood WSE (m)	Future Scenario WSE (m)	Increase in WSE (m)	100-yr Average Channel Velocity (m/s)	Future Scenario Average Channel Velocity (m/s)	Note	Street
Walker Creek	4	3074	90.09	90.19	0.1	1.48	1.64		
Walker Creek	4	3231	90.53	90.65	0.12	0.79	0.82		
Walker Creek	4	3309	90.68	90.8	0.12	0.98	1.1		
Walker Creek	4	3322	90.71	90.84	0.13	0.96	1.09		
Walker Creek	4	3342						Culvert-WKC-01	Regent Dr
Walker Creek	4	3362	90.92	91.15	0.23	0.78	0.81		
Walker Creek	4	3394	90.96	91.19	0.23	0.79	0.83		
Walker Creek	4	3479	91.1	91.33	0.23	0.99	1.03		
Walker Creek	4	3563	91.41	91.61	0.2	1.18	1.22		
Walker Creek	4	3647	91.91	92.07	0.16	1.24	1.31		
Walker Creek	4	3731	92.47	92.6	0.13	0.92	0.97		
Walker Creek	4	3816	93.09	93.2	0.11	1.27	1.37		
Beamer Creek	5	0	76.64	76.84	0.2	0.6	0.61		
Beamer Creek	5	226	78.56	78.63	0.07	2.4	2.54		
Beamer Creek	5	236	78.91	78.99	0.08	1.07	1.23		
Beamer Creek	5	247						Culvert-BMC-08	Arthur St
Beamer Creek	5	277	79.12	79.27	0.15	0.83	0.92		
Beamer Creek	5	283	79.16	79.31	0.15	0.41	0.43		
Beamer Creek	5	347	79.2	79.36	0.16	0.56	0.61		
Beamer Creek	5	354	79.21	79.36	0.15	0.63	0.69		
Beamer Creek	5	360						Culvert-BMC-07	Melody Trail
Beamer Creek	5	378	79.87	80.33	0.46	0.59	0.58		
Beamer Creek	5	388	79.88	80.34	0.46	0.59	0.58		
Beamer Creek	5	485	79.97	80.4	0.43	0.82	0.81		
Beamer Creek	5	494	79.98	80.41	0.43	0.81	0.8		
Beamer Creek	5	507						Culvert-BMS-06	Wildwood Dr
Beamer Creek	5	514	80.65	81.38	0.73	0.6	0.55		
Beamer Creek	5	522	80.66	81.38	0.72	0.6	0.55		
Beamer Creek	5	581	80.74	81.43	0.69	0.88	0.57		
Beamer Creek	5	699	81.03	81.51	0.48	1.11	0.93		
Beamer Creek	5	714	81.14	81.56	0.42	1.02	0.9		

Table 5-8: Comparison Between 100-Year and Future Scenario Flood Level and Velocity

River	Reach	River Station	100-yr Flood WSE (m)	Future Scenario WSE (m)	Increase in WSE (m)	100-yr Average Channel Velocity (m/s)	Future Scenario Average Channel Velocity (m/s)	Note	Street
Beamer Creek	5	722						Culvert-BMC-05	Corydon Dr
Beamer Creek	5	745	81.57	81.8	0.23	0.83	0.85		
Beamer Creek	5	757	81.61	81.84	0.23	0.76	0.78		
Beamer Creek	5	831	81.85	82.04	0.19	1	1.01		
Beamer Creek	5	893	82.22	82.37	0.15	1.4	1.51		
Beamer Creek	5	904	82.32	82.47	0.15	1.3	1.41		
Beamer Creek	5	916						Culvert-BMC-04	Corydon Dr
Beamer Creek	5	928	82.47	82.64	0.17	1.16	1.23		
Beamer Creek	5	938	82.53	82.7	0.17	1.11	1.18		
Beamer Creek	5	1022	82.91	83.07	0.16	0.78	0.81		
Beamer Creek	5	1089	83.27	83.39	0.12	1.45	1.51		
Beamer Creek	5	1105	83.46	83.57	0.11	1.25	1.37		
Beamer Creek	5	1121						Culvert-BMC-03	Lakeshore Rd
Beamer Creek	5	1138	83.71	83.87	0.16	0.92	0.96		
Beamer Creek	5	1152	83.78	83.93	0.15	0.87	0.91		
Beamer Creek	5	1228	84.23	84.36	0.13	0.81	0.83		
Beamer Creek	5	1310	84.34	84.47	0.13	0.67	0.71		
Beamer Creek	5	1374	84.53	84.64	0.11	1.61	1.77		
Beamer Creek	5	1392	84.73	84.87	0.14	1.38	1.49		
Beamer Creek	5	1405						Culvert-BMC-02	Parmell Rd
Beamer Creek	5	1445	85.39	85.63	0.24	0.84	0.9		
Beamer Creek	5	1462	85.41	85.66	0.25	0.83	0.89		
Beamer Creek	5	1521	85.49	85.73	0.24	0.36	0.36		
Beamer Creek	5	1578	85.53	85.76	0.23	0.53	0.45		
Beamer Creek	5	1597	85.56	85.78	0.22	0.52	0.44		
Beamer Creek	5	1615						Culvert-BMC-01	Niagra St
Beamer Creek	5	1633	85.87	85.97	0.1	0.77	0.85		
Beamer Creek	5	1649	86.24	86.28	0.04	2.1	2.22		

6.0 CONCLUSIONS AND RECOMMENDATIONS

The 100 Regulatory floodplain maps of Walker Creek and Beamer Creek were updated by conducting hydrologic and hydraulic modelling using VO5 and HEC-RAS. The models were calibrated and validated with six historical flood events.

Hydraulic modelling indicates that culverts WKC-03, WKC-04, WKC-06, and WKC-10 on Walker Creek and culvert BMC-01 on Beamer Creek will be overtopped during the 100-year flood event. In addition, culverts WKC-01 and WKC-07 on Walker Creek and BMC-2, BMC-6, and BMC-7 on Beamer Creek will operate under a headwater condition.

A few local and access roads along the creeks including Lakeshore Road at Walker Creek, McDermid Road, Silver Drive, Richelieu Drive, and Walker Creek trail are vulnerable to flooding during the 100-year flood.

An analysis of private property lines indicates that 169 private backyards will be partially flooded during the 100-year flood event. In addition, 18 habitable structures may be impacted by the 100-year flood.

During field work it was noted that some culverts are partially blocked with debris and tree branches. It is recommended to conduct regular maintenance to maintain hydraulic structures in working conditions.

The vertical accuracy of the existing 2 m DEM is about 0.5 m, and thereby, it is recommended to obtain and use a more accurate DEM for future floodplain updates.

The following table summarizes a number of mitigation measures to address the effects of the 100-year flood. It is recommended to update floodplain mapping in 5 years.

Table 6-1: Recommendations to Mitigate the 100-Year Flood Effects

Flood Vulnerable Structures	Recommendation
All culverts	Perform annual inspection to assess the effective capacity of the culverts. Perform regular maintenance which includes removing debris and repairing damaged culverts.
Culverts BMC-01, BMC-02, BMC-06, and BMC-07 along Beamer Creek	Although road crossings at BMC-02, BMC-06, and BMC-07 are not overtopped during the 100-year flood, upsizing these culverts can reduce the 100-year flood level along Beamer Creek.
Culverts WKC-01, WKC-06, WKC-07, and WKC-10	Upsizing these culverts can reduce the 100-year flood level along Walker Creek.
Public areas summarized in Table 5-6	A mitigation plan in consultation with the City and NPCA to be developed. In the event of the 100-year flood, adequate warning signages shall be used within these area.
Habitable structures listed in Table 5-7	Structural flood proofing is recommended to mitigate the flood hazard.
All sub-watersheds	Limit development within floodplain limits and use low impact development (LID) practices for any new developments in the watershed (i.e., permeable paving, green roofs, swales, etc.).

7.0 REFERENCES

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APPENDIX A
Culverts Information and Photos Log

Table A-1: Culverts' Input Parameters

ID	Material	Shape	n	No.	H (m)	W (m)	L (m)	US Invert Elevation	DS Invert Elevation	Road Elevation	Note
WKC-01	Concrete	Box	0.013	1	1.80	3.90	21.5	88.68	88.65	91.31	Regent Drive
WKC-02	Concrete	Box	0.013	1	2.14	3.12	24.0	86.77	86.74	89.61	Linwell Road
WKC-03	CSP	Arch	0.027	2	1.01	1.80	3.4	84.01	83.99	85.57	Keistan Drive
WKC-04	CSP	Arch	0.027	2	1.20	1.80	4.5	83.64	83.54	85.08	Costen Boulevard
WKC-05	CSP	Arch	0.027	1	2.52	3.90	24.4	82.40	82.09	86.36	Parnell Road
WKC-06	Concrete	Box	0.013	1	1.25	1.83	18.0	88.00	87.89	89.87	Richelieu Road
WKC-07	Concrete	Box	0.013	1	1.30	1.85	20.0	85.94	85.83	88.41	Oxford Road
WKC-08	CSP	Arch	0.027	1	2.00	2.00	23.4	84.81	84.66	88.11	Trelawne Drive
WKC-09	CSP	Arch	0.027	1	1.85	2.56	29.7	82.93	82.89	86.01	Parnell Road
WKC-10	Concrete	Box	0.013	1	1.60	3.00	14.0	81.30	81.25	84.08	Lakeshore Road
WKC-11	CSP	Arch	0.027	1	2.30	3.60	35.0	79.27	79.20	83.89	Cindy Drive
BMC-01	Concrete	Box	0.013	1	1.04	2.45	12.0	83.80	83.77	85.61	Niagara Street
BMC-02	CSP	Arch	0.027	1	1.78	2.56	50.0	83.34	83.16	85.49	Parnell Road
BMC-03	Concrete	Box	0.013	1	1.55	3.33	16.5	82.34	82.29	85.02	Lakeshore Road
BMC-04	Concrete	Box	0.013	1	2.27	3.35	20.0	81.12	80.87	84.07	Croydon Drive
BMC-05	Concrete	Box	0.013	1	2.00	3.33	21.0	80.29	79.95	83.20	Croydon Drive
BMC-06	CSP	Pipe	0.027	2	1.30	1.50	25.0	78.00	77.88	82.55	Wildwood Road
BMC-07	CSP	Arch	0.027	2	1.22	1.84	30.0	77.76	77.67	82.80	Melody Trail
BMC-08	Concrete	Box	0.013	1	2.03	2.43	42.8	77.17	77.14	80.77	Arthur Street

Photo A-1: Culvert WKC-01

Culvert View

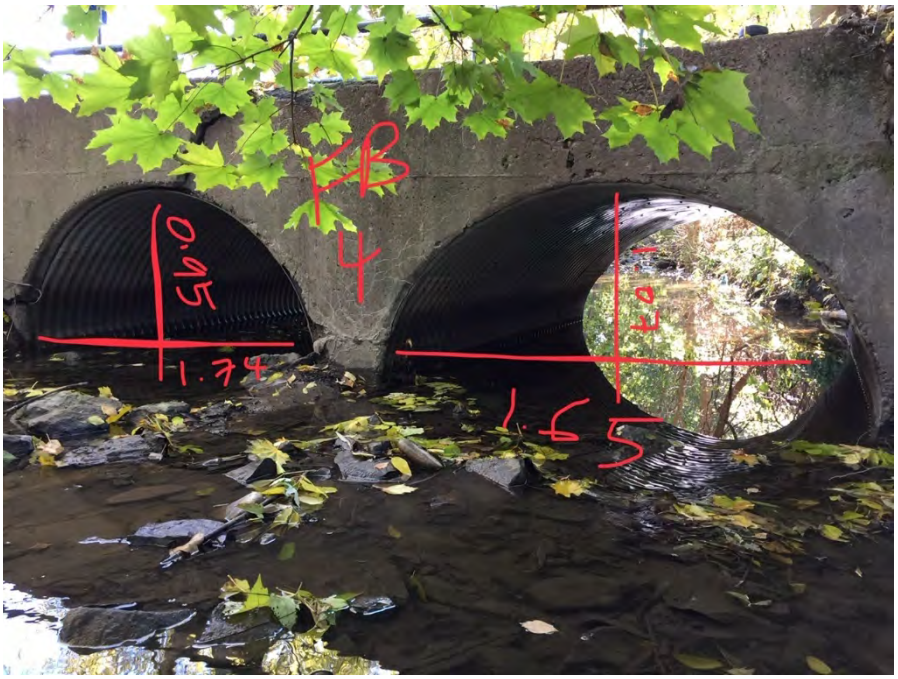
Upstream Reach of the Culvert

Photo A-2: Culvert WKC-02

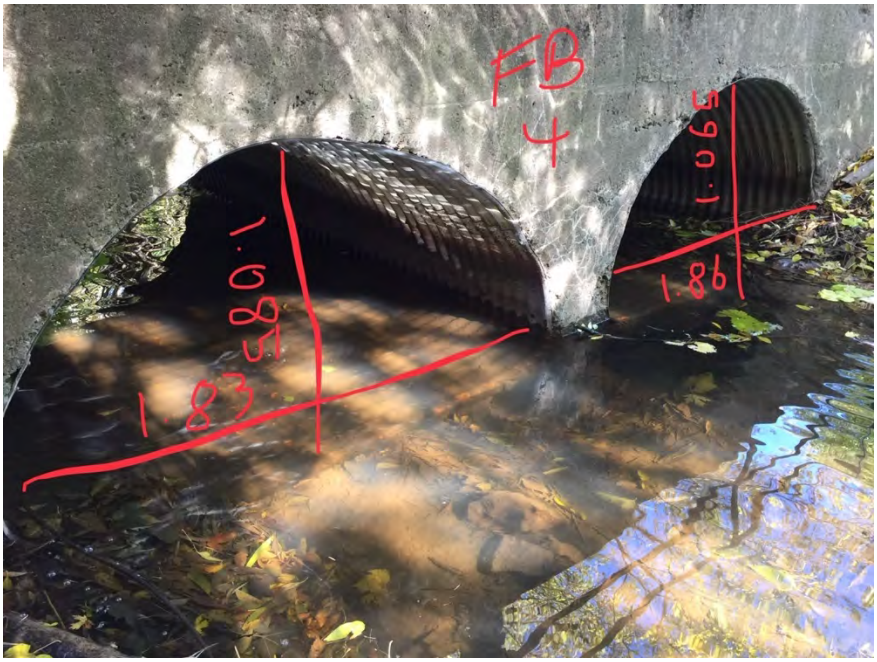
Culvert View

Upstream Reach of the Culvert

Photo A-3: Culvert WKC-03



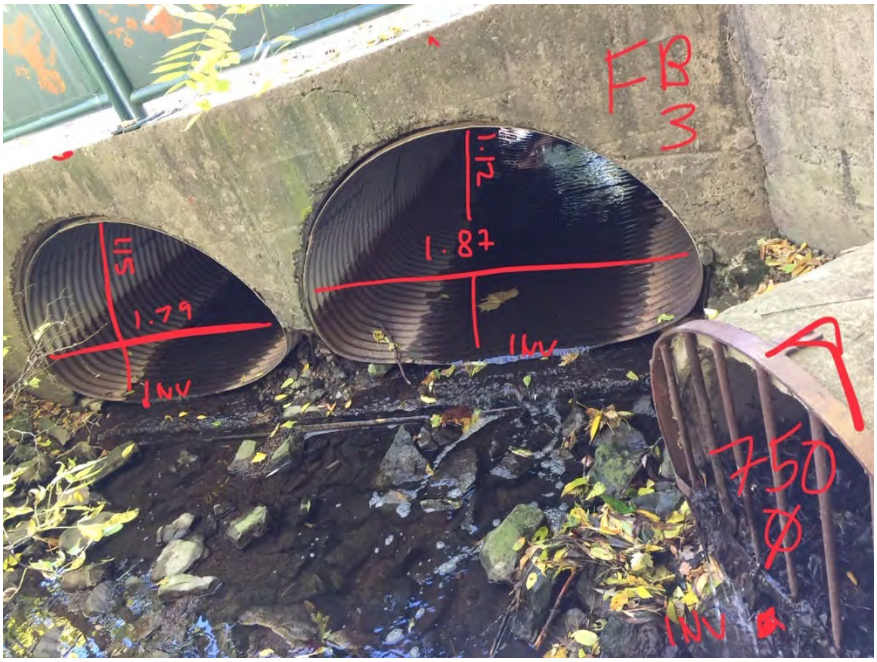
Culvert View



Culvert View

Photo A-4: Culvert WKC-04

Culvert View



Culvert and Stormwater Pipe Drain

Photo A-5: Culvert WKC-05

Culvert View

Upstream Reach of the Culvert

Photo A-6: Culvert WKC-06

Culvert View

Downstream Reach of the Culvert

Photo A-7: Culvert WKC-07

Culvert View

Upstream Reach of the Culvert

Photo A-8: Culvert WKC-08

Culvert View

Culvert View

Photo A-9: Culvert WKC-09

Culvert and Stormwater Drain View

Debris at the Culvert Inlet

Photo A-10: Culvert WKC-10

Culvert View

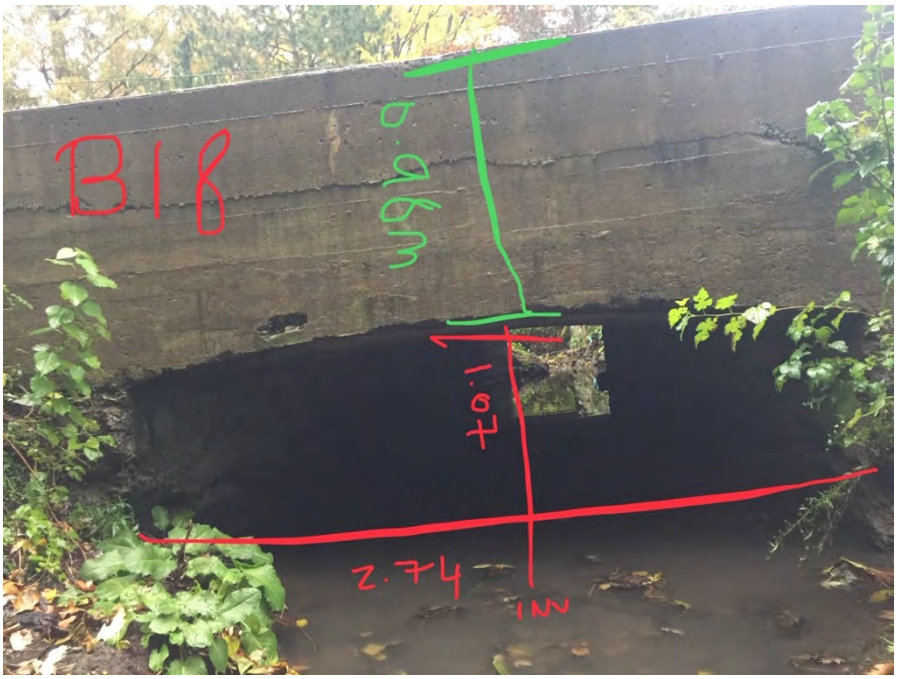
Sedimentation at the Culvert Outlet

Photo A-11: Culvert WKC-11

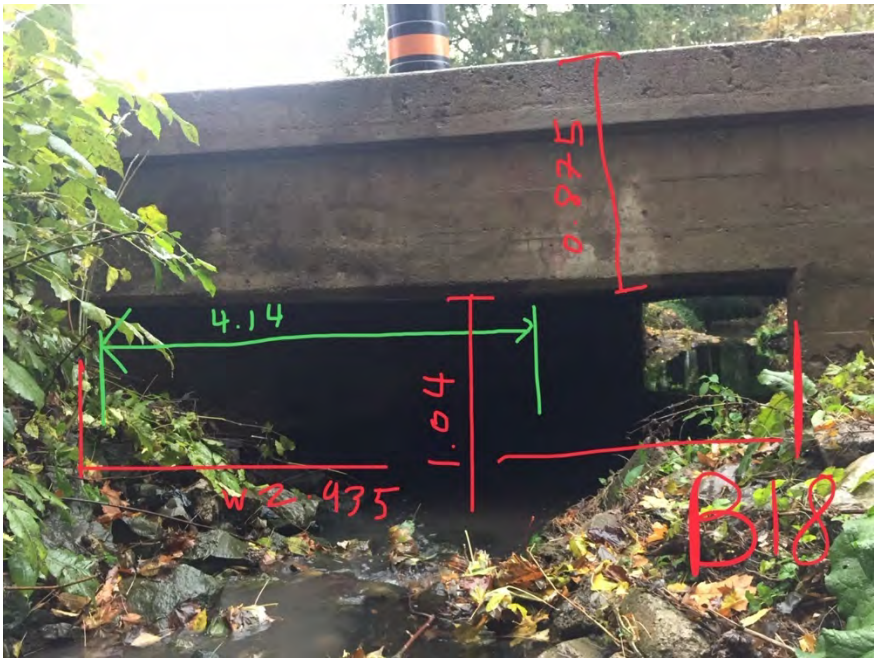
Culvert View

Downstream Reach of the Culvert

Photo A-12: Culvert BMC-01

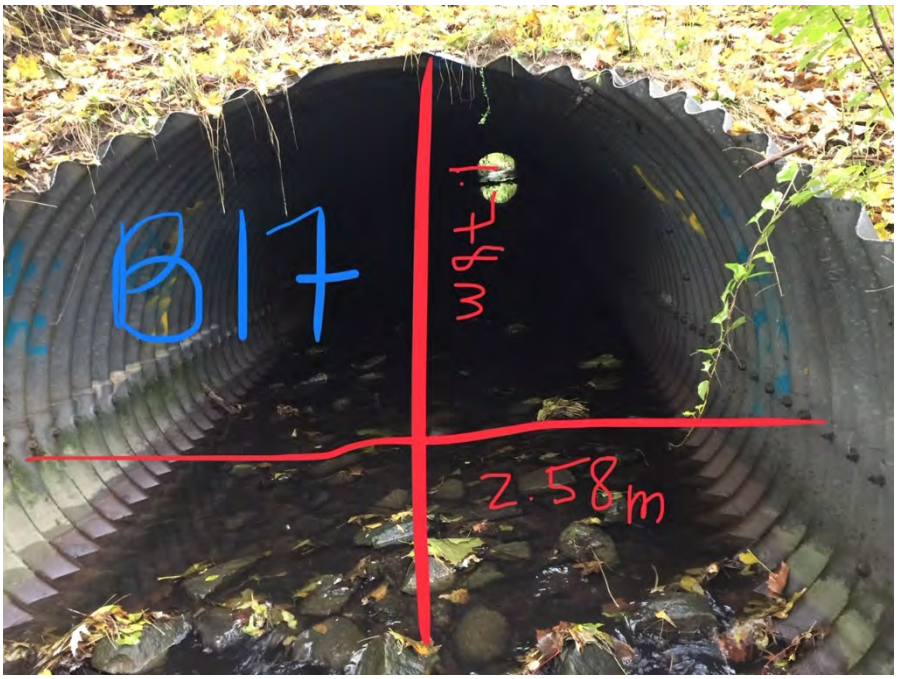


Culvert View



Culvert View

Photo A-13: Culvert BMC-02

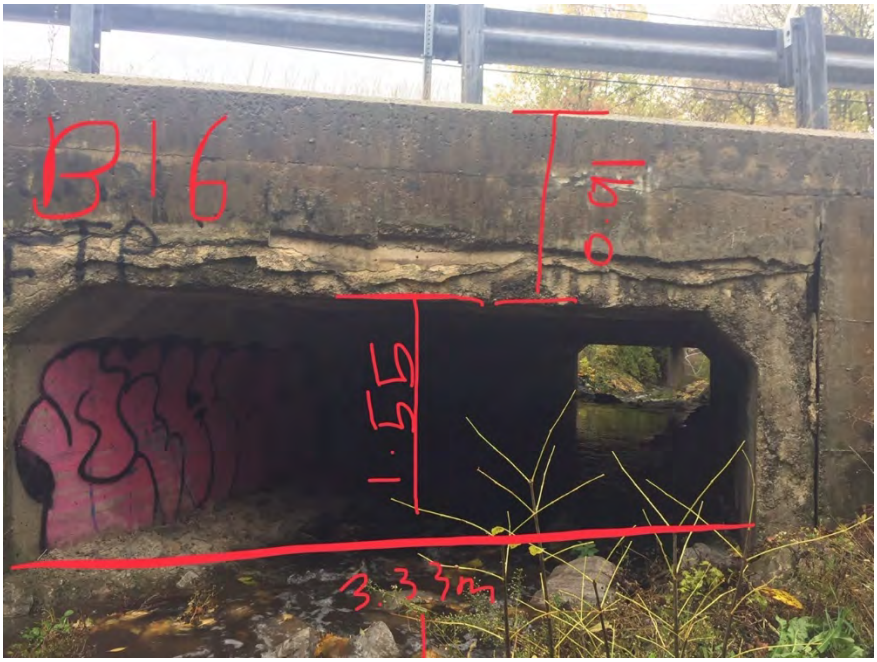


Culvert View

Downstream Culvert View and Stormwater Pipe Drain

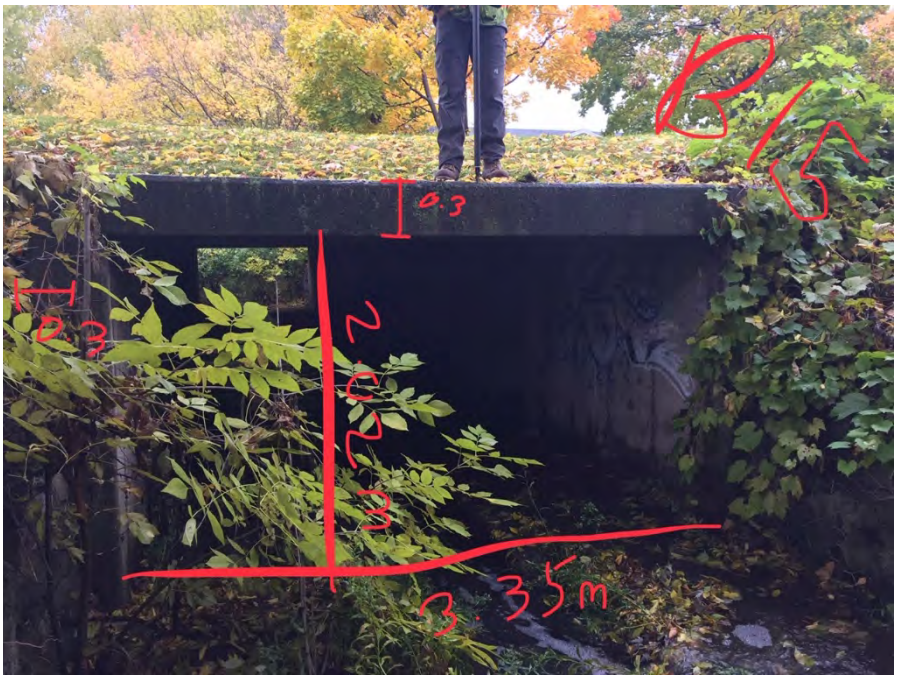
Photo A-14: Culvert BMC-03

Culvert View and Sedimentation at the Inlet



Culvert View

Photo A-15: Culvert BMC-04



Culvert View

Upstream reach of the Culvert

Photo A-16: Culvert BMC-05

Culvert View

Culvert Downstream Reach

Photo A-17: Culvert BMC-06

Culvert View

Upstream Reach of the Culvert

Photo A-18: Culvert BMC-07

Culvert View

Upstream Reach of the Culvert

Photo A-19: Culvert BMC-08

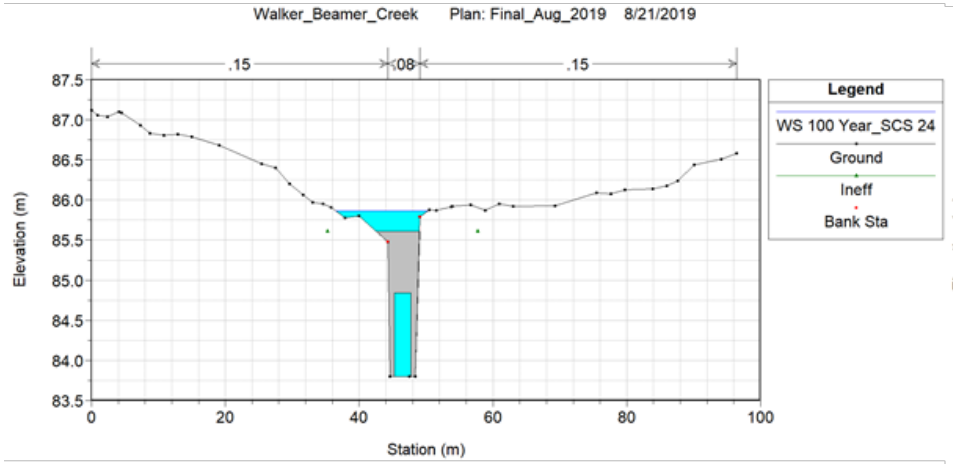
Culvert View

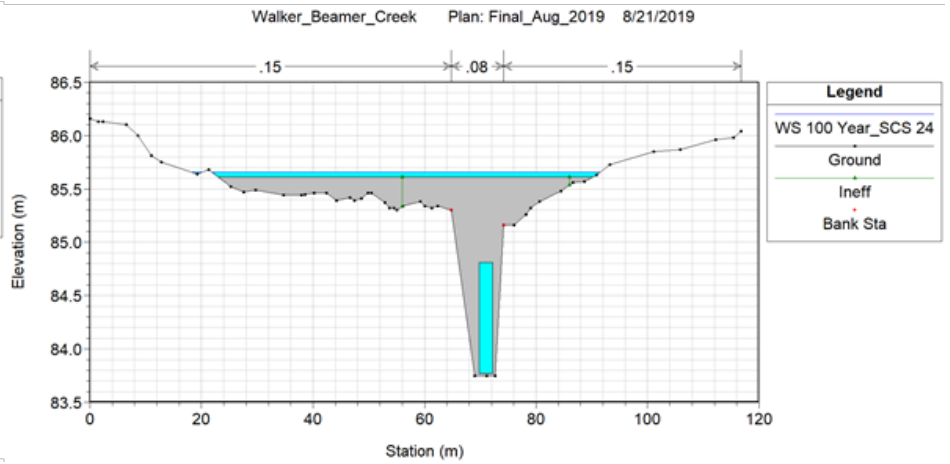
Upstream Reach of the Culvert

APPENDIX B
Hydraulic Model Output

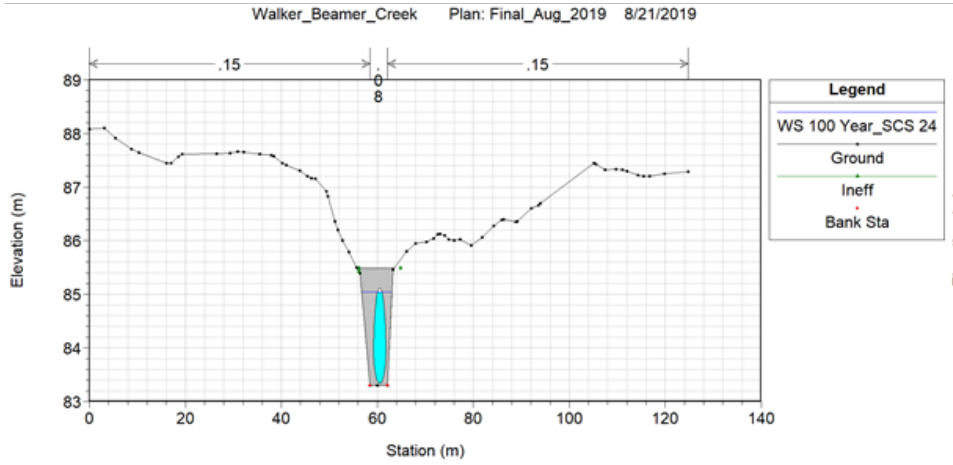
Figure B-1: Water Surface Elevation at Beamer Creek Culverts (BMC-01 to BMC-0*8*). Left and Right Figures Represent Upstream and Downstream of the Culverts

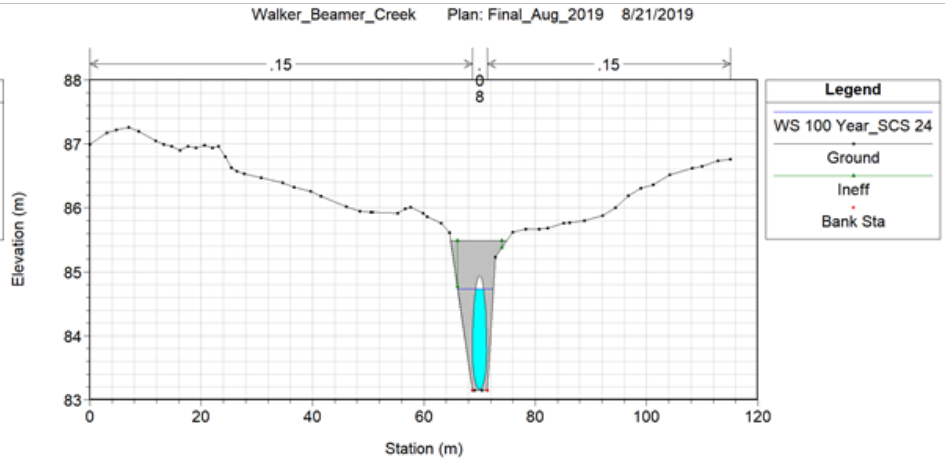
BMC-01 (Niagara St.)



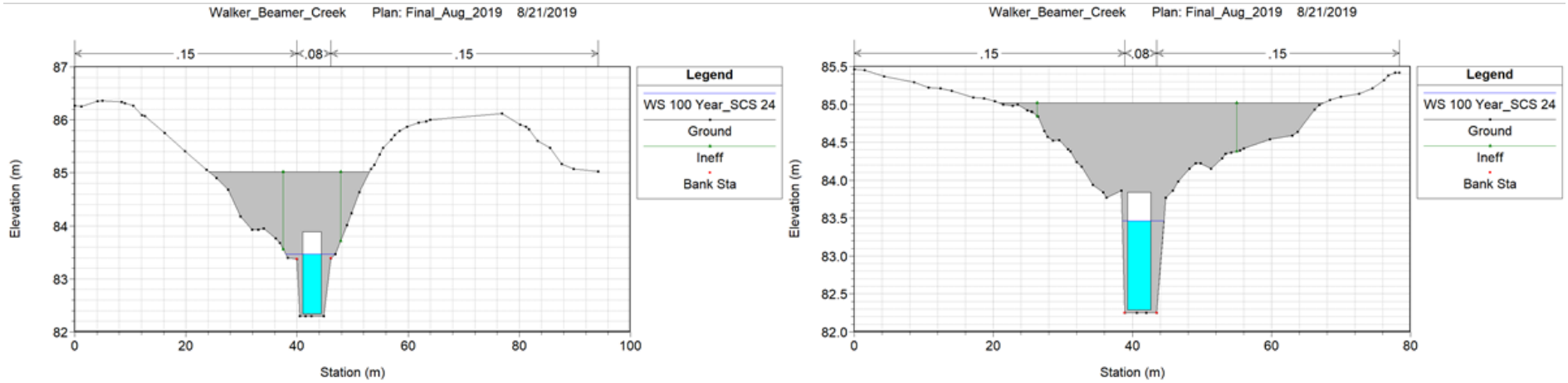


BMC-02 (Parnell Rd.)

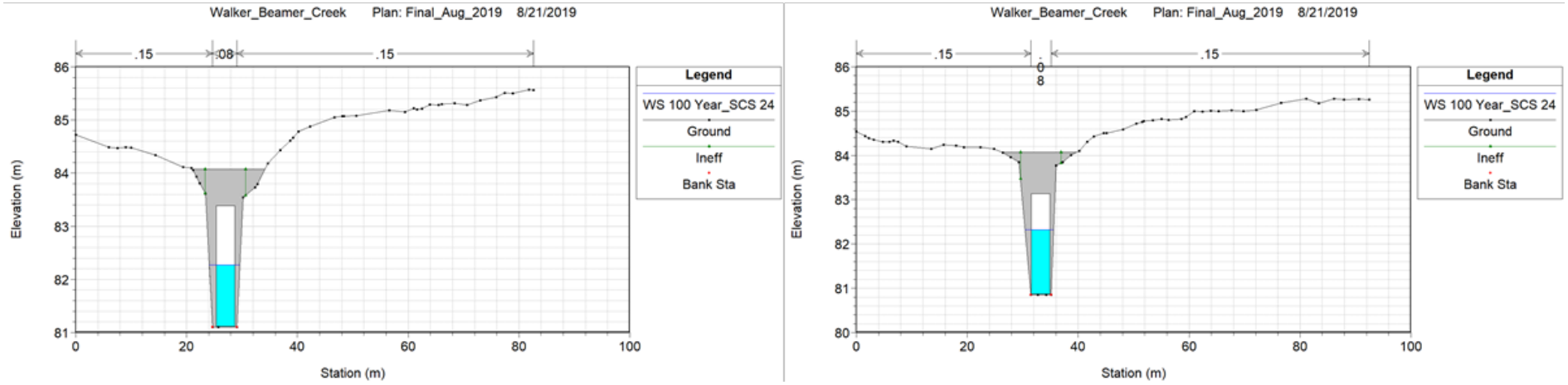




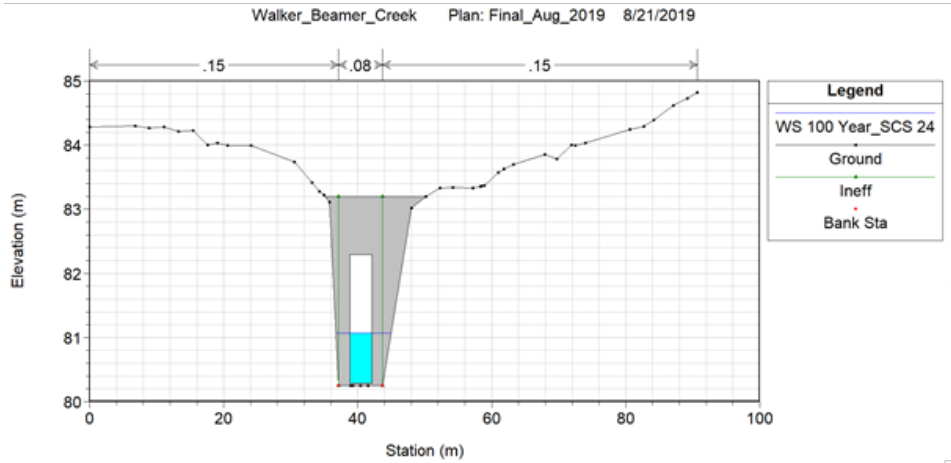
BMC-03 (Lakeshore Rd.)

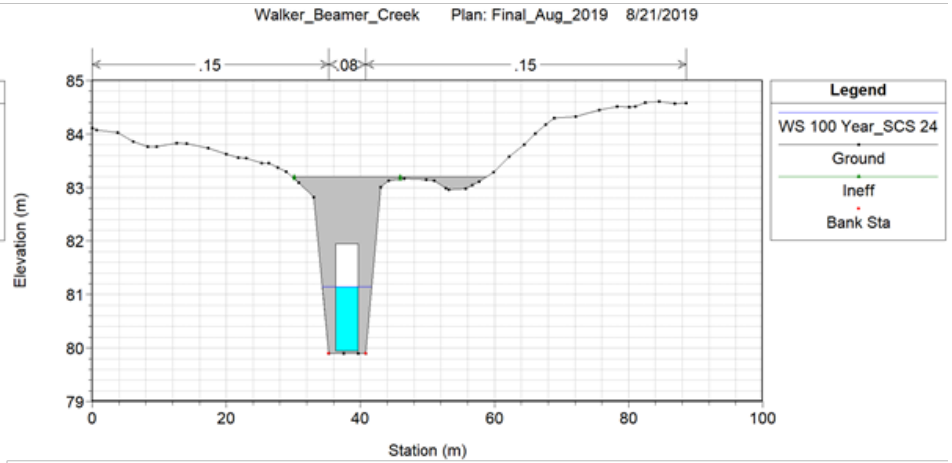


BMC-04 (Corydon Dr.)

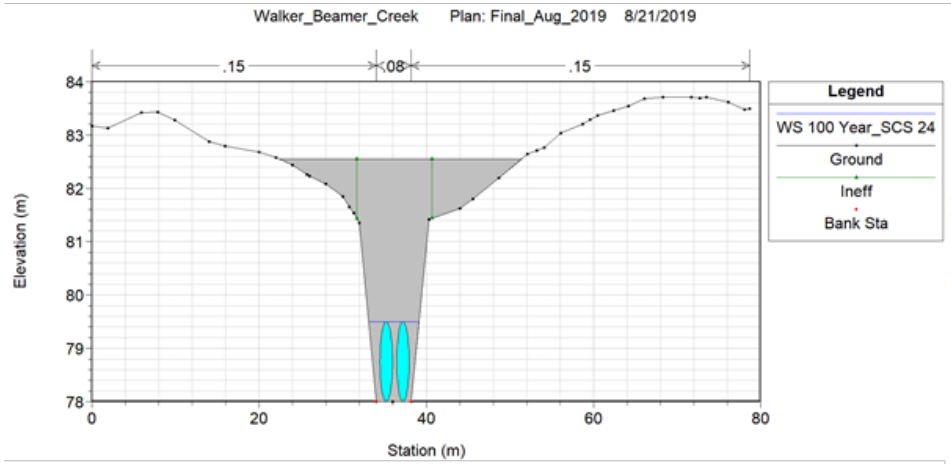


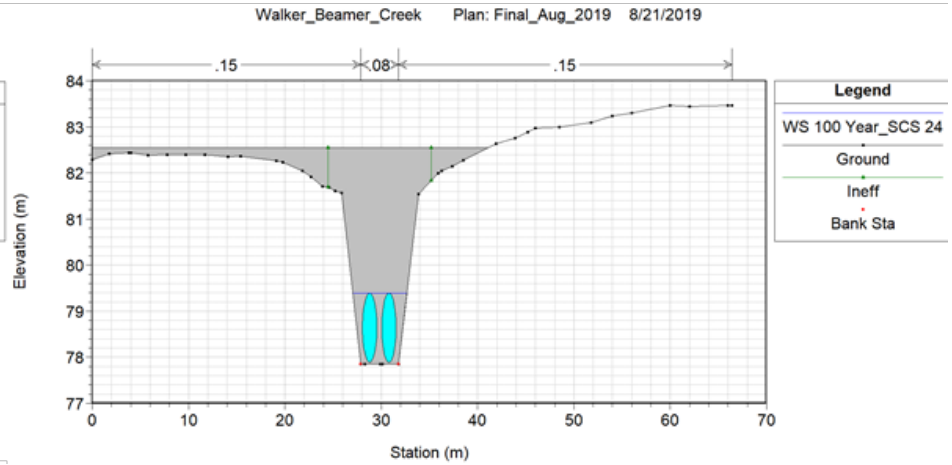
BMC-05 (Corydon Dr.)



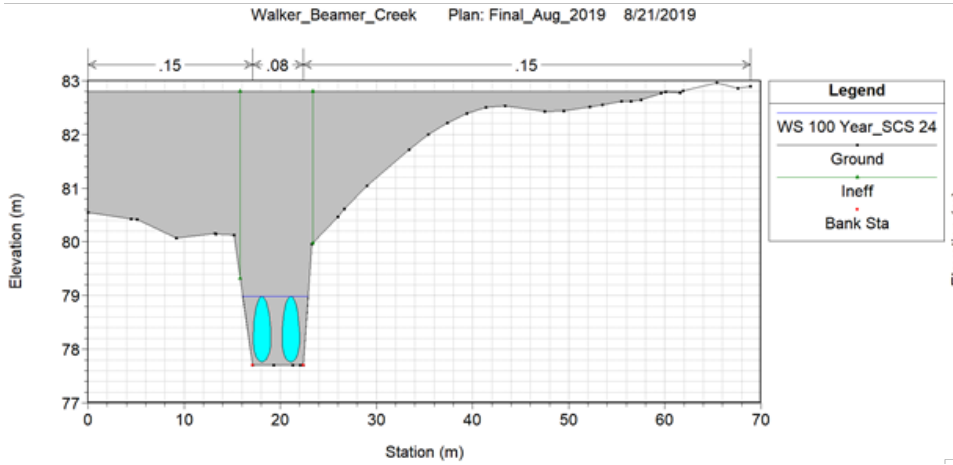


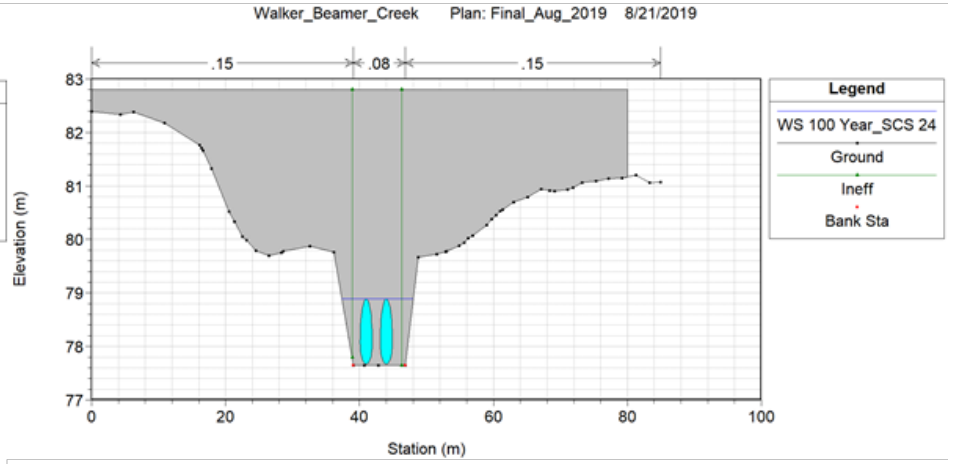
BMC-06 (Wildwood Rd.)



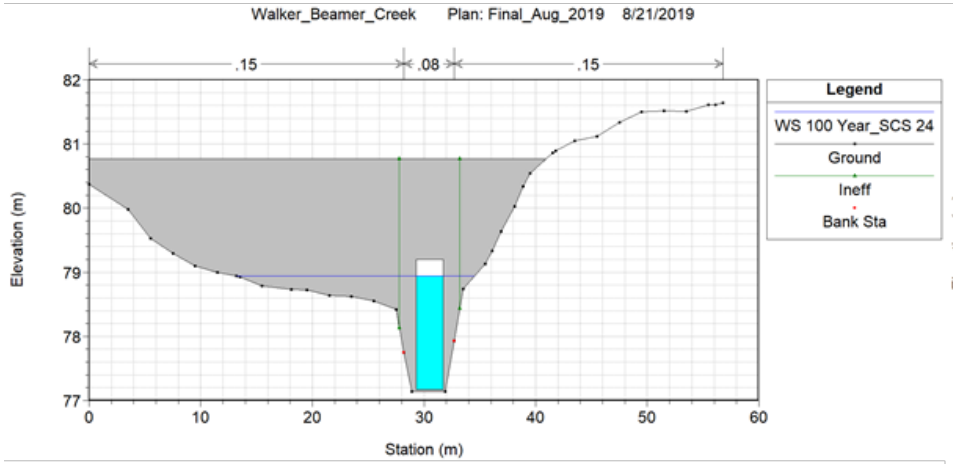


BMC-07 (Melody Trail)





BMC-08 (Arthur St.)



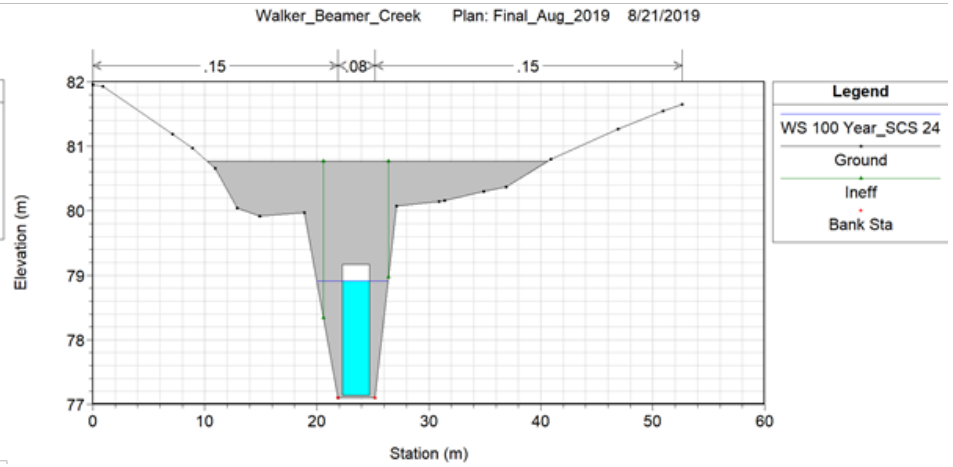
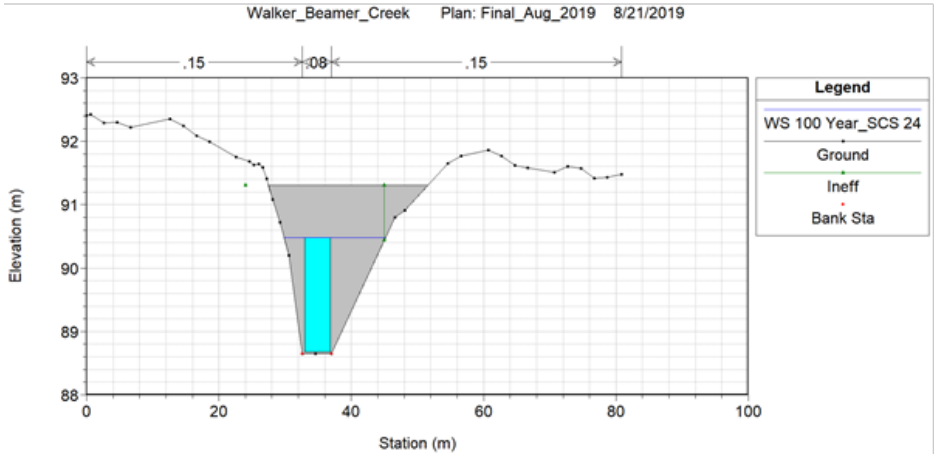
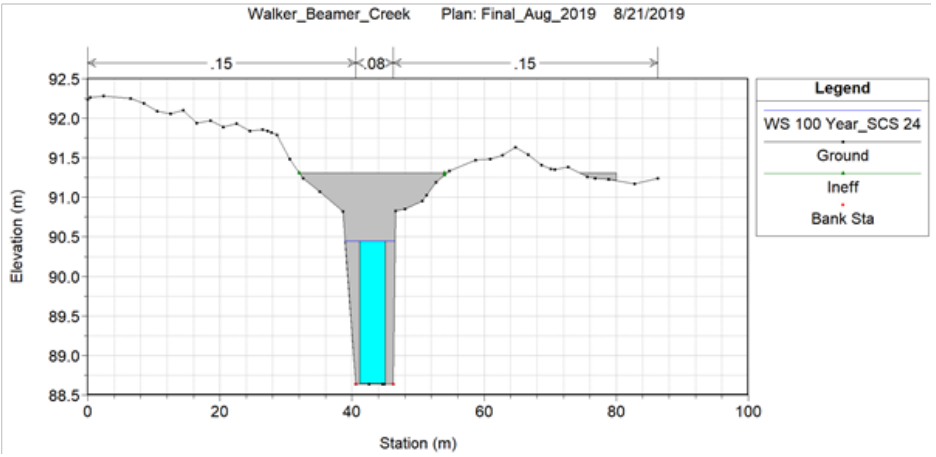


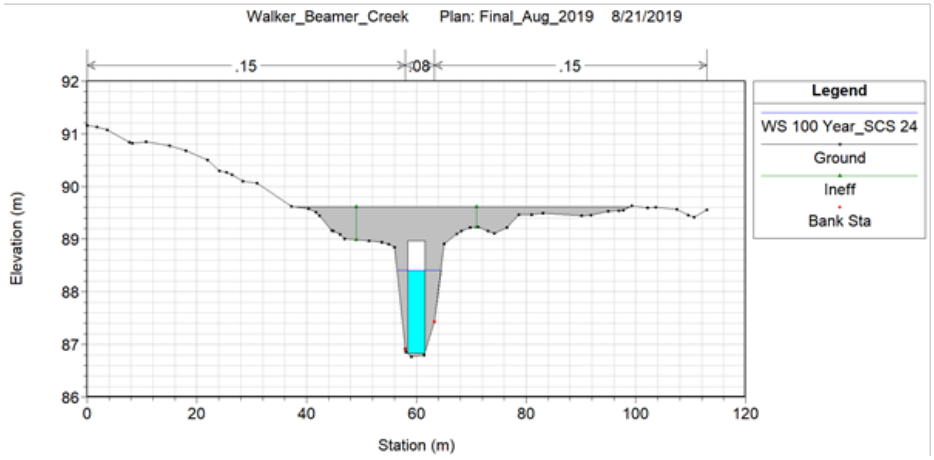
Figure B-2: Water Surface Elevation at Walker Creek Culverts (WKC-01 to WKC-11). Left and Right Figures Represent Upstream and Downstream of the Culverts

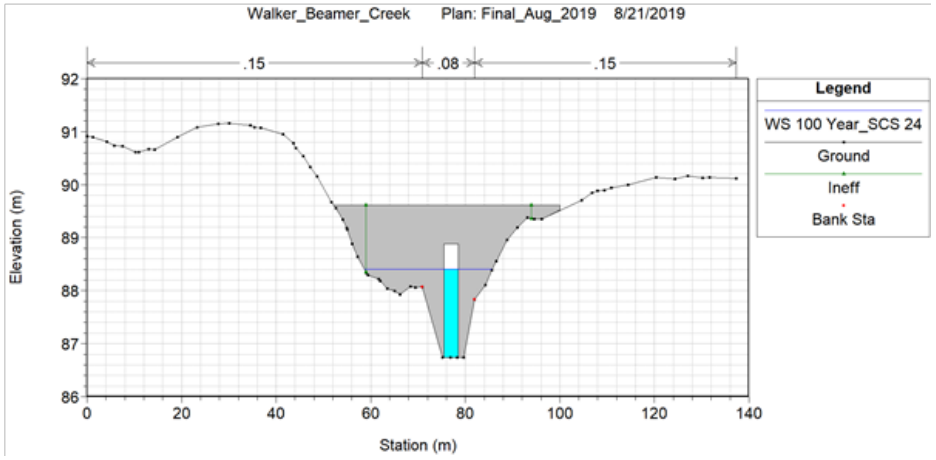
WKC-01 (Regent Dr.)



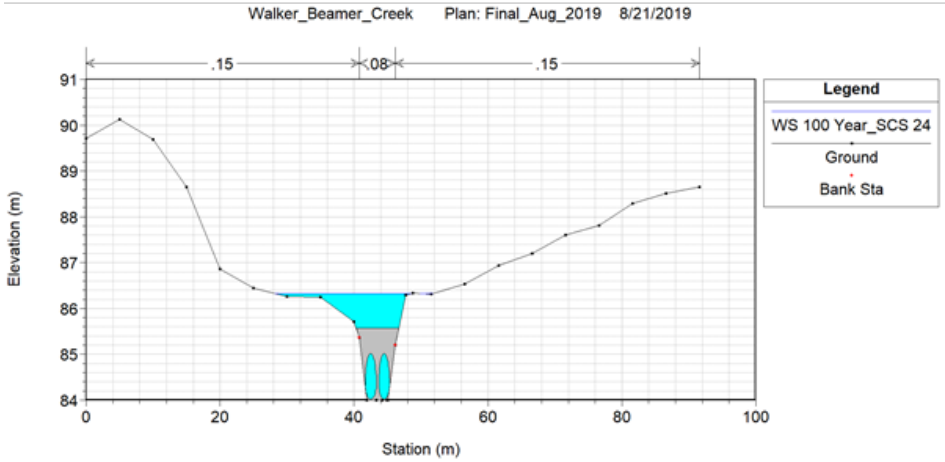


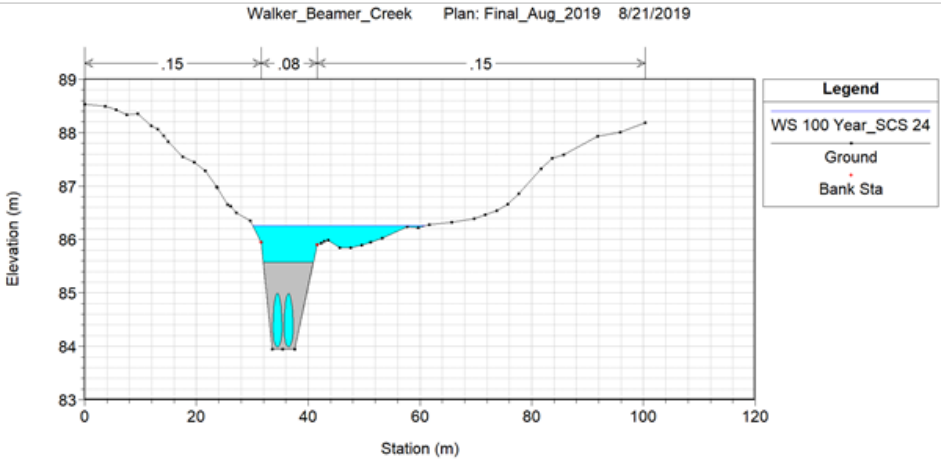
WKC-02 (Linwell Rd.)



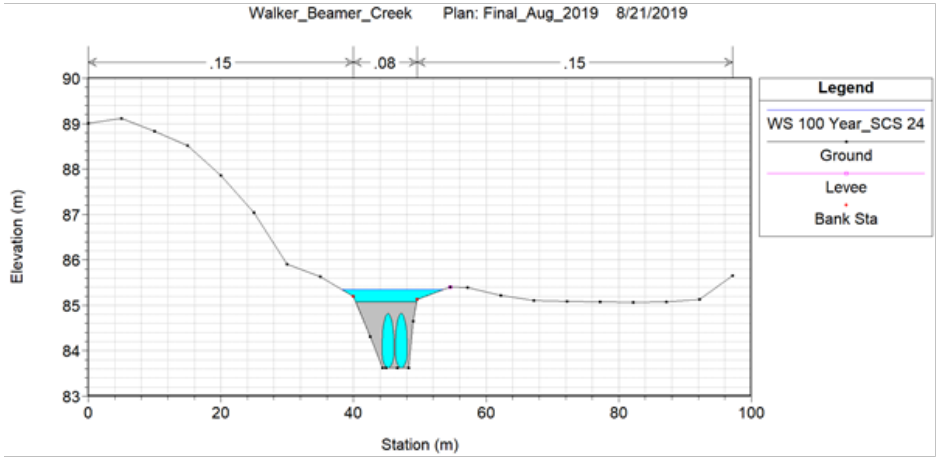


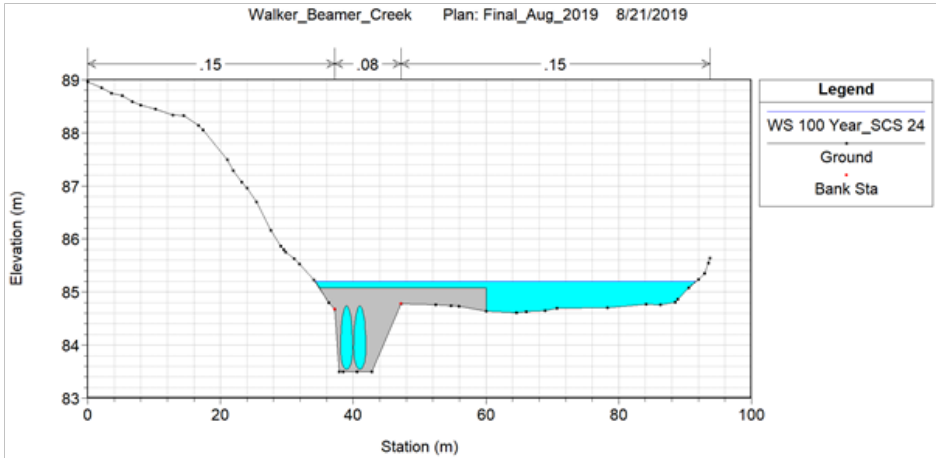
WKC-03 (Keistan Dr.)



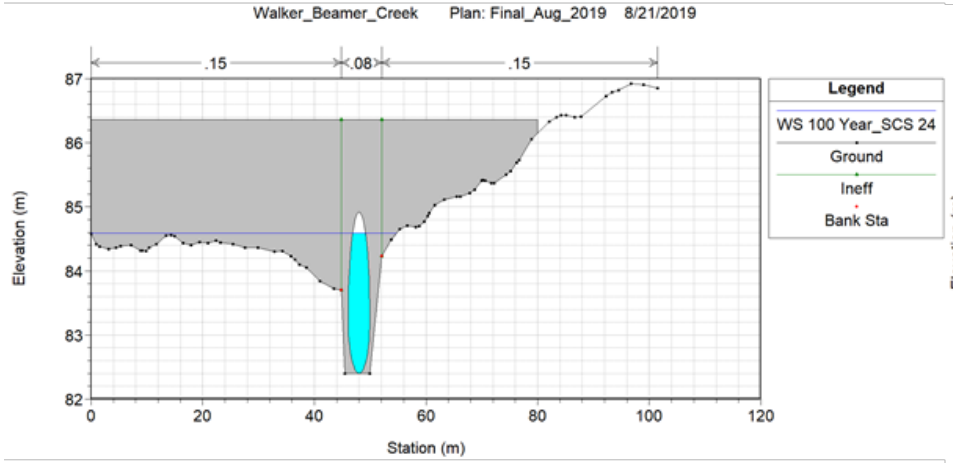


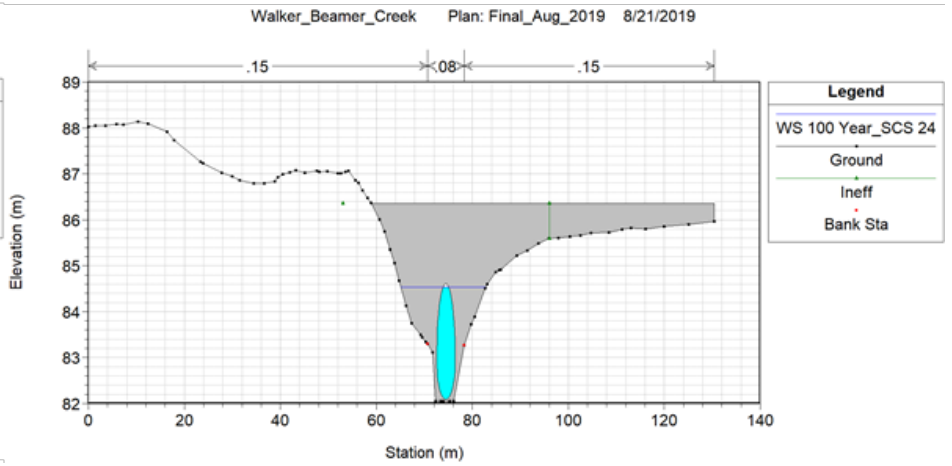
WKC-04 (Costen Blvd.)



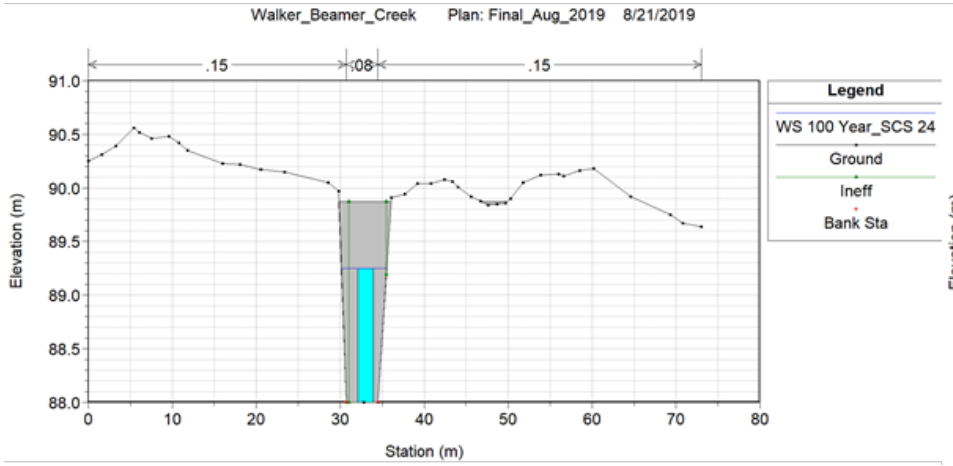


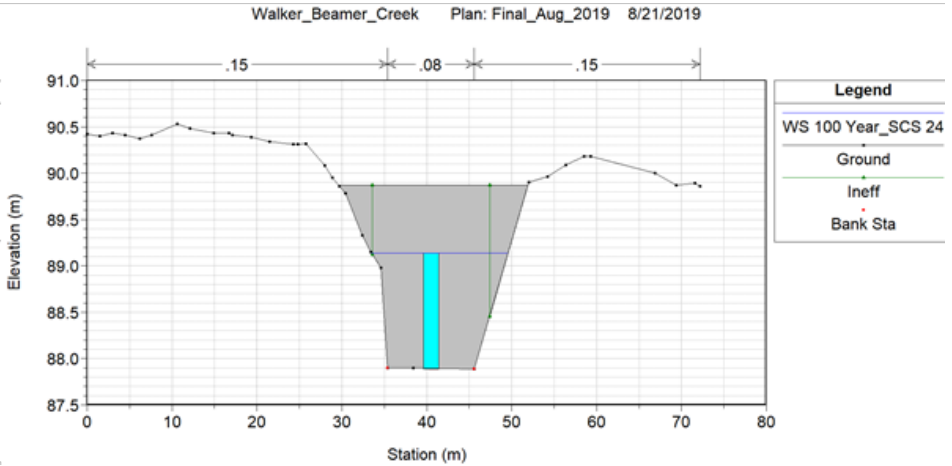
WKC-05 (Parnell Rd.)



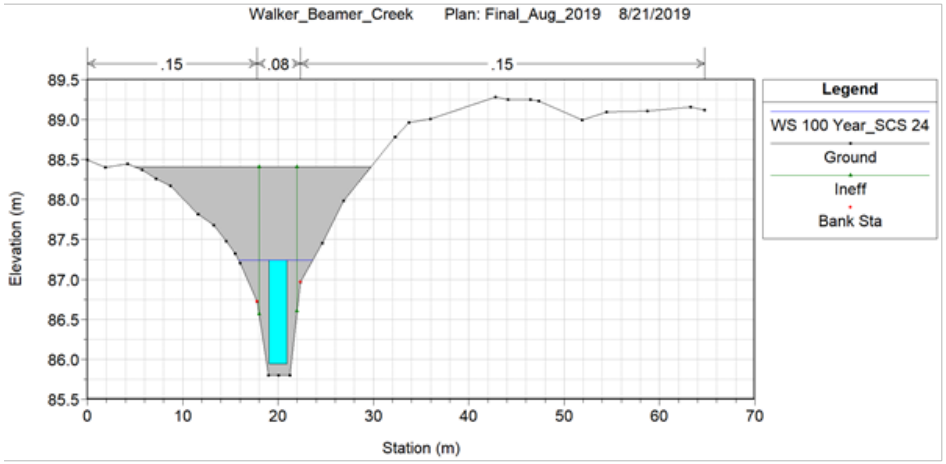


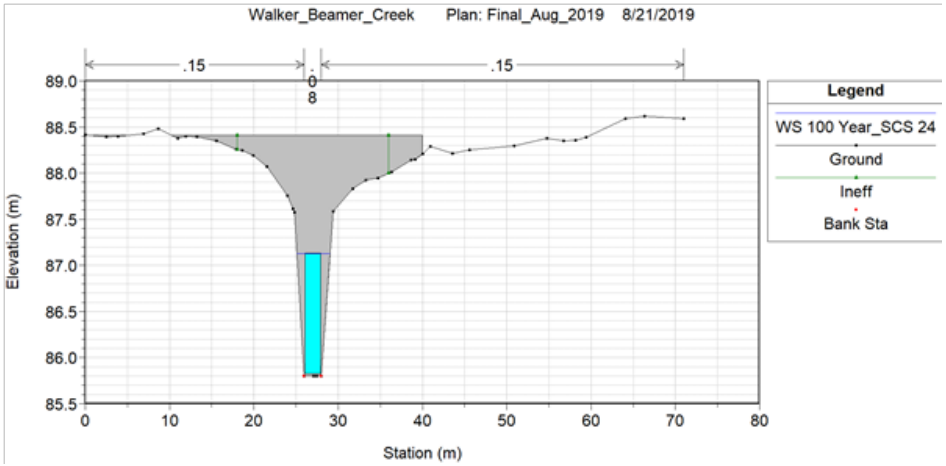
WKC-06 (Richelieu Rd.)



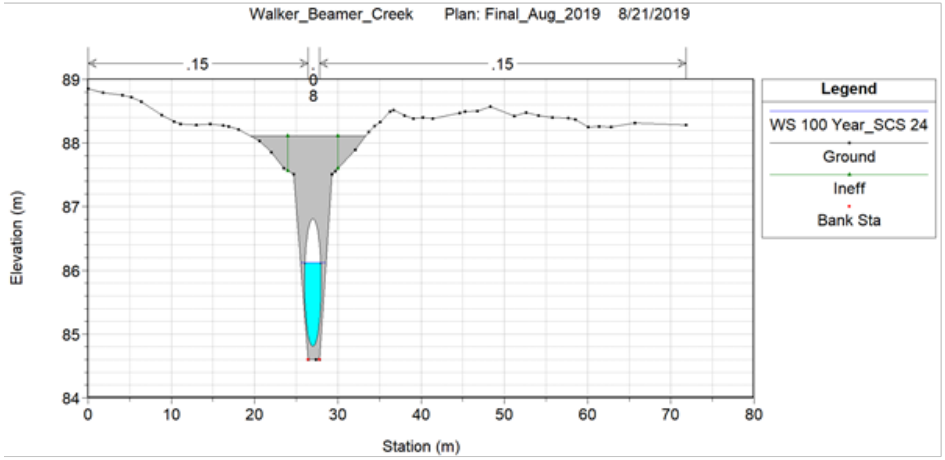


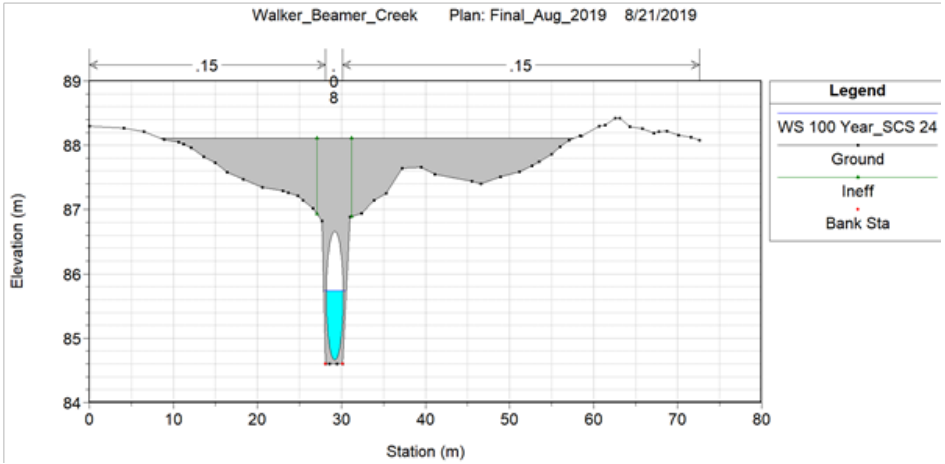
WKC-07 (Oxford Rd.)



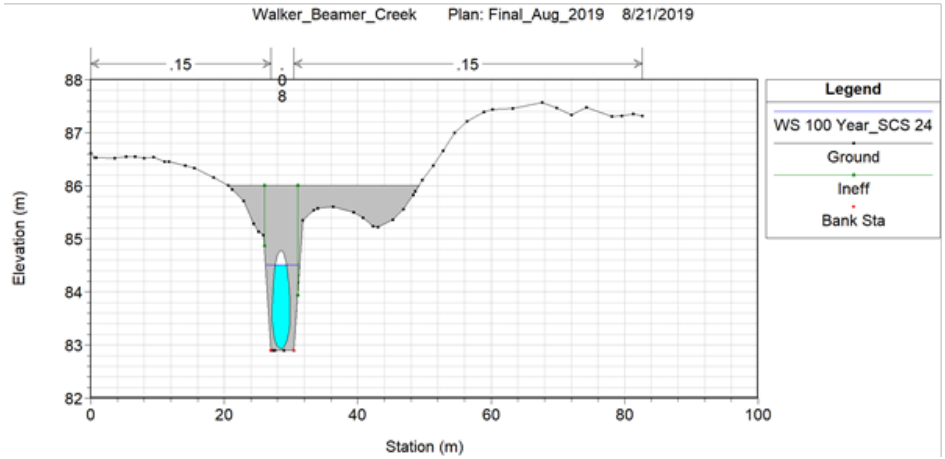


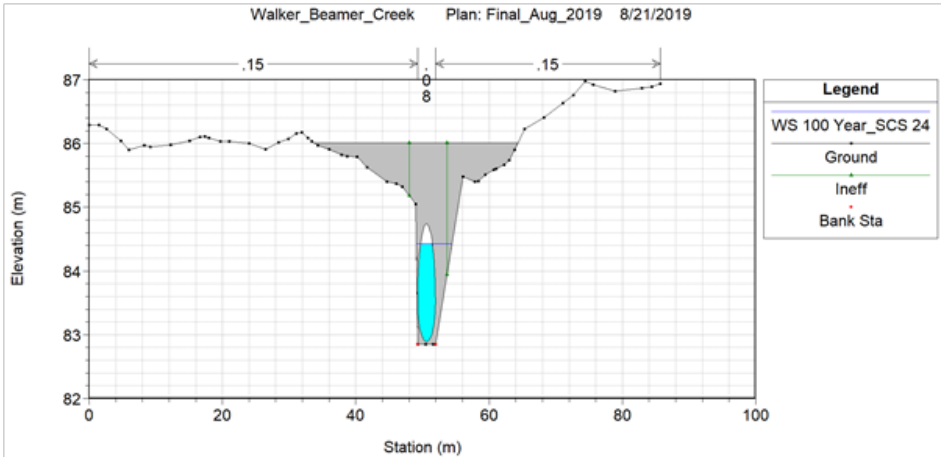
WKC-08 (Trelawne Dr.)



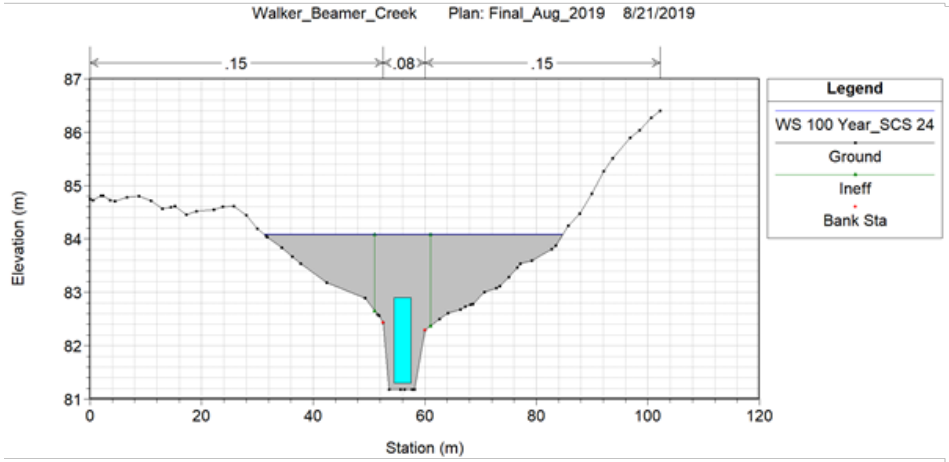


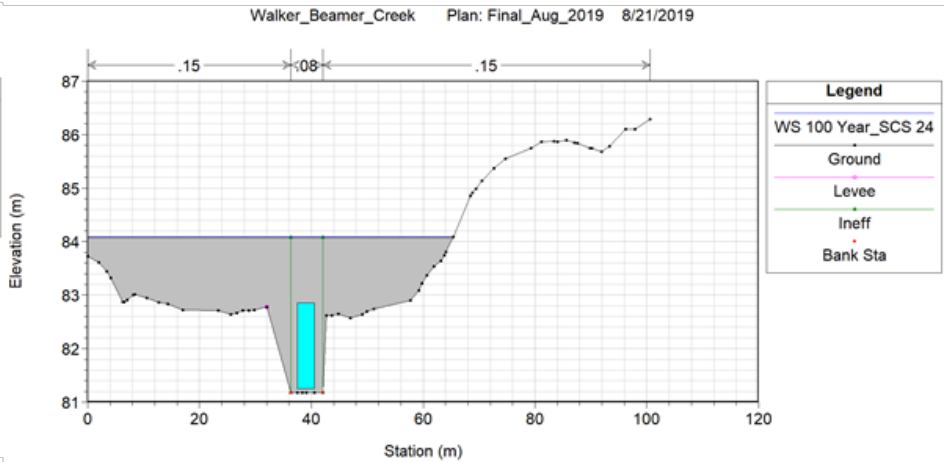
WKC-09 (Parnell Rd.)



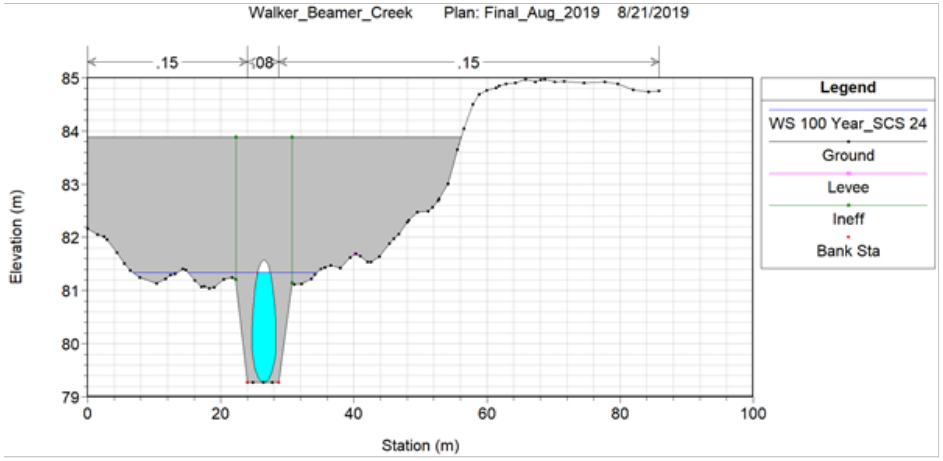


WKC-10 (Lakeshore Rd.)





WKC-11 (Cindy Dr.)



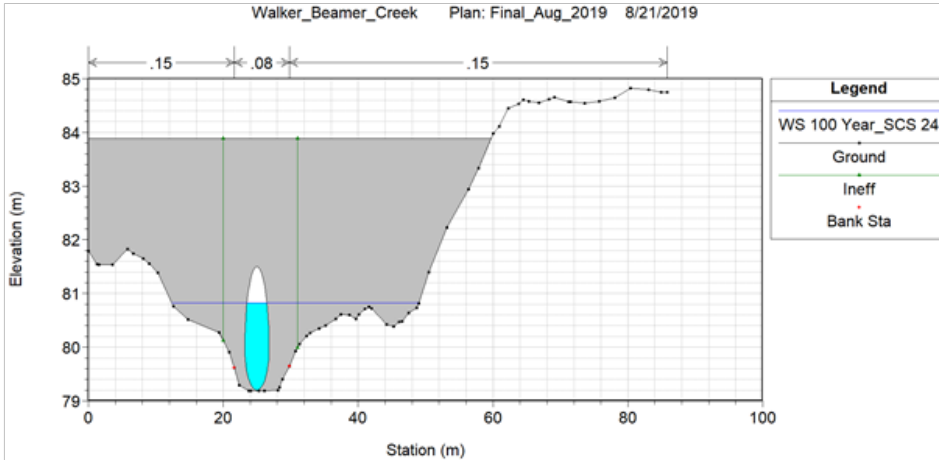


Figure B-3: Beamer Creek Surveyed Cross sections (Stations 0, 581, and 1228)

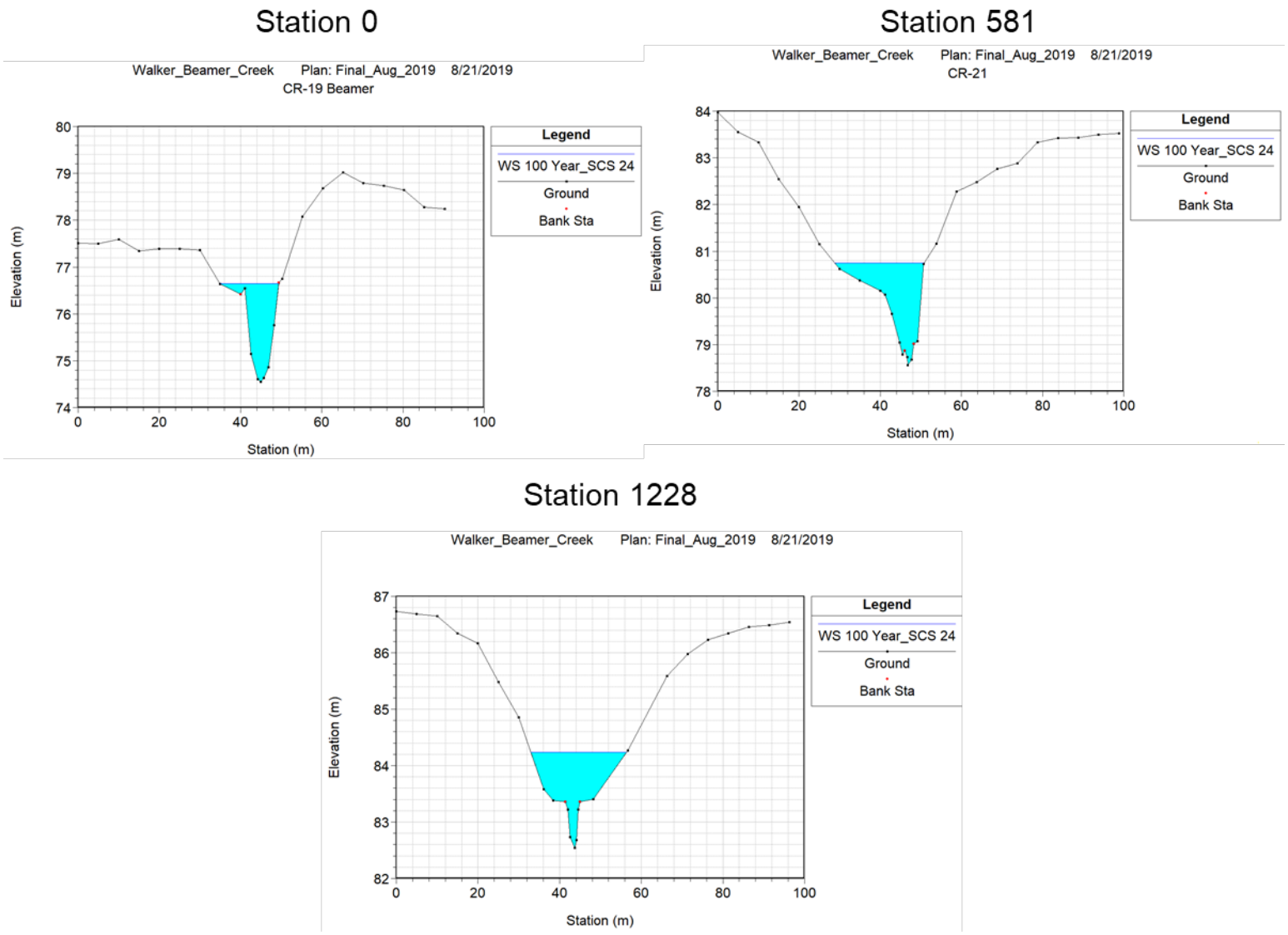
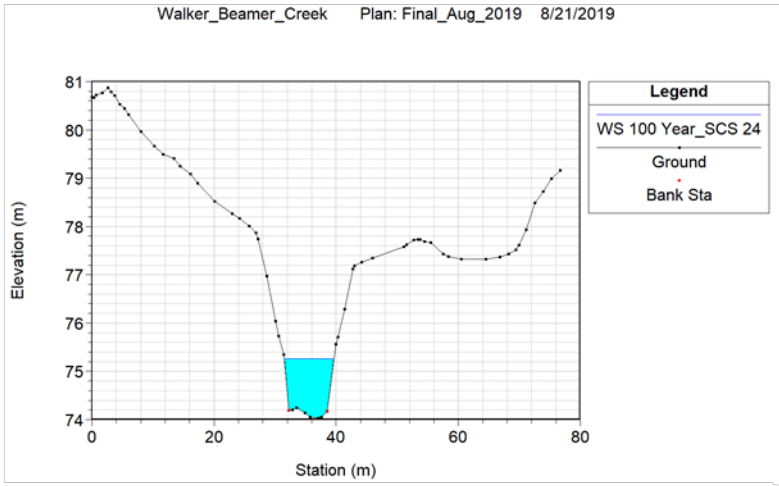
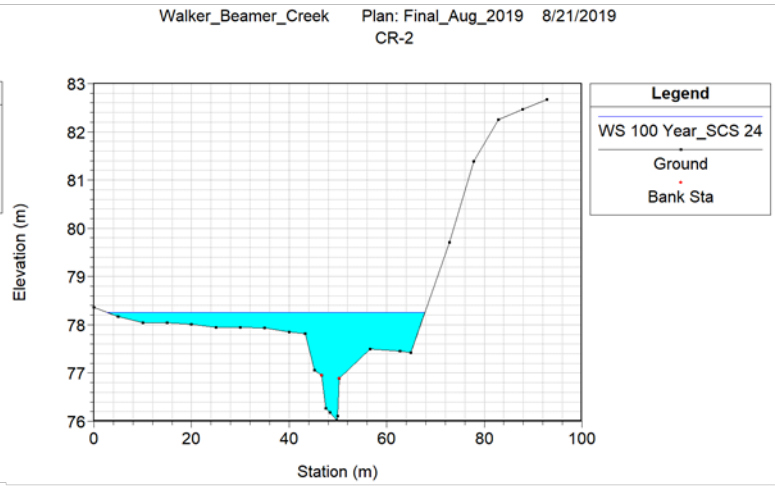


Figure B-4 Walker Creek Surveyed Cross sections (Stations 16, 215, 538, 781, 1244, 1698, 1924 , 2132, 2788, 3074, 1346)

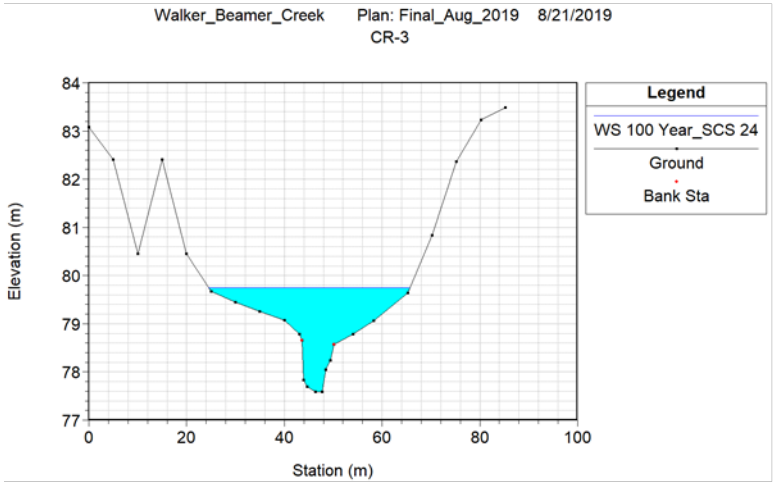
Station 16



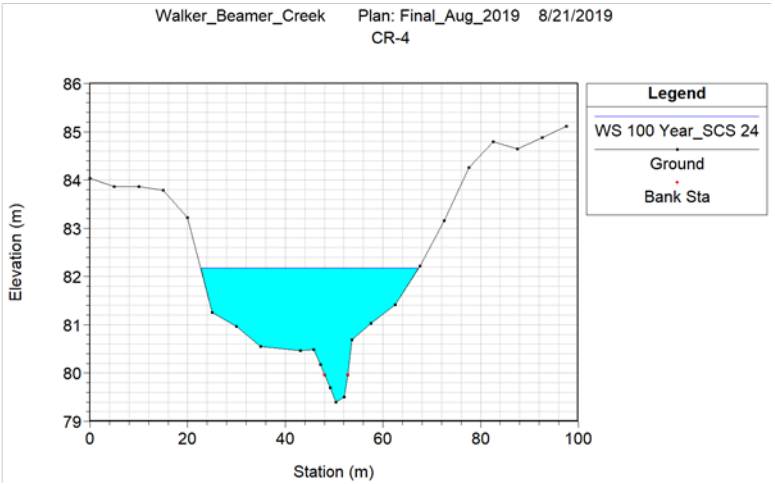
Station 215



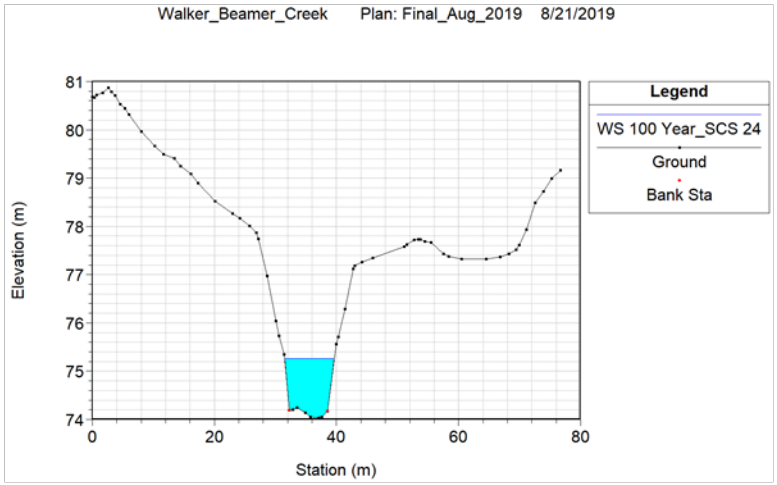
Station 538



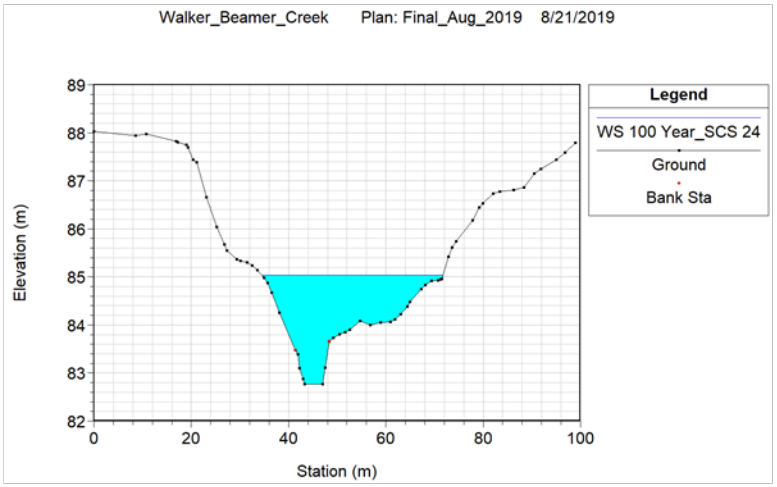
Station 781



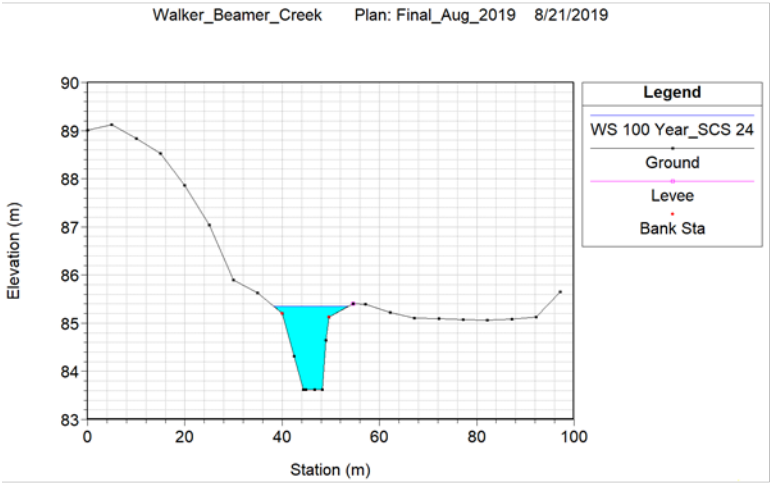
Station 1224



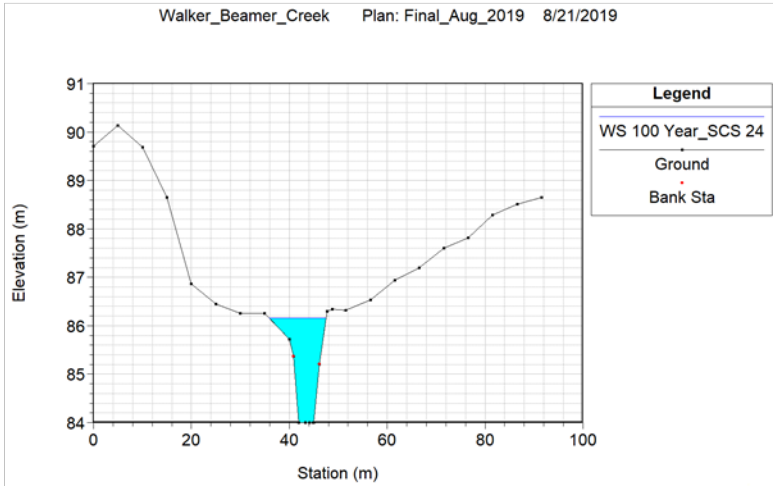
Station 1698



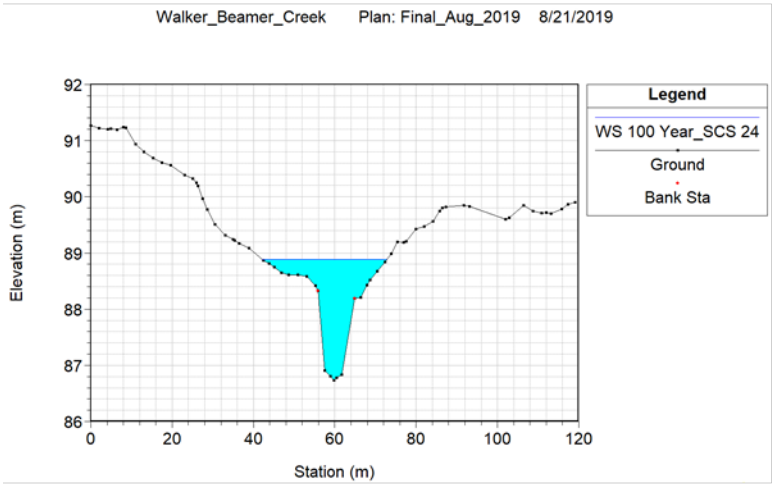
Station 1924



Station 2132



Station 2788



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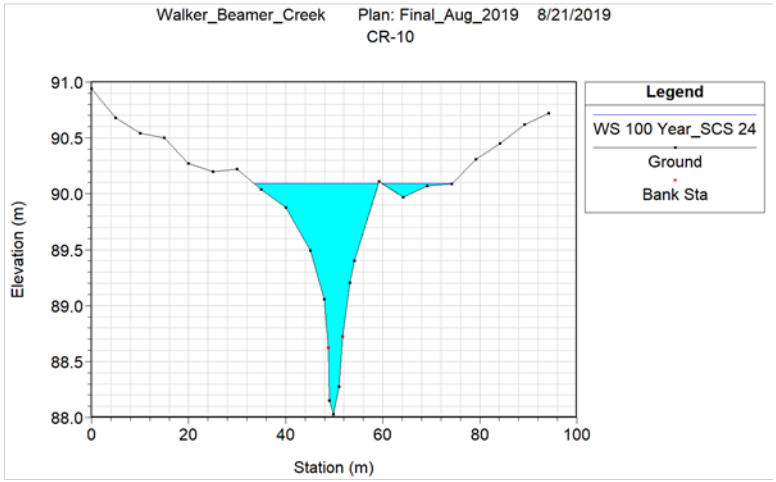

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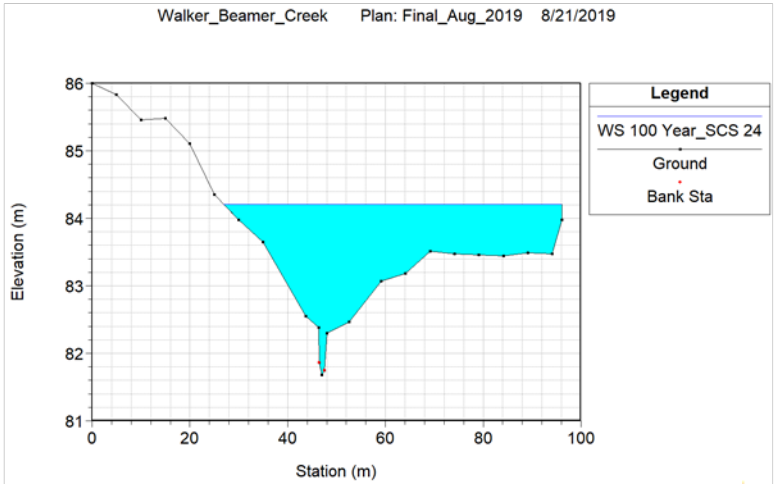
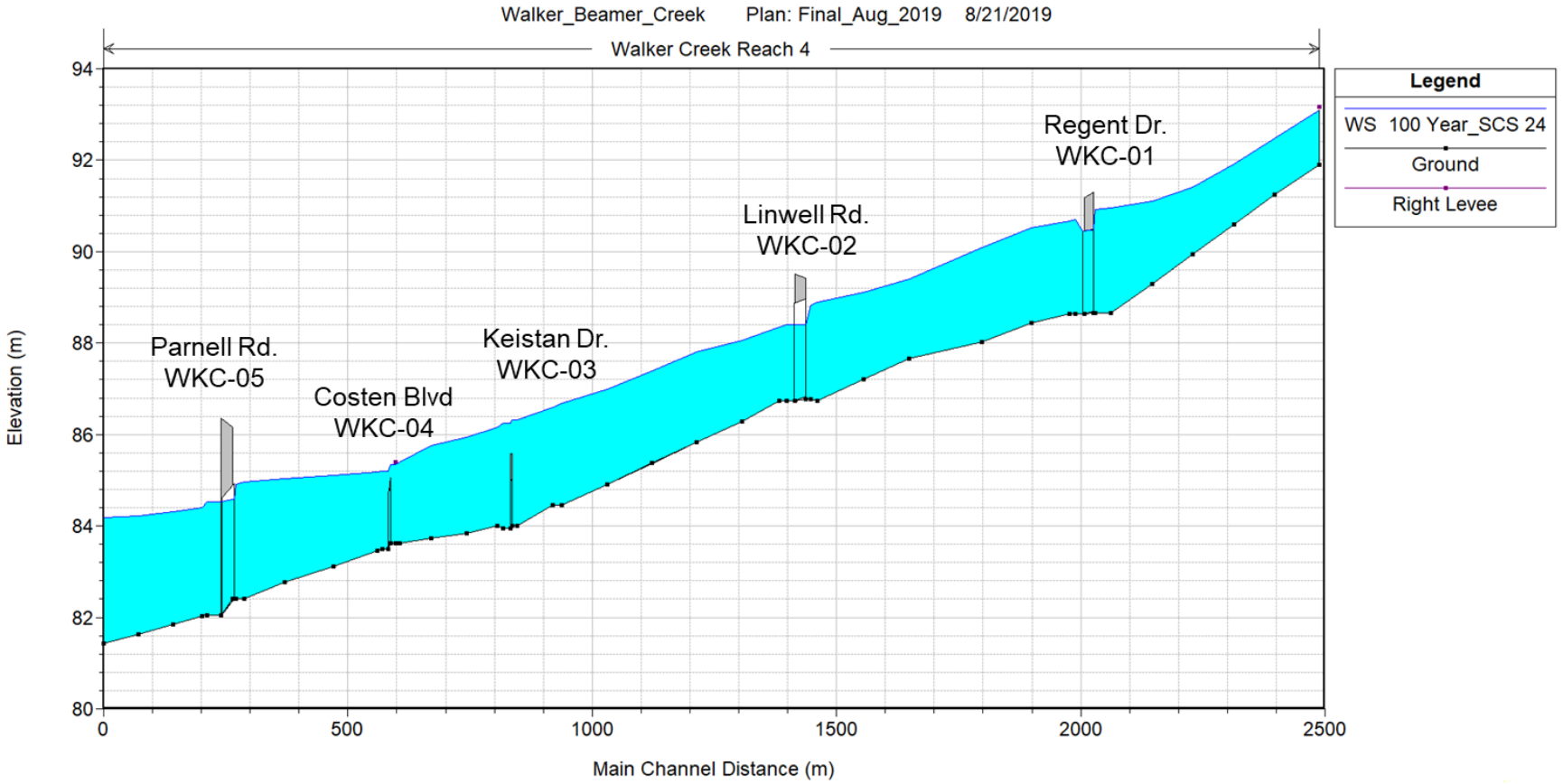
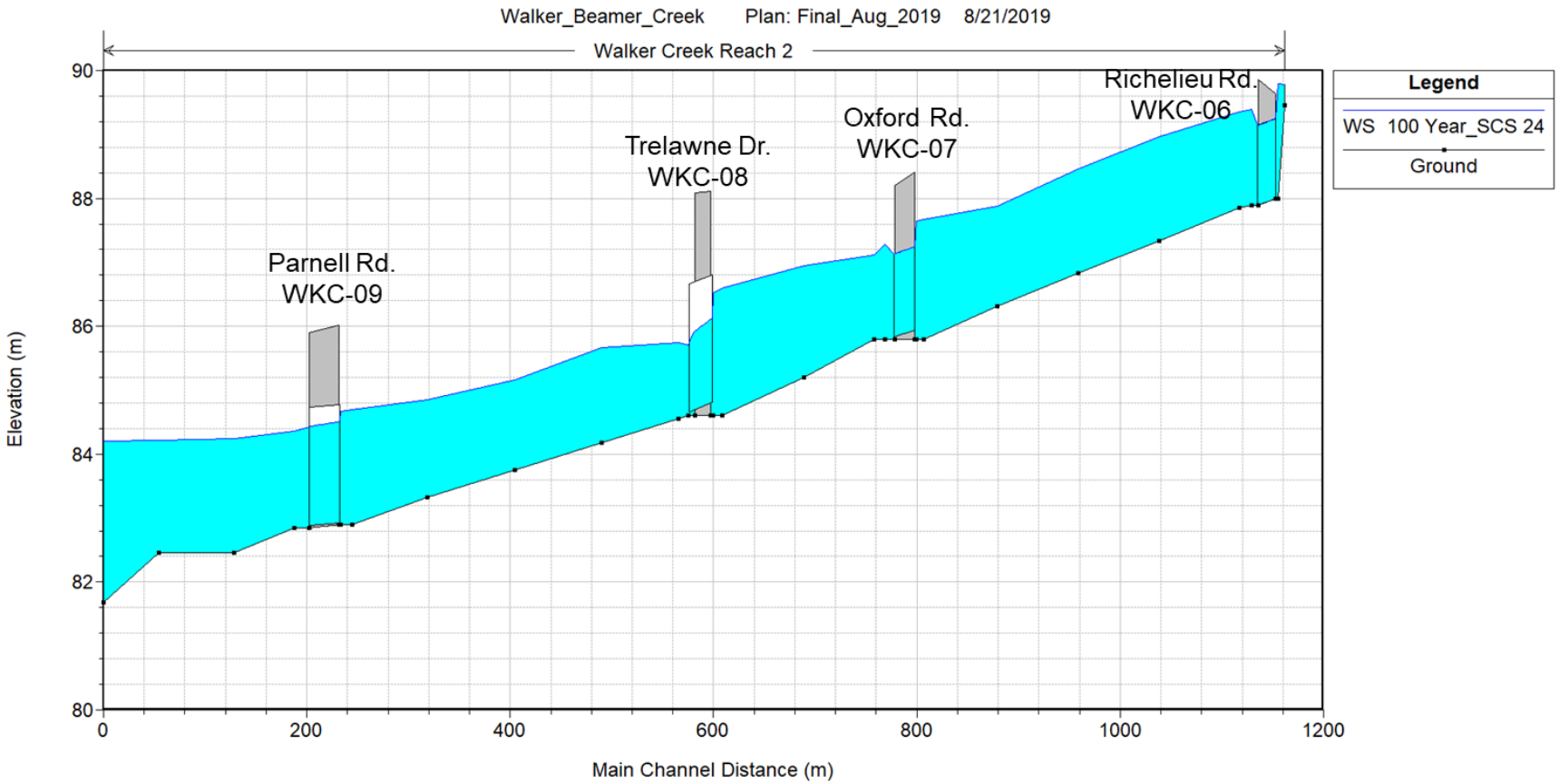


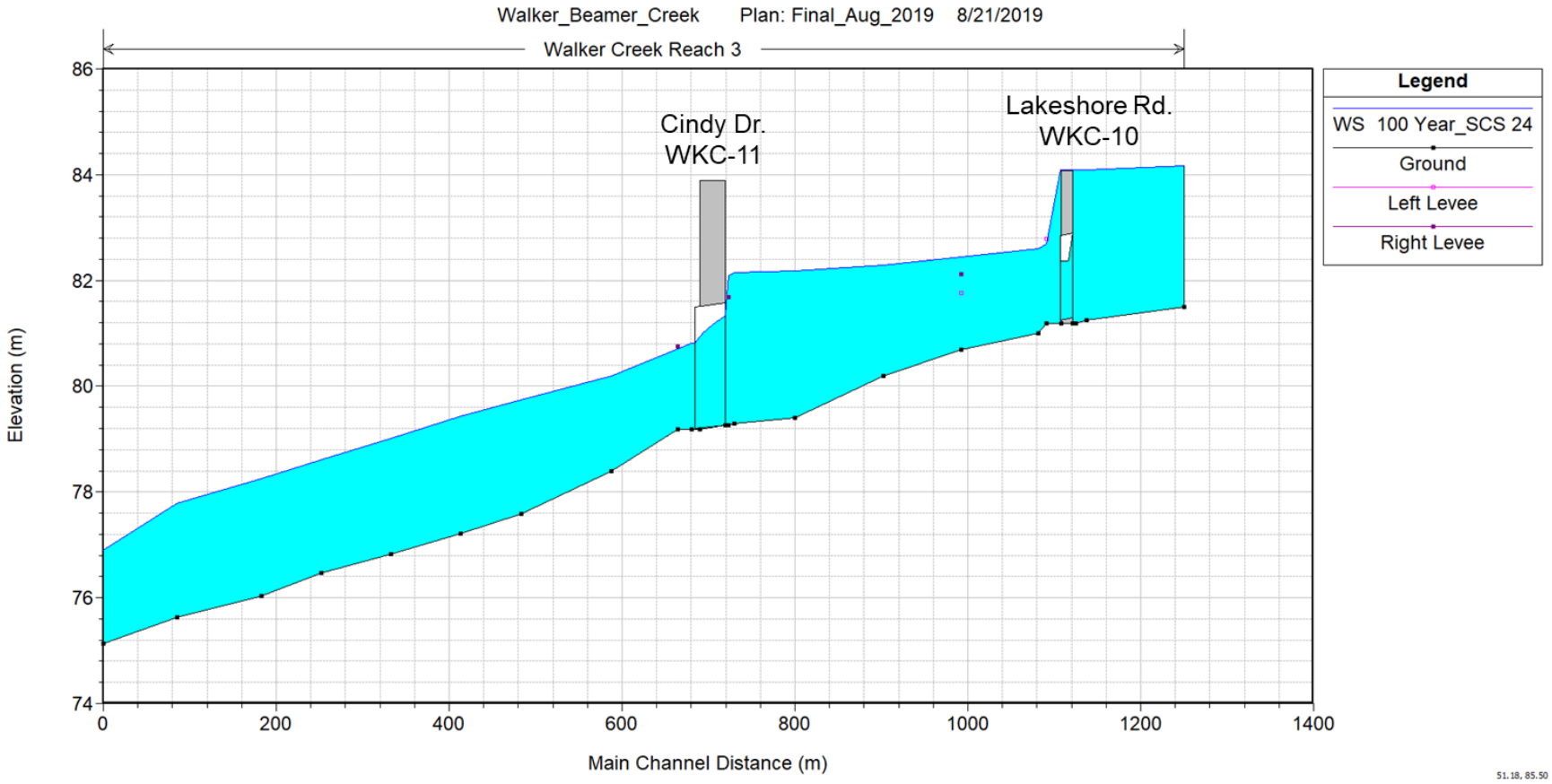
Figure B-5: Water Surface Elevation Along Walker Creek and Beamer Creek



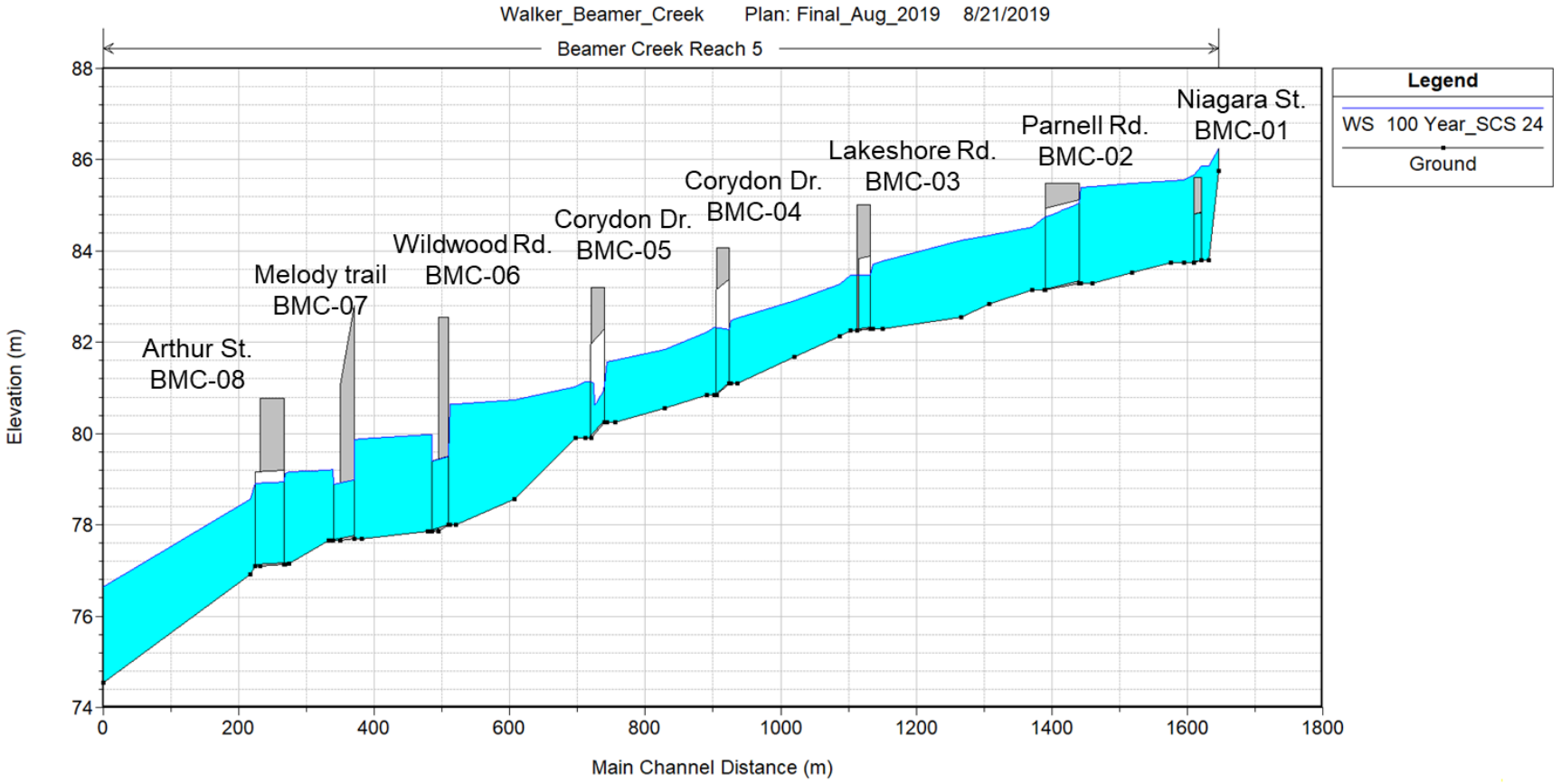
Walker Creek Reach 4



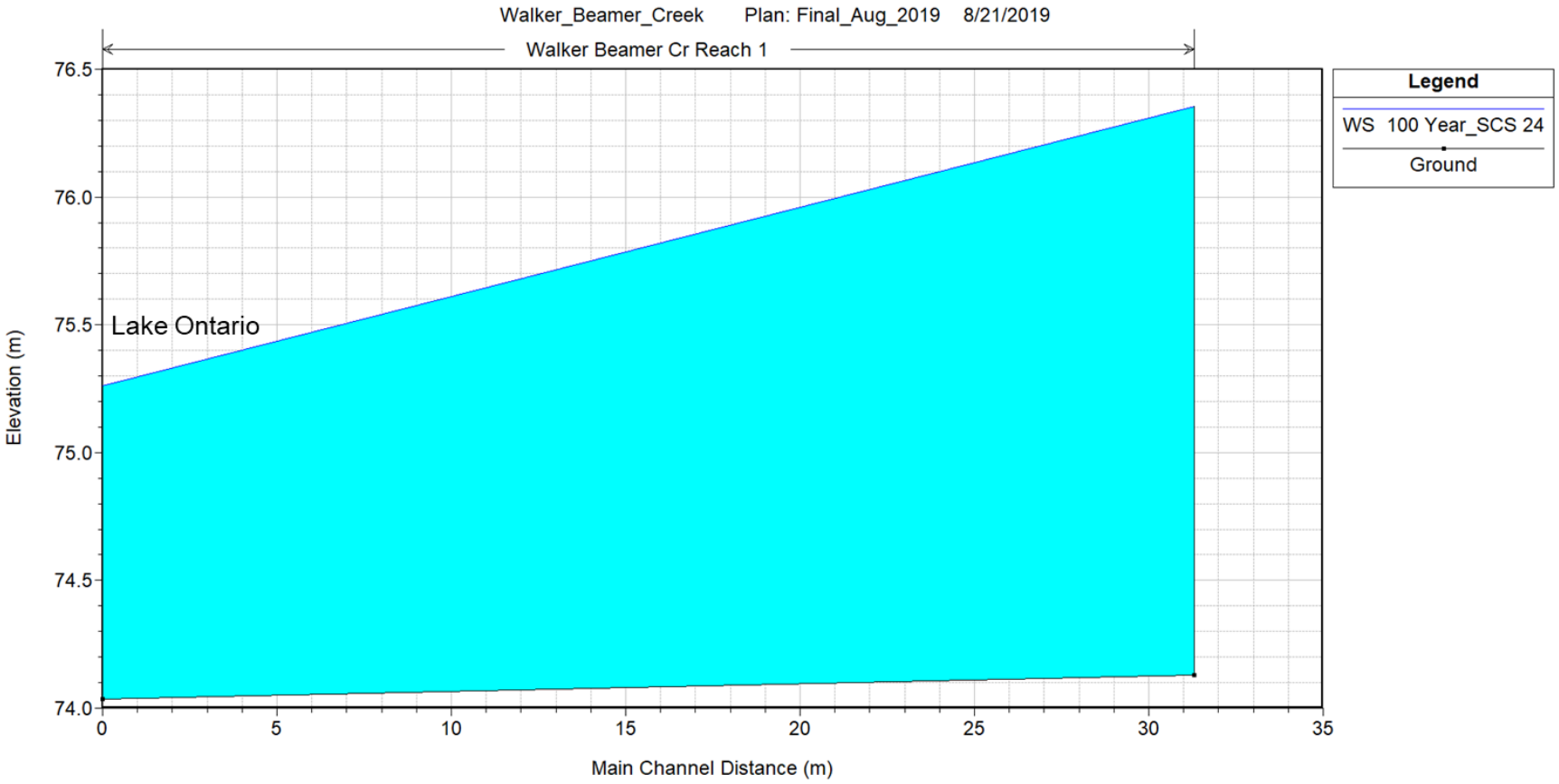
Walker Creek Reach 2



Walker Creek Reach 3



Beamer Creek



Walker Creek and Beamer Creek

APPENDIX C
City of St. Catharines Storm Sewer Network

Stantec

NIAGARA PENINSULA CONSERVATION AUTHORITY

Legend

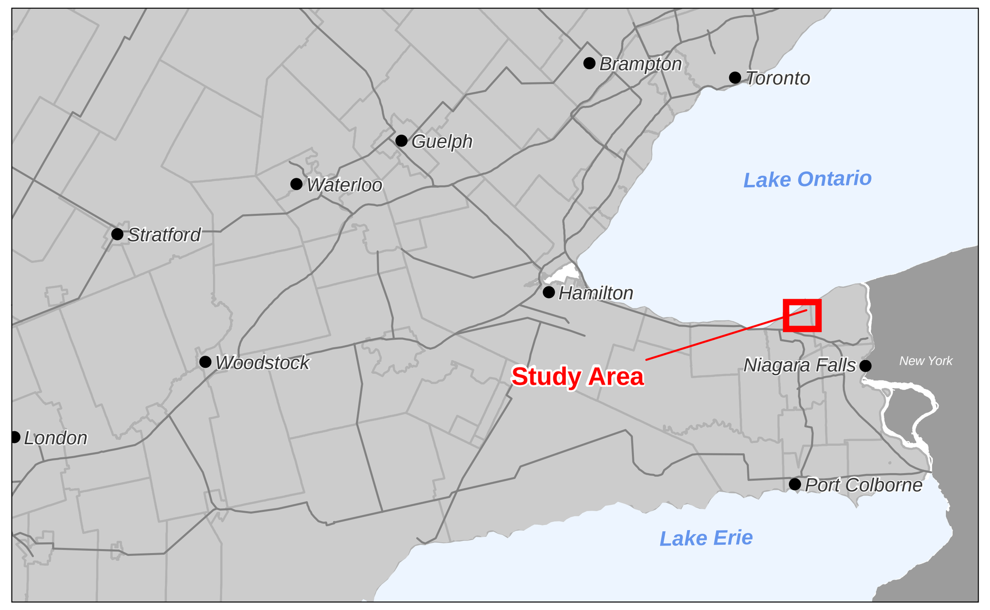
- Road
- Storm Sewer Network
- Watercourse
- Storm Sewer
- Ownership Parcel
- Subcatchment Boundary
- Catchment Boundary

0 0.5 1 km

1:10,000 (At original document size of 34x44)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 2018.



Project Location

City of St. Catahrines, Ontario

160951075 REVA

Prepared by PRM on 2019-10-22
Technical Review by NK on 2019-10-22

Client/Project

NIAGARA PENINSULA CONSERVATION AUTHORITY
FLOODPLAIN MAPPING

Figure No.

C-1

Title

City of St. Catharines Storm Sewer Network

\\cd1004-f01\work_group\01609\active\160951075\03_data\gis_cad\gis\mxds\Water_Resources\report_figures\Floodplain_Mapping\160951075_FigC-1_City_St_Catharines_Stormwater_Network.mxd Revised: 2019-10-22 By: pmoser

APPENDIX D

Hydrologic and Hydraulics Models Detailed Inputs and Outputs Report

```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 5.1.2000)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.1\VO2\voin.dat

  Output  filename:
C:\Users\nkimiaghalam\AppData\Local\Civica\VH5\94c30e1b-94fa-4ba0-88b7-b4cbef040ba8
\63ca947e-8a1a-47df-8d94-172d4ed33250
  Summary filename:
C:\Users\nkimiaghalam\AppData\Local\Civica\VH5\94c30e1b-94fa-4ba0-88b7-b4cbef040ba8
\63ca947e-8a1a-47df-8d94-172d4ed33250


DATE: 04/11/2019                          TIME: 03:44:42

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ********************************************
  ** SIMULATION : Calibration_July2016       **
  ********************************************


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```

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB NASHYD (0011) ID= 1 DT=10.0 min	Area (ha)= 1.40	Curve Number (CN)= 51.8
	Ia (mm)= 2.49	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20	

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00

3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Unit Hyd Qpeak (cms)= 0.267

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 9.000
RUNOFF VOLUME (mm)= 1.789
TOTAL RAINFALL (mm)= 24.250
RUNOFF COEFFICIENT = 0.074

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB

| STANDHYD (0001)| Area (ha)= 216.40
|ID= 1 DT=10.0 min | Total Imp(%)= 30.61 Dir. Conn.(%)= 25.13

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	66.25	150.15
Dep. Storage	(mm)=	4.00	101.74
Average Slope	(%)=	0.81	0.81
Length	(m)=	1201.11	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00

5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00		
over (min)	30.00	390.00		
Storage Coeff. (min)=	45.87 (ii)	382.22 (ii)		
Unit Hyd. Tpeak (min)=	30.00	390.00		
Unit Hyd. peak (cms)=	0.03	0.00		
			TOTALS	
PEAK FLOW (cms)=	1.03	0.00	1.033 (iii)	
TIME TO PEAK (hrs)=	9.17	0.00	9.17	
RUNOFF VOLUME (mm)=	20.25	0.00	5.09	
TOTAL RAINFALL (mm)=	24.25	24.25	24.25	
RUNOFF COEFFICIENT =	0.84	0.00	0.21	

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.2 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(0043)	
IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	94.76	0.0500	
0.50	94.76	0.0500	
2.50	94.70	0.0500 /0.0300	Main Channel
4.50	94.48	0.0300	Main Channel
5.30	94.45	0.0300	Main Channel
5.70	94.40	0.0300	Main Channel
8.50	94.33	0.0300	Main Channel
10.60	94.36	0.0300	Main Channel
12.60	94.54	0.0300 /0.0500	Main Channel
18.60	94.57	0.0500	
20.60	94.54	0.0500	
22.60	94.61	0.0500	
23.50	94.61	0.0500	

<---------- TRAVEL TIME TABLE ---------->

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME

(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.01	94.34	.108E+02	0.0	0.08	217.47
0.03	94.36	.434E+02	0.0	0.12	137.00
0.04	94.37	.934E+02	0.0	0.17	96.43
0.06	94.39	.154E+03	0.0	0.22	77.42
0.07	94.40	.224E+03	0.1	0.25	66.29
0.08	94.41	.301E+03	0.1	0.30	56.22
0.10	94.43	.382E+03	0.1	0.34	49.48
0.11	94.44	.467E+03	0.2	0.38	44.60
0.13	94.46	.556E+03	0.2	0.41	41.33
0.14	94.47	.651E+03	0.3	0.43	39.16
0.15	94.48	.754E+03	0.3	0.45	37.03
0.17	94.50	.862E+03	0.4	0.48	34.72
0.18	94.51	.974E+03	0.5	0.51	32.78
0.20	94.53	.109E+04	0.6	0.54	31.13
0.21	94.54	.121E+04	0.7	0.57	29.69
0.23	94.56	.141E+04	0.8	0.59	28.59
0.25	94.58	.170E+04	1.0	0.58	28.71
0.26	94.59	.202E+04	1.2	0.59	28.59
0.28	94.61	.235E+04	1.4	0.59	28.27

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0001)	216.40	1.03	9.17	5.09	0.25	0.58
OUTFLOW: ID= 1 (0043)	216.40	0.92	9.33	5.08	0.24	0.59

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0002)	Area (ha)= 130.20
ID= 1 DT=10.0 min	Total Imp(%)= 27.41 Dir. Conn.(%)= 21.47

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	35.69	94.51
Dep. Storage	(mm)=	4.00	101.74
Average Slope	(%)=	0.84	0.84
Length	(m)=	931.67	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00

5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	30.00	380.00	
Storage Coeff. (min)=	39.01 (ii)	372.12 (ii)	
Unit Hyd. Tpeak (min)=	30.00	380.00	
Unit Hyd. peak (cms)=	0.03	0.00	
			TOTALS
PEAK FLOW (cms)=	0.56	0.00	0.556 (iii)
TIME TO PEAK (hrs)=	7.17	0.00	7.17
RUNOFF VOLUME (mm)=	20.25	0.00	4.35
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.18

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0017)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0002):		130.20	0.556	7.17	4.35
+ ID2= 2 (0043):		216.40	0.922	9.33	5.08
		==========	==========	==========	==========
ID = 3 (0017):		346.60	1.442	9.17	4.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0018)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
0.00	89.88	0.0720
5.08	89.49	0.0720

7.92	89.06	0.0720 /0.0432	Main Channel
8.81	88.62	0.0432	Main Channel
8.99	88.15	0.0432	Main Channel
9.88	88.03	0.0432	Main Channel
10.97	88.27	0.0432	Main Channel
11.76	88.72	0.0432	Main Channel
13.18	89.20	0.0432 /0.0864	Main Channel
14.20	89.40	0.0864	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.07	88.10	.305E+02	0.0	0.22	85.36
0.14	88.17	.121E+03	0.0	0.35	52.17
0.21	88.23	.249E+03	0.1	0.49	37.46
0.28	88.30	.401E+03	0.2	0.61	30.13
0.34	88.37	.566E+03	0.4	0.73	25.43
0.41	88.44	.743E+03	0.6	0.82	22.44
0.48	88.51	.930E+03	0.8	0.91	20.32
0.55	88.58	.113E+04	1.0	0.99	18.73
0.62	88.65	.134E+04	1.3	1.05	17.58
0.69	88.72	.157E+04	1.6	1.11	16.74
0.76	88.78	.182E+04	1.9	1.14	16.16
0.83	88.85	.210E+04	2.2	1.19	15.60
0.89	88.92	.240E+04	2.7	1.23	15.05
0.96	88.99	.273E+04	3.1	1.27	14.53
1.03	89.06	.309E+04	3.7	1.32	14.03
1.10	89.13	.348E+04	4.3	1.38	13.39
1.19	89.21	.404E+04	5.3	1.45	12.78
1.27	89.30	.468E+04	6.5	1.53	12.09
1.36	89.38	.543E+04	7.8	1.59	11.62

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0017)	346.60	1.44	9.17	4.81	0.66	1.08
OUTFLOW: ID= 1 (0018)	346.60	1.39	9.33	4.81	0.65	1.07

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB STANDHYD (0003)	Area (ha)= 82.10
ID= 1 DT=10.0 min	Total Imp(%)= 26.96 Dir. Conn.(%)= 20.10

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	22.13	59.97
Dep. Storage	(mm)=	4.00	55.56
Average Slope	(%)=	0.91	0.91
Length	(m)=	739.82	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00

3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	30.00	360.00	
Storage Coeff. (min)=	33.10 (ii)	357.72 (ii)	
Unit Hyd. Tpeak (min)=	30.00	360.00	
Unit Hyd. peak (cms)=	0.04	0.00	
			TOTALS
PEAK FLOW (cms)=	0.36	0.00	0.357 (iii)
TIME TO PEAK (hrs)=	7.17	0.00	7.17
RUNOFF VOLUME (mm)=	20.25	0.00	4.07
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.17

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0019)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0018):	346.60	1.385	9.33	4.81
+ ID2= 2 (0003):	82.10	0.357	7.17	4.07
ID = 3 (0019):	428.70	1.689	9.33	4.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0020)	
IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	85.72	0.0720	
0.81	85.37	0.0720	
2.92	84.99	0.0720 /0.0432	Main Channel
3.31	84.52	0.0432	Main Channel
4.19	84.46	0.0432	Main Channel
4.89	84.53	0.0432	Main Channel
5.01	84.69	0.0432	Main Channel
6.15	85.20	0.0432 /0.0864	Main Channel
7.72	86.30	0.0864	
8.75	86.34	0.0864	
11.56	86.32	0.0864	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.09	84.55	.101E+03	0.0	0.25	75.89
0.18	84.63	.276E+03	0.1	0.45	42.42
0.27	84.72	.466E+03	0.2	0.59	32.73
0.36	84.81	.682E+03	0.4	0.69	27.99
0.45	84.90	.927E+03	0.6	0.78	24.85
0.54	84.99	.120E+04	0.9	0.86	22.55
0.64	85.10	.158E+04	1.3	0.94	20.45
0.75	85.20	.206E+04	1.8	1.00	19.24
0.85	85.30	.263E+04	2.5	1.09	17.77
0.95	85.41	.328E+04	3.3	1.15	16.71
1.06	85.51	.399E+04	4.2	1.22	15.80
1.16	85.61	.475E+04	5.3	1.28	15.02
1.26	85.72	.555E+04	6.4	1.34	14.36
1.37	85.82	.638E+04	7.8	1.41	13.68
1.47	85.92	.724E+04	9.2	1.48	13.06
1.57	86.03	.811E+04	10.8	1.54	12.51
1.68	86.13	.899E+04	12.5	1.61	12.01
1.78	86.23	.990E+04	14.3	1.67	11.56
1.88	86.34	.109E+05	15.9	1.70	11.37

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0019)	428.70	1.69	9.33	4.67	0.73	0.99

OUTFLOW: ID= 1 (0020) 428.70 1.61 9.50 4.66 0.71 0.98

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB STANDHYD (0005) ID= 1 DT=10.0 min	Area (ha)= 65.80 Total Imp(%)= 24.67 Dir. Conn.(%)= 17.36

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	16.23	49.57
Dep. Storage	(mm)=	4.00	65.79
Average Slope	(%)=	1.11	1.11
Length	(m)=	662.32	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00

1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	30.00	340.00	
Storage Coeff. (min)=	29.23 (ii)	335.53 (ii)	
Unit Hyd. Tpeak (min)=	30.00	340.00	
Unit Hyd. peak (cms)=	0.04	0.00	
			TOTALS
PEAK FLOW (cms)=	0.26	0.00	0.262 (iii)
TIME TO PEAK (hrs)=	7.17	0.00	7.17
RUNOFF VOLUME (mm)=	20.25	0.00	3.52
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.14

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 63.5 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	428.70	1.609	9.50	4.66
+ ID2= 2 (0005):	65.80	0.262	7.17	3.52
ID = 3 (0021):	494.50	1.784	9.33	4.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0026)		
IN= 2---> OUT= 1	Routing time step (min)'= 10.00	

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	82.72	0.0720	
3.36	81.85	0.0720 /0.0432	Main Channel
3.83	81.50	0.0432	Main Channel
5.04	81.49	0.0432	Main Channel
6.04	81.50	0.0432	Main Channel
6.90	82.26	0.0432 /0.0864	Main Channel
9.45	83.22	0.0864	
12.51	83.36	0.0864	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.06	81.55	.614E+02	0.1	0.52	15.48
0.12	81.61	.130E+03	0.2	0.82	9.88
0.18	81.67	.203E+03	0.4	1.05	7.70
0.24	81.73	.280E+03	0.7	1.24	6.49
0.29	81.79	.361E+03	1.1	1.41	5.71
0.35	81.85	.446E+03	1.4	1.56	5.15
0.42	81.91	.551E+03	2.0	1.74	4.62
0.49	81.98	.667E+03	2.6	1.89	4.26
0.56	82.05	.794E+03	3.3	2.02	3.99
0.62	82.12	.932E+03	4.1	2.13	3.79
0.69	82.18	.108E+04	5.0	2.22	3.62
0.76	82.25	.124E+04	5.9	2.31	3.48
0.82	82.32	.141E+04	7.1	2.42	3.33

0.89	82.38	.160E+04	8.3	2.52	3.20
0.96	82.45	.180E+04	9.7	2.61	3.09
1.03	82.52	.201E+04	11.2	2.68	3.00
1.09	82.59	.224E+04	12.8	2.75	2.92
1.16	82.65	.248E+04	14.5	2.82	2.86
1.23	82.72	.274E+04	16.3	2.88	2.80

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (| 0021)	494.50	1.78	9.33	4.51	0.40	1.67
OUTFLOW: ID= 1 (| 0026)	494.50	1.79	9.50	4.51	0.40	1.67

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0004)	Area (ha)= 58.60
ID= 1 DT=10.0 min	Total Imp(%)= 28.79 Dir. Conn.(%)= 21.47

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	16.87	41.73
Dep. Storage	(mm)=	4.00	51.17
Average Slope	(%)=	0.81	0.81
Length	(m)=	625.03	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00		
over (min)	30.00	370.00		
Storage Coeff. (min)=	31.05 (ii)	367.95 (ii)		
Unit Hyd. Tpeak (min)=	30.00	370.00		
Unit Hyd. peak (cms)=	0.04	0.00		
			TOTALS	
PEAK FLOW (cms)=	0.28	0.00	0.281 (iii)	
TIME TO PEAK (hrs)=	7.17	0.00	7.17	

```
     RUNOFF VOLUME    (mm)=      20.25         0.00          4.35
     TOTAL RAINFALL   (mm)=      24.25        24.25         24.25
     RUNOFF COEFFICIENT   =       0.84         0.00          0.18

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.7    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ROUTE CHN(  0022)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         89.88        0.0720
                   5.08         89.49        0.0720
                   7.92         89.06    0.0720 /0.0432  Main Channel
                   8.81         88.62        0.0432      Main Channel
                   8.99         88.15        0.0432      Main Channel
                   9.88         88.03        0.0432      Main Channel
                  10.97         88.27        0.0432      Main Channel
                  11.76         88.72    0.0432 /0.0864  Main Channel
                  13.18         89.20        0.0864
                  14.20         89.40        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.07    88.10    .283E+02       0.0          0.17      97.43
       0.14    88.17    .112E+03       0.0          0.28      59.39
       0.21    88.24    .230E+03       0.1          0.39      42.73
       0.28    88.31    .370E+03       0.2          0.49      34.34
       0.35    88.38    .522E+03       0.3          0.58      29.02
       0.42    88.44    .684E+03       0.4          0.66      25.61
       0.49    88.51    .857E+03       0.6          0.72      23.21
       0.56    88.58    .104E+04       0.8          0.79      21.40
       0.62    88.65    .123E+04       1.0          0.84      20.10
       0.69    88.72    .145E+04       1.3          0.88      19.14
       0.77    88.80    .170E+04       1.6          0.94      17.86
       0.85    88.87    .198E+04       2.0          0.99      16.90
       0.92    88.95    .229E+04       2.4          1.04      16.16
       1.00    89.02    .263E+04       2.8          1.08      15.55
       1.07    89.10    .300E+04       3.4          1.13      14.87
```

1.15	89.17	.343E+04	4.0	1.18	14.27
1.22	89.25	.391E+04	4.7	1.21	13.86
1.30	89.33	.445E+04	5.5	1.24	13.59
1.37	89.40	.507E+04	6.3	1.25	13.41

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (| 0004)	58.60	0.28	7.17	4.35	0.34	0.56
OUTFLOW: ID= 1 (| 0022)	58.60	0.23	9.33	4.34	0.31	0.52

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB STANDHYD (0006) ID= 1 DT=10.0 min	Area (ha)= 47.50 Total Imp(%)= 27.41 Dir. Conn.(%)= 19.65

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.02	34.48
Dep. Storage	(mm)=	4.00	55.56
Average Slope	(%)=	1.09	1.09
Length	(m)=	562.73	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00		
over (min)	30.00	340.00		
Storage Coeff. (min)=	26.63 (ii)	334.42 (ii)		
Unit Hyd. Tpeak (min)=	30.00	340.00		
Unit Hyd. peak (cms)=	0.04	0.00		
			TOTALS	
PEAK FLOW (cms)=	0.22	0.00	0.222 (iii)	
TIME TO PEAK (hrs)=	7.17	0.00	7.17	
RUNOFF VOLUME (mm)=	20.25	0.00	3.98	
TOTAL RAINFALL (mm)=	24.25	24.25	24.25	

```
     RUNOFF COEFFICIENT   =       0.84         0.00          0.16

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0022):    58.60   0.232     9.33     4.34
      + ID2= 2 (  0006):    47.50   0.222     7.17     3.98
        ================================================
        ID = 3 (  0023):   106.10   0.425     9.17     4.18

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0024)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         89.88        0.0720
                   5.08         89.49        0.0720
                   7.92         89.06    0.0720 /0.0432  Main Channel
                   8.81         88.62        0.0432      Main Channel
                   8.99         88.15        0.0432      Main Channel
                   9.88         88.03        0.0432      Main Channel
                  10.97         88.27        0.0432      Main Channel
                  11.76         88.72    0.0432 /0.0864  Main Channel
                  13.18         89.20        0.0864
                  14.20         89.40        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.07    88.10    .743E+01       0.0          0.17      25.61
       0.14    88.17    .295E+02       0.0          0.28      15.61
```

0.21	88.24	.605E+02	0.1	0.39	11.23
0.28	88.31	.972E+02	0.2	0.49	9.03
0.35	88.38	.137E+03	0.3	0.58	7.63
0.42	88.44	.180E+03	0.4	0.66	6.73
0.49	88.51	.225E+03	0.6	0.72	6.10
0.56	88.58	.273E+03	0.8	0.79	5.62
0.62	88.65	.324E+03	1.0	0.84	5.28
0.69	88.72	.380E+03	1.3	0.88	5.03
0.77	88.80	.447E+03	1.6	0.94	4.69
0.85	88.87	.521E+03	2.0	0.99	4.44
0.92	88.95	.603E+03	2.4	1.04	4.25
1.00	89.02	.692E+03	2.8	1.08	4.09
1.07	89.10	.790E+03	3.4	1.13	3.91
1.15	89.17	.901E+03	4.0	1.18	3.75
1.22	89.25	.103E+04	4.7	1.21	3.64
1.30	89.33	.117E+04	5.5	1.24	3.57
1.37	89.40	.133E+04	6.3	1.25	3.52

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	106.10	0.43	9.17	4.18	0.41	0.64
OUTFLOW: ID= 1 (0024)	106.10	0.42	9.17	4.18	0.40	0.64

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0008)	Area (ha)= 11.70
ID= 1 DT=10.0 min	Total Imp(%)= 27.87 Dir. Conn.(%)= 21.02

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.26	8.44
Dep. Storage	(mm)=	4.00	55.56
Average Slope	(%)=	1.23	1.23
Length	(m)=	279.28	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00

5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	20.00	320.00	
Storage Coeff. (min)=	16.86 (ii)	313.56 (ii)	
Unit Hyd. Tpeak (min)=	20.00	320.00	
Unit Hyd. peak (cms)=	0.06	0.00	
			TOTALS
PEAK FLOW (cms)=	0.07	0.00	0.074 (iii)
TIME TO PEAK (hrs)=	7.00	0.00	7.00
RUNOFF VOLUME (mm)=	20.25	0.00	4.26
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.18

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0024):		106.10	0.421	9.17	4.18
+ ID2= 2 (0008):		11.70	0.074	7.00	4.26
ID = 3 (0025):		117.80	0.472	9.17	4.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00

3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0007)	Area (ha)= 25.90
ID= 1 DT=10.0 min	Total Imp(%)= 27.87 Dir. Conn.(%)= 20.56

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.22	18.68
Dep. Storage	(mm)=	4.00	55.56
Average Slope	(%)=	1.16	1.16
Length	(m)=	415.53	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00

4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	20.00	330.00	
Storage Coeff. (min)=	21.79 (ii)	323.81 (ii)	
Unit Hyd. Tpeak (min)=	20.00	330.00	
Unit Hyd. peak (cms)=	0.05	0.00	
			TOTALS
PEAK FLOW (cms)=	0.15	0.00	0.147 (iii)
TIME TO PEAK (hrs)=	7.00	0.00	7.00
RUNOFF VOLUME (mm)=	20.25	0.00	4.16
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.17

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0027)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0025):	117.80	0.472	9.17	4.18
+ ID2= 2 (0026):	494.50	1.787	9.50	4.51
ID = 3 (0027):	612.30	2.220	9.33	4.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD  (  0027)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0027):   612.30   2.220     9.33     4.45
     + ID2= 2 (  0007):    25.90   0.147     7.00     4.16
       ================================================
       ID = 1 (  0027):   638.20   2.299     9.33     4.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ROUTE CHN(  0028)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         80.46        0.0720
                   2.79         80.49        0.0720
                   5.15         80.18    0.0720 /0.0432  Main Channel
                   5.96         79.96        0.0432      Main Channel
                   6.13         79.16        0.0432      Main Channel
                   7.35         78.91        0.0432      Main Channel
                   8.95         79.40        0.0432      Main Channel
                   9.77         79.96    0.0432 /0.0864  Main Channel
                  10.55         80.69        0.0864
                  14.50         81.03        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.08    78.99    .970E+01       0.0          0.32      19.07
       0.16    79.07    .388E+02       0.1          0.50      12.01
       0.24    79.15    .873E+02       0.2          0.66       9.17
       0.32    79.24    .150E+03       0.4          0.84       7.15
       0.40    79.32    .221E+03       0.6          1.00       6.05
       0.49    79.40    .301E+03       0.9          1.13       5.35
       0.57    79.48    .387E+03       1.4          1.27       4.75
       0.65    79.56    .476E+03       1.8          1.40       4.31
       0.73    79.64    .570E+03       2.4          1.51       3.98
       0.81    79.72    .668E+03       3.0          1.62       3.72
       0.89    79.80    .770E+03       3.7          1.72       3.51
       0.97    79.88    .875E+03       4.4          1.81       3.34
       1.05    79.96    .985E+03       5.1          1.89       3.19
       1.13    80.04    .110E+04       5.9          1.95       3.09
       1.22    80.13    .124E+04       6.9          2.01       3.00
```

1.30	80.21	.138E+04	8.0	2.10	2.88
1.38	80.29	.155E+04	9.4	2.21	2.73
1.47	80.38	.173E+04	11.0	2.29	2.63
1.55	80.46	.194E+04	12.7	2.36	2.56

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (| 0027)	638.20	2.30	9.33	4.44	0.72	1.50
OUTFLOW: ID= 1 (| 0028)	638.20	2.30	9.33	4.44	0.72	1.50

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB STANDHYD (0009) ID= 1 DT=10.0 min	Area (ha)= 34.70 Total Imp(%)= 27.87 Dir. Conn.(%)= 21.02

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.67	25.03
Dep. Storage	(mm)=	4.00	55.56
Average Slope	(%)=	1.30	1.30
Length	(m)=	480.97	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00		
over (min)	20.00	320.00		
Storage Coeff. (min)=	23.00 (ii)	315.06 (ii)		
Unit Hyd. Tpeak (min)=	20.00	320.00		
Unit Hyd. peak (cms)=	0.05	0.00		
			TOTALS	
PEAK FLOW (cms)=	0.20	0.00	0.196 (iii)	
TIME TO PEAK (hrs)=	7.00	0.00	7.00	
RUNOFF VOLUME (mm)=	20.25	0.00	4.26	
TOTAL RAINFALL (mm)=	24.25	24.25	24.25	

```
     RUNOFF COEFFICIENT   =       0.84         0.00          0.18

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0028):   638.20   2.301     9.33     4.44
      + ID2= 2 (  0009):    34.70   0.196     7.00     4.26
        ================================================
        ID = 3 (  0029):   672.90   2.412     9.33     4.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0040)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         79.07        0.0720
                   4.29         78.79        0.0720
                   8.18         78.57    0.0720 /0.0432  Main Channel
                   8.88         78.24        0.0432      Main Channel
                   9.84         78.04        0.0432      Main Channel
                  10.62         77.59        0.0432      Main Channel
                  11.93         77.59        0.0432      Main Channel
                  13.67         77.69        0.0432      Main Channel
                  14.36         77.84        0.0432      Main Channel
                  14.66         78.66        0.0432      Main Channel
                  15.19         79.28    0.0432 /0.0864  Main Channel
                  18.31         79.48        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.08    77.67    .108E+03       0.1          0.44      27.62
       0.15    77.74    .283E+03       0.3          0.69      17.40
```

0.23	77.82	.488E+03	0.6	0.91	13.24
0.30	77.89	.714E+03	1.1	1.12	10.77
0.38	77.97	.950E+03	1.7	1.30	9.22
0.45	78.04	.119E+04	2.4	1.47	8.17
0.53	78.12	.145E+04	3.2	1.58	7.60
0.60	78.19	.173E+04	4.0	1.68	7.14
0.68	78.27	.203E+04	5.1	1.79	6.70
0.75	78.34	.235E+04	6.3	1.92	6.26
0.83	78.42	.267E+04	7.6	2.04	5.89
0.90	78.49	.301E+04	9.0	2.15	5.59
0.98	78.57	.335E+04	10.5	2.26	5.33
1.06	78.65	.378E+04	12.5	2.38	5.05
1.14	78.73	.430E+04	14.7	2.46	4.89
1.23	78.82	.492E+04	17.1	2.50	4.80
1.31	78.90	.562E+04	19.7	2.53	4.75
1.39	78.98	.639E+04	22.6	2.55	4.71
1.48	79.07	.726E+04	25.8	2.57	4.68

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0029)		672.90	2.41	9.33	4.43	0.45	1.46
OUTFLOW: ID= 1 (0040)		672.90	2.41	9.33	4.43	0.45	1.46

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB STANDHYD (0010) ID= 1 DT=10.0 min	Area (ha)= 29.36 Total Imp(%)= 17.82 Dir. Conn.(%)= 8.68

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	5.23	24.13
Dep. Storage	(mm)=	4.00	90.62
Average Slope	(%)=	1.30	1.30
Length	(m)=	442.42	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00
3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00

5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	20.00	320.00	
Storage Coeff. (min)=	21.87 (ii)	313.93 (ii)	
Unit Hyd. Tpeak (min)=	20.00	320.00	
Unit Hyd. peak (cms)=	0.05	0.00	
PEAK FLOW (cms)=	0.07	0.00	0.070 (iii)
TIME TO PEAK (hrs)=	7.00	0.00	7.00
RUNOFF VOLUME (mm)=	20.25	0.00	1.76
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.07

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.5 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0042)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0010):		29.36	0.070	7.00	1.76
+ ID2= 2 (0040):		672.90	2.405	9.33	4.43
ID = 3 (0042):		702.26	2.443	9.33	4.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0012)	Area (ha)= 29.80
ID= 1 DT=10.0 min	Total Imp(%)= 22.39 Dir. Conn.(%)= 16.45

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	6.67	23.13
Dep. Storage	(mm)=	4.00	73.86
Average Slope	(%)=	1.36	1.36
Length	(m)=	445.72	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00

3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	20.00	310.00	
Storage Coeff. (min)=	21.67 (ii)	309.67 (ii)	
Unit Hyd. Tpeak (min)=	20.00	310.00	
Unit Hyd. peak (cms)=	0.05	0.00	
PEAK FLOW (cms)=	0.14	0.00	0.135 (iii)
TIME TO PEAK (hrs)=	7.00	0.00	7.00
RUNOFF VOLUME (mm)=	20.25	0.00	3.33
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.14

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.7 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0013)	Area (ha)= 32.60
ID= 1 DT=10.0 min	Total Imp(%)= 25.13 Dir. Conn.(%)= 19.19

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.19	24.41
Dep. Storage	(mm)=	4.00	68.53
Average Slope	(%)=	0.97	0.97
Length	(m)=	466.19	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00

3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	20.00	350.00	
Storage Coeff. (min)=	24.63 (ii)	343.34 (ii)	
Unit Hyd. Tpeak (min)=	20.00	350.00	
Unit Hyd. peak (cms)=	0.05	0.00	
PEAK FLOW (cms)=	0.16	0.00	0.164 (iii)
TIME TO PEAK (hrs)=	7.00	0.00	7.00
RUNOFF VOLUME (mm)=	20.25	0.00	3.89
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.16

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 63.5 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0014)	Area (ha)= 39.10
ID= 1 DT=10.0 min	Total Imp(%)= 26.50 Dir. Conn.(%)= 18.28

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.36	28.74
Dep. Storage	(mm)=	4.00	60.92
Average Slope	(%)=	0.95	0.95
Length	(m)=	510.56	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00

3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	30.00	350.00	
Storage Coeff. (min)=	26.16 (ii)	346.64 (ii)	
Unit Hyd. Tpeak (min)=	30.00	350.00	
Unit Hyd. peak (cms)=	0.04	0.00	
			TOTALS
PEAK FLOW (cms)=	0.17	0.00	0.171 (iii)
TIME TO PEAK (hrs)=	7.17	0.00	7.17
RUNOFF VOLUME (mm)=	20.25	0.00	3.70
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.15

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.
***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 64.2 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM	Filename: C:\Users\nkimiaghalam\AppData\Local\Temp\e108e77e-6072-48db-a69f-1f82d44d2c16\ba9f9189
Ptotal= 24.25 mm	Comments:

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

1.00	0.00	7.00	12.50	13.00	0.00	19.00	0.00
2.00	0.00	8.00	1.00	14.00	0.00	20.00	0.00
3.00	0.00	9.00	9.00	15.00	0.00	21.00	0.00
4.00	0.00	10.00	1.75	16.00	0.00	22.00	0.00
5.00	0.00	11.00	0.00	17.00	0.00	23.00	0.00
6.00	0.00	12.00	0.00	18.00	0.00	24.00	0.00

CALIB	
STANDHYD (0015)	Area (ha)= 80.70
ID= 1 DT=10.0 min	Total Imp(%)= 27.41 Dir. Conn.(%)= 20.10

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	22.12	58.58
Dep. Storage	(mm)=	4.00	57.87
Average Slope	(%)=	0.88	0.88
Length	(m)=	733.48	40.00
Mannings n	=	0.030	0.400

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	0.00	6.167	12.50	12.167	0.00	18.17	0.00
0.333	0.00	6.333	12.50	12.333	0.00	18.33	0.00
0.500	0.00	6.500	12.50	12.500	0.00	18.50	0.00
0.667	0.00	6.667	12.50	12.667	0.00	18.67	0.00
0.833	0.00	6.833	12.50	12.833	0.00	18.83	0.00
1.000	0.00	7.000	12.50	13.000	0.00	19.00	0.00
1.167	0.00	7.167	1.00	13.167	0.00	19.17	0.00
1.333	0.00	7.333	1.00	13.333	0.00	19.33	0.00
1.500	0.00	7.500	1.00	13.500	0.00	19.50	0.00
1.667	0.00	7.667	1.00	13.667	0.00	19.67	0.00
1.833	0.00	7.833	1.00	13.833	0.00	19.83	0.00
2.000	0.00	8.000	1.00	14.000	0.00	20.00	0.00
2.167	0.00	8.167	9.00	14.167	0.00	20.17	0.00
2.333	0.00	8.333	9.00	14.333	0.00	20.33	0.00
2.500	0.00	8.500	9.00	14.500	0.00	20.50	0.00
2.667	0.00	8.667	9.00	14.667	0.00	20.67	0.00
2.833	0.00	8.833	9.00	14.833	0.00	20.83	0.00
3.000	0.00	9.000	9.00	15.000	0.00	21.00	0.00
3.167	0.00	9.167	1.75	15.167	0.00	21.17	0.00
3.333	0.00	9.333	1.75	15.333	0.00	21.33	0.00
3.500	0.00	9.500	1.75	15.500	0.00	21.50	0.00

3.667	0.00	9.667	1.75	15.667	0.00	21.67	0.00
3.833	0.00	9.833	1.75	15.833	0.00	21.83	0.00
4.000	0.00	10.000	1.75	16.000	0.00	22.00	0.00
4.167	0.00	10.167	0.00	16.167	0.00	22.17	0.00
4.333	0.00	10.333	0.00	16.333	0.00	22.33	0.00
4.500	0.00	10.500	0.00	16.500	0.00	22.50	0.00
4.667	0.00	10.667	0.00	16.667	0.00	22.67	0.00
4.833	0.00	10.833	0.00	16.833	0.00	22.83	0.00
5.000	0.00	11.000	0.00	17.000	0.00	23.00	0.00
5.167	0.00	11.167	0.00	17.167	0.00	23.17	0.00
5.333	0.00	11.333	0.00	17.333	0.00	23.33	0.00
5.500	0.00	11.500	0.00	17.500	0.00	23.50	0.00
5.667	0.00	11.667	0.00	17.667	0.00	23.67	0.00
5.833	0.00	11.833	0.00	17.833	0.00	23.83	0.00
6.000	0.00	12.000	0.00	18.000	0.00	24.00	0.00

Max.Eff.Inten.(mm/hr)=	12.50	0.00	
over (min)	30.00	370.00	
Storage Coeff. (min)=	33.32 (ii)	361.82 (ii)	
Unit Hyd. Tpeak (min)=	30.00	370.00	
Unit Hyd. peak (cms)=	0.03	0.00	
			TOTALS
PEAK FLOW (cms)=	0.35	0.00	0.350 (iii)
TIME TO PEAK (hrs)=	7.17	0.00	7.17
RUNOFF VOLUME (mm)=	20.25	0.00	4.07
TOTAL RAINFALL (mm)=	24.25	24.25	24.25
RUNOFF COEFFICIENT =	0.84	0.00	0.17

***** WARNING: THE PERVIOUS AREA HAS NO FLOW .

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 65.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0032)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0014):	39.10	0.171	7.17	3.70
+ ID2= 2 (0015):	80.70	0.350	7.17	4.07
ID = 3 (0032):	119.80	0.521	7.17	3.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0033)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         84.86        0.0720
                   6.08         83.58        0.0720
                   8.43         83.38        0.0720
                  11.36         83.36    0.0720 /0.0432  Main Channel
                  12.02         83.22        0.0432      Main Channel
                  12.51         82.74        0.0432      Main Channel
                  13.71         82.54        0.0432      Main Channel
                  14.14         82.68        0.0432      Main Channel
                  14.52         83.22        0.0432      Main Channel
                  15.01         83.36    0.0432 /0.0864  Main Channel
                  18.27         83.41        0.0864
                  26.73         84.26        0.0864
                  36.33         85.59        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.12    82.66    .340E+02       0.0          0.45      20.01
       0.23    82.78    .128E+03       0.2          0.77      11.57
       0.35    82.89    .244E+03       0.5          1.07       8.36
       0.47    83.01    .372E+03       0.9          1.30       6.90
       0.58    83.13    .512E+03       1.4          1.48       6.03
       0.70    83.24    .666E+03       2.0          1.60       5.58
       0.82    83.36    .865E+03       2.6          1.59       5.62
       0.94    83.49    .152E+04       4.1          1.47       6.11
       1.07    83.61    .240E+04       6.5          1.44       6.20
       1.19    83.73    .343E+04       9.5          1.49       6.00
       1.32    83.86    .457E+04      13.3          1.56       5.73
       1.44    83.98    .584E+04      17.8          1.64       5.47
       1.57    84.11    .723E+04      23.0          1.71       5.23
       1.69    84.23    .874E+04      29.0          1.78       5.02
       1.82    84.36    .104E+05      35.9          1.86       4.81
       1.94    84.48    .121E+05      43.7          1.94       4.61
       2.07    84.61    .139E+05      52.3          2.02       4.44
       2.19    84.73    .159E+05      61.7          2.09       4.28
       2.32    84.86    .179E+05      72.0          2.16       4.14

                                  <---- hydrograph ---->   <-pipe / channel->
                           AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                           (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
```

```
   INFLOW : ID= 2 (  0032)  119.80     0.52    7.17   3.95      0.36      1.09
   OUTFLOW: ID= 1 (  0033)  119.80     0.51    7.33   3.95      0.36      1.08


--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0034)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0013):    32.60   0.164     7.00     3.89
      + ID2= 2 (  0033):   119.80   0.510     7.33     3.95
        ================================================
        ID = 3 (  0034):   152.40   0.660     7.17     3.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0035)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         80.15        0.0720
                   1.21         80.07        0.0720
                   2.86         79.66        0.0720
                   4.79         79.04        0.0720
                   5.49         78.79    0.0720 /0.0432  Main Channel
                   6.06         78.87        0.0432      Main Channel
                   6.70         78.73        0.0432      Main Channel
                   6.82         78.56        0.0432      Main Channel
                   7.73         78.68        0.0432      Main Channel
                   8.22         79.02        0.0432      Main Channel
                   9.23         79.08    0.0432 /0.0864  Main Channel
                  10.67         80.73        0.0864
                  13.90         81.16        0.0864
                  18.81         82.28        0.0864

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.08    78.64    .268E+02       0.0          0.22      80.25
       0.15    78.71    .102E+03       0.0          0.39      46.11
       0.23    78.79    .203E+03       0.1          0.50      35.95
       0.31    78.87    .399E+03       0.2          0.53      33.74
       0.40    78.96    .668E+03       0.4          0.69      26.11
       0.48    79.04    .976E+03       0.7          0.75      23.92
```

0.57	79.13	.139E+04	1.1	0.83	21.65
0.65	79.22	.184E+04	1.6	0.96	18.73
0.74	79.30	.232E+04	2.3	1.07	16.76
0.82	79.39	.284E+04	3.1	1.17	15.32
0.91	79.47	.338E+04	4.0	1.26	14.21
0.99	79.56	.396E+04	4.9	1.34	13.34
1.08	79.64	.457E+04	6.0	1.42	12.62
1.16	79.73	.521E+04	7.2	1.49	12.05
1.25	79.81	.589E+04	8.5	1.55	11.56
1.33	79.90	.661E+04	9.9	1.61	11.14
1.42	79.98	.736E+04	11.4	1.66	10.78
1.50	80.07	.816E+04	13.0	1.71	10.46
1.59	80.15	.903E+04	14.5	1.73	10.38

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0034)	152.40	0.66	7.17	3.94	0.48	0.74
OUTFLOW: ID= 1 (0035)	152.40	0.56	9.33	3.93	0.44	0.72

ADD HYD (0036)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	29.80	0.135	7.00	3.33
+ ID2= 2 (0035):	152.40	0.558	9.33	3.93
ID = 3 (0036):	182.20	0.646	9.17	3.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0036):	182.20	0.646	9.17	3.83
+ ID2= 2 (0042):	702.26	2.443	9.33	4.32
ID = 3 (0039):	884.46	3.074	9.33	4.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ROUTE CHN(  0030)|
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         78.07        0.0720
                   2.42         77.63    0.0720 /0.0432  Main Channel
                   4.03         75.24        0.0432      Main Channel
                   4.91         74.70        0.0432      Main Channel
                   5.99         74.22        0.0432      Main Channel
                   9.77         74.25        0.0432      Main Channel
                  12.01         74.34        0.0432      Main Channel
                  13.36         74.59        0.0432      Main Channel
                  13.90         74.97        0.0432      Main Channel
                  15.36         75.95        0.0432      Main Channel
                  17.05         77.48    0.0432 /0.0864  Main Channel
                  18.39         75.82        0.0864

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.08    74.30    .514E+02       0.3          1.08       2.52
      0.17    74.39    .136E+03       1.5          1.78       1.53
      0.25    74.47    .231E+03       3.4          2.39       1.14
      0.33    74.55    .336E+03       5.9          2.89       0.95
      0.42    74.64    .448E+03       9.2          3.36       0.81
      0.50    74.72    .565E+03      13.2          3.83       0.71
      0.59    74.80    .685E+03      17.8          4.25       0.64
      0.67    74.89    .810E+03      23.0          4.65       0.59
      0.75    74.97    .937E+03      28.7          5.02       0.54
      0.84    75.06    .107E+04      34.9          5.36       0.51
      0.92    75.14    .120E+04      41.7          5.69       0.48
      1.00    75.22    .134E+04      49.1          6.00       0.46
      1.09    75.31    .148E+04      57.1          6.31       0.43
      1.17    75.39    .163E+04      65.6          6.61       0.41
      1.25    75.47    .177E+04      74.7          6.90       0.40
      1.34    75.56    .192E+04      84.2          7.18       0.38
      1.42    75.64    .208E+04      94.2          7.45       0.37
      1.51    75.72    .223E+04     104.7          7.70       0.35
      1.59    75.81    .239E+04     115.7          7.95       0.34

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0039)  884.46    3.07    9.33   4.22      0.24      2.27
   OUTFLOW: ID= 1 (  0030)  884.46    3.08    9.33   4.22      0.24      2.27
```

```
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0011):     1.40   0.005     9.00     1.79
      + ID2= 2 (  0030):   884.46   3.080     9.33     4.22
        ====================================================
        ID = 3 (  0031):   885.86   3.082     9.33     4.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

Walker_Beamer_Creek.rep

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

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

PROJECT DATA
Project Title: Walker_Beamer_Creek
Project File : Walker_Beamer_Creek.prj
Run Date and Time: 8/21/2019 12:03:59 PM

Project in SI units

PLAN DATA

Plan Title: Final_Aug_2019
Plan File :
w:\Active\160951075\07_Modelling\Final_Report_Models\HEC-RAS_Model_Walker_Beamer_Creek\Walker_Beamer_Creek.p11

Geometry Title: Final_Geometry
Geometry File :
w:\Active\160951075\07_Modelling\Final_Report_Models\HEC-RAS_Model_Walker_Beamer_Creek\Walker_Beamer_Creek.g08

Flow Title : Final_AUG_2019
Flow File :
w:\Active\160951075\07_Modelling\Final_Report_Models\HEC-RAS_Model_Walker_Beamer_Creek\Walker_Beamer_Creek.f07

Plan Summary Information:
Number of: Cross Sections = 128 Multiple Openings = 0
Culverts = 19 Inline Structures = 0

Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculation tolerance = 0.003
Maximum number of iterations = 20
Maximum difference tolerance = 0.1
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: Final_AUG_2019
Flow File :
w:\Active\160951075\07_Modelling\Final_Report_Models\HEC-RAS_Model_Walker_Beamer_Creek\Walker_Beamer_Creek.f07

Flow Data (m3/s)

River	Reach	RS	2015-09-02	2016-07-25	2017-05-01	2017-10-09	2012-08-09	2015-06-27100 Year_SCS 24 hr_15 min100 Year_Chicago 3 hr
Beamer Creek	Reach 5	1649	.359	.521	.845	1.167	.626	.501 7.016 4
Beamer Creek	Reach 5	1152	.463	.66	1.072	1.477	.728	.636 7.204 4.696
Beamer Creek	Reach 5	1105	.463	.66	1.072	1.477	.728	.636 7.204 4.696
Walker Beamer Cr	Reach 1	47	1.858	3.082	5.66	8.351	4.061	3.614 24.403 16.919
Walker Creek	Reach 2	2523	.271	.425	.796	1.092	.553	.46 5.052 3.299
Walker Creek	Reach 2	1609	.303	.472				

.852	1.209	.615	.512	5.166	3.889	
Walker Creek	Reach 4	3816	1.051	1.689		
3.047	4.466	2.192	1.926	11.704	8.721	
Walker Creek	Reach 4	2788	1.051	1.784		
3.298	4.868	2.368	2.119	12.176	8.727	
Walker Creek	Reach 4	1613	1.11	1.934		
3.496	5.142	2.514	2.237	13.977	10.125	
Walker Creek	Reach 3	1244	1.77	2.299		
4.235	6.244	3.034	2.709	16.572	11.225	
Walker Creek	Reach 3	781	1.77	2.412		
5.3	6.578	3.198	2.853	17.717	11.695	
Walker Creek	Reach 3	43	1.8	2.443		
4.501	6.668	3.235	2.897	17.717	12.395	

River	Reach	RS	100 Year_SCS 24 hr_1 hr Future Scenario
Beamer Creek	Reach 5	1649	3.152	8.4192
Beamer Creek	Reach 5	1152	3.863	8.6448
Beamer Creek	Reach 5	1105	3.863	8.6448
Walker Beamer Cr	Reach 1	47	17.967	29.2836
Walker Creek	Reach 2	2523	2.884	6.0624
Walker Creek	Reach 2	1609	3.156	6.1992
Walker Creek	Reach 4	3816	9.38	14.0448
Walker Creek	Reach 4	2788	9.895	14.6112
Walker Creek	Reach 4	1613	10.175	16.7724
Walker Creek	Reach 3	1244	13.331	19.8864
Walker Creek	Reach 3	781	13.83	21.2604
Walker Creek	Reach 3	43	13.949	21.2604

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Walker Beamer Cr	Reach 1	2015-09-02		

```
 Known WS = 75.005
  Walker Beamer CrReach 1         2016-07-25
  Known WS = 74.93
  Walker Beamer CrReach 1         2017-05-01
 Known WS = 75.569
  Walker Beamer CrReach 1         2017-10-09
 Known WS = 74.935
  Walker Beamer CrReach 1         2012-08-09
   Known WS = 74.7
  Walker Beamer CrReach 1         2015-06-27
 Known WS = 75.195
  Walker Beamer CrReach 1         100 Year_SCS 24 hr_15 min
           Known WS = 75.15
  Walker Beamer CrReach 1         100 Year_Chicago 3 hr
       Known WS = 75.15
  Walker Beamer CrReach 1         100 Year_SCS 24 hr_1 hr
         Known WS = 75.15
  Walker Beamer CrReach 1         Future Scenario
  Known WS = 75.15
```

GEOMETRY DATA

Geometry Title: Final_Geometry
Geometry File :
w:\Active\160951075\07_Modelling\Final_Report_Models\HEC-RAS_Model_Walker_Beamer_Creek\Walker_Beamer_Creek.g08

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Beamer Creek	Reach 5		Junction 1
Walker Beamer Cr	Reach 1	Junction 1	
Walker Creek	Reach 2		Junction 2
Walker Creek	Reach 4		Junction 2
Walker Creek	Reach 3	Junction 2	Junction 1

JUNCTION INFORMATION

Name: Junction 1
Description:
Energy computation Method

Length across Junction River	Reach		Tributary River	Reach	Length	Angle
Beamer Creek	Reach 5	to Walker Beamer Cr		Reach 1	20.79	0
Walker Creek	Reach 3	to Walker Beamer Cr		Reach 1	43.41	0

Name: Junction 2
Description:
Energy computation Method

Length across Junction River	Reach		Tributary River	Reach	Length	Angle
Walker Creek	Reach 2	to Walker Creek		Reach 3	69.45	0
Walker Creek	Reach 4	to Walker Creek		Reach 3	29.92	0

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1649

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.18	3.1	87.06	4.8	86.91	5.2	86.89	7.3	86.68
9.6	86.58	11.4	86.56	20.9	86.18	24	86.08	26	85.91
27.4	85.88	28.1	85.88	29.185.82285		30.2	85.76	31.9	85.75
32.4	85.76	33.8	85.82	36.5	85.89	39	86.22	40.3	86.42
41.9	86.62	42.7	86.7	43.5	86.69	44.2	86.73	45.1	86.75
49	86.76	51.5	86.86	52	86.86	56.4	86.86	57.3	86.85
61.5	86.72	62.8	86.73	63.6	86.76	64.4	86.69	64.9	86.63
65.6	86.54	67.7	86.61	69.8	86.59	74	86.65	76.7	86.6
77.3	86.56	78.1	86.58	78.9	86.57	79.6	86.49	80.2	86.46
82.2	86.63	84.4	86.79	88.6	86.86	90.1	86.92		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	29.1	.08	33.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
29.1	33.8	16.1	15.7	16.5	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.24	Reach Len. (m)	16.10	15.70	16.50
Crit W.S. (m)	86.24	Flow Area (m2)	1.95	2.17	1.48
E.G. Slope (m/m)	0.079560	Area (m2)	1.95	2.17	1.48
Q Total (m3/s)	7.02	Flow (m3/s)	1.27	4.56	1.18
Top Width (m)	19.58	Top Width (m)	9.58	4.70	5.30
Vel Total (m/s)	1.25	Avg. Vel. (m/s)	0.65	2.10	0.80
Max Chl Dpth (m)	0.49	Hydr. Depth (m)	0.20	0.46	0.28
Conv. Total (m3/s)	24.9	Conv. (m3/s)	4.5	16.2	4.2
Length Wtd. (m)	15.81	Wetted Per. (m)	9.59	4.70	5.32
Min Ch El (m)	85.75	Shear (N/m2)	158.88	359.65	216.68
Alpha	1.95	Stream Power (N/m s)	103.41	756.68	173.44
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	5.16	11.66	1.88
C & E Loss (m)	0.04	Cum SA (1000 m2)	12.23	8.36	3.94

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.45	Element	Left OB	Channel	Right OB
Vel Head (m)	0.17	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.28	Reach Len. (m)	16.10	15.70	16.50
Crit W.S. (m)	86.28	Flow Area (m2)	2.41	2.38	1.73
E.G. Slope (m/m)	0.078230	Area (m2)	2.41	2.38	1.73
Q Total (m3/s)	8.42	Flow (m3/s)	1.67	5.29	1.46
Top Width (m)	21.01	Top Width (m)	10.71	4.70	5.59
Vel Total (m/s)	1.29	Avg. Vel. (m/s)	0.69	2.22	0.85
Max Chl Dpth (m)	0.53	Hydr. Depth (m)	0.23	0.51	0.31
Conv. Total (m3/s)	30.1	Conv. (m3/s)	6.0	18.9	5.2
Length Wtd. (m)	15.82	Wetted Per. (m)	10.73	4.70	5.62
Min Ch El (m)	85.75	Shear (N/m2)	172.64	388.46	235.50
Alpha	1.99	Stream Power (N/m s)	119.09	862.80	199.82
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	8.40	13.70	2.92
C & E Loss (m)	0.04	Cum SA (1000 m2)	15.65	8.36	6.27

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical
depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1633

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.12	.9	87.06	2.4	87.04	4.1	87.1	4.5	87.09
7.3	86.93	8.7	86.83	10.8	86.81	12.9	86.82	15	86.79
19.1	86.68	25.4	86.45	27.5	86.4	29.6	86.2	31.6	86.0647
33	85.97	34.6	85.95	35.8	85.91	37.9	85.78	40	85.8
44.3	85.48	44.6	83.8	47.5	83.8	48.4	83.8	49.1	85.79
50.5	85.88	51.5	85.87	53.885.91792		53.9	85.92	56.7	85.94
58.8	85.87	60.9	85.95	63	85.92	69.3	85.93	75.5	86.09
77.6	86.08	79.7	86.13	83.9	86.14	86	86.18	87.6	86.24
90.1	86.44	94.1	86.51	96.4	86.58				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	44.3	.08	49.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
44.3	49.1	36.8	36	36.5	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	35.25	85.61	F
57.73	96.4	85.61	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.87	Reach Len. (m)	36.80	36.00	36.50
Crit W.S. (m)	84.49	Flow Area (m2)	1.19	8.97	0.05

E.G. Slope (m/m)	0.003034	Area (m2)	1.19	8.97	0.05
Q Total (m3/s)	7.02	Flow (m3/s)	0.13	6.89	0.00
Top Width (m)	13.78	Top Width (m)	7.80	4.80	1.19
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.11	0.77	0.04
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	0.15	1.87	0.04
Conv. Total (m3/s)	127.4	Conv. (m3/s)	2.3	125.1	0.0
Length Wtd. (m)	36.00	Wetted Per. (m)	7.81	7.62	1.19
Min Ch El (m)	83.80	Shear (N/m2)	4.55	35.04	1.14
Alpha	1.23	Stream Power (N/m s)	0.48	26.91	0.05
Frctn Loss (m)		Cum Volume (1000 m3)	5.13	11.57	1.87
C & E Loss (m)		Cum SA (1000 m2)	12.09	8.29	3.89

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.97	Reach Len. (m)	36.80	36.00	36.50
Crit W.S. (m)	84.58	Flow Area (m2)	2.13	9.47	1.23
E.G. Slope (m/m)	0.003479	Area (m2)	2.13	9.47	1.23
Q Total (m3/s)	8.42	Flow (m3/s)	0.27	8.07	0.07
Top Width (m)	37.86	Top Width (m)	11.30	4.80	21.76
Vel Total (m/s)	0.66	Avg. Vel. (m/s)	0.13	0.85	0.06
Max Chl Dpth (m)	2.17	Hydr. Depth (m)	0.19	1.97	

0.06					
Conv. Total (m3/s)	142.7	Conv. (m3/s)	4.7	136.9	1.2
Length Wtd. (m)	36.00	Wetted Per. (m)	11.32	7.62	21.76
Min Ch El (m)	83.80	Shear (N/m2)	6.41	42.42	1.93
Alpha	1.62	Stream Power (N/m s)	0.83	36.17	0.11
Frctn Loss (m)		Cum Volume (1000 m3)	8.36	13.60	2.90
C & E Loss (m)		Cum SA (1000 m2)	15.47	8.29	6.04

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 1615

INPUT
Description:
Distance from Upstream XS = 10
Deck/Roadway Width = 11
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	85.61		20	85.61		40	85.61	
60	85.61		80	85.61				

Upstream Bridge Cross Section Data
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.12	.9	87.06	2.4	87.04	4.1	87.1	4.5	87.09
7.3	86.93	8.7	86.83	10.8	86.81	12.9	86.82	15	86.79
19.1	86.68	25.4	86.45	27.5	86.4	29.6	86.2	31.6	86.0647
33	85.97	34.6	85.95	35.8	85.91	37.9	85.78	40	85.8
44.3	85.48	44.6	83.8	47.5	83.8	48.4	83.8	49.1	85.79
50.5	85.88	51.5	85.87	53.885.91792		53.9	85.92	56.7	85.94
58.8	85.87	60.9	85.95	63	85.92	69.3	85.93	75.5	86.09
77.6	86.08	79.7	86.13	83.9	86.14	86	86.18	87.6	86.24
90.1	86.44	94.1	86.51	96.4	86.58				

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    44.3     .08    49.1     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          44.3    49.1             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   35.25   85.61       F
   57.73    96.4   85.61       F

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.61              20   85.61              40   85.61
      60   85.61              80   85.61             100   85.61

Downstream Bridge Cross Section Data
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.16     1.5   86.13     2.3   86.13     6.5    86.1     8.6      86
      11   85.81    12.8   85.75    19.2   85.64    21.3   85.68    25.2   85.52
    27.6   85.47    29.7   85.49    34.7   85.44    37.9   85.44    38.685.44609
    40.2   85.46    42.4   85.46    44.2   85.39    46.6   85.42    47.4   85.39
    48.7   85.41    49.8   85.46    50.5   85.46    52.9   85.37    53.7   85.32
    54.5   85.32      55    85.3    56.1   85.34    59.2   85.38      60   85.34
    61.3   85.32    62.4   85.34    64.8    85.3      69   83.75    71.1   83.75
    72.7   83.75    74.2   85.16    76.1   85.16    78.2   85.26      79   85.32
    80.6   85.38    84.5   85.48    86.6   85.56    88.7   85.57    90.8   85.63
    93.2   85.73   101.1   85.85   105.9   85.87   112.2   85.96   115.4   85.98
   116.8   86.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    64.8     .08    74.2     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          64.8    74.2             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      56   85.61       F
      86   116.8   85.61       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
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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    1.04    2.45
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                10      12     .013     .013        0                   .5
       1
Upstream   Elevation =  83.8
           Centerline Station =  46.5
Downstream Elevation =  83.77
           Centerline Station =  71

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       5.13    Culv Full Len (m)        12.00
  # Barrels                    1    Culv Vel US (m/s)         2.01
  Q Barrel (m3/s)           5.13    Culv Vel DS (m/s)         2.01
  E.G. US. (m)             85.90    Culv Inv El Up (m)       83.80
  W.S. US. (m)             85.87    Culv Inv El Dn (m)       83.77
  E.G. DS (m)              85.57    Culv Frctn Ls (m)         0.03
  W.S. DS (m)              85.56    Culv Exit Loss (m)        0.19
  Delta EG (m)              0.33    Culv Entr Loss (m)        0.10
  Delta WS (m)              0.31    Q Weir (m3/s)             1.89
  E.G. IC (m)              85.62    Weir Sta Lft (m)         36.01
  E.G. OC (m)              85.90    Weir Sta Rgt (m)         59.51
  Culvert Control         Outlet    Weir Submerg              0.00
  Culv WS Inlet (m)         84.84    Weir Max Depth (m)        0.29
  Culv WS Outlet (m)        84.81    Weir Avg Depth (m)        0.16
  Culv Nml Depth (m)                 Weir Flow Area (m2)       2.85
  Culv Crt Depth (m)         0.76    Min El Weir Flow (m)     85.61


CULVERT OUTPUT  Profile #Future Scenario  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       4.19    Culv Full Len (m)        12.00
  # Barrels                    1    Culv Vel US (m/s)         1.64
  Q Barrel (m3/s)           4.19    Culv Vel DS (m/s)         1.64
  E.G. US. (m)             86.01    Culv Inv El Up (m)       83.80
  W.S. US. (m)             85.97    Culv Inv El Dn (m)       83.77
  E.G. DS (m)              85.79    Culv Frctn Ls (m)         0.02
```

W.S. DS (m)	85.78	Culv Exit Loss (m)	0.13
Delta EG (m)	0.22	Culv Entr Loss (m)	0.07
Delta WS (m)	0.19	Q Weir (m3/s)	4.23
E.G. IC (m)	85.80	Weir Sta Lft (m)	32.50
E.G. OC (m)	86.01	Weir Sta Rgt (m)	72.15
Culvert Control	Outlet	Weir Submerg	0.26
Culv WS Inlet (m)	84.84	Weir Max Depth (m)	0.39
Culv WS Outlet (m)	84.81	Weir Avg Depth (m)	0.16
Culv Nml Depth (m)		Weir Flow Area (m2)	6.27
Culv Crt Depth (m)	0.67	Min El Weir Flow (m)	85.61

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1597

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.16	1.5	86.13	2.3	86.13	6.5	86.1	8.6	86
11	85.81	12.8	85.75	19.2	85.64	21.3	85.68	25.2	85.52
27.6	85.47	29.7	85.49	34.7	85.44	37.9	85.44	38.685	.44609
40.2	85.46	42.4	85.46	44.2	85.39	46.6	85.42	47.4	85.39
48.7	85.41	49.8	85.46	50.5	85.46	52.9	85.37	53.7	85.32
54.5	85.32	55	85.3	56.1	85.34	59.2	85.38	60	85.34
61.3	85.32	62.4	85.34	64.8	85.3	69	83.75	71.1	83.75
72.7	83.75	74.2	85.16	76.1	85.16	78.2	85.26	79	85.32
80.6	85.38	84.5	85.48	86.6	85.56	88.7	85.57	90.8	85.63
93.2	85.73	101.1	85.85	105.9	85.87	112.2	85.96	115.4	85.98
116.8	86.04								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	64.8	.08	74.2	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64.8	74.2	19.4	19.6	16.6	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	56	85.61	F
86	116.8	85.61	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.57	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.56	Reach Len. (m)	19.40	19.60	16.60
Crit W.S. (m)	84.39	Flow Area (m2)	1.89	12.66	2.57
E.G. Slope (m/m)	0.001322	Area (m2)	5.64	12.66	2.58
Q Total (m3/s)	7.02	Flow (m3/s)	0.16	6.63	0.23
Top Width (m)	62.12	Top Width (m)	40.46	9.40	12.27
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.09	0.52	0.09
Max Chl Dpth (m)	1.81	Hydr. Depth (m)	0.21	1.35	0.22
Conv. Total (m3/s)	192.9	Conv. (m3/s)	4.5	182.2	6.2
Length Wtd. (m)	19.51	Wetted Per. (m)	8.80	10.24	11.81
Min Ch El (m)	83.75	Shear (N/m2)	2.78	16.03	2.83
Alpha	1.54	Stream Power (N/m s)	0.24	8.39	0.25
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	5.13	11.35	1.87
C & E Loss (m)	0.00	Cum SA (1000 m2)	11.21	8.03	3.64

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.78	Reach Len. (m)	19.40	19.60	16.60
Crit W.S. (m)	84.46	Flow Area (m2)	15.99	14.76	6.50
E.G. Slope (m/m)	0.000774	Area (m2)	15.99	14.76	

6.50					
Q Total (m3/s)	8.42	Flow (m3/s)	1.34	6.55	
0.53					
Top Width (m)	84.49	Top Width (m)	52.87	9.40	
22.23					
Vel Total (m/s)	0.23	Avg. Vel. (m/s)	0.08	0.44	
0.08					
Max Chl Dpth (m)	2.03	Hydr. Depth (m)	0.30	1.57	
0.29					
Conv. Total (m3/s)	302.5	Conv. (m3/s)	48.0	235.5	
19.1					
Length Wtd. (m)	19.38	Wetted Per. (m)	52.88	10.24	
22.24					
Min Ch El (m)	83.75	Shear (N/m2)	2.30	10.95	
2.22					
Alpha	3.03	Stream Power (N/m s)	0.19	4.86	
0.18					
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	8.36	13.28	
2.90					
C & E Loss (m)	0.00	Cum SA (1000 m2)	14.29	8.03	
5.24					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1578

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.16	1.5	86.13	2.3	86.13	6.5	86.1	8.6	86
11	85.81	12.8	85.75	19.2	85.64	21.3	85.68	25.2	85.52
27.6	85.47	29.7	85.49	34.7	85.44	37.9	85.44	38.685.44609	
40.2	85.46	42.4	85.46	44.2	85.39	46.6	85.42	47.4	85.39
48.7	85.41	49.8	85.46	50.5	85.46	52.9	85.37	53.7	85.32
54.5	85.32	55	85.3	56.1	85.34	59.2	85.38	60	85.34
61.3	85.32	62.4	85.34	64.8	85.3	69	83.75	71.1	83.75
72.7	83.75	74.2	85.16	76.1	85.16	78.2	85.26	79	85.32
80.6	85.38	84.5	85.48	86.6	85.56	88.7	85.57	90.8	85.63
93.2	85.73	101.1	85.85	105.9	85.87	112.2	85.96	115.4	85.98
116.8	86.04								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    64.8     .08    74.2     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          64.8    74.2             89.4    56.8    14.8             .6       .8

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           85.54    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.01    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           85.53    Reach Len. (m)          89.40      56.80
14.80
  Crit W.S. (m)                    Flow Area (m2)           4.57      12.41
2.26
  E.G. Slope (m/m)      0.001385    Area (m2)               4.57      12.41
2.26
  Q Total (m3/s)           7.02    Flow (m3/s)             0.27       6.56
0.19
  Top Width (m)           60.78    Top Width (m)           39.81       9.40
11.57
  Vel Total (m/s)          0.36    Avg. Vel. (m/s)         0.06       0.53
0.08
  Max Chl Dpth (m)         1.78    Hydr. Depth (m)         0.11       1.32
0.20
  Conv. Total (m3/s)      188.5    Conv. (m3/s)             7.2      176.3
 5.1
  Length Wtd. (m)         61.78    Wetted Per. (m)         39.82      10.24
11.58
  Min Ch El (m)           83.75    Shear (N/m2)            1.56      16.46
2.65
  Alpha                    1.97    Stream Power (N/m s)    0.09       8.70
0.22
  Frctn Loss (m)           0.04    Cum Volume (1000 m3)    5.03      11.11
1.83
  C & E Loss (m)           0.01    Cum SA (1000 m2)        10.43      7.85
3.45



Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.76	Reach Len. (m)	89.40	56.80	14.80
Crit W.S. (m)		Flow Area (m2)	15.13	14.61	6.14
E.G. Slope (m/m)	0.000823	Area (m2)	15.13	14.61	6.14
Q Total (m3/s)	8.42	Flow (m3/s)	1.26	6.64	0.51
Top Width (m)	82.94	Top Width (m)	52.38	9.40	21.16
Vel Total (m/s)	0.23	Avg. Vel. (m/s)	0.08	0.45	0.08
Max Chl Dpth (m)	2.01	Hydr. Depth (m)	0.29	1.55	0.29
Conv. Total (m3/s)	293.5	Conv. (m3/s)	44.1	231.4	18.0
Length Wtd. (m)	62.57	Wetted Per. (m)	52.40	10.24	21.17
Min Ch El (m)	83.75	Shear (N/m2)	2.33	11.52	2.34
Alpha	2.99	Stream Power (N/m s)	0.19	5.24	0.20
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	8.06	12.99	2.79
C & E Loss (m)	0.00	Cum SA (1000 m2)	13.27	7.85	4.88

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1521

INPUT
Description:

Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.889	.584	87.852	4.586	87.815	8.588	87.828	10.589	87.904
12.709	87.931	14.591	87.847	16.592	87.706	18.908	87.593	20.238	87.481
22.595	87.34	24.596	87.302	25.106	87.277	26.057	87.27	27.172	87.222
27.997	87.229	28.598	87.207	30.599	87.077	32.6	86.994	33.371	86.923
33.816	86.859	34.601	86.789	38.603	86.721	40.604	86.762	42.605	86.66
44.606	86.156	46.607	85.524	48.608	84.869	50.609	84.471	52.61	84.334
54.611	84.078	56.099	84.1	60.614	84.098	62.615	84.134	63.75	83.742
64.38	83.525	67.389	83.525	67.4	83.533	68.628	84.408	70.628	84.765
72.628	84.958	74.629	85.034	76.629	85.145	78.63	85.395	82.63	85.633
88.632	85.895	90.632	86.031	92.632	86.126	94.633	86.247	96.633	86.331
98.633	86.281	102.634	86.225	106.635	86.117	108.635	85.994	110.636	86.068
112.636	86.108	114.637	86.106	118.194	86.201	120.838	86.253		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	62.615	.08	68.628	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
62.615	68.628	39.6	59.5	73.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.49	Reach Len. (m)	39.60	59.50	73.40
Crit W.S. (m)		Flow Area (m2)	18.04	10.71	5.33
E.G. Slope (m/m)	0.000426	Area (m2)	18.04	10.71	5.33
Q Total (m3/s)	7.02	Flow (m3/s)	2.68	3.90	0.44
Top Width (m)	33.45	Top Width (m)	15.89	6.01	11.55
Vel Total (m/s)	0.21	Avg. Vel. (m/s)	0.15	0.36	0.08
Max Chl Dpth (m)	1.96	Hydr. Depth (m)	1.13	1.78	0.46
Conv. Total (m3/s)	339.9	Conv. (m3/s)	130.0	188.8	21.2
Length Wtd. (m)	55.65	Wetted Per. (m)	16.05	6.40	11.61
Min Ch El (m)	83.52	Shear (N/m2)	4.69	6.99	

1.92					
Alpha	1.94	Stream Power (N/m s)	0.70	2.54	
0.16					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	4.02	10.45	
1.77					
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.94	7.41	
3.28					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.74	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	85.73	Reach Len. (m)	39.60	59.50	
73.40					
Crit W.S. (m)		Flow Area (m2)	22.02	12.18	
8.69					
E.G. Slope (m/m)	0.000354	Area (m2)	22.02	12.18	
8.69					
Q Total (m3/s)	8.42	Flow (m3/s)	3.30	4.40	
0.72					
Top Width (m)	38.93	Top Width (m)	16.66	6.01	
16.25					
Vel Total (m/s)	0.20	Avg. Vel. (m/s)	0.15	0.36	
0.08					
Max Chl Dpth (m)	2.21	Hydr. Depth (m)	1.32	2.03	
0.53					
Conv. Total (m3/s)	447.3	Conv. (m3/s)	175.4	233.9	
38.0					
Length Wtd. (m)	55.69	Wetted Per. (m)	16.86	6.40	
16.32					
Min Ch El (m)	83.52	Shear (N/m2)	4.54	6.61	
1.85					
Alpha	2.02	Stream Power (N/m s)	0.68	2.39	
0.15					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	6.40	12.23	
2.69					
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.18	7.41	
4.60					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1462

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.08	3.1	88.1	5.4	87.91	8.8	87.71	10.3	87.64
16.1	87.45	17	87.45	18.6	87.57	19.3	87.61	26.5	87.62
29.3	87.63	30.9	87.66	32.2	87.65	35.5	87.61	37.9	87.6
38.4	87.58	40.2	87.45	41	87.41	43.9	87.31	45.4	87.2
46.3	87.17	47.1	87.16	49.4	86.92	49.7	86.82667	51.2	86.36
51.8	86.2	52.7	86	54.1	85.79	55.6	85.5	56.4	85.4
58.5	83.3	60	83.3	62.1	83.3	63.3	85.46	66.1	85.8
68	85.95	70.3	85.98	71.7	86.04	72.6	86.12	73.1	86.13
74	86.1	74.9	86.02	76	86	77.3	86.02	79.6	85.91
81.9	86.06	84.2	86.28	85.9	86.39	86.3	86.4	88.8	86.35
89.2	86.36	92.1	86.6	93.5	86.66	94	86.69405	105.1	87.45
105.6	87.43	107.4	87.32	109.7	87.33	111.1	87.32	112	87.3
114.3	87.22	115.5	87.2	116.7	87.2	119.9	87.25	124.8	87.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58.5	.08	62.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58.5	62.1	14.2	16.9	17.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.45	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.41	Reach Len. (m)	14.20	16.90	17.40
Crit W.S. (m)		Flow Area (m2)	2.24	7.61	1.24

E.G. Slope (m/m)	0.001623	Area (m2)	2.24	7.61	1.24
Q Total (m3/s)	7.02	Flow (m3/s)	0.48	6.32	0.21
Top Width (m)	6.99	Top Width (m)	2.22	3.60	1.17
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.22	0.83	0.17
Max Chl Dpth (m)	2.11	Hydr. Depth (m)	1.01	2.11	1.06
Conv. Total (m3/s)	174.1	Conv. (m3/s)	12.0	156.8	5.3
Length Wtd. (m)	16.73	Wetted Per. (m)	3.09	3.60	2.42
Min Ch El (m)	83.30	Shear (N/m2)	11.53	33.67	8.17
Alpha	1.56	Stream Power (N/m s)	2.50	27.93	1.41
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	3.62	9.91	1.53
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.58	7.12	2.81

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.70	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.66	Reach Len. (m)	14.20	16.90	17.40
Crit W.S. (m)		Flow Area (m2)	2.98	8.49	1.70
E.G. Slope (m/m)	0.001620	Area (m2)	2.98	8.49	1.70
Q Total (m3/s)	8.42	Flow (m3/s)	0.60	7.57	0.25
Top Width (m)	10.16	Top Width (m)	3.72	3.60	2.84
Vel Total (m/s)	0.64	Avg. Vel. (m/s)	0.20	0.89	0.15
Max Chl Dpth (m)	2.36	Hydr. Depth (m)	0.80	2.36	0.60
Conv. Total (m3/s)	209.2	Conv. (m3/s)	14.8	188.1	6.3

Length Wtd. (m)	16.72	Wetted Per. (m)	4.61	3.60	4.12
Min Ch El (m)	83.30	Shear (N/m2)	10.26	37.47	6.54
Alpha	1.76	Stream Power (N/m s)	2.06	33.40	0.97
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	5.90	11.62	2.30
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.78	7.13	3.90

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1445

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.08	3.1	88.1	5.4	87.91	8.8	87.71	10.3	87.64
16.1	87.45	17	87.45	18.6	87.57	19.3	87.61	26.5	87.62
29.3	87.63	30.9	87.66	32.2	87.65	35.5	87.61	37.9	87.6
38.4	87.58	40.2	87.45	41	87.41	43.9	87.31	45.4	87.2
46.3	87.17	47.1	87.16	49.4	86.92	49.786.82667		51.2	86.36
51.8	86.2	52.7	86	54.1	85.79	55.6	85.5	56.4	85.4
58.5	83.3	60	83.3	62.1	83.3	63.3	85.46	66.1	85.8
68	85.95	70.3	85.98	71.7	86.04	72.6	86.12	73.1	86.13
74	86.1	74.9	86.02	76	86	77.3	86.02	79.6	85.91
81.9	86.06	84.2	86.28	85.9	86.39	86.3	86.4	88.8	86.35
89.2	86.36	92.1	86.6	93.5	86.66	9486.69405		105.1	87.45
105.6	87.43	107.4	87.32	109.7	87.33	111.1	87.32	112	87.3
114.3	87.22	115.5	87.2	116.7	87.2	119.9	87.25	124.8	87.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58.5	.08	62.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58.5	62.1	62.6	52.6	54.9	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	56.21	85.49	F
64.79	124.8	85.49	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.39	Reach Len. (m)	62.60	52.60	54.90
Crit W.S. (m)	84.01	Flow Area (m2)	2.18	7.51	1.21
E.G. Slope (m/m)	0.001699	Area (m2)	2.18	7.51	1.21
Q Total (m3/s)	7.02	Flow (m3/s)	0.49	6.32	0.21
Top Width (m)	6.85	Top Width (m)	2.09	3.60	1.16
Vel Total (m/s)	0.64	Avg. Vel. (m/s)	0.22	0.84	0.17
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	1.04	2.09	1.04
Conv. Total (m3/s)	170.2	Conv. (m3/s)	11.8	153.3	5.1
Length Wtd. (m)	52.60	Wetted Per. (m)	2.95	3.60	2.39
Min Ch El (m)	83.30	Shear (N/m2)	12.29	34.75	8.44
Alpha	1.55	Stream Power (N/m s)	2.76	29.23	1.47
Frctn Loss (m)		Cum Volume (1000 m3)	3.59	9.78	1.51
C & E Loss (m)		Cum SA (1000 m2)	7.55	7.06	2.79

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.63	Reach Len. (m)	62.60	52.60	54.90
Crit W.S. (m)	84.11	Flow Area (m2)	2.87	8.39	1.62
E.G. Slope (m/m)	0.001694	Area (m2)	2.87	8.39	

1.62					
Q Total (m3/s)	8.42	Flow (m3/s)	0.59	7.58	
0.25					
Top Width (m)	9.77	Top Width (m)	3.57	3.60	
2.60					
Vel Total (m/s)	0.65	Avg. Vel. (m/s)	0.20	0.90	
0.15					
Max Chl Dpth (m)	2.33	Hydr. Depth (m)	0.80	2.33	
0.62					
Conv. Total (m3/s)	204.6	Conv. (m3/s)	14.3	184.2	
6.0					
Length Wtd. (m)	52.60	Wetted Per. (m)	4.46	3.60	
3.88					
Min Ch El (m)	83.30	Shear (N/m2)	10.71	38.70	
6.93					
Alpha	1.73	Stream Power (N/m s)	2.19	34.99	
1.06					
Frctn Loss (m)		Cum Volume (1000 m3)	5.86	11.48	
2.28					
C & E Loss (m)		Cum SA (1000 m2)	9.73	7.07	
3.85					

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 1405

INPUT
Description:
Distance from Upstream XS = 2.5
Deck/Roadway Width = 49
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	85.49		20	85.49		40	85.49	
60	85.49		80	85.49				

Upstream Bridge Cross Section Data
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.08	3.1	88.1	5.4	87.91	8.8	87.71	10.3	87.64
16.1	87.45	17	87.45	18.6	87.57	19.3	87.61	26.5	87.62
29.3	87.63	30.9	87.66	32.2	87.65	35.5	87.61	37.9	87.6
38.4	87.58	40.2	87.45	41	87.41	43.9	87.31	45.4	87.2

46.3	87.17	47.1	87.16	49.4	86.92	49.786.82667		51.2	86.36
51.8	86.2	52.7	86	54.1	85.79	55.6	85.5	56.4	85.4
58.5	83.3	60	83.3	62.1	83.3	63.3	85.46	66.1	85.8
68	85.95	70.3	85.98	71.7	86.04	72.6	86.12	73.1	86.13
74	86.1	74.9	86.02	76	86	77.3	86.02	79.6	85.91
81.9	86.06	84.2	86.28	85.9	86.39	86.3	86.4	88.8	86.35
89.2	86.36	92.1	86.6	93.5	86.66	9486.69405		105.1	87.45
105.6	87.43	107.4	87.32	109.7	87.33	111.1	87.32	112	87.3
114.3	87.22	115.5	87.2	116.7	87.2	119.9	87.25	124.8	87.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58.5	.08	62.1	.15

Bank Sta: Left Right Coeff Contr. Expan.

58.5 62.1 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	56.21	85.49	F
64.79	124.8	85.49	F

Downstream Deck/Roadway Coordinates

num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	85.49		20	85.49		40	85.49	
60	85.49		80	85.49				

Downstream Bridge Cross Section Data

Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.99	3	87.17	4.7	87.22	7	87.26	8.8	87.2
11.8	87.05	13.2	86.99	14.7	86.96	16.2	86.9	17.6	86.96
19.1	86.94	20.6	86.98	22	86.94	23.1	86.96	24.3	86.8
25.4	86.63	26.4	86.57	27.7	86.53	30.8	86.47	34.6	86.39
36.7	86.32	39.6	86.26	41.5	86.18	46.1	86.02	48.5	85.95
50.585.93182		50.7	85.93	55.3	85.92	56.6	85.99	57.6	86.01
59.9	85.92	60.6	85.86	63.1	85.76	64.6	85.61	68.7	83.15
69.1	83.15	70.4	83.15	71.4	83.15	72.8	85.23	76	85.62
78.3	85.67	80.7	85.67	82.2	85.68	85.1	85.76	86.285.77158	
88.9	85.8	92.1	85.88	94.4	86	96.7	86.19	99	86.31
101.2	86.36	104.2	86.52	108.2	86.62	110	86.65	112.8	86.74
115.1	86.76								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	68.7	.08	71.4	.15

Bank Sta: Left Right Coeff Contr. Expan.

```
         68.7    71.4             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      66   85.49       F
      74   115.1   85.49       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     Pipe Arch    1.78    2.56
FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               2.5      50     .027     .027        0                    .9
       1
Upstream   Elevation =  83.34
           Centerline Station =  60.5
Downstream Elevation =  83.16
           Centerline Station =  70

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       7.02    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         1.97
  Q Barrel (m3/s)           7.02    Culv Vel DS (m/s)         2.04
  E.G. US. (m)             85.42    Culv Inv El Up (m)       83.34
  W.S. US. (m)             85.39    Culv Inv El Dn (m)       83.16
  E.G. DS (m)              84.81    Culv Frctn Ls (m)         0.30
  W.S. DS (m)              84.73    Culv Exit Loss (m)        0.13
  Delta EG (m)              0.60    Culv Entr Loss (m)        0.18
  Delta WS (m)              0.65    Q Weir (m3/s)
  E.G. IC (m)              85.04    Weir Sta Lft (m)
  E.G. OC (m)              85.42    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)         85.04    Weir Max Depth (m)
  Culv WS Outlet (m)        84.73    Weir Avg Depth (m)
  Culv Nml Depth (m)         1.78    Weir Flow Area (m2)
  Culv Crt Depth (m)         0.95    Min El Weir Flow (m)     85.49
```

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the
height of the culvert.

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	7.50	Culv Full Len (m)	33.81
# Barrels	1	Culv Vel US (m/s)	2.07
Q Barrel (m3/s)	7.50	Culv Vel DS (m/s)	2.10
E.G. US. (m)	85.67	Culv Inv El Up (m)	83.34
W.S. US. (m)	85.63	Culv Inv El Dn (m)	83.16
E.G. DS (m)	84.96	Culv Frctn Ls (m)	0.38
W.S. DS (m)	84.87	Culv Exit Loss (m)	0.13
Delta EG (m)	0.70	Culv Entr Loss (m)	0.20
Delta WS (m)	0.76	Q Weir (m3/s)	0.92
E.G. IC (m)	85.32	Weir Sta Lft (m)	54.73
E.G. OC (m)	85.67	Weir Sta Rgt (m)	65.01
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	85.12	Weir Max Depth (m)	0.18
Culv WS Outlet (m)	84.87	Weir Avg Depth (m)	0.16
Culv Nml Depth (m)	1.78	Weir Flow Area (m2)	1.61
Culv Crt Depth (m)	1.00	Min El Weir Flow (m)	85.49

Warning: During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported
inlet energy grade answer may not be valid.
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the
height of the culvert.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1392

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.99	3	87.17	4.7	87.22	7	87.26	8.8	87.2
11.8	87.05	13.2	86.99	14.7	86.96	16.2	86.9	17.6	86.96
19.1	86.94	20.6	86.98	22	86.94	23.1	86.96	24.3	86.8
25.4	86.63	26.4	86.57	27.7	86.53	30.8	86.47	34.6	86.39
36.7	86.32	39.6	86.26	41.5	86.18	46.1	86.02	48.5	85.95

```
    50.585.93182    50.7   85.93    55.3   85.92    56.6   85.99    57.6   86.01
    59.9   85.92    60.6   85.86    63.1   85.76    64.6   85.61    68.7   83.15
    69.1   83.15    70.4   83.15    71.4   83.15    72.8   85.23      76   85.62
    78.3   85.67    80.7   85.67    82.2   85.68    85.1   85.76    86.285.77158
    88.9    85.8    92.1   85.88    94.4      86    96.7   86.19      99   86.31
   101.2   86.36   104.2   86.52   108.2   86.62     110   86.65   112.8   86.74
   115.1   86.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    68.7     .08    71.4     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          68.7    71.4             17.3    18.3    17.3             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      66   85.49       F
      74   115.1   85.49       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            84.81    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.08    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            84.73    Reach Len. (m)          17.30      18.30
17.30
  Crit W.S. (m)            83.99    Flow Area (m2)           2.09       4.27
0.84
  E.G. Slope (m/m)      0.006571    Area (m2)                2.09       4.27
0.84
  Q Total (m3/s)            7.02    Flow (m3/s)              0.87       5.88
0.26
  Top Width (m)             6.40    Top Width (m)            2.64       2.70
1.07
  Vel Total (m/s)           0.97    Avg. Vel. (m/s)          0.42       1.38
0.31
  Max Chl Dpth (m)          1.58    Hydr. Depth (m)          0.79       1.58
0.79
  Conv. Total (m3/s)        86.5    Conv. (m3/s)             10.7       72.5
 3.3
  Length Wtd. (m)          18.15    Wetted Per. (m)          3.08       2.70
1.91
  Min Ch El (m)            83.15    Shear (N/m2)            43.73     101.99
28.47
  Alpha                     1.70    Stream Power (N/m s)    18.25     140.36
8.93
```

Frctn Loss (m)	0.15	Cum Volume (1000 m3)	3.59	9.57	1.51
C & E Loss (m)	0.02	Cum SA (1000 m2)	7.40	6.90	2.73

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.96	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.87	Reach Len. (m)	17.30	18.30	17.30
Crit W.S. (m)	84.09	Flow Area (m2)	2.46	4.64	0.99
E.G. Slope (m/m)	0.006920	Area (m2)	2.46	4.64	0.99
Q Total (m3/s)	8.42	Flow (m3/s)	1.15	6.93	0.34
Top Width (m)	6.72	Top Width (m)	2.87	2.70	1.16
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.47	1.49	0.34
Max Chl Dpth (m)	1.72	Hydr. Depth (m)	0.91	1.72	0.86
Conv. Total (m3/s)	101.2	Conv. (m3/s)	13.9	83.3	4.1
Length Wtd. (m)	18.13	Wetted Per. (m)	3.15	2.70	2.07
Min Ch El (m)	83.15	Shear (N/m2)	52.91	116.67	32.57
Alpha	1.73	Stream Power (N/m s)	24.86	174.11	11.07
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	5.86	11.17	2.28
C & E Loss (m)	0.03	Cum SA (1000 m2)	9.53	6.90	3.75

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1374

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.99	3	87.17	4.7	87.22	7	87.26	8.8	87.2
11.8	87.05	13.2	86.99	14.7	86.96	16.2	86.9	17.6	86.96
19.1	86.94	20.6	86.98	22	86.94	23.1	86.96	24.3	86.8
25.4	86.63	26.4	86.57	27.7	86.53	30.8	86.47	34.6	86.39
36.7	86.32	39.6	86.26	41.5	86.18	46.1	86.02	48.5	85.95
50.585.93182		50.7	85.93	55.3	85.92	56.6	85.99	57.6	86.01
59.9	85.92	60.6	85.86	63.1	85.76	64.6	85.61	68.7	83.15
69.1	83.15	70.4	83.15	71.4	83.15	72.8	85.23	76	85.62
78.3	85.67	80.7	85.67	82.2	85.68	85.1	85.76	86.285.77158	
88.9	85.8	92.1	85.88	94.4	86	96.7	86.19	99	86.31
101.2	86.36	104.2	86.52	108.2	86.62	110	86.65	112.8	86.74
115.1	86.76								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	68.7	.08	71.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.7	71.4	71.1	64	58.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.64	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.53	Reach Len. (m)	71.10	64.00	58.60
Crit W.S. (m)		Flow Area (m2)	1.59	3.72	0.64
E.G. Slope (m/m)	0.010838	Area (m2)	1.59	3.72	0.64
Q Total (m3/s)	7.02	Flow (m3/s)	0.78	6.01	0.24
Top Width (m)	5.93	Top Width (m)	2.30	2.70	0.93
Vel Total (m/s)	1.18	Avg. Vel. (m/s)	0.49	1.61	0.37
Max Chl Dpth (m)	1.38	Hydr. Depth (m)	0.69	1.38	0.69
Conv. Total (m3/s)	67.4	Conv. (m3/s)	7.4	57.7	2.3

Length Wtd. (m)	65.61	Wetted Per. (m)	2.68	2.70	1.66
Min Ch El (m)	83.15	Shear (N/m2)	62.86	146.60	40.93
Alpha	1.62	Stream Power (N/m s)	30.74	236.40	15.04
Frctn Loss (m)	0.26	Cum Volume (1000 m3)	3.56	9.49	1.50
C & E Loss (m)	0.03	Cum SA (1000 m2)	7.36	6.85	2.71

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.78	Element	Left OB	Channel	Right OB
Vel Head (m)	0.14	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.64	Reach Len. (m)	71.10	64.00	58.60
Crit W.S. (m)		Flow Area (m2)	1.86	4.03	0.75
E.G. Slope (m/m)	0.011736	Area (m2)	1.86	4.03	0.75
Q Total (m3/s)	8.42	Flow (m3/s)	0.99	7.12	0.30
Top Width (m)	6.19	Top Width (m)	2.49	2.70	1.00
Vel Total (m/s)	1.27	Avg. Vel. (m/s)	0.54	1.77	0.40
Max Chl Dpth (m)	1.49	Hydr. Depth (m)	0.75	1.49	0.75
Conv. Total (m3/s)	77.7	Conv. (m3/s)	9.2	65.7	2.8
Length Wtd. (m)	65.59	Wetted Per. (m)	2.90	2.70	1.80
Min Ch El (m)	83.15	Shear (N/m2)	73.62	171.71	47.94
Alpha	1.67	Stream Power (N/m s)	39.47	303.61	19.31
Frctn Loss (m)	0.26	Cum Volume (1000 m3)	5.82	11.09	2.26

C & E Loss (m)	0.04	Cum SA (1000 m2)	9.48	6.85	3.73

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1310

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.541	.721	86.524	3.509	86.596	5.095	86.613	9.85	86.421
13.349	86.248	15.453	86.259	16.192	86.302	17.558	86.418	19.662	86.672
20.255	86.673	20.947	86.698	21.767	86.672	22.533	86.565	23.871	86.42
25.976	85.807	28.08	85.25	30.459	85.027	32.29	84.78	34.394	84.435
36.499	84.371	38.603	84.134	40.708	83.808	42.812	83.645	47.021	83.398
47.897	83.424	49.126	83.496	51.231	83.327	53.335	83.411	55.029	83.249
55.069	83.245	55.189	83.219	55.923	82.95	56.238	82.855	57.287	82.846
58.204	83.176	59.636	83.69	63.834	83.884	65.934	84.076	68.033	84.339
70.133	84.546	74.927	85.321	78.531	85.803	81.293	86.062	82.884	86.231
84.829	86.489	86.928	86.591	87.658	86.611	89.028	86.618	91.127	86.538
92.433	86.514	97.425	86.513	99.525	86.712	103.572	86.596	105.745	86.55

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	55.029	.08	58.204	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.029	58.204	32.7	41.6	43.9	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.34	Reach Len. (m)	32.70	41.60	43.90
Crit W.S. (m)		Flow Area (m2)	13.38	4.35	

4.70					
E.G. Slope (m/m)	0.002009	Area (m2)	13.38	4.35	
4.70					
Q Total (m3/s)	7.02	Flow (m3/s)	3.24	2.93	
0.85					
Top Width (m)	31.35	Top Width (m)	18.29	3.18	
9.88					
Vel Total (m/s)	0.31	Avg. Vel. (m/s)	0.24	0.67	
0.18					
Max Chl Dpth (m)	1.50	Hydr. Depth (m)	0.73	1.37	
0.48					
Conv. Total (m3/s)	156.5	Conv. (m3/s)	72.3	65.3	
18.9					
Length Wtd. (m)	38.97	Wetted Per. (m)	18.36	3.30	
10.00					
Min Ch El (m)	82.85	Shear (N/m2)	14.36	25.97	
9.26					
Alpha	2.25	Stream Power (N/m s)	3.48	17.50	
1.67					
Frctn Loss (m)	0.10	Cum Volume (1000 m3)	3.02	9.23	
1.34					
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.63	6.66	
2.39					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.48	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	84.47	Reach Len. (m)	32.70	41.60	
43.90					
Crit W.S. (m)		Flow Area (m2)	15.84	4.74	
6.01					
E.G. Slope (m/m)	0.001970	Area (m2)	15.84	4.74	
6.01					
Q Total (m3/s)	8.42	Flow (m3/s)	3.90	3.35	
1.17					
Top Width (m)	35.17	Top Width (m)	20.85	3.18	
11.15					
Vel Total (m/s)	0.32	Avg. Vel. (m/s)	0.25	0.71	
0.19					
Max Chl Dpth (m)	1.62	Hydr. Depth (m)	0.76	1.49	
0.54					
Conv. Total (m3/s)	189.7	Conv. (m3/s)	87.8	75.6	

```
26.4
  Length Wtd. (m)          38.96    Wetted Per. (m)          20.92       3.30
11.28
  Min Ch El (m)            82.85    Shear (N/m2)             14.63      27.79
10.30
  Alpha                     2.32    Stream Power (N/m s)      3.60      19.65
2.00
  Frctn Loss (m)            0.10    Cum Volume (1000 m3)      5.19      10.81
2.06
  C & E Loss (m)            0.00    Cum SA (1000 m2)          8.65       6.66
3.38



CROSS SECTION


RIVER: Beamer Creek
REACH: Reach 5            RS: 1228

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.735.000037   86.6910.00007   86.6515.00005   86.3420.00001   86.17
24.99998   85.4830.0000484.85858 36.080183.5814438.4279883.3784341.3576183.36032
42.02249 83.222442.5112682.7362943.7083782.5413244.1430282.6805444.5246983.22243
45.0083583.3616948.2746283.4071356.7308184.2639666.3349285.5877871.33499   85.98
76.33499   86.2381.33493   86.3486.33497   86.4691.33497   86.49  96.335   86.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1541.35761     .0845.00835     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      41.3576145.00835            118.9   115.7     108             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            84.25    Element                  Left OB    Channel
Right OB
  Vel Head (m)              0.02    Wt. n-Val.                0.150      0.080
0.150
  W.S. Elev (m)            84.23    Reach Len. (m)           118.90     115.70
108.00
  Crit W.S. (m)                     Flow Area (m2)             5.31       4.80
6.14
```

E.G. Slope (m/m)	0.003511	Area (m2)	5.31	4.80	6.14
Q Total (m3/s)	7.02	Flow (m3/s)	1.54	3.88	1.60
Top Width (m)	23.45	Top Width (m)	8.38	3.65	11.42
Vel Total (m/s)	0.43	Avg. Vel. (m/s)	0.29	0.81	0.26
Max Chl Dpth (m)	1.69	Hydr. Depth (m)	0.63	1.31	0.54
Conv. Total (m3/s)	118.4	Conv. (m3/s)	26.0	65.5	27.0
Length Wtd. (m)	115.18	Wetted Per. (m)	8.46	4.20	11.46
Min Ch El (m)	82.54	Shear (N/m2)	21.62	39.29	18.44
Alpha	2.12	Stream Power (N/m s)	6.26	31.77	4.81
Frctn Loss (m)	0.44	Cum Volume (1000 m3)	2.72	9.04	1.10
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.19	6.52	1.93

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.36	Reach Len. (m)	118.90	115.70	108.00
Crit W.S. (m)		Flow Area (m2)	6.44	5.27	7.70
E.G. Slope (m/m)	0.003238	Area (m2)	6.44	5.27	7.70
Q Total (m3/s)	8.42	Flow (m3/s)	1.94	4.36	2.11
Top Width (m)	25.09	Top Width (m)	9.00	3.65	12.44
Vel Total (m/s)	0.43	Avg. Vel. (m/s)	0.30	0.83	0.27

Max Chl Dpth (m)	1.82	Hydr. Depth (m)	0.72	1.44	0.62
Conv. Total (m3/s)	147.9	Conv. (m3/s)	34.1	76.6	37.2
Length Wtd. (m)	115.10	Wetted Per. (m)	9.09	4.20	12.49
Min Ch El (m)	82.54	Shear (N/m2)	22.51	39.83	19.57
Alpha	2.10	Stream Power (N/m s)	6.79	32.96	5.37
Frctn Loss (m)	0.41	Cum Volume (1000 m3)	4.83	10.60	1.76
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.16	6.52	2.86

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1152

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.27	1.2	86.25	4.1	86.35	5	86.36	8.4	86.34
9	86.31	10.5	86.27	12.1	86.09	12.6	86.07	16.2	85.75
19.8	85.41	23.785.06106		25.5	84.9	27.6	84.68	29.8	84.18
31.9	83.93	33	83.93	34	83.95	36.2	83.76	36.9	83.68
38.3	83.4	40	83.37	40.5	82.3	41.5	82.3	42.6	82.3
44.8	82.3	46.1	83.39	46.9	83.47	49	84.01	49.8	84.24
51.2	84.64	53.3	85.07	53.9	85.15	54.9	85.35	55.5	85.47
57	85.63	57.6	85.71	58.5	85.79	59.8	85.87	61.9	85.95
63.2	85.97	64	86	76.9	86.12	80.2	85.91	81.2	85.87
81.7	85.82	83.3	85.6	85.5	85.47	87.6	85.17	89.8	85.07
94.2	85.03								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	40	.08	46.1	.15

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

40 46.1 12.5 14.6 10.7 .1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	83.81	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.78	Reach Len. (m)	12.50	14.60	10.70
Crit W.S. (m)		Flow Area (m2)	1.04	8.03	0.46
E.G. Slope (m/m)	0.004122	Area (m2)	1.04	8.03	0.46
Q Total (m3/s)	7.20	Flow (m3/s)	0.18	6.95	0.07
Top Width (m)	12.09	Top Width (m)	4.00	6.10	1.99
Vel Total (m/s)	0.76	Avg. Vel. (m/s)	0.17	0.87	0.16
Max Chl Dpth (m)	1.48	Hydr. Depth (m)	0.26	1.32	0.23
Conv. Total (m3/s)	112.2	Conv. (m3/s)	2.8	108.3	1.1
Length Wtd. (m)	14.52	Wetted Per. (m)	4.03	7.18	2.04
Min Ch El (m)	82.30	Shear (N/m2)	10.43	45.24	9.14
Alpha	1.27	Stream Power (N/m s)	1.81	39.14	1.45
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	2.34	8.30	0.75
C & E Loss (m)	0.00	Cum SA (1000 m2)	5.45	5.95	1.20

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.93	Reach Len. (m)	12.50	14.60	10.70
Crit W.S. (m)		Flow Area (m2)	1.82	8.99	

0.82					
E.G. Slope (m/m)	0.003887	Area (m2)	1.82	8.99	
0.82					
Q Total (m3/s)	8.64	Flow (m3/s)	0.34	8.14	
0.16					
Top Width (m)	15.86	Top Width (m)	7.15	6.10	
2.61					
Vel Total (m/s)	0.74	Avg. Vel. (m/s)	0.19	0.91	
0.19					
Max Chl Dpth (m)	1.63	Hydr. Depth (m)	0.25	1.47	
0.32					
Conv. Total (m3/s)	138.7	Conv. (m3/s)	5.5	130.6	
2.5					
Length Wtd. (m)	14.46	Wetted Per. (m)	7.19	7.18	
2.67					
Min Ch El (m)	82.30	Shear (N/m2)	9.62	47.76	
11.75					
Alpha	1.40	Stream Power (N/m s)	1.82	43.26	
2.23					
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	4.34	9.77	
1.30					
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.20	5.96	
2.05					

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1138

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.27	1.2	86.25	4.1	86.35	5	86.36	8.4	86.34
9	86.31	10.5	86.27	12.1	86.09	12.6	86.07	16.2	85.75
19.8	85.41	23.785.06106		25.5	84.9	27.6	84.68	29.8	84.18
31.9	83.93	33	83.93	34	83.95	36.2	83.76	36.9	83.68
38.3	83.4	40	83.37	40.5	82.3	41.5	82.3	42.6	82.3
44.8	82.3	46.1	83.39	46.9	83.47	49	84.01	49.8	84.24
51.2	84.64	53.3	85.07	53.9	85.15	54.9	85.35	55.5	85.47
57	85.63	57.6	85.71	58.5	85.79	59.8	85.87	61.9	85.95
63.2	85.97	64	86	76.9	86.12	80.2	85.91	81.2	85.87
81.7	85.82	83.3	85.6	85.5	85.47	87.6	85.17	89.8	85.07

```
    94.2   85.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15      40     .08    46.1     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            40    46.1                34    32.9      33             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    37.5   85.02       F
   47.87    94.2   85.02       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            83.75    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.04    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            83.71    Reach Len. (m)          34.00      32.90
33.00
  Crit W.S. (m)            82.93    Flow Area (m2)           0.72       7.60
0.33
  E.G. Slope (m/m)      0.005047    Area (m2)                0.78       7.60
0.33
  Q Total (m3/s)            7.20    Flow (m3/s)              0.15       7.00
0.05
  Top Width (m)            11.13    Top Width (m)            3.32       6.10
1.71
  Vel Total (m/s)           0.83    Avg. Vel. (m/s)          0.21       0.92
0.16
  Max Chl Dpth (m)          1.41    Hydr. Depth (m)          0.29       1.25
0.19
  Conv. Total (m3/s)       101.4    Conv. (m3/s)              2.1       98.6
 0.7
  Length Wtd. (m)          32.90    Wetted Per. (m)          2.52       7.18
1.75
  Min Ch El (m)            82.30    Shear (N/m2)            14.24      52.37
9.27
  Alpha                     1.19    Stream Power (N/m s)     2.94      48.29
1.44
  Frctn Loss (m)                    Cum Volume (1000 m3)     2.33       8.19
0.74
  C & E Loss (m)                    Cum SA (1000 m2)         5.41       5.86
1.18
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.87	Reach Len. (m)	34.00	32.90	33.00
Crit W.S. (m)	83.01	Flow Area (m2)	1.13	8.59	0.61
E.G. Slope (m/m)	0.004605	Area (m2)	1.45	8.59	0.66
Q Total (m3/s)	8.64	Flow (m3/s)	0.30	8.21	0.14
Top Width (m)	13.49	Top Width (m)	5.05	6.10	2.35
Vel Total (m/s)	0.84	Avg. Vel. (m/s)	0.27	0.96	0.22
Max Chl Dpth (m)	1.57	Hydr. Depth (m)	0.45	1.41	0.35
Conv. Total (m3/s)	127.4	Conv. (m3/s)	4.4	121.0	2.0
Length Wtd. (m)	32.90	Wetted Per. (m)	2.52	7.18	1.81
Min Ch El (m)	82.30	Shear (N/m2)	20.29	54.03	15.38
Alpha	1.24	Stream Power (N/m s)	5.39	51.65	3.39
Frctn Loss (m)		Cum Volume (1000 m3)	4.32	9.65	1.29
C & E Loss (m)		Cum SA (1000 m2)	7.13	5.87	2.02

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 1121

```
INPUT
Description:
Distance from Upstream XS =     3.5
Deck/Roadway Width        =      19
Weir Coefficient          =     1.4
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.02              20   85.02              40   85.02
      60   85.02              80   85.02

Upstream Bridge Cross Section Data
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.27     1.2   86.25     4.1   86.35       5   86.36     8.4   86.34
       9   86.31    10.5   86.27    12.1   86.09    12.6   86.07    16.2   85.75
    19.8   85.41    23.785.06106    25.5    84.9    27.6   84.68    29.8   84.18
    31.9   83.93      33   83.93      34   83.95    36.2   83.76    36.9   83.68
    38.3    83.4      40   83.37    40.5    82.3    41.5    82.3    42.6    82.3
    44.8    82.3    46.1   83.39    46.9   83.47      49   84.01    49.8   84.24
    51.2   84.64    53.3   85.07    53.9   85.15    54.9   85.35    55.5   85.47
      57   85.63    57.6   85.71    58.5   85.79    59.8   85.87    61.9   85.95
    63.2   85.97      64      86    76.9   86.12    80.2   85.91    81.2   85.87
    81.7   85.82    83.3    85.6    85.5   85.47    87.6   85.17    89.8   85.07
    94.2   85.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15      40     .08    46.1     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
            40    46.1             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    37.5   85.02       F
   47.87    94.2   85.02       F

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.02              20   85.02              40   85.02
      60   85.02              80   85.02

Downstream Bridge Cross Section Data
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.46     1.5   85.45     4.3   85.37     8.6   85.29    10.7   85.22
```

```
    12.4   85.21      14   85.18    17.1   85.09    18.7   85.08    20.2   85.04
    21.4      85    22.8   84.98    23.5      85    24.9   84.92    25.584.90285
    25.6    84.9    26.4   84.84    27.3   84.65    27.8   84.57    28.6   84.52
    29.5   84.53    30.7   84.41    31.1   84.38      32   84.24    32.7   84.18
    34.3   83.94    35.8   83.84    36.3   83.77    38.4   83.86    38.9   82.25
    40.6   82.25      42   82.25    43.5   82.25    44.8   83.77    45.8   83.86
    46.6   83.98    48.2   84.15    49.1   84.22    49.8   84.22    51.3   84.15
    52.9   84.29    53.4   84.35    54.284.36523    55.5   84.39      56   84.42
    59.8   84.54      63   84.59    63.8   84.64    66.2   84.93    66.9   84.99
    68.4   85.06      70    85.1    72.6   85.14    74.5   85.21    76.2   85.32
    76.8   85.38    77.8   85.42    78.4   85.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    38.9     .08    43.5     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          38.9    43.5             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    26.3   85.02       F
      55    78.4   85.02       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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    1.55    3.33
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               3.5    16.5     .013     .013        0                    .5
       1
Upstream   Elevation =  82.34
           Centerline Station =  42.7
Downstream Elevation =  82.29
           Centerline Station =  41

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1
```

Q Culv Group (m3/s)	7.20	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	1.92
Q Barrel (m3/s)	7.20	Culv Vel DS (m/s)	1.84
E.G. US. (m)	83.75	Culv Inv El Up (m)	82.34
W.S. US. (m)	83.71	Culv Inv El Dn (m)	82.29
E.G. DS (m)	83.54	Culv Frctn Ls (m)	0.02
W.S. DS (m)	83.46	Culv Exit Loss (m)	0.10
Delta EG (m)	0.21	Culv Entr Loss (m)	0.09
Delta WS (m)	0.24	Q Weir (m3/s)	
E.G. IC (m)	83.67	Weir Sta Lft (m)	
E.G. OC (m)	83.75	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	83.47	Weir Max Depth (m)	
Culv WS Outlet (m)	83.46	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.78	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.78	Min El Weir Flow (m)	85.02

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.10
Q Barrel (m3/s)	8.64	Culv Vel DS (m/s)	2.02
E.G. US. (m)	83.91	Culv Inv El Up (m)	82.34
W.S. US. (m)	83.87	Culv Inv El Dn (m)	82.29
E.G. DS (m)	83.67	Culv Frctn Ls (m)	0.02
W.S. DS (m)	83.57	Culv Exit Loss (m)	0.12
Delta EG (m)	0.25	Culv Entr Loss (m)	0.11
Delta WS (m)	0.29	Q Weir (m3/s)	
E.G. IC (m)	83.85	Weir Sta Lft (m)	
E.G. OC (m)	83.91	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	83.58	Weir Max Depth (m)	
Culv WS Outlet (m)	83.57	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.88	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.88	Min El Weir Flow (m)	85.02

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1105

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.46	1.5	85.45	4.3	85.37	8.6	85.29	10.7	85.22
12.4	85.21	14	85.18	17.1	85.09	18.7	85.08	20.2	85.04
21.4	85	22.8	84.98	23.5	85	24.9	84.92	25.584.90285	
25.6	84.9	26.4	84.84	27.3	84.65	27.8	84.57	28.6	84.52
29.5	84.53	30.7	84.41	31.1	84.38	32	84.24	32.7	84.18
34.3	83.94	35.8	83.84	36.3	83.77	38.4	83.86	38.9	82.25
40.6	82.25	42	82.25	43.5	82.25	44.8	83.77	45.8	83.86
46.6	83.98	48.2	84.15	49.1	84.22	49.8	84.22	51.3	84.15
52.9	84.29	53.4	84.35	54.284.36523		55.5	84.39	56	84.42
59.8	84.54	63	84.59	63.8	84.64	66.2	84.93	66.9	84.99
68.4	85.06	70	85.1	72.6	85.14	74.5	85.21	76.2	85.32
76.8	85.38	77.8	85.42	78.4	85.42				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	38.9	.08	43.5	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
38.9	43.5	16.5	16.3	17.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	26.3	85.02	F
55	78.4	85.02	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	83.54	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.46	Reach Len. (m)	16.50	16.30	17.30
Crit W.S. (m)	82.88	Flow Area (m2)	0.23	5.59	0.63
E.G. Slope (m/m)	0.007663	Area (m2)	0.23	5.59	0.63
Q Total (m3/s)	7.20	Flow (m3/s)	0.04	6.96	0.20
Top Width (m)	6.02	Top Width (m)	0.38	4.60	1.04
Vel Total (m/s)	1.12	Avg. Vel. (m/s)	0.19	1.25	0.31
Max Chl Dpth (m)	1.21	Hydr. Depth (m)	0.61	1.21	0.61
Conv. Total (m3/s)	82.3	Conv. (m3/s)	0.5	79.5	2.3

Length Wtd. (m)	16.33	Wetted Per. (m)	1.27	4.60	1.60
Min Ch El (m)	82.25	Shear (N/m2)	13.54	91.30	29.67
Alpha	1.20	Stream Power (N/m s)	2.52	113.75	9.32
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	2.33	8.08	0.74
C & E Loss (m)	0.01	Cum SA (1000 m2)	5.35	5.69	1.14

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.57	Reach Len. (m)	16.50	16.30	17.30
Crit W.S. (m)	82.95	Flow Area (m2)	0.27	6.09	0.75
E.G. Slope (m/m)	0.008242	Area (m2)	0.27	6.09	0.75
Q Total (m3/s)	8.64	Flow (m3/s)	0.06	8.33	0.26
Top Width (m)	6.14	Top Width (m)	0.41	4.60	1.13
Vel Total (m/s)	1.22	Avg. Vel. (m/s)	0.20	1.37	0.34
Max Chl Dpth (m)	1.32	Hydr. Depth (m)	0.66	1.32	0.66
Conv. Total (m3/s)	95.2	Conv. (m3/s)	0.6	91.8	2.8
Length Wtd. (m)	16.34	Wetted Per. (m)	1.39	4.60	1.74
Min Ch El (m)	82.25	Shear (N/m2)	15.87	106.99	34.77
Alpha	1.22	Stream Power (N/m s)	3.25	146.37	11.99
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	4.32	9.53	1.29
C & E Loss (m)	0.01	Cum SA (1000 m2)	7.03	5.69	

1.96

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1089

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86	.9	85.96	3.6	85.9	6.7	85.9	9.5	85.96
11.7	85.93	12.8	85.88	13.8	85.86	15.5	85.89	20.5	85.78
24.6	85.5	26.8	85.32	26.985.30273		29	84.94	31.1	84.46
34.3	83.81	36.7	83.23	37.6	83.04	38.9	83.08	39.8	83.05
40.9	82.47	41.7	82.14	44.9	82.14	45.1	82.31	46.2	83.21
46.5	83.22	47.3	83.3	48	83.19	48.4	83.48	50.6	83.9
52.7	84.22	54.2	84.39	57.3	84.78	59.2	84.99	60.1	85.185
60.4	85.25	61.4	85.44	63.5	85.64	65	85.62	67.8	85.48
70	85.55	72.2	85.72	74.3	85.79	76.5	85.9	78.8	85.78
80.3	85.86	81.8	85.88	82.8	85.94				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	40.9	.08	45.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40.9	45.1	71.5	67	62	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	83.37	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.27	Reach Len. (m)	71.50	67.00	62.00
Crit W.S. (m)		Flow Area (m2)	1.14	4.60	0.61
E.G. Slope (m/m)	0.012476	Area (m2)	1.14	4.60	0.61

Q Total (m3/s)	7.20	Flow (m3/s)	0.34	6.68	0.18
Top Width (m)	11.08	Top Width (m)	4.37	4.20	2.52
Vel Total (m/s)	1.13	Avg. Vel. (m/s)	0.30	1.45	0.30
Max Chl Dpth (m)	1.13	Hydr. Depth (m)	0.26	1.09	0.24
Conv. Total (m3/s)	64.5	Conv. (m3/s)	3.0	59.8	1.6
Length Wtd. (m)	67.12	Wetted Per. (m)	4.53	4.33	2.87
Min Ch El (m)	82.14	Shear (N/m2)	30.83	129.94	26.16
Alpha	1.53	Stream Power (N/m s)	9.16	188.86	7.81
Frctn Loss (m)	0.41	Cum Volume (1000 m3)	2.32	8.00	0.73
C & E Loss (m)	0.02	Cum SA (1000 m2)	5.31	5.62	1.11

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.50	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.39	Reach Len. (m)	71.50	67.00	62.00
Crit W.S. (m)		Flow Area (m2)	1.72	5.12	0.99
E.G. Slope (m/m)	0.011709	Area (m2)	1.72	5.12	0.99
Q Total (m3/s)	8.64	Flow (m3/s)	0.60	7.74	0.30
Top Width (m)	12.26	Top Width (m)	4.88	4.20	3.18

Vel Total (m/s)	1.10	Avg. Vel. (m/s)	0.35	1.51	0.31
Max Chl Dpth (m)	1.25	Hydr. Depth (m)	0.35	1.22	0.31
Conv. Total (m3/s)	79.9	Conv. (m3/s)	5.6	71.5	2.8
Length Wtd. (m)	67.17	Wetted Per. (m)	5.06	4.33	3.58
Min Ch El (m)	82.14	Shear (N/m2)	38.92	135.76	31.77
Alpha	1.69	Stream Power (N/m s)	13.65	205.33	9.73
Frctn Loss (m)	0.38	Cum Volume (1000 m3)	4.30	9.43	1.28
C & E Loss (m)	0.02	Cum SA (1000 m2)	6.99	5.62	1.92

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 1022

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.63	1.792	85.674	4.215	85.771	5.599	85.772	7.785	85.811
9.859	85.821	11.356	85.801	13.893	85.797	15.91	85.618	19.943	84.776
21.96	84.721	23.977	84.49	25.993	83.955	28.01	83.557	30.027	83.117
31.8	82.703	32.044	82.646	34.06	82.122	36.077	81.703	36.3	81.703
36.392	81.702	36.853	81.675	41.193	81.675	41.885	82.551	42.31	83.021
44.047	83.381	44.392	83.673	48.178	84.267	50.435	84.396	52.449	84.484
54.464	84.606	57.169	84.926	57.888	85.037	58.968	85.177	60.177	85.403
60.507	85.447	62.521	85.536	64.756	85.583	66.161	85.587	68.564	85.644
70.579	85.654	72.593	85.632	73.354	85.672	75.153	85.721	80.651	85.813
84.144	85.764	86.694	85.757	88.708	85.826	90.723	86.061	92.886	86.051

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	34.06	.08	41.885	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
34.06	41.885	76.1	83.3	94.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.91	Reach Len. (m)	76.10	83.30	94.80
Crit W.S. (m)		Flow Area (m2)	1.21	8.88	0.06
E.G. Slope (m/m)	0.003579	Area (m2)	1.21	8.88	0.06
Q Total (m3/s)	7.20	Flow (m3/s)	0.25	6.95	0.01
Top Width (m)	11.30	Top Width (m)	3.15	7.83	0.33
Vel Total (m/s)	0.71	Avg. Vel. (m/s)	0.21	0.78	0.10
Max Chl Dpth (m)	1.24	Hydr. Depth (m)	0.39	1.13	0.18
Conv. Total (m3/s)	120.4	Conv. (m3/s)	4.2	116.1	0.1
Length Wtd. (m)	83.20	Wetted Per. (m)	3.25	8.29	0.49
Min Ch El (m)	81.68	Shear (N/m2)	13.11	37.57	4.24
Alpha	1.18	Stream Power (N/m s)	2.71	29.40	0.41
Frctn Loss (m)	0.35	Cum Volume (1000 m3)	2.23	7.55	0.71
C & E Loss (m)	0.00	Cum SA (1000 m2)	5.04	5.21	1.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	83.07	Reach Len. (m)	76.10	83.30	94.80
Crit W.S. (m)		Flow Area (m2)	1.77	10.12	0.13
E.G. Slope (m/m)	0.003257	Area (m2)	1.77	10.12	0.13
Q Total (m3/s)	8.64	Flow (m3/s)	0.39	8.24	0.01
Top Width (m)	12.31	Top Width (m)	3.83	7.83	0.66
Vel Total (m/s)	0.72	Avg. Vel. (m/s)	0.22	0.81	0.10
Max Chl Dpth (m)	1.39	Hydr. Depth (m)	0.46	1.29	0.19
Conv. Total (m3/s)	151.5	Conv. (m3/s)	6.9	144.4	0.2
Length Wtd. (m)	83.16	Wetted Per. (m)	3.95	8.29	0.87
Min Ch El (m)	81.68	Shear (N/m2)	14.30	38.95	4.62
Alpha	1.22	Stream Power (N/m s)	3.18	31.72	0.48
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	4.18	8.92	1.24
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.68	5.22	1.81

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 938

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	84.72	6	84.49	7.5	84.47	9	84.49	10	84.48
14.4	84.34	19.4	84.11	20.9	84.1	21.2	84.06	21.8	83.935
22.4	83.81	23.4	83.61	24.7	81.1	25.7	81.1	29.1	81.1
30.2	83.54	32.4	83.73	32.8	83.79	34.7	84.18	36.9	84.43
38.7	84.61	39.2	84.67	40.2	84.78	42.3	84.88	46.7	85.05
48.1	85.07	48.4	85.0712	50.6	85.08	56.6	85.18	59.4	85.15
61	85.22	61.6	85.2	62.5	85.21	63.9	85.29	65.5	85.28
66.1	85.3	68.4	85.31	70.6	85.28	73	85.37	75.9	85.43
77.4	85.51	78.9	85.5	81.8	85.57	82.6	85.56		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	24.7	.08	29.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.7	29.1	10.9	10.3	9.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.53	Reach Len. (m)	10.90	10.30	9.40
Crit W.S. (m)		Flow Area (m2)	0.53	6.29	0.46
E.G. Slope (m/m)	0.004902	Area (m2)	0.53	6.29	0.46
Q Total (m3/s)	7.20	Flow (m3/s)	0.12	6.99	0.10
Top Width (m)	5.79	Top Width (m)	0.74	4.40	0.64
Vel Total (m/s)	0.99	Avg. Vel. (m/s)	0.22	1.11	0.21
Max Chl Dpth (m)	1.43	Hydr. Depth (m)	0.72	1.43	0.72
Conv. Total (m3/s)	102.9	Conv. (m3/s)	1.7	99.9	1.4
Length Wtd. (m)	10.30	Wetted Per. (m)	1.61	4.40	1.57
Min Ch El (m)	81.10	Shear (N/m2)	15.81	68.75	14.13
Alpha	1.23	Stream Power (N/m s)	3.52	76.38	2.92
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	2.17	6.91	0.69

C & E Loss (m)	0.00	Cum SA (1000 m2)	4.89	4.71	0.97

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.70	Reach Len. (m)	10.90	10.30	9.40
Crit W.S. (m)		Flow Area (m2)	0.67	7.05	0.58
E.G. Slope (m/m)	0.004788	Area (m2)	0.67	7.05	0.58
Q Total (m3/s)	8.64	Flow (m3/s)	0.16	8.36	0.13
Top Width (m)	5.95	Top Width (m)	0.83	4.40	0.72
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.24	1.18	0.22
Max Chl Dpth (m)	1.60	Hydr. Depth (m)	0.80	1.60	0.80
Conv. Total (m3/s)	124.9	Conv. (m3/s)	2.3	120.8	1.8
Length Wtd. (m)	10.30	Wetted Per. (m)	1.81	4.40	1.76
Min Ch El (m)	81.10	Shear (N/m2)	17.31	75.28	15.47
Alpha	1.25	Stream Power (N/m s)	4.11	89.20	3.40
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	4.09	8.21	1.21
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.50	4.71	1.74

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 928

INPUT

Description:

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.72	6	84.49	7.5	84.47	9	84.49	10	84.48
14.4	84.34	19.4	84.11	20.9	84.1	21.2	84.06	21.8	83.935
22.4	83.81	23.4	83.61	24.7	81.1	25.7	81.1	29.1	81.1
30.2	83.54	32.4	83.73	32.8	83.79	34.7	84.18	36.9	84.43
38.7	84.61	39.2	84.67	40.2	84.78	42.3	84.88	46.7	85.05
48.1	85.07	48.4	85.0712	50.6	85.08	56.6	85.18	59.4	85.15
61	85.22	61.6	85.2	62.5	85.21	63.9	85.29	65.5	85.28
66.1	85.3	68.4	85.31	70.6	85.28	73	85.37	75.9	85.43
77.4	85.51	78.9	85.5	81.8	85.57	82.6	85.56		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	24.7	.08	29.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.7	29.1	23.3	24	24.8	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	23.33	84.07	F
30.68	82.6	84.07	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.54	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.47	Reach Len. (m)	23.30	24.00	24.80
Crit W.S. (m)	81.75	Flow Area (m2)	0.49	6.03	0.42
E.G. Slope (m/m)	0.005677	Area (m2)	0.49	6.03	0.42
Q Total (m3/s)	7.20	Flow (m3/s)	0.11	7.00	0.09
Top Width (m)	5.73	Top Width (m)	0.71	4.40	0.62
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.23	1.16	0.22
Max Chl Dpth (m)	1.37	Hydr. Depth (m)	0.68	1.37	0.68
Conv. Total (m3/s)	95.6	Conv. (m3/s)	1.5	92.9	1.2
Length Wtd. (m)	24.00	Wetted Per. (m)	1.54	4.40	

1.50					
Min Ch El (m)	81.10	Shear (N/m2)	17.53	76.25	15.67
Alpha	1.22	Stream Power (N/m s)	4.08	88.57	3.38
Frctn Loss (m)		Cum Volume (1000 m3)	2.16	6.85	0.68
C & E Loss (m)		Cum SA (1000 m2)	4.88	4.66	0.97

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.64	Reach Len. (m)	23.30	24.00	24.80
Crit W.S. (m)	81.83	Flow Area (m2)	0.62	6.80	0.54
E.G. Slope (m/m)	0.005434	Area (m2)	0.62	6.80	0.54
Q Total (m3/s)	8.64	Flow (m3/s)	0.15	8.37	0.12
Top Width (m)	5.90	Top Width (m)	0.80	4.40	0.70
Vel Total (m/s)	1.09	Avg. Vel. (m/s)	0.25	1.23	0.23
Max Chl Dpth (m)	1.54	Hydr. Depth (m)	0.77	1.54	0.77
Conv. Total (m3/s)	117.3	Conv. (m3/s)	2.1	113.5	1.7
Length Wtd. (m)	24.00	Wetted Per. (m)	1.74	4.40	1.69
Min Ch El (m)	81.10	Shear (N/m2)	18.93	82.32	16.92
Alpha	1.24	Stream Power (N/m s)	4.67	101.37	3.87
Frctn Loss (m)		Cum Volume (1000 m3)	4.08	8.14	1.20
C & E Loss (m)		Cum SA (1000 m2)	6.49	4.66	1.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 916

INPUT
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 19
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	84.07		20	84.07		40	84.07	
60	84.07							

Upstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.72	6	84.49	7.5	84.47	9	84.49	10	84.48
14.4	84.34	19.4	84.11	20.9	84.1	21.2	84.06	21.8	83.935
22.4	83.81	23.4	83.61	24.7	81.1	25.7	81.1	29.1	81.1
30.2	83.54	32.4	83.73	32.8	83.79	34.7	84.18	36.9	84.43
38.7	84.61	39.2	84.67	40.2	84.78	42.3	84.88	46.7	85.05
48.1	85.07	48.4	85.0712	50.6	85.08	56.6	85.18	59.4	85.15
61	85.22	61.6	85.2	62.5	85.21	63.9	85.29	65.5	85.28
66.1	85.3	68.4	85.31	70.6	85.28	73	85.37	75.9	85.43
77.4	85.51	78.9	85.5	81.8	85.57	82.6	85.56		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	24.7	.08	29.1	.15

Bank Sta: Left Right Coeff Contr. Expan.
24.7 29.1 .6 .8
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	23.33	84.07	F
30.68	82.6	84.07	F

Downstream Deck/Roadway Coordinates

```
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   84.07              20   84.07              40   84.07
      60   84.07

Downstream Bridge Cross Section Data
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   84.54     1.6   84.44     2.2   84.39     3.1   84.35     4.8   84.31
       6   84.31     6.7   84.33     7.5   84.31       9    84.2    13.5   84.15
    15.7   84.24      18   84.22    19.4   84.18    22.4   84.18    24.8   84.15
    26.4   84.06    27.883.95862    29.3   83.85    31.5   80.85    32.7   80.85
    34.2   80.85    35.1   80.85      36   83.77    37.2   83.85    38.7   84.01
    40.2    84.1    41.6   84.31    42.8   84.43    44.6    84.5    45.1    84.5
    48.1   84.59    50.5   84.72    51.584.75846    51.8   84.77    53.5   84.79
      55   84.82    56.3    84.8    58.6   84.82    59.4   84.87    60.9      85
    62.4   84.99    63.9   85.01    65.3      85    67.6   85.02    69.8      85
    72.1   85.03    76.6   85.19    81.1   85.28    83.4   85.18    86.1   85.28
    87.9   85.26    90.6   85.27    92.5   85.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    31.5     .08    35.1     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          31.5    35.1             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  29.575   84.07       F
  36.925    92.5   84.07       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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    2.27    3.35
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
```

```
                2      20     .013     .013        0                    .5
      1
Upstream   Elevation =  81.12
           Centerline Station =  27
Downstream Elevation =  80.87
           Centerline Station =  33.25
```

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	7.20	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	1.87
Q Barrel (m3/s)	7.20	Culv Vel DS (m/s)	1.48
E.G. US. (m)	82.54	Culv Inv El Up (m)	81.12
W.S. US. (m)	82.47	Culv Inv El Dn (m)	80.87
E.G. DS (m)	82.41	Culv Frctn Ls (m)	0.01
W.S. DS (m)	82.32	Culv Exit Loss (m)	0.03
Delta EG (m)	0.13	Culv Entr Loss (m)	0.09
Delta WS (m)	0.15	Q Weir (m3/s)	
E.G. IC (m)	82.43	Weir Sta Lft (m)	
E.G. OC (m)	82.54	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	82.27	Weir Max Depth (m)	
Culv WS Outlet (m)	82.32	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.48	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.78	Min El Weir Flow (m)	84.07

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	1.98
Q Barrel (m3/s)	8.64	Culv Vel DS (m/s)	1.61
E.G. US. (m)	82.72	Culv Inv El Up (m)	81.12
W.S. US. (m)	82.64	Culv Inv El Dn (m)	80.87
E.G. DS (m)	82.57	Culv Frctn Ls (m)	0.02
W.S. DS (m)	82.47	Culv Exit Loss (m)	0.04
Delta EG (m)	0.15	Culv Entr Loss (m)	0.10
Delta WS (m)	0.17	Q Weir (m3/s)	
E.G. IC (m)	82.60	Weir Sta Lft (m)	
E.G. OC (m)	82.72	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	82.42	Weir Max Depth (m)	
Culv WS Outlet (m)	82.47	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.54	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.88	Min El Weir Flow (m)	84.07

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 904

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.54	1.6	84.44	2.2	84.39	3.1	84.35	4.8	84.31
6	84.31	6.7	84.33	7.5	84.31	9	84.2	13.5	84.15
15.7	84.24	18	84.22	19.4	84.18	22.4	84.18	24.8	84.15
26.4	84.06	27.883	.95862	29.3	83.85	31.5	80.85	32.7	80.85
34.2	80.85	35.1	80.85	36	83.77	37.2	83.85	38.7	84.01
40.2	84.1	41.6	84.31	42.8	84.43	44.6	84.5	45.1	84.5
48.1	84.59	50.5	84.72	51.584	.75846	51.8	84.77	53.5	84.79
55	84.82	56.3	84.8	58.6	84.82	59.4	84.87	60.9	85
62.4	84.99	63.9	85.01	65.3	85	67.6	85.02	69.8	85
72.1	85.03	76.6	85.19	81.1	85.28	83.4	85.18	86.1	85.28
87.9	85.26	90.6	85.27	92.5	85.26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	31.5	.08	35.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.5	35.1	12	11	9.6	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	29.575	84.07	F
36.925	92.5	84.07	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.41	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.32	Reach Len. (m)	12.00	11.00	9.60
Crit W.S. (m)	81.58	Flow Area (m2)	0.80	5.31	0.33
E.G. Slope (m/m)	0.006439	Area (m2)	0.80	5.31	0.33
Q Total (m3/s)	7.20	Flow (m3/s)	0.24	6.89	0.06
Top Width (m)	5.14	Top Width (m)	1.08	3.60	

0.45					
Vel Total (m/s)	1.12	Avg. Vel. (m/s)	0.31	1.30	
0.19					
Max Chl Dpth (m)	1.47	Hydr. Depth (m)	0.74	1.47	
0.74					
Conv. Total (m3/s)	89.8	Conv. (m3/s)	3.1	85.9	
0.8					
Length Wtd. (m)	11.02	Wetted Per. (m)	1.83	3.60	
1.54					
Min Ch El (m)	80.85	Shear (N/m2)	27.52	93.08	
13.71					
Alpha	1.29	Stream Power (N/m s)	8.46	120.93	
2.65					
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	2.16	6.74	
0.68					
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.86	4.56	
0.95					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.57	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	82.47	Reach Len. (m)	12.00	11.00	
9.60					
Crit W.S. (m)	81.68	Flow Area (m2)	0.97	5.85	
0.41					
E.G. Slope (m/m)	0.006645	Area (m2)	0.97	5.85	
0.41					
Q Total (m3/s)	8.64	Flow (m3/s)	0.32	8.24	
0.09					
Top Width (m)	5.29	Top Width (m)	1.19	3.60	
0.50					
Vel Total (m/s)	1.20	Avg. Vel. (m/s)	0.33	1.41	
0.21					
Max Chl Dpth (m)	1.62	Hydr. Depth (m)	0.81	1.62	
0.81					
Conv. Total (m3/s)	106.1	Conv. (m3/s)	4.0	101.0	
1.0					
Length Wtd. (m)	11.02	Wetted Per. (m)	2.01	3.60	
1.70					
Min Ch El (m)	80.85	Shear (N/m2)	31.30	105.87	
15.59					
Alpha	1.32	Stream Power (N/m s)	10.43	149.09	

3.27					
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	4.08	8.02	
1.20					
C & E Loss (m)	0.01	Cum SA (1000 m2)	6.47	4.57	
1.72					

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 893

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.54	1.6	84.44	2.2	84.39	3.1	84.35	4.8	84.31
6	84.31	6.7	84.33	7.5	84.31	9	84.2	13.5	84.15
15.7	84.24	18	84.22	19.4	84.18	22.4	84.18	24.8	84.15
26.4	84.06	27.883.95862		29.3	83.85	31.5	80.85	32.7	80.85
34.2	80.85	35.1	80.85	36	83.77	37.2	83.85	38.7	84.01
40.2	84.1	41.6	84.31	42.8	84.43	44.6	84.5	45.1	84.5
48.1	84.59	50.5	84.72	51.584.75846		51.8	84.77	53.5	84.79
55	84.82	56.3	84.8	58.6	84.82	59.4	84.87	60.9	85
62.4	84.99	63.9	85.01	65.3	85	67.6	85.02	69.8	85
72.1	85.03	76.6	85.19	81.1	85.28	83.4	85.18	86.1	85.28
87.9	85.26	90.6	85.27	92.5	85.26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	31.5	.08	35.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.5	35.1	63.2	62.5	61.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.32	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	82.22	Reach Len. (m)	63.20	62.50	
61.70					
Crit W.S. (m)		Flow Area (m2)	0.69	4.94	
0.29					

E.G. Slope (m/m)	0.008215	Area (m2)	0.69	4.94	0.29
Q Total (m3/s)	7.20	Flow (m3/s)	0.23	6.91	0.06
Top Width (m)	5.03	Top Width (m)	1.01	3.60	0.42
Vel Total (m/s)	1.22	Avg. Vel. (m/s)	0.33	1.40	0.21
Max Chl Dpth (m)	1.37	Hydr. Depth (m)	0.69	1.37	0.69
Conv. Total (m3/s)	79.5	Conv. (m3/s)	2.5	76.3	0.7
Length Wtd. (m)	62.52	Wetted Per. (m)	1.70	3.60	1.44
Min Ch El (m)	80.85	Shear (N/m2)	32.70	110.58	16.29
Alpha	1.27	Stream Power (N/m s)	10.83	154.74	3.39
Frctn Loss (m)	0.41	Cum Volume (1000 m3)	2.15	6.69	0.68
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.85	4.52	0.95

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.48	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.37	Reach Len. (m)	63.20	62.50	61.70
Crit W.S. (m)		Flow Area (m2)	0.85	5.47	0.36
E.G. Slope (m/m)	0.008368	Area (m2)	0.85	5.47	0.36
Q Total (m3/s)	8.64	Flow (m3/s)	0.30	8.26	0.08
Top Width (m)	5.18	Top Width (m)	1.11	3.60	0.47
Vel Total (m/s)	1.30	Avg. Vel. (m/s)	0.36	1.51	0.22

Max Chl Dpth (m)	1.52	Hydr. Depth (m)	0.76	1.52	0.76
Conv. Total (m3/s)	94.5	Conv. (m3/s)	3.3	90.3	0.9
Length Wtd. (m)	62.53	Wetted Per. (m)	1.88	3.60	1.59
Min Ch El (m)	80.85	Shear (N/m2)	36.85	124.65	18.36
Alpha	1.30	Stream Power (N/m s)	13.18	188.34	4.13
Frctn Loss (m)	0.38	Cum Volume (1000 m3)	4.07	7.95	1.20
C & E Loss (m)	0.02	Cum SA (1000 m2)	6.45	4.53	1.71

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 831

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.524	1.47	84.534	2.484	84.568	2.992	84.563	4.513	84.521
9.077	84.347	11.199	84.304	12.12	84.249	13.378	84.204	15.556	83.998
18.206	83.941	19.914	83.849	22.77	83.423	24.271	83.136	25.813	82.767
26.45	82.599	27.334	82.406	28.628	82.153	29.382	82.059	31.898	81.695
32.986	81.557	34.3	81.427	34.425	81.415	35.112	81.196	35.785	80.55
39.4	80.55	40.284	80.55	40.692	81.004	41.781	82.861	48.267	84.111
48.618	84.144	50.429	84.231	52.591	84.37	60.88	84.932	63.401	85.119
63.945	85.137	65.563	85.107	70.538	84.823	72.049	84.753	74.674	84.696
78.535	84.647	80.697	84.436	81.069	84.423	82.859	84.393	85.021	84.402
87.183	84.475	93.669	84.511	94.072	84.492				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	35.112	.08	40.692	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.112	40.692	74.1	73.4	74	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	81.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.85	Reach Len. (m)	74.10	73.40	74.00
Crit W.S. (m)		Flow Area (m2)	1.22	6.93	0.21
E.G. Slope (m/m)	0.005297	Area (m2)	1.22	6.93	0.21
Q Total (m3/s)	7.20	Flow (m3/s)	0.25	6.91	0.04
Top Width (m)	10.35	Top Width (m)	4.27	5.58	0.50
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.21	1.00	0.17
Max Chl Dpth (m)	1.30	Hydr. Depth (m)	0.28	1.24	0.42
Conv. Total (m3/s)	99.0	Conv. (m3/s)	3.5	95.0	0.5
Length Wtd. (m)	73.43	Wetted Per. (m)	4.33	6.04	0.98
Min Ch El (m)	80.55	Shear (N/m2)	14.59	59.61	11.09
Alpha	1.29	Stream Power (N/m s)	3.04	59.44	1.92
Frctn Loss (m)	0.26	Cum Volume (1000 m3)	2.09	6.31	0.67
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.68	4.24	0.92

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150

W.S. Elev (m)	82.04	Reach Len. (m)	74.10	73.40	74.00
Crit W.S. (m)		Flow Area (m2)	2.15	7.99	0.31
E.G. Slope (m/m)	0.004509	Area (m2)	2.15	7.99	0.31
Q Total (m3/s)	8.64	Flow (m3/s)	0.51	8.08	0.06
Top Width (m)	11.77	Top Width (m)	5.58	5.58	0.61
Vel Total (m/s)	0.83	Avg. Vel. (m/s)	0.23	1.01	0.18
Max Chl Dpth (m)	1.49	Hydr. Depth (m)	0.39	1.43	0.52
Conv. Total (m3/s)	128.7	Conv. (m3/s)	7.5	120.4	0.9
Length Wtd. (m)	73.44	Wetted Per. (m)	5.66	6.04	1.20
Min Ch El (m)	80.55	Shear (N/m2)	16.81	58.48	11.56
Alpha	1.40	Stream Power (N/m s)	3.95	59.15	2.12
Frctn Loss (m)	0.22	Cum Volume (1000 m3)	3.97	7.53	1.18
C & E Loss (m)	0.01	Cum SA (1000 m2)	6.24	4.24	1.68

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 757

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.28	6.8	84.3	8.9	84.27	11.1	84.28	13.3	84.21
15.4	84.23	17.6	84	19.1	84.03	20.6	83.99	24.1	83.99
30.6	83.74	33.283.41676		34.3	83.28	35	83.22	35.8	83.11
37.1	80.25	38.9	80.25	39.3	80.25	40.4	80.25	41.5	80.25
43.7	80.25	48	83.02	50.2	83.2	52.3	83.33	54.2	83.34

57.2	83.33	58.38	3.35538	58.5	83.36	58.9	83.37	61	83.57
61.8	83.63	63.2	83.7	67.9	83.85	69.7	83.78	71.9	84
72.5	83.99	74	84.03	80.6	84.24	82.7	84.29	84.2	84.39
87.1	84.62	89.2	84.73	90.7	84.82				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	37.1	.08	43.7	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
37.1	43.7	11.1	11.8	12.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	81.63	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.61	Reach Len. (m)	11.10	11.80	12.60
Crit W.S. (m)		Flow Area (m2)	0.42	8.95	1.43
E.G. Slope (m/m)	0.002472	Area (m2)	0.42	8.95	1.43
Q Total (m3/s)	7.20	Flow (m3/s)	0.06	6.82	0.33
Top Width (m)	9.32	Top Width (m)	0.62	6.60	2.11
Vel Total (m/s)	0.67	Avg. Vel. (m/s)	0.14	0.76	0.23
Max Chl Dpth (m)	1.36	Hydr. Depth (m)	0.68	1.36	0.68
Conv. Total (m3/s)	144.9	Conv. (m3/s)	1.2	137.1	6.5
Length Wtd. (m)	11.82	Wetted Per. (m)	1.49	6.60	2.50
Min Ch El (m)	80.25	Shear (N/m2)	6.80	32.89	13.82
Alpha	1.24	Stream Power (N/m s)	0.97	25.05	3.15
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	2.03	5.73	0.60
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.50	3.79	0.82

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.84	Reach Len. (m)	11.10	11.80	12.60
Crit W.S. (m)		Flow Area (m2)	0.57	10.46	1.95
E.G. Slope (m/m)	0.002081	Area (m2)	0.57	10.46	1.95
Q Total (m3/s)	8.64	Flow (m3/s)	0.08	8.11	0.45
Top Width (m)	9.78	Top Width (m)	0.72	6.60	2.46
Vel Total (m/s)	0.67	Avg. Vel. (m/s)	0.14	0.78	0.23
Max Chl Dpth (m)	1.59	Hydr. Depth (m)	0.79	1.59	0.79
Conv. Total (m3/s)	189.5	Conv. (m3/s)	1.8	177.8	9.9
Length Wtd. (m)	11.82	Wetted Per. (m)	1.74	6.60	2.93
Min Ch El (m)	80.25	Shear (N/m2)	6.69	32.34	13.59
Alpha	1.28	Stream Power (N/m s)	0.97	25.07	3.15
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	3.87	6.86	1.10
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.01	3.79	1.57

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 745

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.28	6.8	84.3	8.9	84.27	11.1	84.28	13.3	84.21
15.4	84.23	17.6	84	19.1	84.03	20.6	83.99	24.1	83.99

30.6	83.74	33.283.41676		34.3	83.28	35	83.22	35.8	83.11
37.1	80.25	38.9	80.25	39.3	80.25	40.4	80.25	41.5	80.25
43.7	80.25	48	83.02	50.2	83.2	52.3	83.33	54.2	83.34
57.2	83.33	58.383.35538		58.5	83.36	58.9	83.37	61	83.57
61.8	83.63	63.2	83.7	67.9	83.85	69.7	83.78	71.9	84
72.5	83.99	74	84.03	80.6	84.24	82.7	84.29	84.2	84.39
87.1	84.62	89.2	84.73	90.7	84.82				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	37.1	.08	43.7	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
37.1	43.7	29.7	31.1	31.9	.6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	37.1	83.2	F
43.7	90.7	83.2	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	81.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.080	
W.S. Elev (m)	81.57	Reach Len. (m)	29.70	31.10	31.90
Crit W.S. (m)	80.75	Flow Area (m2)		8.69	
E.G. Slope (m/m)	0.003049	Area (m2)	0.39	8.69	1.35
Q Total (m3/s)	7.20	Flow (m3/s)		7.20	
Top Width (m)	9.24	Top Width (m)	0.60	6.60	2.04
Vel Total (m/s)	0.83	Avg. Vel. (m/s)		0.83	
Max Chl Dpth (m)	1.32	Hydr. Depth (m)		1.32	
Conv. Total (m3/s)	130.5	Conv. (m3/s)		130.5	
Length Wtd. (m)	31.10	Wetted Per. (m)		6.60	
Min Ch El (m)	80.25	Shear (N/m2)		39.36	
Alpha	1.00	Stream Power (N/m s)		32.63	

Frctn Loss (m)		Cum Volume (1000 m3)	2.03	5.63	0.59
C & E Loss (m)		Cum SA (1000 m2)	4.49	3.71	0.80

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.84	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.080	
W.S. Elev (m)	81.80	Reach Len. (m)	29.70	31.10	31.90
Crit W.S. (m)	80.81	Flow Area (m2)		10.23	
E.G. Slope (m/m)	0.002549	Area (m2)	0.55	10.23	1.86
Q Total (m3/s)	8.64	Flow (m3/s)		8.64	
Top Width (m)	9.71	Top Width (m)	0.70	6.60	2.41
Vel Total (m/s)	0.85	Avg. Vel. (m/s)		0.85	
Max Chl Dpth (m)	1.55	Hydr. Depth (m)		1.55	
Conv. Total (m3/s)	171.2	Conv. (m3/s)		171.2	
Length Wtd. (m)	31.10	Wetted Per. (m)		6.60	
Min Ch El (m)	80.25	Shear (N/m2)		38.74	
Alpha	1.00	Stream Power (N/m s)		32.74	
Frctn Loss (m)		Cum Volume (1000 m3)	3.87	6.73	1.07
C & E Loss (m)		Cum SA (1000 m2)	6.00	3.72	1.54

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 722

INPUT
Description:
Distance from Upstream XS = 3.5
Deck/Roadway Width = 20
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	83.2	20	83.2	40	83.2
60	83.2	80	83.2		

Upstream Bridge Cross Section Data
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.28	6.8	84.3	8.9	84.27	11.1	84.28	13.3	84.21
15.4	84.23	17.6	84	19.1	84.03	20.6	83.99	24.1	83.99
30.6	83.74	33.283.41676		34.3	83.28	35	83.22	35.8	83.11
37.1	80.25	38.9	80.25	39.3	80.25	40.4	80.25	41.5	80.25
43.7	80.25	48	83.02	50.2	83.2	52.3	83.33	54.2	83.34
57.2	83.33	58.383.35538		58.5	83.36	58.9	83.37	61	83.57
61.8	83.63	63.2	83.7	67.9	83.85	69.7	83.78	71.9	84
72.5	83.99	74	84.03	80.6	84.24	82.7	84.29	84.2	84.39
87.1	84.62	89.2	84.73	90.7	84.82				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	37.1	.08	43.7	.15

Bank Sta: Left Right Coeff Contr. Expan.
37.1 43.7 .6 .8
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	37.1	83.2	F
43.7	90.7	83.2	F

Downstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	83.2	20	83.2	40	83.2
60	83.2	80	83.2		

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   84.11      .7   84.07     3.8   84.03     6.1   83.86     8.3   83.76
     9.6   83.76    12.6   83.83    14.1   83.82    17.3   83.74      20   83.62
    21.8   83.56      23   83.55    25.3   83.46    26.3   83.46    27.783.37385
    28.9    83.3    30.8   83.09      33   82.82    35.3    79.9    37.5    79.9
    39.7    79.9    40.8    79.9      43   83.01    44.2   83.13    46.5   83.17
    49.8   83.15      51   83.13    52.7   82.99    53.2   82.96    55.7   82.98
    56.7  83.045    57.7   83.11    59.9   83.29    62.2   83.58    64.4    83.8
    66.1   84.01    67.6   84.18    68.9    84.3    72.1   84.33    75.6   84.45
    78.3   84.51    80.1    84.5      81   84.51    82.5   84.59    84.6   84.61
    86.9   84.57    88.6   84.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    35.3     .08    40.8     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.3    40.8             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   30.11    83.2       F
    45.9    88.6    83.2       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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       2    3.33
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               3.5      21     .013     .013        0                   .5
       1
Upstream   Elevation =  80.29
           Centerline Station =  40.5
Downstream Elevation =  79.95
           Centerline Station =  38
```

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	7.20	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.77
Q Barrel (m3/s)	7.20	Culv Vel DS (m/s)	1.82
E.G. US. (m)	81.60	Culv Inv El Up (m)	80.29
W.S. US. (m)	81.57	Culv Inv El Dn (m)	79.95
E.G. DS (m)	81.19	Culv Frctn Ls (m)	0.15
W.S. DS (m)	81.14	Culv Exit Loss (m)	0.12
Delta EG (m)	0.41	Culv Entr Loss (m)	0.14
Delta WS (m)	0.43	Q Weir (m3/s)	
E.G. IC (m)	81.60	Weir Sta Lft (m)	
E.G. OC (m)	81.66	Weir Sta Rgt (m)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (m)	81.07	Weir Max Depth (m)	
Culv WS Outlet (m)	81.14	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.44	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.78	Min El Weir Flow (m)	83.20

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.22
Q Barrel (m3/s)	8.64	Culv Vel DS (m/s)	1.61
E.G. US. (m)	81.84	Culv Inv El Up (m)	80.29
W.S. US. (m)	81.80	Culv Inv El Dn (m)	79.95
E.G. DS (m)	81.60	Culv Frctn Ls (m)	0.02
W.S. DS (m)	81.56	Culv Exit Loss (m)	0.09
Delta EG (m)	0.24	Culv Entr Loss (m)	0.13
Delta WS (m)	0.24	Q Weir (m3/s)	
E.G. IC (m)	81.78	Weir Sta Lft (m)	
E.G. OC (m)	81.84	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	81.46	Weir Max Depth (m)	
Culv WS Outlet (m)	81.56	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.50	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.88	Min El Weir Flow (m)	83.20

CROSS SECTION

RIVER: Beamer Creek

REACH: Reach 5 RS: 714

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.11	.7	84.07	3.8	84.03	6.1	83.86	8.3	83.76
9.6	83.76	12.6	83.83	14.1	83.82	17.3	83.74	20	83.62
21.8	83.56	23	83.55	25.3	83.46	26.3	83.46	27.783	.37385
28.9	83.3	30.8	83.09	33	82.82	35.3	79.9	37.5	79.9
39.7	79.9	40.8	79.9	43	83.01	44.2	83.13	46.5	83.17
49.8	83.15	51	83.13	52.7	82.99	53.2	82.96	55.7	82.98
56.7	83.045	57.7	83.11	59.9	83.29	62.2	83.58	64.4	83.8
66.1	84.01	67.6	84.18	68.9	84.3	72.1	84.33	75.6	84.45
78.3	84.51	80.1	84.5	81	84.51	82.5	84.59	84.6	84.61
86.9	84.57	88.6	84.58						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	35.3	.08	40.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.3	40.8	16.9	15.5	14.6	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	30.11	83.2	F
45.9	88.6	83.2	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	81.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.14	Reach Len. (m)	16.90	15.50	14.60
Crit W.S. (m)	80.46	Flow Area (m2)	0.61	6.82	0.54
E.G. Slope (m/m)	0.004957	Area (m2)	0.61	6.82	0.54
Q Total (m3/s)	7.20	Flow (m3/s)	0.15	6.93	0.13
Top Width (m)	7.35	Top Width (m)	0.98	5.50	0.88
Vel Total (m/s)	0.90	Avg. Vel. (m/s)	0.25	1.02	0.24
Max Chl Dpth (m)	1.24	Hydr. Depth (m)	0.62	1.24	

0.62					
Conv. Total (m3/s)	102.3	Conv. (m3/s)	2.1	98.4	1.8
Length Wtd. (m)	15.51	Wetted Per. (m)	1.58	5.50	1.52
Min Ch El (m)	79.90	Shear (N/m2)	18.65	60.26	17.40
Alpha	1.22	Stream Power (N/m s)	4.62	61.21	4.12
Frctn Loss (m)	0.09	Cum Volume (1000 m3)	2.03	5.53	0.59
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.47	3.52	0.75

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.56	Reach Len. (m)	16.90	15.50	14.60
Crit W.S. (m)	80.53	Flow Area (m2)	1.09	9.13	0.97
E.G. Slope (m/m)	0.002629	Area (m2)	1.09	9.13	0.97
Q Total (m3/s)	8.64	Flow (m3/s)	0.24	8.20	0.20
Top Width (m)	7.98	Top Width (m)	1.31	5.50	1.17
Vel Total (m/s)	0.77	Avg. Vel. (m/s)	0.22	0.90	0.21
Max Chl Dpth (m)	1.66	Hydr. Depth (m)	0.83	1.66	0.83
Conv. Total (m3/s)	168.6	Conv. (m3/s)	4.6	160.0	4.0
Length Wtd. (m)	15.52	Wetted Per. (m)	2.11	5.50	2.03
Min Ch El (m)	79.90	Shear (N/m2)	13.24	42.79	12.36
Alpha	1.29	Stream Power (N/m s)	2.90	38.45	2.59
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	3.87	6.58	1.07
C & E Loss (m)	0.00	Cum SA (1000 m2)	5.97	3.53	

1.48

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 699

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.11	.7	84.07	3.8	84.03	6.1	83.86	8.3	83.76
9.6	83.76	12.6	83.83	14.1	83.82	17.3	83.74	20	83.62
21.8	83.56	23	83.55	25.3	83.46	26.3	83.46	27.783.37385	
28.9	83.3	30.8	83.09	33	82.82	35.3	79.9	37.5	79.9
39.7	79.9	40.8	79.9	43	83.01	44.2	83.13	46.5	83.17
49.8	83.15	51	83.13	52.7	82.99	53.2	82.96	55.7	82.98
56.7	83.045	57.7	83.11	59.9	83.29	62.2	83.58	64.4	83.8
66.1	84.01	67.6	84.18	68.9	84.3	72.1	84.33	75.6	84.45
78.3	84.51	80.1	84.5	81	84.51	82.5	84.59	84.6	84.61
86.9	84.57	88.6	84.58						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	35.3	.08	40.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.3	40.8	89.9	90.1	73.9	.1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	81.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.03	Reach Len. (m)	89.90	90.10	73.90
Crit W.S. (m)		Flow Area (m2)	0.51	6.24	0.45
E.G. Slope (m/m)	0.006717	Area (m2)	0.51	6.24	0.45
Q Total (m3/s)	7.20	Flow (m3/s)	0.14	6.95	0.12
Top Width (m)	7.20	Top Width (m)	0.89	5.50	

0.80					
Vel Total (m/s)	1.00	Avg. Vel. (m/s)	0.27	1.11	
0.26					
Max Chl Dpth (m)	1.13	Hydr. Depth (m)	0.57	1.13	
0.57					
Conv. Total (m3/s)	87.9	Conv. (m3/s)	1.7	84.8	
1.4					
Length Wtd. (m)	88.98	Wetted Per. (m)	1.44	5.50	
1.39					
Min Ch El (m)	79.90	Shear (N/m2)	23.11	74.70	
21.57					
Alpha	1.20	Stream Power (N/m s)	6.28	83.22	
5.60					
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	2.02	5.43	
0.58					
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.45	3.44	
0.74					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.55	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	81.51	Reach Len. (m)	89.90	90.10	
73.90					
Crit W.S. (m)		Flow Area (m2)	1.02	8.87	
0.92					
E.G. Slope (m/m)	0.002900	Area (m2)	1.02	8.87	
0.92					
Q Total (m3/s)	8.64	Flow (m3/s)	0.23	8.21	
0.20					
Top Width (m)	7.91	Top Width (m)	1.27	5.50	
1.14					
Vel Total (m/s)	0.80	Avg. Vel. (m/s)	0.23	0.93	
0.22					
Max Chl Dpth (m)	1.61	Hydr. Depth (m)	0.81	1.61	
0.81					

Conv. Total (m3/s)	160.5	Conv. (m3/s)	4.3	152.5	3.7
Length Wtd. (m)	88.99	Wetted Per. (m)	2.05	5.50	1.98
Min Ch El (m)	79.90	Shear (N/m2)	14.19	45.88	13.25
Alpha	1.28	Stream Power (N/m s)	3.21	42.48	2.86
Frctn Loss (m)	0.10	Cum Volume (1000 m3)	3.85	6.44	1.06
C & E Loss (m)	0.01	Cum SA (1000 m2)	5.95	3.44	1.46

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 581

INPUT
Description: CR-21
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.975.000022	83.559.999969	83.3315.00001	82.5420.00004	81.95				
24.99998	81.1530.00003	80.6234.99995	80.3740.0000280.1524541.2111680.07269						
42.8612379.6585544.7927279.04185 45.491578.7890646.0629178.8683546.6972878.73007									
46.8212778.5625247.7256778.6756748.2185979.0188449.2266479.0755850.67004 80.7281									
53.8951281.1648258.8052182.2804963.80519	82.4868.80526	82.7673.80521	82.88						
78.80518	83.3383.80525	83.4288.80523	83.43 93.8052	83.598.80525	83.52				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1546.06291	.0848.21859	.15		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
46.0629148.21859		90.6	86.6	83.7	.1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	80.77	Element	Left OB	Channel	Right OB

Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.74	Reach Len. (m)	90.60	86.60	83.70
Crit W.S. (m)		Flow Area (m2)	11.01	4.35	2.93
E.G. Slope (m/m)	0.002203	Area (m2)	11.01	4.35	2.93
Q Total (m3/s)	7.20	Flow (m3/s)	2.53	3.83	0.84
Top Width (m)	21.96	Top Width (m)	17.23	2.16	2.57
Vel Total (m/s)	0.39	Avg. Vel. (m/s)	0.23	0.88	0.29
Max Chl Dpth (m)	2.18	Hydr. Depth (m)	0.64	2.02	1.14
Conv. Total (m3/s)	153.5	Conv. (m3/s)	54.0	81.5	17.9
Length Wtd. (m)	87.15	Wetted Per. (m)	17.45	2.37	3.32
Min Ch El (m)	78.56	Shear (N/m2)	13.63	39.66	19.03
Alpha	2.83	Stream Power (N/m s)	3.14	34.89	5.47
Frctn Loss (m)	0.09	Cum Volume (1000 m3)	1.50	4.95	0.46
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.64	3.09	0.61

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.43	Reach Len. (m)	90.60	86.60	83.70
Crit W.S. (m)		Flow Area (m2)	25.01	5.84	6.35
E.G. Slope (m/m)	0.000624	Area (m2)	25.01	5.84	6.35

Q Total (m3/s)	8.64	Flow (m3/s)	4.39	3.32	0.93
Top Width (m)	31.85	Top Width (m)	22.84	2.16	6.86
Vel Total (m/s)	0.23	Avg. Vel. (m/s)	0.18	0.57	0.15
Max Chl Dpth (m)	2.87	Hydr. Depth (m)	1.10	2.71	0.93
Conv. Total (m3/s)	346.2	Conv. (m3/s)	175.8	133.1	37.3
Length Wtd. (m)	87.48	Wetted Per. (m)	23.10	2.37	7.67
Min Ch El (m)	78.56	Shear (N/m2)	6.62	15.06	5.06
Alpha	2.64	Stream Power (N/m s)	1.16	8.58	0.74
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	2.68	5.77	0.79
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.87	3.10	1.17

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 522

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.17	1.9	83.13	5.9	83.42	7.9	83.43	9.9	83.28
14	82.88	15.9	82.79	20	82.68	22	82.58	24	82.44
25.782.26151		26	82.23	28	82.08	30	81.85	30.8	81.65
31.3	81.54	32	81.35	34	78	36	78	38.2	78
40.3	81.42	44	81.62	45.6	81.8	48.7	82.19	52.1	82.64
53.2	82.706	54.1	82.76	56.1	83.04	58.7	83.2	59.6	83.29
60.5	83.36	62.4	83.46	64.2	83.54	66.1	83.68	68.3	83.71
71.7	83.71	72.7	83.69	73.5	83.71	76.1	83.62	78.1	83.48
78.7	83.49								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	34	.08	38.2	.15

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

34 38.2 9 8.4 7.3 .1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	80.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.66	Reach Len. (m)	9.00	8.40	7.30
Crit W.S. (m)		Flow Area (m2)	2.11	11.15	2.17
E.G. Slope (m/m)	0.000619	Area (m2)	2.11	11.15	2.17
Q Total (m3/s)	7.20	Flow (m3/s)	0.27	6.65	0.28
Top Width (m)	7.42	Top Width (m)	1.59	4.20	1.63
Vel Total (m/s)	0.47	Avg. Vel. (m/s)	0.13	0.60	0.13
Max Chl Dpth (m)	2.66	Hydr. Depth (m)	1.33	2.66	1.33
Conv. Total (m3/s)	289.5	Conv. (m3/s)	10.9	267.4	11.3
Length Wtd. (m)	8.38	Wetted Per. (m)	3.09	4.20	3.12
Min Ch El (m)	78.00	Shear (N/m2)	4.13	16.12	4.22
Alpha	1.51	Stream Power (N/m s)	0.53	9.61	0.55
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.91	4.28	0.24
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.79	2.82	0.44

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.38	Reach Len. (m)	9.00	8.40	7.30
Crit W.S. (m)		Flow Area (m2)	3.42	14.21	

3.52					
E.G. Slope (m/m)	0.000382	Area (m2)	3.42	14.21	
3.52					
Q Total (m3/s)	8.64	Flow (m3/s)	0.40	7.82	
0.42					
Top Width (m)	8.40	Top Width (m)	2.13	4.20	
2.08					
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.12	0.55	
0.12					
Max Chl Dpth (m)	3.38	Hydr. Depth (m)	1.61	3.38	
1.69					
Conv. Total (m3/s)	442.5	Conv. (m3/s)	20.4	400.4	
21.6					
Length Wtd. (m)	8.37	Wetted Per. (m)	4.03	4.20	
3.97					
Min Ch El (m)	78.00	Shear (N/m2)	3.18	12.67	
3.31					
Alpha	1.65	Stream Power (N/m s)	0.37	6.97	
0.40					
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	1.39	4.91	
0.38					
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.73	2.82	
0.79					

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 514

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.17	1.9	83.13	5.9	83.42	7.9	83.43	9.9	83.28
14	82.88	15.9	82.79	20	82.68	22	82.58	24	82.44
25.782.26151		26	82.23	28	82.08	30	81.85	30.8	81.65
31.3	81.54	32	81.35	34	78	36	78	38.2	78
40.3	81.42	44	81.62	45.6	81.8	48.7	82.19	52.1	82.64
53.2	82.706	54.1	82.76	56.1	83.04	58.7	83.2	59.6	83.29
60.5	83.36	62.4	83.46	64.2	83.54	66.1	83.68	68.3	83.71
71.7	83.71	72.7	83.69	73.5	83.71	76.1	83.62	78.1	83.48
78.7	83.49								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .15      34     .08    38.2     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            34    38.2                27      27      27             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    31.7   82.55       F
    40.7    78.7   82.55       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            80.67    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.02    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            80.65    Reach Len. (m)          27.00      27.00
27.00
  Crit W.S. (m)            78.66    Flow Area (m2)           2.10      11.13
2.16
  E.G. Slope (m/m)      0.000623    Area (m2)                2.10      11.13
2.16
  Q Total (m3/s)            7.20    Flow (m3/s)              0.27       6.65
0.28
  Top Width (m)             7.41    Top Width (m)            1.58       4.20
1.63
  Vel Total (m/s)           0.47    Avg. Vel. (m/s)          0.13       0.60
0.13
  Max Chl Dpth (m)          2.65    Hydr. Depth (m)          1.33       2.65
1.33
  Conv. Total (m3/s)       288.5    Conv. (m3/s)             10.8      266.5
11.3
  Length Wtd. (m)          27.00    Wetted Per. (m)          3.09       4.20
3.11
  Min Ch El (m)            78.00    Shear (N/m2)             4.15      16.20
4.24
  Alpha                     1.51    Stream Power (N/m s)     0.53       9.68
0.55
  Frctn Loss (m)                    Cum Volume (1000 m3)     0.89       4.18
0.23
  C & E Loss (m)                    Cum SA (1000 m2)         2.77       2.78
0.43



Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	81.38	Reach Len. (m)	27.00	27.00	27.00
Crit W.S. (m)	78.75	Flow Area (m2)	3.41	14.20	3.51
E.G. Slope (m/m)	0.000383	Area (m2)	3.41	14.20	3.51
Q Total (m3/s)	8.64	Flow (m3/s)	0.40	7.82	0.42
Top Width (m)	8.39	Top Width (m)	2.11	4.20	2.08
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.12	0.55	0.12
Max Chl Dpth (m)	3.38	Hydr. Depth (m)	1.61	3.38	1.69
Conv. Total (m3/s)	441.8	Conv. (m3/s)	20.4	399.8	21.6
Length Wtd. (m)	27.00	Wetted Per. (m)	4.02	4.20	3.97
Min Ch El (m)	78.00	Shear (N/m2)	3.19	12.70	3.32
Alpha	1.65	Stream Power (N/m s)	0.37	7.00	0.40
Frctn Loss (m)		Cum Volume (1000 m3)	1.36	4.79	0.35
C & E Loss (m)		Cum SA (1000 m2)	3.72	2.79	0.78

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 507

INPUT
Description:
Distance from Upstream XS = 2

Deck/Roadway Width = 15
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	82.55	40	82.55	60	82.55

Upstream Bridge Cross Section Data
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.17	1.9	83.13	5.9	83.42	7.9	83.43	9.9	83.28
14	82.88	15.9	82.79	20	82.68	22	82.58	24	82.44
25.782.26151		26	82.23	28	82.08	30	81.85	30.8	81.65
31.3	81.54	32	81.35	34	78	36	78	38.2	78
40.3	81.42	44	81.62	45.6	81.8	48.7	82.19	52.1	82.64
53.2	82.706	54.1	82.76	56.1	83.04	58.7	83.2	59.6	83.29
60.5	83.36	62.4	83.46	64.2	83.54	66.1	83.68	68.3	83.71
71.7	83.71	72.7	83.69	73.5	83.71	76.1	83.62	78.1	83.48
78.7	83.49								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	34	.08	38.2	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
34	38.2	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	31.7	82.55	F
40.7	78.7	82.55	F

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	82.55	40	82.55	60	82.55

Downstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.29	1.8	82.42	3.8	82.44	4	82.434	5.8	82.38
7.8	82.4	9.7	82.4	11.7	82.39	14.1	82.35	15.4	82.36
19.1	82.26	19.8	82.23	21.8	82.05	22.7	81.91	23.9	81.71
24.6	81.69	25.2	81.61	25.9	81.57	27.9	77.85	28.3	77.85
29.9	77.85	30.1	77.85	31.8	77.85	33.9	81.54	35.9	81.99
36.3	82.04	37.4	82.14	38.5	82.28	41.9	82.63	43.9	82.75
45.282.88619		46	82.97	48.5	82.99	51.8	83.09	54	83.24
56	83.3	60	83.46	62	83.44	66	83.47	66.4	83.46

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    27.9     .08    31.8     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          27.9    31.8             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    24.5   82.55       F
    35.2    66.4   82.55       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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      Circular     1.5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 3 - Pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  2      25     .027     .027        0                   .9
       1
Number of Barrels =  2
Upstream   Elevation =  78
Centerline Stations
    Sta.    Sta.
    35.2    37.2
Downstream Elevation =  77.89
Centerline Stations
    Sta.    Sta.
    28.8    30.8

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       7.20    Culv Full Len (m)        25.00
  # Barrels                    2    Culv Vel US (m/s)         2.04
  Q Barrel (m3/s)           3.60    Culv Vel DS (m/s)         2.04
  E.G. US. (m)             80.67    Culv Inv El Up (m)       78.00
  W.S. US. (m)             80.65    Culv Inv El Dn (m)       77.89
  E.G. DS (m)              80.02    Culv Frctn Ls (m)         0.28
```

W.S. DS (m)	79.98	Culv Exit Loss (m)	0.18
Delta EG (m)	0.65	Culv Entr Loss (m)	0.19
Delta WS (m)	0.67	Q Weir (m3/s)	
E.G. IC (m)	79.69	Weir Sta Lft (m)	
E.G. OC (m)	80.67	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	79.50	Weir Max Depth (m)	
Culv WS Outlet (m)	79.39	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.99	Min El Weir Flow (m)	82.55

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	25.00
# Barrels	2	Culv Vel US (m/s)	2.45
Q Barrel (m3/s)	4.32	Culv Vel DS (m/s)	2.45
E.G. US. (m)	81.39	Culv Inv El Up (m)	78.00
W.S. US. (m)	81.38	Culv Inv El Dn (m)	77.89
E.G. DS (m)	80.44	Culv Frctn Ls (m)	0.40
W.S. DS (m)	80.41	Culv Exit Loss (m)	0.27
Delta EG (m)	0.95	Culv Entr Loss (m)	0.27
Delta WS (m)	0.97	Q Weir (m3/s)	
E.G. IC (m)	79.93	Weir Sta Lft (m)	
E.G. OC (m)	81.39	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	79.50	Weir Max Depth (m)	
Culv WS Outlet (m)	79.39	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	1.08	Min El Weir Flow (m)	82.55

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 494

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.29	1.8	82.42	3.8	82.44	4	82.434	5.8	82.38
7.8	82.4	9.7	82.4	11.7	82.39	14.1	82.35	15.4	82.36
19.1	82.26	19.8	82.23	21.8	82.05	22.7	81.91	23.9	81.71
24.6	81.69	25.2	81.61	25.9	81.57	27.9	77.85	28.3	77.85
29.9	77.85	30.1	77.85	31.8	77.85	33.9	81.54	35.9	81.99
36.3	82.04	37.4	82.14	38.5	82.28	41.9	82.63	43.9	82.75

```
    45.282.88619      46   82.97    48.5   82.99    51.8   83.09      54   83.24
      56    83.3      60   83.46      62   83.44      66   83.47    66.4   83.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    27.9     .08    31.8     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          27.9    31.8              2.6     6.1     6.4             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    24.5   82.55       F
    35.2    66.4   82.55       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            80.02    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.03    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            79.98    Reach Len. (m)           2.60       6.10
6.40
  Crit W.S. (m)            78.55    Flow Area (m2)           1.22       8.33
1.30
  E.G. Slope (m/m)      0.001544    Area (m2)                1.22       8.33
1.30
  Q Total (m3/s)            7.20    Flow (m3/s)              0.20       6.78
0.22
  Top Width (m)             6.26    Top Width (m)            1.15       3.90
1.21
  Vel Total (m/s)           0.66    Avg. Vel. (m/s)          0.17       0.81
0.17
  Max Chl Dpth (m)          2.13    Hydr. Depth (m)          1.07       2.13
1.07
  Conv. Total (m3/s)       183.4    Conv. (m3/s)              5.2      172.5
 5.6
  Length Wtd. (m)           6.01    Wetted Per. (m)          2.42       3.90
2.46
  Min Ch El (m)            77.85    Shear (N/m2)             7.65      32.31
7.99
  Alpha                     1.42    Stream Power (N/m s)     1.27      26.31
1.37
  Frctn Loss (m)            0.01    Cum Volume (1000 m3)     0.89       4.11
0.23
  C & E Loss (m)            0.00    Cum SA (1000 m2)         2.74       2.67
0.39
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.41	Reach Len. (m)	2.60	6.10	6.40
Crit W.S. (m)	78.64	Flow Area (m2)	1.76	9.99	1.87
E.G. Slope (m/m)	0.001182	Area (m2)	1.76	9.99	1.87
Q Total (m3/s)	8.64	Flow (m3/s)	0.29	8.04	0.32
Top Width (m)	6.74	Top Width (m)	1.38	3.90	1.46
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.16	0.80	0.17
Max Chl Dpth (m)	2.56	Hydr. Depth (m)	1.28	2.56	1.28
Conv. Total (m3/s)	251.4	Conv. (m3/s)	8.4	233.8	9.2
Length Wtd. (m)	5.99	Wetted Per. (m)	2.91	3.90	2.95
Min Ch El (m)	77.85	Shear (N/m2)	7.03	29.70	7.34
Alpha	1.50	Stream Power (N/m s)	1.15	23.90	1.24
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	1.36	4.70	0.35
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.67	2.68	0.73

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 485

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	82.29	1.8	82.42	3.8	82.44	4	82.434	5.8	82.38
7.8	82.4	9.7	82.4	11.7	82.39	14.1	82.35	15.4	82.36
19.1	82.26	19.8	82.23	21.8	82.05	22.7	81.91	23.9	81.71
24.6	81.69	25.2	81.61	25.9	81.57	27.9	77.85	28.3	77.85
29.9	77.85	30.1	77.85	31.8	77.85	33.9	81.54	35.9	81.99
36.3	82.04	37.4	82.14	38.5	82.28	41.9	82.63	43.9	82.75
45.2	82.88619	46	82.97	48.5	82.99	51.8	83.09	54	83.24
56	83.3	60	83.46	62	83.44	66	83.47	66.4	83.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27.9	.08	31.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.9	31.8	95.7	96.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	80.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.97	Reach Len. (m)	95.70	96.60	99.40
Crit W.S. (m)		Flow Area (m2)	1.21	8.29	1.28
E.G. Slope (m/m)	0.001568	Area (m2)	1.21	8.29	1.28
Q Total (m3/s)	7.20	Flow (m3/s)	0.20	6.78	0.22
Top Width (m)	6.25	Top Width (m)	1.14	3.90	1.21
Vel Total (m/s)	0.67	Avg. Vel. (m/s)	0.17	0.82	0.17
Max Chl Dpth (m)	2.12	Hydr. Depth (m)	1.06	2.12	1.06
Conv. Total (m3/s)	181.9	Conv. (m3/s)	5.1	171.2	5.6
Length Wtd. (m)	96.63	Wetted Per. (m)	2.41	3.90	2.44
Min Ch El (m)	77.85	Shear (N/m2)	7.74	32.68	8.08
Alpha	1.42	Stream Power (N/m s)	1.29	26.74	1.39
Frctn Loss (m)	0.10	Cum Volume (1000 m3)	0.88	4.06	0.22
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.73	2.65	

0.38

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.40	Reach Len. (m)	95.70	96.60	99.40
Crit W.S. (m)		Flow Area (m2)	1.75	9.96	1.86
E.G. Slope (m/m)	0.001194	Area (m2)	1.75	9.96	1.86
Q Total (m3/s)	8.64	Flow (m3/s)	0.29	8.04	0.31
Top Width (m)	6.73	Top Width (m)	1.37	3.90	1.45
Vel Total (m/s)	0.64	Avg. Vel. (m/s)	0.16	0.81	0.17
Max Chl Dpth (m)	2.55	Hydr. Depth (m)	1.28	2.55	1.28
Conv. Total (m3/s)	250.2	Conv. (m3/s)	8.4	232.7	9.1
Length Wtd. (m)	96.64	Wetted Per. (m)	2.90	3.90	2.94
Min Ch El (m)	77.85	Shear (N/m2)	7.08	29.91	7.40
Alpha	1.50	Stream Power (N/m s)	1.17	24.14	1.25
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	1.35	4.64	0.34
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.67	2.65	0.72

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 388

INPUT
Description:

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.55	4.5	80.43	5.1	80.42	9.2	80.07	13.2	80.15
13.3	80.149	15.2	80.13	17.1	77.7	19.3	77.7	21.3	77.7
22.1	77.7	22.4	77.7	23.3	79.96	26	80.46	26.7	80.61
29	81.04	33.4	81.72	35.4	82	37.4	82.21	39.4	82.39
41.4	82.5	43.4	82.53	47.5	82.43	49.5	82.44	52.282.51425	
53.5	82.55	55.5	82.62	56.5	82.62	57.5	82.64	59.6	82.77
60.1	82.79	61.6	82.78	61.9	82.81	65.4	82.96	67.6	82.86
68.9	82.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.1	.08	22.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.1	22.4	8.5	10.8	7.3	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.88	Reach Len. (m)	8.50	10.80	7.30
Crit W.S. (m)		Flow Area (m2)	1.86	11.56	0.95
E.G. Slope (m/m)	0.000792	Area (m2)	1.86	11.56	0.95
Q Total (m3/s)	7.20	Flow (m3/s)	0.27	6.84	0.10
Top Width (m)	7.87	Top Width (m)	1.70	5.30	0.87
Vel Total (m/s)	0.50	Avg. Vel. (m/s)	0.14	0.59	0.10
Max Chl Dpth (m)	2.18	Hydr. Depth (m)	1.09	2.18	1.09
Conv. Total (m3/s)	255.9	Conv. (m3/s)	9.5	243.0	3.4
Length Wtd. (m)	10.66	Wetted Per. (m)	2.77	5.30	2.35
Min Ch El (m)	77.70	Shear (N/m2)	5.22	16.94	3.13
Alpha	1.33	Stream Power (N/m s)	0.75	10.03	0.32
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.74	3.10	

0.11					
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.60	2.21	
0.28					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.35	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	80.34	Reach Len. (m)	8.50	10.80	
7.30					
Crit W.S. (m)		Flow Area (m2)	4.40	13.97	
1.74					
E.G. Slope (m/m)	0.000596	Area (m2)	4.40	13.97	
1.74					
Q Total (m3/s)	8.64	Flow (m3/s)	0.36	8.13	
0.15					
Top Width (m)	19.24	Top Width (m)	11.01	5.30	
2.93					
Vel Total (m/s)	0.43	Avg. Vel. (m/s)	0.08	0.58	
0.09					
Max Chl Dpth (m)	2.64	Hydr. Depth (m)	0.40	2.64	
0.59					
Conv. Total (m3/s)	354.2	Conv. (m3/s)	14.9	333.2	
6.1					
Length Wtd. (m)	10.64	Wetted Per. (m)	12.21	5.30	
4.50					
Min Ch El (m)	77.70	Shear (N/m2)	2.11	15.40	
2.26					
Alpha	1.73	Stream Power (N/m s)	0.17	8.96	
0.19					
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	1.06	3.48	
0.16					
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.07	2.21	
0.50					

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 378

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.55	4.5	80.43	5.1	80.42	9.2	80.07	13.2	80.15
13.3	80.149	15.2	80.13	17.1	77.7	19.3	77.7	21.3	77.7
22.1	77.7	22.4	77.7	23.3	79.96	26	80.46	26.7	80.61
29	81.04	33.4	81.72	35.4	82	37.4	82.21	39.4	82.39
41.4	82.5	43.4	82.53	47.5	82.43	49.5	82.44	52.282.51425	
53.5	82.55	55.5	82.62	56.5	82.62	57.5	82.64	59.6	82.77
60.1	82.79	61.6	82.78	61.9	82.81	65.4	82.96	67.6	82.86
68.9	82.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.1	.08	22.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.1	22.4	28.8	32.7	42.9	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	15.83	82.8	F
23.37	68.9	82.8	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.89	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.87	Reach Len. (m)	28.80	32.70	42.90
Crit W.S. (m)	78.27	Flow Area (m2)	1.73	11.51	0.94
E.G. Slope (m/m)	0.000798	Area (m2)	1.84	11.51	0.94
Q Total (m3/s)	7.20	Flow (m3/s)	0.29	6.82	0.10
Top Width (m)	7.86	Top Width (m)	1.70	5.30	0.87
Vel Total (m/s)	0.51	Avg. Vel. (m/s)	0.17	0.59	0.10
Max Chl Dpth (m)	2.17	Hydr. Depth (m)	1.36	2.17	1.09
Conv. Total (m3/s)	255.0	Conv. (m3/s)	10.2	241.4	3.4
Length Wtd. (m)	32.70	Wetted Per. (m)	2.06	5.30	

2.34				
Min Ch El (m)	77.70	Shear (N/m2)	6.55	17.00
3.14				
Alpha	1.29	Stream Power (N/m s)	1.10	10.07
0.32				
Frctn Loss (m)		Cum Volume (1000 m3)	0.72	2.97
0.10				
C & E Loss (m)		Cum SA (1000 m2)	2.58	2.15
0.27				

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.35	Element	Left OB	Channel
Right OB				
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080
0.150				
W.S. Elev (m)	80.33	Reach Len. (m)	28.80	32.70
42.90				
Crit W.S. (m)	78.34	Flow Area (m2)	2.31	13.94
1.37				
E.G. Slope (m/m)	0.000594	Area (m2)	4.34	13.94
1.72				
Q Total (m3/s)	8.64	Flow (m3/s)	0.40	8.09
0.15				
Top Width (m)	19.13	Top Width (m)	10.94	5.30
2.89				
Vel Total (m/s)	0.49	Avg. Vel. (m/s)	0.18	0.58
0.11				
Max Chl Dpth (m)	2.63	Hydr. Depth (m)	1.82	2.63
1.42				
Conv. Total (m3/s)	354.6	Conv. (m3/s)	16.6	331.8
6.1				
Length Wtd. (m)	32.70	Wetted Per. (m)	2.06	5.30
2.50				
Min Ch El (m)	77.70	Shear (N/m2)	6.52	15.33
3.20				
Alpha	1.32	Stream Power (N/m s)	1.14	8.90
0.35				
Frctn Loss (m)		Cum Volume (1000 m3)	1.02	3.33
0.15				
C & E Loss (m)		Cum SA (1000 m2)	2.98	2.15
0.48				

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 360

INPUT
Description:
Distance from Upstream XS = 1
Deck/Roadway Width = 20
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	82.8	20	82.8	40	82.8
60	82.8	80	82.8		

Upstream Bridge Cross Section Data
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.55	4.5	80.43	5.1	80.42	9.2	80.07	13.2	80.15
13.3	80.149	15.2	80.13	17.1	77.7	19.3	77.7	21.3	77.7
22.1	77.7	22.4	77.7	23.3	79.96	26	80.46	26.7	80.61
29	81.04	33.4	81.72	35.4	82	37.4	82.21	39.4	82.39
41.4	82.5	43.4	82.53	47.5	82.43	49.5	82.44	52.282.51425	
53.5	82.55	55.5	82.62	56.5	82.62	57.5	82.64	59.6	82.77
60.1	82.79	61.6	82.78	61.9	82.81	65.4	82.96	67.6	82.86
68.9	82.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.1	.08	22.4	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
17.1	22.4	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	15.83	82.8	F
23.37	68.9	82.8	F

Downstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	82.8	20	82.8	40	82.8
60	82.8	80	82.8		

Downstream Bridge Cross Section Data
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.39	4.3	82.34	6.3	82.38	10.9	82.18	16.1	81.76
16.4	81.71	16.6	81.658	17.9	81.32	20.5	80.52	21.3	80.33
22.5	80.05	23.1	79.99	24.5	79.79	26.5	79.7	28.3	79.75
28.6	79.78	32.6	79.87	36.2	79.76	39.1	77.65	40.7	77.65
42.8	77.65	46.8	77.65	48.8	79.67	51.5	79.72	52.9	79.77
53	79.7755	54.9	79.88	55.6	79.94	56.2	80.02	56.9	80.07
59	80.27	59.7	80.38	60.4	80.45	61	80.53	61.4	80.56
63	80.7	65.1	80.79	67.1	80.94	68.4	80.91	69.1	80.9
71.1	80.93	71.9	80.97	73.2	81.06	75.3	81.09	77.2	81.14
79.2	81.15	81.3	81.2	83.3	81.06	84.9	81.07		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	39.1	.08	46.8	.15

Bank Sta: Left Right Coeff Contr. Expan.
39.1 46.8 .6 .8
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	38.9	82.8	F
46.3	84.9	82.8	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 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	Pipe Arch	1.22	1.84

FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	30	.027	.027	0		.9	1

Number of Barrels = 2
Upstream Elevation = 77.76
Centerline Stations
Sta. Sta.
18.1 21.1
Downstream Elevation = 77.67
Centerline Stations
Sta. Sta.
41 44

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	7.20	Culv Full Len (m)	30.00
# Barrels	2	Culv Vel US (m/s)	1.94
Q Barrel (m3/s)	3.60	Culv Vel DS (m/s)	1.94
E.G. US. (m)	79.89	Culv Inv El Up (m)	77.76
W.S. US. (m)	79.87	Culv Inv El Dn (m)	77.67
E.G. DS (m)	79.23	Culv Frctn Ls (m)	0.32
W.S. DS (m)	79.21	Culv Exit Loss (m)	0.17
Delta EG (m)	0.66	Culv Entr Loss (m)	0.17
Delta WS (m)	0.66	Q Weir (m3/s)	
E.G. IC (m)	79.13	Weir Sta Lft (m)	
E.G. OC (m)	79.89	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	78.98	Weir Max Depth (m)	
Culv WS Outlet (m)	78.89	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.73	Min El Weir Flow (m)	82.80

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	30.00
# Barrels	2	Culv Vel US (m/s)	2.33
Q Barrel (m3/s)	4.32	Culv Vel DS (m/s)	2.33
E.G. US. (m)	80.35	Culv Inv El Up (m)	77.76
W.S. US. (m)	80.33	Culv Inv El Dn (m)	77.67
E.G. DS (m)	79.39	Culv Frctn Ls (m)	0.45
W.S. DS (m)	79.36	Culv Exit Loss (m)	0.25
Delta EG (m)	0.96	Culv Entr Loss (m)	0.25
Delta WS (m)	0.96	Q Weir (m3/s)	
E.G. IC (m)	79.35	Weir Sta Lft (m)	
E.G. OC (m)	80.35	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	78.98	Weir Max Depth (m)	
Culv WS Outlet (m)	78.89	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.83	Min El Weir Flow (m)	82.80

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 354

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.39	4.3	82.34	6.3	82.38	10.9	82.18	16.1	81.76
16.4	81.71	16.6	81.658	17.9	81.32	20.5	80.52	21.3	80.33
22.5	80.05	23.1	79.99	24.5	79.79	26.5	79.7	28.3	79.75
28.6	79.78	32.6	79.87	36.2	79.76	39.1	77.65	40.7	77.65
42.8	77.65	46.8	77.65	48.8	79.67	51.5	79.72	52.9	79.77
53	79.7755	54.9	79.88	55.6	79.94	56.2	80.02	56.9	80.07
59	80.27	59.7	80.38	60.4	80.45	61	80.53	61.4	80.56
63	80.7	65.1	80.79	67.1	80.94	68.4	80.91	69.1	80.9
71.1	80.93	71.9	80.97	73.2	81.06	75.3	81.09	77.2	81.14
79.2	81.15	81.3	81.2	83.3	81.06	84.9	81.07		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	39.1	.08	46.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.1	46.8	5.5	5.5	5.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	38.9	82.8	F
46.3	84.9	82.8	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.23	Element	Left OB	Channel
Right OB				
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080
W.S. Elev (m)	79.21	Reach Len. (m)	5.50	5.50
5.30				
Crit W.S. (m)	78.11	Flow Area (m2)	0.30	11.22
E.G. Slope (m/m)	0.001427	Area (m2)	1.67	12.00
1.20				
Q Total (m3/s)	7.20	Flow (m3/s)	0.08	7.12

Top Width (m)	11.38	Top Width (m)	2.14	7.70	1.54
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.28	0.63	
Max Chl Dpth (m)	1.56	Hydr. Depth (m)	1.49	1.56	
Conv. Total (m3/s)	190.7	Conv. (m3/s)	2.2	188.5	
Length Wtd. (m)	5.50	Wetted Per. (m)	0.25	7.20	
Min Ch El (m)	77.65	Shear (N/m2)	16.81	21.80	
Alpha	1.02	Stream Power (N/m s)	4.78	13.84	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.72	2.90	0.10
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.53	1.94	0.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
W.S. Elev (m)	79.36	Reach Len. (m)	5.50	5.50	5.30
Crit W.S. (m)	78.17	Flow Area (m2)	0.33	12.34	
E.G. Slope (m/m)	0.001494	Area (m2)	2.02	13.20	1.46
Q Total (m3/s)	8.64	Flow (m3/s)	0.10	8.54	
Top Width (m)	11.75	Top Width (m)	2.36	7.70	1.70
Vel Total (m/s)	0.68	Avg. Vel. (m/s)	0.31	0.69	
Max Chl Dpth (m)	1.71	Hydr. Depth (m)	1.64	1.71	
Conv. Total (m3/s)	223.7	Conv. (m3/s)	2.6	221.0	

Length Wtd. (m)	5.50	Wetted Per. (m)	0.25	7.20	
Min Ch El (m)	77.65	Shear (N/m2)	19.44	25.11	
Alpha	1.02	Stream Power (N/m s)	6.05	17.38	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	1.02	3.25	0.15
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.79	1.94	0.38

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 347

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.39	4.3	82.34	6.3	82.38	10.9	82.18	16.1	81.76
16.4	81.71	16.6	81.658	17.9	81.32	20.5	80.52	21.3	80.33
22.5	80.05	23.1	79.99	24.5	79.79	26.5	79.7	28.3	79.75
28.6	79.78	32.6	79.87	36.2	79.76	39.1	77.65	40.7	77.65
42.8	77.65	46.8	77.65	48.8	79.67	51.5	79.72	52.9	79.77
53	79.7755	54.9	79.88	55.6	79.94	56.2	80.02	56.9	80.07
59	80.27	59.7	80.38	60.4	80.45	61	80.53	61.4	80.56
63	80.7	65.1	80.79	67.1	80.94	68.4	80.91	69.1	80.9
71.1	80.93	71.9	80.97	73.2	81.06	75.3	81.09	77.2	81.14
79.2	81.15	81.3	81.2	83.3	81.06	84.9	81.07		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	39.1	.08	46.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.1	46.8	41.6	58.5	89.2	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.22	Element	Left OB	Channel

Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.20	Reach Len. (m)	41.60	58.50	89.20
Crit W.S. (m)		Flow Area (m2)	1.66	11.95	1.19
E.G. Slope (m/m)	0.001137	Area (m2)	1.66	11.95	1.19
Q Total (m3/s)	7.20	Flow (m3/s)	0.27	6.75	0.18
Top Width (m)	11.37	Top Width (m)	2.13	7.70	1.54
Vel Total (m/s)	0.49	Avg. Vel. (m/s)	0.16	0.56	0.15
Max Chl Dpth (m)	1.55	Hydr. Depth (m)	0.78	1.55	0.78
Conv. Total (m3/s)	213.7	Conv. (m3/s)	8.1	200.3	5.3
Length Wtd. (m)	56.57	Wetted Per. (m)	2.64	7.70	2.18
Min Ch El (m)	77.65	Shear (N/m2)	7.00	17.30	6.09
Alpha	1.27	Stream Power (N/m s)	1.15	9.78	0.91
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.71	2.83	0.09
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.52	1.89	0.21

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.36	Reach Len. (m)	41.60	58.50	89.20
Crit W.S. (m)		Flow Area (m2)	2.01	13.16	1.45
E.G. Slope (m/m)	0.001174	Area (m2)	2.01	13.16	1.45
Q Total (m3/s)	8.64	Flow (m3/s)	0.36	8.05	0.24
Top Width (m)	11.74	Top Width (m)	2.35	7.70	

1.69					
Vel Total (m/s)	0.52	Avg. Vel. (m/s)	0.18	0.61	
0.16					
Max Chl Dpth (m)	1.71	Hydr. Depth (m)	0.85	1.71	
0.85					
Conv. Total (m3/s)	252.3	Conv. (m3/s)	10.5	235.0	
6.9					
Length Wtd. (m)	56.32	Wetted Per. (m)	2.90	7.70	
2.40					
Min Ch El (m)	77.65	Shear (N/m2)	7.95	19.67	
6.92					
Alpha	1.30	Stream Power (N/m s)	1.42	12.04	
1.13					
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	1.01	3.18	
0.14					
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.77	1.90	
0.37					

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 283

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.79	5.4	79.86	9.4	79.24	11.4	78.73	15.178.55733	
17.4	78.45	19.4	78.44	23.4	78.38	25.4	78.3	27.4	78.27
29.4	78.22	31.4	77.15	33.4	77.15	35.4	77.15	37.4	78.76
39.6	79.83	41.4	80.69	44.781.29225		45.4	81.42	47.4	81.6
51.4	81.64	53.4	81.78	55.4	81.9	57.4	81.91	61.5	82.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	29.4	.08	37.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
29.4	37.4	6	6.2	6.6	.1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.16	Element	Left OB	Channel
Right OB				

Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.16	Reach Len. (m)	6.00	6.20	6.60
Crit W.S. (m)		Flow Area (m2)	13.38	13.38	0.16
E.G. Slope (m/m)	0.000618	Area (m2)	13.38	13.38	0.16
Q Total (m3/s)	7.20	Flow (m3/s)	1.71	5.48	0.01
Top Width (m)	28.49	Top Width (m)	19.68	8.00	0.82
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.13	0.41	0.05
Max Chl Dpth (m)	2.01	Hydr. Depth (m)	0.68	1.67	0.20
Conv. Total (m3/s)	289.7	Conv. (m3/s)	68.8	220.5	0.3
Length Wtd. (m)	6.18	Wetted Per. (m)	19.74	8.84	0.91
Min Ch El (m)	77.15	Shear (N/m2)	4.11	9.18	1.08
Alpha	1.84	Stream Power (N/m s)	0.53	3.76	0.06
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.40	2.09	0.03
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.06	1.43	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.31	Reach Len. (m)	6.00	6.20	6.60
Crit W.S. (m)		Flow Area (m2)	16.53	14.64	0.32
E.G. Slope (m/m)	0.000602	Area (m2)	16.53	14.64	0.32

Q Total (m3/s)	8.64	Flow (m3/s)	2.34	6.29	0.02
Top Width (m)	29.62	Top Width (m)	20.48	8.00	1.14
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.14	0.43	0.06
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.81	1.83	0.28
Conv. Total (m3/s)	352.2	Conv. (m3/s)	95.3	256.1	0.8
Length Wtd. (m)	6.17	Wetted Per. (m)	20.56	8.84	1.27
Min Ch El (m)	77.15	Shear (N/m2)	4.75	9.78	1.47
Alpha	1.85	Stream Power (N/m s)	0.67	4.20	0.10
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.63	2.37	0.06
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.30	1.44	0.25

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 277

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.37	3.5	79.98	5.5	79.53	7.5	79.29	9.5	79.1
11.5	79	13.2	78.9405	13.5	78.93	15.5	78.79	18.1	78.73
19.5	78.72	21.5	78.64	23.5	78.62	25.5	78.55	27.5	78.42
28.2	77.75	28.9	77.14	31.9	77.14	32.7	77.93	33.5	78.74
35.5	79.13	36.1	79.33	36.9	79.64	38.1	80.03	38.9	80.34
39.5	80.54	41.5	80.86	41.8	80.8885	43.5	81.05	45.5	81.12
47.5	81.34	49.5	81.5	51.5	81.52	53.5	81.51	55.5	81.61
56.1	81.61	56.8	81.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .15    28.2     .08    32.7     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          28.2    32.7             43.2      44    45.1             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    27.8   80.77       F
    33.2    56.8   80.77       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            79.15    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.03    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            79.12    Reach Len. (m)          43.20      44.00
45.10
  Crit W.S. (m)            77.90    Flow Area (m2)           0.47       8.38
0.47
  E.G. Slope (m/m)      0.002244    Area (m2)                7.40       8.38
1.00
  Q Total (m3/s)            7.20    Flow (m3/s)              0.13       6.96
0.11
  Top Width (m)            26.17    Top Width (m)           18.92       4.50
2.75
  Vel Total (m/s)           0.77    Avg. Vel. (m/s)          0.28       0.83
0.24
  Max Chl Dpth (m)          1.98    Hydr. Depth (m)          1.18       1.86
0.94
  Conv. Total (m3/s)       152.1    Conv. (m3/s)              2.8      146.9
 2.4
  Length Wtd. (m)          44.00    Wetted Per. (m)          0.55       5.05
0.71
  Min Ch El (m)            77.14    Shear (N/m2)            18.75      36.52
14.50
  Alpha                     1.12    Stream Power (N/m s)     5.32      30.31
3.47
  Frctn Loss (m)                    Cum Volume (1000 m3)     0.34       2.03
0.03
  C & E Loss (m)                    Cum SA (1000 m2)         1.95       1.40
0.09



Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.31	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.27	Reach Len. (m)	43.20	44.00	45.10
Crit W.S. (m)	77.98	Flow Area (m2)	0.53	9.05	0.54
E.G. Slope (m/m)	0.002484	Area (m2)	10.34	9.05	1.45
Q Total (m3/s)	8.64	Flow (m3/s)	0.17	8.32	0.15
Top Width (m)	28.21	Top Width (m)	20.49	4.50	3.22
Vel Total (m/s)	0.85	Avg. Vel. (m/s)	0.32	0.92	0.28
Max Chl Dpth (m)	2.13	Hydr. Depth (m)	1.33	2.01	1.09
Conv. Total (m3/s)	173.5	Conv. (m3/s)	3.4	167.0	3.0
Length Wtd. (m)	44.00	Wetted Per. (m)	0.55	5.05	0.71
Min Ch El (m)	77.14	Shear (N/m2)	23.38	43.65	18.60
Alpha	1.12	Stream Power (N/m s)	7.56	40.12	5.16
Frctn Loss (m)		Cum Volume (1000 m3)	0.55	2.29	0.06
C & E Loss (m)		Cum SA (1000 m2)	2.18	1.40	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Beamer Creek
REACH: Reach 5 RS: 247

INPUT
Description:
Distance from Upstream XS = 1.5

Deck/Roadway Width = 35
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	80.77		10	80.77		20	80.77	
30	80.77		40	80.77		50	80.77	

Upstream Bridge Cross Section Data
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.37	3.5	79.98	5.5	79.53	7.5	79.29	9.5	79.1
11.5	79	13.2	78.9405	13.5	78.93	15.5	78.79	18.1	78.73
19.5	78.72	21.5	78.64	23.5	78.62	25.5	78.55	27.5	78.42
28.2	77.75	28.9	77.14	31.9	77.14	32.7	77.93	33.5	78.74
35.5	79.13	36.1	79.33	36.9	79.64	38.1	80.03	38.9	80.34
39.5	80.54	41.5	80.86	41.8	80.8885	43.5	81.05	45.5	81.12
47.5	81.34	49.5	81.5	51.5	81.52	53.5	81.51	55.5	81.61
56.1	81.61	56.8	81.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	28.2	.08	32.7	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
28.2	32.7	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	27.8	80.77	F
33.2	56.8	80.77	F

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	80.77		10	80.77		20	80.77	
30	80.77		40	80.77		45	80.77	

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.95	.9	81.93	7.1	81.186	8.9	80.97	10.9	80.66
12.9	80.04	14.9	79.92	18.9	79.97	21.9	77.1	25.2	77.1
27.1	80.07	30.9	80.14	31.4	80.16	34.9	80.3	36.9	80.37
40.9	80.8	46.9	81.27	50.9	81.55	52.6	81.65		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	21.9	.08	25.2	.15

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          21.9    25.2            .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    20.6   80.77       F
    26.4    52.6   80.77       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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    2.03    2.43
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 1    42.8     .013     .013        0                   .5
       1
Upstream   Elevation =  77.17
           Centerline Station =  30.5
Downstream Elevation =  77.14
           Centerline Station =  23.5

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       7.20    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         1.67
  Q Barrel (m3/s)           7.20    Culv Vel DS (m/s)         1.68
  E.G. US. (m)             79.16    Culv Inv El Up (m)       77.17
  W.S. US. (m)             79.12    Culv Inv El Dn (m)       77.14
  E.G. DS (m)              78.96    Culv Frctn Ls (m)         0.03
  W.S. DS (m)              78.91    Culv Exit Loss (m)        0.09
  Delta EG (m)              0.19    Culv Entr Loss (m)        0.07
  Delta WS (m)              0.21    Q Weir (m3/s)
  E.G. IC (m)              78.81    Weir Sta Lft (m)
  E.G. OC (m)              79.16    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)         78.94    Weir Max Depth (m)
  Culv WS Outlet (m)        78.91    Weir Avg Depth (m)
```

Culv Nml Depth (m)	1.81	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.96	Min El Weir Flow (m)	80.77

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	8.64	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	1.91
Q Barrel (m3/s)	8.64	Culv Vel DS (m/s)	1.92
E.G. US. (m)	79.31	Culv Inv El Up (m)	77.17
W.S. US. (m)	79.27	Culv Inv El Dn (m)	77.14
E.G. DS (m)	79.06	Culv Frctn Ls (m)	0.04
W.S. DS (m)	78.99	Culv Exit Loss (m)	0.12
Delta EG (m)	0.25	Culv Entr Loss (m)	0.09
Delta WS (m)	0.28	Q Weir (m3/s)	
E.G. IC (m)	79.03	Weir Sta Lft (m)	
E.G. OC (m)	79.31	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	79.03	Weir Max Depth (m)	
Culv WS Outlet (m)	78.99	Weir Avg Depth (m)	
Culv Nml Depth (m)	2.03	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.09	Min El Weir Flow (m)	80.77

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the
height of the culvert.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 236

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.95	.9	81.93	7.1	81.186	8.9	80.97	10.9	80.66
12.9	80.04	14.9	79.92	18.9	79.97	21.9	77.1	25.2	77.1
27.1	80.07	30.9	80.14	31.4	80.16	34.9	80.3	36.9	80.37
40.9	80.8	46.9	81.27	50.9	81.55	52.6	81.65		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	21.9	.08	25.2	.15

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

```
          21.9    25.2              9.3     7.3     5.2             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    20.6   80.77       F
    26.4    52.6   80.77       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           78.96    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.05    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           78.91    Reach Len. (m)           9.30       7.30
5.20
  Crit W.S. (m)           77.87    Flow Area (m2)           1.54       5.97
1.05
  E.G. Slope (m/m)      0.003353   Area (m2)                1.71       5.97
1.05
  Q Total (m3/s)           7.20    Flow (m3/s)              0.54       6.42
0.25
  Top Width (m)            6.35    Top Width (m)            1.89       3.30
1.16
  Vel Total (m/s)          0.84    Avg. Vel. (m/s)          0.35       1.07
0.24
  Max Chl Dpth (m)         1.81    Hydr. Depth (m)          1.19       1.81
0.90
  Conv. Total (m3/s)       124.4   Conv. (m3/s)              9.3      110.8
 4.3
  Length Wtd. (m)          7.58    Wetted Per. (m)          1.80       3.30
2.15
  Min Ch El (m)            77.10   Shear (N/m2)            28.21      59.49
16.03
  Alpha                    1.47    Stream Power (N/m s)     9.83      63.93
3.83
  Frctn Loss (m)           0.07    Cum Volume (1000 m3)     0.34       1.82
0.03
  C & E Loss (m)           0.11    Cum SA (1000 m2)         1.50       1.22
0.01



Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	78.99	Reach Len. (m)	9.30	7.30	5.20
Crit W.S. (m)	77.96	Flow Area (m2)	1.65	6.24	1.14
E.G. Slope (m/m)	0.004132	Area (m2)	1.87	6.24	1.14
Q Total (m3/s)	8.64	Flow (m3/s)	0.67	7.66	0.31
Top Width (m)	6.49	Top Width (m)	1.98	3.30	1.21
Vel Total (m/s)	0.96	Avg. Vel. (m/s)	0.40	1.23	0.27
Max Chl Dpth (m)	1.89	Hydr. Depth (m)	1.27	1.89	0.95
Conv. Total (m3/s)	134.5	Conv. (m3/s)	10.4	119.2	4.9
Length Wtd. (m)	7.63	Wetted Per. (m)	1.80	3.30	2.23
Min Ch El (m)	77.10	Shear (N/m2)	37.14	76.60	20.80
Alpha	1.48	Stream Power (N/m s)	15.02	94.10	5.72
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	0.55	2.08	0.06
C & E Loss (m)	0.10	Cum SA (1000 m2)	1.69	1.23	0.13

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 226

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.07	1.1	81.96	1.8	81.91	3	81.74	3.5	81.72
4	81.57	4.9	81.23	6.6	80.72	7.5	80.45	9.5	79.99
11.5	79.33	13.5	78.88	15.5	78.51	17.5	78.22	19.5	78.26
19.9	77.98	21.3	78.24	21.8	78.27	23.4	78.51	23.6	78.2
23.9	76.91	24.9	76.91	25.3	78.48	25.5	79	25.8	79.08
27.2	79.33	27.5	79.39	29.4	79.53	31.5	79.63	32.3	79.60714
33.6	79.57	35.3	79.42	35.7	79.42	37.5	79.47	39.5	79.86
39.9	79.9	41	80.06	41.5	80.11	42.1	80.19	42.9	80.36
43.5	80.44	45.5	80.67	47.5	80.85	52.4	81.33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	23.6	.08	25.3	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
23.6	25.3	216.8	216.8	216.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	78.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	78.56	Reach Len. (m)	216.80	216.80	216.80
Crit W.S. (m)	78.56	Flow Area (m2)	2.27	2.29	0.00
E.G. Slope (m/m)	0.076004	Area (m2)	2.27	2.29	0.00
Q Total (m3/s)	7.20	Flow (m3/s)	1.71	5.49	0.00
Top Width (m)	10.08	Top Width (m)	8.35	1.70	0.03
Vel Total (m/s)	1.58	Avg. Vel. (m/s)	0.75	2.40	0.10
Max Chl Dpth (m)	1.65	Hydr. Depth (m)	0.27	1.35	0.04

Conv. Total (m3/s)	26.1	Conv. (m3/s)	6.2	19.9	0.0
Length Wtd. (m)	216.80	Wetted Per. (m)	8.67	3.94	0.08
Min Ch El (m)	76.91	Shear (N/m2)	195.33	432.74	10.15
Alpha	1.81	Stream Power (N/m s)	147.02	1037.88	1.06
Frctn Loss (m)	1.30	Cum Volume (1000 m3)	0.32	1.79	0.03
C & E Loss (m)	0.06	Cum SA (1000 m2)	1.45	1.21	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	78.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	78.63	Reach Len. (m)	216.80	216.80	216.80
Crit W.S. (m)	78.63	Flow Area (m2)	2.88	2.41	0.00
E.G. Slope (m/m)	0.079359	Area (m2)	2.88	2.41	0.00
Q Total (m3/s)	8.64	Flow (m3/s)	2.52	6.12	0.00

Top Width (m)	10.49	Top Width (m)	8.73	1.70	0.06
Vel Total (m/s)	1.63	Avg. Vel. (m/s)	0.88	2.54	0.17
Max Chl Dpth (m)	1.72	Hydr. Depth (m)	0.33	1.42	0.07
Conv. Total (m3/s)	30.7	Conv. (m3/s)	9.0	21.7	0.0
Length Wtd. (m)	216.80	Wetted Per. (m)	9.07	3.94	0.16
Min Ch El (m)	76.91	Shear (N/m2)	247.61	475.87	20.60
Alpha	1.80	Stream Power (N/m s)	216.73	1207.22	3.44
Frctn Loss (m)	1.13	Cum Volume (1000 m3)	0.52	2.04	0.05
C & E Loss (m)	0.07	Cum SA (1000 m2)	1.64	1.21	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Beamer Creek
REACH: Reach 5 RS: 0

INPUT
Description: CR-19 Beamer
Station Elevation Data num= 26

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   77.51 4.99996    77.59.999921   77.5915.00001   77.3419.99997   77.39
24.99996   77.3929.99992   77.36      35   76.6439.9999476.4221341.0991276.54851
42.5975575.1445744.2369674.6041344.9559674.5463745.7372274.6337546.8906974.86346
48.2549775.7630549.4548176.6627150.2568876.7523755.25688   78.0860.25694   78.68
 65.2569   79.0270.25695   78.7975.25691   78.7480.25697   78.6485.25693   78.28
90.25687   78.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1539.99994     .0849.45481     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      39.9999449.45481                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           76.66    Element                 Left OB    Channel
Right OB
  Vel Head (m)             0.02    Wt. n-Val.               0.150      0.080

  W.S. Elev (m)           76.64    Reach Len. (m)           20.79      20.79
20.79
  Crit W.S. (m)                    Flow Area (m2)            0.56      11.87

  E.G. Slope (m/m)      0.002022    Area (m2)                0.56      11.87

  Q Total (m3/s)           7.20    Flow (m3/s)              0.04       7.17

  Top Width (m)           14.45    Top Width (m)            5.02       9.43

  Vel Total (m/s)          0.58    Avg. Vel. (m/s)          0.07       0.60

  Max Chl Dpth (m)         2.10    Hydr. Depth (m)          0.11       1.26

  Conv. Total (m3/s)       160.2    Conv. (m3/s)             0.9      159.3

  Length Wtd. (m)         20.79    Wetted Per. (m)          5.02      10.67

  Min Ch El (m)           74.55    Shear (N/m2)             2.20      22.06

  Alpha                    1.08    Stream Power (N/m s)     0.15      13.32

  Frctn Loss (m)           0.13    Cum Volume (1000 m3)     0.01       0.26
0.03
  C & E Loss (m)           0.01    Cum SA (1000 m2)
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	76.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	76.84	Reach Len. (m)	20.79	20.79	20.79
Crit W.S. (m)		Flow Area (m2)	1.71	13.77	0.13
E.G. Slope (m/m)	0.001718	Area (m2)	1.71	13.77	0.13
Q Total (m3/s)	8.64	Flow (m3/s)	0.19	8.44	0.01
Top Width (m)	17.02	Top Width (m)	6.42	9.45	1.15
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.11	0.61	0.06
Max Chl Dpth (m)	2.30	Hydr. Depth (m)	0.27	1.46	0.11
Conv. Total (m3/s)	208.6	Conv. (m3/s)	4.7	203.7	0.2
Length Wtd. (m)	20.79	Wetted Per. (m)	6.43	10.70	1.16
Min Ch El (m)	74.55	Shear (N/m2)	4.47	21.68	1.81
Alpha	1.20	Stream Power (N/m s)	0.51	13.29	0.11
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	0.03	0.29	0.04
C & E Loss (m)	0.02	Cum SA (1000 m2)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.

CROSS SECTION

RIVER: Walker Beamer Cr
REACH: Reach 1   RS: 47

```
INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.854.999966   82.389.999932   82.26      15    82.219.99996    81.9
24.99993   81.1229.99999   79.8834.9999778.0457541.9034877.8467543.3209176.50229
44.2618374.9618146.4955674.5756647.9970274.26396 50.389474.1306651.1535675.55819
53.0060775.6725461.86081   77.3866.86077   77.6371.86089   77.9176.86086   77.45
81.86082   76.5286.86079   77.2691.86082   77.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1544.26183     .0851.15356     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      44.2618351.15356             30.1    31.3    32.1             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           76.51    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.16    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           76.35    Reach Len. (m)          30.10      31.30
32.10
  Crit W.S. (m)           75.59    Flow Area (m2)           0.59      12.76
2.58
  E.G. Slope (m/m)      0.010904   Area (m2)                0.59      12.76
2.58
  Q Total (m3/s)          24.40    Flow (m3/s)              0.21      23.11
1.09
  Top Width (m)           13.13    Top Width (m)            0.85       6.89
5.39
  Vel Total (m/s)          1.53    Avg. Vel. (m/s)          0.35       1.81
0.42
  Max Chl Dpth (m)         2.22    Hydr. Depth (m)          0.70       1.85
0.48
  Conv. Total (m3/s)      233.7    Conv. (m3/s)              2.0      221.3
10.4
  Length Wtd. (m)         31.31    Wetted Per. (m)          1.63       7.82
5.46
  Min Ch El (m)           74.13    Shear (N/m2)            38.82     174.64
50.48
  Alpha                    1.33    Stream Power (N/m s)    13.75     316.13
21.30
  Frctn Loss (m)           0.67    Cum Volume (1000 m3)     0.01       0.31
```

0.05					
C & E Loss (m)	0.04	Cum SA (1000 m2)	0.02	0.21	
0.10					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	76.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	76.54	Reach Len. (m)	30.10	31.30	32.10
Crit W.S. (m)	75.75	Flow Area (m2)	0.76	14.06	3.69
E.G. Slope (m/m)	0.010966	Area (m2)	0.76	14.06	3.69
Q Total (m3/s)	29.28	Flow (m3/s)	0.29	27.22	1.77
Top Width (m)	14.52	Top Width (m)	0.98	6.89	6.64
Vel Total (m/s)	1.58	Avg. Vel. (m/s)	0.39	1.94	0.48
Max Chl Dpth (m)	2.41	Hydr. Depth (m)	0.78	2.04	0.55
Conv. Total (m3/s)	279.6	Conv. (m3/s)	2.8	259.9	16.9
Length Wtd. (m)	31.32	Wetted Per. (m)	1.86	7.82	6.73
Min Ch El (m)	74.13	Shear (N/m2)	44.06	193.44	58.87
Alpha	1.40	Stream Power (N/m s)	16.97	374.53	28.25
Frctn Loss (m)	0.67	Cum Volume (1000 m3)	0.02	0.35	0.07
C & E Loss (m)	0.04	Cum SA (1000 m2)	0.03	0.21	

0.13

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Beamer Cr
REACH: Reach 1 RS: 16

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.68	.298	80.672	.685	80.72	1.714	80.769	2.641	80.873
3.131	80.785	3.675	80.714	4.547	80.526	5.332	80.446	5.963	80.314
8.022	79.963	10.211	79.661	11.628	79.495	13.404	79.408	14.46	79.246
16.095	79.085	17.292	78.894	20.125	78.521	22.957	78.26	24.167	78.168
25.789	78.005	26.858	77.866	27.206	77.742	28.622	76.966	30.038	76.04
30.582	75.732	31.454	75.348	32.239	74.197	32.87	74.206	33.572	74.242
34.93	74.143	35.703	74.054	37.119	74.037	37.62	74.058	38.535	74.175
39.951	75.56	40.311	75.711	41.367	76.282	42.783	77.12	43.002	77.18
44.2	77.258	45.988	77.341	51.074	77.576	51.51	77.625	52.697	77.717
53.363	77.726	53.765	77.732	54.499	77.685	55.529	77.662	57.489	77.432
58.361	77.381	60.479	77.321	64.528	77.324	66.858	77.37	68.274	77.433
69.448	77.52	69.909	77.61	71.107	77.93	72.6	78.492	73.939	78.722
75.291	78.993	76.709	79.157						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	32.239	.08	38.535	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32.239	38.535	16	16	16	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	75.80	Element	Left OB	Channel	Right OB
Vel Head (m)	0.54	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	75.26	Reach Len. (m)			
Crit W.S. (m)	75.26	Flow Area (m2)	0.39	7.13	0.60
E.G. Slope (m/m)	0.059648	Area (m2)	0.39	7.13	0.60
Q Total (m3/s)	24.40	Flow (m3/s)	0.28	23.60	0.52
Top Width (m)	8.13	Top Width (m)	0.73	6.30	1.11
Vel Total (m/s)	3.01	Avg. Vel. (m/s)	0.73	3.31	0.87
Max Chl Dpth (m)	1.22	Hydr. Depth (m)	0.53	1.13	0.54
Conv. Total (m3/s)	99.9	Conv. (m3/s)	1.2	96.6	2.1
Length Wtd. (m)		Wetted Per. (m)	1.29	6.31	1.55
Min Ch El (m)	74.04	Shear (N/m2)	175.47	660.44	227.28
Alpha	1.18	Stream Power (N/m s)	128.03	2186.20	197.05
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Warning: User specified water surface is not possible for the specified flow regime. The program used critical depth as the
starting water surface.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	76.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.61	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	75.40	Reach Len. (m)			
Crit W.S. (m)	75.40	Flow Area (m2)	0.50	8.01	

0.77					
E.G. Slope (m/m)	0.057652	Area (m2)	0.50	8.01	
0.77					
Q Total (m3/s)	29.28	Flow (m3/s)	0.38	28.19	
0.71					
Top Width (m)	8.46	Top Width (m)	0.91	6.30	
1.26					
Vel Total (m/s)	3.16	Avg. Vel. (m/s)	0.76	3.52	
0.92					
Max Chl Dpth (m)	1.37	Hydr. Depth (m)	0.55	1.27	
0.61					
Conv. Total (m3/s)	122.0	Conv. (m3/s)	1.6	117.4	
3.0					
Length Wtd. (m)		Wetted Per. (m)	1.53	6.31	
1.76					
Min Ch El (m)	74.04	Shear (N/m2)	184.17	717.58	
248.08					
Alpha	1.20	Stream Power (N/m s)	139.57	2524.71	
229.31					
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Warning: User specified water surface is not possible for the specified flow regime. The program used critical depth as the
starting water surface.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2523

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.68	2.9	90.77	9.8	90.61	13	90.58	13.3	90.56
14.1	90.47	14.6	90.39	15.4	90.33	17.5	90.45	18.5	90.42
18.790.41333		19.4	90.39	21	90.39	21.7	90.36	23.8	90.12
24.2	90.09	25.9	89.87	27.4	89.62	28	89.55	30.1	89.46
35.4	89.5	38.5	89.56	40.6	89.74	42.7	89.86	43.4	89.91
45	89.97	45.9	90.066	46.5	90.13	46.8	90.15	48.9	90.09
51	90.09	53.1	90.19	56.1	90.25	57.7	90.25	59.5	90.1
60.9	90.09	61.5	90.06						

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15      28     .08    38.5     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            28    38.5                7     6.4     5.9             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           89.91    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.13    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           89.78    Reach Len. (m)           7.00       6.40
5.90
  Crit W.S. (m)           89.78    Flow Area (m2)           0.20       2.96
0.29
  E.G. Slope (m/m)      0.091697   Area (m2)                0.20       2.96
0.29
  Q Total (m3/s)           5.05    Flow (m3/s)              0.10       4.82
0.13
  Top Width (m)           14.90    Top Width (m)            1.57      10.50
2.83
  Vel Total (m/s)          1.46    Avg. Vel. (m/s)          0.50       1.63
0.44
  Max Chl Dpth (m)         0.32    Hydr. Depth (m)          0.13       0.28
0.10
  Conv. Total (m3/s)       16.7    Conv. (m3/s)              0.3       15.9
 0.4
  Length Wtd. (m)          6.39    Wetted Per. (m)          1.59      10.50
2.84
  Min Ch El (m)           89.46    Shear (N/m2)           111.37     253.67
92.47
  Alpha                    1.19    Stream Power (N/m s)    55.87     413.02
40.97
  Frctn Loss (m)           0.03    Cum Volume (1000 m3)     2.93       6.70
6.47
  C & E Loss (m)           0.03    Cum SA (1000 m2)         3.84       4.30
6.51



Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream
```

conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.89	Reach Len. (m)	7.00	6.40	5.90
Crit W.S. (m)		Flow Area (m2)	0.41	4.15	0.72
E.G. Slope (m/m)	0.040489	Area (m2)	0.41	4.15	0.72
Q Total (m3/s)	6.06	Flow (m3/s)	0.18	5.61	0.28
Top Width (m)	17.47	Top Width (m)	2.29	10.50	4.68
Vel Total (m/s)	1.15	Avg. Vel. (m/s)	0.42	1.35	0.38
Max Chl Dpth (m)	0.43	Hydr. Depth (m)	0.18	0.39	0.15
Conv. Total (m3/s)	30.1	Conv. (m3/s)	0.9	27.9	1.4
Length Wtd. (m)	6.39	Wetted Per. (m)	2.32	10.50	4.70
Min Ch El (m)	89.46	Shear (N/m2)	70.70	156.72	60.89
Alpha	1.29	Stream Power (N/m s)	30.02	212.11	23.40
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	3.73	7.40	7.85
C & E Loss (m)	0.02	Cum SA (1000 m2)	4.99	4.30	7.50

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2517

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.25	1.6	90.31	3.3	90.39	5.4	90.56	6.1	90.52
7.5	90.46	9.6	90.48	10.8	90.42	11.8	90.35	16	90.23
18.1	90.22	20.5	90.172	20.6	90.17	23.4	90.15	28.6	90.05
29.8	89.97	30.7	88	32.8	88	34.5	88	36.1	89.91
37.7	89.94	39.2	90.04	40.8	90.04	42.4	90.08	43.4	90.06
44	90.01	45.6	89.92	46.7	89.876	47.6	89.84	48.7	89.85
49.7	89.86	50.3	89.9	51.8	90.05	53.9	90.12	56	90.13
56.6	90.11	58.5	90.16	60.2	90.18	64.6	89.92	69.3	89.75
70.8	89.67	73	89.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	30.7	.08	34.5	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
30.7	34.5	28.3	26.1	23.9	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	31	89.87	F
35.5	73	89.87	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	89.82	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.080	0.150
W.S. Elev (m)	89.79	Reach Len. (m)	28.30	26.10	23.90
Crit W.S. (m)	88.59	Flow Area (m2)		6.28	1.20
E.G. Slope (m/m)	0.001698	Area (m2)	0.74	6.82	1.81
Q Total (m3/s)	5.05	Flow (m3/s)		4.78	0.28
Top Width (m)	11.05	Top Width (m)	0.82	3.80	6.43

Vel Total (m/s)	0.68	Avg. Vel. (m/s)		0.76	0.23
Max Chl Dpth (m)	1.79	Hydr. Depth (m)		1.79	1.20
Conv. Total (m3/s)	122.6	Conv. (m3/s)		115.9	6.7
Length Wtd. (m)	26.10	Wetted Per. (m)		3.50	1.56
Min Ch El (m)	88.00	Shear (N/m2)		29.88	12.80
Alpha	1.20	Stream Power (N/m s)		22.72	2.95
Frctn Loss (m)		Cum Volume (1000 m3)	2.93	6.67	6.46
C & E Loss (m)		Cum SA (1000 m2)	3.83	4.26	6.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.91	Reach Len. (m)	28.30	26.10	23.90
Crit W.S. (m)	88.67	Flow Area (m2)	0.83	7.25	2.92
E.G. Slope (m/m)	0.001590	Area (m2)	0.83	7.25	2.92
Q Total (m3/s)	6.06	Flow (m3/s)	0.12	5.56	0.39
Top Width (m)	18.80	Top Width (m)	0.87	3.80	14.13
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.14	0.77	0.13
Max Chl Dpth (m)	1.91	Hydr. Depth (m)	0.95	1.91	0.21
Conv. Total (m3/s)	152.1	Conv. (m3/s)	3.0	139.4	9.7
Length Wtd. (m)	26.10	Wetted Per. (m)	2.10	3.80	15.30
Min Ch El (m)	88.00	Shear (N/m2)	6.18	29.74	

2.97					
Alpha	1.78	Stream Power (N/m s)	0.89	22.80	0.39
Frctn Loss (m)		Cum Volume (1000 m3)	3.73	7.37	7.84
C & E Loss (m)		Cum SA (1000 m2)	4.98	4.26	7.44

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 2 RS: 2504

INPUT
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 17
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	89.87	40	89.87	60	89.87

Upstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.25	1.6	90.31	3.3	90.39	5.4	90.56	6.1	90.52
7.5	90.46	9.6	90.48	10.8	90.42	11.8	90.35	16	90.23
18.1	90.22	20.5	90.172	20.6	90.17	23.4	90.15	28.6	90.05
29.8	89.97	30.7	88	32.8	88	34.5	88	36.1	89.91
37.7	89.94	39.2	90.04	40.8	90.04	42.4	90.08	43.4	90.06
44	90.01	45.6	89.92	46.7	89.876	47.6	89.84	48.7	89.85
49.7	89.86	50.3	89.9	51.8	90.05	53.9	90.12	56	90.13
56.6	90.11	58.5	90.16	60.2	90.18	64.6	89.92	69.3	89.75
70.8	89.67	73	89.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	30.7	.08	34.5	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
30.7	34.5	.6	.8

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      31   89.87       F
    35.5      73   89.87       F

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   89.87              40   89.87              60   89.87

Downstream Bridge Cross Section Data
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.42     1.5    90.4       3   90.43     4.5   90.41     6.2   90.37
     7.6   90.41    10.6   90.53    12.1   90.48    14.9   90.43    16.7   90.43
    17.1   90.41    19.3   90.39    21.5   90.34    24.3   90.31    24.890.31333
    25.8   90.32      28   90.08    28.9   89.95    29.7   89.86    30.4   89.78
    32.4   89.33    33.4   89.15    34.6   88.98    35.4    87.9    38.4    87.9
    45.6   87.89      52    89.9    54.2   89.96    56.4   90.09    58.5   90.18
    59.3   90.18    66.9      90    69.4   89.87    71.6   89.89    72.2   89.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    35.4     .08    45.6     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.4    45.6             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    33.6   89.87       F
    47.4    72.2   89.87       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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    1.25    1.83
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
                2      18     .013     .013        0                    .5
       1
Upstream   Elevation =  88
           Centerline Station =  33
Downstream Elevation =  87.89
           Centerline Station =  40.5
```

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	5.05	Culv Full Len (m)	18.00
# Barrels	1	Culv Vel US (m/s)	2.21
Q Barrel (m3/s)	5.05	Culv Vel DS (m/s)	2.21
E.G. US. (m)	89.82	Culv Inv El Up (m)	88.00
W.S. US. (m)	89.79	Culv Inv El Dn (m)	87.89
E.G. DS (m)	89.40	Culv Frctn Ls (m)	0.06
W.S. DS (m)	89.39	Culv Exit Loss (m)	0.24
Delta EG (m)	0.42	Culv Entr Loss (m)	0.12
Delta WS (m)	0.40	Q Weir (m3/s)	
E.G. IC (m)	89.51	Weir Sta Lft (m)	
E.G. OC (m)	89.82	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	89.25	Weir Max Depth (m)	
Culv WS Outlet (m)	89.14	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.92	Min El Weir Flow (m)	89.87

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	4.92	Culv Full Len (m)	18.00
# Barrels	1	Culv Vel US (m/s)	2.15
Q Barrel (m3/s)	4.92	Culv Vel DS (m/s)	2.15
E.G. US. (m)	89.94	Culv Inv El Up (m)	88.00
W.S. US. (m)	89.91	Culv Inv El Dn (m)	87.89
E.G. DS (m)	89.53	Culv Frctn Ls (m)	0.05
W.S. DS (m)	89.53	Culv Exit Loss (m)	0.23
Delta EG (m)	0.40	Culv Entr Loss (m)	0.12
Delta WS (m)	0.38	Q Weir (m3/s)	1.14
E.G. IC (m)	89.87	Weir Sta Lft (m)	29.82
E.G. OC (m)	89.94	Weir Sta Rgt (m)	73.00
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	89.25	Weir Max Depth (m)	0.30
Culv WS Outlet (m)	89.14	Weir Avg Depth (m)	0.10
Culv Nml Depth (m)		Weir Flow Area (m2)	2.15
Culv Crt Depth (m)	0.90	Min El Weir Flow (m)	89.87

Warning: During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2491

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.42	1.5	90.4	3	90.43	4.5	90.41	6.2	90.37
7.6	90.41	10.6	90.53	12.1	90.48	14.9	90.43	16.7	90.43
17.1	90.41	19.3	90.39	21.5	90.34	24.3	90.31	24.890.31333	
25.8	90.32	28	90.08	28.9	89.95	29.7	89.86	30.4	89.78
32.4	89.33	33.4	89.15	34.6	88.98	35.4	87.9	38.4	87.9
45.6	87.89	52	89.9	54.2	89.96	56.4	90.09	58.5	90.18
59.3	90.18	66.9	90	69.4	89.87	71.6	89.89	72.2	89.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	35.4	.08	45.6	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.4	45.6	13.9	11.6	8.7	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	33.6	89.87	F
47.4	72.2	89.87	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	89.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.39	Reach Len. (m)	13.90	11.60	8.70
Crit W.S. (m)	88.19	Flow Area (m2)	1.11	15.27	2.20
E.G. Slope (m/m)	0.000349	Area (m2)	1.32	15.27	3.60
Q Total (m3/s)	5.05	Flow (m3/s)	0.08	4.67	0.30

Top Width (m)	18.27	Top Width (m)	3.28	10.20	4.79
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.08	0.31	0.14
Max Chl Dpth (m)	1.50	Hydr. Depth (m)	0.61	1.50	1.22
Conv. Total (m3/s)	270.5	Conv. (m3/s)	4.5	249.8	16.2
Length Wtd. (m)	11.52	Wetted Per. (m)	2.35	10.20	1.89
Min Ch El (m)	87.89	Shear (N/m2)	1.61	5.12	3.98
Alpha	1.18	Stream Power (N/m s)	0.12	1.56	0.55
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	2.93	6.61	6.46
C & E Loss (m)	0.01	Cum SA (1000 m2)	3.77	4.08	6.35

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

			Left OB	Channel	Right OB
E.G. Elev (m)	89.53	Element			
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.53	Reach Len. (m)	13.90	11.60	8.70
Crit W.S. (m)	88.22	Flow Area (m2)	1.35	16.65	2.44
E.G. Slope (m/m)	0.000373	Area (m2)	1.81	16.65	4.28
Q Total (m3/s)	6.06	Flow (m3/s)	0.12	5.57	0.37
Top Width (m)	19.30	Top Width (m)	3.88	10.20	5.22
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.09	0.33	0.15
Max Chl Dpth (m)	1.64	Hydr. Depth (m)	0.75	1.63	1.36

Conv. Total (m3/s)	314.1	Conv. (m3/s)	6.2	288.6	19.3
Length Wtd. (m)	11.52	Wetted Per. (m)	2.35	10.20	1.89
Min Ch El (m)	87.89	Shear (N/m2)	2.09	5.96	4.73
Alpha	1.19	Stream Power (N/m s)	0.19	1.99	0.72
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	3.73	7.26	7.84
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.92	4.08	7.21

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2479

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.33	3	90.29	5.9	90.35	7.4	90.39	9.5	90.51
11.9	90.52	14.7	90.49	16.3	90.5	17.7	90.47	20.1	90.32
23.6	90.28	25.5	90.22	26.5	90.21	28.9	90.15	30.1	90.12
30.9	90.01	32.4	89.75	33.8	89.45	34.7	89.31	37	89.01
38.3	88.75	39.3	87.85	40.5	87.85	41.6	87.85	43.9	88.68
45.6	89.04	48.4	89.58	50	89.83	50.589	.86572	50.7	89.88
51.5	89.86	52.8	89.85	54.4	89.92	57.4	89.91	58.8	90.05
59.9	90.13	64.5	90.26	67.6	90.23	69.2	90.11	71.4	90.01
73.7	89.94	76	89.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	38.3	.08	43.9	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
38.3	43.9	77	79.5	82.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	89.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.36	Reach Len. (m)	77.00	79.50	82.70
Crit W.S. (m)		Flow Area (m2)	1.08	7.04	1.11
E.G. Slope (m/m)	0.002386	Area (m2)	1.08	7.04	1.11
Q Total (m3/s)	5.05	Flow (m3/s)	0.15	4.73	0.17
Top Width (m)	12.85	Top Width (m)	3.91	5.60	3.35
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.14	0.67	0.15
Max Chl Dpth (m)	1.51	Hydr. Depth (m)	0.28	1.26	0.33
Conv. Total (m3/s)	103.4	Conv. (m3/s)	3.0	96.9	3.5
Length Wtd. (m)	79.53	Wetted Per. (m)	3.96	6.09	3.42
Min Ch El (m)	87.85	Shear (N/m2)	6.41	27.04	7.59
Alpha	1.42	Stream Power (N/m s)	0.88	18.18	1.17
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	2.91	6.48	6.44
C & E Loss (m)	0.01	Cum SA (1000 m2)	3.72	3.98	6.32

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
         the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.51	Element	Left OB	Channel	Right OB

Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.49	Reach Len. (m)	77.00	79.50	82.70
Crit W.S. (m)		Flow Area (m2)	1.66	7.79	1.60
E.G. Slope (m/m)	0.002323	Area (m2)	1.66	7.79	1.60
Q Total (m3/s)	6.06	Flow (m3/s)	0.26	5.52	0.27
Top Width (m)	14.33	Top Width (m)	4.69	5.60	4.04
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.16	0.71	0.17
Max Chl Dpth (m)	1.64	Hydr. Depth (m)	0.35	1.39	0.40
Conv. Total (m3/s)	125.8	Conv. (m3/s)	5.5	114.6	5.7
Length Wtd. (m)	79.54	Wetted Per. (m)	4.75	6.09	4.12
Min Ch El (m)	87.85	Shear (N/m2)	7.95	29.12	8.85
Alpha	1.53	Stream Power (N/m s)	1.27	20.66	1.51
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	3.70	7.11	7.81
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.86	3.98	7.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2400

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
       0  90.041    .408  90.081   1.022   90.11   4.751  90.237   6.922   90.24
  11.705  90.177  13.436  90.213  14.758  90.136  16.284  90.139  17.779  90.061
   19.95  90.039  22.121  90.043  22.389  90.026  24.293  89.797  26.464  89.484
  28.635  89.058  31.546  88.936  32.978  88.807  34.225  87.849  34.891  87.338
  35.976  87.338  36.509  87.881   37.32  88.708  39.493  88.897  41.665  89.258
  43.837  89.582  45.279  89.739   46.01  89.766  48.182  89.796  57.483  89.718
  59.044  89.687  61.216    89.7  63.389  89.652   65.11  89.662  68.162  89.458
  69.906  89.436  72.078  89.263  72.738  89.241   74.25  89.157  76.423  89.184
  78.581  89.131

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  34.225     .08  36.509     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        34.225  36.509             75.1    79.5    85.4             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            89.05    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.09    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            88.96    Reach Len. (m)          75.10      79.50
85.40
  Crit W.S. (m)                     Flow Area (m2)           0.93       3.39
0.90
  E.G. Slope (m/m)      0.008633    Area (m2)                0.93       3.39
0.90
  Q Total (m3/s)            5.05    Flow (m3/s)              0.23       4.61
0.22
  Top Width (m)             8.94    Top Width (m)            3.28       2.28
3.37
  Vel Total (m/s)           0.97    Avg. Vel. (m/s)          0.25       1.36
0.24
  Max Chl Dpth (m)          1.62    Hydr. Depth (m)          0.28       1.49
0.27
  Conv. Total (m3/s)        54.4    Conv. (m3/s)              2.5       49.6
 2.3
  Length Wtd. (m)           79.44   Wetted Per. (m)          3.62       2.69
3.73
  Min Ch El (m)             87.34   Shear (N/m2)            21.68     106.97
20.38
  Alpha                     1.80    Stream Power (N/m s)     5.42     145.20
4.89
  Frctn Loss (m)            0.52    Cum Volume (1000 m3)     2.83       6.06
6.36
```

C & E Loss (m)	0.01	Cum SA (1000 m2)	3.44	3.67	6.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.10	Reach Len. (m)	75.10	79.50	85.40
Crit W.S. (m)		Flow Area (m2)	1.61	3.72	1.43
E.G. Slope (m/m)	0.008323	Area (m2)	1.61	3.72	1.43
Q Total (m3/s)	6.06	Flow (m3/s)	0.40	5.26	0.40
Top Width (m)	12.32	Top Width (m)	5.82	2.28	4.22
Vel Total (m/s)	0.90	Avg. Vel. (m/s)	0.25	1.42	0.28
Max Chl Dpth (m)	1.76	Hydr. Depth (m)	0.28	1.63	0.34
Conv. Total (m3/s)	66.5	Conv. (m3/s)	4.4	57.7	4.4
Length Wtd. (m)	79.42	Wetted Per. (m)	6.16	2.69	4.59
Min Ch El (m)	87.34	Shear (N/m2)	21.33	112.93	25.49
Alpha	2.17	Stream Power (N/m s)	5.30	159.90	7.14
Frctn Loss (m)	0.52	Cum Volume (1000 m3)	3.58	6.66	7.69
C & E Loss (m)	0.01	Cum SA (1000 m2)	4.45	3.67	6.83

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2320

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.773	1.946	89.755	6.02	89.782	10.094	89.891	12.131	89.804
14.168	89.821	16.985	89.596	17.576	89.512	18.242	89.442	20.399	88.953
22.316	88.643	24.353	88.444	26.39	88.081	27.229	88.036	27.673	88.054
28.426	88.036	29.15	86.898	29.155	86.891	29.277	86.825	31.265	86.825
31.417	87.032	32.528	88.54	34.567	89.113	36.606	89.318	38.645	89.379
40.683	89.502	42.722	89.842	44.761	89.872	46.799	89.847	50.877	89.891
53.246	89.838	56.993	89.666	59.032	89.633	61.205	89.504	63.109	89.434
65.148	89.332	68.014	88.958	69.225	88.83	71.264	88.997	73.303	89.073
73.959	89.077								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	29.15	.08	31.417	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
29.15	31.417	75	79.5	88.9	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.46	Reach Len. (m)	75.00	79.50	88.90
Crit W.S. (m)		Flow Area (m2)	1.94	3.68	0.75
E.G. Slope (m/m)	0.005144	Area (m2)	1.94	3.68	0.75
Q Total (m3/s)	5.05	Flow (m3/s)	0.46	4.39	0.20
Top Width (m)	8.24	Top Width (m)	4.92	2.27	1.05
Vel Total (m/s)	0.79	Avg. Vel. (m/s)	0.24	1.19	0.27
Max Chl Dpth (m)	1.63	Hydr. Depth (m)	0.39	1.62	

0.71					
Conv. Total (m3/s)	70.4	Conv. (m3/s)	6.4	61.3	2.8
Length Wtd. (m)	80.00	Wetted Per. (m)	5.58	2.39	1.77
Min Ch El (m)	86.83	Shear (N/m2)	17.51	77.57	21.31
Alpha	1.98	Stream Power (N/m s)	4.14	92.65	5.74
Frctn Loss (m)	0.56	Cum Volume (1000 m3)	2.72	5.78	6.29
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.13	3.49	5.85

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	88.66	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.59	Reach Len. (m)	75.00	79.50	88.90
Crit W.S. (m)		Flow Area (m2)	2.71	3.99	0.90
E.G. Slope (m/m)	0.005309	Area (m2)	2.71	3.99	0.90
Q Total (m3/s)	6.06	Flow (m3/s)	0.70	5.11	0.25
Top Width (m)	9.90	Top Width (m)	6.33	2.27	1.30
Vel Total (m/s)	0.80	Avg. Vel. (m/s)	0.26	1.28	0.28
Max Chl Dpth (m)	1.77	Hydr. Depth (m)	0.43	1.76	0.69
Conv. Total (m3/s)	83.2	Conv. (m3/s)	9.6	70.1	3.5
Length Wtd. (m)	79.88	Wetted Per. (m)	7.00	2.39	2.07

Min Ch El (m)	86.83	Shear (N/m2)	20.17	86.84	22.68
Alpha	2.19	Stream Power (N/m s)	5.21	111.24	6.33
Frctn Loss (m)	0.48	Cum Volume (1000 m3)	3.41	6.35	7.59
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.00	3.49	6.59

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2241

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.853	3.973	88.708	6.548	88.71	11.999	88.673	14.03	88.387
16.011	88.08	18.389	87.917	19.559	87.865	22.03	87.675	24.036	87.374
24.076	87.319	24.813	86.312	25.833	86.312	26.076	86.433	26.326	86.574
28.09	87.572	30.101	87.983	32.112	88.202	34.052	88.458	36.134	88.871
38.145	89.197	39.511	89.256	42.167	89.331	44.178	89.547	46.189	89.667
48.2	89.724	52.223	89.727	60.267	89.781	62.278	89.817	64.289	89.873
64.984	89.862	65.678	89.878	66.3	89.873	66.803	89.844	67.926	89.711
68.311	89.685	69.338	89.667						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	24.076	.08	26.326	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.076	26.326	66.8	71.9	82.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	87.96	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150

W.S. Elev (m)	87.88	Reach Len. (m)	66.80	71.90	82.80
Crit W.S. (m)		Flow Area (m2)	1.01	3.09	1.65
E.G. Slope (m/m)	0.010216	Area (m2)	1.01	3.09	1.65
Q Total (m3/s)	5.05	Flow (m3/s)	0.24	4.15	0.67
Top Width (m)	10.35	Top Width (m)	4.84	2.25	3.27
Vel Total (m/s)	0.88	Avg. Vel. (m/s)	0.23	1.34	0.40
Max Chl Dpth (m)	1.57	Hydr. Depth (m)	0.21	1.37	0.51
Conv. Total (m3/s)	50.0	Conv. (m3/s)	2.3	41.0	6.6
Length Wtd. (m)	72.54	Wetted Per. (m)	4.89	2.83	3.56
Min Ch El (m)	86.31	Shear (N/m2)	20.57	109.61	46.51
Alpha	1.95	Stream Power (N/m s)	4.82	147.05	18.79
Frctn Loss (m)	0.25	Cum Volume (1000 m3)	2.61	5.51	6.18
C & E Loss (m)	0.02	Cum SA (1000 m2)	2.77	3.31	5.66

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	88.18	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.12	Reach Len. (m)	66.80	71.90	82.80
Crit W.S. (m)		Flow Area (m2)	2.65	3.63	2.62
E.G. Slope (m/m)	0.006929	Area (m2)	2.65	3.63	2.62
Q Total (m3/s)	6.06	Flow (m3/s)	0.68	4.47	0.91

Top Width (m)	15.61	Top Width (m)	8.33	2.25	5.04
Vel Total (m/s)	0.68	Avg. Vel. (m/s)	0.26	1.23	0.35
Max Chl Dpth (m)	1.81	Hydr. Depth (m)	0.32	1.62	0.52
Conv. Total (m3/s)	72.8	Conv. (m3/s)	8.2	53.7	10.9
Length Wtd. (m)	72.51	Wetted Per. (m)	8.39	2.83	5.35
Min Ch El (m)	86.31	Shear (N/m2)	21.49	87.39	33.34
Alpha	2.47	Stream Power (N/m s)	5.54	107.54	11.51
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	3.21	6.05	7.43
C & E Loss (m)	0.01	Cum SA (1000 m2)	3.45	3.31	6.31

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2169

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.498	1.879	88.403	4.243	88.448	5.719	88.372	7.195	88.26
8.699	88.17	11.6	87.817	11.622	87.815	13.246	87.675	14.574	87.481
15.52	87.323	16.049	87.205	17.793	86.722	19.001	85.8	20.067	85.8
21.235	85.8	22.34	86.966	24.614	87.452	26.887	87.986	32.283	88.782
32.3	88.784	33.708	88.966	35.981	89.004	42.801	89.28	44.089	89.25
46.471	89.248	47.348	89.229	51.895	88.992	54.419	89.094	58.716	89.109
63.263	89.156	64.713	89.121						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.793	.08	22.34	.15

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

17.793	22.34		7.7	7.6	6.3	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	87.69	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.67	Reach Len. (m)	7.70	7.60	6.30
Crit W.S. (m)		Flow Area (m2)	1.83	7.31	1.16
E.G. Slope (m/m)	0.001693	Area (m2)	1.83	7.31	1.16
Q Total (m3/s)	5.05	Flow (m3/s)	0.27	4.62	0.16
Top Width (m)	12.28	Top Width (m)	4.52	4.55	3.21
Vel Total (m/s)	0.49	Avg. Vel. (m/s)	0.15	0.63	0.14
Max Chl Dpth (m)	1.87	Hydr. Depth (m)	0.40	1.61	0.36
Conv. Total (m3/s)	122.8	Conv. (m3/s)	6.6	112.4	3.8
Length Wtd. (m)	7.58	Wetted Per. (m)	4.63	5.36	3.29
Min Ch El (m)	85.80	Shear (N/m2)	6.56	22.64	5.84
Alpha	1.53	Stream Power (N/m s)	0.97	14.32	0.80
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	2.52	5.14	6.07
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.46	3.07	5.39

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.98	Reach Len. (m)	7.70	7.60	6.30
Crit W.S. (m)		Flow Area (m2)	3.70	8.70	

2.33					
E.G. Slope (m/m)	0.001197	Area (m2)	3.70	8.70	
2.33					
Q Total (m3/s)	6.06	Flow (m3/s)	0.53	5.19	
0.34					
Top Width (m)	16.56	Top Width (m)	7.51	4.55	
4.51					
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.14	0.60	
0.15					
Max Chl Dpth (m)	2.18	Hydr. Depth (m)	0.49	1.91	
0.52					
Conv. Total (m3/s)	175.2	Conv. (m3/s)	15.3	150.1	
9.9					
Length Wtd. (m)	7.57	Wetted Per. (m)	7.63	5.36	
4.62					
Min Ch El (m)	85.80	Shear (N/m2)	5.70	19.04	
5.93					
Alpha	1.82	Stream Power (N/m s)	0.81	11.37	
0.87					
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	3.00	5.60	
7.23					
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.92	3.07	
5.91					

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2161

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.498	1.879	88.403	4.243	88.448	5.719	88.372	7.195	88.26
8.699	88.17	11.6	87.817	11.622	87.815	13.246	87.675	14.574	87.481
15.52	87.323	16.049	87.205	17.793	86.722	19.001	85.8	20.067	85.8
21.235	85.8	22.34	86.966	24.614	87.452	26.887	87.986	32.283	88.782
32.3	88.784	33.708	88.966	35.981	89.004	42.801	89.28	44.089	89.25
46.471	89.248	47.348	89.229	51.895	88.992	54.419	89.094	58.716	89.109
63.263	89.156	64.713	89.121						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.793	.08	22.34	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
17.793 22.34 30.1 30.7 31.2 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	18	88.41	F
22	64.713	88.41	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	87.67	Element	Left OB	Channel	Right OB	
Vel Head (m)	0.03	Wt. n-Val.		0.080		
W.S. Elev (m)	87.65	Reach Len. (m)	30.10	30.70	31.20	
Crit W.S. (m)	86.51	Flow Area (m2)		6.69		
E.G. Slope (m/m)	0.002216	Area (m2)	1.72	7.19	1.07	
Q Total (m3/s)	5.05	Flow (m3/s)		5.05		
Top Width (m)	11.99	Top Width (m)	4.35	4.55	3.10	
Vel Total (m/s)	0.75	Avg. Vel. (m/s)		0.75		
Max Chl Dpth (m)	1.85	Hydr. Depth (m)		1.67		
Conv. Total (m3/s)	107.3	Conv. (m3/s)		107.3		
Length Wtd. (m)	30.70	Wetted Per. (m)		4.61		
Min Ch El (m)	85.80	Shear (N/m2)		31.57		
Alpha	1.00	Stream Power (N/m s)		23.84		
Frctn Loss (m)		Cum Volume (1000 m3)	2.51	5.08	6.06	
C & E Loss (m)		Cum SA (1000 m2)	2.42	3.03	5.37	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.080	
W.S. Elev (m)	87.95	Reach Len. (m)	30.10	30.70	31.20
Crit W.S. (m)	86.59	Flow Area (m2)		7.91	
E.G. Slope (m/m)	0.001828	Area (m2)	3.51	8.58	2.21
Q Total (m3/s)	6.06	Flow (m3/s)		6.06	
Top Width (m)	16.23	Top Width (m)	7.29	4.55	4.39
Vel Total (m/s)	0.77	Avg. Vel. (m/s)		0.77	
Max Chl Dpth (m)	2.15	Hydr. Depth (m)		1.98	
Conv. Total (m3/s)	141.8	Conv. (m3/s)		141.8	
Length Wtd. (m)	30.70	Wetted Per. (m)		4.61	
Min Ch El (m)	85.80	Shear (N/m2)		30.78	
Alpha	1.00	Stream Power (N/m s)		23.59	
Frctn Loss (m)		Cum Volume (1000 m3)	2.97	5.54	7.21
C & E Loss (m)		Cum SA (1000 m2)	2.86	3.03	5.89

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 2 RS: 2146

INPUT
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 19
Weir Coefficient = 1.4

Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	88.41		10	88.41		20	88.41	
30	88.41		40	88.41				

Upstream Bridge Cross Section Data
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.498	1.879	88.403	4.243	88.448	5.719	88.372	7.195	88.26
8.699	88.17	11.6	87.817	11.622	87.815	13.246	87.675	14.574	87.481
15.52	87.323	16.049	87.205	17.793	86.722	19.001	85.8	20.067	85.8
21.235	85.8	22.34	86.966	24.614	87.452	26.887	87.986	32.283	88.782
32.3	88.784	33.708	88.966	35.981	89.004	42.801	89.28	44.089	89.25
46.471	89.248	47.348	89.229	51.895	88.992	54.419	89.094	58.716	89.109
63.263	89.156	64.713	89.121						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	17.793	.08	22.34	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
17.793	22.34	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	18	88.41	F
22	64.713	88.41	F

Downstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	88.41		10	88.41		20	88.41	
30	88.41		40	88.41				

Downstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.416	2.521	88.392	3.895	88.398	6.915	88.428	8.652	88.479
10.959	88.378	11.919	88.398	13.266	88.396	15.52	88.352	15.573	88.351
17.88	88.257	18.633	88.245	19.944	88.19	21.563	88.073	23.956	87.754
24.614	87.614	24.801	87.574	25.957	85.8	27.108	85.8	27.422	85.8
27.968	85.8	29.415	87.585	31.722	87.833	33.281	87.926	34.746	87.944
36.336	88.013	38.643	88.141	39.141	88.15	40.005	88.206	40.951	88.29
43.535	88.213	45.565	88.254	50.859	88.293	54.793	88.375	56.718	88.349
58.183	88.358	59.407	88.391	64.042	88.593	66.328	88.62	71.006	88.589

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .15  25.957     .08  27.968     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
        25.957  27.968            .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      18   88.41       F
      36  71.006   88.41       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     1.3    1.85
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 2      20     .013     .013        0                   .5
       1
Upstream   Elevation =  85.94
           Centerline Station =  20
Downstream Elevation =  85.83
           Centerline Station =  27

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       5.05    Culv Full Len (m)        20.00
  # Barrels                    1    Culv Vel US (m/s)         2.10
  Q Barrel (m3/s)           5.05    Culv Vel DS (m/s)         2.10
  E.G. US. (m)             87.68    Culv Inv El Up (m)       85.94
  W.S. US. (m)             87.65    Culv Inv El Dn (m)       85.83
  E.G. DS (m)              87.39    Culv Frctn Ls (m)         0.05
  W.S. DS (m)              87.28    Culv Exit Loss (m)        0.12
  Delta EG (m)              0.29    Culv Entr Loss (m)        0.11
  Delta WS (m)              0.36    Q Weir (m3/s)
  E.G. IC (m)              87.50    Weir Sta Lft (m)
  E.G. OC (m)              87.68    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)         87.24    Weir Max Depth (m)
```

Culv WS Outlet (m)	87.13	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.91	Min El Weir Flow (m)	88.41

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	6.06	Culv Full Len (m)	20.00
# Barrels	1	Culv Vel US (m/s)	2.52
Q Barrel (m3/s)	6.06	Culv Vel DS (m/s)	2.52
E.G. US. (m)	87.98	Culv Inv El Up (m)	85.94
W.S. US. (m)	87.95	Culv Inv El Dn (m)	85.83
E.G. DS (m)	87.54	Culv Frctn Ls (m)	0.08
W.S. DS (m)	87.42	Culv Exit Loss (m)	0.20
Delta EG (m)	0.44	Culv Entr Loss (m)	0.16
Delta WS (m)	0.53	Q Weir (m3/s)	
E.G. IC (m)	87.81	Weir Sta Lft (m)	
E.G. OC (m)	87.98	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	87.24	Weir Max Depth (m)	
Culv WS Outlet (m)	87.13	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	1.03	Min El Weir Flow (m)	88.41

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2131

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.416	2.521	88.392	3.895	88.398	6.915	88.428	8.652	88.479
10.959	88.378	11.919	88.398	13.266	88.396	15.52	88.352	15.573	88.351
17.88	88.257	18.633	88.245	19.944	88.19	21.563	88.073	23.956	87.754
24.614	87.614	24.801	87.574	25.957	85.8	27.108	85.8	27.422	85.8
27.968	85.8	29.415	87.585	31.722	87.833	33.281	87.926	34.746	87.944
36.336	88.013	38.643	88.141	39.141	88.15	40.005	88.206	40.951	88.29
43.535	88.213	45.565	88.254	50.859	88.293	54.793	88.375	56.718	88.349
58.183	88.358	59.407	88.391	64.042	88.593	66.328	88.62	71.006	88.589

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	25.957	.08	27.968	.15

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        25.957  27.968             11.5    10.9       9             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      18   88.41       F
      36  71.006   88.41       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           87.39    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.10    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           87.28    Reach Len. (m)          11.50      10.90
9.00
  Crit W.S. (m)           86.63    Flow Area (m2)           0.72       2.98
0.89
  E.G. Slope (m/m)      0.008521   Area (m2)                0.72       2.98
0.89
  Q Total (m3/s)           5.05    Flow (m3/s)              0.24       4.48
0.33
  Top Width (m)            4.18    Top Width (m)            0.97       2.01
1.20
  Vel Total (m/s)          1.10    Avg. Vel. (m/s)          0.34       1.50
0.37
  Max Chl Dpth (m)         1.48    Hydr. Depth (m)          0.74       1.48
0.74
  Conv. Total (m3/s)       54.7    Conv. (m3/s)              2.6       48.5
 3.6
  Length Wtd. (m)         10.81    Wetted Per. (m)          1.77       2.01
1.91
  Min Ch El (m)           85.80    Shear (N/m2)            33.85     123.99
39.04
  Alpha                    1.66    Stream Power (N/m s)    11.40     186.13
14.47
  Frctn Loss (m)           0.11    Cum Volume (1000 m3)     2.51       5.01
6.06
  C & E Loss (m)           0.02    Cum SA (1000 m2)         2.34       2.93
5.30



CROSS SECTION OUTPUT  Profile #Future Scenario


  E.G. Elev (m)           87.54    Element                Left OB    Channel
Right OB
```

Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.42	Reach Len. (m)	11.50	10.90	9.00
Crit W.S. (m)	86.74	Flow Area (m2)	0.85	3.25	1.06
E.G. Slope (m/m)	0.009031	Area (m2)	0.85	3.25	1.06
Q Total (m3/s)	6.06	Flow (m3/s)	0.31	5.32	0.43
Top Width (m)	4.38	Top Width (m)	1.05	2.01	1.31
Vel Total (m/s)	1.17	Avg. Vel. (m/s)	0.37	1.64	0.40
Max Chl Dpth (m)	1.62	Hydr. Depth (m)	0.81	1.62	0.81
Conv. Total (m3/s)	63.8	Conv. (m3/s)	3.3	56.0	4.5
Length Wtd. (m)	10.80	Wetted Per. (m)	1.93	2.01	2.08
Min Ch El (m)	85.80	Shear (N/m2)	39.09	143.20	45.09
Alpha	1.72	Stream Power (N/m s)	14.36	234.35	18.21
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	2.97	5.46	7.21
C & E Loss (m)	0.02	Cum SA (1000 m2)	2.74	2.93	5.80

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 2120

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.416	2.521	88.392	3.895	88.398	6.915	88.428	8.652	88.479
10.959	88.378	11.919	88.398	13.266	88.396	15.52	88.352	15.573	88.351
17.88	88.257	18.633	88.245	19.944	88.19	21.563	88.073	23.956	87.754
24.614	87.614	24.801	87.574	25.957	85.8	27.108	85.8	27.422	85.8
27.968	85.8	29.415	87.585	31.722	87.833	33.281	87.926	34.746	87.944
36.336	88.013	38.643	88.141	39.141	88.15	40.005	88.206	40.951	88.29
43.535	88.213	45.565	88.254	50.859	88.293	54.793	88.375	56.718	88.349

```
  58.183  88.358  59.407  88.391  64.042  88.593  66.328   88.62  71.006  88.589

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  25.957     .08  27.968     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        25.957  27.968             73.9    69.3      59             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            87.26    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.13    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            87.12    Reach Len. (m)          73.90      69.30
59.00
  Crit W.S. (m)                     Flow Area (m2)           0.57       2.66
0.71
  E.G. Slope (m/m)      0.012874    Area (m2)                0.57       2.66
0.71
  Q Total (m3/s)            5.05    Flow (m3/s)              0.22       4.54
0.30
  Top Width (m)             3.94    Top Width (m)            0.86       2.01
1.07
  Vel Total (m/s)           1.28    Avg. Vel. (m/s)          0.38       1.71
0.42
  Max Chl Dpth (m)          1.32    Hydr. Depth (m)          0.66       1.32
0.66
  Conv. Total (m3/s)        44.5    Conv. (m3/s)              1.9       40.0
 2.6
  Length Wtd. (m)          66.10    Wetted Per. (m)          1.58       2.01
1.70
  Min Ch El (m)             85.80    Shear (N/m2)            45.53     166.77
52.51
  Alpha                     1.60    Stream Power (N/m s)    17.45     284.75
22.13
  Frctn Loss (m)            0.26    Cum Volume (1000 m3)     2.50       4.98
6.05
  C & E Loss (m)            0.04    Cum SA (1000 m2)         2.33       2.91
5.29



Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.23	Reach Len. (m)	73.90	69.30	59.00
Crit W.S. (m)		Flow Area (m2)	0.67	2.89	0.83
E.G. Slope (m/m)	0.013823	Area (m2)	0.67	2.89	0.83
Q Total (m3/s)	6.06	Flow (m3/s)	0.28	5.40	0.39
Top Width (m)	4.11	Top Width (m)	0.94	2.01	1.16
Vel Total (m/s)	1.38	Avg. Vel. (m/s)	0.42	1.87	0.46
Max Chl Dpth (m)	1.43	Hydr. Depth (m)	0.72	1.43	0.72
Conv. Total (m3/s)	51.6	Conv. (m3/s)	2.4	45.9	3.3
Length Wtd. (m)	65.76	Wetted Per. (m)	1.71	2.01	1.85
Min Ch El (m)	85.80	Shear (N/m2)	53.10	194.51	61.24
Alpha	1.64	Stream Power (N/m s)	22.28	363.68	28.26
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	2.96	5.42	7.20
C & E Loss (m)	0.05	Cum SA (1000 m2)	2.72	2.91	5.79

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek

REACH: Reach 2 RS: 2050

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.104	2.619	89.163	4.63	89.158	5.478	89.117	5.827	89.079
6.64	89.031	14.681	88.036	16.691	87.818	18.702	87.684	20.712	87.35
22.722	87.202	24.733	87.087	26.179	85.545	26.502	85.2	27.503	85.2
27.884	85.669	28.746	85.73	30.757	86	32.768	86.089	34.779	85.929
36.79	86.077	38.801	86.464	40.812	86.537	42.125	86.485	44.834	86.433
46.846	86.518	48.857	86.665	50.868	86.742	54.555	86.915	56.901	86.956
58.912	87.075	62.935	87.264	64.946	87.386	66.957	87.487	69.41	87.656
71.391	87.74								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	26.179	.08	27.884	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
26.179	27.884	69.5	80.2	86.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.96	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.95	Reach Len. (m)	69.50	80.20	86.80
Crit W.S. (m)		Flow Area (m2)	0.93	2.84	15.78
E.G. Slope (m/m)	0.001836	Area (m2)	0.93	2.84	15.78
Q Total (m3/s)	5.05	Flow (m3/s)	0.16	1.88	3.01
Top Width (m)	31.84	Top Width (m)	1.32	1.71	28.82
Vel Total (m/s)	0.26	Avg. Vel. (m/s)	0.18	0.66	0.19
Max Chl Dpth (m)	1.75	Hydr. Depth (m)	0.70	1.67	0.55
Conv. Total (m3/s)	117.9	Conv. (m3/s)	3.8	43.8	70.3
Length Wtd. (m)	81.80	Wetted Per. (m)	1.93	2.08	28.91
Min Ch El (m)	85.20	Shear (N/m2)	8.67	24.64	

9.83					
Alpha	2.77	Stream Power (N/m s)	1.52	16.26	
1.88					
Frctn Loss (m)	0.25	Cum Volume (1000 m3)	2.44	4.79	
5.57					
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.25	2.78	
4.41					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.14	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	87.13	Reach Len. (m)	69.50	80.20	
86.80					
Crit W.S. (m)		Flow Area (m2)	1.20	3.15	
21.31					
E.G. Slope (m/m)	0.001368	Area (m2)	1.20	3.15	
21.31					
Q Total (m3/s)	6.06	Flow (m3/s)	0.16	1.92	
3.98					
Top Width (m)	36.24	Top Width (m)	2.26	1.71	
32.27					
Vel Total (m/s)	0.24	Avg. Vel. (m/s)	0.14	0.61	
0.19					
Max Chl Dpth (m)	1.93	Hydr. Depth (m)	0.53	1.85	
0.66					
Conv. Total (m3/s)	163.9	Conv. (m3/s)	4.4	52.0	
107.5					
Length Wtd. (m)	82.00	Wetted Per. (m)	2.93	2.08	
32.37					
Min Ch El (m)	85.20	Shear (N/m2)	5.51	20.35	
8.83					
Alpha	2.54	Stream Power (N/m s)	0.75	12.42	
1.65					
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	2.89	5.21	
6.55					
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.61	2.78	
4.80					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1970

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.85	1.8	88.79	4.1	88.75	5.2	88.72	6.4	88.65
8.8	88.44	10.3	88.34	11.1	88.3	13	88.28	14.7	88.3
16.2	88.27273	16.9	88.26	18.1	88.21	20.6	88.03	22	87.85
23.5	87.6	24.7	87.51	26.4	84.6	27.4	84.6	27.8	84.6
29.3	87.51	29.7	87.56	32.1	87.89	33.7	88.17	34.4	88.27
35.1	88.33	36.3	88.49	36.7	88.52	38	88.43	39.1	88.38
40.2	88.4	41.4	88.38	44.6	88.47025	45.3	88.49	46.8	88.5
48.3	88.57	51.2	88.42	52.6	88.48	54.1	88.43	55.8	88.4
57.7	88.39	58.5	88.37	60.1	88.25	61.4	88.26	62.8	88.25
65.7	88.31	71.8	88.28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	26.4	.08	27.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
26.4	27.8	9.8	9	8.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.70	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.59	Reach Len. (m)	9.80	9.00	8.70
Crit W.S. (m)		Flow Area (m2)	1.16	2.79	1.02
E.G. Slope (m/m)	0.006197	Area (m2)	1.16	2.79	1.02
Q Total (m3/s)	5.05	Flow (m3/s)	0.38	4.35	

0.32					
Top Width (m)	3.59	Top Width (m)	1.16	1.40	
1.03					
Vel Total (m/s)	1.02	Avg. Vel. (m/s)	0.33	1.56	
0.31					
Max Chl Dpth (m)	1.99	Hydr. Depth (m)	1.00	1.99	
1.00					
Conv. Total (m3/s)	64.2	Conv. (m3/s)	4.9	55.2	
4.0					
Length Wtd. (m)	9.04	Wetted Per. (m)	2.31	1.40	
2.24					
Min Ch El (m)	84.60	Shear (N/m2)	30.55	121.12	
27.75					
Alpha	2.04	Stream Power (N/m s)	10.14	188.76	
8.64					
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	2.37	4.56	
4.84					
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.16	2.66	
3.11					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.92	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	86.80	Reach Len. (m)	9.80	9.00	
8.70					
Crit W.S. (m)		Flow Area (m2)	1.41	3.08	
1.25					
E.G. Slope (m/m)	0.006254	Area (m2)	1.41	3.08	
1.25					
Q Total (m3/s)	6.06	Flow (m3/s)	0.50	5.14	
0.42					
Top Width (m)	3.82	Top Width (m)	1.28	1.40	
1.13					
Vel Total (m/s)	1.06	Avg. Vel. (m/s)	0.36	1.67	
0.33					
Max Chl Dpth (m)	2.20	Hydr. Depth (m)	1.10	2.20	
1.10					
Conv. Total (m3/s)	76.7	Conv. (m3/s)	6.4	65.0	
5.3					
Length Wtd. (m)	9.05	Wetted Per. (m)	2.55	1.40	
2.47					
Min Ch El (m)	84.60	Shear (N/m2)	34.01	134.84	

30.89

Alpha	2.14	Stream Power (N/m s)	12.10	225.36	10.31
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	2.80	4.96	5.57
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.48	2.66	3.35

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1961

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.85	1.8	88.79	4.1	88.75	5.2	88.72	6.4	88.65
8.8	88.44	10.3	88.34	11.1	88.3	13	88.28	14.7	88.3
16.28	88.27273	16.9	88.26	18.1	88.21	20.6	88.03	22	87.85
23.5	87.6	24.7	87.51	26.4	84.6	27.4	84.6	27.8	84.6
29.3	87.51	29.7	87.56	32.1	87.89	33.7	88.17	34.4	88.27
35.1	88.33	36.3	88.49	36.7	88.52	38	88.43	39.1	88.38
40.2	88.4	41.4	88.38	44.68	88.47025	45.3	88.49	46.8	88.5
48.3	88.57	51.2	88.42	52.6	88.48	54.1	88.43	55.8	88.4
57.7	88.39	58.5	88.37	60.1	88.25	61.4	88.26	62.8	88.25
65.7	88.31	71.8	88.28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	26.4	.08	27.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
26.4	27.8	23.2	23.8	24.7	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	24	88.11	F
30	71.8	88.11	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.64	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	

0.150					
W.S. Elev (m)	86.52	Reach Len. (m)	23.20	23.80	24.70
Crit W.S. (m)	85.65	Flow Area (m2)	1.08	2.69	0.95
E.G. Slope (m/m)	0.007055	Area (m2)	1.08	2.69	0.95
Q Total (m3/s)	5.05	Flow (m3/s)	0.37	4.37	0.31
Top Width (m)	3.51	Top Width (m)	1.12	1.40	0.99
Vel Total (m/s)	1.07	Avg. Vel. (m/s)	0.35	1.62	0.32
Max Chl Dpth (m)	1.92	Hydr. Depth (m)	0.96	1.92	0.96
Conv. Total (m3/s)	60.1	Conv. (m3/s)	4.4	52.0	3.7
Length Wtd. (m)	23.80	Wetted Per. (m)	2.23	1.40	2.16
Min Ch El (m)	84.60	Shear (N/m2)	33.55	133.03	30.48
Alpha	2.01	Stream Power (N/m s)	11.60	215.97	9.88
Frctn Loss (m)		Cum Volume (1000 m3)	2.36	4.54	4.83
C & E Loss (m)		Cum SA (1000 m2)	2.15	2.64	3.11

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.73	Reach Len. (m)	23.20	23.80	24.70
Crit W.S. (m)	85.78	Flow Area (m2)	1.32	2.98	1.17
E.G. Slope (m/m)	0.007049	Area (m2)	1.32	2.98	1.17
Q Total (m3/s)	6.06	Flow (m3/s)	0.49	5.17	0.40
Top Width (m)	3.74	Top Width (m)	1.24	1.40	1.10
Vel Total (m/s)	1.11	Avg. Vel. (m/s)	0.37	1.74	

0.35					
Max Chl Dpth (m)	2.13	Hydr. Depth (m)	1.06	2.13	1.06
Conv. Total (m3/s)	72.2	Conv. (m3/s)	5.8	61.6	4.8
Length Wtd. (m)	23.80	Wetted Per. (m)	2.46	1.40	2.39
Min Ch El (m)	84.60	Shear (N/m2)	37.09	147.05	33.69
Alpha	2.10	Stream Power (N/m s)	13.71	255.25	11.68
Frctn Loss (m)		Cum Volume (1000 m3)	2.79	4.94	5.56
C & E Loss (m)		Cum SA (1000 m2)	2.47	2.64	3.34

CULVERT

RIVER: Walker Creek
REACH: Reach 2 RS: 1950

INPUT
Description:
Distance from Upstream XS = 2.5
Deck/Roadway Width = 15
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	88.11		60	88.11	

Upstream Bridge Cross Section Data
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.85	1.8	88.79	4.1	88.75	5.2	88.72	6.4	88.65
8.8	88.44	10.3	88.34	11.1	88.3	13	88.28	14.7	88.3
16.2	88.27273	16.9	88.26	18.1	88.21	20.6	88.03	22	87.85
23.5	87.6	24.7	87.51	26.4	84.6	27.4	84.6	27.8	84.6
29.3	87.51	29.7	87.56	32.1	87.89	33.7	88.17	34.4	88.27
35.1	88.33	36.3	88.49	36.7	88.52	38	88.43	39.1	88.38
40.2	88.4	41.4	88.38	44.68	8.47025	45.3	88.49	46.8	88.5
48.3	88.57	51.2	88.42	52.6	88.48	54.1	88.43	55.8	88.4
57.7	88.39	58.5	88.37	60.1	88.25	61.4	88.26	62.8	88.25
65.7	88.31	71.8	88.28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	26.4	.08	27.8	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
26.4	27.8	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	24	88.11	F
30	71.8	88.11	F

Downstream Deck/Roadway Coordinates

num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	88.11		60	88.11	

Downstream Bridge Cross Section Data

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.3	4.1	88.27	6.5	88.21	8.9	88.09	10.6	88.05
11.2	88.02	12.1	87.96	13.6	87.82	15	87.73	16.4	87.58
18.3	87.47	20.6	87.35	23	87.29	23.787	25889	24.8	87.21
25.4	87.14	26.6	87.02	27.7	86.82	28.1	84.6	28.6	84.6
29.5	84.6	30.1	84.6	31	86.89	32.4	86.94	33.9	87.14
35.3	87.25	37.2	87.64	39.5	87.66	41.1	87.55	45.5	87.44
46.6	87.4	48.9	87.51	51.2	87.59	52.7	87.68	53.587	.74261
55	87.86	56	87.98	57.1	88.08	58.4	88.15	58.5	88.14
60.7	88.3	61.4	88.31	62.6	88.42	63.1	88.42	64.3	88.29
65.8	88.26	67.2	88.19	67.8	88.21	68.7	88.22	70.1	88.16
71.6	88.13	72.6	88.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	28.1	.08	30.1	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
28.1	30.1	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	27.1	88.11	F
31.2	72.6	88.11	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 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	Circular	2	

FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 3 - Pipe projecting from fill
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	.5	23	.027	.027	0	.9	1

Upstream Elevation = 84.81
Centerline Station = 27
Downstream Elevation = 84.66
Centerline Station = 29.2

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	5.05	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.32
Q Barrel (m3/s)	5.05	Culv Vel DS (m/s)	2.92
E.G. US. (m)	86.64	Culv Inv El Up (m)	84.81
W.S. US. (m)	86.52	Culv Inv El Dn (m)	84.66
E.G. DS (m)	85.95	Culv Frctn Ls (m)	0.22
W.S. DS (m)	85.70	Culv Exit Loss (m)	0.22
Delta EG (m)	0.69	Culv Entr Loss (m)	0.25
Delta WS (m)	0.82	Q Weir (m3/s)	
E.G. IC (m)	86.52	Weir Sta Lft (m)	
E.G. OC (m)	86.64	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	86.12	Weir Max Depth (m)	
Culv WS Outlet (m)	85.74	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.42	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.08	Min El Weir Flow (m)	88.11

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	6.06	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.47
Q Barrel (m3/s)	6.06	Culv Vel DS (m/s)	3.12
E.G. US. (m)	86.86	Culv Inv El Up (m)	84.81
W.S. US. (m)	86.73	Culv Inv El Dn (m)	84.66
E.G. DS (m)	86.12	Culv Frctn Ls (m)	0.24
W.S. DS (m)	85.84	Culv Exit Loss (m)	0.22
Delta EG (m)	0.74	Culv Entr Loss (m)	0.28

Delta WS (m)	0.89	Q Weir (m3/s)	
E.G. IC (m)	86.75	Weir Sta Lft (m)	
E.G. OC (m)	86.86	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	86.27	Weir Max Depth (m)	
Culv WS Outlet (m)	85.85	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.69	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.19	Min El Weir Flow (m)	88.11

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1940

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.3	4.1	88.27	6.5	88.21	8.9	88.09	10.6	88.05
11.2	88.02	12.1	87.96	13.6	87.82	15	87.73	16.4	87.58
18.3	87.47	20.6	87.35	23	87.29	23.787	25889	24.8	87.21
25.4	87.14	26.6	87.02	27.7	86.82	28.1	84.6	28.6	84.6
29.5	84.6	30.1	84.6	31	86.89	32.4	86.94	33.9	87.14
35.3	87.25	37.2	87.64	39.5	87.66	41.1	87.55	45.5	87.44
46.6	87.4	48.9	87.51	51.2	87.59	52.7	87.68	53.587	.74261
55	87.86	56	87.98	57.1	88.08	58.4	88.15	58.5	88.14
60.7	88.3	61.4	88.31	62.6	88.42	63.1	88.42	64.3	88.29
65.8	88.26	67.2	88.19	67.8	88.21	68.7	88.22	70.1	88.16
71.6	88.13	72.6	88.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	28.1	.08	30.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
28.1	30.1	10.1	10.1	10	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	27.1	88.11	F
31.2	72.6	88.11	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.95	Element	Left OB	Channel	Right OB

Vel Head (m)	0.25	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.70	Reach Len. (m)	10.10	10.10	10.00
Crit W.S. (m)	85.46	Flow Area (m2)	0.11	2.20	0.24
E.G. Slope (m/m)	0.028391	Area (m2)	0.11	2.20	0.24
Q Total (m3/s)	5.05	Flow (m3/s)	0.03	4.93	0.09
Top Width (m)	2.63	Top Width (m)	0.20	2.00	0.43
Vel Total (m/s)	1.98	Avg. Vel. (m/s)	0.24	2.24	0.39
Max Chl Dpth (m)	1.10	Hydr. Depth (m)	0.55	1.10	0.55
Conv. Total (m3/s)	30.0	Conv. (m3/s)	0.2	29.3	0.5
Length Wtd. (m)	10.10	Wetted Per. (m)	1.12	2.00	1.18
Min Ch El (m)	84.60	Shear (N/m2)	27.16	306.16	56.00
Alpha	1.25	Stream Power (N/m s)	6.46	686.99	21.59
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	2.36	4.49	4.83
C & E Loss (m)	0.20	Cum SA (1000 m2)	2.14	2.60	3.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.28	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.84	Reach Len. (m)	10.10	10.10	

10.00					
Crit W.S. (m)	85.57	Flow Area (m2)	0.14	2.47	0.30
E.G. Slope (m/m)	0.027530	Area (m2)	0.14	2.47	0.30
Q Total (m3/s)	6.06	Flow (m3/s)	0.03	5.90	0.12
Top Width (m)	2.71	Top Width (m)	0.22	2.00	0.49
Vel Total (m/s)	2.08	Avg. Vel. (m/s)	0.25	2.39	0.41
Max Chl Dpth (m)	1.24	Hydr. Depth (m)	0.62	1.24	0.62
Conv. Total (m3/s)	36.5	Conv. (m3/s)	0.2	35.6	0.7
Length Wtd. (m)	10.10	Wetted Per. (m)	1.26	2.00	1.33
Min Ch El (m)	84.60	Shear (N/m2)	29.60	333.69	61.03
Alpha	1.28	Stream Power (N/m s)	7.50	797.07	25.05
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	2.79	4.88	5.56
C & E Loss (m)	0.22	Cum SA (1000 m2)	2.45	2.60	3.32

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1930

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.66	.6	88.66	1.9	88.61	4.3	88.44	5	88.36

6.4	88.29	9.1	87.94	9.7	87.88	11.4	87.68	13.8	87.2
15.1	87.02	16.2	86.89	16.5	86.86	17.1	86.85	18	86.78
18.6	86.7	19.4	86.54	22.3	86.31	23.8	86.11	24.4	86.06
24.8	85.03	25.3	84.55	42.2	84.55	43.7	85.77	44.9	86.64
46.3	86.56	47.3	86.53	49.6	86.63	50	86.68	51.2	86.94
51.4	86.964	52.7	87.12	54.1	87.25	54.4	87.25	55.6	87.31
58.5	87.57	59.9	87.64	61	87.66	62.8	87.77	64.6	87.83
65.7	87.9	67.1	87.96	67.8	87.97				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	25.3	.08	42.2	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
25.3	42.2	75.7	75.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.74	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.74	Reach Len. (m)	75.70	75.60	75.30
Crit W.S. (m)		Flow Area (m2)	0.57	20.09	0.87
E.G. Slope (m/m)	0.000309	Area (m2)	0.57	20.09	0.87
Q Total (m3/s)	5.05	Flow (m3/s)	0.04	4.96	0.06
Top Width (m)	19.14	Top Width (m)	0.78	16.90	1.46
Vel Total (m/s)	0.23	Avg. Vel. (m/s)	0.06	0.25	0.07
Max Chl Dpth (m)	1.19	Hydr. Depth (m)	0.74	1.19	0.59
Conv. Total (m3/s)	287.4	Conv. (m3/s)	2.0	281.9	3.5
Length Wtd. (m)	75.58	Wetted Per. (m)	1.45	16.90	1.88
Min Ch El (m)	84.55	Shear (N/m2)	1.19	3.60	1.40
Alpha	1.09	Stream Power (N/m s)	0.08	0.89	0.10
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	2.36	4.38	4.82
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.13	2.51	

3.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.89	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.88	Reach Len. (m)	75.70	75.60	75.30
Crit W.S. (m)		Flow Area (m2)	0.69	22.51	1.09
E.G. Slope (m/m)	0.000304	Area (m2)	0.69	22.51	1.09
Q Total (m3/s)	6.06	Flow (m3/s)	0.05	5.94	0.08
Top Width (m)	19.39	Top Width (m)	0.83	16.90	1.65
Vel Total (m/s)	0.25	Avg. Vel. (m/s)	0.07	0.26	0.07
Max Chl Dpth (m)	1.33	Hydr. Depth (m)	0.83	1.33	0.66
Conv. Total (m3/s)	347.9	Conv. (m3/s)	2.6	340.6	4.7
Length Wtd. (m)	75.57	Wetted Per. (m)	1.61	16.90	2.12
Min Ch El (m)	84.55	Shear (N/m2)	1.27	3.97	1.53
Alpha	1.09	Stream Power (N/m s)	0.08	1.05	0.11
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	2.79	4.75	5.56
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.45	2.51	3.31

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1855

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.505	1.018	88.502	2.035	88.557	3.368	88.542	3.686	88.512
4.942	88.346	5.717	88.224	6.396	88.057	7.849	87.769	8.067	87.741
9.303	87.663	10.417	87.617	10.756	87.587	12.21	87.399	13.663	87.308
15.116	87.242	17.466	87.009	18.023	86.938	18.928	86.757	19.815	86.495
20.93	86.273	22.165	86.088	25.29	85.768	26.864	85.635	27.031	85.367
27.821	84.615	27.825	84.612	28.332	84.175	30.175	84.175	30.672	84.175
31.126	84.409	31.932	84.608	32.778	84.562	34.05	85.048	34.472	85.236
40.976	85.704	41.274	85.733	41.506	85.779	42.699	85.944	44.228	86.095
46.579	86.168	47.48	86.182	49.115	86.038	49.824	86.033	50.732	86.056
51.249	86.099	54.099	86.449	55.524	86.496	56.949	86.574	60.489	87.026
63.741	87.552	66.924	88.098	68.349	88.324	69.406	88.468	70.245	88.428
71.199	88.33	71.943	88.285	74.049	88.186	75.089	88.163		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27.821	.08	31.932	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.821	31.932	81.8	85.7	81	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.69	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.66	Reach Len. (m)	81.80	85.70	81.00
Crit W.S. (m)		Flow Area (m2)	0.56	5.68	3.49
E.G. Slope (m/m)	0.002591	Area (m2)	0.56	5.68	3.49
Q Total (m3/s)	5.05	Flow (m3/s)	0.09	4.31	0.65
Top Width (m)	13.86	Top Width (m)	1.28	4.11	8.47
Vel Total (m/s)	0.52	Avg. Vel. (m/s)	0.16	0.76	

0.19					
Max Chl Dpth (m)	1.49	Hydr. Depth (m)	0.44	1.38	
0.41					
Conv. Total (m3/s)	99.2	Conv. (m3/s)	1.8	84.8	
12.7					
Length Wtd. (m)	85.32	Wetted Per. (m)	1.73	4.36	
8.61					
Min Ch El (m)	84.18	Shear (N/m2)	8.24	33.14	
10.28					
Alpha	1.85	Stream Power (N/m s)	1.32	25.17	
1.91					
Frctn Loss (m)	0.40	Cum Volume (1000 m3)	2.31	3.40	
4.66					
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.05	1.71	
2.71					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.83	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	85.81	Reach Len. (m)	81.80	85.70	
81.00					
Crit W.S. (m)		Flow Area (m2)	0.87	6.27	
4.81					
E.G. Slope (m/m)	0.002465	Area (m2)	0.87	6.27	
4.81					
Q Total (m3/s)	6.06	Flow (m3/s)	0.12	4.96	
0.98					
Top Width (m)	16.79	Top Width (m)	2.90	4.11	
9.77					
Vel Total (m/s)	0.51	Avg. Vel. (m/s)	0.13	0.79	
0.20					
Max Chl Dpth (m)	1.63	Hydr. Depth (m)	0.30	1.53	
0.49					
Conv. Total (m3/s)	122.1	Conv. (m3/s)	2.3	100.0	
19.8					

Length Wtd. (m)	85.23	Wetted Per. (m)	3.36	4.36	9.93
Min Ch El (m)	84.18	Shear (N/m2)	6.23	34.81	11.72
Alpha	2.02	Stream Power (N/m s)	0.84	27.54	2.39
Frctn Loss (m)	0.40	Cum Volume (1000 m3)	2.73	3.67	5.33
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.31	1.71	2.88

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1769

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.462	8.845	86.779	9.741	86.694	11.275	86.521	12.086	86.414
13.263	86.214	13.705	86.122	16.4	85.671	17.837	85.56	18.565	85.551
20.305	85.598	23.425	85.644	27.347	85.668	27.55	85.029	27.935	83.815
27.985	83.75	30.129	83.75	30.25	84.114	30.772	85.68	32.215	85.718
33.137	85.77	34.502	85.88	35.115	85.902	36.565	85.885	38.015	85.92
39.465	85.927	40.232	85.946	40.915	85.99	42.597	86.142	43.815	86.287
44.962	86.444	46.714	86.656	49.614	87.062	52.057	87.355	55.414	87.657
58.314	87.834	60.733	88.149	61.214	88.192	61.517	88.206	65.564	88.234
67.013	88.23	68.463	88.289	69.913	88.269	72.813	88.311	73.342	88.307
75.707	88.219	77.589	88.099						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27.935	.08	30.25	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.935	30.25	99	85.7	64.5	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.16	Reach Len. (m)	99.00	85.70	64.50
Crit W.S. (m)		Flow Area (m2)	0.29	3.24	0.18
E.G. Slope (m/m)	0.011123	Area (m2)	0.29	3.24	0.18
Q Total (m3/s)	5.05	Flow (m3/s)	0.07	4.94	0.04
Top Width (m)	3.09	Top Width (m)	0.43	2.31	0.35
Vel Total (m/s)	1.36	Avg. Vel. (m/s)	0.24	1.52	0.21
Max Chl Dpth (m)	1.41	Hydr. Depth (m)	0.67	1.40	0.52
Conv. Total (m3/s)	47.9	Conv. (m3/s)	0.7	46.9	0.4
Length Wtd. (m)	86.38	Wetted Per. (m)	1.41	2.61	1.10
Min Ch El (m)	83.75	Shear (N/m2)	22.19	135.56	18.07
Alpha	1.23	Stream Power (N/m s)	5.40	206.59	3.83
Frctn Loss (m)	0.37	Cum Volume (1000 m3)	2.28	3.02	4.51
C & E Loss (m)	0.03	Cum SA (1000 m2)	1.99	1.44	2.35

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
         the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.42	Element	Left OB	Channel	Right OB

Vel Head (m)	0.14	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.28	Reach Len. (m)	99.00	85.70	64.50
Crit W.S. (m)		Flow Area (m2)	0.34	3.53	0.23
E.G. Slope (m/m)	0.012044	Area (m2)	0.34	3.53	0.23
Q Total (m3/s)	6.06	Flow (m3/s)	0.09	5.92	0.05
Top Width (m)	3.17	Top Width (m)	0.47	2.31	0.39
Vel Total (m/s)	1.48	Avg. Vel. (m/s)	0.27	1.68	0.24
Max Chl Dpth (m)	1.53	Hydr. Depth (m)	0.73	1.52	0.58
Conv. Total (m3/s)	55.2	Conv. (m3/s)	0.8	53.9	0.5
Length Wtd. (m)	86.36	Wetted Per. (m)	1.54	2.61	1.23
Min Ch El (m)	83.75	Shear (N/m2)	26.22	159.65	21.86
Alpha	1.26	Stream Power (N/m s)	7.03	267.74	5.19
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	2.68	3.25	5.13
C & E Loss (m)	0.04	Cum SA (1000 m2)	2.17	1.44	2.47

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1683

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	86.842	2.056	86.684	4.067	86.578	6.079	86.539	8.091	86.453
10.102	86.212	12.114	85.848	13.826	85.484	16.137	85.023	20.16	84.428
22.172	84.291	23.445	84.25	24.184	84.228	26.195	84.235	27.275	83.679
27.963	83.325	29.963	83.325	30.325	83.507	30.779	83.734	32.202	84.495
34.202	84.579	36.202	84.87	38.202	85.714	40.203	86.398	42.203	86.62
44.203	86.678	46.203	86.802	48.204	87.037	50.204	87.227	58.205	87.618
62.826	87.833	64.206	87.881	66.206	87.746	68.206	87.68	72.207	87.609
76.207	87.597	80.088	87.472						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27.275	.08	30.779	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.275	30.779	62.9	74.2	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.88	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.86	Reach Len. (m)	62.90	74.20	85.30
Crit W.S. (m)		Flow Area (m2)	5.05	5.08	1.96
E.G. Slope (m/m)	0.002262	Area (m2)	5.05	5.08	1.96
Q Total (m3/s)	5.05	Flow (m3/s)	1.00	3.74	0.31
Top Width (m)	18.85	Top Width (m)	10.01	3.50	5.33
Vel Total (m/s)	0.42	Avg. Vel. (m/s)	0.20	0.74	0.16
Max Chl Dpth (m)	1.53	Hydr. Depth (m)	0.50	1.45	0.37
Conv. Total (m3/s)	106.2	Conv. (m3/s)	21.1	78.6	6.5
Length Wtd. (m)	73.45	Wetted Per. (m)	10.18	3.69	5.54
Min Ch El (m)	83.33	Shear (N/m2)	11.00	30.56	7.84
Alpha	2.35	Stream Power (N/m s)	2.19	22.49	1.24
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	2.01	2.66	4.44
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.47	1.19	

2.16

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.07	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.05	Reach Len. (m)	62.90	74.20	85.30
Crit W.S. (m)		Flow Area (m2)	7.12	5.76	3.05
E.G. Slope (m/m)	0.001765	Area (m2)	7.12	5.76	3.05
Q Total (m3/s)	6.06	Flow (m3/s)	1.45	4.07	0.54
Top Width (m)	20.63	Top Width (m)	11.28	3.50	5.85
Vel Total (m/s)	0.38	Avg. Vel. (m/s)	0.20	0.71	0.18
Max Chl Dpth (m)	1.73	Hydr. Depth (m)	0.63	1.64	0.52
Conv. Total (m3/s)	144.3	Conv. (m3/s)	34.6	96.9	12.8
Length Wtd. (m)	73.38	Wetted Per. (m)	11.46	3.69	6.10
Min Ch El (m)	83.33	Shear (N/m2)	10.76	27.04	8.66
Alpha	2.41	Stream Power (N/m s)	2.19	19.12	1.53
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	2.31	2.85	5.02
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.59	1.19	2.27

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1609

INPUT
Description:

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.61	.6	86.53	.8	86.53	3.6	86.52	5.3	86.55
6.6	86.55	8	86.52	9.4	86.54	11	86.46	11.7	86.46
14.2	86.38	15.5	86.33	18.4	86.16	20.6	86.01	21.285.93435	
22.9	85.72	24.4	85.29	25.1	85.14	25.9	85.07	27	82.9
27.4	82.9	27.6	82.9	28.9	82.9	30.4	82.9	31.8	85.35
33.4	85.54	34	85.58	36.3	85.6	39.4	85.5	40.8	85.4
42.3	85.24	43	85.22	45.3	85.36	46.8	85.56	48.3	85.83
48.6	85.89	49.7	86.11	51.3	86.38	52.8	86.66	54.5	87
56.4	87.21	58.9	87.39	60.2	87.44	63.2	87.46	67.6	87.57
69.8	87.47	72	87.34	74.3	87.48	78.1	87.31	79.6	87.32
81.3	87.35	82.6	87.32						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27	.08	30.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27	30.4	11.6	11.5	10.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.73	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.69	Reach Len. (m)	11.60	11.50	10.80
Crit W.S. (m)		Flow Area (m2)	0.82	6.10	0.92
E.G. Slope (m/m)	0.001879	Area (m2)	0.82	6.10	0.92
Q Total (m3/s)	5.17	Flow (m3/s)	0.13	4.88	0.15
Top Width (m)	5.34	Top Width (m)	0.91	3.40	1.03
Vel Total (m/s)	0.66	Avg. Vel. (m/s)	0.16	0.80	0.17
Max Chl Dpth (m)	1.79	Hydr. Depth (m)	0.90	1.79	0.90
Conv. Total (m3/s)	119.2	Conv. (m3/s)	3.0	112.6	3.6
Length Wtd. (m)	11.48	Wetted Per. (m)	2.01	3.40	2.07
Min Ch El (m)	82.90	Shear (N/m2)	7.48	33.07	8.20

Alpha	1.40	Stream Power (N/m s)	1.18	26.46	1.38
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	1.83	2.25	4.32
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.12	0.93	1.89

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.93	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.90	Reach Len. (m)	11.60	11.50	10.80
Crit W.S. (m)		Flow Area (m2)	1.01	6.79	1.14
E.G. Slope (m/m)	0.001868	Area (m2)	1.01	6.79	1.14
Q Total (m3/s)	6.20	Flow (m3/s)	0.17	5.82	0.21
Top Width (m)	5.55	Top Width (m)	1.01	3.40	1.14
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.17	0.86	0.18
Max Chl Dpth (m)	2.00	Hydr. Depth (m)	1.00	2.00	1.00
Conv. Total (m3/s)	143.4	Conv. (m3/s)	4.0	134.7	4.8
Length Wtd. (m)	11.48	Wetted Per. (m)	2.24	3.40	2.30
Min Ch El (m)	82.90	Shear (N/m2)	8.27	36.60	9.08
Alpha	1.44	Stream Power (N/m s)	1.40	31.36	1.64
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	2.05	2.38	4.84
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.20	0.93	1.97

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1598

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.61	.6	86.53	.8	86.53	3.6	86.52	5.3	86.55
6.6	86.55	8	86.52	9.4	86.54	11	86.46	11.7	86.46
14.2	86.38	15.5	86.33	18.4	86.16	20.6	86.01	21.285	.93435
22.9	85.72	24.4	85.29	25.1	85.14	25.9	85.07	27	82.9
27.4	82.9	27.6	82.9	28.9	82.9	30.4	82.9	31.8	85.35
33.4	85.54	34	85.58	36.3	85.6	39.4	85.5	40.8	85.4
42.3	85.24	43	85.22	45.3	85.36	46.8	85.56	48.3	85.83
48.6	85.89	49.7	86.11	51.3	86.38	52.8	86.66	54.5	87
56.4	87.21	58.9	87.39	60.2	87.44	63.2	87.46	67.6	87.57
69.8	87.47	72	87.34	74.3	87.48	78.1	87.31	79.6	87.32
81.3	87.35	82.6	87.32						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27	.08	30.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27	30.4	30.7	30.9	34.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	26	86.01	F
31	82.6	86.01	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.70	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.67	Reach Len. (m)	30.70	30.90	34.30
Crit W.S. (m)	83.51	Flow Area (m2)	0.80	6.02	0.75
E.G. Slope (m/m)	0.001959	Area (m2)	0.80	6.02	0.90
Q Total (m3/s)	5.17	Flow (m3/s)	0.13	4.88	0.16
Top Width (m)	5.31	Top Width (m)	0.90	3.40	1.01
Vel Total (m/s)	0.68	Avg. Vel. (m/s)	0.16	0.81	

0.21					
Max Chl Dpth (m)	1.77	Hydr. Depth (m)	0.89	1.77	
1.25					
Conv. Total (m3/s)	116.7	Conv. (m3/s)	2.9	110.2	
3.6					
Length Wtd. (m)	30.90	Wetted Per. (m)	1.99	3.40	
1.21					
Min Ch El (m)	82.90	Shear (N/m2)	7.69	34.03	
11.88					
Alpha	1.33	Stream Power (N/m s)	1.23	27.56	
2.54					
Frctn Loss (m)		Cum Volume (1000 m3)	1.82	2.18	
4.31					
C & E Loss (m)		Cum SA (1000 m2)	1.11	0.89	
1.88					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.91	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	84.88	Reach Len. (m)	30.70	30.90	
34.30					
Crit W.S. (m)	83.59	Flow Area (m2)	0.99	6.72	
0.87					
E.G. Slope (m/m)	0.001942	Area (m2)	0.99	6.72	
1.11					
Q Total (m3/s)	6.20	Flow (m3/s)	0.17	5.82	
0.21					
Top Width (m)	5.53	Top Width (m)	1.00	3.40	
1.13					
Vel Total (m/s)	0.72	Avg. Vel. (m/s)	0.17	0.87	
0.24					
Max Chl Dpth (m)	1.98	Hydr. Depth (m)	0.99	1.98	
1.45					
Conv. Total (m3/s)	140.7	Conv. (m3/s)	3.9	132.2	
4.7					
Length Wtd. (m)	30.90	Wetted Per. (m)	2.21	3.40	
1.21					
Min Ch El (m)	82.90	Shear (N/m2)	8.52	37.62	
13.70					

Alpha	1.36	Stream Power (N/m s)	1.46	32.63	3.23
Frctn Loss (m)		Cum Volume (1000 m3)	2.04	2.31	4.83
C & E Loss (m)		Cum SA (1000 m2)	1.19	0.89	1.96

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 2 RS: 1582

INPUT
Description:
Distance from Upstream XS = 1.5
Deck/Roadway Width = 29
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
20	86.01	50	86.01

Upstream Bridge Cross Section Data
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.61	.6	86.53	.8	86.53	3.6	86.52	5.3	86.55
6.6	86.55	8	86.52	9.4	86.54	11	86.46	11.7	86.46
14.2	86.38	15.5	86.33	18.4	86.16	20.6	86.01	21.285.93435	
22.9	85.72	24.4	85.29	25.1	85.14	25.9	85.07	27	82.9
27.4	82.9	27.6	82.9	28.9	82.9	30.4	82.9	31.8	85.35
33.4	85.54	34	85.58	36.3	85.6	39.4	85.5	40.8	85.4
42.3	85.24	43	85.22	45.3	85.36	46.8	85.56	48.3	85.83
48.6	85.89	49.7	86.11	51.3	86.38	52.8	86.66	54.5	87
56.4	87.21	58.9	87.39	60.2	87.44	63.2	87.46	67.6	87.57
69.8	87.47	72	87.34	74.3	87.48	78.1	87.31	79.6	87.32
81.3	87.35	82.6	87.32						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27	.08	30.4	.15

Bank Sta: Left Right Coeff Contr. Expan.

```
           27    30.4             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      26   86.01       F
      31    82.6   86.01       F

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      30   86.01              70   86.01

Downstream Bridge Cross Section Data
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.29     1.5   86.29     2.6   86.23     4.8   86.04       6    85.9
     8.3   85.97     9.2   85.95    12.2   85.98    15.1   86.04    16.6    86.1
    17.4   86.11      1886.08913    19.7   86.03      21   86.03      24      86
    26.5   85.91    28.4   86.02    29.9   86.07    31.1   86.16    31.9   86.17
    32.8   86.09    33.4   86.03    34.3   85.97      36   85.91    37.9   85.82
    38.7    85.8    40.2   85.79    41.7   85.63    44.7    85.4    46.1   85.37
      47   85.32      4985.05044    49.3   82.85    50.5   82.85    51.6   82.85
      52   82.85    56.1   85.48    57.9    85.4    58.4   85.41    59.4   85.51
    60.7   85.59    61.1    85.6    62.3   85.67      63   85.74    63.8    85.9
    65.3   86.23    68.2   86.41    71.1   86.63    72.6   86.76    74.4   86.98
    75.6   86.92    78.9   86.82    82.9   86.87    84.4   86.89    85.7   86.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    49.3     .08      52     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          49.3      52             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      48   86.01       F
    53.7    85.7   86.01       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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
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Culvert #1     Pipe Arch    1.85    2.69
FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                .5      30     .027     .027        0                   .9
       1
Upstream   Elevation =  82.93
           Centerline Station =  28.5
Downstream Elevation =  82.89
           Centerline Station =  50.6

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       5.17    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         1.41
  Q Barrel (m3/s)           5.17    Culv Vel DS (m/s)         1.44
  E.G. US. (m)             84.70    Culv Inv El Up (m)       82.93
  W.S. US. (m)             84.67    Culv Inv El Dn (m)       82.89
  E.G. DS (m)              84.48    Culv Frctn Ls (m)         0.08
  W.S. DS (m)              84.43    Culv Exit Loss (m)        0.06
  Delta EG (m)              0.22    Culv Entr Loss (m)        0.09
  Delta WS (m)              0.24    Q Weir (m3/s)
  E.G. IC (m)              84.23    Weir Sta Lft (m)
  E.G. OC (m)              84.70    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)         84.51    Weir Max Depth (m)
  Culv WS Outlet (m)        84.43    Weir Avg Depth (m)
  Culv Nml Depth (m)         1.85    Weir Flow Area (m2)
  Culv Crt Depth (m)         0.80    Min El Weir Flow (m)     86.01


Note:    The normal depth exceeds the height of the culvert.  The program assumes
that the normal depth is equal to the
         height of the culvert.

CULVERT OUTPUT  Profile #Future Scenario  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       6.20    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         1.60
  Q Barrel (m3/s)           6.20    Culv Vel DS (m/s)         1.63
  E.G. US. (m)             84.91    Culv Inv El Up (m)       82.93
  W.S. US. (m)             84.88    Culv Inv El Dn (m)       82.89
  E.G. DS (m)              84.61    Culv Frctn Ls (m)         0.11
  W.S. DS (m)              84.55    Culv Exit Loss (m)        0.07
  Delta EG (m)              0.30    Culv Entr Loss (m)        0.12
  Delta WS (m)              0.32    Q Weir (m3/s)
```

E.G. IC (m)	84.41	Weir Sta Lft (m)	
E.G. OC (m)	84.91	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	84.66	Weir Max Depth (m)	
Culv WS Outlet (m)	84.55	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.85	Weir Flow Area (m2)	
Culv Crt Depth (m)	0.89	Min El Weir Flow (m)	86.01

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1567

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.29	1.5	86.29	2.6	86.23	4.8	86.04	6	85.9
8.3	85.97	9.2	85.95	12.2	85.98	15.1	86.04	16.6	86.1
17.4	86.11	1886.08913		19.7	86.03	21	86.03	24	86
26.5	85.91	28.4	86.02	29.9	86.07	31.1	86.16	31.9	86.17
32.8	86.09	33.4	86.03	34.3	85.97	36	85.91	37.9	85.82
38.7	85.8	40.2	85.79	41.7	85.63	44.7	85.4	46.1	85.37
47	85.32	4985.05044		49.3	82.85	50.5	82.85	51.6	82.85
52	82.85	56.1	85.48	57.9	85.4	58.4	85.41	59.4	85.51
60.7	85.59	61.1	85.6	62.3	85.67	63	85.74	63.8	85.9
65.3	86.23	68.2	86.41	71.1	86.63	72.6	86.76	74.4	86.98
75.6	86.92	78.9	86.82	82.9	86.87	84.4	86.89	85.7	86.94

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	49.3	.08	52	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49.3	52	11	14.4	13.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	48	86.01	F
53.7	85.7	86.01	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.48	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.43	Reach Len. (m)	11.00	14.40	13.30
Crit W.S. (m)	83.55	Flow Area (m2)	0.17	4.26	1.76
E.G. Slope (m/m)	0.003856	Area (m2)	0.17	4.26	1.94
Q Total (m3/s)	5.17	Flow (m3/s)	0.02	4.49	0.66
Top Width (m)	5.38	Top Width (m)	0.22	2.70	2.46
Vel Total (m/s)	0.83	Avg. Vel. (m/s)	0.09	1.05	0.38
Max Chl Dpth (m)	1.58	Hydr. Depth (m)	0.79	1.58	1.03
Conv. Total (m3/s)	83.2	Conv. (m3/s)	0.3	72.3	10.7
Length Wtd. (m)	14.26	Wetted Per. (m)	1.59	2.70	2.02
Min Ch El (m)	82.85	Shear (N/m2)	4.03	59.70	32.90
Alpha	1.41	Stream Power (N/m s)	0.38	62.84	12.41
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	1.82	2.06	4.31
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.10	0.80	1.82

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.61	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.55	Reach Len. (m)	11.00	14.40	13.30
Crit W.S. (m)	83.64	Flow Area (m2)	0.20	4.59	1.96

E.G. Slope (m/m)	0.004263	Area (m2)	0.20	4.59	2.25
Q Total (m3/s)	6.20	Flow (m3/s)	0.02	5.34	0.84
Top Width (m)	5.58	Top Width (m)	0.23	2.70	2.65
Vel Total (m/s)	0.92	Avg. Vel. (m/s)	0.10	1.16	0.43
Max Chl Dpth (m)	1.70	Hydr. Depth (m)	0.85	1.70	1.16
Conv. Total (m3/s)	94.9	Conv. (m3/s)	0.3	81.8	12.9
Length Wtd. (m)	14.25	Wetted Per. (m)	1.72	2.70	2.02
Min Ch El (m)	82.85	Shear (N/m2)	4.80	71.10	40.66
Alpha	1.41	Stream Power (N/m s)	0.49	82.67	17.37
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	2.04	2.18	4.83
C & E Loss (m)	0.01	Cum SA (1000 m2)	1.17	0.80	1.89

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1552

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.29	1.5	86.29	2.6	86.23	4.8	86.04	6	85.9
8.3	85.97	9.2	85.95	12.2	85.98	15.1	86.04	16.6	86.1
17.4	86.11	18	86.08	913	19.7	86.03	21	86.03	24	86
26.5	85.91	28.4	86.02	29.9	86.07	31.1	86.16	31.9	86.17
32.8	86.09	33.4	86.03	34.3	85.97	36	85.91	37.9	85.82
38.7	85.8	40.2	85.79	41.7	85.63	44.7	85.4	46.1	85.37
47	85.32	49	85.05	044	49.3	82.85	50.5	82.85	51.6	82.85
52	82.85	56.1	85.48	57.9	85.4	58.4	85.41	59.4	85.51
60.7	85.59	61.1	85.6	62.3	85.67	63	85.74	63.8	85.9
65.3	86.23	68.2	86.41	71.1	86.63	72.6	86.76	74.4	86.98

75.6	86.92	78.9	86.82	82.9	86.87	84.4	86.89	85.7	86.94

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	49.3	.08	52	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49.3	52	63.1	59.3	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.41	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.36	Reach Len. (m)	63.10	59.30	54.80
Crit W.S. (m)		Flow Area (m2)	0.15	4.07	1.77
E.G. Slope (m/m)	0.004640	Area (m2)	0.15	4.07	1.77
Q Total (m3/s)	5.17	Flow (m3/s)	0.02	4.56	0.59
Top Width (m)	5.26	Top Width (m)	0.21	2.70	2.35
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.10	1.12	0.34
Max Chl Dpth (m)	1.51	Hydr. Depth (m)	0.75	1.51	0.75
Conv. Total (m3/s)	75.8	Conv. (m3/s)	0.2	66.9	8.7
Length Wtd. (m)	58.16	Wetted Per. (m)	1.52	2.70	2.79
Min Ch El (m)	82.85	Shear (N/m2)	4.63	68.59	28.87
Alpha	1.51	Stream Power (N/m s)	0.46	76.78	9.68
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	1.82	2.00	4.28
C & E Loss (m)	0.01	Cum SA (1000 m2)	1.09	0.76	1.79

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.54	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.47	Reach Len. (m)	63.10	59.30	54.80
Crit W.S. (m)		Flow Area (m2)	0.18	4.37	2.05
E.G. Slope (m/m)	0.005164	Area (m2)	0.18	4.37	2.05
Q Total (m3/s)	6.20	Flow (m3/s)	0.02	5.42	0.76
Top Width (m)	5.45	Top Width (m)	0.22	2.70	2.53
Vel Total (m/s)	0.94	Avg. Vel. (m/s)	0.11	1.24	0.37
Max Chl Dpth (m)	1.62	Hydr. Depth (m)	0.81	1.62	0.81
Conv. Total (m3/s)	86.3	Conv. (m3/s)	0.3	75.4	10.6
Length Wtd. (m)	58.13	Wetted Per. (m)	1.64	2.70	3.00
Min Ch El (m)	82.85	Shear (N/m2)	5.54	82.04	34.53
Alpha	1.54	Stream Power (N/m s)	0.61	101.66	12.81
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	2.04	2.12	4.80
C & E Loss (m)	0.02	Cum SA (1000 m2)	1.17	0.76	1.86

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2   RS: 1493

INPUT

Description:

Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.117	1.276	87.116	7.397	87.178	9.437	87.139	11.478	86.993
13.518	87.047	16.297	87.011	17.599	86.973	19.639	87.072	21.679	86.986
23.719	86.963	29.783	86.551	33.921	86.218	35.961	86.097	36.669	85.974
37.451	85.77	38.367	85.585	40.042	85.289	41.763	84.777	42.082	84.669
44.123	84.291	46.163	83.89	46.856	83.737	47.676	83.614	48.203	83.51
48.345	83.341	49.084	82.459	50.058	82.459	50.325	82.609	50.497	82.645
50.5	82.645	51.053	82.676	52.596	83.126	53.229	83.126	54.251	83.185
54.648	83.193	56.701	83.18	58.753	83.405	62.857	84.377	64.909	84.789
66.962	85.075	68.246	85.223	69.014	85.289	69.914	85.306	71.066	85.362
73.118	85.339	75.17	85.349	76.588	85.505	77.222	85.597	79.275	85.851
88.507	86.841								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	49.084	.08	51.053	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49.084	51.053	58.9	73.7	84.5	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.25	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.24	Reach Len. (m)	58.90	73.70	84.50
Crit W.S. (m)		Flow Area (m2)	2.54	3.35	9.88
E.G. Slope (m/m)	0.001604	Area (m2)	2.54	3.35	9.88
Q Total (m3/s)	5.17	Flow (m3/s)	0.42	2.35	2.40
Top Width (m)	17.90	Top Width (m)	4.70	1.97	11.23
Vel Total (m/s)	0.33	Avg. Vel. (m/s)	0.16	0.70	0.24
Max Chl Dpth (m)	1.78	Hydr. Depth (m)	0.54	1.70	0.88
Conv. Total (m3/s)	129.0	Conv. (m3/s)	10.4	58.7	59.9
Length Wtd. (m)	74.27	Wetted Per. (m)	5.27	2.01	11.40
Min Ch El (m)	82.46	Shear (N/m2)	7.58	26.16	

13.63					
Alpha	2.37	Stream Power (N/m s)	1.24	18.38	
3.31					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	1.73	1.78	
3.96					
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.94	0.62	
1.42					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.36	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	84.35	Reach Len. (m)	58.90	73.70	
84.50					
Crit W.S. (m)		Flow Area (m2)	3.07	3.56	
11.10					
E.G. Slope (m/m)	0.001729	Area (m2)	3.07	3.56	
11.10					
Q Total (m3/s)	6.20	Flow (m3/s)	0.55	2.70	
2.94					
Top Width (m)	18.91	Top Width (m)	5.26	1.97	
11.68					
Vel Total (m/s)	0.35	Avg. Vel. (m/s)	0.18	0.76	
0.27					
Max Chl Dpth (m)	1.89	Hydr. Depth (m)	0.58	1.81	
0.95					
Conv. Total (m3/s)	149.1	Conv. (m3/s)	13.3	65.0	
70.8					
Length Wtd. (m)	74.26	Wetted Per. (m)	5.84	2.01	
11.87					
Min Ch El (m)	82.46	Shear (N/m2)	8.91	29.95	
15.86					
Alpha	2.35	Stream Power (N/m s)	1.61	22.75	
4.21					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	1.94	1.88	
4.44					
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.99	0.62	
1.47					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 2 RS: 1419

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.506	.941	86.507	4.869	86.363	8.335	86.113	9.765	86.095
10.918	86.058	12.623	85.976	13.412	85.905	14.052	85.818	15.906	85.633
18.259	85.439	19.769	85.364	20.895	85.344	21.198	85.319	22.628	85.147
23.389	85.111	24.953	85.068	25.883	84.945	26.915	84.746	28.377	84.571
29.774	84.271	31.203	83.938	32.632	83.689	34.061	83.396	35.86	83.109
36.92	82.974	39.778	82.834	40.848	82.803	42.637	82.6	44.066	82.6
45.037	82.6	45.495	82.6	47.39	82.6	48.296	82.6	48.335	82.6
48.461	82.6	49	82.584	49.52	82.458	50.739	82.811	51.233	82.884
52.667	83.19	54.1	83.411	55.657	83.605	56.968	83.829	58.401	84.037
60.574	84.436	63.033	84.837	67.003	85.376	69.115	85.624	74.171	86.047
75.991	86.181	82.867	86.84	85.639	87.139	87.622	87.331	88.506	87.379
90.08	87.415	91.318	87.314						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	42.637	.08	50.739	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.637	50.739	26.8	54.5	20.3	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.21	Reach Len. (m)	26.80	54.50	20.30
Crit W.S. (m)		Flow Area (m2)	12.58	13.06	5.89
E.G. Slope (m/m)	0.000236	Area (m2)	12.58	13.06	

5.89					
Q Total (m3/s)	5.17	Flow (m3/s)	1.28	3.43	
0.46					
Top Width (m)	29.32	Top Width (m)	12.61	8.10	
8.61					
Vel Total (m/s)	0.16	Avg. Vel. (m/s)	0.10	0.26	
0.08					
Max Chl Dpth (m)	1.75	Hydr. Depth (m)	1.00	1.61	
0.68					
Conv. Total (m3/s)	336.5	Conv. (m3/s)	83.1	223.2	
30.2					
Length Wtd. (m)	35.25	Wetted Per. (m)	12.74	8.17	
8.73					
Min Ch El (m)	82.46	Shear (N/m2)	2.28	3.69	
1.56					
Alpha	1.82	Stream Power (N/m s)	0.23	0.97	
0.12					
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	1.29	1.18	
3.30					
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.43	0.25	
0.58					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.32	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	84.31	Reach Len. (m)	26.80	54.50	
20.30					
Crit W.S. (m)		Flow Area (m2)	13.90	13.90	
6.81					
E.G. Slope (m/m)	0.000266	Area (m2)	13.90	13.90	
6.81					
Q Total (m3/s)	6.20	Flow (m3/s)	1.56	4.04	
0.60					
Top Width (m)	30.34	Top Width (m)	13.07	8.10	
9.17					
Vel Total (m/s)	0.18	Avg. Vel. (m/s)	0.11	0.29	
0.09					
Max Chl Dpth (m)	1.86	Hydr. Depth (m)	1.06	1.72	
0.74					
Conv. Total (m3/s)	380.3	Conv. (m3/s)	95.9	247.5	
36.8					
Length Wtd. (m)	34.89	Wetted Per. (m)	13.21	8.17	

```
9.30
  Min Ch El (m)            82.46    Shear (N/m2)              2.74       4.43
1.91
  Alpha                     1.83    Stream Power (N/m s)      0.31       1.29
0.17
  Frctn Loss (m)            0.01    Cum Volume (1000 m3)      1.44       1.24
3.69
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.46       0.25
0.59



Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Walker Creek
REACH: Reach 2            RS: 1346

INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0      864.999993   85.839.999986   85.4615.00007   85.4820.00006   85.11
25.00005   84.3530.00003   83.9835.0000283.6523143.6823382.55125 46.305282.38519
46.43475 81.862646.9423481.6760847.4998981.7469648.0455782.3003952.56863 82.4683
59.1351783.0656464.13515   83.1869.13515   83.5174.13515   83.4779.13516   83.46
84.13516   83.4489.13517   83.4994.13517   83.47   96.13   83.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1546.43475     .0847.49989     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      46.4347547.49989               16      16      16             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            84.21    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.00    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            84.21    Reach Len. (m)          69.45      69.45
69.45
```

Crit W.S. (m)		Flow Area (m2)	16.73	2.63	48.00
E.G. Slope (m/m)	0.000120	Area (m2)	16.73	2.63	48.00
Q Total (m3/s)	5.17	Flow (m3/s)	1.08	0.64	3.44
Top Width (m)	69.19	Top Width (m)	19.50	1.07	48.63
Vel Total (m/s)	0.08	Avg. Vel. (m/s)	0.06	0.24	0.07
Max Chl Dpth (m)	2.53	Hydr. Depth (m)	0.86	2.47	0.99
Conv. Total (m3/s)	472.4	Conv. (m3/s)	99.0	58.6	314.8
Length Wtd. (m)	69.45	Wetted Per. (m)	20.00	1.10	49.20
Min Ch El (m)	81.68	Shear (N/m2)	0.98	2.80	1.14
Alpha	1.99	Stream Power (N/m s)	0.06	0.68	0.08
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	0.90	0.75	2.75
C & E Loss (m)	0.00	Cum SA (1000 m2)			

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.31	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.31	Reach Len. (m)	69.45	69.45	69.45
Crit W.S. (m)		Flow Area (m2)	18.81	2.74	53.02
E.G. Slope (m/m)	0.000128	Area (m2)	18.81	2.74	53.02
Q Total (m3/s)	6.20	Flow (m3/s)	1.30	0.71	4.19
Top Width (m)	70.59	Top Width (m)	20.89	1.07	48.63
Vel Total (m/s)	0.08	Avg. Vel. (m/s)	0.07	0.26	

0.08					
Max Chl Dpth (m)	2.63	Hydr. Depth (m)	0.90	2.57	
1.09					
Conv. Total (m3/s)	548.9	Conv. (m3/s)	115.1	62.8	
371.0					
Length Wtd. (m)	69.45	Wetted Per. (m)	21.40	1.10	
49.30					
Min Ch El (m)	81.68	Shear (N/m2)	1.10	3.11	
1.35					
Alpha	1.86	Stream Power (N/m s)	0.08	0.80	
0.11					
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	1.00	0.79	
3.08					
C & E Loss (m)	0.00	Cum SA (1000 m2)			

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3816

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.97	3	93.96	12.6	93.83	17.1	93.52	18	93.51
19.7	93.55	20.9	93.54	26	93.47	28.3	93.39	29.9	93.31
31.4	93.29	32.7	93.23	33.1	93.24	35.8	93.45	37.2	93.54
37.6	93.53	38.8	93.49	39.4	93.45	41.7	93.4	43.3	93.27
44.59	3.22861	46.2	93.17	50.6	93.14	52.2	93.09	55.2	93.05
57.3	92.97	61.8	91.9	65.7	91.9	66.3	91.9	67.2	91.9
68.5	91.9	71.6	92.97	73	92.99	74.6	93.07	76.1	93.1
77.5	93.17	78.7	93.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	61.8	.08	68.5	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
61.8	68.5	94.2	90.6	88	.1	.3

Right Levee Station= 77.5 Elevation= 93.17

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	93.16	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	93.09	Reach Len. (m)	94.20	90.60	88.00
Crit W.S. (m)	92.54	Flow Area (m2)	3.17	7.97	2.29
E.G. Slope (m/m)	0.008232	Area (m2)	3.17	7.97	2.29
Q Total (m3/s)	11.70	Flow (m3/s)	0.91	10.15	0.64
Top Width (m)	23.39	Top Width (m)	9.60	6.70	7.09
Vel Total (m/s)	0.87	Avg. Vel. (m/s)	0.29	1.27	0.28
Max Chl Dpth (m)	1.19	Hydr. Depth (m)	0.33	1.19	0.32
Conv. Total (m3/s)	129.0	Conv. (m3/s)	10.0	111.9	7.1
Length Wtd. (m)	90.67	Wetted Per. (m)	9.73	6.70	7.28
Min Ch El (m)	91.90	Shear (N/m2)	26.35	96.06	25.40
Alpha	1.87	Stream Power (N/m s)	7.55	122.33	7.11
Frctn Loss (m)	0.64	Cum Volume (1000 m3)	14.52	26.64	17.77
C & E Loss (m)	0.01	Cum SA (1000 m2)	26.60	16.37	36.26

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	93.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	93.20	Reach Len. (m)	94.20	90.60	

88.00					
Crit W.S. (m)	92.62	Flow Area (m2)	4.56	8.70	3.28
E.G. Slope (m/m)	0.008478	Area (m2)	4.56	8.70	3.28
Q Total (m3/s)	14.04	Flow (m3/s)	1.19	11.93	0.93
Top Width (m)	33.35	Top Width (m)	16.45	6.70	10.20
Vel Total (m/s)	0.85	Avg. Vel. (m/s)	0.26	1.37	0.28
Max Chl Dpth (m)	1.30	Hydr. Depth (m)	0.28	1.30	0.32
Conv. Total (m3/s)	152.5	Conv. (m3/s)	12.9	129.6	10.1
Length Wtd. (m)	90.67	Wetted Per. (m)	16.57	6.70	10.48
Min Ch El (m)	91.90	Shear (N/m2)	22.90	108.01	26.04
Alpha	2.23	Stream Power (N/m s)	5.95	148.02	7.37
Frctn Loss (m)	0.62	Cum Volume (1000 m3)	18.66	29.63	23.81
C & E Loss (m)	0.01	Cum SA (1000 m2)	31.01	16.37	41.47

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3731

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.658	1.03	93.657	2.717	93.639	4.463	93.605	7.896	93.566
11.329	93.509	11.409	93.508	15.484	93.27	16.299	93.265	17.838	93.3
18.925	93.295	21.629	93.269	23.543	93.234	25.062	93.177	25.626	93.155
27.074	93.078	28.433	93.051	28.495	93.047	29.61	92.996	29.972	93.001

31.928	93.124	32.417	93.155	33.685	93.218	34.047	93.207	35.133	93.168
35.677	93.132	37.759	93.077	38.794	92.996	39.208	92.964	40.295	92.927
41.834	92.874	42.227	92.87	43.429	92.852	44.631	92.847	45.661	92.831
45.818	92.824	46.691	92.77	47.267	92.729	48.235	92.677	49.984	92.589
50.124	92.579	51.885	92.444	52.527	92.281	55.96	91.25	58.796	91.25
59.592	91.25	60.151	91.25	60.989	91.25	62.2	91.25	65.908	92.297
66.488	92.416	67.342	92.608	68.999	92.717	69.665	92.743	69.772	92.749
71.355	92.805	72.128	92.805	72.319	92.803	72.901	92.786	73.673	92.785
74.807	92.786	75.218	92.792	75.991	92.829	76.764	92.841	77.129	92.836
77.536	92.809	78.309	92.789	79.12	92.776				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	52.527	.08	65.908	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.527	65.908	84.5	83.8	82.9	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	92.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	92.47	Reach Len. (m)	84.50	83.80	82.90
Crit W.S. (m)		Flow Area (m2)	0.08	12.67	0.08
E.G. Slope (m/m)	0.006035	Area (m2)	0.08	12.67	0.08
Q Total (m3/s)	11.70	Flow (m3/s)	0.01	11.69	0.01
Top Width (m)	15.25	Top Width (m)	1.04	13.38	0.84
Vel Total (m/s)	0.91	Avg. Vel. (m/s)	0.09	0.92	0.10
Max Chl Dpth (m)	1.22	Hydr. Depth (m)	0.07	0.95	0.09
Conv. Total (m3/s)	150.7	Conv. (m3/s)	0.1	150.5	0.1
Length Wtd. (m)	83.77	Wetted Per. (m)	1.06	13.68	0.86
Min Ch El (m)	91.25	Shear (N/m2)	4.35	54.82	5.23
Alpha	1.02	Stream Power (N/m s)	0.40	50.58	0.54
Frctn Loss (m)	0.54	Cum Volume (1000 m3)	14.37	25.71	

17.67					
C & E Loss (m)	0.00	Cum SA (1000 m2)	26.10	15.46	
35.91					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	92.65	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	92.60	Reach Len. (m)	84.50	83.80	
82.90					
Crit W.S. (m)		Flow Area (m2)	0.32	14.41	
0.22					
E.G. Slope (m/m)	0.005610	Area (m2)	0.32	14.41	
0.22					
Q Total (m3/s)	14.04	Flow (m3/s)	0.04	13.98	
0.03					
Top Width (m)	17.65	Top Width (m)	2.85	13.38	
1.42					
Vel Total (m/s)	0.94	Avg. Vel. (m/s)	0.12	0.97	
0.14					
Max Chl Dpth (m)	1.35	Hydr. Depth (m)	0.11	1.08	
0.16					
Conv. Total (m3/s)	187.5	Conv. (m3/s)	0.5	186.6	
0.4					
Length Wtd. (m)	83.77	Wetted Per. (m)	2.88	13.68	
1.45					
Min Ch El (m)	91.25	Shear (N/m2)	6.21	57.97	
8.45					
Alpha	1.06	Stream Power (N/m s)	0.72	56.21	
1.21					
Frctn Loss (m)	0.51	Cum Volume (1000 m3)	18.43	28.59	
23.65					
C & E Loss (m)	0.00	Cum SA (1000 m2)	30.10	15.46	
40.96					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3647

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.346	.922	93.348	2.433	93.318	3.997	93.276	7.072	93.25
10.147	93.187	10.219	93.186	13.868	93.021	14.598	93.019	15.977	93.051
16.95	93.05	19.372	93.039	21.086	92.997	22.446	92.943	22.951	92.92
24.249	92.847	25.466	92.811	25.521	92.808	26.52	92.761	26.844	92.763
28.596	92.841	29.034	92.859	30.169	92.895	30.494	92.884	31.467	92.845
31.954	92.814	33.819	92.754	34.746	92.684	35.116	92.659	36.09	92.625
37.468	92.577	37.821	92.572	38.897	92.547	39.973	92.545	40.895	92.521
41.037	92.509	41.818	92.43	42.334	92.369	43.202	92.277	44.767	92.129
44.893	92.114	46.47	91.918	47.045	91.761	50.12	90.6	52.747	90.6
53.484	90.6	54.002	90.6	54.779	90.6	55.9	90.6	61.081	91.923
61.891	92.04	63.085	92.247	65.399	92.451	66.329	92.495	66.479	92.504
68.692	92.569	69.771	92.547	70.038	92.535	70.85	92.494	71.93	92.484
73.514	92.471	74.089	92.471	75.168	92.521	76.248	92.523	76.759	92.502
77.327	92.461	78.407	92.449	79.54	92.452				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	50.12	.08	55.9	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50.12	55.9	81.9	83.8	85.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	91.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	91.91	Reach Len. (m)	81.90	83.80	85.40
Crit W.S. (m)		Flow Area (m2)	2.29	7.59	3.37
E.G. Slope (m/m)	0.006876	Area (m2)	2.29	7.59	3.37
Q Total (m3/s)	11.70	Flow (m3/s)	0.90	9.43	

1.38					
Top Width (m)	14.55	Top Width (m)	3.63	5.78	
5.14					
Vel Total (m/s)	0.88	Avg. Vel. (m/s)	0.39	1.24	
0.41					
Max Chl Dpth (m)	1.31	Hydr. Depth (m)	0.63	1.31	
0.66					
Conv. Total (m3/s)	141.1	Conv. (m3/s)	10.8	113.7	
16.6					
Length Wtd. (m)	83.87	Wetted Per. (m)	3.86	5.78	
5.31					
Min Ch El (m)	90.60	Shear (N/m2)	40.04	88.52	
42.88					
Alpha	1.64	Stream Power (N/m s)	15.64	110.00	
17.53					
Frctn Loss (m)	0.51	Cum Volume (1000 m3)	14.27	24.86	
17.53					
C & E Loss (m)	0.00	Cum SA (1000 m2)	25.90	14.66	
35.67					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	92.14	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	92.07	Reach Len. (m)	81.90	83.80	
85.40					
Crit W.S. (m)		Flow Area (m2)	2.97	8.50	
4.27					
E.G. Slope (m/m)	0.006583	Area (m2)	2.97	8.50	
4.27					
Q Total (m3/s)	14.04	Flow (m3/s)	1.11	11.16	
1.77					
Top Width (m)	16.83	Top Width (m)	4.88	5.78	
6.17					
Vel Total (m/s)	0.89	Avg. Vel. (m/s)	0.38	1.31	
0.42					
Max Chl Dpth (m)	1.47	Hydr. Depth (m)	0.61	1.47	
0.69					
Conv. Total (m3/s)	173.1	Conv. (m3/s)	13.7	137.5	

21.9					
Length Wtd. (m)	83.88	Wetted Per. (m)	5.13	5.78	6.35
Min Ch El (m)	90.60	Shear (N/m2)	37.36	94.98	43.43
Alpha	1.76	Stream Power (N/m s)	14.04	124.60	18.04
Frctn Loss (m)	0.47	Cum Volume (1000 m3)	18.29	27.63	23.46
C & E Loss (m)	0.00	Cum SA (1000 m2)	29.77	14.66	40.65

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3563

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.034	.815	93.038	2.15	92.998	3.532	92.948	6.248	92.933
8.965	92.864	9.028	92.865	12.252	92.771	12.897	92.774	14.115	92.801
14.975	92.806	17.114	92.81	18.629	92.761	19.831	92.709	20.277	92.685
21.423	92.615	22.498	92.572	22.547	92.569	23.43	92.527	23.716	92.524
25.264	92.557	25.651	92.564	26.654	92.573	26.941	92.562	27.8	92.523
28.23	92.495	29.878	92.432	30.697	92.373	31.025	92.353	31.884	92.323
33.103	92.281	33.414	92.275	34.365	92.241	35.315	92.244	36.13	92.21
36.255	92.193	36.945	92.09	37.402	92.008	38.168	91.878	39.551	91.668
39.662	91.65	41.056	91.391	41.563	91.241	44.28	89.95	46.698	89.95
47.377	89.95	47.853	89.95	48.568	89.95	49.6	89.95	56.254	91.549
57.294	91.663	58.827	91.885	61.799	92.184	62.994	92.248	63.186	92.259
66.028	92.332	67.414	92.288	67.756	92.268	68.8	92.203	70.187	92.183
72.221	92.157	72.959	92.151	74.345	92.214	75.732	92.206	76.388	92.167
77.118	92.114	78.504	92.109	79.96	92.128				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	44.28	.08	49.6	.15

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

44.28 49.6 81.8 83.8 85.3 .1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	91.47	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	91.41	Reach Len. (m)	81.80	83.80	85.30
Crit W.S. (m)		Flow Area (m2)	2.26	7.76	4.43
E.G. Slope (m/m)	0.005400	Area (m2)	2.26	7.76	4.43
Q Total (m3/s)	11.70	Flow (m3/s)	0.81	9.17	1.73
Top Width (m)	14.71	Top Width (m)	3.32	5.32	6.07
Vel Total (m/s)	0.81	Avg. Vel. (m/s)	0.36	1.18	0.39
Max Chl Dpth (m)	1.46	Hydr. Depth (m)	0.68	1.46	0.73
Conv. Total (m3/s)	159.3	Conv. (m3/s)	11.0	124.8	23.5
Length Wtd. (m)	83.92	Wetted Per. (m)	3.64	5.32	6.24
Min Ch El (m)	89.95	Shear (N/m2)	32.89	77.27	37.56
Alpha	1.72	Stream Power (N/m s)	11.73	91.31	14.64
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	14.08	24.21	17.19
C & E Loss (m)	0.01	Cum SA (1000 m2)	25.62	14.19	35.19

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	91.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	

W.S. Elev (m)	91.61	Reach Len. (m)	81.80	83.80	85.30
Crit W.S. (m)		Flow Area (m2)	3.03	8.82	5.73
E.G. Slope (m/m)	0.004849	Area (m2)	3.03	8.82	5.73
Q Total (m3/s)	14.04	Flow (m3/s)	1.04	10.76	2.25
Top Width (m)	16.91	Top Width (m)	4.39	5.32	7.19
Vel Total (m/s)	0.80	Avg. Vel. (m/s)	0.34	1.22	0.39
Max Chl Dpth (m)	1.66	Hydr. Depth (m)	0.69	1.66	0.80
Conv. Total (m3/s)	201.7	Conv. (m3/s)	15.0	154.5	32.2
Length Wtd. (m)	83.92	Wetted Per. (m)	4.73	5.32	7.39
Min Ch El (m)	89.95	Shear (N/m2)	30.45	78.84	36.88
Alpha	1.84	Stream Power (N/m s)	10.50	96.14	14.45
Frctn Loss (m)	0.29	Cum Volume (1000 m3)	18.04	26.90	23.04
C & E Loss (m)	0.01	Cum SA (1000 m2)	29.39	14.19	40.08

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3479

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.722	.707	92.729	1.866	92.677	3.066	92.619	5.424	92.617
7.782	92.542	7.837	92.543	10.636	92.522	11.196	92.528	12.254	92.552
13	92.561	14.857	92.58	16.172	92.525	17.215	92.474	17.603	92.45
18.598	92.384	19.531	92.332	19.574	92.329	20.34	92.292	20.588	92.286
21.932	92.274	22.268	92.268	23.139	92.251	23.387	92.239	24.134	92.2
24.507	92.177	25.938	92.109	26.649	92.061	26.933	92.047	27.679	92.021
28.737	91.984	29.007	91.977	29.832	91.936	30.658	91.942	31.365	91.9
31.474	91.878	32.073	91.75	32.469	91.647	33.134	91.479	34.335	91.207

34.431	91.185	35.641	90.865	36.082	90.72	38.44	89.3	40.649	89.3
41.269	89.3	41.704	89.3	42.357	89.3	43.3	89.3	51.427	91.174
52.697	91.287	54.569	91.524	58.2	91.917	59.659	92.001	59.893	92.015
63.364	92.096	65.057	92.029	65.475	92	66.75	91.911	68.443	91.881
70.928	91.843	71.83	91.83	73.523	91.907	75.216	91.888	76.018	91.833
76.909	91.767	78.602	91.77	80.38	91.804				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	38.44	.08	43.3	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
38.44	43.3	86.5	83.8	81.5	.1 .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	91.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	91.10	Reach Len. (m)	86.50	83.80	81.50
Crit W.S. (m)		Flow Area (m2)	2.82	8.76	7.05
E.G. Slope (m/m)	0.002832	Area (m2)	2.82	8.76	7.05
Q Total (m3/s)	11.70	Flow (m3/s)	0.77	8.64	2.29
Top Width (m)	16.38	Top Width (m)	3.70	4.86	7.82
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.27	0.99	0.33
Max Chl Dpth (m)	1.80	Hydr. Depth (m)	0.76	1.80	0.90
Conv. Total (m3/s)	219.9	Conv. (m3/s)	14.5	162.3	43.1
Length Wtd. (m)	83.47	Wetted Per. (m)	4.15	4.86	8.03
Min Ch El (m)	89.30	Shear (N/m2)	18.89	50.07	24.40
Alpha	1.88	Stream Power (N/m s)	5.18	49.34	7.94
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	13.88	23.52	16.70
C & E Loss (m)	0.00	Cum SA (1000 m2)	25.33	13.77	34.59

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	91.37	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	91.33	Reach Len. (m)	86.50	83.80	81.50
Crit W.S. (m)		Flow Area (m2)	3.76	9.86	9.01
E.G. Slope (m/m)	0.002624	Area (m2)	3.76	9.86	9.01
Q Total (m3/s)	14.04	Flow (m3/s)	1.05	10.12	2.88
Top Width (m)	19.23	Top Width (m)	4.64	4.86	9.73
Vel Total (m/s)	0.62	Avg. Vel. (m/s)	0.28	1.03	0.32
Max Chl Dpth (m)	2.03	Hydr. Depth (m)	0.81	2.03	0.93
Conv. Total (m3/s)	274.2	Conv. (m3/s)	20.4	197.6	56.2
Length Wtd. (m)	83.46	Wetted Per. (m)	5.12	4.86	9.95
Min Ch El (m)	89.30	Shear (N/m2)	18.90	52.21	23.29
Alpha	2.04	Stream Power (N/m s)	5.26	53.58	7.44
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	17.76	26.12	22.41
C & E Loss (m)	0.00	Cum SA (1000 m2)	29.02	13.77	39.35

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3394

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.41	.6	92.42	2.6	92.29	4.6	92.3	6.6	92.22
12.6	92.35	14.6	92.24	16.6	92.09	18.6	91.99	22.6	91.75
24.6	91.68	25.3	91.63	26	91.64	26.6	91.59	27.2	91.41
28.1	91.08	29.2	90.72	30.6	90.2	32.6	88.65	34.6	88.65
37	88.65	46.6	90.8	48.190.91062		54.6	91.65	56.6	91.77
60.7	91.86	62.7	91.77	64.7	91.62	66.7	91.58	70.7	91.51
72.7	91.6	74.7	91.57	76.7	91.42	78.7	91.43	80.8	91.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	32.6	.08	37	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32.6	37	32.2	32.3	32	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.96	Reach Len. (m)	32.20	32.30	32.00
Crit W.S. (m)		Flow Area (m2)	3.86	10.17	12.03
E.G. Slope (m/m)	0.001292	Area (m2)	3.86	10.17	12.03
Q Total (m3/s)	11.70	Flow (m3/s)	0.80	7.98	2.92
Top Width (m)	20.07	Top Width (m)	4.13	4.40	11.54
Vel Total (m/s)	0.45	Avg. Vel. (m/s)	0.21	0.79	0.24
Max Chl Dpth (m)	2.31	Hydr. Depth (m)	0.93	2.31	1.04
Conv. Total (m3/s)	325.6	Conv. (m3/s)	22.2	222.1	81.3
Length Wtd. (m)	32.21	Wetted Per. (m)	4.80	4.40	11.78

Min Ch El (m)	88.65	Shear (N/m2)	10.19	29.27	12.94
Alpha	2.17	Stream Power (N/m s)	2.11	22.99	3.14
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	13.59	22.73	15.93
C & E Loss (m)	0.00	Cum SA (1000 m2)	24.99	13.38	33.81

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	91.22	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	91.19	Reach Len. (m)	32.20	32.30	32.00
Crit W.S. (m)		Flow Area (m2)	4.90	11.19	14.96
E.G. Slope (m/m)	0.001258	Area (m2)	4.90	11.19	14.96
Q Total (m3/s)	14.04	Flow (m3/s)	1.07	9.25	3.72
Top Width (m)	22.80	Top Width (m)	4.81	4.40	13.59
Vel Total (m/s)	0.45	Avg. Vel. (m/s)	0.22	0.83	0.25
Max Chl Dpth (m)	2.54	Hydr. Depth (m)	1.02	2.54	1.10
Conv. Total (m3/s)	396.0	Conv. (m3/s)	30.3	260.7	105.0
Length Wtd. (m)	32.21	Wetted Per. (m)	5.51	4.40	13.85
Min Ch El (m)	88.65	Shear (N/m2)	10.98	31.38	13.33
Alpha	2.30	Stream Power (N/m s)	2.40	25.93	3.32
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	17.39	25.23	21.43
C & E Loss (m)	0.00	Cum SA (1000 m2)	28.61	13.38	38.40

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3362

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.41	.6	92.42	2.6	92.29	4.6	92.3	6.6	92.22
12.6	92.35	14.6	92.24	16.6	92.09	18.6	91.99	22.6	91.75
24.6	91.68	25.3	91.63	26	91.64	26.6	91.59	27.2	91.41
28.1	91.08	29.2	90.72	30.6	90.2	32.6	88.65	34.6	88.65
37	88.65	46.6	90.8	48.19	0.91062	54.6	91.65	56.6	91.77
60.7	91.86	62.7	91.77	64.7	91.62	66.7	91.58	70.7	91.51
72.7	91.6	74.7	91.57	76.7	91.42	78.7	91.43	80.8	91.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	32.6	.08	37	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32.6	37	37.8	40.1	43	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	24	91.31	F
45	80.8	91.31	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.92	Reach Len. (m)	37.80	40.10	43.00
Crit W.S. (m)	89.47	Flow Area (m2)	3.69	9.98	10.99
E.G. Slope (m/m)	0.001292	Area (m2)	3.69	9.98	11.56
Q Total (m3/s)	11.70	Flow (m3/s)	0.76	7.75	3.20
Top Width (m)	19.58	Top Width (m)	4.01	4.40	11.17
Vel Total (m/s)	0.47	Avg. Vel. (m/s)	0.21	0.78	0.29
Max Chl Dpth (m)	2.27	Hydr. Depth (m)	0.92	2.27	

1.37					
Conv. Total (m3/s)	325.6	Conv. (m3/s)	21.1	215.5	
89.0					
Length Wtd. (m)	40.10	Wetted Per. (m)	4.66	4.40	
8.20					
Min Ch El (m)	88.65	Shear (N/m2)	10.03	28.76	
16.98					
Alpha	1.88	Stream Power (N/m s)	2.06	22.31	
4.95					
Frctn Loss (m)		Cum Volume (1000 m3)	13.47	22.40	
15.55					
C & E Loss (m)		Cum SA (1000 m2)	24.86	13.24	
33.44					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	91.18	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	91.15	Reach Len. (m)	37.80	40.10	
43.00					
Crit W.S. (m)	89.57	Flow Area (m2)	4.72	11.02	
12.87					
E.G. Slope (m/m)	0.001242	Area (m2)	4.72	11.02	
14.43					
Q Total (m3/s)	14.04	Flow (m3/s)	1.01	8.95	
4.08					
Top Width (m)	22.34	Top Width (m)	4.70	4.40	
13.24					
Vel Total (m/s)	0.49	Avg. Vel. (m/s)	0.21	0.81	
0.32					
Max Chl Dpth (m)	2.50	Hydr. Depth (m)	1.00	2.50	
1.61					
Conv. Total (m3/s)	398.5	Conv. (m3/s)	28.7	254.0	
115.8					
Length Wtd. (m)	40.10	Wetted Per. (m)	5.40	4.40	
8.20					
Min Ch El (m)	88.65	Shear (N/m2)	10.64	30.50	
19.11					
Alpha	1.88	Stream Power (N/m s)	2.29	24.77	
6.06					
Frctn Loss (m)		Cum Volume (1000 m3)	17.23	24.88	
20.96					
C & E Loss (m)		Cum SA (1000 m2)	28.46	13.24	

37.97

CULVERT

RIVER: Walker Creek
REACH: Reach 4 RS: 3342

INPUT
Description:
Distance from Upstream XS = 3
Deck/Roadway Width = 20
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	91.31	80	91.31

Upstream Bridge Cross Section Data
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.41	.6	92.42	2.6	92.29	4.6	92.3	6.6	92.22
12.6	92.35	14.6	92.24	16.6	92.09	18.6	91.99	22.6	91.75
24.6	91.68	25.3	91.63	26	91.64	26.6	91.59	27.2	91.41
28.1	91.08	29.2	90.72	30.6	90.2	32.6	88.65	34.6	88.65
37	88.65	46.6	90.8	48.190.91062		54.6	91.65	56.6	91.77
60.7	91.86	62.7	91.77	64.7	91.62	66.7	91.58	70.7	91.51
72.7	91.6	74.7	91.57	76.7	91.42	78.7	91.43	80.8	91.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	32.6	.08	37	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
32.6	37	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	24	91.31	F
45	80.8	91.31	F

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	91.31	80	91.31

Downstream Bridge Cross Section Data

```
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.24      .4   92.26     2.4   92.28     6.5   92.25     8.5   92.19
    10.5   92.09    12.5   92.06    14.5    92.1    16.5   91.94    18.6   91.97
    20.5   91.89    22.5   91.93    24.5   91.84    26.5   91.86    27.291.83846
    27.8   91.82    28.6   91.79    30.6   91.48    32.6   91.24    35.1   91.07
    38.6   90.82    40.6   88.64    42.6   88.64    44.6   88.64    44.9   88.64
    46.2   88.64    46.6   90.83      48   90.85    50.6   90.95    51.3   91.03
    52.7   91.19    54.7   91.33    58.7   91.47    60.9   91.48    62.8   91.53
    64.7   91.63    66.7   91.54    68.7   91.41    70.1   91.36    70.7   91.35
    72.7   91.38    75.6   91.26    76.8   91.24    78.8   91.23    82.8   91.17
    86.3   91.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    40.6     .08    46.2     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          40.6    46.2             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      32   91.31       F
      54    86.3   91.31       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     1.8     3.9
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
                 3      22     .013     .013        0                   .5
       1
Upstream   Elevation =  88.68
           Centerline Station =  34.9
Downstream Elevation =  88.65
           Centerline Station =  43.1
```

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	11.70	Culv Full Len (m)	22.00
# Barrels	1	Culv Vel US (m/s)	1.67
Q Barrel (m3/s)	11.70	Culv Vel DS (m/s)	1.67
E.G. US. (m)	90.94	Culv Inv El Up (m)	88.68
W.S. US. (m)	90.92	Culv Inv El Dn (m)	88.65
E.G. DS (m)	90.75	Culv Frctn Ls (m)	0.02
W.S. DS (m)	90.71	Culv Exit Loss (m)	0.10
Delta EG (m)	0.19	Culv Entr Loss (m)	0.07
Delta WS (m)	0.21	Q Weir (m3/s)	
E.G. IC (m)	90.24	Weir Sta Lft (m)	
E.G. OC (m)	90.94	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	90.48	Weir Max Depth (m)	
Culv WS Outlet (m)	90.45	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	0.97	Min El Weir Flow (m)	91.31

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	14.04	Culv Full Len (m)	22.00
# Barrels	1	Culv Vel US (m/s)	2.00
Q Barrel (m3/s)	14.04	Culv Vel DS (m/s)	2.00
E.G. US. (m)	91.18	Culv Inv El Up (m)	88.68
W.S. US. (m)	91.15	Culv Inv El Dn (m)	88.65
E.G. DS (m)	90.90	Culv Frctn Ls (m)	0.03
W.S. DS (m)	90.84	Culv Exit Loss (m)	0.15
Delta EG (m)	0.28	Culv Entr Loss (m)	0.10
Delta WS (m)	0.31	Q Weir (m3/s)	
E.G. IC (m)	90.45	Weir Sta Lft (m)	
E.G. OC (m)	91.18	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	90.48	Weir Max Depth (m)	
Culv WS Outlet (m)	90.45	Weir Avg Depth (m)	
Culv Nml Depth (m)		Weir Flow Area (m2)	
Culv Crt Depth (m)	1.10	Min El Weir Flow (m)	91.31

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3322

INPUT
Description:

Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.24	.4	92.26	2.4	92.28	6.5	92.25	8.5	92.19
10.5	92.09	12.5	92.06	14.5	92.1	16.5	91.94	18.6	91.97
20.5	91.89	22.5	91.93	24.5	91.84	26.5	91.86	27.29	1.83846
27.8	91.82	28.6	91.79	30.6	91.48	32.6	91.24	35.1	91.07
38.6	90.82	40.6	88.64	42.6	88.64	44.6	88.64	44.9	88.64
46.2	88.64	46.6	90.83	48	90.85	50.6	90.95	51.3	91.03
52.7	91.19	54.7	91.33	58.7	91.47	60.9	91.48	62.8	91.53
64.7	91.63	66.7	91.54	68.7	91.41	70.1	91.36	70.7	91.35
72.7	91.38	75.6	91.26	76.8	91.24	78.8	91.23	82.8	91.17
86.3	91.24								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	40.6	.08	46.2	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40.6	46.2	13.2	13.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	32	91.31	F
54	86.3	91.31	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.75	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.71	Reach Len. (m)	13.20	13.30	13.40
Crit W.S. (m)	89.40	Flow Area (m2)	1.96	11.58	0.39
E.G. Slope (m/m)	0.002260	Area (m2)	1.96	11.58	0.39
Q Total (m3/s)	11.70	Flow (m3/s)	0.49	11.17	0.04
Top Width (m)	7.88	Top Width (m)	1.90	5.60	0.38
Vel Total (m/s)	0.84	Avg. Vel. (m/s)	0.25	0.96	0.10
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	1.03	2.07	1.03
Conv. Total (m3/s)	246.2	Conv. (m3/s)	10.3	235.0	0.8
Length Wtd. (m)	13.30	Wetted Per. (m)	2.81	5.60	

2.10					
Min Ch El (m)	88.64	Shear (N/m2)	15.50	45.84	
4.12					
Alpha	1.26	Stream Power (N/m s)	3.87	44.22	
0.42					
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	13.47	22.15	
15.55					
C & E Loss (m)	0.00	Cum SA (1000 m2)	24.75	13.04	
33.19					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	90.90	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	90.84	Reach Len. (m)	13.20	13.30	
13.40					
Crit W.S. (m)	89.49	Flow Area (m2)	2.23	12.33	
0.45					
E.G. Slope (m/m)	0.002640	Area (m2)	2.23	12.33	
0.45					
Q Total (m3/s)	14.04	Flow (m3/s)	0.59	13.41	
0.04					
Top Width (m)	9.21	Top Width (m)	2.32	5.60	
1.29					
Vel Total (m/s)	0.94	Avg. Vel. (m/s)	0.26	1.09	
0.09					
Max Chl Dpth (m)	2.20	Hydr. Depth (m)	0.96	2.20	
0.35					
Conv. Total (m3/s)	273.3	Conv. (m3/s)	11.5	261.0	
0.8					
Length Wtd. (m)	13.30	Wetted Per. (m)	3.28	5.60	
3.12					
Min Ch El (m)	88.64	Shear (N/m2)	17.61	57.03	
3.72					
Alpha	1.29	Stream Power (N/m s)	4.67	62.01	
0.35					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	17.23	24.61	
20.96					
C & E Loss (m)	0.00	Cum SA (1000 m2)	28.33	13.04	
37.66					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3309

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.24	.4	92.26	2.4	92.28	6.5	92.25	8.5	92.19
10.5	92.09	12.5	92.06	14.5	92.1	16.5	91.94	18.6	91.97
20.5	91.89	22.5	91.93	24.5	91.84	26.5	91.86	27.29	1.83846
27.8	91.82	28.6	91.79	30.6	91.48	32.6	91.24	35.1	91.07
38.6	90.82	40.6	88.64	42.6	88.64	44.6	88.64	44.9	88.64
46.2	88.64	46.6	90.83	48	90.85	50.6	90.95	51.3	91.03
52.7	91.19	54.7	91.33	58.7	91.47	60.9	91.48	62.8	91.53
64.7	91.63	66.7	91.54	68.7	91.41	70.1	91.36	70.7	91.35
72.7	91.38	75.6	91.26	76.8	91.24	78.8	91.23	82.8	91.17
86.3	91.24								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	40.6	.08	46.2	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40.6	46.2	79.7	77.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.68	Reach Len. (m)	79.70	77.70	74.90
Crit W.S. (m)		Flow Area (m2)	1.90	11.40	0.38
E.G. Slope (m/m)	0.002389	Area (m2)	1.90	11.40	0.38
Q Total (m3/s)	11.70	Flow (m3/s)	0.48	11.18	

0.04					
Top Width (m)	7.84	Top Width (m)	1.87	5.60	
0.37					
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.25	0.98	
0.10					
Max Chl Dpth (m)	2.03	Hydr. Depth (m)	1.02	2.03	
1.02					
Conv. Total (m3/s)	239.4	Conv. (m3/s)	9.9	228.8	
0.8					
Length Wtd. (m)	77.59	Wetted Per. (m)	2.76	5.60	
2.07					
Min Ch El (m)	88.64	Shear (N/m2)	16.12	47.68	
4.28					
Alpha	1.26	Stream Power (N/m s)	4.09	46.79	
0.45					
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	13.44	22.00	
15.54					
C & E Loss (m)	0.01	Cum SA (1000 m2)	24.72	12.96	
33.19					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	90.86	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	90.80	Reach Len. (m)	79.70	77.70	
74.90					
Crit W.S. (m)		Flow Area (m2)	2.15	12.12	
0.43					
E.G. Slope (m/m)	0.002788	Area (m2)	2.15	12.12	
0.43					
Q Total (m3/s)	14.04	Flow (m3/s)	0.61	13.38	
0.05					
Top Width (m)	7.98	Top Width (m)	1.99	5.60	
0.40					
Vel Total (m/s)	0.96	Avg. Vel. (m/s)	0.29	1.10	
0.12					
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	1.08	2.16	
1.08					
Conv. Total (m3/s)	266.0	Conv. (m3/s)	11.6	253.4	
1.0					
Length Wtd. (m)	77.53	Wetted Per. (m)	2.94	5.60	
2.20					
Min Ch El (m)	88.64	Shear (N/m2)	20.00	59.16	

5.31					
Alpha	1.28	Stream Power (N/m s)	5.71	65.32	
0.63					
Frctn Loss (m)	0.18	Cum Volume (1000 m3)	17.21	24.45	
20.96					
C & E Loss (m)	0.01	Cum SA (1000 m2)	28.30	12.96	
37.65					

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 3231

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.453	.76	91.469	4.417	91.422	6.418	91.415	17.888	90.993
24.419	90.645	26.419	90.58	34.419	90.137	36.419	90.004	40.42	89.442
42.42	89.508	43.183	88.443	43.396	88.443	46.189	88.436	46.767	88.48
47.608	88.998	47.789	89.204	48.43	89.933	50.43	90.008	52.43	89.955
54.43	89.925	56.43	89.944	60.43	90.048	64.431	90.089	68.431	90.177
70.431	90.204	72.431	90.197	76.431	90.343	78.432	90.518	80.432	90.762
80.943	90.787	81.933	90.784	84.432	90.931	87.814	91.06		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	42.42	.08	47.608	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.42	47.608	90.2	100.7	106.3	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.55	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	90.53	Reach Len. (m)	90.20	100.70	
106.30					
Crit W.S. (m)		Flow Area (m2)	7.59	10.15	
13.48					
E.G. Slope (m/m)	0.001940	Area (m2)	7.59	10.15	
13.48					

Q Total (m3/s)	11.70	Flow (m3/s)	1.41	8.04	2.25
Top Width (m)	51.10	Top Width (m)	15.02	5.19	30.89
Vel Total (m/s)	0.37	Avg. Vel. (m/s)	0.19	0.79	0.17
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	0.51	1.96	0.44
Conv. Total (m3/s)	265.7	Conv. (m3/s)	32.0	182.5	51.2
Length Wtd. (m)	100.12	Wetted Per. (m)	15.08	5.88	31.33
Min Ch El (m)	88.44	Shear (N/m2)	9.57	32.82	8.18
Alpha	3.13	Stream Power (N/m s)	1.78	26.00	1.37
Frctn Loss (m)	0.34	Cum Volume (1000 m3)	13.06	21.16	15.03
C & E Loss (m)	0.03	Cum SA (1000 m2)	24.05	12.54	32.02

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	90.68	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.65	Reach Len. (m)	90.20	100.70	106.30
Crit W.S. (m)		Flow Area (m2)	9.69	10.81	17.49
E.G. Slope (m/m)	0.001895	Area (m2)	9.69	10.81	17.49
Q Total (m3/s)	14.04	Flow (m3/s)	1.85	8.83	3.37
Top Width (m)	55.28	Top Width (m)	18.16	5.19	31.93
Vel Total (m/s)	0.37	Avg. Vel. (m/s)	0.19	0.82	

```
0.19
  Max Chl Dpth (m)          2.22    Hydr. Depth (m)           0.53       2.08
0.55
  Conv. Total (m3/s)       322.6    Conv. (m3/s)              42.4      202.9
77.4
  Length Wtd. (m)         100.03    Wetted Per. (m)          18.22       5.88
32.38
  Min Ch El (m)            88.44    Shear (N/m2)              9.89      34.16
10.04
  Alpha                     3.17    Stream Power (N/m s)      1.88      27.90
1.93
  Frctn Loss (m)            0.35    Cum Volume (1000 m3)     16.73      23.56
20.29
  C & E Loss (m)            0.04    Cum SA (1000 m2)         27.50      12.54
36.44



Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
         the need for additional cross sections.

CROSS SECTION


RIVER: Walker Creek
REACH: Reach 4            RS: 3074

INPUT
Description: CR-10
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.944.999959   90.689.999919   90.5415.00001    90.519.99997   90.27
24.99996    90.229.99992   90.2235.00001   90.0439.9999589.8773345.0770189.49272
47.9226289.0596548.8084688.6223948.9868188.1525349.8845988.0279350.9664388.27271
51.7556288.7223353.1825889.2044654.2052789.4011859.20531   90.1164.20524   89.97
69.20528   90.0774.20521   90.0979.20525   90.3184.20531   90.4589.20523   90.62
94.20528   90.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1548.80846     .0851.75562     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      48.8084651.75562            162.6   148.6   140.8             .1       .3
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CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	90.17	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.09	Reach Len. (m)	162.60	148.60	140.80
Crit W.S. (m)		Flow Area (m2)	6.24	5.47	4.84
E.G. Slope (m/m)	0.007510	Area (m2)	6.24	5.47	4.84
Q Total (m3/s)	11.70	Flow (m3/s)	1.97	8.09	1.65
Top Width (m)	40.14	Top Width (m)	15.32	2.95	21.88
Vel Total (m/s)	0.71	Avg. Vel. (m/s)	0.32	1.48	0.34
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	0.41	1.85	0.22
Conv. Total (m3/s)	135.1	Conv. (m3/s)	22.7	93.3	19.1
Length Wtd. (m)	147.37	Wetted Per. (m)	15.47	3.43	22.03
Min Ch El (m)	88.03	Shear (N/m2)	29.69	117.50	16.17
Alpha	3.08	Stream Power (N/m s)	9.36	173.78	5.53
Frctn Loss (m)	0.74	Cum Volume (1000 m3)	12.44	20.38	14.05
C & E Loss (m)	0.02	Cum SA (1000 m2)	22.68	12.13	29.21

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	90.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	90.19	Reach Len. (m)	162.60	148.60	140.80
Crit W.S. (m)		Flow Area (m2)	7.75	5.74	6.99
E.G. Slope (m/m)	0.008700	Area (m2)	7.75	5.74	6.99
Q Total (m3/s)	14.04	Flow (m3/s)	2.75	9.43	1.87
Top Width (m)	45.43	Top Width (m)	17.86	2.95	24.62
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.35	1.64	0.27
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.43	1.95	0.28
Conv. Total (m3/s)	150.6	Conv. (m3/s)	29.5	101.1	20.0
Length Wtd. (m)	147.46	Wetted Per. (m)	18.01	3.43	24.78
Min Ch El (m)	88.03	Shear (N/m2)	36.72	142.82	24.06
Alpha	3.93	Stream Power (N/m s)	13.02	234.76	6.43
Frctn Loss (m)	0.71	Cum Volume (1000 m3)	15.95	22.72	18.98
C & E Loss (m)	0.02	Cum SA (1000 m2)	25.87	12.13	33.43

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2978

INPUT
Description:

Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.367	1.756	91.134	3.78	91.237	5.804	91.207	7.828	91.077
9.852	91.107	14.001	91.355	15.752	91.294	19.255	91.116	21.996	90.996
24.02	90.863	26.044	90.756	28.068	90.753	29.765	90.585	32.117	90.453
34.141	90.066	36.165	89.883	38.189	89.791	40.213	89.633	42.027	89.614
44.261	89.487	46.285	89.285	48.309	88.876	49.033	88.803	49.714	88.696
50.333	88.625	51.084	87.763	51.139	87.735	51.825	87.706	53.128	87.653
54.381	88.774	54.544	88.767	56.042	88.703	56.405	88.7	58.429	88.863
60.453	88.886	63.048	88.789	68.549	88.786	70.573	88.699	74.621	88.711
76.645	88.698	80.693	88.714	82.317	88.772	86.765	88.852	89.323	88.973
90.813	89.068	92.827	89.327	94.861	89.749	96.885	90.26	98.909	90.609
101.003	90.848								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	50.333	.08	54.381	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50.333	54.381	94.2	93.9	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	89.41	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.40	Reach Len. (m)	94.20	93.90	93.70
Crit W.S. (m)		Flow Area (m2)	2.00	5.86	22.61
E.G. Slope (m/m)	0.003604	Area (m2)	2.00	5.86	22.61
Q Total (m3/s)	11.70	Flow (m3/s)	0.42	4.97	6.31
Top Width (m)	47.98	Top Width (m)	5.16	4.05	38.78
Vel Total (m/s)	0.38	Avg. Vel. (m/s)	0.21	0.85	0.28
Max Chl Dpth (m)	1.74	Hydr. Depth (m)	0.39	1.45	0.58
Conv. Total (m3/s)	195.0	Conv. (m3/s)	7.0	82.8	105.1
Length Wtd. (m)	93.84	Wetted Per. (m)	5.22	4.88	38.82
Min Ch El (m)	87.65	Shear (N/m2)	13.53	42.47	20.59

Alpha	2.37	Stream Power (N/m s)	2.85	36.02	5.75
Frctn Loss (m)	0.28	Cum Volume (1000 m3)	11.77	19.53	12.12
C & E Loss (m)	0.00	Cum SA (1000 m2)	21.02	11.61	24.94

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.55	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.53	Reach Len. (m)	94.20	93.90	93.70
Crit W.S. (m)		Flow Area (m2)	2.82	6.42	28.02
E.G. Slope (m/m)	0.003027	Area (m2)	2.82	6.42	28.02
Q Total (m3/s)	14.04	Flow (m3/s)	0.56	5.30	8.18
Top Width (m)	50.39	Top Width (m)	6.90	4.05	39.44
Vel Total (m/s)	0.38	Avg. Vel. (m/s)	0.20	0.83	0.29
Max Chl Dpth (m)	1.88	Hydr. Depth (m)	0.41	1.59	0.71
Conv. Total (m3/s)	255.3	Conv. (m3/s)	10.3	96.4	148.6
Length Wtd. (m)	93.84	Wetted Per. (m)	6.97	4.88	39.50
Min Ch El (m)	87.65	Shear (N/m2)	12.00	39.09	21.06
Alpha	2.17	Stream Power (N/m s)	2.40	32.29	6.15
Frctn Loss (m)	0.23	Cum Volume (1000 m3)	15.09	21.82	16.52
C & E Loss (m)	0.00	Cum SA (1000 m2)	23.86	11.61	28.92

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2884

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.471	1.964	91.522	2.445	91.505	3.361	91.506	3.991	91.475
6.017	91.23	6.844	91.211	7.289	91.227	8.044	91.223	10.07	91.127
10.328	91.135	12.097	91.102	14.123	91.214	16.15	91.271	18.176	91.458
20.203	91.362	24.314	91.002	26.006	90.839	28.309	90.576	30.335	90.177
32.362	90.016	36.355	89.554	38.441	89.355	40.468	89.024	42.494	88.746
44.521	88.641	46.547	88.634	48.651	88.603	50.6	88.458	52.627	88.164
54.413	87.3	54.662	87.288	56.441	87.207	58.122	88.025	58.709	88.31
63.024	88.354	64.789	88.361	66.816	88.341	69.541	88.408	74.922	88.582
78.975	88.932	81.002	89.091	83.028	89.329	85.055	89.8	87.081	90.078
88.7	90.276	90.442	90.437	91.134	90.486	93.161	90.523	95.188	90.535
101.267	90.69	103.294	90.709	105.321	90.662	109.18	90.761		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	52.627	.08	58.122	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.627	58.122	77.1	93.9	113.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	89.13	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	89.11	Reach Len. (m)	77.10	93.90	113.80
Crit W.S. (m)		Flow Area (m2)	6.03	8.72	13.66
E.G. Slope (m/m)	0.002581	Area (m2)	6.03	8.72	13.66
Q Total (m3/s)	11.70	Flow (m3/s)	1.24	7.20	3.26
Top Width (m)	41.19	Top Width (m)	12.67	5.49	23.02
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.21	0.83	0.24
Max Chl Dpth (m)	1.90	Hydr. Depth (m)	0.48	1.59	0.59
Conv. Total (m3/s)	230.4	Conv. (m3/s)	24.4	141.8	

64.2					
Length Wtd. (m)	95.84	Wetted Per. (m)	12.73	5.88	
23.11					
Min Ch El (m)	87.21	Shear (N/m2)	11.99	37.52	
14.96					
Alpha	2.59	Stream Power (N/m s)	2.47	30.98	
3.57					
Frctn Loss (m)	0.22	Cum Volume (1000 m3)	11.39	18.85	
10.42					
C & E Loss (m)	0.00	Cum SA (1000 m2)	20.18	11.16	
22.05					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.32	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	89.30	Reach Len. (m)	77.10	93.90	
113.80					
Crit W.S. (m)		Flow Area (m2)	8.60	9.79	
18.29					
E.G. Slope (m/m)	0.002013	Area (m2)	8.60	9.79	
18.29					
Q Total (m3/s)	14.04	Flow (m3/s)	1.87	7.71	
4.47					
Top Width (m)	44.03	Top Width (m)	13.86	5.49	
24.67					
Vel Total (m/s)	0.38	Avg. Vel. (m/s)	0.22	0.79	
0.24					
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	0.62	1.78	
0.74					
Conv. Total (m3/s)	313.1	Conv. (m3/s)	41.6	171.8	
99.6					
Length Wtd. (m)	95.92	Wetted Per. (m)	13.93	5.88	
24.78					
Min Ch El (m)	87.21	Shear (N/m2)	12.19	32.84	
14.57					
Alpha	2.49	Stream Power (N/m s)	2.64	25.86	
3.56					
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	14.55	21.06	
14.35					
C & E Loss (m)	0.00	Cum SA (1000 m2)	22.88	11.16	
25.92					

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2788

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.27	2	91.22	4.2	91.2	5	91.21	6.5	91.19
8	91.24	8.6	91.23	11	90.94	13.1	90.8	15.3	90.69
17.5	90.61	19.7	90.56	23	90.39	25.1	90.32	26	90.25
26.4	90.2	27.5	89.97	28.6	89.77	30.5	89.51	33.1	89.32
35	89.24	35.3	89.22	36.5	89.17	38.9	89.09	42.4	88.87
43.9	88.81	45.1	88.746	46.9	88.65	48.6	88.61	50.9	88.61
53.1	88.58	55.3	88.42	55.9	88.33	57.5	86.91	58.9	86.81
59.8	86.73	60.4	86.78	61.7	86.83	64.9	88.19	66.4	88.21
67.9	88.43	68.7	88.52	70.588	.67567	72.4	88.84	73.9	88.99
75.4	89.2	76.9	89.19	77.6	89.21	79.9	89.43	82	89.47
84.2	89.56	85.8	89.75	86.4	89.8	87.3	89.82	91.8	89.85
93.1	89.83	102	89.6	102.9	89.63	106.5	89.85	108.7	89.75
110.9	89.71	112	89.72	113.1	89.7	115.8	89.78	117.3	89.87
119.1	89.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	55.9	.08	64.9	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.9	64.9	14.4	13.8	16.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.89	Reach Len. (m)	14.40	13.80	16.70
Crit W.S. (m)		Flow Area (m2)	3.41	15.16	2.98
E.G. Slope (m/m)	0.002002	Area (m2)	3.41	15.16	2.98
Q Total (m3/s)	12.18	Flow (m3/s)	0.40	11.31	

0.46					
Top Width (m)	30.72	Top Width (m)	13.76	9.00	
7.96					
Vel Total (m/s)	0.57	Avg. Vel. (m/s)	0.12	0.75	
0.15					
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.25	1.68	
0.37					
Conv. Total (m3/s)	272.2	Conv. (m3/s)	9.0	252.9	
10.3					
Length Wtd. (m)	13.92	Wetted Per. (m)	13.78	9.83	
8.00					
Min Ch El (m)	86.73	Shear (N/m2)	4.86	30.27	
7.32					
Alpha	1.63	Stream Power (N/m s)	0.57	22.60	
1.13					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	11.03	17.73	
9.47					
C & E Loss (m)	0.00	Cum SA (1000 m2)	19.16	10.48	
20.28					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.15	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	89.12	Reach Len. (m)	14.40	13.80	
16.70					
Crit W.S. (m)		Flow Area (m2)	7.11	17.28	
5.12					
E.G. Slope (m/m)	0.001628	Area (m2)	7.11	17.28	
5.12					
Q Total (m3/s)	14.61	Flow (m3/s)	1.03	12.70	
0.88					
Top Width (m)	36.92	Top Width (m)	17.97	9.00	
9.95					
Vel Total (m/s)	0.50	Avg. Vel. (m/s)	0.14	0.73	
0.17					
Max Chl Dpth (m)	2.39	Hydr. Depth (m)	0.40	1.92	
0.51					
Conv. Total (m3/s)	362.1	Conv. (m3/s)	25.5	314.7	
21.8					
Length Wtd. (m)	13.96	Wetted Per. (m)	18.00	9.83	
10.00					
Min Ch El (m)	86.73	Shear (N/m2)	6.31	28.08	

8.17					
Alpha	1.93	Stream Power (N/m s)	0.91	20.64	
1.41					
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	13.94	19.79	
13.02					
C & E Loss (m)	0.00	Cum SA (1000 m2)	21.65	10.48	
23.95					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2774

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.16	1.8	91.13	3.7	91.07	7.7	90.84	8.2	90.82
10.7	90.85	15	90.77	18	90.68	21.9	90.5	24.1	90.3
25.4	90.27	26.4	90.22	28.4	90.1	31	90.06	37.2	89.62
40.4	89.58	41.7	89.51	42.3	89.44	44.6	89.16	44.889.15067	
46.1	89.09	46.9	89	51.4	88.97	53.7	88.94	54.9	88.9
56	88.85	58	86.9	58	86.92	58.1	86.85	59.1	86.77
61.4	86.8	63.3	87.43	65.1	88.91	67.4	89.1	68.2	89.15
69.8	89.22	71.2	89.23	73	89.158	74.2	89.11	76.5	89.22
78.7	89.46	81	89.46	83	89.49	90.1	89.44	91.8	89.45
94.9	89.53	96.9	89.54	97.7	89.55	99.2	89.63	102.1	89.59
103.6	89.6	107.5	89.57	109.5	89.45	110.6	89.42	112.9	89.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58	.08	63.3	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58	63.3	51.3	49.4	52.9	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	49	89.61	F
71	112.9	89.61	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.87	Element	Left OB	Channel
Right OB				
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080
0.150				
W.S. Elev (m)	88.81	Reach Len. (m)	51.30	49.40
52.90				
Crit W.S. (m)	87.72	Flow Area (m2)	1.88	10.09
1.16				
E.G. Slope (m/m)	0.003512	Area (m2)	1.88	10.09
1.16				
Q Total (m3/s)	12.18	Flow (m3/s)	0.57	11.30
0.30				
Top Width (m)	8.95	Top Width (m)	1.96	5.30
1.68				
Vel Total (m/s)	0.93	Avg. Vel. (m/s)	0.31	1.12
0.26				
Max Chl Dpth (m)	2.04	Hydr. Depth (m)	0.96	1.90
0.69				
Conv. Total (m3/s)	205.5	Conv. (m3/s)	9.7	190.7
5.1				
Length Wtd. (m)	49.40	Wetted Per. (m)	2.76	5.43
2.18				
Min Ch El (m)	86.77	Shear (N/m2)	23.42	64.02
18.40				
Alpha	1.36	Stream Power (N/m s)	7.16	71.70
4.79				
Frctn Loss (m)		Cum Volume (1000 m3)	10.99	17.55
9.44				
C & E Loss (m)		Cum SA (1000 m2)	19.05	10.39
20.20				

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	89.11	Element	Left OB	Channel
Right OB				
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080
0.150				
W.S. Elev (m)	89.04	Reach Len. (m)	51.30	49.40
52.90				
Crit W.S. (m)	87.82	Flow Area (m2)	2.99	11.28

1.67					
E.G. Slope (m/m)	0.003554	Area (m2)	3.09	11.28	
1.67					
Q Total (m3/s)	14.61	Flow (m3/s)	0.54	13.70	
0.38					
Top Width (m)	20.11	Top Width (m)	11.45	5.30	
3.36					
Vel Total (m/s)	0.92	Avg. Vel. (m/s)	0.18	1.21	
0.23					
Max Chl Dpth (m)	2.27	Hydr. Depth (m)	0.33	2.13	
0.50					
Conv. Total (m3/s)	245.1	Conv. (m3/s)	9.0	229.8	
6.3					
Length Wtd. (m)	49.40	Wetted Per. (m)	9.82	5.43	
3.90					
Min Ch El (m)	86.77	Shear (N/m2)	10.62	72.46	
14.89					
Alpha	1.65	Stream Power (N/m s)	1.91	87.95	
3.36					
Frctn Loss (m)		Cum Volume (1000 m3)	13.87	19.59	
12.96					
C & E Loss (m)		Cum SA (1000 m2)	21.44	10.39	
23.84					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 4 RS: 2750

INPUT
Description:
Distance from Upstream XS = 10
Deck/Roadway Width = 23
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	89.61	100	89.61

Upstream Bridge Cross Section Data
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	91.16	1.8	91.13	3.7	91.07	7.7	90.84	8.2	90.82
10.7	90.85	15	90.77	18	90.68	21.9	90.5	24.1	90.3
25.4	90.27	26.4	90.22	28.4	90.1	31	90.06	37.2	89.62
40.4	89.58	41.7	89.51	42.3	89.44	44.6	89.16	44.889.15067	
46.1	89.09	46.9	89	51.4	88.97	53.7	88.94	54.9	88.9
56	88.85	58	86.9	58	86.92	58.1	86.85	59.1	86.77
61.4	86.8	63.3	87.43	65.1	88.91	67.4	89.1	68.2	89.15
69.8	89.22	71.2	89.23	73	89.158	74.2	89.11	76.5	89.22
78.7	89.46	81	89.46	83	89.49	90.1	89.44	91.8	89.45
94.9	89.53	96.9	89.54	97.7	89.55	99.2	89.63	102.1	89.59
103.6	89.6	107.5	89.57	109.5	89.45	110.6	89.42	112.9	89.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58	.08	63.3	.15

Bank Sta: Left Right Coeff Contr. Expan.

58	63.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	49	89.61	F
71	112.9	89.61	F

Downstream Deck/Roadway Coordinates num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	89.61		100	89.61	

Downstream Bridge Cross Section Data

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.91	1.3	90.9	4.2	90.81	5.7	90.74	7.5	90.73
10.2	90.61	11	90.61	13.1	90.67	14.3	90.66	19.1	90.9
23.3	91.08	27.8	91.15	30.1	91.16	34.6	91.12	35.4	91.08
36.8	91.07	41.4	90.95	43.6	90.78	44.2	90.69	45.7	90.54
47.2	90.33	48.7	90.16	51.7	89.67	52.6	89.56	54.1	89.34
54.9	89.18	55	89.155	56.1	88.88	57.2	88.64	59.1	88.33
59.4	88.29	61.7	88.22	62	88.18	63.5	88.04	65	87.99
66.2	87.93	68.4	88.08	69.4	88.06	70.9	88.07	75.2	86.74
76.8	86.74	78.3	86.74	79.7	86.74	82	87.83	84.2	88.11
85.688.38391		86.5	88.56	88.8	88.96	91	89.19	93.1	89.38
94.6	89.35	96.1	89.35	104.6	89.71	106.8	89.85	108	89.88
109.4	89.89	110.9	89.94	114.4	90	120.4	90.14	124.3	90.11
127.1	90.17	130.2	90.13	131.7	90.14	137.3	90.12		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	70.9	.08	82	.15

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          70.9      82            .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      59   89.61       F
      94   137.3   89.61       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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    2.14    3.12
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
                10      24     .013     .013        0                   .5
       1
Upstream   Elevation =  86.83
           Centerline Station =  60
Downstream Elevation =  86.74
           Centerline Station =  77

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)      12.18    Culv Full Len (m)
  # Barrels                   1    Culv Vel US (m/s)        2.48
  Q Barrel (m3/s)          12.18    Culv Vel DS (m/s)        2.34
  E.G. US. (m)             88.87    Culv Inv El Up (m)      86.83
  W.S. US. (m)             88.81    Culv Inv El Dn (m)      86.74
  E.G. DS (m)              88.44    Culv Frctn Ls (m)        0.03
  W.S. DS (m)              88.41    Culv Exit Loss (m)       0.25
  Delta EG (m)              0.44    Culv Entr Loss (m)       0.16
  Delta WS (m)              0.41    Q Weir (m3/s)
  E.G. IC (m)              88.69    Weir Sta Lft (m)
  E.G. OC (m)              88.87    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)        88.40    Weir Max Depth (m)
  Culv WS Outlet (m)       88.41    Weir Avg Depth (m)
```

Culv Nml Depth (m)	1.11	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.16	Min El Weir Flow (m)	89.61

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	14.61	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	2.75
Q Barrel (m3/s)	14.61	Culv Vel DS (m/s)	2.61
E.G. US. (m)	89.11	Culv Inv El Up (m)	86.83
W.S. US. (m)	89.04	Culv Inv El Dn (m)	86.74
E.G. DS (m)	88.57	Culv Frctn Ls (m)	0.04
W.S. DS (m)	88.53	Culv Exit Loss (m)	0.32
Delta EG (m)	0.55	Culv Entr Loss (m)	0.19
Delta WS (m)	0.51	Q Weir (m3/s)	
E.G. IC (m)	88.94	Weir Sta Lft (m)	
E.G. OC (m)	89.11	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	88.53	Weir Max Depth (m)	
Culv WS Outlet (m)	88.53	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.26	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.31	Min El Weir Flow (m)	89.61

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2725

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.91	1.3	90.9	4.2	90.81	5.7	90.74	7.5	90.73
10.2	90.61	11	90.61	13.1	90.67	14.3	90.66	19.1	90.9
23.3	91.08	27.8	91.15	30.1	91.16	34.6	91.12	35.4	91.08
36.8	91.07	41.4	90.95	43.6	90.78	44.2	90.69	45.7	90.54
47.2	90.33	48.7	90.16	51.7	89.67	52.6	89.56	54.1	89.34
54.9	89.18	55	89.155	56.1	88.88	57.2	88.64	59.1	88.33
59.4	88.29	61.7	88.22	62	88.18	63.5	88.04	65	87.99
66.2	87.93	68.4	88.08	69.4	88.06	70.9	88.07	75.2	86.74
76.8	86.74	78.3	86.74	79.7	86.74	82	87.83	84.2	88.11
85.6	88.38391	86.5	88.56	88.8	88.96	91	89.19	93.1	89.38
94.6	89.35	96.1	89.35	104.6	89.71	106.8	89.85	108	89.88
109.4	89.89	110.9	89.94	114.4	90	120.4	90.14	124.3	90.11
127.1	90.17	130.2	90.13	131.7	90.14	137.3	90.12		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	70.9	.08	82	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
70.9	82	15.2	15.3	16.5	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	59	89.61	F
94	137.3	89.61	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.41	Reach Len. (m)	15.20	15.30	16.50
Crit W.S. (m)	87.51	Flow Area (m2)	3.74	14.38	1.18
E.G. Slope (m/m)	0.002979	Area (m2)	3.75	14.38	1.18
Q Total (m3/s)	12.18	Flow (m3/s)	0.63	11.35	0.20
Top Width (m)	27.07	Top Width (m)	12.26	11.10	3.71
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.17	0.79	0.17
Max Chl Dpth (m)	1.67	Hydr. Depth (m)	0.31	1.30	0.32
Conv. Total (m3/s)	223.1	Conv. (m3/s)	11.5	208.0	3.6
Length Wtd. (m)	15.31	Wetted Per. (m)	11.92	11.55	3.76
Min Ch El (m)	86.74	Shear (N/m2)	9.15	36.37	9.19
Alpha	1.46	Stream Power (N/m s)	1.54	28.72	1.55
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	10.99	17.25	9.44
C & E Loss (m)	0.00	Cum SA (1000 m2)	18.68	9.98	20.06

Note: Multiple critical depths were found at this location. The critical depth

with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	88.57	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.53	Reach Len. (m)	15.20	15.30	16.50
Crit W.S. (m)	87.60	Flow Area (m2)	5.25	15.79	1.70
E.G. Slope (m/m)	0.002943	Area (m2)	5.36	15.79	1.70
Q Total (m3/s)	14.61	Flow (m3/s)	1.10	13.19	0.32
Top Width (m)	28.50	Top Width (m)	13.04	11.10	4.36
Vel Total (m/s)	0.64	Avg. Vel. (m/s)	0.21	0.84	0.19
Max Chl Dpth (m)	1.79	Hydr. Depth (m)	0.44	1.42	0.39
Conv. Total (m3/s)	269.3	Conv. (m3/s)	20.3	243.1	6.0
Length Wtd. (m)	15.32	Wetted Per. (m)	11.92	11.55	4.42
Min Ch El (m)	86.74	Shear (N/m2)	12.71	39.46	11.07
Alpha	1.53	Stream Power (N/m s)	2.66	32.96	2.11
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	13.87	19.25	12.96
C & E Loss (m)	0.00	Cum SA (1000 m2)	20.81	9.98	23.63

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2710

INPUT

Description:

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.91	1.3	90.9	4.2	90.81	5.7	90.74	7.5	90.73
10.2	90.61	11	90.61	13.1	90.67	14.3	90.66	19.1	90.9
23.3	91.08	27.8	91.15	30.1	91.16	34.6	91.12	35.4	91.08
36.8	91.07	41.4	90.95	43.6	90.78	44.2	90.69	45.7	90.54
47.2	90.33	48.7	90.16	51.7	89.67	52.6	89.56	54.1	89.34
54.9	89.18	55	89.155	56.1	88.88	57.2	88.64	59.1	88.33
59.4	88.29	61.7	88.22	62	88.18	63.5	88.04	65	87.99
66.2	87.93	68.4	88.08	69.4	88.06	70.9	88.07	75.2	86.74
76.8	86.74	78.3	86.74	79.7	86.74	82	87.83	84.2	88.11
85.688.38391		86.5	88.56	88.8	88.96	91	89.19	93.1	89.38
94.6	89.35	96.1	89.35	104.6	89.71	106.8	89.85	108	89.88
109.4	89.89	110.9	89.94	114.4	90	120.4	90.14	124.3	90.11
127.1	90.17	130.2	90.13	131.7	90.14	137.3	90.12		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	70.9	.08	82	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
70.9	82	94.9	76.7	41.1	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.35	Reach Len. (m)	94.90	76.70	41.10
Crit W.S. (m)		Flow Area (m2)	3.07	13.75	0.98
E.G. Slope (m/m)	0.003557	Area (m2)	3.07	13.75	0.98
Q Total (m3/s)	12.18	Flow (m3/s)	0.49	11.52	0.17
Top Width (m)	26.44	Top Width (m)	11.92	11.10	3.42
Vel Total (m/s)	0.68	Avg. Vel. (m/s)	0.16	0.84	0.17
Max Chl Dpth (m)	1.61	Hydr. Depth (m)	0.26	1.24	0.29
Conv. Total (m3/s)	204.2	Conv. (m3/s)	8.3	193.1	2.8
Length Wtd. (m)	78.26	Wetted Per. (m)	11.94	11.55	

3.46					
Min Ch El (m)	86.74	Shear (N/m2)	8.95	41.54	9.87
Alpha	1.42	Stream Power (N/m s)	1.44	34.79	1.69
Frctn Loss (m)	0.28	Cum Volume (1000 m3)	10.94	17.04	9.42
C & E Loss (m)	0.00	Cum SA (1000 m2)	18.50	9.81	20.00

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	88.51	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.48	Reach Len. (m)	94.90	76.70	41.10
Crit W.S. (m)		Flow Area (m2)	4.64	15.17	1.46
E.G. Slope (m/m)	0.003468	Area (m2)	4.64	15.17	1.46
Q Total (m3/s)	14.61	Flow (m3/s)	0.93	13.40	0.29
Top Width (m)	27.88	Top Width (m)	12.70	11.10	4.08
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.20	0.88	0.20
Max Chl Dpth (m)	1.74	Hydr. Depth (m)	0.37	1.37	0.36
Conv. Total (m3/s)	248.1	Conv. (m3/s)	15.8	227.5	4.9
Length Wtd. (m)	78.59	Wetted Per. (m)	12.73	11.55	4.13
Min Ch El (m)	86.74	Shear (N/m2)	12.39	44.68	12.02
Alpha	1.52	Stream Power (N/m s)	2.48	39.45	2.36
Frctn Loss (m)	0.27	Cum Volume (1000 m3)	13.80	19.01	12.94
C & E Loss (m)	0.00	Cum SA (1000 m2)	20.62	9.81	23.56

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2633

INPUT
Description:
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.729	3.426	90.703	5.026	90.707	7.135	90.683	9.244	90.692
11.353	90.635	12.526	90.623	15.687	90.617	19.789	90.668	21.898	90.343
23.588	90.119	25.168	89.826	26.116	89.634	26.749	89.531	28.015	89.364
29.909	89.079	30.333	89.036	33.07	88.911	36.23	88.673	38.769	88.528
40.878	88.35	42.987	88.219	45.712	88.116	48.872	87.945	51.423	87.721
53.532	87.597	55.641	87.604	57.75	87.452	58.354	87.451	59.859	87.491
64.077	87.447	66.186	87.384	68.295	87.376	69.653	86.585	70.171	86.283
73.451	86.283	73.558	86.342	73.918	86.598	74.785	87.215	75.528	87.424
76.922	87.766	79.059	88.103	81.197	88.269	83.29	88.475	87.609	88.816
89.499	89.014	92.603	89.239	96.158	89.54	98.295	89.495	100.365	89.393
101.917	89.366	104.707	89.347	105.856	89.372	108.982	89.387	111.119	89.464
113.257	89.757	115.394	89.923	117.531	89.96	122.097	89.887	128.542	89.823
129.671	89.792								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	68.295	.08	74.785	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.295	74.785	73.6	92	109.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	88.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.07	Reach Len. (m)	73.60	92.00	109.60
Crit W.S. (m)		Flow Area (m2)	10.35	9.95	1.50
E.G. Slope (m/m)	0.003592	Area (m2)	10.35	9.95	1.50
Q Total (m3/s)	12.18	Flow (m3/s)	2.52	9.35	0.31
Top Width (m)	32.24	Top Width (m)	21.70	6.49	4.05

Vel Total (m/s)	0.56	Avg. Vel. (m/s)	0.24	0.94	0.20
Max Chl Dpth (m)	1.78	Hydr. Depth (m)	0.48	1.53	0.37
Conv. Total (m3/s)	203.2	Conv. (m3/s)	42.1	156.0	5.1
Length Wtd. (m)	86.95	Wetted Per. (m)	21.72	7.08	4.14
Min Ch El (m)	86.28	Shear (N/m2)	16.78	49.50	12.78
Alpha	2.22	Stream Power (N/m s)	4.09	46.52	2.60
Frctn Loss (m)	0.27	Cum Volume (1000 m3)	10.30	16.13	9.37
C & E Loss (m)	0.00	Cum SA (1000 m2)	16.90	9.14	19.85

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	88.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	88.20	Reach Len. (m)	73.60	92.00	109.60
Crit W.S. (m)		Flow Area (m2)	13.47	10.82	2.14
E.G. Slope (m/m)	0.003511	Area (m2)	13.47	10.82	2.14
Q Total (m3/s)	14.61	Flow (m3/s)	3.53	10.64	0.44
Top Width (m)	36.93	Top Width (m)	24.88	6.49	5.56
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.26	0.98	0.21
Max Chl Dpth (m)	1.92	Hydr. Depth (m)	0.54	1.67	0.39
Conv. Total (m3/s)	246.6	Conv. (m3/s)	59.6	179.5	7.5
Length Wtd. (m)	86.49	Wetted Per. (m)	24.91	7.08	5.66
Min Ch El (m)	86.28	Shear (N/m2)	18.62	52.63	13.02
Alpha	2.36	Stream Power (N/m s)	4.88	51.73	2.69

Frctn Loss (m)	0.27	Cum Volume (1000 m3)	12.94	18.01	12.86
C & E Loss (m)	0.00	Cum SA (1000 m2)	18.83	9.14	23.37

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2541

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.939	2.797	89.87	6.899	89.812	11.002	89.701	13.053	89.667
17.155	89.533	22.518	89.449	27.412	89.328	30.871	89.27	32.542	89.205
35.617	89.05	37.668	88.973	39.719	88.797	43.822	88.512	45.873	88.102
47.924	87.639	49.975	87.262	54.078	86.82	58.18	86.695	60.232	86.68
62.613	86.763	64.061	86.784	64.106	86.759	64.559	86.511	65.112	85.827
67.761	85.827	68.136	86.189	68.255	86.303	69.173	86.696	70.472	87.886
71.013	88.022	72.687	88.499	74.361	89.025	74.571	89.06	76.621	88.947
78.671	88.992	82.733	88.852	84.819	88.863	90.968	89.025	93.018	89.065
94.453	89.172	95.068	89.236	96.128	89.242	97.117	89.227	99.476	89.34
101.217	89.467	102.825	89.392	103.266	89.386	105.316	89.429	109.415	89.567
111.465	89.51	113.514	89.556	115.564	89.671	117.614	89.656	119.568	89.71
121.243	89.837	122.048	89.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	64.106	.08	69.173	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64.106	69.173	81.1	92	109.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	87.83	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.81	Reach Len. (m)	81.10	92.00	109.80
Crit W.S. (m)		Flow Area (m2)	14.68	8.75	0.67

E.G. Slope (m/m)	0.002661	Area (m2)	14.68	8.75	0.67
Q Total (m3/s)	12.18	Flow (m3/s)	4.57	7.48	0.13
Top Width (m)	23.21	Top Width (m)	16.93	5.07	1.21
Vel Total (m/s)	0.51	Avg. Vel. (m/s)	0.31	0.85	0.19
Max Chl Dpth (m)	1.98	Hydr. Depth (m)	0.87	1.73	0.56
Conv. Total (m3/s)	236.1	Conv. (m3/s)	88.7	144.9	2.5
Length Wtd. (m)	89.96	Wetted Per. (m)	17.02	5.73	1.65
Min Ch El (m)	85.83	Shear (N/m2)	22.50	39.83	10.69
Alpha	1.90	Stream Power (N/m s)	7.01	34.04	2.03
Frctn Loss (m)	0.36	Cum Volume (1000 m3)	9.38	15.27	9.25
C & E Loss (m)	0.01	Cum SA (1000 m2)	15.48	8.60	19.56

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.94	Reach Len. (m)	81.10	92.00	109.80
Crit W.S. (m)		Flow Area (m2)	16.95	9.41	0.85
E.G. Slope (m/m)	0.002778	Area (m2)	16.95	9.41	0.85
Q Total (m3/s)	14.61	Flow (m3/s)	5.81	8.64	0.17
Top Width (m)	24.09	Top Width (m)	17.51	5.07	

1.51					
Vel Total (m/s)	0.54	Avg. Vel. (m/s)	0.34	0.92	
0.20					
Max Chl Dpth (m)	2.11	Hydr. Depth (m)	0.97	1.86	
0.56					
Conv. Total (m3/s)	277.2	Conv. (m3/s)	110.1	163.9	
3.2					
Length Wtd. (m)	90.07	Wetted Per. (m)	17.61	5.73	
1.98					
Min Ch El (m)	85.83	Shear (N/m2)	26.22	44.77	
11.66					
Alpha	1.89	Stream Power (N/m s)	8.98	41.07	
2.33					
Frctn Loss (m)	0.35	Cum Volume (1000 m3)	11.82	17.08	
12.70					
C & E Loss (m)	0.01	Cum SA (1000 m2)	17.27	8.60	
22.98					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2449

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.139	1.302	90.079	3.681	89.874	4.6	89.865	6.059	89.883
10.816	89.827	15.572	89.675	17.951	89.65	19.071	89.586	20.329	89.486
21.966	89.327	23.413	89.208	24.509	89.1	26.307	88.865	27.464	88.736
29.201	88.72	29.842	88.678	31.901	88.429	33.542	88.323	43.672	87.441
46.685	87.316	48.014	87.236	48.868	87.181	49.461	87.104	50.908	86.974
51.247	86.96	52.355	86.922	54.077	86.93	57.773	86.902	58.32	86.57
58.559	86.113	58.948	85.37	61.801	85.37	62.018	85.558	62.354	85.96
63.366	87.171	64.621	87.145	65.312	87.155	66.753	87.209	68.185	87.211
70.594	87.151	71.077	87.155	78.283	87.313	80.231	87.402	82.64	87.47
86.93	87.681	88.371	87.803	89.868	87.978	91.254	88.012	92.695	88.069
94.687	88.105	95.578	88.17	97.096	88.405	98.46	88.446	100.491	88.476

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 101.914   88.52 104.225  88.678 107.108  88.692 107.665   88.72 108.549  88.809
 111.431  88.988 112.872  88.922 113.961  88.902 114.425  88.926

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  58.559     .08  62.354     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        58.559  62.354             104.9      92    71.4             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            87.47    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.08    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            87.38    Reach Len. (m)         104.90      92.00
71.40
  Crit W.S. (m)                     Flow Area (m2)           4.74       7.35
3.55
  E.G. Slope (m/m)      0.006527    Area (m2)                4.74       7.35
3.55
  Q Total (m3/s)           12.18    Flow (m3/s)              1.25      10.28
0.65
  Top Width (m)            34.78    Top Width (m)           13.51       3.79
17.48
  Vel Total (m/s)           0.78    Avg. Vel. (m/s)          0.26       1.40
0.18
  Max Chl Dpth (m)          2.01    Hydr. Depth (m)          0.35       1.94
0.20
  Conv. Total (m3/s)       150.7    Conv. (m3/s)             15.4      127.3
 8.0
  Length Wtd. (m)          92.24    Wetted Per. (m)         13.89       4.50
18.05
  Min Ch El (m)            85.37    Shear (N/m2)            21.85     104.43
12.58
  Alpha                     2.74    Stream Power (N/m s)     5.75     146.16
2.29
  Frctn Loss (m)            0.41    Cum Volume (1000 m3)     8.59      14.53
9.02
  C & E Loss (m)            0.01    Cum SA (1000 m2)        14.25       8.20
18.53



Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
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the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.61	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.53	Reach Len. (m)	104.90	92.00	71.40
Crit W.S. (m)		Flow Area (m2)	6.92	7.90	6.41
E.G. Slope (m/m)	0.006011	Area (m2)	6.92	7.90	6.41
Q Total (m3/s)	14.61	Flow (m3/s)	2.02	11.14	1.45
Top Width (m)	41.20	Top Width (m)	15.90	3.79	21.50
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.29	1.41	0.23
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.44	2.08	0.30
Conv. Total (m3/s)	188.5	Conv. (m3/s)	26.1	143.7	18.7
Length Wtd. (m)	92.09	Wetted Per. (m)	16.30	4.50	22.07
Min Ch El (m)	85.37	Shear (N/m2)	25.03	103.42	17.12
Alpha	3.23	Stream Power (N/m s)	7.31	145.80	3.88
Frctn Loss (m)	0.41	Cum Volume (1000 m3)	10.85	16.29	12.30
C & E Loss (m)	0.01	Cum SA (1000 m2)	15.92	8.20	21.72

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2357

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.11	.916	90.147	2.961	90.208	4.018	90.231	5.287	90.284
6.323	90.308	7.19	90.25	7.754	90.224	9.235	90.175	10.081	90.132
12.647	90.074	13.464	90.004	16.425	89.739	18.97	89.479	19.597	89.365
21.219	89.062	24.391	88.45	24.955	88.331	25.293	88.266	25.942	88.235
29.185	88.055	30.735	87.931	31.158	87.883	31.617	87.842	32.216	87.801
33.273	87.71	34.331	87.632	36.445	87.427	37.08	87.377	37.94	87.3
38.137	87.286	38.701	87.233	38.772	87.224	39.547	87.132	40.323	87.051
41.662	86.946	41.874	86.933	43.495	86.907	43.706	86.894	44.263	86.869
44.764	86.819	45.821	86.743	46.667	86.675	48.218	86.638	48.923	86.592
49.98	86.536	50.587	86.413	51.617	86.028	53.012	84.913	54.277	84.913
54.618	84.913	55.464	84.913	55.624	84.913	56.438	84.913	56.572	84.913
57.808	85.939	58.578	86.41	59.502	86.854	60.496	86.926	60.615	86.937
61.717	87.015	62.502	87.07	63.644	87.14	64.508	87.221	66.427	87.348
68.258	87.459	69.039	87.474	69.567	87.497	70.875	87.563	74.435	87.801
78.288	87.987	79.83	88.074	80.207	88.102	81.254	88.164	82.475	88.227
83.783	88.309	85.226	88.389	86.835	88.442	90.621	88.574	92.068	88.672
95.47	88.864	96.017	88.901	97.912	88.968	100.615	89.028	101.412	89.052
101.924	89.062	106.808	89.14						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	51.617	.08	57.808	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.617	57.808	92.8	92	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	87.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	87.00	Reach Len. (m)	92.80	92.00	92.00
Crit W.S. (m)		Flow Area (m2)	3.16	11.49	1.11
E.G. Slope (m/m)	0.003259	Area (m2)	3.16	11.49	1.11
Q Total (m3/s)	12.18	Flow (m3/s)	0.53	11.46	0.18
Top Width (m)	20.45	Top Width (m)	10.60	6.19	3.65
Vel Total (m/s)	0.77	Avg. Vel. (m/s)	0.17	1.00	

0.16					
Max Chl Dpth (m)	2.08	Hydr. Depth (m)	0.30	1.86	
0.30					
Conv. Total (m3/s)	213.3	Conv. (m3/s)	9.3	200.8	
3.2					
Length Wtd. (m)	92.17	Wetted Per. (m)	10.70	6.95	
3.89					
Min Ch El (m)	84.91	Shear (N/m2)	9.43	52.81	
9.11					
Alpha	1.57	Stream Power (N/m s)	1.59	52.68	
1.50					
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	8.18	13.66	
8.85					
C & E Loss (m)	0.00	Cum SA (1000 m2)	12.98	7.74	
17.78					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	87.19	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	87.13	Reach Len. (m)	92.80	92.00	
92.00					
Crit W.S. (m)		Flow Area (m2)	4.72	12.34	
1.75					
E.G. Slope (m/m)	0.003472	Area (m2)	4.72	12.34	
1.75					
Q Total (m3/s)	14.61	Flow (m3/s)	0.99	13.32	
0.30					
Top Width (m)	24.02	Top Width (m)	12.09	6.19	
5.74					
Vel Total (m/s)	0.78	Avg. Vel. (m/s)	0.21	1.08	
0.17					
Max Chl Dpth (m)	2.22	Hydr. Depth (m)	0.39	1.99	
0.30					
Conv. Total (m3/s)	248.0	Conv. (m3/s)	16.7	226.1	
5.1					
Length Wtd. (m)	92.20	Wetted Per. (m)	12.19	6.95	
5.99					
Min Ch El (m)	84.91	Shear (N/m2)	13.19	60.43	

9.95					
Alpha	1.77	Stream Power (N/m s)	2.75	65.24	1.72
Frctn Loss (m)	0.34	Cum Volume (1000 m3)	10.24	15.35	12.01
C & E Loss (m)	0.00	Cum SA (1000 m2)	14.45	7.74	20.74

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2265

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.593	1.553	89.713	3.553	89.697	5.553	89.586	7.678	89.44
11.553	89.28	13.553	89.003	15.553	88.683	17.553	88.52	19.553	87.965
21.594	87.313	23.553	86.845	25.553	86.565	29.546	86.523	31.553	86.343
33.522	86.29	37.553	86.222	39.621	85.956	41.633	85.54	43.463	85.312
45.553	84.998	47.465	85.367	47.553	85.384	48.316	84.457	50.316	84.457
50.79	85.196	51.554	86.385	55.554	86.619	59.554	86.813	61.554	86.937
63.554	87.106	65.554	87.187	69.554	87.404	73.554	87.654	77.235	87.788
77.877	87.831	81.554	88.218	83.2	88.342	85.554	88.477	87.554	88.452
91.554	88.586	95.555	88.989	99.179	89.19				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	47.465	.08	50.79	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.465	50.79	11	19.9	15.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150

W.S. Elev (m)	86.67	Reach Len. (m)	11.00	19.90	15.60
Crit W.S. (m)		Flow Area (m2)	14.83	6.76	1.40
E.G. Slope (m/m)	0.003929	Area (m2)	14.83	6.76	1.40
Q Total (m3/s)	12.18	Flow (m3/s)	4.65	7.32	0.21
Top Width (m)	31.93	Top Width (m)	22.70	3.33	5.91
Vel Total (m/s)	0.53	Avg. Vel. (m/s)	0.31	1.08	0.15
Max Chl Dpth (m)	2.22	Hydr. Depth (m)	0.65	2.03	0.24
Conv. Total (m3/s)	194.3	Conv. (m3/s)	74.2	116.8	3.3
Length Wtd. (m)	17.52	Wetted Per. (m)	22.85	4.17	6.57
Min Ch El (m)	84.46	Shear (N/m2)	25.02	62.53	8.20
Alpha	2.65	Stream Power (N/m s)	7.84	67.66	1.22
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	7.34	12.82	8.74
C & E Loss (m)	0.00	Cum SA (1000 m2)	11.44	7.30	17.34

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.81	Reach Len. (m)	11.00	19.90	15.60
Crit W.S. (m)		Flow Area (m2)	17.93	7.21	2.37
E.G. Slope (m/m)	0.003863	Area (m2)	17.93	7.21	2.37
Q Total (m3/s)	14.61	Flow (m3/s)	6.15	8.07	0.39
Top Width (m)	35.64	Top Width (m)	23.65	3.33	8.66
Vel Total (m/s)	0.53	Avg. Vel. (m/s)	0.34	1.12	0.17

```
  Max Chl Dpth (m)          2.35    Hydr. Depth (m)           0.76       2.17
0.27
  Conv. Total (m3/s)       235.1    Conv. (m3/s)              98.9      129.8
 6.3
  Length Wtd. (m)          17.12    Wetted Per. (m)          23.81       4.17
9.32
  Min Ch El (m)            84.46    Shear (N/m2)             28.52      65.51
9.64
  Alpha                     2.63    Stream Power (N/m s)      9.78      73.33
1.60
  Frctn Loss (m)            0.06    Cum Volume (1000 m3)      9.19      14.46
11.82
  C & E Loss (m)            0.00    Cum SA (1000 m2)         12.79       7.30
20.08



CROSS SECTION


RIVER: Walker Creek
REACH: Reach 4            RS: 2184

INPUT
Description:
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   89.715.000075   90.1310.00002   89.6915.00007   88.6520.00001   86.86
25.00006   86.4530.00004   86.2635.00008   86.2539.9999885.7179740.81475 85.3659
41.9174384.9939143.3119484.5233544.1853484.4555244.8914284.52625 45.0075 84.6899
46.1535185.2030747.7230986.2978948.7544186.3378151.56137 86.316656.56135   86.53
61.56141   86.9466.56139    87.271.56136    87.676.56142   87.8181.56139   88.29
86.56136   88.5191.56134   88.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1540.81475     .0846.15351     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      40.8147546.15351             83.6    72.2    73.7             .6       .8

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            86.65    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.05    Wt. n-Val.              0.150      0.080
0.150
```

W.S. Elev (m)	86.60	Reach Len. (m)	83.60	72.20	73.70
Crit W.S. (m)		Flow Area (m2)	7.01	9.59	3.29
E.G. Slope (m/m)	0.003544	Area (m2)	7.01	9.59	3.29
Q Total (m3/s)	12.18	Flow (m3/s)	1.50	10.11	0.56
Top Width (m)	34.21	Top Width (m)	17.63	5.34	11.25
Vel Total (m/s)	0.61	Avg. Vel. (m/s)	0.21	1.06	0.17
Max Chl Dpth (m)	2.14	Hydr. Depth (m)	0.40	1.80	0.29
Conv. Total (m3/s)	204.5	Conv. (m3/s)	25.2	169.9	9.5
Length Wtd. (m)	73.14	Wetted Per. (m)	17.74	5.68	11.60
Min Ch El (m)	84.46	Shear (N/m2)	13.73	58.69	9.86
Alpha	2.49	Stream Power (N/m s)	2.93	61.93	1.69
Frctn Loss (m)	0.26	Cum Volume (1000 m3)	7.22	12.66	8.70
C & E Loss (m)	0.00	Cum SA (1000 m2)	11.22	7.21	17.21

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.78	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.73	Reach Len. (m)	83.60	72.20	73.70
Crit W.S. (m)		Flow Area (m2)	9.52	10.31	4.93
E.G. Slope (m/m)	0.003463	Area (m2)	9.52	10.31	4.93
Q Total (m3/s)	14.61	Flow (m3/s)	2.32	11.29	1.00
Top Width (m)	37.53	Top Width (m)	19.28	5.34	12.90
Vel Total (m/s)	0.59	Avg. Vel. (m/s)	0.24	1.09	0.20

Max Chl Dpth (m)	2.28	Hydr. Depth (m)	0.49	1.93	0.38
Conv. Total (m3/s)	248.3	Conv. (m3/s)	39.5	191.9	17.0
Length Wtd. (m)	73.46	Wetted Per. (m)	19.40	5.68	13.26
Min Ch El (m)	84.46	Shear (N/m2)	16.66	61.67	12.62
Alpha	2.69	Stream Power (N/m s)	4.06	67.52	2.56
Frctn Loss (m)	0.28	Cum Volume (1000 m3)	9.04	14.28	11.76
C & E Loss (m)	0.01	Cum SA (1000 m2)	12.56	7.21	19.91

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2173

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.715.000075	90.1310.00002	89.6915.00007	88.6520.00001	86.86				
25.00006	86.4530.00004	86.2635.00008	86.2539.9999885.7179740.81475	85.3659					
41.91743	8443.31194	8444.18534	8444.89142	84 45.0075	84				
46.1535185.2030747.7230986.2978948.7544186.3378151.56137	86.316656.56135	86.53							
61.56141	86.9466.56139	87.271.56136	87.676.56142	87.8181.56139	88.29				
86.56136	88.5191.56134	88.65							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1540.81475	.0846.15351	.15		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40.8147546.15351		29.3	29.4	29.4	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150

W.S. Elev (m)	86.33	Reach Len. (m)	29.30	29.40	29.40
Crit W.S. (m)	85.05	Flow Area (m2)	2.80	10.99	0.93
E.G. Slope (m/m)	0.003538	Area (m2)	2.80	10.99	0.93
Q Total (m3/s)	12.18	Flow (m3/s)	0.41	11.59	0.18
Top Width (m)	22.34	Top Width (m)	12.64	5.34	4.36
Vel Total (m/s)	0.83	Avg. Vel. (m/s)	0.14	1.05	0.19
Max Chl Dpth (m)	2.33	Hydr. Depth (m)	0.22	2.06	0.21
Conv. Total (m3/s)	204.7	Conv. (m3/s)	6.8	194.9	3.0
Length Wtd. (m)	29.40	Wetted Per. (m)	12.74	6.51	4.71
Min Ch El (m)	84.00	Shear (N/m2)	7.64	58.61	6.89
Alpha	1.55	Stream Power (N/m s)	1.10	61.81	1.31
Frctn Loss (m)		Cum Volume (1000 m3)	6.81	11.92	8.54
C & E Loss (m)		Cum SA (1000 m2)	9.95	6.83	16.63

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.42	Reach Len. (m)	29.30	29.40	29.40
Crit W.S. (m)	85.17	Flow Area (m2)	4.11	11.50	1.57
E.G. Slope (m/m)	0.004219	Area (m2)	4.11	11.50	1.57
Q Total (m3/s)	14.61	Flow (m3/s)	0.74	13.64	0.22
Top Width (m)	28.38	Top Width (m)	15.12	5.34	7.92
Vel Total (m/s)	0.85	Avg. Vel. (m/s)	0.18	1.19	0.14

Max Chl Dpth (m)	2.42	Hydr. Depth (m)	0.27	2.15	0.20
Conv. Total (m3/s)	224.9	Conv. (m3/s)	11.5	210.0	3.5
Length Wtd. (m)	29.40	Wetted Per. (m)	15.22	6.51	8.26
Min Ch El (m)	84.00	Shear (N/m2)	11.18	73.10	7.86
Alpha	1.82	Stream Power (N/m s)	2.02	86.75	1.13
Frctn Loss (m)		Cum Volume (1000 m3)	8.47	13.49	11.52
C & E Loss (m)		Cum SA (1000 m2)	11.12	6.83	19.15

CULVERT

RIVER: Walker Creek
REACH: Reach 4 RS: 2164

INPUT
Description:
Distance from Upstream XS = 10
Deck/Roadway Width = 3
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	85.57	80	85.57

Upstream Bridge Cross Section Data
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.715.000075	90.1310.00002	89.6915.00007	88.6520.00001	86.86				
25.00006	86.4530.00004	86.2635.00008	86.2539.9999885.7179740.81475	85.3659					
41.91743	8443.31194	8444.18534	8444.89142	84 45.0075	84				
46.1535185.2030747.7230986.2978948.7544186.3378151.56137	86.316656.56135	86.53							
61.56141	86.9466.56139	87.271.56136	87.676.56142	87.8181.56139	88.29				
86.56136	88.5191.56134	88.65							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1540.81475	.0846.15351	.15		

Bank Sta: Left Right Coeff Contr. Expan.

```
      40.8147546.15351             .6       .8

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.57              80   85.57

Downstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   88.53     3.7   88.49     5.6   88.43     7.5   88.34     9.5   88.35
    11.9   88.13    13.1   88.06    14.1   87.94    14.9   87.83    17.5   87.55
    19.6   87.45    21.6   87.29    23.6   86.99    23.7  86.973    25.6   86.65
    26.1   86.62    27.1    86.5    29.6   86.35    31.6   85.95    33.6   83.95
    35.4   83.95    37.6   83.95    41.6    85.9    42.3   85.93    42.9   85.97
    43.6   85.99    45.6   85.85    47.6   85.85    49.6   85.89    51.285.94778
    53.2   86.02    57.7   86.24    59.7   86.22    61.7   86.28    65.7   86.32
    69.7   86.39    71.7   86.46    73.7   86.54    75.7   86.66    77.7   86.86
    81.7   87.32    83.7   87.52    85.7   87.59    91.8   87.93    95.8   88.01
   100.3   88.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    31.6     .08    41.6     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          31.6    41.6             .6       .8

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     Pipe Arch       1    1.64
FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 10     3.5     .027     .027        0                    .9
       1
Number of Barrels =  2
```

Upstream Elevation = 84.02
Centerline Stations
Sta.	Sta.
42.5	44.5

Downstream Elevation = 83.99
Centerline Stations
Sta.	Sta.
34.5	36.5

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	2.78	Culv Full Len (m)	3.50
# Barrels	2	Culv Vel US (m/s)	1.08
Q Barrel (m3/s)	1.39	Culv Vel DS (m/s)	1.08
E.G. US. (m)	86.38	Culv Inv El Up (m)	84.02
W.S. US. (m)	86.33	Culv Inv El Dn (m)	83.99
E.G. DS (m)	86.28	Culv Frctn Ls (m)	0.01
W.S. DS (m)	86.26	Culv Exit Loss (m)	0.04
Delta EG (m)	0.11	Culv Entr Loss (m)	0.05
Delta WS (m)	0.07	Q Weir (m3/s)	9.40
E.G. IC (m)	86.28	Weir Sta Lft (m)	26.76
E.G. OC (m)	86.38	Weir Sta Rgt (m)	53.12
Culvert Control	Outlet	Weir Submerg	0.76
Culv WS Inlet (m)	85.02	Weir Max Depth (m)	0.81
Culv WS Outlet (m)	84.99	Weir Avg Depth (m)	0.34
Culv Nml Depth (m)		Weir Flow Area (m2)	8.99
Culv Crt Depth (m)	0.47	Min El Weir Flow (m)	85.57

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	2.29	Culv Full Len (m)	3.50
# Barrels	2	Culv Vel US (m/s)	0.89
Q Barrel (m3/s)	1.15	Culv Vel DS (m/s)	0.89
E.G. US. (m)	86.49	Culv Inv El Up (m)	84.02
W.S. US. (m)	86.42	Culv Inv El Dn (m)	83.99
E.G. DS (m)	86.43	Culv Frctn Ls (m)	0.01
W.S. DS (m)	86.41	Culv Exit Loss (m)	0.02
Delta EG (m)	0.06	Culv Entr Loss (m)	0.04
Delta WS (m)	0.02	Q Weir (m3/s)	12.32
E.G. IC (m)	86.44	Weir Sta Lft (m)	24.49
E.G. OC (m)	86.49	Weir Sta Rgt (m)	55.67
Culvert Control	Outlet	Weir Submerg	0.83
Culv WS Inlet (m)	85.02	Weir Max Depth (m)	0.92
Culv WS Outlet (m)	84.99	Weir Avg Depth (m)	0.39
Culv Nml Depth (m)		Weir Flow Area (m2)	12.14
Culv Crt Depth (m)	0.42	Min El Weir Flow (m)	85.57

Warning: During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported
inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2144

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.53	3.7	88.49	5.6	88.43	7.5	88.34	9.5	88.35
11.9	88.13	13.1	88.06	14.1	87.94	14.9	87.83	17.5	87.55
19.6	87.45	21.6	87.29	23.6	86.99	23.7	86.973	25.6	86.65
26.1	86.62	27.1	86.5	29.6	86.35	31.6	85.95	33.6	83.95
35.4	83.95	37.6	83.95	41.6	85.9	42.3	85.93	42.9	85.97
43.6	85.99	45.6	85.85	47.6	85.85	49.6	85.89	51.285.94778	
53.2	86.02	57.7	86.24	59.7	86.22	61.7	86.28	65.7	86.32
69.7	86.39	71.7	86.46	73.7	86.54	75.7	86.66	77.7	86.86
81.7	87.32	83.7	87.52	85.7	87.59	91.8	87.93	95.8	88.01
100.3	88.19								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	31.6	.08	41.6	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.6	41.6	11	11.6	12.2	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.26	Reach Len. (m)	11.00	11.60	12.20
Crit W.S. (m)		Flow Area (m2)	0.24	17.17	4.61
E.G. Slope (m/m)	0.001690	Area (m2)	0.24	17.17	4.61
Q Total (m3/s)	12.18	Flow (m3/s)	0.02	11.67	0.49

Top Width (m)	30.86	Top Width (m)	1.53	10.00	19.33
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.08	0.68	0.11
Max Chl Dpth (m)	2.31	Hydr. Depth (m)	0.15	1.72	0.24
Conv. Total (m3/s)	296.2	Conv. (m3/s)	0.4	284.0	11.8
Length Wtd. (m)	11.61	Wetted Per. (m)	1.56	11.28	19.34
Min Ch El (m)	83.95	Shear (N/m2)	2.49	25.22	3.95
Alpha	1.45	Stream Power (N/m s)	0.19	17.15	0.42
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	6.81	11.63	8.54
C & E Loss (m)	0.03	Cum SA (1000 m2)	9.74	6.60	16.28

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.41	Reach Len. (m)	11.00	11.60	12.20
Crit W.S. (m)		Flow Area (m2)	0.54	18.66	8.24
E.G. Slope (m/m)	0.001728	Area (m2)	0.54	18.66	8.24
Q Total (m3/s)	14.61	Flow (m3/s)	0.05	13.57	1.00
Top Width (m)	41.50	Top Width (m)	2.94	10.00	28.56
Vel Total (m/s)	0.53	Avg. Vel. (m/s)	0.09	0.73	0.12
Max Chl Dpth (m)	2.46	Hydr. Depth (m)	0.18	1.87	0.29
Conv. Total (m3/s)	351.5	Conv. (m3/s)	1.1	326.3	24.0

Length Wtd. (m)	11.62	Wetted Per. (m)	2.98	11.28	28.58
Min Ch El (m)	83.95	Shear (N/m2)	3.07	28.05	4.89
Alpha	1.73	Stream Power (N/m s)	0.27	20.39	0.59
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	8.47	13.14	11.52
C & E Loss (m)	0.03	Cum SA (1000 m2)	10.85	6.60	18.61

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2132

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.715.000075	90.1310.00002	89.6915.00007	88.6520.00001	86.86				
25.00006	86.4530.00004	86.2635.00008	86.2539.9999885.7179740.81475	85.3659					
41.91743	8443.31194	8444.18534	8444.89142	84 45.0075	84				
46.1535185.2030747.7230986.2978948.7544186.3378151.56137	86.316656.56135	86.53							
61.56141	86.9466.56139	87.271.56136	87.676.56142	87.8181.56139	88.29				
86.56136	88.5191.56134	88.65							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1540.81475	.0846.15351	.15		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40.8147546.15351		58.3	61.7	65	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	86.22	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150

W.S. Elev (m)	86.15	Reach Len. (m)	58.30	61.70	65.00
Crit W.S. (m)		Flow Area (m2)	1.40	10.06	0.65
E.G. Slope (m/m)	0.004873	Area (m2)	1.40	10.06	0.65
Q Total (m3/s)	12.18	Flow (m3/s)	0.28	11.74	0.16
Top Width (m)	11.62	Top Width (m)	4.92	5.34	1.36
Vel Total (m/s)	1.01	Avg. Vel. (m/s)	0.20	1.17	0.25
Max Chl Dpth (m)	2.15	Hydr. Depth (m)	0.28	1.88	0.48
Conv. Total (m3/s)	174.4	Conv. (m3/s)	4.0	168.1	2.3
Length Wtd. (m)	61.72	Wetted Per. (m)	5.02	6.51	1.66
Min Ch El (m)	84.00	Shear (N/m2)	13.30	73.89	18.65
Alpha	1.30	Stream Power (N/m s)	2.64	86.21	4.63
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	6.80	11.47	8.51
C & E Loss (m)	0.03	Cum SA (1000 m2)	9.71	6.51	16.16

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.28	Reach Len. (m)	58.30	61.70	65.00
Crit W.S. (m)		Flow Area (m2)	2.21	10.73	0.83
E.G. Slope (m/m)	0.005598	Area (m2)	2.21	10.73	0.83
Q Total (m3/s)	14.61	Flow (m3/s)	0.37	14.00	0.24
Top Width (m)	18.22	Top Width (m)	11.34	5.34	1.54
Vel Total (m/s)	1.06	Avg. Vel. (m/s)	0.17	1.31	0.29

Max Chl Dpth (m)	2.28	Hydr. Depth (m)	0.19	2.01	0.54
Conv. Total (m3/s)	195.3	Conv. (m3/s)	4.9	187.2	3.2
Length Wtd. (m)	61.76	Wetted Per. (m)	11.44	6.51	1.88
Min Ch El (m)	84.00	Shear (N/m2)	10.61	90.51	24.24
Alpha	1.45	Stream Power (N/m s)	1.77	118.13	7.01
Frctn Loss (m)	0.24	Cum Volume (1000 m3)	8.45	12.97	11.47
C & E Loss (m)	0.04	Cum SA (1000 m2)	10.78	6.51	18.43

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 2070

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.69	4.096	88.699	4.19	88.698	6.199	88.614	8.303	88.505
8.38	88.504	10.517	88.457	12.57	88.293	13.173	88.228	14.502	88.112
15.609	87.974	16.494	87.854	16.76	87.823	19.373	87.483	20.95	87.335
21.697	87.246	23.911	86.938	25.14	86.716	26.125	86.605	26.236	86.592
28.339	86.331	28.893	86.299	29.33	86.258	30	86.187	32.767	85.992
33.52	85.875	34.981	85.491	35.59	85.038	37.195	83.84	37.692	83.84
38.98	83.84	39.476	83.84	41.162	83.84	42.009	84.478	42.712	84.887
44.868	85.677	45.517	85.707	46.073	85.742	46.721	85.765	48.575	85.7
48.633	85.701	50.428	85.699	51.731	85.717	52.281	85.719	53.764	85.743
55.617	85.773	57.672	85.826	59.786	85.887	61.64	85.862	63.493	85.891
63.613	85.891	67.199	85.913	69.554	85.94	70.906	85.955	72.759	86
74.612	86.051	75.495	86.088	76.465	86.129	78.319	86.262	81.436	86.518
82.025	86.567	83.878	86.703	85.731	86.751	87.378	86.819	91.384	86.991
93.319	87.025	95.09	87.102	99.26	87.343				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	34.981	.08	44.868	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
34.981	44.868	67.9	73.2	79.5	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.95	Reach Len. (m)	67.90	73.20	79.50
Crit W.S. (m)		Flow Area (m2)	0.41	15.05	3.41
E.G. Slope (m/m)	0.002570	Area (m2)	0.41	15.05	3.41
Q Total (m3/s)	12.18	Flow (m3/s)	0.05	11.83	0.30
Top Width (m)	37.33	Top Width (m)	1.94	9.89	25.50
Vel Total (m/s)	0.65	Avg. Vel. (m/s)	0.12	0.79	0.09
Max Chl Dpth (m)	2.11	Hydr. Depth (m)	0.21	1.52	0.13
Conv. Total (m3/s)	240.2	Conv. (m3/s)	0.9	233.3	5.9
Length Wtd. (m)	73.48	Wetted Per. (m)	1.99	10.90	25.51
Min Ch El (m)	83.84	Shear (N/m2)	5.14	34.80	3.37
Alpha	1.44	Stream Power (N/m s)	0.60	27.35	0.30
Frctn Loss (m)	0.20	Cum Volume (1000 m3)	6.75	10.70	8.38
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.51	6.04	15.28

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	86.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	86.05	Reach Len. (m)	67.90	73.20	79.50
Crit W.S. (m)		Flow Area (m2)	0.66	16.08	6.31

E.G. Slope (m/m)	0.002783	Area (m2)	0.66	16.08	6.31
Q Total (m3/s)	14.61	Flow (m3/s)	0.08	13.74	0.79
Top Width (m)	42.76	Top Width (m)	3.08	9.89	29.79
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.12	0.85	0.12
Max Chl Dpth (m)	2.21	Hydr. Depth (m)	0.21	1.63	0.21
Conv. Total (m3/s)	277.0	Conv. (m3/s)	1.5	260.5	14.9
Length Wtd. (m)	73.68	Wetted Per. (m)	3.14	10.90	29.80
Min Ch El (m)	83.84	Shear (N/m2)	5.71	40.27	5.78
Alpha	1.71	Stream Power (N/m s)	0.71	34.42	0.72
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	8.37	12.14	11.23
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.36	6.04	17.41

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1997

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.85	4.492	88.908	4.595	88.909	6.798	88.797	9.105	88.67
9.19	88.667	11.533	88.565	13.785	88.407	14.447	88.327	15.903	88.164
17.118	88.008	18.089	87.878	18.38	87.841	21.245	87.416	22.975	87.187
23.795	87.041	26.223	86.586	27.57	86.308	28.651	86.221	28.772	86.211
31.079	86.013	31.686	85.979	32.165	85.944	32.9	85.874	35.935	85.634
36.76	85.537	38.363	85.033	39.031	84.676	40.791	83.73	41.283	83.73
42.56	83.73	43.052	83.73	44.723	83.73	45.503	84.561	46.151	85.008
48.136	85.453	48.733	85.483	49.245	85.514	49.843	85.54	51.549	85.551
51.603	85.553	53.255	85.549	54.455	85.555	54.962	85.548	56.327	85.539
58.033	85.527	59.926	85.523	61.873	85.534	63.579	85.504	65.286	85.501
65.396	85.5	68.699	85.505	70.867	85.515	72.111	85.52	73.818	85.539
75.524	85.562	76.338	85.579	77.231	85.599	78.937	85.663	81.808	85.789
82.35	85.815	84.056	85.885	85.763	85.913	87.279	85.95	90.967	86.052

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  92.749  86.077   94.38  86.193   98.22  86.497

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15   36.76     .08  48.136     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         36.76  48.136             57.2      64    71.5             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            85.78    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.03    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            85.75    Reach Len. (m)          57.20      64.00
71.50
  Crit W.S. (m)                     Flow Area (m2)           0.23      14.96
6.85
  E.G. Slope (m/m)      0.002827    Area (m2)                0.23      14.96
6.85
  Q Total (m3/s)           12.18    Flow (m3/s)              0.02      11.31
0.85
  Top Width (m)            46.57    Top Width (m)            2.34      11.38
32.86
  Vel Total (m/s)           0.55    Avg. Vel. (m/s)          0.08       0.76
0.12
  Max Chl Dpth (m)          2.02    Hydr. Depth (m)          0.10       1.31
0.21
  Conv. Total (m3/s)       229.0    Conv. (m3/s)              0.3      212.6
16.0
  Length Wtd. (m)          64.70    Wetted Per. (m)          2.35      12.33
32.87
  Min Ch El (m)            83.73    Shear (N/m2)             2.71      33.63
5.77
  Alpha                     1.74    Stream Power (N/m s)     0.20      25.43
0.72
  Frctn Loss (m)            0.31    Cum Volume (1000 m3)     6.73       9.60
7.97
  C & E Loss (m)            0.00    Cum SA (1000 m2)         9.36       5.27
12.96



Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.84	Reach Len. (m)	57.20	64.00	71.50
Crit W.S. (m)		Flow Area (m2)	0.49	15.98	9.90
E.G. Slope (m/m)	0.002999	Area (m2)	0.49	15.98	9.90
Q Total (m3/s)	14.61	Flow (m3/s)	0.05	13.00	1.56
Top Width (m)	49.76	Top Width (m)	3.47	11.38	34.91
Vel Total (m/s)	0.55	Avg. Vel. (m/s)	0.10	0.81	0.16
Max Chl Dpth (m)	2.11	Hydr. Depth (m)	0.14	1.40	0.28
Conv. Total (m3/s)	266.8	Conv. (m3/s)	0.9	237.5	28.5
Length Wtd. (m)	64.97	Wetted Per. (m)	3.49	12.33	34.92
Min Ch El (m)	83.73	Shear (N/m2)	4.14	38.12	8.33
Alpha	1.93	Stream Power (N/m s)	0.41	31.02	1.31
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	8.33	10.97	10.59
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.13	5.27	14.84

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1933

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.63	2.1	88.45	3.3	88.36	5.6	88.32	10.9	88.31
12.5	88.28	14.8	88.19	15.3	88.17	17.1	88.05	19.4	87.99
21.7	87.84	24	87.65	25.6	86.97	26.3	86.71	27	86.44
28.6	85.97	30	85.78	30.8	85.68	31.385.64764		32.5	85.57
33.1	85.52	35.4	85.08	36.6	85.02	37.7	85	38.8	85.01
40	84.99	40.9	83.63	44	83.63	44.6	84.89	44.7	85.01
46.1	85.09	49.1	85.19	50.5	85.11	51.5	85.09	53.5	85.13
5585.10692		56.1	85.09	56.9	85.12	57.9	85.12	59.3	85.06
61	85.03	63.7	85.07	66.7	85.18	69.9	85.27	74.5	85.25
76.8	85.27	79.1	85.36	83.6	85.43	85.5	85.5	88.2	85.71
88.7	85.77	90.1	86						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	40	.08	44.7	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
40	44.7	9.2	9.3	9.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.47	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.40	Reach Len. (m)	9.20	9.30	9.40
Crit W.S. (m)		Flow Area (m2)	2.02	7.19	8.30
E.G. Slope (m/m)	0.009471	Area (m2)	2.02	7.19	8.30
Q Total (m3/s)	12.18	Flow (m3/s)	0.62	9.57	1.99
Top Width (m)	47.85	Top Width (m)	6.27	4.70	36.89
Vel Total (m/s)	0.70	Avg. Vel. (m/s)	0.30	1.33	0.24
Max Chl Dpth (m)	1.77	Hydr. Depth (m)	0.32	1.53	

0.22					
Conv. Total (m3/s)	125.1	Conv. (m3/s)	6.3	98.3	20.5
Length Wtd. (m)	9.31	Wetted Per. (m)	6.30	6.28	36.90
Min Ch El (m)	83.63	Shear (N/m2)	29.83	106.29	20.89
Alpha	2.91	Stream Power (N/m s)	9.07	141.47	5.01
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	6.67	8.89	7.43
C & E Loss (m)	0.01	Cum SA (1000 m2)	9.12	4.75	10.47

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.54	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.46	Reach Len. (m)	9.20	9.30	9.40
Crit W.S. (m)		Flow Area (m2)	2.41	7.47	10.60
E.G. Slope (m/m)	0.010549	Area (m2)	2.41	7.47	10.60
Q Total (m3/s)	14.61	Flow (m3/s)	0.84	10.76	3.01
Top Width (m)	50.94	Top Width (m)	6.58	4.70	39.67
Vel Total (m/s)	0.71	Avg. Vel. (m/s)	0.35	1.44	0.28
Max Chl Dpth (m)	1.83	Hydr. Depth (m)	0.37	1.59	0.27
Conv. Total (m3/s)	142.3	Conv. (m3/s)	8.2	104.8	29.3
Length Wtd. (m)	9.31	Wetted Per. (m)	6.62	6.28	39.68
Min Ch El (m)	83.63	Shear (N/m2)	37.61	123.00	27.62
Alpha	3.05	Stream Power (N/m s)	13.12	177.23	7.84
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	8.25	10.22	9.86
C & E Loss (m)	0.01	Cum SA (1000 m2)	9.85	4.75	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1924

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.01	4.99944	89.12	9.99979	88.83	14.99997	88.52	19.99992	87.86
24.99995	87.04	29.99998	85.93	4.99993	85.63	39.99997	85.19	83842.47088	84.31383
44.38596	83.62	44.87381	83.62	46.62764	83.62	48.285	83.62	48.99781	84.64358
49.58951	85.12	98154.57282	85.40	41657.17968	85.39	34262.17969	85.22	67.17967	85.11
72.17966	85.09	77.17973	85.07	82.17972	85.06	87.17973	85.08	92.17972	85.13
97.1797	85.65								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.153	9.99997	.084	9.58951	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
39.99997 49.58951 28.9 25.8 22.4 .6 .8
Right Levee Station= 54.57 Elevation= 85.4

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.35	Reach Len. (m)	28.90	25.80	22.40
Crit W.S. (m)	84.49	Flow Area (m2)	0.13	11.97	0.42
E.G. Slope (m/m)	0.005566	Area (m2)	0.13	11.97	0.42
Q Total (m3/s)	12.18	Flow (m3/s)	0.01	12.12	0.05

Top Width (m)	15.23	Top Width (m)	1.71	9.59	3.93
Vel Total (m/s)	0.97	Avg. Vel. (m/s)	0.09	1.01	0.11
Max Chl Dpth (m)	1.73	Hydr. Depth (m)	0.07	1.25	0.11
Conv. Total (m3/s)	163.2	Conv. (m3/s)	0.1	162.4	0.6
Length Wtd. (m)	25.80	Wetted Per. (m)	1.72	10.57	3.93
Min Ch El (m)	83.62	Shear (N/m2)	4.01	61.76	5.89
Alpha	1.08	Stream Power (N/m s)	0.35	62.55	0.66
Frctn Loss (m)		Cum Volume (1000 m3)	6.66	8.80	7.39
C & E Loss (m)		Cum SA (1000 m2)	9.08	4.68	10.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.42	Reach Len. (m)	28.90	25.80	22.40
Crit W.S. (m)	84.59	Flow Area (m2)	0.28	12.67	11.46
E.G. Slope (m/m)	0.004855	Area (m2)	0.28	12.67	11.46
Q Total (m3/s)	14.61	Flow (m3/s)	0.03	12.46	2.13
Top Width (m)	57.53	Top Width (m)	2.57	9.59	45.38
Vel Total (m/s)	0.60	Avg. Vel. (m/s)	0.11	0.98	0.19
Max Chl Dpth (m)	1.80	Hydr. Depth (m)	0.11	1.32	0.25
Conv. Total (m3/s)	209.7	Conv. (m3/s)	0.4	178.8	30.5
Length Wtd. (m)	25.80	Wetted Per. (m)	2.58	10.57	

```
45.40
  Min Ch El (m)            83.62    Shear (N/m2)              5.25      57.07
12.01
  Alpha                     2.31    Stream Power (N/m s)      0.56      56.09
2.23
  Frctn Loss (m)                    Cum Volume (1000 m3)      8.23      10.13
9.75
  C & E Loss (m)                    Cum SA (1000 m2)          9.80       4.68
11.77



Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CULVERT


RIVER: Walker Creek
REACH: Reach 4            RS: 1912

INPUT
Description:
Distance from Upstream XS =      10
Deck/Roadway Width        =       4
Weir Coefficient          =     1.4
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.08              60   85.08

Upstream Bridge Cross Section Data
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   89.014.999944   89.129.999979   88.8314.99997   88.5219.99992   87.86
24.99995   87.0429.99998    85.934.99993   85.6339.9999785.1983842.4708884.31383
44.38596   83.6244.87381   83.6246.62764   83.62  48.285   83.6248.9978584.64358
49.5895185.1298154.5728285.4041657.1796885.3934262.17969   85.2267.17967   85.11
72.17966   85.0977.17973   85.0782.17972   85.0687.17973   85.0892.17972   85.13
 97.1797   85.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1539.99997     .0849.58951     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
      39.9999749.58951             .6       .8
Right Levee     Station=   54.57      Elevation=    85.4
```

```
Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   85.08              60   85.08

Downstream Bridge Cross Section Data
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   88.96     2.1   88.85     3.6   88.75     5.2    88.7     6.7   88.59
       8   88.52    10.2   88.45    12.8   88.34    14.5   88.33    16.7   88.14
    17.4   88.05      21   87.49    21.9   87.29    23.2   87.07      24   86.96
    25.4    86.7    27.6   86.16    29.1   85.86    29.585.79714    29.8   85.75
    31.1   85.63    31.9   85.53    34.1   85.23    36.3    84.8    37.2   84.68
    37.9    83.5    38.5    83.5    40.6    83.5    42.8    83.5    47.2   84.78
    52.4   84.76    54.784.74029    55.9   84.73      60   84.64    64.6   84.61
    66.1   84.63    68.9   84.65    70.7   84.69    78.3    84.7    84.1   84.77
    86.3   84.76    88.5   84.81    88.9   84.86    90.5   85.08      92   85.24
    92.9   85.35    93.5   85.55    93.7   85.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    37.2     .08    47.2     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          37.2    47.2             .6       .8

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     Pipe Arch     1.2    1.84
FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                10     4.5     .027     .027        0                   .9
       1
Number of Barrels =  2
Upstream   Elevation =  83.62
```

Centerline Stations

Sta.	Sta.
45.2	47.2

Downstream Elevation = 83.54

Centerline Stations

Sta.	Sta.
39	41

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s)	4.92	Culv Full Len (m)	4.50
# Barrels	2	Culv Vel US (m/s)	1.36
Q Barrel (m3/s)	2.46	Culv Vel DS (m/s)	1.36
E.G. US. (m)	85.40	Culv Inv El Up (m)	83.62
W.S. US. (m)	85.35	Culv Inv El Dn (m)	83.54
E.G. DS (m)	85.21	Culv Frctn Ls (m)	0.02
W.S. DS (m)	85.20	Culv Exit Loss (m)	0.08
Delta EG (m)	0.19	Culv Entr Loss (m)	0.08
Delta WS (m)	0.15	Q Weir (m3/s)	2.85
E.G. IC (m)	85.39	Weir Sta Lft (m)	37.67
E.G. OC (m)	85.40	Weir Sta Rgt (m)	54.49
Culvert Control	Outlet	Weir Submerg	0.31
Culv WS Inlet (m)	84.82	Weir Max Depth (m)	0.32
Culv WS Outlet (m)	84.74	Weir Avg Depth (m)	0.23
Culv Nml Depth (m)		Weir Flow Area (m2)	3.94
Culv Crt Depth (m)	0.60	Min El Weir Flow (m)	85.08

Warning: During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of
energy within the specified tolerance and number of trials. The program used the solution with the minimum error.
Warning: During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported
outlet energy grade answer may not be valid.

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	1.80	Culv Full Len (m)	4.50
# Barrels	2	Culv Vel US (m/s)	0.50
Q Barrel (m3/s)	0.90	Culv Vel DS (m/s)	0.50
E.G. US. (m)	85.46	Culv Inv El Up (m)	83.62
W.S. US. (m)	85.42	Culv Inv El Dn (m)	83.54
E.G. DS (m)	85.44	Culv Frctn Ls (m)	0.00
W.S. DS (m)	85.43	Culv Exit Loss (m)	0.00
Delta EG (m)	0.02	Culv Entr Loss (m)	0.01
Delta WS (m)	0.01	Q Weir (m3/s)	12.82
E.G. IC (m)	85.44	Weir Sta Lft (m)	36.92

E.G. OC (m)	85.46	Weir Sta Rgt (m)	95.40
Culvert Control	Outlet	Weir Submerg	0.90
Culv WS Inlet (m)	84.82	Weir Max Depth (m)	0.40
Culv WS Outlet (m)	84.74	Weir Avg Depth (m)	0.30
Culv Nml Depth (m)		Weir Flow Area (m2)	17.57
Culv Crt Depth (m)	0.33	Min El Weir Flow (m)	85.08

Warning: During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported
inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1899

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.96	2.1	88.85	3.6	88.75	5.2	88.7	6.7	88.59
8	88.52	10.2	88.45	12.8	88.34	14.5	88.33	16.7	88.14
17.4	88.05	21	87.49	21.9	87.29	23.2	87.07	24	86.96
25.4	86.7	27.6	86.16	29.1	85.86	29.585.79714		29.8	85.75
31.1	85.63	31.9	85.53	34.1	85.23	36.3	84.8	37.2	84.68
37.9	83.5	38.5	83.5	40.6	83.5	42.8	83.5	47.2	84.78
52.4	84.76	54.784.74029		55.9	84.73	60	84.64	64.6	84.61
66.1	84.63	68.9	84.65	70.7	84.69	78.3	84.7	84.1	84.77
86.3	84.76	88.5	84.81	88.9	84.86	90.5	85.08	92	85.24
92.9	85.35	93.5	85.55	93.7	85.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	37.2	.08	47.2	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
37.2	47.2	9.9	10.5	11.1	.6	.8

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.20	Reach Len. (m)	9.90	10.50	

11.10					
Crit W.S. (m)		Flow Area (m2)	0.81	13.74	
20.83					
E.G. Slope (m/m)	0.001798	Area (m2)	0.81	13.74	
20.83					
Q Total (m3/s)	12.18	Flow (m3/s)	0.10	8.52	
3.55					
Top Width (m)	57.33	Top Width (m)	2.93	10.00	
44.40					
Vel Total (m/s)	0.34	Avg. Vel. (m/s)	0.12	0.62	
0.17					
Max Chl Dpth (m)	1.70	Hydr. Depth (m)	0.28	1.37	
0.47					
Conv. Total (m3/s)	287.1	Conv. (m3/s)	2.3	201.0	
83.8					
Length Wtd. (m)	10.67	Wetted Per. (m)	2.98	10.85	
44.42					
Min Ch El (m)	83.50	Shear (N/m2)	4.82	22.33	
8.27					
Alpha	2.35	Stream Power (N/m s)	0.57	13.85	
1.41					
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	6.66	8.59	
7.39					
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.01	4.43	
9.74					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.44	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	85.43	Reach Len. (m)	9.90	10.50	
11.10					
Crit W.S. (m)		Flow Area (m2)	1.69	16.10	
31.53					
E.G. Slope (m/m)	0.001149	Area (m2)	1.69	16.10	
31.53					
Q Total (m3/s)	14.61	Flow (m3/s)	0.20	8.88	
5.54					
Top Width (m)	60.54	Top Width (m)	4.59	10.00	
45.95					
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.12	0.55	
0.18					
Max Chl Dpth (m)	1.93	Hydr. Depth (m)	0.37	1.61	

0.69					
Conv. Total (m3/s)	431.0	Conv. (m3/s)	5.8	261.8	163.4
Length Wtd. (m)	10.72	Wetted Per. (m)	4.65	10.85	46.00
Min Ch El (m)	83.50	Shear (N/m2)	4.11	16.72	7.73
Alpha	2.24	Stream Power (N/m s)	0.47	9.22	1.36
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	8.23	9.60	9.75
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.70	4.43	10.75

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1888

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.58	.9	88.59	1.2	88.57	1.8	88.5	3.1	88.33
4.2	88.14	5.3	87.91	5.7	87.86	6.6	87.81	7.2	87.81
8.7	87.77	9.7	87.72	11.5	87.55	14.8	87.31	16.3	87.1
17.8	87.04	18.5	87	19.3	86.91	20.7	86.67	21.2	86.56
22.3	86.36	23.8	85.98	25	85.66	25.985.50046		27.2	85.27
28.4	85.12	29.4	84.95	31.6	84.3	33.8	83.94	34.5	83.55
34.7	83.46	39.1	83.46	40.4	84.78	42	84.78	42.6	84.8
46.5	84.72	49.5	84.68	51.4	84.68	53.284.70182		58	84.76
60.2	84.74	61.6	84.69	64.6	84.67	69	84.69	71.2	84.67
73.3	84.69	74.5	84.68	77.7	84.69	79.9	84.75	82.1	84.87
84.3	85.03	86.7	85.29						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	29.4	.08	40.4	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
29.4	40.4	114.3	89.4	55.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.18	Reach Len. (m)	114.30	89.40	55.40
Crit W.S. (m)		Flow Area (m2)	0.15	13.78	19.78
E.G. Slope (m/m)	0.002075	Area (m2)	0.15	13.78	19.78
Q Total (m3/s)	12.18	Flow (m3/s)	0.01	8.71	3.46
Top Width (m)	57.68	Top Width (m)	1.44	11.00	45.24
Vel Total (m/s)	0.36	Avg. Vel. (m/s)	0.07	0.63	0.17
Max Chl Dpth (m)	1.72	Hydr. Depth (m)	0.11	1.25	0.44
Conv. Total (m3/s)	267.3	Conv. (m3/s)	0.2	191.2	75.9
Length Wtd. (m)	81.15	Wetted Per. (m)	1.46	11.80	45.26
Min Ch El (m)	83.46	Shear (N/m2)	2.12	23.78	8.89
Alpha	2.25	Stream Power (N/m s)	0.14	15.02	1.55
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	6.65	8.45	7.17
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.99	4.32	9.24

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.42	Reach Len. (m)	114.30	89.40	55.40
Crit W.S. (m)		Flow Area (m2)	0.72	16.48	31.07

E.G. Slope (m/m)	0.001224	Area (m2)	0.72	16.48	31.07
Q Total (m3/s)	14.61	Flow (m3/s)	0.06	9.01	5.54
Top Width (m)	60.35	Top Width (m)	3.05	11.00	46.30
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.09	0.55	0.18
Max Chl Dpth (m)	1.96	Hydr. Depth (m)	0.24	1.50	0.67
Conv. Total (m3/s)	417.7	Conv. (m3/s)	1.8	257.5	158.4
Length Wtd. (m)	79.05	Wetted Per. (m)	3.09	11.80	46.46
Min Ch El (m)	83.46	Shear (N/m2)	2.80	16.77	8.02
Alpha	2.14	Stream Power (N/m s)	0.25	9.16	1.43
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	8.22	9.43	9.41
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.66	4.32	10.23

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1798

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.302	4.592	88.361	6.027	88.41	7.734	88.403	10.185	88.419
12.635	88.328	15.085	88.263	17.535	88.25	19.985	88.215	22.435	88.092
23.244	87.935	24.388	87.647	24.885	87.539	27.336	86.713	27.85	86.488
29.786	85.482	31.312	84.948	31.853	84.775	32.236	84.689	34.686	84.548
36.158	84.537	37.136	84.475	37.592	84.422	39.586	84.061	40.246	83.429
40.433	83.319	40.75	83.133	45.167	83.124	45.467	83.123	46.995	83.202
48.029	83.346	50.417	83.811	51.956	84.051	52.805	84.136	53.402	84.171

54.847	84.219	57.581	84.225	62.073	84.315	66.408	84.304	69.299	84.253
72.621	84.273	74.295	84.331	76.282	84.483	77.97	84.647	79.071	84.787
79.942	85.058	81.459	85.627	82.306	85.973	83.847	86.498	85.196	87.031
86.235	87.343	86.641	87.397	87.264	87.45	88.623	87.548	89.531	87.594
90.925	87.698	92.422	87.834	93.398	87.883	96.294	87.878		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	39.586	.08	51.956	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.586	51.956	90	99.9	104.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.11	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.10	Reach Len. (m)	90.00	99.90	104.60
Crit W.S. (m)		Flow Area (m2)	4.93	21.44	21.74
E.G. Slope (m/m)	0.000543	Area (m2)	4.93	21.44	21.74
Q Total (m3/s)	12.18	Flow (m3/s)	0.52	8.82	2.84
Top Width (m)	49.20	Top Width (m)	8.72	12.37	28.11
Vel Total (m/s)	0.25	Avg. Vel. (m/s)	0.11	0.41	0.13
Max Chl Dpth (m)	1.98	Hydr. Depth (m)	0.57	1.73	0.77
Conv. Total (m3/s)	522.7	Conv. (m3/s)	22.3	378.5	121.9
Length Wtd. (m)	100.51	Wetted Per. (m)	8.82	12.78	28.19
Min Ch El (m)	83.12	Shear (N/m2)	2.97	8.93	4.11
Alpha	1.98	Stream Power (N/m s)	0.31	3.67	0.54
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	6.36	6.87	6.02
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.41	3.28	7.21

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.37	Reach Len. (m)	90.00	99.90	104.60
Crit W.S. (m)		Flow Area (m2)	7.36	24.75	29.35
E.G. Slope (m/m)	0.000413	Area (m2)	7.36	24.75	29.35
Q Total (m3/s)	14.61	Flow (m3/s)	0.83	9.77	4.01
Top Width (m)	50.67	Top Width (m)	9.48	12.37	28.82
Vel Total (m/s)	0.24	Avg. Vel. (m/s)	0.11	0.39	0.14
Max Chl Dpth (m)	2.25	Hydr. Depth (m)	0.78	2.00	1.02
Conv. Total (m3/s)	719.0	Conv. (m3/s)	41.0	480.6	197.4
Length Wtd. (m)	100.64	Wetted Per. (m)	9.63	12.78	28.95
Min Ch El (m)	83.12	Shear (N/m2)	3.09	7.84	4.11
Alpha	1.95	Stream Power (N/m s)	0.35	3.09	0.56
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	7.76	7.59	7.73
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.95	3.28	8.15

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1698

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.024	8.573	87.945	10.73	87.969	16.903	87.827	17.187	87.8

18.985	87.748	19.321	87.696	20.415	87.443	21.068	87.382	23.15	86.655
25.189	86.044	26.871	85.672	27.315	85.551	29.398	85.369	30.1	85.334
31.48	85.305	32.518	85.243	33.563	85.141	34.942	84.978	35.645	84.875
36.556	84.671	38.17	84.253	41.398	83.477	41.893	83.389	42.235	83.096
42.967	82.874	43.318	82.767	47.02	82.767	47.533	83.112	48.34	83.655
49.169	83.729	50.447	83.809	51.672	83.851	52.554	83.899	54.661	84.079
56.768	84	58.875	84.057	60.982	84.063	61.829	84.116	63.089	84.221
64.384	84.387	64.994	84.484	67.303	84.751	68.159	84.829	69.41	84.917
70.741	84.924	71.324	84.945	71.517	84.965	72.906	85.423	73.624	85.613
74.489	85.745	77.838	86.18	79.236	86.446	79.945	86.536	82.052	86.73
83.453	86.779	86.266	86.814	88.373	86.862	90.48	87.148	91.896	87.251
95.061	87.445	96.802	87.592	98.894	87.793				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	41.398	.08	48.34	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
41.398	48.34	60.4	84.2	111	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	85.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.03	Reach Len. (m)	60.40	84.20	111.00
Crit W.S. (m)		Flow Area (m2)	4.99	14.45	18.40
E.G. Slope (m/m)	0.000867	Area (m2)	4.99	14.45	18.40
Q Total (m3/s)	12.18	Flow (m3/s)	0.78	8.33	3.07
Top Width (m)	37.21	Top Width (m)	6.89	6.94	23.37
Vel Total (m/s)	0.32	Avg. Vel. (m/s)	0.16	0.58	0.17
Max Chl Dpth (m)	2.26	Hydr. Depth (m)	0.72	2.08	0.79
Conv. Total (m3/s)	413.6	Conv. (m3/s)	26.4	282.8	104.4
Length Wtd. (m)	82.87	Wetted Per. (m)	7.07	7.38	23.45
Min Ch El (m)	82.77	Shear (N/m2)	6.00	16.65	6.67
Alpha	2.28	Stream Power (N/m s)	0.93	9.59	

1.11					
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	5.91	5.08	
3.92					
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.71	2.31	
4.52					

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.32	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	85.31	Reach Len. (m)	60.40	84.20	
111.00					
Crit W.S. (m)		Flow Area (m2)	7.33	16.42	
25.15					
E.G. Slope (m/m)	0.000682	Area (m2)	7.33	16.42	
25.15					
Q Total (m3/s)	14.61	Flow (m3/s)	1.00	9.14	
4.47					
Top Width (m)	41.49	Top Width (m)	10.31	6.94	
24.23					
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.14	0.56	
0.18					
Max Chl Dpth (m)	2.55	Hydr. Depth (m)	0.71	2.37	
1.04					
Conv. Total (m3/s)	559.6	Conv. (m3/s)	38.5	349.9	
171.3					
Length Wtd. (m)	82.58	Wetted Per. (m)	10.50	7.38	
24.35					
Min Ch El (m)	82.77	Shear (N/m2)	4.67	14.88	
6.90					
Alpha	2.29	Stream Power (N/m s)	0.64	8.28	
1.23					
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	7.10	5.53	
4.88					
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.06	2.31	
5.38					

CROSS SECTION

RIVER: Walker Creek

REACH: Reach 4 RS: 1613

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.58	.9	84.42	1.5	84.38	3.1	84.34	4.5	84.36
5.3	84.39	7.2	84.4	8.9	84.32	9.184.31778		9.8	84.31
10.4	84.36	11.7	84.42	13.4	84.55	14.3	84.56	14.9	84.54
16.5	84.43	17.9	84.4	19.4	84.45	20.9	84.43	22.4	84.47
23.2	84.44	25.4	84.42	27.6	84.36	29.9	84.36	32.8	84.3
34.3	84.31	35.8	84.23	36.5	84.18	37.3	84.1	38.6	84.05
41	83.84	43.5	83.72	44.8	83.7	45.5	82.4	49.9	82.4
52.1	84.23	53.8	84.49	55.3	84.65	56.6	84.71	58.2	84.68
58.8	84.7	59.7	84.77	60.384.85667		60.6	84.9	61.6	85.03
63.3	85.11	65.5	85.16	66.1	85.16	67.8	85.21	68.7	85.27
70	85.41	70.2	85.42	70.6	85.41	71.7	85.37	72.2	85.37
74.4	85.5	75.2	85.56	76.2	85.69	76.7	85.73	78.9	86.06
82.1	86.33	83.4	86.4	84.2	86.43	85.1	86.43	86.6	86.4
87.8	86.41	92.3	86.73	93.3	86.79	94.5	86.82	96.7	86.92
99	86.91	101.5	86.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	44.8	.08	52.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
44.8	52.1	11.9	15.7	10.9	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.96	Reach Len. (m)	11.90	15.70	10.90
Crit W.S. (m)		Flow Area (m2)	29.32	16.19	2.85
E.G. Slope (m/m)	0.000921	Area (m2)	29.32	16.19	2.85
Q Total (m3/s)	13.98	Flow (m3/s)	4.44	9.27	0.27
Top Width (m)	61.03	Top Width (m)	44.80	7.30	8.93
Vel Total (m/s)	0.29	Avg. Vel. (m/s)	0.15	0.57	0.09

Max Chl Dpth (m)	2.56	Hydr. Depth (m)	0.65	2.22	0.32
Conv. Total (m3/s)	460.6	Conv. (m3/s)	146.4	305.3	8.8
Length Wtd. (m)	15.05	Wetted Per. (m)	45.23	8.74	8.98
Min Ch El (m)	82.40	Shear (N/m2)	5.85	16.73	2.87
Alpha	2.69	Stream Power (N/m s)	0.89	9.58	0.27
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	4.88	3.79	2.74
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.15	1.71	2.72

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	85.26	Reach Len. (m)	11.90	15.70	10.90
Crit W.S. (m)		Flow Area (m2)	43.03	18.42	6.55
E.G. Slope (m/m)	0.000611	Area (m2)	43.03	18.42	6.55
Q Total (m3/s)	16.77	Flow (m3/s)	6.83	9.36	0.58
Top Width (m)	68.58	Top Width (m)	44.80	7.30	16.48
Vel Total (m/s)	0.25	Avg. Vel. (m/s)	0.16	0.51	0.09
Max Chl Dpth (m)	2.86	Hydr. Depth (m)	0.96	2.52	0.40
Conv. Total (m3/s)	678.5	Conv. (m3/s)	276.2	378.7	23.6
Length Wtd. (m)	14.84	Wetted Per. (m)	45.54	8.74	16.54

Min Ch El (m)	82.40	Shear (N/m2)	5.66	12.64	2.37
Alpha	2.54	Stream Power (N/m s)	0.90	6.42	0.21
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	5.58	4.06	3.12
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.39	1.71	3.12

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1597

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.58	.9	84.42	1.5	84.38	3.1	84.34	4.5	84.36
5.3	84.39	7.2	84.4	8.9	84.32	9.184.31778		9.8	84.31
10.4	84.36	11.7	84.42	13.4	84.55	14.3	84.56	14.9	84.54
16.5	84.43	17.9	84.4	19.4	84.45	20.9	84.43	22.4	84.47
23.2	84.44	25.4	84.42	27.6	84.36	29.9	84.36	32.8	84.3
34.3	84.31	35.8	84.23	36.5	84.18	37.3	84.1	38.6	84.05
41	83.84	43.5	83.72	44.8	83.7	45.5	82.4	49.9	82.4
52.1	84.23	53.8	84.49	55.3	84.65	56.6	84.71	58.2	84.68
58.8	84.7	59.7	84.77	60.384.85667		60.6	84.9	61.6	85.03
63.3	85.11	65.5	85.16	66.1	85.16	67.8	85.21	68.7	85.27
70	85.41	70.2	85.42	70.6	85.41	71.7	85.37	72.2	85.37
74.4	85.5	75.2	85.56	76.2	85.69	76.7	85.73	78.9	86.06
82.1	86.33	83.4	86.4	84.2	86.43	85.1	86.43	86.6	86.4
87.8	86.41	92.3	86.73	93.3	86.79	94.5	86.82	96.7	86.92
99	86.91	101.5	86.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	44.8	.08	52.1	.15

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

```
          44.8    52.1             55.3    59.1    55.5             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    44.8   86.36       F
    52.1   101.5   86.36       F
```

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.080	
W.S. Elev (m)	84.90	Reach Len. (m)	55.30	59.10	55.50
Crit W.S. (m)	83.34	Flow Area (m2)		15.81	
E.G. Slope (m/m)	0.002268	Area (m2)	27.00	15.81	2.39
Q Total (m3/s)	13.98	Flow (m3/s)		13.98	
Top Width (m)	60.63	Top Width (m)	44.80	7.30	8.53
Vel Total (m/s)	0.88	Avg. Vel. (m/s)		0.88	
Max Chl Dpth (m)	2.50	Hydr. Depth (m)		2.17	
Conv. Total (m3/s)	293.5	Conv. (m3/s)		293.5	
Length Wtd. (m)	59.10	Wetted Per. (m)		8.74	
Min Ch El (m)	82.40	Shear (N/m2)		40.24	
Alpha	1.00	Stream Power (N/m s)		35.57	
Frctn Loss (m)		Cum Volume (1000 m3)	4.54	3.54	2.71
C & E Loss (m)		Cum SA (1000 m2)	5.61	1.60	2.63

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	85.25	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.080	
W.S. Elev (m)	85.21	Reach Len. (m)	55.30	59.10	55.50
Crit W.S. (m)	83.46	Flow Area (m2)		18.02	
E.G. Slope (m/m)	0.002112	Area (m2)	40.56	18.02	5.66
Q Total (m3/s)	16.77	Flow (m3/s)		16.77	
Top Width (m)	67.69	Top Width (m)	44.80	7.30	15.59
Vel Total (m/s)	0.93	Avg. Vel. (m/s)		0.93	
Max Chl Dpth (m)	2.81	Hydr. Depth (m)		2.47	
Conv. Total (m3/s)	365.0	Conv. (m3/s)		365.0	
Length Wtd. (m)	59.10	Wetted Per. (m)		8.74	
Min Ch El (m)	82.40	Shear (N/m2)		42.71	
Alpha	1.00	Stream Power (N/m s)		39.75	
Frctn Loss (m)		Cum Volume (1000 m3)	5.08	3.78	3.06
C & E Loss (m)		Cum SA (1000 m2)	5.86	1.60	2.94

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 4 RS: 1567

INPUT
Description:
Distance from Upstream XS = 7
Deck/Roadway Width = 24
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates

num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	86.36		80	86.36	

Upstream Bridge Cross Section Data

Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.58	.9	84.42	1.5	84.38	3.1	84.34	4.5	84.36
5.3	84.39	7.2	84.4	8.9	84.32	9.184.31778		9.8	84.31
10.4	84.36	11.7	84.42	13.4	84.55	14.3	84.56	14.9	84.54
16.5	84.43	17.9	84.4	19.4	84.45	20.9	84.43	22.4	84.47
23.2	84.44	25.4	84.42	27.6	84.36	29.9	84.36	32.8	84.3
34.3	84.31	35.8	84.23	36.5	84.18	37.3	84.1	38.6	84.05
41	83.84	43.5	83.72	44.8	83.7	45.5	82.4	49.9	82.4
52.1	84.23	53.8	84.49	55.3	84.65	56.6	84.71	58.2	84.68
58.8	84.7	59.7	84.77	60.384.85667		60.6	84.9	61.6	85.03
63.3	85.11	65.5	85.16	66.1	85.16	67.8	85.21	68.7	85.27
70	85.41	70.2	85.42	70.6	85.41	71.7	85.37	72.2	85.37
74.4	85.5	75.2	85.56	76.2	85.69	76.7	85.73	78.9	86.06
82.1	86.33	83.4	86.4	84.2	86.43	85.1	86.43	86.6	86.4
87.8	86.41	92.3	86.73	93.3	86.79	94.5	86.82	96.7	86.92
99	86.91	101.5	86.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	44.8	.08	52.1	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
44.8	52.1	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	44.8	86.36	F
52.1	101.5	86.36	F

Downstream Deck/Roadway Coordinates

num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	86.36		140	86.36	

Downstream Bridge Cross Section Data

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.03	1.5	88.05	3.6	88.05	5.8	88.08	7.3	88.07
10.3	88.14	12.4	88.09	16.4	87.92	17.9	87.73	23.4	87.26
23.9	87.23	27.8	87.02	30	86.95	31.5	86.86	34.4	86.79
36.6	86.79	38.8	86.84	39.5	86.92	40.5	86.99	42	87.03
43.2	87.08	45.1	87.02	47.6	87.07	48.1	87.04	49.8	87.06
52	87.01	52.6	87.01	53.6	87.0475	54.2	87.07	55.6	86.86

56.3	86.8	57.1	86.64	58.2	86.48	58.9	86.37	60.7	86.01
61.7	85.75	62.9	85.35	63.8	85.06	64.7	84.68	66.2	84.13
67.3	83.75	69.2	83.5	69.5	83.44	70.3	83.34	70.7	83.3
71.7	83.11	72.3	82.05	73.4	82.05	73.8	82.05	73.9	82.05
75.3	82.05	76.1	82.05	78.3	83.27	79.8	83.73	80.5	83.89
82.7	84.51	83.1	84.6	84.9	84.86	85.6	84.902	85.9	84.92
89.3	85.22	91.5	85.33	93.7	85.48	95.9	85.59	97.9	85.6
100.3	85.64	102.5	85.66	104.7	85.71	108.5	85.72	111.2	85.79
113.1	85.82	116.1	85.8	120	85.86	125.1	85.9	130.4	85.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	70.7	.08	78.3	.15

Bank Sta: Left Right Coeff Contr. Expan.

70.7	78.3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	53	86.36	F
96	130.4	86.36	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 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	Pipe Arch	2.52	3.9

FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4	25	.027	.027	0	.9	1

Upstream Elevation = 82.4
Centerline Station = 48
Downstream Elevation = 82.09
Centerline Station = 74.5

CULVERT OUTPUT Profile #100 Year_SCS 24 Culv Group: Culvert #1

Q Culv Group (m3/s) 13.98 Culv Full Len (m)

# Barrels	1	Culv Vel US (m/s)	1.92
Q Barrel (m3/s)	13.98	Culv Vel DS (m/s)	1.82
E.G. US. (m)	84.94	Culv Inv El Up (m)	82.40
W.S. US. (m)	84.90	Culv Inv El Dn (m)	82.09
E.G. DS (m)	84.56	Culv Frctn Ls (m)	0.08
W.S. DS (m)	84.53	Culv Exit Loss (m)	0.14
Delta EG (m)	0.39	Culv Entr Loss (m)	0.17
Delta WS (m)	0.38	Q Weir (m3/s)	
E.G. IC (m)	84.38	Weir Sta Lft (m)	
E.G. OC (m)	84.94	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	84.59	Weir Max Depth (m)	
Culv WS Outlet (m)	84.53	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.18	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.21	Min El Weir Flow (m)	86.36

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	16.77	Culv Full Len (m)	8.61
# Barrels	1	Culv Vel US (m/s)	2.20
Q Barrel (m3/s)	16.77	Culv Vel DS (m/s)	2.15
E.G. US. (m)	85.25	Culv Inv El Up (m)	82.40
W.S. US. (m)	85.21	Culv Inv El Dn (m)	82.09
E.G. DS (m)	84.71	Culv Frctn Ls (m)	0.12
W.S. DS (m)	84.67	Culv Exit Loss (m)	0.20
Delta EG (m)	0.54	Culv Entr Loss (m)	0.22
Delta WS (m)	0.53	Q Weir (m3/s)	
E.G. IC (m)	84.67	Weir Sta Lft (m)	
E.G. OC (m)	85.25	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	84.78	Weir Max Depth (m)	
Culv WS Outlet (m)	84.61	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.34	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.28	Min El Weir Flow (m)	86.36

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1538

INPUT
Description:
Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.03	1.5	88.05	3.6	88.05	5.8	88.08	7.3	88.07

10.3	88.14	12.4	88.09	16.4	87.92	17.9	87.73	23.4	87.26
23.9	87.23	27.8	87.02	30	86.95	31.5	86.86	34.4	86.79
36.6	86.79	38.8	86.84	39.5	86.92	40.5	86.99	42	87.03
43.2	87.08	45.1	87.02	47.6	87.07	48.1	87.04	49.8	87.06
52	87.01	52.6	87.01	53.6	87.0475	54.2	87.07	55.6	86.86
56.3	86.8	57.1	86.64	58.2	86.48	58.9	86.37	60.7	86.01
61.7	85.75	62.9	85.35	63.8	85.06	64.7	84.68	66.2	84.13
67.3	83.75	69.2	83.5	69.5	83.44	70.3	83.34	70.7	83.3
71.7	83.11	72.3	82.05	73.4	82.05	73.8	82.05	73.9	82.05
75.3	82.05	76.1	82.05	78.3	83.27	79.8	83.73	80.5	83.89
82.7	84.51	83.1	84.6	84.9	84.86	85.6	84.902	85.9	84.92
89.3	85.22	91.5	85.33	93.7	85.48	95.9	85.59	97.9	85.6
100.3	85.64	102.5	85.66	104.7	85.71	108.5	85.72	111.2	85.79
113.1	85.82	116.1	85.8	120	85.86	125.1	85.9	130.4	85.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	70.7	.08	78.3	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
70.7	78.3	10.2	10.8	12.8	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	53	86.36	F
96	130.4	86.36	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.53	Reach Len. (m)	10.20	10.80	12.80
Crit W.S. (m)	83.05	Flow Area (m2)	4.29	16.02	2.77
E.G. Slope (m/m)	0.001680	Area (m2)	4.29	16.02	2.77
Q Total (m3/s)	13.98	Flow (m3/s)	0.97	12.48	0.54
Top Width (m)	17.67	Top Width (m)	5.59	7.60	4.48
Vel Total (m/s)	0.61	Avg. Vel. (m/s)	0.22	0.78	0.19
Max Chl Dpth (m)	2.48	Hydr. Depth (m)	0.77	2.11	0.62
Conv. Total (m3/s)	341.0	Conv. (m3/s)	23.5	304.4	

13.1					
Length Wtd. (m)	10.93	Wetted Per. (m)	5.75	8.55	
4.66					
Min Ch El (m)	82.05	Shear (N/m2)	12.30	30.87	
9.80					
Alpha	1.49	Stream Power (N/m s)	2.77	24.04	
1.89					
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	4.54	3.14	
2.71					
C & E Loss (m)	0.04	Cum SA (1000 m2)	4.22	1.16	
2.27					

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.71	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.03	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	84.67	Reach Len. (m)	10.20	10.80	
12.80					
Crit W.S. (m)	83.18	Flow Area (m2)	5.13	17.12	
3.47					
E.G. Slope (m/m)	0.001876	Area (m2)	5.13	17.12	
3.47					
Q Total (m3/s)	16.77	Flow (m3/s)	1.31	14.73	
0.74					
Top Width (m)	18.89	Top Width (m)	5.98	7.60	
5.31					
Vel Total (m/s)	0.65	Avg. Vel. (m/s)	0.26	0.86	
0.21					
Max Chl Dpth (m)	2.62	Hydr. Depth (m)	0.86	2.25	
0.65					
Conv. Total (m3/s)	387.3	Conv. (m3/s)	30.2	340.0	
17.0					
Length Wtd. (m)	10.95	Wetted Per. (m)	6.17	8.55	
5.50					
Min Ch El (m)	82.05	Shear (N/m2)	15.29	36.83	
11.62					
Alpha	1.54	Stream Power (N/m s)	3.90	31.67	

2.47					
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	5.08	3.30	3.06
C & E Loss (m)	0.04	Cum SA (1000 m2)	4.45	1.16	2.36

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1527

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.69	2.9	87.56	5.1	87.33	7.1	87.14	10.1	86.97
11.7	86.85	13.1	86.83	19.1	86.83	20.7	86.97	22.8	87.06
25	87.06	26.6	87.11	28.1	87.18	29.5	87.18	30	87.22
31.7	87.39	32.6	87.44	33.9	87.42	42.486.96602		42.7	86.95
43.1	86.83	44.6	86.47	45	86.41	46.1	86.02	47.2	85.72
47.6	85.73	49.4	85.9	51.6	85.44	52.1	85.29	53.3	84.95
53.8	84.78	55.2	84.47	56	84.29	56.7	84.18	58	83.9
58.2	83.81	59.1	82.02	61.3	82.02	62.6	83.43	62.7	83.44
63.9	83.04	64.9	83.72	67.3	84.09	69.3	84.48	71.484.92863	
71.5	84.95	73.7	85.21	78.2	85.26	79.2	85.28	82.2	85.41
85.2	85.51	87	85.6	90.6	85.7	91.5	85.71	93.7	85.68
95.7	85.76	97.2	85.78	98.7	85.77	100.3	85.78	104.7	85.67
107.7	85.63	109.2	85.58	112.3	85.53				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	58.2	.08	62.6	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58.2	62.6	78.8	60	43.6	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.40	Reach Len. (m)	78.80	60.00	43.60
Crit W.S. (m)		Flow Area (m2)	0.72	8.75	3.94
E.G. Slope (m/m)	0.007696	Area (m2)	0.72	8.75	3.94
Q Total (m3/s)	13.98	Flow (m3/s)	0.17	12.17	1.63
Top Width (m)	13.38	Top Width (m)	2.69	4.40	6.29
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.24	1.39	0.41
Max Chl Dpth (m)	2.38	Hydr. Depth (m)	0.27	1.99	0.63
Conv. Total (m3/s)	159.3	Conv. (m3/s)	2.0	138.8	18.6
Length Wtd. (m)	62.96	Wetted Per. (m)	2.76	6.12	6.62
Min Ch El (m)	82.02	Shear (N/m2)	19.67	107.88	44.92
Alpha	1.57	Stream Power (N/m s)	4.70	150.11	18.59
Frctn Loss (m)	0.14	Cum Volume (1000 m3)	4.52	3.01	2.67
C & E Loss (m)	0.02	Cum SA (1000 m2)	4.18	1.09	2.20

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.63	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.52	Reach Len. (m)	78.80	60.00	43.60
Crit W.S. (m)		Flow Area (m2)	1.09	9.30	4.76

E.G. Slope (m/m)	0.008591	Area (m2)	1.09	9.30	4.76
Q Total (m3/s)	16.77	Flow (m3/s)	0.32	14.23	2.22
Top Width (m)	14.55	Top Width (m)	3.24	4.40	6.91
Vel Total (m/s)	1.11	Avg. Vel. (m/s)	0.29	1.53	0.47
Max Chl Dpth (m)	2.50	Hydr. Depth (m)	0.34	2.11	0.69
Conv. Total (m3/s)	181.0	Conv. (m3/s)	3.4	153.5	24.0
Length Wtd. (m)	62.94	Wetted Per. (m)	3.33	6.12	7.25
Min Ch El (m)	82.02	Shear (N/m2)	27.53	127.94	55.32
Alpha	1.65	Stream Power (N/m s)	8.07	195.84	25.83
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	5.05	3.15	3.00
C & E Loss (m)	0.03	Cum SA (1000 m2)	4.41	1.09	2.29

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1467

INPUT
Description:
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.573	1.432	87.458	3.4	87.396	5.437	87.269	9.194	87.355
11.103	87.383	13.447	87.366	15.449	87.419	17.452	87.514	18.136	87.514
18.74	87.535	19.454	87.533	21.456	87.372	23.459	87.075	25.461	86.604
27.464	85.986	29.466	85.431	33.471	84.351	34.012	84.233	34.979	83.962
35.473	83.851	37.475	83.633	39.478	83.354	41.48	83.212	43.483	83.215
45.485	83.118	47.61	83.155	49.49	83.117	51.492	83.053	53.926	83.018
55.497	82.957	57.499	82.81	58.137	82.745	58.83	82.704	59.502	82.633
60.3	82.276	61.268	81.843	63.276	81.843	63.8	82.171	65.516	83.243
67.517	83.492	69.518	83.663	71.518	83.944	73.519	84.098	75.52	84.536

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   77.52  84.816  79.521  85.171  81.522  85.571  83.522   85.88  85.523  86.059
  87.524  85.927  89.524  86.079  93.526  86.067  95.526   86.17  97.527  86.154
  99.528  86.064 101.528  86.121 103.529  86.198  107.53  86.286 109.531  86.365
 111.272  86.374

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    60.3     .08    63.8     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          60.3    63.8             81.3    70.8    56.1             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            84.32    Element                 Left OB    Channel
Right OB
  Vel Head (m)              0.01    Wt. n-Val.               0.150      0.080
0.150
  W.S. Elev (m)            84.31    Reach Len. (m)           81.30      70.80
56.10
  Crit W.S. (m)                     Flow Area (m2)           29.63       8.35
7.81
  E.G. Slope (m/m)      0.001046    Area (m2)                29.63       8.35
7.81
  Q Total (m3/s)           13.98    Flow (m3/s)               6.82       5.82
1.34
  Top Width (m)            40.84    Top Width (m)            26.65       3.50
10.70
  Vel Total (m/s)           0.31    Avg. Vel. (m/s)           0.23       0.70
0.17
  Max Chl Dpth (m)          2.47    Hydr. Depth (m)           1.11       2.38
0.73
  Conv. Total (m3/s)       432.1    Conv. (m3/s)             211.0      179.8
41.3
  Length Wtd. (m)          71.97    Wetted Per. (m)          26.84       3.69
11.07
  Min Ch El (m)            81.84    Shear (N/m2)             11.33      23.23
7.24
  Alpha                     2.48    Stream Power (N/m s)      2.61      16.19
1.24
  Frctn Loss (m)            0.08    Cum Volume (1000 m3)      3.32       2.49
2.41
  C & E Loss (m)            0.00    Cum SA (1000 m2)          3.02       0.86
1.83
```

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.43	Reach Len. (m)	81.30	70.80	56.10
Crit W.S. (m)		Flow Area (m2)	32.85	8.76	9.13
E.G. Slope (m/m)	0.001151	Area (m2)	32.85	8.76	9.13
Q Total (m3/s)	16.77	Flow (m3/s)	8.40	6.62	1.76
Top Width (m)	41.87	Top Width (m)	27.13	3.50	11.24
Vel Total (m/s)	0.33	Avg. Vel. (m/s)	0.26	0.76	0.19
Max Chl Dpth (m)	2.59	Hydr. Depth (m)	1.21	2.50	0.81
Conv. Total (m3/s)	494.5	Conv. (m3/s)	247.5	195.1	51.8
Length Wtd. (m)	71.89	Wetted Per. (m)	27.33	3.69	11.63
Min Ch El (m)	81.84	Shear (N/m2)	13.56	26.83	8.85
Alpha	2.40	Stream Power (N/m s)	3.47	20.26	1.70
Frctn Loss (m)	0.09	Cum Volume (1000 m3)	3.71	2.61	2.70
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.21	0.86	1.89

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1397

INPUT
Description:
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.903	1.002	86.856	2.405	86.78	3.875	86.711	4.877	86.654
6.881	86.569	6.919	86.566	8.284	86.469	9.713	86.353	10.956	86.27

11.958	86.162	12.507	86.113	15.632	85.676	15.966	85.634	16.898	85.518
18.229	85.349	18.572	85.309	19.56	85.204	20.041	85.139	20.624	85.053
21.044	84.979	21.955	84.836	22.981	84.72	23.551	84.663	24.451	84.601
25.68	84.531	25.92	84.519	26.388	84.519	27.056	84.504	27.41	84.488
28.058	84.47	28.86	84.454	29.539	84.416	30.129	84.388	31.402	84.359
31.799	84.341	32.133	84.313	32.732	84.283	33.269	84.256	34.739	84.158
34.994	84.143	35.139	84.141	35.393	84.141	35.807	84.15	36.208	84.158
37.144	84.09	37.611	84.071	38.146	84.019	38.587	83.988	38.88	83.96
39.348	83.912	40.551	83.764	40.849	83.718	41.219	83.671	42.02	83.541
42.622	83.446	42.712	83.428	43.223	83.316	44.225	83.123	44.96	82.99
45.772	82.93	46.229	82.905	46.429	82.887	46.964	82.843	47.102	82.833
47.231	82.75	47.899	82.289	48.3	81.697	49.233	81.65	49.7	81.637
50.067	81.637	50.2	81.637	50.233	81.637	50.7	81.637	50.967	81.637
51.5	81.643	53.146	82.418	54.269	82.823	54.793	82.994	54.866	83.019
56.439	83.207	56.738	83.236	58.085	83.314	58.232	83.317	58.609	83.333
58.833	83.343	59.915	83.403	61.378	83.455	61.718	83.461	63.024	83.495
63.401	83.508	64.67	83.511	64.844	83.511	65.325	83.521	66.317	83.613
67.813	83.72	68.571	83.779	69.609	83.94	70.254	84.038	71.255	84.19
71.817	84.279	72.902	84.475	75.063	84.846	75.745	84.929	76.986	85.094
77.766	85.186	78.308	85.247	79.03	85.306	79.188	85.313	80.352	85.357
81.432	85.431	81.554	85.441	82.636	85.542	83.838	85.59	84.351	85.625
84.8	85.655	85.521	85.657	87.204	85.703	88.167	85.718	88.887	85.73
90.571	85.785	92.133	85.853						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	47.231	.08	54.269	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.231	54.269	82.5	70.8	62.7	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.23	Reach Len. (m)	82.50	70.80	62.70
Crit W.S. (m)		Flow Area (m2)	7.85	15.70	12.28
E.G. Slope (m/m)	0.001130	Area (m2)	7.85	15.70	12.28
Q Total (m3/s)	13.98	Flow (m3/s)	1.22	10.57	2.19
Top Width (m)	37.78	Top Width (m)	13.53	7.04	17.22

Vel Total (m/s)	0.39	Avg. Vel. (m/s)	0.15	0.67	0.18
Max Chl Dpth (m)	2.59	Hydr. Depth (m)	0.58	2.23	0.71
Conv. Total (m3/s)	415.8	Conv. (m3/s)	36.2	314.6	65.1
Length Wtd. (m)	71.17	Wetted Per. (m)	13.65	7.74	17.31
Min Ch El (m)	81.64	Shear (N/m2)	6.37	22.48	7.86
Alpha	2.30	Stream Power (N/m s)	0.99	15.13	1.40
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	1.80	1.64	1.85
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.39	0.48	1.04

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.34	Reach Len. (m)	82.50	70.80	62.70
Crit W.S. (m)		Flow Area (m2)	9.42	16.47	14.18
E.G. Slope (m/m)	0.001294	Area (m2)	9.42	16.47	14.18
Q Total (m3/s)	16.77	Flow (m3/s)	1.62	12.25	2.90
Top Width (m)	40.26	Top Width (m)	15.37	7.04	17.86
Vel Total (m/s)	0.42	Avg. Vel. (m/s)	0.17	0.74	0.20
Max Chl Dpth (m)	2.70	Hydr. Depth (m)	0.61	2.34	0.79
Conv. Total (m3/s)	466.2	Conv. (m3/s)	45.0	340.5	80.7
Length Wtd. (m)	71.19	Wetted Per. (m)	15.49	7.74	17.96

Min Ch El (m)	81.64	Shear (N/m2)	7.71	27.00	10.02
Alpha	2.36	Stream Power (N/m s)	1.33	20.08	2.05
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	1.99	1.72	2.05
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.48	0.48	1.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 4 RS: 1325.5

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.34	5.2	85.78	7.3	85.53	9.4	85.34	12.7	84.7
13.7	84.5	14.7	84.32	15.5	84.13	16.5	83.84	17.7	83.6
19.3	83.38	20.6	83.23	22.2	83.1	23.6	83.01	24.68	2.89889
26.3	82.71	26.6	82.7	29	82.71	30.7	82.63	32.1	82.64
34.4	82.6	34.9	82.61	35.4	82.59	36.3	81.52	37.7	81.45
38.4	81.43	39.2	81.44	42	82.57	44.8	82.54	46.2	82.58
47.7	82.57	49.1	82.58	50.3	82.52	50.7	82.52	53.4	82.86
54.8	83.23334	56.1	83.58	58.8	84.41	60.4	84.76	61.5	84.97
62.1	85.05	63.2	85.13	64.2	85.26	65.1	85.4	66.1	85.46
66.9	85.55	67.5	85.55	68.9	85.61	70.3	85.64	71.7	85.71
73	85.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	35.4	.08	42	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.4	42	32	32	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.19	Element	Left OB	Channel	

Right OB					
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.19	Reach Len. (m)	29.92	29.92	29.92
Crit W.S. (m)		Flow Area (m2)	23.83	15.95	21.45
E.G. Slope (m/m)	0.000418	Area (m2)	23.83	15.95	21.45
Q Total (m3/s)	13.98	Flow (m3/s)	3.62	6.85	3.51
Top Width (m)	42.83	Top Width (m)	20.15	6.60	16.08
Vel Total (m/s)	0.23	Avg. Vel. (m/s)	0.15	0.43	0.16
Max Chl Dpth (m)	2.76	Hydr. Depth (m)	1.18	2.42	1.33
Conv. Total (m3/s)	683.9	Conv. (m3/s)	176.9	335.2	171.7
Length Wtd. (m)	29.92	Wetted Per. (m)	20.27	7.32	16.29
Min Ch El (m)	81.43	Shear (N/m2)	4.81	8.93	5.39
Alpha	1.98	Stream Power (N/m s)	0.73	3.83	0.88
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	0.49	0.52	0.79
C & E Loss (m)	0.00	Cum SA (1000 m2)			

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.30	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.29	Reach Len. (m)	29.92	29.92	29.92
Crit W.S. (m)		Flow Area (m2)	25.90	16.62	23.10
E.G. Slope (m/m)	0.000499	Area (m2)	25.90	16.62	23.10
Q Total (m3/s)	16.77	Flow (m3/s)	4.48	8.02	4.28
Top Width (m)	43.59	Top Width (m)	20.58	6.60	

16.41					
Vel Total (m/s)	0.26	Avg. Vel. (m/s)	0.17	0.48	
0.19					
Max Chl Dpth (m)	2.86	Hydr. Depth (m)	1.26	2.52	
1.41					
Conv. Total (m3/s)	751.2	Conv. (m3/s)	200.4	359.1	
191.7					
Length Wtd. (m)	29.92	Wetted Per. (m)	20.72	7.32	
16.64					
Min Ch El (m)	81.43	Shear (N/m2)	6.11	11.10	
6.79					
Alpha	1.96	Stream Power (N/m s)	1.06	5.36	
1.26					
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	0.54	0.55	
0.88					
C & E Loss (m)	0.00	Cum SA (1000 m2)			

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1244

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.2	4.99997	87.3	9.99994	87.4	15.00004	87.53	20.00002	87.08
24.99998	86.35	29.99996	84.47	35.00002	82.96	39.99999	82.72	43.36036	81.84656
43.83455	81.49591	45.04153	81.49275	46.03828	81.50161	46.89588	82.25909	49.44894	83.22208
52.50453	83.35815	57.50452	83.346	62.50452	83.4567	50449	83.4172	50459	83.42
77.50457	83.4782	50457	83.4487	50455	83.6792	50455	83.66	95	84.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.153	9.99999	.084	9.44894	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.99999	49.44894	116	112.7	104.1	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.18	Element	Left OB	Channel	
Right OB					

Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.17	Reach Len. (m)	116.00	112.70	104.10
Crit W.S. (m)		Flow Area (m2)	9.05	19.01	31.23
E.G. Slope (m/m)	0.000803	Area (m2)	9.05	19.01	31.23
Q Total (m3/s)	16.57	Flow (m3/s)	1.69	10.23	4.64
Top Width (m)	63.07	Top Width (m)	9.00	9.45	44.62
Vel Total (m/s)	0.28	Avg. Vel. (m/s)	0.19	0.54	0.15
Max Chl Dpth (m)	2.67	Hydr. Depth (m)	1.01	2.01	0.70
Conv. Total (m3/s)	584.9	Conv. (m3/s)	59.8	361.2	163.9
Length Wtd. (m)	110.92	Wetted Per. (m)	9.18	10.14	44.71
Min Ch El (m)	81.49	Shear (N/m2)	7.76	14.76	5.50
Alpha	2.42	Stream Power (N/m s)	1.45	7.95	0.82
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	16.48	13.33	15.87
C & E Loss (m)	0.00	Cum SA (1000 m2)	25.14	6.83	22.58

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.27	Reach Len. (m)	116.00	112.70	104.10
Crit W.S. (m)		Flow Area (m2)	9.96	19.94	35.66
E.G. Slope (m/m)	0.000899	Area (m2)	9.96	19.94	35.66
Q Total (m3/s)	19.89	Flow (m3/s)	2.05	11.73	6.10
Top Width (m)	63.70	Top Width (m)	9.33	9.45	44.92

Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.21	0.59	0.17
Max Chl Dpth (m)	2.77	Hydr. Depth (m)	1.07	2.11	0.79
Conv. Total (m3/s)	663.1	Conv. (m3/s)	68.4	391.3	203.4
Length Wtd. (m)	110.78	Wetted Per. (m)	9.52	10.14	45.03
Min Ch El (m)	81.49	Shear (N/m2)	9.22	17.35	6.98
Alpha	2.37	Stream Power (N/m s)	1.90	10.21	1.20
Frctn Loss (m)	0.09	Cum Volume (1000 m3)	22.81	14.92	20.76
C & E Loss (m)	0.00	Cum SA (1000 m2)	27.98	6.83	24.81

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1181

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.74	.5	84.73	2	84.81	2.3	84.81	3.6	84.73
4.5	84.71	6.6	84.78	8.8	84.8	10.9	84.72	13	84.57
14.5	84.59	15.2	84.61	17.3	84.45	19.1	84.52	22.2	84.55
23.8	84.6	25.8	84.61	28	84.44	30	84.19	31.6	84.05
31.8	84.035	34.4	83.84	36.2	83.67	37.8	83.54	42.4	83.18
49.3	82.89	51.5	82.58	51.8	82.56	52.5	82.43	53.6	81.25
55.7	81.25	56.4	81.25	57.7	81.25	58.2	81.25	60	82.29
62.6	82.5	64.2	82.61	66.4	82.68	67.3	82.73	68.28	2.76462
68.6	82.78	70.7	83	72.8	83.08	73.5	83.12	75.1	83.28
76.6	83.46	77.1	83.54	79.2	83.59	82.8	83.81	83.5	83.87
85.7	84.25	87.8	84.47	89.9	84.85	92.1	85.27	93.7	85.51
96.8	85.9	98.5	86.04	100.6	86.27	102.2	86.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	52.5	.08	60	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.5	60	10.5	12.8	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.09	Reach Len. (m)	10.50	12.80	12.80
Crit W.S. (m)		Flow Area (m2)	17.05	19.74	24.14
E.G. Slope (m/m)	0.000568	Area (m2)	17.05	19.74	24.14
Q Total (m3/s)	16.57	Flow (m3/s)	2.32	10.49	3.76
Top Width (m)	53.68	Top Width (m)	21.39	7.50	24.79
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.14	0.53	0.16
Max Chl Dpth (m)	2.84	Hydr. Depth (m)	0.80	2.63	0.97
Conv. Total (m3/s)	695.2	Conv. (m3/s)	97.5	439.9	157.8
Length Wtd. (m)	12.48	Wetted Per. (m)	21.47	8.29	24.88
Min Ch El (m)	81.25	Shear (N/m2)	4.43	13.27	5.41
Alpha	2.52	Stream Power (N/m s)	0.60	7.05	0.84
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	14.96	11.15	12.99
C & E Loss (m)	0.00	Cum SA (1000 m2)	23.38	5.88	18.97

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.18	Reach Len. (m)	10.50	12.80	12.80
Crit W.S. (m)		Flow Area (m2)	18.92	20.38	26.28

E.G. Slope (m/m)	0.000692	Area (m2)	18.92	20.38	26.28
Q Total (m3/s)	19.89	Flow (m3/s)	2.96	12.21	4.72
Top Width (m)	55.15	Top Width (m)	22.37	7.50	25.29
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.16	0.60	0.18
Max Chl Dpth (m)	2.93	Hydr. Depth (m)	0.85	2.72	1.04
Conv. Total (m3/s)	755.8	Conv. (m3/s)	112.5	463.9	179.3
Length Wtd. (m)	12.46	Wetted Per. (m)	22.45	8.29	25.38
Min Ch El (m)	81.25	Shear (N/m2)	5.72	16.69	7.03
Alpha	2.52	Stream Power (N/m s)	0.90	10.00	1.26
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	21.13	12.65	17.53
C & E Loss (m)	0.00	Cum SA (1000 m2)	26.15	5.88	21.16

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1159

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.74	.5	84.73	2	84.81	2.3	84.81	3.6	84.73
4.5	84.71	6.6	84.78	8.8	84.8	10.9	84.72	13	84.57
14.5	84.59	15.2	84.61	17.3	84.45	19.1	84.52	22.2	84.55
23.8	84.6	25.8	84.61	28	84.44	30	84.19	31.6	84.05
31.8	84.035	34.4	83.84	36.2	83.67	37.8	83.54	42.4	83.18
49.3	82.89	51.5	82.58	51.8	82.56	52.5	82.43	53.6	81.18
55.7	81.18	56.4	81.18	57.7	81.18	58.2	81.18	60	82.29
62.6	82.5	64.2	82.61	66.4	82.68	67.3	82.73	68.2	82.76462
68.6	82.78	70.7	83	72.8	83.08	73.5	83.12	75.1	83.28
76.6	83.46	77.1	83.54	79.2	83.59	82.8	83.81	83.5	83.87
85.7	84.25	87.8	84.47	89.9	84.85	92.1	85.27	93.7	85.51
96.8	85.9	98.5	86.04	100.6	86.27	102.2	86.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	52.5	.08	60	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.5	60	34.2	33.8	26.2	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	51	84.08	F
61	102.2	84.08	F

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	84.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.09	Reach Len. (m)	34.20	33.80	26.20
Crit W.S. (m)	82.18	Flow Area (m2)	16.90	20.11	23.97
E.G. Slope (m/m)	0.000556	Area (m2)	16.90	20.11	23.97
Q Total (m3/s)	16.57	Flow (m3/s)	2.27	10.62	3.68
Top Width (m)	53.56	Top Width (m)	21.31	7.50	24.75
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.13	0.53	0.15
Max Chl Dpth (m)	2.91	Hydr. Depth (m)	0.79	2.68	0.97
Conv. Total (m3/s)	702.9	Conv. (m3/s)	96.3	450.6	156.1
Length Wtd. (m)	33.80	Wetted Per. (m)	21.39	8.38	24.83
Min Ch El (m)	81.18	Shear (N/m2)	4.31	13.08	5.26
Alpha	2.53	Stream Power (N/m s)	0.58	6.91	0.81
Frctn Loss (m)		Cum Volume (1000 m3)	14.79	10.89	12.68
C & E Loss (m)		Cum SA (1000 m2)	23.16	5.78	18.65

Note: Multiple critical depths were found at this location. The critical depth

with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	84.18	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	84.17	Reach Len. (m)	34.20	33.80	26.20
Crit W.S. (m)	82.29	Flow Area (m2)	18.73	20.74	26.06
E.G. Slope (m/m)	0.000681	Area (m2)	18.73	20.74	26.06
Q Total (m3/s)	19.89	Flow (m3/s)	2.89	12.37	4.62
Top Width (m)	55.01	Top Width (m)	22.27	7.50	25.24
Vel Total (m/s)	0.30	Avg. Vel. (m/s)	0.15	0.60	0.18
Max Chl Dpth (m)	2.99	Hydr. Depth (m)	0.84	2.76	1.03
Conv. Total (m3/s)	762.3	Conv. (m3/s)	111.0	474.2	177.1
Length Wtd. (m)	33.80	Wetted Per. (m)	22.35	8.38	25.33
Min Ch El (m)	81.18	Shear (N/m2)	5.59	16.52	6.87
Alpha	2.52	Stream Power (N/m s)	0.86	9.85	1.22
Frctn Loss (m)		Cum Volume (1000 m3)	20.94	12.38	17.20
C & E Loss (m)		Cum SA (1000 m2)	25.91	5.78	20.83

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 3 RS: 1155

INPUT

Description:
Distance from Upstream XS = 3.5
Deck/Roadway Width = 13
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
20	84.08	90	84.08

Upstream Bridge Cross Section Data
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.74	.5	84.73	2	84.81	2.3	84.81	3.6	84.73
4.5	84.71	6.6	84.78	8.8	84.8	10.9	84.72	13	84.57
14.5	84.59	15.2	84.61	17.3	84.45	19.1	84.52	22.2	84.55
23.8	84.6	25.8	84.61	28	84.44	30	84.19	31.6	84.05
31.8	84.035	34.4	83.84	36.2	83.67	37.8	83.54	42.4	83.18
49.3	82.89	51.5	82.58	51.8	82.56	52.5	82.43	53.6	81.18
55.7	81.18	56.4	81.18	57.7	81.18	58.2	81.18	60	82.29
62.6	82.5	64.2	82.61	66.4	82.68	67.3	82.73	68.2	82.76462
68.6	82.78	70.7	83	72.8	83.08	73.5	83.12	75.1	83.28
76.6	83.46	77.1	83.54	79.2	83.59	82.8	83.81	83.5	83.87
85.7	84.25	87.8	84.47	89.9	84.85	92.1	85.27	93.7	85.51
96.8	85.9	98.5	86.04	100.6	86.27	102.2	86.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	52.5	.08	60	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
52.5	60	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	51	84.08	F
61	102.2	84.08	F

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	84.08	90	84.08

Downstream Bridge Cross Section Data
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.72	2	83.61	3.4	83.44	4.1	83.32	6.3	82.87
6.5	82.87	7.1	82.91	8.1	83	8.4	83.01	10.6	82.95
12.7	82.86	14.3	82.83	17	82.72	23.4	82.71	25.6	82.64
26.7	82.67	27.7	82.71	28.8	82.71524	29.8	82.72	32	82.78

```
    36.3   81.18    37.5   81.18    38.4   81.18    39.1   81.18    40.5   81.18
    42.1   81.18    42.7   82.62    43.7   82.62    44.8   82.65      47   82.57
    49.1   82.64    49.9   82.69    51.2   82.74    57.7    82.9    59.2   83.09
    59.8   83.22    60.7   83.37    61.9   83.54    63.2   83.64    63.8   83.74
    64.1   83.81    65.4   84.09    68.5   84.86    68.8   84.91    69.484.99118
    70.5   85.14    72.7   85.37    74.7   85.55    79.3   85.75    81.2   85.87
    83.4   85.88      84   85.87    85.6    85.9    87.1   85.85    87.6   85.84
    89.8   85.75    90.2   85.75    91.9   85.68    93.3   85.78    96.2    86.1
    97.9    86.1   100.6   86.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    36.3     .08    42.1     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          36.3    42.1             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    36.3   84.08       F
    42.1   100.6   84.08       F
Left Levee      Station=      32      Elevation=   82.78

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     1.6       3
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               3.5      14     .013     .013        0                   .7
       1
Upstream   Elevation =  81.3
           Centerline Station =  56
Downstream Elevation =  81.25
           Centerline Station =  39

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1
```

Q Culv Group (m3/s)	16.32	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	3.40
Q Barrel (m3/s)	16.32	Culv Vel DS (m/s)	4.88
E.G. US. (m)	84.09	Culv Inv El Up (m)	81.30
W.S. US. (m)	84.09	Culv Inv El Dn (m)	81.25
E.G. DS (m)	82.87	Culv Frctn Ls (m)	0.10
W.S. DS (m)	82.69	Culv Exit Loss (m)	0.71
Delta EG (m)	1.22	Culv Entr Loss (m)	0.41
Delta WS (m)	1.40	Q Weir (m3/s)	0.26
E.G. IC (m)	84.09	Weir Sta Lft (m)	31.00
E.G. OC (m)	83.97	Weir Sta Rgt (m)	84.85
Culvert Control	Inlet	Weir Submerg	0.00
Culv WS Inlet (m)	82.90	Weir Max Depth (m)	0.02
Culv WS Outlet (m)	82.36	Weir Avg Depth (m)	0.02
Culv Nml Depth (m)	1.45	Weir Flow Area (m2)	1.21
Culv Crt Depth (m)	1.44	Min El Weir Flow (m)	84.08

Warning: Since the culvert has supercritical flow, the program should be run in mixed flow in order to check if the cross section
downstream of the culvert has supercritical flow.
Warning: During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported
outlet energy grade answer may not be valid.
Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	17.48	Culv Full Len (m)	14.00
# Barrels	1	Culv Vel US (m/s)	3.64
Q Barrel (m3/s)	17.48	Culv Vel DS (m/s)	3.64
E.G. US. (m)	84.18	Culv Inv El Up (m)	81.30
W.S. US. (m)	84.17	Culv Inv El Dn (m)	81.25
E.G. DS (m)	83.15	Culv Frctn Ls (m)	0.07
W.S. DS (m)	82.96	Culv Exit Loss (m)	0.49
Delta EG (m)	1.03	Culv Entr Loss (m)	0.47
Delta WS (m)	1.21	Q Weir (m3/s)	2.41
E.G. IC (m)	84.20	Weir Sta Lft (m)	30.11
E.G. OC (m)	84.18	Weir Sta Rgt (m)	85.30
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	82.90	Weir Max Depth (m)	0.10
Culv WS Outlet (m)	82.85	Weir Avg Depth (m)	0.10
Culv Nml Depth (m)	1.53	Weir Flow Area (m2)	5.44
Culv Crt Depth (m)	1.51	Min El Weir Flow (m)	84.08

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

Note: The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the culvert inlet equations are not valid and the supercritical result has been discarded. The outlet answer will be used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1125

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.72	2	83.61	3.4	83.44	4.1	83.32	6.3	82.87
6.5	82.87	7.1	82.91	8.1	83	8.4	83.01	10.6	82.95
12.7	82.86	14.3	82.83	17	82.72	23.4	82.71	25.6	82.64
26.7	82.67	27.7	82.71	28.88	2.71524	29.8	82.72	32	82.78
36.3	81.18	37.5	81.18	38.4	81.18	39.1	81.18	40.5	81.18
42.1	81.18	42.7	82.62	43.7	82.62	44.8	82.65	47	82.57
49.1	82.64	49.9	82.69	51.2	82.74	57.7	82.9	59.2	83.09
59.8	83.22	60.7	83.37	61.9	83.54	63.2	83.64	63.8	83.74
64.1	83.81	65.4	84.09	68.5	84.86	68.8	84.91	69.48	4.99118
70.5	85.14	72.7	85.37	74.7	85.55	79.3	85.75	81.2	85.87
83.4	85.88	84	85.87	85.6	85.9	87.1	85.85	87.6	85.84
89.8	85.75	90.2	85.75	91.9	85.68	93.3	85.78	96.2	86.1
97.9	86.1	100.6	86.29						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	36.3	.08	42.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.3	42.1	11	9.4	6.5	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	36.3	84.08	F
42.1	100.6	84.08	F

Left Levee Station= 32 Elevation= 82.78

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.		0.080	

W.S. Elev (m)	82.69	Reach Len. (m)	11.00	9.40	6.50
Crit W.S. (m)	82.12	Flow Area (m2)		8.75	
E.G. Slope (m/m)	0.013254	Area (m2)	3.06	8.75	0.97
Q Total (m3/s)	16.57	Flow (m3/s)		16.57	
Top Width (m)	17.64	Top Width (m)	4.06	5.80	7.79
Vel Total (m/s)	1.89	Avg. Vel. (m/s)		1.89	
Max Chl Dpth (m)	1.51	Hydr. Depth (m)		1.51	
Conv. Total (m3/s)	143.9	Conv. (m3/s)		143.9	
Length Wtd. (m)	9.47	Wetted Per. (m)		5.80	
Min Ch El (m)	81.18	Shear (N/m2)		196.15	
Alpha	1.00	Stream Power (N/m s)		371.38	
Frctn Loss (m)	0.10	Cum Volume (1000 m3)	14.79	10.59	12.68
C & E Loss (m)	0.05	Cum SA (1000 m2)	22.72	5.56	18.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.15	Element	Left OB	Channel	Right OB
Vel Head (m)	0.19	Wt. n-Val.		0.080	
W.S. Elev (m)	82.96	Reach Len. (m)	11.00	9.40	6.50
Crit W.S. (m)	82.24	Flow Area (m2)		10.31	
E.G. Slope (m/m)	0.011066	Area (m2)	8.81	10.31	4.28
Q Total (m3/s)	19.89	Flow (m3/s)		19.89	
Top Width (m)	49.57	Top Width (m)	27.72	5.80	

16.05

Vel Total (m/s)	1.93	Avg. Vel. (m/s)			1.93
Max Chl Dpth (m)	1.78	Hydr. Depth (m)			1.78
Conv. Total (m3/s)	189.0	Conv. (m3/s)			189.0
Length Wtd. (m)	9.43	Wetted Per. (m)			5.80
Min Ch El (m)	81.18	Shear (N/m2)			192.85
Alpha	1.00	Stream Power (N/m s)			372.07
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	20.94		11.98

17.20

C & E Loss (m)	0.06	Cum SA (1000 m2)	25.06		5.56

20.29

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1106

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.72	2	83.61	3.4	83.44	4.1	83.32	6.3	82.87
6.5	82.87	7.1	82.91	8.1	83	8.4	83.01	10.6	82.95
12.7	82.86	14.3	82.83	17	82.72	23.4	82.71	25.6	82.64
26.7	82.67	27.7	82.71	28.882.71524		29.8	82.72	32	82.78
36.3	81	37.5	81	38.4	81	39.1	81	40.5	81
42.1	81	42.7	82.62	43.7	82.62	44.8	82.65	47	82.57
49.1	82.64	49.9	82.69	51.2	82.74	57.7	82.9	59.2	83.09
59.8	83.22	60.7	83.37	61.9	83.54	63.2	83.64	63.8	83.74
64.1	83.81	65.4	84.09	68.5	84.86	68.8	84.91	69.484.99118	
70.5	85.14	72.7	85.37	74.7	85.55	79.3	85.75	81.2	85.87
83.4	85.88	84	85.87	85.6	85.9	87.1	85.85	87.6	85.84
89.8	85.75	90.2	85.75	91.9	85.68	93.3	85.78	96.2	86.1
97.9	86.1	100.6	86.29						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	36.3	.08	42.1	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.3	42.1	72.8	89.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.60	Reach Len. (m)	72.80	89.40	93.80
Crit W.S. (m)		Flow Area (m2)	3.10	9.29	0.50
E.G. Slope (m/m)	0.008753	Area (m2)	3.10	9.29	0.50
Q Total (m3/s)	16.57	Flow (m3/s)	1.58	14.86	0.13
Top Width (m)	12.05	Top Width (m)	3.87	5.80	2.39
Vel Total (m/s)	1.29	Avg. Vel. (m/s)	0.51	1.60	0.25
Max Chl Dpth (m)	1.60	Hydr. Depth (m)	0.80	1.60	0.21
Conv. Total (m3/s)	177.1	Conv. (m3/s)	16.9	158.9	1.4
Length Wtd. (m)	84.76	Wetted Per. (m)	4.19	5.80	3.50
Min Ch El (m)	81.00	Shear (N/m2)	63.49	137.44	12.32
Alpha	1.40	Stream Power (N/m s)	32.39	219.98	3.12
Frctn Loss (m)	0.23	Cum Volume (1000 m3)	14.75	10.51	12.68
C & E Loss (m)	0.03	Cum SA (1000 m2)	22.68	5.50	18.19

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	83.00	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.89	Reach Len. (m)	72.80	89.40	93.80
Crit W.S. (m)		Flow Area (m2)	7.47	10.97	3.30
E.G. Slope (m/m)	0.006882	Area (m2)	7.47	10.97	3.30
Q Total (m3/s)	19.89	Flow (m3/s)	1.86	17.40	0.63
Top Width (m)	46.03	Top Width (m)	24.97	5.80	15.26
Vel Total (m/s)	0.91	Avg. Vel. (m/s)	0.25	1.59	0.19
Max Chl Dpth (m)	1.89	Hydr. Depth (m)	0.30	1.89	0.22
Conv. Total (m3/s)	239.7	Conv. (m3/s)	22.4	209.8	7.6
Length Wtd. (m)	84.82	Wetted Per. (m)	25.33	5.80	16.39
Min Ch El (m)	81.00	Shear (N/m2)	19.90	127.66	13.59
Alpha	2.64	Stream Power (N/m s)	4.95	202.47	2.58
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	20.85	11.87	17.17
C & E Loss (m)	0.03	Cum SA (1000 m2)	24.77	5.50	20.19

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 1036

INPUT

Description:

Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.5	1.658	81.802	3.374	81.669	4.813	81.593	6.251	81.491
7.689	81.472	9.128	81.408	10.566	81.426	12.004	81.397	16.466	81.25
19.196	81.455	20.634	81.37	21.072	81.395	22.072	81.498	24.949	81.544
25.925	81.651	26.387	81.677	27.06	81.664	27.826	81.608	28.352	81.55
29.264	81.511	30.591	81.519	32.141	81.69	33.205	81.764	35.632	81.631
36.456	81.54	37.654	81.376	37.894	81.353	38.059	81.357	39.519	80.908
39.523	80.907	40.048	80.778	40.127	80.688	43.664	80.696	44.371	80.724
44.398	80.784	44.577	80.886	44.683	80.946	45.903	82.112	46.467	82.119
47.421	82.188	50.848	82.101	52.874	82.148	55.228	82.036	57.521	81.79
58.148	81.776	61.068	81.554	62.528	81.538	64.491	81.401	65.449	81.449
66.909	81.603	68.369	81.946	69.829	82.258	70.998	82.549	71.461	82.69
72.749	83.16	73.785	83.587	74.927	84.084	76.108	84.455	78.432	85.077
78.59	85.098	83.079	85.453	84.43	85.617	85.402	85.81	85.89	85.845
88.811	85.899	90.645	85.877	93.191	85.916	94.575	85.887	96.111	85.924
97.571	85.932	99.031	85.9	99.831	85.862				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	39.523	.08	44.577	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.523	44.577	94.7	89.7	82.4	.1	.3

Left Levee Station= 33.205 Elevation= 81.764

Right Levee Station= 45.903 Elevation= 82.112

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.45	Reach Len. (m)	94.70	89.70	82.40
Crit W.S. (m)	81.76	Flow Area (m2)	36.60	8.74	15.30
E.G. Slope (m/m)	0.001316	Area (m2)	36.60	8.74	15.30
Q Total (m3/s)	16.57	Flow (m3/s)	8.39	5.62	2.56
Top Width (m)	70.46	Top Width (m)	39.40	5.05	26.01
Vel Total (m/s)	0.27	Avg. Vel. (m/s)	0.23	0.64	0.17
Max Chl Dpth (m)	1.76	Hydr. Depth (m)	0.93	1.73	

0.59					
Conv. Total (m3/s)	456.7	Conv. (m3/s)	231.3	155.0	70.5
Length Wtd. (m)	90.17	Wetted Per. (m)	39.67	5.18	26.63
Min Ch El (m)	80.69	Shear (N/m2)	11.91	21.81	7.42
Alpha	2.29	Stream Power (N/m s)	2.73	14.03	1.24
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	13.31	9.70	11.94
C & E Loss (m)	0.00	Cum SA (1000 m2)	21.11	5.02	16.86

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.84	Reach Len. (m)	94.70	89.70	82.40
Crit W.S. (m)	81.81	Flow Area (m2)	52.25	10.74	25.87
E.G. Slope (m/m)	0.000622	Area (m2)	52.25	10.74	25.87
Q Total (m3/s)	19.89	Flow (m3/s)	10.35	5.45	4.08
Top Width (m)	71.88	Top Width (m)	39.52	5.05	27.30
Vel Total (m/s)	0.22	Avg. Vel. (m/s)	0.20	0.51	0.16
Max Chl Dpth (m)	2.15	Hydr. Depth (m)	1.32	2.13	0.95
Conv. Total (m3/s)	797.4	Conv. (m3/s)	415.2	218.5	163.7
Length Wtd. (m)	90.01	Wetted Per. (m)	40.15	5.18	27.98
Min Ch El (m)	80.69	Shear (N/m2)	7.94	12.66	5.64
Alpha	1.92	Stream Power (N/m s)	1.57	6.42	0.89

Frctn Loss (m)	0.07	Cum Volume (1000 m3)	18.67	10.90	15.80
C & E Loss (m)	0.00	Cum SA (1000 m2)	22.42	5.02	18.20

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 946

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.832	3.777	83.65	5.908	83.497	8.236	83.307	14.434	82.889
16.565	82.626	18.697	82.411	20.828	82.304	22.254	82.167	23.811	81.988
27.223	81.827	29.354	81.783	31.485	81.526	31.907	81.503	33.156	81.381
36.272	81.297	37.88	81.291	40.011	80.953	40.944	80.832	41.364	80.742
42.143	80.606	42.548	80.388	42.745	80.299	42.945	80.208	45.992	80.195
46.887	80.312	47.053	80.389	47.163	80.439	48.35	81.243	52.694	81.268
54.866	81.385	55.206	81.385	56.732	81.304	57.038	81.311	59.21	81.586
59.784	81.606	61.382	81.717	62.835	81.896	63.554	82.027	65.887	82.664
67.412	82.94	67.898	83.051	68.938	83.229	70.07	83.453	71.395	83.598
71.99	83.63	72.864	83.773	73.516	83.9	74.414	84.02	76.586	84.171
78.758	84.266	80.93	84.433	82.67	84.806	83.102	84.882	84.196	84.929
85.722	85.024	86.78	85.164	90.299	85.488	91.79	85.718	93.351	85.726
93.962	85.758	99.072	85.787						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	42.548	.08	47.163	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.548	47.163	105.9	102.3	97.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.31	Element	Left OB	Channel	Right OB

Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.28	Reach Len. (m)	105.90	102.30	97.40
Crit W.S. (m)		Flow Area (m2)	16.32	9.47	14.54
E.G. Slope (m/m)	0.002068	Area (m2)	16.32	9.47	14.54
Q Total (m3/s)	16.57	Flow (m3/s)	4.10	8.61	3.87
Top Width (m)	43.45	Top Width (m)	21.50	4.61	17.33
Vel Total (m/s)	0.41	Avg. Vel. (m/s)	0.25	0.91	0.27
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	0.76	2.05	0.84
Conv. Total (m3/s)	364.4	Conv. (m3/s)	90.1	189.2	85.1
Length Wtd. (m)	102.71	Wetted Per. (m)	21.66	4.69	17.66
Min Ch El (m)	80.20	Shear (N/m2)	15.28	40.97	16.69
Alpha	2.73	Stream Power (N/m s)	3.84	37.22	4.45
Frctn Loss (m)	0.11	Cum Volume (1000 m3)	10.80	8.88	10.71
C & E Loss (m)	0.00	Cum SA (1000 m2)	18.22	4.58	15.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.78	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.76	Reach Len. (m)	105.90	102.30	97.40
Crit W.S. (m)		Flow Area (m2)	28.23	11.69	23.31
E.G. Slope (m/m)	0.000980	Area (m2)	28.23	11.69	23.31

Q Total (m3/s)	19.89	Flow (m3/s)	6.03	8.41	5.45
Top Width (m)	50.99	Top Width (m)	27.10	4.61	19.28
Vel Total (m/s)	0.31	Avg. Vel. (m/s)	0.21	0.72	0.23
Max Chl Dpth (m)	2.57	Hydr. Depth (m)	1.04	2.53	1.21
Conv. Total (m3/s)	635.3	Conv. (m3/s)	192.5	268.8	174.0
Length Wtd. (m)	102.66	Wetted Per. (m)	27.28	4.69	19.67
Min Ch El (m)	80.20	Shear (N/m2)	9.94	23.96	11.39
Alpha	2.51	Stream Power (N/m s)	2.12	17.24	2.66
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	14.86	9.90	13.78
C & E Loss (m)	0.00	Cum SA (1000 m2)	19.27	4.58	16.28

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 781

INPUT
Description: CR-4
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.03	4.999946	83.869	9.999914	83.861	4.99996	83.791	9.99993	83.22
24.99997	81.26	29.99994	80.973	4.99998	80.554	3.059948	0.463654	5.853278	0.48796
47.218	0.18051	48.027	9.958664	9.19016	79.75	0.40633	79.452	0.00671	79.5
52.83164	79.96325	53.60954	80.69183	57.56426	81.03425	62.5643	81.4267	56425	82.22
72.56427	83.167	7.56432	84.268	2.56424	84.798	7.56426	84.649	2.56431	84.88
97.56432	85.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	48.02	.085	2.83164	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.02	52.83164	58.4	70.8	73.3	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.18	Reach Len. (m)	58.40	70.80	73.30
Crit W.S. (m)		Flow Area (m2)	35.93	12.33	13.20
E.G. Slope (m/m)	0.000715	Area (m2)	35.93	12.33	13.20
Q Total (m3/s)	17.72	Flow (m3/s)	8.02	7.52	2.17
Top Width (m)	44.65	Top Width (m)	25.36	4.81	14.47
Vel Total (m/s)	0.29	Avg. Vel. (m/s)	0.22	0.61	0.16
Max Chl Dpth (m)	2.78	Hydr. Depth (m)	1.42	2.56	0.91
Conv. Total (m3/s)	662.7	Conv. (m3/s)	300.0	281.3	81.3
Length Wtd. (m)	66.05	Wetted Per. (m)	25.63	5.00	14.85
Min Ch El (m)	79.40	Shear (N/m2)	9.83	17.29	6.23
Alpha	2.21	Stream Power (N/m s)	2.19	10.54	1.03
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	8.03	7.77	9.36
C & E Loss (m)	0.00	Cum SA (1000 m2)	15.74	4.10	13.52

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.71	Reach Len. (m)	58.40	70.80	73.30

Crit W.S. (m)		Flow Area (m2)	49.69	14.87	21.61
E.G. Slope (m/m)	0.000414	Area (m2)	49.69	14.87	21.61
Q Total (m3/s)	21.26	Flow (m3/s)	10.10	7.82	3.34
Top Width (m)	48.85	Top Width (m)	26.71	4.81	17.32
Vel Total (m/s)	0.25	Avg. Vel. (m/s)	0.20	0.53	0.15
Max Chl Dpth (m)	3.31	Hydr. Depth (m)	1.86	3.09	1.25
Conv. Total (m3/s)	1045.2	Conv. (m3/s)	496.5	384.5	164.2
Length Wtd. (m)	65.72	Wetted Per. (m)	27.08	5.00	17.75
Min Ch El (m)	79.40	Shear (N/m2)	7.45	12.07	4.94
Alpha	2.05	Stream Power (N/m s)	1.51	6.35	0.76
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	10.74	8.54	11.59
C & E Loss (m)	0.00	Cum SA (1000 m2)	16.42	4.10	14.49

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 767

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.09	2.4	81.09	2.9	81.12	4.7	81.08	7.7	81.08
9.4	81.04	11.7	80.95	14	80.94	15.6	80.87	16	80.86
16.3	80.87	18.6	80.77	19.5	80.77	20.4	80.75	21.9	80.61
23.5	80.5	24.8	80.43	25.6	80.35	27.4	80.3	30.2	80.27
30.7	79.4	32.6	79.3	33.6	79.3	35	79.3	35.3	79.4
36.5	80.25	37.2	80.26	38	80.33	39.5	80.39	40.9	80.6
41.8	80.69	42.3	80.72	43.8	80.71	46.5	80.91	46.7	80.89
47.1	80.83	48.2	80.71	48.5	80.705	48.8	80.7	49.6	80.89
51.1	81.42	52.68	2.00846	55	82.95	58.1	84.08	59	84.39
59.9	84.63	60.4	84.72	62.9	84.92	65	84.94	69.7	84.93
72	84.95	78.7	85.06	80.3	84.99	81.8	84.96		

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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    30.7     .08    35.3     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          30.7    35.3              6.4     6.3     6.2             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           82.15    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.01    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           82.14    Reach Len. (m)           6.40       6.30
6.20
  Crit W.S. (m)                    Flow Area (m2)          41.76      12.98
24.77
  E.G. Slope (m/m)      0.000428    Area (m2)              41.76      12.98
24.77
  Q Total (m3/s)          17.72    Flow (m3/s)             6.84       6.68
4.19
  Top Width (m)           52.95    Top Width (m)          30.70       4.60
17.65
  Vel Total (m/s)          0.22    Avg. Vel. (m/s)         0.16       0.52
0.17
  Max Chl Dpth (m)         2.84    Hydr. Depth (m)         1.36       2.82
1.40
  Conv. Total (m3/s)      856.1    Conv. (m3/s)           330.5      323.0
202.7
  Length Wtd. (m)          6.31    Wetted Per. (m)        32.28       4.62
18.21
  Min Ch El (m)           79.30    Shear (N/m2)            5.43      11.80
5.71
  Alpha                    2.36    Stream Power (N/m s)    0.89       6.08
0.97
  Frctn Loss (m)           0.01    Cum Volume (1000 m3)    5.77       6.87
7.96
  C & E Loss (m)           0.01    Cum SA (1000 m2)       14.10       3.77
12.35



Warning: The cross-section end points had to be extended vertically for the
computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
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1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.69	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.69	Reach Len. (m)	6.40	6.30	6.20
Crit W.S. (m)		Flow Area (m2)	58.42	15.47	34.72
E.G. Slope (m/m)	0.000251	Area (m2)	58.42	15.47	34.72
Q Total (m3/s)	21.26	Flow (m3/s)	9.06	6.86	5.35
Top Width (m)	54.33	Top Width (m)	30.70	4.60	19.03
Vel Total (m/s)	0.20	Avg. Vel. (m/s)	0.16	0.44	0.15
Max Chl Dpth (m)	3.39	Hydr. Depth (m)	1.90	3.36	1.82
Conv. Total (m3/s)	1342.8	Conv. (m3/s)	572.0	433.0	337.8
Length Wtd. (m)	6.31	Wetted Per. (m)	32.83	4.62	19.70
Min Ch El (m)	79.30	Shear (N/m2)	4.38	8.24	4.33
Alpha	2.08	Stream Power (N/m s)	0.68	3.65	0.67
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	7.58	7.46	9.53
C & E Loss (m)	0.01	Cum SA (1000 m2)	14.74	3.77	13.16

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek

REACH: Reach 3 RS: 766

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.162	1.459	82.047	2.462	82.01	2.921	81.961	4.383	81.716
5.507	81.507	6.421	81.373	7.824	81.242	10.379	81.138	11.691	81.222
12.459	81.289	13.153	81.308	14.338	81.406	14.777	81.391	16.077	81.189
17.094	81.071	17.539	81.08	18.297	81.04	19	81.059	20.462	81.208
21.729	81.242	22.256	81.213	24.047	79.27	24.847	79.27	26.364	79.27
27.771	79.27	28.682	79.27	30.695	81.139	30.999	81.12	32.156	81.123
33.618	81.22	34.133	81.303	35.08	81.403	35.634	81.433	36.542	81.469
37.951	81.429	39.465	81.619	40.269	81.693	40.927	81.647	42.051	81.539
42.586	81.536	43.851	81.638	45.312	81.881	46.01	81.979	46.774	82.065
48.02	82.282	48.236	82.319	49.539	82.471	51.16	82.491	51.856	82.57
52.621	82.686	52.832	82.729	54.174	83.007	55.545	83.653	56.491	84.042
57.887	84.502	58.809	84.687	59.93	84.769	61.392	84.814	61.846	84.847
62.854	84.885	64.316	84.903	65.761	84.968	67.239	84.928	68.078	84.967
68.701	84.969	70.163	84.923	71.624	84.931	74.548	84.907	77.682	84.928
79.666	84.887	81.983	84.778	84.301	84.739	85.8	84.758		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	24.047	.08	28.682	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.047 28.682 48.6 42.4 41.4 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	22.26	83.89	F
30.695	85.8	83.89	F

Right Levee Station= 40.27 Elevation= 81.69

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	82.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	82.08	Reach Len. (m)	48.60	42.40	41.40
Crit W.S. (m)	80.38	Flow Area (m2)	3.29	13.03	3.78
E.G. Slope (m/m)	0.002162	Area (m2)	18.61	13.03	12.99
Q Total (m3/s)	17.72	Flow (m3/s)	1.18	15.09	

1.45					
Top Width (m)	45.84	Top Width (m)	23.02	4.64	
18.19					
Vel Total (m/s)	0.88	Avg. Vel. (m/s)	0.36	1.16	
0.38					
Max Chl Dpth (m)	2.81	Hydr. Depth (m)	1.84	2.81	
1.88					
Conv. Total (m3/s)	381.0	Conv. (m3/s)	25.4	324.4	
31.1					
Length Wtd. (m)	42.40	Wetted Per. (m)	2.64	4.64	
2.75					
Min Ch El (m)	79.27	Shear (N/m2)	26.47	59.61	
29.16					
Alpha	1.50	Stream Power (N/m s)	9.51	69.01	
11.18					
Frctn Loss (m)		Cum Volume (1000 m3)	5.57	6.79	
7.85					
C & E Loss (m)		Cum SA (1000 m2)	13.93	3.74	
12.23					

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	82.68	Element	Left OB	Channel	
Right OB					
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	
0.150					
W.S. Elev (m)	82.63	Reach Len. (m)	48.60	42.40	
41.40					
Crit W.S. (m)	80.51	Flow Area (m2)	4.27	15.56	
4.88					
E.G. Slope (m/m)	0.001653	Area (m2)	31.69	15.56	
24.11					
Q Total (m3/s)	21.26	Flow (m3/s)	1.59	17.73	
1.94					
Top Width (m)	52.23	Top Width (m)	24.05	4.64	
23.55					
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.37	1.14	
0.40					
Max Chl Dpth (m)	3.36	Hydr. Depth (m)	2.39	3.36	
2.42					
Conv. Total (m3/s)	522.9	Conv. (m3/s)	39.2	436.0	
47.7					

Length Wtd. (m)	42.40	Wetted Per. (m)	2.64	4.64	2.75
Min Ch El (m)	79.27	Shear (N/m2)	26.23	54.42	28.78
Alpha	1.50	Stream Power (N/m s)	9.80	62.00	11.44
Frctn Loss (m)		Cum Volume (1000 m3)	7.29	7.37	9.34
C & E Loss (m)		Cum SA (1000 m2)	14.56	3.74	13.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Walker Creek
REACH: Reach 3 RS: 745

INPUT
Description:
Distance from Upstream XS = 3.5
Deck/Roadway Width = 30
Weir Coefficient = 1.4
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	83.89		80	83.89	

Upstream Bridge Cross Section Data
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.162	1.459	82.047	2.462	82.01	2.921	81.961	4.383	81.716
5.507	81.507	6.421	81.373	7.824	81.242	10.379	81.138	11.691	81.222
12.459	81.289	13.153	81.308	14.338	81.406	14.777	81.391	16.077	81.189
17.094	81.071	17.539	81.08	18.297	81.04	19	81.059	20.462	81.208
21.729	81.242	22.256	81.213	24.047	79.27	24.847	79.27	26.364	79.27
27.771	79.27	28.682	79.27	30.695	81.139	30.999	81.12	32.156	81.123
33.618	81.22	34.133	81.303	35.08	81.403	35.634	81.433	36.542	81.469
37.951	81.429	39.465	81.619	40.269	81.693	40.927	81.647	42.051	81.539
42.586	81.536	43.851	81.638	45.312	81.881	46.01	81.979	46.774	82.065
48.02	82.282	48.236	82.319	49.539	82.471	51.16	82.491	51.856	82.57
52.621	82.686	52.832	82.729	54.174	83.007	55.545	83.653	56.491	84.042
57.887	84.502	58.809	84.687	59.93	84.769	61.392	84.814	61.846	84.847
62.854	84.885	64.316	84.903	65.761	84.968	67.239	84.928	68.078	84.967

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  68.701  84.969  70.163  84.923  71.624  84.931  74.548  84.907  77.682  84.928
  79.666  84.887  81.983  84.778  84.301  84.739    85.8  84.758

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  24.047     .08  28.682     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
        24.047  28.682             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   22.26   83.89       F
  30.695    85.8   83.89       F
Right Levee     Station=   40.27      Elevation=   81.69

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   83.89              80   83.89

Downstream Bridge Cross Section Data
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.79     1.3   81.55     1.6   81.54     3.6   81.54     5.8   81.83
     6.6   81.74     8.1   81.65       9   81.56    10.3   81.39    12.6   80.76
    14.8   80.52    19.4   80.27    20.9   79.91    21.6   79.62    22.4   79.29
    23.8   79.19    24.1   79.19    25.3   79.19    26.1   79.19    28.1    79.2
    28.3   79.25    28.8    79.4    29.8   79.65    30.7   79.93    31.3   80.06
    32.4   80.21    32.9   80.26    34.2   80.35    35.2    80.4    36.7   80.53
    37.4   80.61    38.7    80.6    39.7   80.53    40.1   80.61      41   80.71
    41.6   80.75      42   80.72    44.2   80.42    45.3   80.39    46.1   80.47
    46.5   80.48    47.5   80.64    48.7   80.73      49   80.82    50.5    81.4
    53.2   82.23    56.4   82.94    57.9   83.33      60   83.98    60.9   84.11
    62.3   84.45    63.8   84.53    64.5   84.61    65.3   84.58    66.8   84.55
    68.3   84.62    69.1   84.65    71.2   84.57    71.584.56625    73.6   84.54
    75.8   84.58    78.1   84.64    80.4   84.82    83.1   84.79    84.9   84.75
    85.8   84.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    21.6     .08    29.8     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
          21.6    29.8             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      20   83.89       F
      31    85.8   83.89       F
```

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 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     Pipe Arch     2.3    3.59
FHWA Chart # 34- 18 inch corner radius; Corrugated metal
FHWA Scale # 3 - Projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               3.5      35     .027     .027        0                   .9
       1
Upstream   Elevation =  79.27
           Centerline Station =  26.5
Downstream Elevation =  79.2
           Centerline Station =  25

CULVERT OUTPUT  Profile #100 Year_SCS 24  Culv Group:  Culvert #1

  Q Culv Group (m3/s)      17.72    Culv Full Len (m)
  # Barrels                   1    Culv Vel US (m/s)         2.88
  Q Barrel (m3/s)          17.72    Culv Vel DS (m/s)         3.47
  E.G. US. (m)             82.14    Culv Inv El Up (m)       79.27
  W.S. US. (m)             82.08    Culv Inv El Dn (m)       79.20
  E.G. DS (m)              80.90    Culv Frctn Ls (m)         0.32
  W.S. DS (m)              80.82    Culv Exit Loss (m)        0.53
  Delta EG (m)              1.24    Culv Entr Loss (m)        0.38
  Delta WS (m)              1.26    Q Weir (m3/s)
  E.G. IC (m)              81.93    Weir Sta Lft (m)
  E.G. OC (m)              82.14    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)         81.34    Weir Max Depth (m)
  Culv WS Outlet (m)        80.82    Weir Avg Depth (m)
  Culv Nml Depth (m)         2.30    Weir Flow Area (m2)
  Culv Crt Depth (m)         1.39    Min El Weir Flow (m)     83.89


Note:    The normal depth exceeds the height of the culvert.  The program assumes
that the normal depth is equal to the
         height of the culvert.
```

CULVERT OUTPUT Profile #Future Scenario Culv Group: Culvert #1

Q Culv Group (m3/s)	21.26	Culv Full Len (m)	4.38
# Barrels	1	Culv Vel US (m/s)	3.31
Q Barrel (m3/s)	21.26	Culv Vel DS (m/s)	3.94
E.G. US. (m)	82.68	Culv Inv El Up (m)	79.27
W.S. US. (m)	82.63	Culv Inv El Dn (m)	79.20
E.G. DS (m)	81.04	Culv Frctn Ls (m)	0.45
W.S. DS (m)	80.94	Culv Exit Loss (m)	0.69
Delta EG (m)	1.64	Culv Entr Loss (m)	0.50
Delta WS (m)	1.69	Q Weir (m3/s)	
E.G. IC (m)	82.37	Weir Sta Lft (m)	
E.G. OC (m)	82.68	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	81.57	Weir Max Depth (m)	
Culv WS Outlet (m)	80.94	Weir Avg Depth (m)	
Culv Nml Depth (m)	2.30	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.60	Min El Weir Flow (m)	83.89

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the
height of the culvert.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 724

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.79	1.3	81.55	1.6	81.54	3.6	81.54	5.8	81.83
6.6	81.74	8.1	81.65	9	81.56	10.3	81.39	12.6	80.76
14.8	80.52	19.4	80.27	20.9	79.91	21.6	79.62	22.4	79.29
23.8	79.19	24.1	79.19	25.3	79.19	26.1	79.19	28.1	79.2
28.3	79.25	28.8	79.4	29.8	79.65	30.7	79.93	31.3	80.06
32.4	80.21	32.9	80.26	34.2	80.35	35.2	80.4	36.7	80.53
37.4	80.61	38.7	80.6	39.7	80.53	40.1	80.61	41	80.71
41.6	80.75	42	80.72	44.2	80.42	45.3	80.39	46.1	80.47
46.5	80.48	47.5	80.64	48.7	80.73	49	80.82	50.5	81.4
53.2	82.23	56.4	82.94	57.9	83.33	60	83.98	60.9	84.11
62.3	84.45	63.8	84.53	64.5	84.61	65.3	84.58	66.8	84.55
68.3	84.62	69.1	84.65	71.2	84.57	71.584.56625		73.6	84.54
75.8	84.58	78.1	84.64	80.4	84.82	83.1	84.79	84.9	84.75

```
    85.8   84.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15    21.6     .08    29.8     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          21.6    29.8             21.6    16.4      16             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0      20   83.89       F
      31    85.8   83.89       F

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            80.90    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.08    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            80.82    Reach Len. (m)          21.60      16.40
16.00
  Crit W.S. (m)            80.07    Flow Area (m2)           1.46      12.68
1.19
  E.G. Slope (m/m)      0.006135    Area (m2)                4.21      12.68
7.08
  Q Total (m3/s)           17.72    Flow (m3/s)              0.70      16.42
0.60
  Top Width (m)            36.63    Top Width (m)            9.22       8.20
19.20
  Vel Total (m/s)           1.16    Avg. Vel. (m/s)          0.48       1.30
0.50
  Max Chl Dpth (m)          1.63    Hydr. Depth (m)          0.91       1.55
0.99
  Conv. Total (m3/s)       226.2    Conv. (m3/s)              8.9      209.7
 7.6
  Length Wtd. (m)          16.62    Wetted Per. (m)          1.68       8.33
1.25
  Min Ch El (m)            79.19    Shear (N/m2)            52.28      91.58
57.10
  Alpha                     1.18    Stream Power (N/m s)    24.86     118.65
28.80
  Frctn Loss (m)            0.11    Cum Volume (1000 m3)     5.57       6.41
7.85
  C & E Loss (m)            0.00    Cum SA (1000 m2)        13.15       3.47
11.46
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	81.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.94	Reach Len. (m)	21.60	16.40	16.00
Crit W.S. (m)	80.17	Flow Area (m2)	1.65	13.64	1.33
E.G. Slope (m/m)	0.006842	Area (m2)	5.32	13.64	9.36
Q Total (m3/s)	21.26	Flow (m3/s)	0.90	19.60	0.76
Top Width (m)	37.36	Top Width (m)	9.65	8.20	19.51
Vel Total (m/s)	1.28	Avg. Vel. (m/s)	0.54	1.44	0.57
Max Chl Dpth (m)	1.75	Hydr. Depth (m)	1.03	1.66	1.11
Conv. Total (m3/s)	257.0	Conv. (m3/s)	10.9	237.0	9.2
Length Wtd. (m)	16.66	Wetted Per. (m)	1.68	8.33	1.25
Min Ch El (m)	79.19	Shear (N/m2)	65.81	109.90	71.26
Alpha	1.18	Stream Power (N/m s)	35.82	157.90	40.91
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	7.29	6.88	9.34
C & E Loss (m)	0.01	Cum SA (1000 m2)	13.75	3.47	12.14

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 708

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.79	1.3	81.55	1.6	81.54	3.6	81.54	5.8	81.83
6.6	81.74	8.1	81.65	9	81.56	10.3	81.39	12.6	80.76
14.8	80.52	19.4	80.27	20.9	79.91	21.6	79.62	22.4	79.29
23.8	79.19	24.1	79.19	25.3	79.19	26.1	79.19	28.1	79.2
28.3	79.25	28.8	79.4	29.8	79.65	30.7	79.93	31.3	80.06
32.4	80.21	32.9	80.26	34.2	80.35	35.2	80.4	36.7	80.53
37.4	80.61	38.7	80.6	39.7	80.53	40.1	80.61	41	80.71
41.6	80.75	42	80.72	44.2	80.42	45.3	80.39	46.1	80.47
46.5	80.48	47.5	80.64	48.7	80.73	49	80.82	50.5	81.4
53.2	82.23	56.4	82.94	57.9	83.33	60	83.98	60.9	84.11
62.3	84.45	63.8	84.53	64.5	84.61	65.3	84.58	66.8	84.55
68.3	84.62	69.1	84.65	71.2	84.57	71.58	4.56625	73.6	84.54
75.8	84.58	78.1	84.64	80.4	84.82	83.1	84.79	84.9	84.75
85.8	84.75								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	21.6	.08	29.8	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
21.6	29.8	95.6	76.8	71.1	.1	.3

Right Levee Station= 41.6 Elevation= 80.75

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	80.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.71	Reach Len. (m)	95.60	76.80	71.10
Crit W.S. (m)	80.06	Flow Area (m2)	3.20	11.75	3.82
E.G. Slope (m/m)	0.007239	Area (m2)	3.20	11.75	3.82
Q Total (m3/s)	17.72	Flow (m3/s)	0.93	15.73	1.05
Top Width (m)	27.92	Top Width (m)	8.53	8.20	11.19
Vel Total (m/s)	0.94	Avg. Vel. (m/s)	0.29	1.34	0.28
Max Chl Dpth (m)	1.52	Hydr. Depth (m)	0.37	1.43	

0.34					
Conv. Total (m3/s)	208.2	Conv. (m3/s)	11.0	184.9	12.4
Length Wtd. (m)	77.60	Wetted Per. (m)	8.65	8.33	11.29
Min Ch El (m)	79.19	Shear (N/m2)	26.24	100.19	24.05
Alpha	1.80	Stream Power (N/m s)	7.67	134.08	6.63
Frctn Loss (m)	0.53	Cum Volume (1000 m3)	5.49	6.21	7.76
C & E Loss (m)	0.00	Cum SA (1000 m2)	12.96	3.33	11.22

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.83	Reach Len. (m)	95.60	76.80	71.10
Crit W.S. (m)	80.17	Flow Area (m2)	4.24	12.71	7.16
E.G. Slope (m/m)	0.007125	Area (m2)	4.24	12.71	7.16
Q Total (m3/s)	21.26	Flow (m3/s)	1.41	17.78	2.07
Top Width (m)	36.65	Top Width (m)	9.24	8.20	19.21
Vel Total (m/s)	0.88	Avg. Vel. (m/s)	0.33	1.40	0.29
Max Chl Dpth (m)	1.64	Hydr. Depth (m)	0.46	1.55	0.37
Conv. Total (m3/s)	251.9	Conv. (m3/s)	16.7	210.6	24.6
Length Wtd. (m)	77.77	Wetted Per. (m)	9.37	8.33	19.37
Min Ch El (m)	79.19	Shear (N/m2)	31.65	106.65	

```
25.81
  Alpha                    2.12    Stream Power (N/m s)     10.50     149.17
7.48
  Frctn Loss (m)           0.52    Cum Volume (1000 m3)      7.19       6.66
9.21
  C & E Loss (m)           0.00    Cum SA (1000 m2)         13.54       3.33
11.83



Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Walker Creek
REACH: Reach 3           RS: 631

INPUT
Description:
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  82.435    1.85  82.154   2.277  82.112   3.854  81.975   5.124  81.652
   7.708  81.115   8.255  81.279   9.394  81.524  11.529  82.022  11.561  82.029
   12.81  81.668   14.66  81.112  15.415  80.847  17.934   80.35  19.269  80.164
  21.065  80.044  23.123  79.946  26.977  79.762  27.612   79.77  29.747  79.659
  30.744  79.545  30.831  79.536  31.882  79.339  33.231  79.249  33.642   78.93
  33.875  78.513  34.218  78.441  35.089   78.39  35.239   78.39  35.839   78.39
  36.239   78.39  37.895  78.396   38.06  78.459  38.473  78.628  38.885  78.785
  39.298   78.88   40.04  79.079  40.101  79.092  40.536  79.229  40.992  79.351
  41.443  79.398  41.856  79.433  42.929  79.502  43.754  79.545  44.992  79.638
  45.569  79.691  45.923  79.697  46.642  79.712  47.467  79.699  47.797  79.747
   48.54  79.816  49.035  79.849  49.365  79.842   51.18  79.738  51.368   79.74
  52.088  79.752  52.748  79.813  53.078  79.829  53.904  79.936  54.894  80.014
  55.141  80.067  56.379  80.397  58.607  80.885  60.133   81.14  61.248  81.395
  62.486  81.708  64.218  82.196  64.961  82.332  66.116  82.611  66.476  82.657
  67.354   82.79  67.932  82.899  68.592  82.963   69.83  83.097  71.067   83.28
  71.728  83.374   72.82   83.48  73.461  83.509  73.708  83.524  75.441   83.63
  77.256  83.774  79.154  83.934  79.164  83.935  81.052  84.064   83.28  84.094
  84.766  84.105  85.508   84.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  33.642     .08  38.885     .15
```

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
33.642	38.885	104.1	104.1	104.1	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	80.26	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.19	Reach Len. (m)	104.10	104.10	104.10
Crit W.S. (m)		Flow Area (m2)	6.25	9.11	9.19
E.G. Slope (m/m)	0.006338	Area (m2)	6.25	9.11	9.19
Q Total (m3/s)	17.72	Flow (m3/s)	1.88	12.59	3.26
Top Width (m)	36.54	Top Width (m)	14.57	5.24	16.72
Vel Total (m/s)	0.72	Avg. Vel. (m/s)	0.30	1.38	0.35
Max Chl Dpth (m)	1.80	Hydr. Depth (m)	0.43	1.74	0.55
Conv. Total (m3/s)	222.5	Conv. (m3/s)	23.6	158.1	40.9
Length Wtd. (m)	104.10	Wetted Per. (m)	14.72	5.57	16.86
Min Ch El (m)	78.39	Shear (N/m2)	26.40	101.66	33.89
Alpha	2.67	Stream Power (N/m s)	7.92	140.44	12.00
Frctn Loss (m)	0.46	Cum Volume (1000 m3)	5.04	5.41	7.30
C & E Loss (m)	0.01	Cum SA (1000 m2)	11.85	2.82	10.23

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	80.39	Element	Left OB	Channel

Right OB					
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	80.32	Reach Len. (m)	104.10	104.10	104.10
Crit W.S. (m)		Flow Area (m2)	8.17	9.78	11.36
E.G. Slope (m/m)	0.006187	Area (m2)	8.17	9.78	11.36
Q Total (m3/s)	21.26	Flow (m3/s)	2.78	13.99	4.49
Top Width (m)	37.93	Top Width (m)	15.49	5.24	17.20
Vel Total (m/s)	0.73	Avg. Vel. (m/s)	0.34	1.43	0.40
Max Chl Dpth (m)	1.93	Hydr. Depth (m)	0.53	1.87	0.66
Conv. Total (m3/s)	270.3	Conv. (m3/s)	35.3	177.9	57.1
Length Wtd. (m)	104.10	Wetted Per. (m)	15.65	5.57	17.35
Min Ch El (m)	78.39	Shear (N/m2)	31.68	106.52	39.70
Alpha	2.65	Stream Power (N/m s)	10.77	152.42	15.69
Frctn Loss (m)	0.47	Cum Volume (1000 m3)	6.60	5.80	8.55
C & E Loss (m)	0.01	Cum SA (1000 m2)	12.36	2.82	10.53

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 538

INPUT
Description: CR-3
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.08	5.00001	82.41	10	80.45	15	82.41	19.99999	80.45
25	79.67	30	79.45	35.00001	79.25	39.99999	79.07	43.1143	78.79

43.6477478.6590643.9496477.8362844.6359577.6929846.3779377.5905647.6898577.59247
48.4701678.0442349.42834 78.238150.1306378.5667354.01715 78.788258.3087479.06626
65.21655   79.6470.21655   80.8475.21655   82.3680.21655   83.2385.21655   83.49

Manning's n Values   num=   3
     Sta   n Val   Sta   n Val   Sta   n Val
       0   .1543.64774   .0850.13063   .15

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
      43.6477450.13063   69.8   69.8   69.8   .1   .3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.75	Reach Len. (m)	69.80	69.80	69.80
Crit W.S. (m)		Flow Area (m2)	9.01	12.31	10.46
E.G. Slope (m/m)	0.003307	Area (m2)	9.01	12.31	10.46
Q Total (m3/s)	17.72	Flow (m3/s)	2.09	12.56	3.07
Top Width (m)	41.18	Top Width (m)	19.16	6.48	15.54
Vel Total (m/s)	0.56	Avg. Vel. (m/s)	0.23	1.02	0.29
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.47	1.90	0.67
Conv. Total (m3/s)	308.1	Conv. (m3/s)	36.3	218.3	53.4
Length Wtd. (m)	69.80	Wetted Per. (m)	19.20	7.29	15.60
Min Ch El (m)	77.59	Shear (N/m2)	15.22	54.79	21.76
Alpha	2.44	Stream Power (N/m s)	3.52	55.86	6.39
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	4.25	4.30	6.27
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.10	2.21	8.55

Warning: The conveyance ratio (upstream conveyance divided by downstream

conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.87	Reach Len. (m)	69.80	69.80	69.80
Crit W.S. (m)		Flow Area (m2)	11.33	13.08	12.33
E.G. Slope (m/m)	0.003448	Area (m2)	11.33	13.08	12.33
Q Total (m3/s)	21.26	Flow (m3/s)	3.04	14.18	4.04
Top Width (m)	42.44	Top Width (m)	19.92	6.48	16.04
Vel Total (m/s)	0.58	Avg. Vel. (m/s)	0.27	1.08	0.33
Max Chl Dpth (m)	2.28	Hydr. Depth (m)	0.57	2.02	0.77
Conv. Total (m3/s)	362.0	Conv. (m3/s)	51.7	241.5	68.8
Length Wtd. (m)	69.80	Wetted Per. (m)	19.97	7.29	16.10
Min Ch El (m)	77.59	Shear (N/m2)	19.18	60.69	25.90
Alpha	2.43	Stream Power (N/m s)	5.14	65.79	8.49
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	5.58	4.61	7.32
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.52	2.21	8.80

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 457

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.898	.721	81.785	1.845	81.577	4.009	80.944	6.173	80.557
8.377	80.075	9.908	79.87	11.44	79.621	12.971	79.437	14.829	79.295
16.993	79.25	20.627	79.239	21.321	79.254	25.65	79.078	26.752	79.055
27.814	78.997	28.283	78.953	32.142	78.978	34.306	78.885	35.939	78.926
36.47	78.897	37.277	77.384	38.401	77.251	39.318	77.208	40.626	78.522
40.809	78.503	42.343	78.226	42.787	78.112	44.83	77.914	44.948	77.902
45.41	77.952	46.943	78.057	47.109	78.074	48.264	78.339	49.27	78.57
51.43	78.76	53.078	79.063	53.591	79.19	54.611	79.293	56.145	79.357
57.678	79.45	60.745	79.797	62.234	79.988	64.395	80.406	65.346	80.575
66.556	80.76	68.413	81.018	69.947	81.195	71.877	81.476		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	36.47	.08	40.626	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.47	40.626	92.2	80.7	62.4	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.47	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.43	Reach Len. (m)	92.20	80.70	62.40
Crit W.S. (m)		Flow Area (m2)	7.38	7.47	13.95
E.G. Slope (m/m)	0.006625	Area (m2)	7.38	7.47	13.95
Q Total (m3/s)	17.72	Flow (m3/s)	1.86	9.19	6.67
Top Width (m)	44.20	Top Width (m)	23.37	4.16	16.67
Vel Total (m/s)	0.62	Avg. Vel. (m/s)	0.25	1.23	0.48

Max Chl Dpth (m)	2.22	Hydr. Depth (m)	0.32	1.80	0.84
Conv. Total (m3/s)	217.7	Conv. (m3/s)	22.8	112.9	82.0
Length Wtd. (m)	75.14	Wetted Per. (m)	23.39	5.62	16.85
Min Ch El (m)	77.21	Shear (N/m2)	20.51	86.35	53.79
Alpha	2.32	Stream Power (N/m s)	5.16	106.21	25.73
Frctn Loss (m)	0.44	Cum Volume (1000 m3)	3.67	3.60	5.42
C & E Loss (m)	0.01	Cum SA (1000 m2)	8.61	1.83	7.42

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.58	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.53	Reach Len. (m)	92.20	80.70	62.40
Crit W.S. (m)		Flow Area (m2)	9.88	7.90	15.76
E.G. Slope (m/m)	0.006869	Area (m2)	9.88	7.90	15.76
Q Total (m3/s)	21.26	Flow (m3/s)	3.00	10.28	7.98
Top Width (m)	46.22	Top Width (m)	24.29	4.16	17.78
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.30	1.30	0.51
Max Chl Dpth (m)	2.32	Hydr. Depth (m)	0.41	1.90	0.89
Conv. Total (m3/s)	256.5	Conv. (m3/s)	36.2	124.0	96.3
Length Wtd. (m)	75.22	Wetted Per. (m)	24.31	5.62	17.96
Min Ch El (m)	77.21	Shear (N/m2)	27.38	94.75	59.13

Alpha	2.31	Stream Power (N/m s)	8.30	123.24	29.95
Frctn Loss (m)	0.44	Cum Volume (1000 m3)	4.84	3.88	6.34
C & E Loss (m)	0.01	Cum SA (1000 m2)	8.97	1.83	7.62

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 376

INPUT
Description:
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.643	2.792	82.65	4.129	82.634	5.8	82.499	7.303	82.482
8.548	82.426	9.359	82.475	10.311	82.568	10.757	82.587	11.814	82.587
12.966	82.565	14.067	82.391	16.325	81.885	17.385	81.577	19.594	80.415
20.836	79.604	21.804	79.011	22.34	78.791	23.481	78.5	24.013	78.388
25.347	78.251	26.222	78.221	26.85	78.256	28.432	78.303	30.641	78.24
31.361	78.276	32.896	78.259	34.369	78.333	37.269	78.446	38.148	76.977
39.355	76.843	39.842	76.821	40.071	77.619	40.292	77.735	41.446	78.19
41.764	78.148	42.38	78.098	43.258	77.984	44.752	77.914	45.71	77.977
45.977	77.995	47.74	78.02	48.607	78.137	48.838	78.187	49.234	78.274
50.728	78.393	52.222	78.38	53.065	78.326	53.716	78.333	55.294	78.389
57.523	78.376	59.57	78.455	61.98	78.51	62.68	78.491	64.174	78.508
68.656	78.5	70.896	78.516	71.644	78.531	73.125	78.609	73.449	78.696
75	79.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	37.269	.08	41.446	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
37.269	41.446	91.7	80.7	68	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	79.03	Element	Left OB	Channel

Right OB					
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.01	Reach Len. (m)	91.70	80.70	68.00
Crit W.S. (m)		Flow Area (m2)	10.15	6.64	21.15
E.G. Slope (m/m)	0.005102	Area (m2)	10.15	6.64	21.15
Q Total (m3/s)	17.72	Flow (m3/s)	3.64	6.54	7.54
Top Width (m)	52.18	Top Width (m)	15.46	4.18	32.54
Vel Total (m/s)	0.47	Avg. Vel. (m/s)	0.36	0.98	0.36
Max Chl Dpth (m)	2.19	Hydr. Depth (m)	0.66	1.59	0.65
Conv. Total (m3/s)	248.0	Conv. (m3/s)	50.9	91.6	105.5
Length Wtd. (m)	76.58	Wetted Per. (m)	15.57	5.73	32.69
Min Ch El (m)	76.82	Shear (N/m2)	32.64	57.97	32.38
Alpha	2.01	Stream Power (N/m s)	11.69	57.10	11.54
Frctn Loss (m)	0.38	Cum Volume (1000 m3)	2.87	3.04	4.33
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.82	1.50	5.89

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	79.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	79.11	Reach Len. (m)	91.70	80.70	68.00
Crit W.S. (m)		Flow Area (m2)	11.78	7.08	24.56
E.G. Slope (m/m)	0.004979	Area (m2)	11.78	7.08	

24.56					
Q Total (m3/s)	21.26	Flow (m3/s)	4.56	7.19	
9.51					
Top Width (m)	52.53	Top Width (m)	15.63	4.18	
32.72					
Vel Total (m/s)	0.49	Avg. Vel. (m/s)	0.39	1.02	
0.39					
Max Chl Dpth (m)	2.29	Hydr. Depth (m)	0.75	1.70	
0.75					
Conv. Total (m3/s)	301.3	Conv. (m3/s)	64.7	101.9	
134.8					
Length Wtd. (m)	76.28	Wetted Per. (m)	15.77	5.73	
32.89					
Min Ch El (m)	76.82	Shear (N/m2)	36.48	60.29	
36.46					
Alpha	1.87	Stream Power (N/m s)	14.13	61.20	
14.12					
Frctn Loss (m)	0.38	Cum Volume (1000 m3)	3.84	3.27	
5.08					
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.13	1.50	
6.05					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 296

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.833	.814	81.231	1.338	81.454	2.255	81.813	3.752	82.221
5.136	82.25	6.576	82.257	8.579	82.211	10.992	82.224	13.406	82.194
18.233	82.215	23.862	82.148	25.303	82.163	27.888	82.043	28.184	81.98
28.622	81.81	29.624	81.343	30.301	81.063	31.065	80.701	32.715	79.718
33.946	79.01	35.128	78.247	35.386	78.112	35.767	77.971	36.827	77.675
37.542	77.458	38.122	76.904	38.556	76.645	39.601	76.507	39.971	76.472
40.679	76.464	40.793	76.737	42.365	77.866	42.541	77.908	42.664	77.919
43.977	77.953	46.591	77.986	46.848	77.99	49.328	77.889	49.412	77.89
52.438	77.932	54.027	77.851	56.291	77.803	57.325	77.836	59.768	77.859
61.206	77.913	62.641	77.978	64.655	78.155	65.513	78.161	67.098	78.096

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  68.384  78.124   69.82  78.072  71.256  78.091  71.985  78.074  73.698  78.076
  75.022    78.1      80   79.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15  35.767     .08  42.365     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        35.767  42.365             78.7    69.5    73.3             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)            78.65    Element                Left OB    Channel
Right OB
  Vel Head (m)              0.04    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)            78.61    Reach Len. (m)          78.70      69.50
73.30
  Crit W.S. (m)                     Flow Area (m2)           0.43       9.94
21.56
  E.G. Slope (m/m)      0.004865    Area (m2)                0.43       9.94
21.56
  Q Total (m3/s)           17.72    Flow (m3/s)              0.09      10.44
7.19
  Top Width (m)            43.27    Top Width (m)            1.21       6.60
35.46
  Vel Total (m/s)           0.55    Avg. Vel. (m/s)          0.22       1.05
0.33
  Max Chl Dpth (m)          2.15    Hydr. Depth (m)          0.36       1.51
0.61
  Conv. Total (m3/s)       254.0    Conv. (m3/s)              1.3      149.6
103.0
  Length Wtd. (m)          71.75    Wetted Per. (m)          1.37       7.52
35.54
  Min Ch El (m)            76.46    Shear (N/m2)            15.07      63.06
28.95
  Alpha                     2.26    Stream Power (N/m s)     3.25      66.22
9.65
  Frctn Loss (m)            0.35    Cum Volume (1000 m3)     2.38       2.37
2.87
  C & E Loss (m)            0.00    Cum SA (1000 m2)         6.06       1.06
3.57


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
```

the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	78.76	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	78.72	Reach Len. (m)	78.70	69.50	73.30
Crit W.S. (m)		Flow Area (m2)	0.57	10.64	25.35
E.G. Slope (m/m)	0.004925	Area (m2)	0.57	10.64	25.35
Q Total (m3/s)	21.26	Flow (m3/s)	0.14	11.76	9.36
Top Width (m)	44.01	Top Width (m)	1.37	6.60	36.04
Vel Total (m/s)	0.58	Avg. Vel. (m/s)	0.24	1.11	0.37
Max Chl Dpth (m)	2.26	Hydr. Depth (m)	0.42	1.61	0.70
Conv. Total (m3/s)	303.0	Conv. (m3/s)	1.9	167.6	133.4
Length Wtd. (m)	72.09	Wetted Per. (m)	1.57	7.52	36.12
Min Ch El (m)	76.46	Shear (N/m2)	17.56	68.32	33.89
Alpha	2.18	Stream Power (N/m s)	4.18	75.52	12.52
Frctn Loss (m)	0.34	Cum Volume (1000 m3)	3.28	2.56	3.39
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.35	1.06	3.71

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 215

```
INPUT
Description: CR-2
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   78.365.000014   78.179.999971   78.0414.99999   78.04      20   78.01
25.00002   77.9529.99997   77.9534.99998   77.9339.9999677.8534943.2590577.81276
45.1942977.0584846.6447176.9517747.4708576.2719148.3525576.1854249.7347976.02594
49.9859176.1048150.2778176.88912 56.5828  77.49562.6994277.4542564.9321177.42289
72.84072   79.7177.84074   81.3982.84075   82.2587.84076   82.4792.84072   82.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .1546.64471     .0850.27781     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      46.6447150.27781             83.5      97      90             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           78.30    Element                 Left OB    Channel
Right OB
  Vel Head (m)             0.04    Wt. n-Val.               0.150      0.080
0.150
  W.S. Elev (m)           78.26    Reach Len. (m)           83.50      97.00
90.00
  Crit W.S. (m)                    Flow Area (m2)           14.32       7.19
14.57
  E.G. Slope (m/m)      0.004853    Area (m2)               14.32       7.19
14.57
  Q Total (m3/s)          17.72    Flow (m3/s)              3.14       8.63
5.94
  Top Width (m)           65.17    Top Width (m)           43.99       3.63
17.55
  Vel Total (m/s)          0.49    Avg. Vel. (m/s)          0.22       1.20
0.41
  Max Chl Dpth (m)         2.23    Hydr. Depth (m)          0.33       1.98
0.83
  Conv. Total (m3/s)       254.3    Conv. (m3/s)             45.1      123.9
85.3
  Length Wtd. (m)         92.95    Wetted Per. (m)          44.14       4.45
17.69
  Min Ch El (m)           76.03    Shear (N/m2)             15.44      76.98
39.19
  Alpha                    3.18    Stream Power (N/m s)      3.39      92.37
15.99
  Frctn Loss (m)           0.44    Cum Volume (1000 m3)      1.80       1.77
1.55
```

C & E Loss (m)	0.00	Cum SA (1000 m2)	4.28	0.71	1.63

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	78.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	78.38	Reach Len. (m)	83.50	97.00	90.00
Crit W.S. (m)		Flow Area (m2)	20.00	7.65	16.78
E.G. Slope (m/m)	0.004441	Area (m2)	20.00	7.65	16.78
Q Total (m3/s)	21.26	Flow (m3/s)	5.04	9.14	7.08
Top Width (m)	68.26	Top Width (m)	46.64	3.63	17.98
Vel Total (m/s)	0.48	Avg. Vel. (m/s)	0.25	1.20	0.42
Max Chl Dpth (m)	2.36	Hydr. Depth (m)	0.43	2.10	0.93
Conv. Total (m3/s)	319.0	Conv. (m3/s)	75.6	137.2	106.2
Length Wtd. (m)	92.15	Wetted Per. (m)	46.82	4.45	18.14
Min Ch El (m)	76.03	Shear (N/m2)	18.61	74.88	40.29
Alpha	3.01	Stream Power (N/m s)	4.69	89.52	16.99
Frctn Loss (m)	0.40	Cum Volume (1000 m3)	2.47	1.92	1.84
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.46	0.71	1.73

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and

previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 129

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.04	1.377	77.541	3.574	77.499	8.422	77.561	12.329	77.578
18.118	77.637	20.541	77.607	21.52	77.414	22.965	77.187	25.389	76.253
26.489	76	27.463	75.835	27.492	75.83	27.793	75.819	28.914	75.655
29.348	75.627	29.694	75.633	29.984	75.674	30.352	75.757	30.656	75.825
31.748	75.848	32.957	76.392	34.553	76.286	35.498	77.013	38.023	77.577
38.672	77.763	39.513	78.04	40.098	78.255	41.524	78.836	42.79	79.411
45.598	80.842	47.228	81.576	48.123	81.938	48.654	82.1	49.343	82.241
51.506	82.422	53.173	82.728	54.358	82.764	55.784	82.784	57.21	82.881
60.062	83.011	63.273	83.1	72.277	83.01	73.373	82.984	74.322	83.006
75.748	83.09	77.174	82.997	78.423	82.945	81.525	82.738		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	27.463	.08	31.748	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.463	31.748	86.4	85.7	92.2	.1	.3

CROSS SECTION OUTPUT Profile #100 Year_SCS 24

E.G. Elev (m)	77.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	77.79	Reach Len. (m)	86.40	85.70	92.20
Crit W.S. (m)		Flow Area (m2)	11.46	8.75	6.73
E.G. Slope (m/m)	0.004641	Area (m2)	11.46	8.75	6.73
Q Total (m3/s)	17.72	Flow (m3/s)	2.93	11.93	2.86
Top Width (m)	38.06	Top Width (m)	26.77	4.28	7.00

Vel Total (m/s)	0.66	Avg. Vel. (m/s)	0.26	1.36	0.42
Max Chl Dpth (m)	2.16	Hydr. Depth (m)	0.43	2.04	0.96
Conv. Total (m3/s)	260.1	Conv. (m3/s)	43.1	175.1	41.9
Length Wtd. (m)	86.78	Wetted Per. (m)	27.07	4.32	7.46
Min Ch El (m)	75.63	Shear (N/m2)	19.27	92.20	41.06
Alpha	2.99	Stream Power (N/m s)	4.93	125.71	17.41
Frctn Loss (m)	0.72	Cum Volume (1000 m3)	0.72	1.00	0.59
C & E Loss (m)	0.01	Cum SA (1000 m2)	1.32	0.32	0.53

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Future Scenario

E.G. Elev (m)	78.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	77.95	Reach Len. (m)	86.40	85.70	92.20
Crit W.S. (m)		Flow Area (m2)	15.85	9.45	7.91
E.G. Slope (m/m)	0.004291	Area (m2)	15.85	9.45	7.91
Q Total (m3/s)	21.26	Flow (m3/s)	4.79	13.03	3.44
Top Width (m)	39.00	Top Width (m)	27.22	4.28	7.50
Vel Total (m/s)	0.64	Avg. Vel. (m/s)	0.30	1.38	0.43
Max Chl Dpth (m)	2.32	Hydr. Depth (m)	0.58	2.20	1.06
Conv. Total (m3/s)	324.6	Conv. (m3/s)	73.1	199.0	

52.4					
Length Wtd. (m)	86.85	Wetted Per. (m)	27.55	4.32	7.98
Min Ch El (m)	75.63	Shear (N/m2)	24.22	92.05	41.72
Alpha	2.97	Stream Power (N/m s)	7.32	127.01	18.11
Frctn Loss (m)	0.68	Cum Volume (1000 m3)	0.97	1.09	0.73
C & E Loss (m)	0.02	Cum SA (1000 m2)	1.38	0.32	0.58

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Walker Creek
REACH: Reach 3 RS: 43

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.642	.38	77.519	1.795	77.274	2.539	77.128	3.935	76.822
4.626	76.413	5.266	76.103	6.041	75.701	6.877	75.505	7.456	75.456
7.992	75.366	8.871	75.127	9.82	75.192	10.287	75.295	10.719	75.452
12.762	76.037	13.446	76.32	14.532	76.737	15.705	77.067	17.363	77.256
18.647	77.362	21.59	77.538	23.024	77.531	24.352	77.485	25.2	77.386
25.854	77.311	27.475	77.146	28.1	77.156	28.685	77.165	29.806	77.232
31.515	77.248	32.93	77.349	33.36	77.409	34.346	77.464	35.259	77.484
38.591	77.446	39.245	77.509	40.007	77.516	40.712	77.473	41.422	77.405
43.439	77.298	44.252	77.356	45.668	77.514	46.166	77.535	47.083	77.527
48.893	77.557	51.015	77.536	51.619	77.606	52.744	77.962	54.346	78.619
55.574	79.2	56.9	79.94	58.405	80.587	59.842	81.288	61.235	81.585
62.526	81.839	64.066	81.985	65.727	82.074	67.979	82.245	68.311	82.242
68.67	82.204	69.727	82.151	70.174	82.148				

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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .15   7.456     .08  10.719     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         7.456  10.719               47      47      47             .1       .3

CROSS SECTION OUTPUT  Profile #100 Year_SCS 24


  E.G. Elev (m)           77.12    Element                Left OB    Channel
Right OB
  Vel Head (m)             0.21    Wt. n-Val.              0.150      0.080
0.150
  W.S. Elev (m)           76.91    Reach Len. (m)          43.41      43.41
43.41
  Crit W.S. (m)                    Flow Area (m2)           3.32       5.35
3.33
  E.G. Slope (m/m)      0.019089    Area (m2)               3.32       5.35
3.33
  Q Total (m3/s)          17.72    Flow (m3/s)             2.61      12.66
2.45
  Top Width (m)           11.58    Top Width (m)           3.90       3.26
4.41
  Vel Total (m/s)          1.48    Avg. Vel. (m/s)         0.79       2.36
0.74
  Max Chl Dpth (m)         1.78    Hydr. Depth (m)         0.85       1.64
0.75
  Conv. Total (m3/s)       128.2   Conv. (m3/s)            18.9       91.6
17.8
  Length Wtd. (m)         43.41    Wetted Per. (m)         4.22       3.34
4.65
  Min Ch El (m)           75.13    Shear (N/m2)          147.43     299.76
133.98
  Alpha                    1.91    Stream Power (N/m s)  115.81     708.58
98.75
  Frctn Loss (m)           0.59    Cum Volume (1000 m3)    0.08       0.39
0.13
  C & E Loss (m)           0.02    Cum SA (1000 m2)



Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
         the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Future Scenario
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E.G. Elev (m)	77.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.150	0.080	0.150
W.S. Elev (m)	77.09	Reach Len. (m)	43.41	43.41	43.41
Crit W.S. (m)		Flow Area (m2)	4.11	5.95	4.20
E.G. Slope (m/m)	0.018401	Area (m2)	4.11	5.95	4.20
Q Total (m3/s)	21.26	Flow (m3/s)	3.24	14.83	3.20
Top Width (m)	13.18	Top Width (m)	4.74	3.26	5.18
Vel Total (m/s)	1.49	Avg. Vel. (m/s)	0.79	2.49	0.76
Max Chl Dpth (m)	1.96	Hydr. Depth (m)	0.87	1.82	0.81
Conv. Total (m3/s)	156.7	Conv. (m3/s)	23.8	109.3	23.6
Length Wtd. (m)	43.41	Wetted Per. (m)	5.07	3.34	5.44
Min Ch El (m)	75.13	Shear (N/m2)	146.31	321.31	139.24
Alpha	2.03	Stream Power (N/m s)	115.05	800.38	105.94
Frctn Loss (m)	0.58	Cum Volume (1000 m3)	0.11	0.43	0.17
C & E Loss (m)	0.02	Cum SA (1000 m2)			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:Beamer Creek

Reach	River Sta.	n1	n2	n3
Reach 5	1649	.15	.08	.15

Reach 5	1633	.15	.08	.15
Reach 5	1615	Culvert		
Reach 5	1597	.15	.08	.15
Reach 5	1578	.15	.08	.15
Reach 5	1521	.15	.08	.15
Reach 5	1462	.15	.08	.15
Reach 5	1445	.15	.08	.15
Reach 5	1405	Culvert		
Reach 5	1392	.15	.08	.15
Reach 5	1374	.15	.08	.15
Reach 5	1310	.15	.08	.15
Reach 5	1228	.15	.08	.15
Reach 5	1152	.15	.08	.15
Reach 5	1138	.15	.08	.15
Reach 5	1121	Culvert		
Reach 5	1105	.15	.08	.15
Reach 5	1089	.15	.08	.15
Reach 5	1022	.15	.08	.15
Reach 5	938	.15	.08	.15
Reach 5	928	.15	.08	.15
Reach 5	916	Culvert		
Reach 5	904	.15	.08	.15
Reach 5	893	.15	.08	.15
Reach 5	831	.15	.08	.15
Reach 5	757	.15	.08	.15
Reach 5	745	.15	.08	.15
Reach 5	722	Culvert		
Reach 5	714	.15	.08	.15
Reach 5	699	.15	.08	.15
Reach 5	581	.15	.08	.15
Reach 5	522	.15	.08	.15
Reach 5	514	.15	.08	.15
Reach 5	507	Culvert		
Reach 5	494	.15	.08	.15
Reach 5	485	.15	.08	.15
Reach 5	388	.15	.08	.15
Reach 5	378	.15	.08	.15
Reach 5	360	Culvert		
Reach 5	354	.15	.08	.15
Reach 5	347	.15	.08	.15
Reach 5	283	.15	.08	.15
Reach 5	277	.15	.08	.15
Reach 5	247	Culvert		
Reach 5	236	.15	.08	.15
Reach 5	226	.15	.08	.15
Reach 5	0	.15	.08	.15

River:Walker Beamer Cr

Reach	River Sta.	n1	n2	n3
Reach 1	47	.15	.08	.15
Reach 1	16	.15	.08	.15

River:Walker Creek

Reach	River Sta.	n1	n2	n3
Reach 2	2523	.15	.08	.15
Reach 2	2517	.15	.08	.15
Reach 2	2504	Culvert		
Reach 2	2491	.15	.08	.15
Reach 2	2479	.15	.08	.15
Reach 2	2400	.15	.08	.15
Reach 2	2320	.15	.08	.15
Reach 2	2241	.15	.08	.15
Reach 2	2169	.15	.08	.15
Reach 2	2161	.15	.08	.15
Reach 2	2146	Culvert		
Reach 2	2131	.15	.08	.15
Reach 2	2120	.15	.08	.15
Reach 2	2050	.15	.08	.15
Reach 2	1970	.15	.08	.15
Reach 2	1961	.15	.08	.15
Reach 2	1950	Culvert		
Reach 2	1940	.15	.08	.15
Reach 2	1930	.15	.08	.15
Reach 2	1855	.15	.08	.15
Reach 2	1769	.15	.08	.15
Reach 2	1683	.15	.08	.15
Reach 2	1609	.15	.08	.15
Reach 2	1598	.15	.08	.15
Reach 2	1582	Culvert		
Reach 2	1567	.15	.08	.15
Reach 2	1552	.15	.08	.15
Reach 2	1493	.15	.08	.15
Reach 2	1419	.15	.08	.15
Reach 2	1346	.15	.08	.15
Reach 4	3816	.15	.08	.15
Reach 4	3731	.15	.08	.15
Reach 4	3647	.15	.08	.15
Reach 4	3563	.15	.08	.15
Reach 4	3479	.15	.08	.15
Reach 4	3394	.15	.08	.15

Reach 4	3362	.15	.08	.15
Reach 4	3342	Culvert		
Reach 4	3322	.15	.08	.15
Reach 4	3309	.15	.08	.15
Reach 4	3231	.15	.08	.15
Reach 4	3074	.15	.08	.15
Reach 4	2978	.15	.08	.15
Reach 4	2884	.15	.08	.15
Reach 4	2788	.15	.08	.15
Reach 4	2774	.15	.08	.15
Reach 4	2750	Culvert		
Reach 4	2725	.15	.08	.15
Reach 4	2710	.15	.08	.15
Reach 4	2633	.15	.08	.15
Reach 4	2541	.15	.08	.15
Reach 4	2449	.15	.08	.15
Reach 4	2357	.15	.08	.15
Reach 4	2265	.15	.08	.15
Reach 4	2184	.15	.08	.15
Reach 4	2173	.15	.08	.15
Reach 4	2164	Culvert		
Reach 4	2144	.15	.08	.15
Reach 4	2132	.15	.08	.15
Reach 4	2070	.15	.08	.15
Reach 4	1997	.15	.08	.15
Reach 4	1933	.15	.08	.15
Reach 4	1924	.15	.08	.15
Reach 4	1912	Culvert		
Reach 4	1899	.15	.08	.15
Reach 4	1888	.15	.08	.15
Reach 4	1798	.15	.08	.15
Reach 4	1698	.15	.08	.15
Reach 4	1613	.15	.08	.15
Reach 4	1597	.15	.08	.15
Reach 4	1567	Culvert		
Reach 4	1538	.15	.08	.15
Reach 4	1527	.15	.08	.15
Reach 4	1467	.15	.08	.15
Reach 4	1397	.15	.08	.15
Reach 4	1325.5	.15	.08	.15
Reach 3	1244	.15	.08	.15
Reach 3	1181	.15	.08	.15
Reach 3	1159	.15	.08	.15
Reach 3	1155	Culvert		
Reach 3	1125	.15	.08	.15
Reach 3	1106	.15	.08	.15
Reach 3	1036	.15	.08	.15
Reach 3	946	.15	.08	.15

Reach 3	781	.15	.08	.15
Reach 3	767	.15	.08	.15
Reach 3	766	.15	.08	.15
Reach 3	745	Culvert		
Reach 3	724	.15	.08	.15
Reach 3	708	.15	.08	.15
Reach 3	631	.15	.08	.15
Reach 3	538	.15	.08	.15
Reach 3	457	.15	.08	.15
Reach 3	376	.15	.08	.15
Reach 3	296	.15	.08	.15
Reach 3	215	.15	.08	.15
Reach 3	129	.15	.08	.15
Reach 3	43	.15	.08	.15

SUMMARY OF REACH LENGTHS

River: Beamer Creek

Reach	River Sta.	Left	Channel	Right
Reach 5	1649	16.1	15.7	16.5
Reach 5	1633	36.8	36	36.5
Reach 5	1615	Culvert		
Reach 5	1597	19.4	19.6	16.6
Reach 5	1578	89.4	56.8	14.8
Reach 5	1521	39.6	59.5	73.4
Reach 5	1462	14.2	16.9	17.4
Reach 5	1445	62.6	52.6	54.9
Reach 5	1405	Culvert		
Reach 5	1392	17.3	18.3	17.3
Reach 5	1374	71.1	64	58.6
Reach 5	1310	32.7	41.6	43.9
Reach 5	1228	118.9	115.7	108
Reach 5	1152	12.5	14.6	10.7
Reach 5	1138	34	32.9	33
Reach 5	1121	Culvert		
Reach 5	1105	16.5	16.3	17.3
Reach 5	1089	71.5	67	62
Reach 5	1022	76.1	83.3	94.8
Reach 5	938	10.9	10.3	9.4
Reach 5	928	23.3	24	24.8
Reach 5	916	Culvert		
Reach 5	904	12	11	9.6
Reach 5	893	63.2	62.5	61.7

Reach 5	831	74.1	73.4	74
Reach 5	757	11.1	11.8	12.6
Reach 5	745	29.7	31.1	31.9
Reach 5	722	Culvert		
Reach 5	714	16.9	15.5	14.6
Reach 5	699	89.9	90.1	73.9
Reach 5	581	90.6	86.6	83.7
Reach 5	522	9	8.4	7.3
Reach 5	514	27	27	27
Reach 5	507	Culvert		
Reach 5	494	2.6	6.1	6.4
Reach 5	485	95.7	96.6	99.4
Reach 5	388	8.5	10.8	7.3
Reach 5	378	28.8	32.7	42.9
Reach 5	360	Culvert		
Reach 5	354	5.5	5.5	5.3
Reach 5	347	41.6	58.5	89.2
Reach 5	283	6	6.2	6.6
Reach 5	277	43.2	44	45.1
Reach 5	247	Culvert		
Reach 5	236	9.3	7.3	5.2
Reach 5	226	216.8	216.8	216.8
Reach 5	0	5	5	5

River: Walker Beamer Cr

Reach	River Sta.	Left	Channel	Right
Reach 1	47	30.1	31.3	32.1
Reach 1	16	16	16	16

River: Walker Creek

Reach	River Sta.	Left	Channel	Right
Reach 2	2523	7	6.4	5.9
Reach 2	2517	28.3	26.1	23.9
Reach 2	2504	Culvert		
Reach 2	2491	13.9	11.6	8.7
Reach 2	2479	77	79.5	82.7
Reach 2	2400	75.1	79.5	85.4
Reach 2	2320	75	79.5	88.9
Reach 2	2241	66.8	71.9	82.8
Reach 2	2169	7.7	7.6	6.3
Reach 2	2161	30.1	30.7	31.2
Reach 2	2146	Culvert		

Reach 2	2131	11.5	10.9	9
Reach 2	2120	73.9	69.3	59
Reach 2	2050	69.5	80.2	86.8
Reach 2	1970	9.8	9	8.7
Reach 2	1961	23.2	23.8	24.7
Reach 2	1950	Culvert		
Reach 2	1940	10.1	10.1	10
Reach 2	1930	75.7	75.6	75.3
Reach 2	1855	81.8	85.7	81
Reach 2	1769	99	85.7	64.5
Reach 2	1683	62.9	74.2	85.3
Reach 2	1609	11.6	11.5	10.8
Reach 2	1598	30.7	30.9	34.3
Reach 2	1582	Culvert		
Reach 2	1567	11	14.4	13.3
Reach 2	1552	63.1	59.3	54.8
Reach 2	1493	58.9	73.7	84.5
Reach 2	1419	26.8	54.5	20.3
Reach 2	1346	16	16	16
Reach 4	3816	94.2	90.6	88
Reach 4	3731	84.5	83.8	82.9
Reach 4	3647	81.9	83.8	85.4
Reach 4	3563	81.8	83.8	85.3
Reach 4	3479	86.5	83.8	81.5
Reach 4	3394	32.2	32.3	32
Reach 4	3362	37.8	40.1	43
Reach 4	3342	Culvert		
Reach 4	3322	13.2	13.3	13.4
Reach 4	3309	79.7	77.7	74.9
Reach 4	3231	90.2	100.7	106.3
Reach 4	3074	162.6	148.6	140.8
Reach 4	2978	94.2	93.9	93.7
Reach 4	2884	77.1	93.9	113.8
Reach 4	2788	14.4	13.8	16.7
Reach 4	2774	51.3	49.4	52.9
Reach 4	2750	Culvert		
Reach 4	2725	15.2	15.3	16.5
Reach 4	2710	94.9	76.7	41.1
Reach 4	2633	73.6	92	109.6
Reach 4	2541	81.1	92	109.8
Reach 4	2449	104.9	92	71.4
Reach 4	2357	92.8	92	92
Reach 4	2265	11	19.9	15.6
Reach 4	2184	83.6	72.2	73.7
Reach 4	2173	29.3	29.4	29.4
Reach 4	2164	Culvert		
Reach 4	2144	11	11.6	12.2
Reach 4	2132	58.3	61.7	65

Reach 4	2070	67.9	73.2	79.5
Reach 4	1997	57.2	64	71.5
Reach 4	1933	9.2	9.3	9.4
Reach 4	1924	28.9	25.8	22.4
Reach 4	1912	Culvert		
Reach 4	1899	9.9	10.5	11.1
Reach 4	1888	114.3	89.4	55.4
Reach 4	1798	90	99.9	104.6
Reach 4	1698	60.4	84.2	111
Reach 4	1613	11.9	15.7	10.9
Reach 4	1597	55.3	59.1	55.5
Reach 4	1567	Culvert		
Reach 4	1538	10.2	10.8	12.8
Reach 4	1527	78.8	60	43.6
Reach 4	1467	81.3	70.8	56.1
Reach 4	1397	82.5	70.8	62.7
Reach 4	1325.5	32	32	32
Reach 3	1244	116	112.7	104.1
Reach 3	1181	10.5	12.8	12.8
Reach 3	1159	34.2	33.8	26.2
Reach 3	1155	Culvert		
Reach 3	1125	11	9.4	6.5
Reach 3	1106	72.8	89.4	93.8
Reach 3	1036	94.7	89.7	82.4
Reach 3	946	105.9	102.3	97.4
Reach 3	781	58.4	70.8	73.3
Reach 3	767	6.4	6.3	6.2
Reach 3	766	48.6	42.4	41.4
Reach 3	745	Culvert		
Reach 3	724	21.6	16.4	16
Reach 3	708	95.6	76.8	71.1
Reach 3	631	104.1	104.1	104.1
Reach 3	538	69.8	69.8	69.8
Reach 3	457	92.2	80.7	62.4
Reach 3	376	91.7	80.7	68
Reach 3	296	78.7	69.5	73.3
Reach 3	215	83.5	97	90
Reach 3	129	86.4	85.7	92.2
Reach 3	43	47	47	47

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Beamer Creek

Reach	River Sta.	Contr.	Expan.

Reach 5	1649	.1	.3
Reach 5	1633	.6	.8
Reach 5	1615	Culvert	
Reach 5	1597	.6	.8
Reach 5	1578	.6	.8
Reach 5	1521	.1	.3
Reach 5	1462	.1	.3
Reach 5	1445	.6	.8
Reach 5	1405	Culvert	
Reach 5	1392	.6	.8
Reach 5	1374	.1	.3
Reach 5	1310	.1	.3
Reach 5	1228	.1	.3
Reach 5	1152	.1	.3
Reach 5	1138	.6	.8
Reach 5	1121	Culvert	
Reach 5	1105	.6	.8
Reach 5	1089	.1	.3
Reach 5	1022	.1	.3
Reach 5	938	.1	.3
Reach 5	928	.6	.8
Reach 5	916	Culvert	
Reach 5	904	.6	.8
Reach 5	893	.1	.3
Reach 5	831	.1	.3
Reach 5	757	.1	.3
Reach 5	745	.6	.8
Reach 5	722	Culvert	
Reach 5	714	.6	.8
Reach 5	699	.1	.3
Reach 5	581	.1	.3
Reach 5	522	.1	.3
Reach 5	514	.6	.8
Reach 5	507	Culvert	
Reach 5	494	.6	.8
Reach 5	485	.1	.3
Reach 5	388	.1	.3
Reach 5	378	.6	.8
Reach 5	360	Culvert	
Reach 5	354	.6	.8
Reach 5	347	.6	.8
Reach 5	283	.1	.3
Reach 5	277	.6	.8
Reach 5	247	Culvert	
Reach 5	236	.6	.8
Reach 5	226	.1	.3
Reach 5	0	.1	.3

River: Walker Beamer Cr

Reach	River Sta.	Contr.	Expan.
Reach 1	47	.1	.3
Reach 1	16	.1	.3

River: Walker Creek

Reach	River Sta.	Contr.	Expan.
Reach 2	2523	.1	.3
Reach 2	2517	.6	.8
Reach 2	2504	Culvert	
Reach 2	2491	.6	.8
Reach 2	2479	.1	.3
Reach 2	2400	.1	.3
Reach 2	2320	.1	.3
Reach 2	2241	.1	.3
Reach 2	2169	.1	.3
Reach 2	2161	.6	.8
Reach 2	2146	Culvert	
Reach 2	2131	.6	.8
Reach 2	2120	.1	.3
Reach 2	2050	.1	.3
Reach 2	1970	.1	.3
Reach 2	1961	.6	.8
Reach 2	1950	Culvert	
Reach 2	1940	.6	.8
Reach 2	1930	.1	.3
Reach 2	1855	.1	.3
Reach 2	1769	.1	.3
Reach 2	1683	.1	.3
Reach 2	1609	.1	.3
Reach 2	1598	.6	.8
Reach 2	1582	Culvert	
Reach 2	1567	.6	.8
Reach 2	1552	.1	.3
Reach 2	1493	.1	.3
Reach 2	1419	.1	.3
Reach 2	1346	.1	.3
Reach 4	3816	.1	.3
Reach 4	3731	.1	.3
Reach 4	3647	.1	.3
Reach 4	3563	.1	.3

Reach 4	3479	.1	.3
Reach 4	3394	.1	.3
Reach 4	3362	.6	.8
Reach 4	3342	Culvert	
Reach 4	3322	.6	.8
Reach 4	3309	.1	.3
Reach 4	3231	.6	.8
Reach 4	3074	.1	.3
Reach 4	2978	.1	.3
Reach 4	2884	.1	.3
Reach 4	2788	.1	.3
Reach 4	2774	.6	.8
Reach 4	2750	Culvert	
Reach 4	2725	.6	.8
Reach 4	2710	.1	.3
Reach 4	2633	.1	.3
Reach 4	2541	.1	.3
Reach 4	2449	.1	.3
Reach 4	2357	.1	.3
Reach 4	2265	.1	.3
Reach 4	2184	.6	.8
Reach 4	2173	.6	.8
Reach 4	2164	Culvert	
Reach 4	2144	.6	.8
Reach 4	2132	.6	.8
Reach 4	2070	.1	.3
Reach 4	1997	.1	.3
Reach 4	1933	.1	.3
Reach 4	1924	.6	.8
Reach 4	1912	Culvert	
Reach 4	1899	.6	.8
Reach 4	1888	.1	.3
Reach 4	1798	.1	.3
Reach 4	1698	.1	.3
Reach 4	1613	.1	.3
Reach 4	1597	.6	.8
Reach 4	1567	Culvert	
Reach 4	1538	.6	.8
Reach 4	1527	.1	.3
Reach 4	1467	.1	.3
Reach 4	1397	.1	.3
Reach 4	1325.5	.1	.3
Reach 3	1244	.1	.3
Reach 3	1181	.1	.3
Reach 3	1159	.6	.8
Reach 3	1155	Culvert	
Reach 3	1125	.6	.8
Reach 3	1106	.1	.3

Reach 3	1036	.1	.3
Reach 3	946	.1	.3
Reach 3	781	.1	.3
Reach 3	767	.1	.3
Reach 3	766	.6	.8
Reach 3	745	Culvert	
Reach 3	724	.6	.8
Reach 3	708	.1	.3
Reach 3	631	.1	.3
Reach 3	538	.1	.3
Reach 3	457	.1	.3
Reach 3	376	.1	.3
Reach 3	296	.1	.3
Reach 3	215	.1	.3
Reach 3	129	.1	.3
Reach 3	43	.1	.3

Profile Output Table - Culvert Only

River	Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
								(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Beamer Creek	Reach 5	247	Culvert #1	100 Year_SCS 24	79.16	79.12	78.81	79.16	80.77	7.20	0.21	1.67	1.68
Beamer Creek	Reach 5	247	Culvert #1	Future Scenario	79.31	79.27	79.03	79.31	80.77	8.64	0.28	1.91	1.92
Beamer Creek	Reach 5	360	Culvert #1	100 Year_SCS 24	79.89	79.87	79.13	79.89	82.80	7.20	0.66	1.94	1.94
Beamer Creek	Reach 5	360	Culvert #1	Future Scenario	80.35	80.33	79.35	80.35	82.80	8.64	0.96	2.33	2.33

Beamer Creek	Reach 5	507	Culvert #1	100 Year_SCS 24				80.67
80.65	79.69	80.67		82.55	7.20			0.67
2.04		2.04						
Beamer Creek	Reach 5	507	Culvert #1	Future Scenario				81.39
81.38	79.93	81.39		82.55	8.64			0.97
2.45		2.45						
Beamer Creek	Reach 5	722	Culvert #1	100 Year_SCS 24				81.60
81.57	81.60	81.66		83.20	7.20			0.43
2.77		1.82						
Beamer Creek	Reach 5	722	Culvert #1	Future Scenario				81.84
81.80	81.78	81.84		83.20	8.64			0.24
2.22		1.61						
Beamer Creek	Reach 5	916	Culvert #1	100 Year_SCS 24				82.54
82.47	82.43	82.54		84.07	7.20			0.15
1.87		1.48						
Beamer Creek	Reach 5	916	Culvert #1	Future Scenario				82.72
82.64	82.60	82.72		84.07	8.64			0.17
1.98		1.61						
Beamer Creek	Reach 5	1121	Culvert #1	100 Year_SCS 24				83.75
83.71	83.67	83.75		85.02	7.20			0.24
1.92		1.84						
Beamer Creek	Reach 5	1121	Culvert #1	Future Scenario				83.91
83.87	83.85	83.91		85.02	8.64			0.29
2.10		2.02						
Beamer Creek	Reach 5	1405	Culvert #1	100 Year_SCS 24				85.42
85.39	85.04	85.42		85.49	7.02			0.65
1.97		2.04						
Beamer Creek	Reach 5	1405	Culvert #1	Future Scenario				85.67
85.63	85.32	85.67		85.49	7.50	0.92		0.76
2.07		2.10						
Beamer Creek	Reach 5	1615	Culvert #1	100 Year_SCS 24				85.90
85.87	85.62	85.90		85.61	5.13	1.89		0.31

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      2.01          2.01
Beamer Creek   Reach 5       1615     Culvert #1     Future Scenario      86.01
 85.97     85.80     86.01              85.61          4.19     4.23       0.19
      1.64          1.64



Walker Creek   Reach 3       745      Culvert #1     100 Year_SCS 24      82.14
 82.08     81.93     82.14              83.89          17.72                1.26
      2.88          3.47
Walker Creek   Reach 3       745      Culvert #1     Future Scenario      82.68
 82.63     82.37     82.68              83.89          21.26                1.69
      3.31          3.94



Walker Creek   Reach 3       1155     Culvert #1     100 Year_SCS 24      84.09
 84.09     84.09     83.97              84.08          16.32     0.26       1.40
      3.40          4.88
Walker Creek   Reach 3       1155     Culvert #1     Future Scenario      84.18
 84.17     84.20     84.18              84.08          17.48     2.41       1.21
      3.64          3.64



Walker Creek   Reach 4       1567     Culvert #1     100 Year_SCS 24      84.94
 84.90     84.38     84.94              86.36          13.98                0.38
      1.92          1.82
Walker Creek   Reach 4       1567     Culvert #1     Future Scenario      85.25
 85.21     84.67     85.25              86.36          16.77                0.53
      2.20          2.15



Walker Creek   Reach 4       1912     Culvert #1     100 Year_SCS 24      85.40
 85.35     85.39     85.40              85.08          4.92     2.85       0.15
      1.36          1.36
Walker Creek   Reach 4       1912     Culvert #1     Future Scenario      85.46
 85.42     85.44     85.46              85.08          1.80    12.82       0.01
      0.50          0.50



Walker Creek   Reach 4       2164     Culvert #1     100 Year_SCS 24      86.38
 86.33     86.28     86.38              85.57          2.78     9.40       0.07
      1.08          1.08
Walker Creek   Reach 4       2164     Culvert #1     Future Scenario      86.49
 86.42     86.44     86.49              85.57          2.29    12.32       0.02
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0.89		0.89										
Walker Creek	Reach 4		2750	Culvert #1	100 Year_SCS 24	88.87						
88.81	88.69	88.87		89.61	12.18	0.41						
2.48		2.34										
Walker Creek	Reach 4		2750	Culvert #1	Future Scenario	89.11						
89.04	88.94	89.11		89.61	14.61	0.51						
2.75		2.61										
Walker Creek	Reach 4		3342	Culvert #1	100 Year_SCS 24	90.94						
90.92	90.24	90.94		91.31	11.70	0.21						
1.67		1.67										
Walker Creek	Reach 4		3342	Culvert #1	Future Scenario	91.18						
91.15	90.45	91.18		91.31	14.04	0.31						
2.00		2.00										
Walker Creek	Reach 2		1582	Culvert #1	100 Year_SCS 24	84.70						
84.67	84.23	84.70		86.01	5.17	0.24						
1.41		1.44										
Walker Creek	Reach 2		1582	Culvert #1	Future Scenario	84.91						
84.88	84.41	84.91		86.01	6.20	0.32						
1.60		1.63										
Walker Creek	Reach 2		1950	Culvert #1	100 Year_SCS 24	86.64						
86.52	86.52	86.64		88.11	5.05	0.82						
2.32		2.92										
Walker Creek	Reach 2		1950	Culvert #1	Future Scenario	86.86						
86.73	86.75	86.86		88.11	6.06	0.89						
2.47		3.12										
Walker Creek	Reach 2		2146	Culvert #1	100 Year_SCS 24	87.68						
87.65	87.50	87.68		88.41	5.05	0.36						
2.10		2.10										
Walker Creek	Reach 2		2146	Culvert #1	Future Scenario	87.98						
87.95	87.81	87.98		88.41	6.06	0.53						
2.52		2.52										

Walker Creek	Reach 2	2504	Culvert #1	100 Year_SCS 24	89.82	89.79	89.51	89.82	89.87	5.05		0.40
					2.21	2.21						
Walker Creek	Reach 2	2504	Culvert #1	Future Scenario	89.94	89.91	89.87	89.94	89.87	4.92	1.14	0.38
					2.15	2.15						

Profile Output Table - Standard Table 1

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Beamer Creek	Reach 5	0	100 Year_SCS 24	7.20	74.55	76.64		76.66	0.002022	0.60	12.43	14.45	0.17
Beamer Creek	Reach 5	0	Future Scenario	8.64	74.55	76.84		76.86	0.001718	0.61	15.61	17.02	0.16
Beamer Creek	Reach 5	226	100 Year_SCS 24	7.20	76.91	78.56	78.56	78.79	0.076004	2.40	4.56	10.08	0.66
Beamer Creek	Reach 5	226	Future Scenario	8.64	76.91	78.63	78.63	78.87	0.079359	2.54	5.30	10.49	0.68
Beamer Creek	Reach 5	236	100 Year_SCS 24	7.20	77.10	78.91	77.87	78.96	0.003353	1.07	8.56	6.35	0.26
Beamer Creek	Reach 5	236	Future Scenario	8.64	77.10	78.99	77.96	79.06	0.004132	1.23	9.03	6.49	0.29

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  Beamer Creek       Reach 5       247                              Culvert



  Beamer Creek       Reach 5       277           100 Year_SCS 24      7.20
77.14       79.12       77.90       79.15     0.002244       0.83        9.32
26.17           0.19
  Beamer Creek       Reach 5       277           Future Scenario      8.64
77.14       79.27       77.98       79.31     0.002484       0.92       10.13
28.21           0.21



  Beamer Creek       Reach 5       283           100 Year_SCS 24      7.20
77.15       79.16                   79.16     0.000618       0.41       26.92
28.49           0.10
  Beamer Creek       Reach 5       283           Future Scenario      8.64
77.15       79.31                   79.32     0.000602       0.43       31.48
29.62           0.10



  Beamer Creek       Reach 5       347           100 Year_SCS 24      7.20
77.65       79.20                   79.22     0.001137       0.56       14.80
11.37           0.14
  Beamer Creek       Reach 5       347           Future Scenario      8.64
77.65       79.36                   79.38     0.001174       0.61       16.61
11.74           0.15



  Beamer Creek       Reach 5       354           100 Year_SCS 24      7.20
77.65       79.21       78.11       79.23     0.001427       0.63       11.52
11.38           0.16
  Beamer Creek       Reach 5       354           Future Scenario      8.64
77.65       79.36       78.17       79.39     0.001494       0.69       12.67
11.75           0.17



  Beamer Creek       Reach 5       360                              Culvert
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  Beamer Creek       Reach 5       378           100 Year_SCS 24      7.20
77.70       79.87       78.27       79.89     0.000798       0.59       14.18
 7.86           0.13
  Beamer Creek       Reach 5       378           Future Scenario      8.64
77.70       80.33       78.34       80.35     0.000594       0.58       17.62
19.13           0.11



  Beamer Creek       Reach 5       388           100 Year_SCS 24      7.20
77.70       79.88                   79.90     0.000792       0.59       14.36
 7.87           0.13
  Beamer Creek       Reach 5       388           Future Scenario      8.64
77.70       80.34                   80.35     0.000596       0.58       20.11
19.24           0.11



  Beamer Creek       Reach 5       485           100 Year_SCS 24      7.20
77.85       79.97                   80.01     0.001568       0.82       10.79
 6.25           0.18
  Beamer Creek       Reach 5       485           Future Scenario      8.64
77.85       80.40                   80.44     0.001194       0.81       13.57
 6.73           0.16



  Beamer Creek       Reach 5       494           100 Year_SCS 24      7.20
77.85       79.98       78.55       80.02     0.001544       0.81       10.85
 6.26           0.18
  Beamer Creek       Reach 5       494           Future Scenario      8.64
77.85       80.41       78.64       80.44     0.001182       0.80       13.62
 6.74           0.16



  Beamer Creek       Reach 5       507                           Culvert



  Beamer Creek       Reach 5       514           100 Year_SCS 24      7.20
78.00       80.65       78.66       80.67     0.000623       0.60       15.38
 7.41           0.12
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  Beamer Creek       Reach 5       514           Future Scenario      8.64
78.00       81.38       78.75       81.39     0.000383       0.55       21.12
 8.39           0.10



  Beamer Creek       Reach 5       522           100 Year_SCS 24      7.20
78.00       80.66                   80.67     0.000619       0.60       15.42
 7.42           0.12
  Beamer Creek       Reach 5       522           Future Scenario      8.64
78.00       81.38                   81.40     0.000382       0.55       21.15
 8.40           0.10



  Beamer Creek       Reach 5       581           100 Year_SCS 24      7.20
78.56       80.74                   80.77     0.002203       0.88       18.29
21.96           0.20
  Beamer Creek       Reach 5       581           Future Scenario      8.64
78.56       81.43                   81.44     0.000624       0.57       37.19
31.85           0.11



  Beamer Creek       Reach 5       699           100 Year_SCS 24      7.20
79.90       81.03                   81.10     0.006717       1.11        7.20
 7.20           0.33
  Beamer Creek       Reach 5       699           Future Scenario      8.64
79.90       81.51                   81.55     0.002900       0.93       10.82
 7.91           0.23



  Beamer Creek       Reach 5       714           100 Year_SCS 24      7.20
79.90       81.14       80.46       81.19     0.004957       1.02        7.97
 7.35           0.29
  Beamer Creek       Reach 5       714           Future Scenario      8.64
79.90       81.56       80.53       81.60     0.002629       0.90       11.19
 7.98           0.22



  Beamer Creek       Reach 5       722                           Culvert
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  Beamer Creek       Reach 5       745           100 Year_SCS 24      7.20
80.25       81.57       80.75       81.60     0.003049       0.83        8.69
 9.24           0.23
  Beamer Creek       Reach 5       745           Future Scenario      8.64
80.25       81.80       80.81       81.84     0.002549       0.85       10.23
 9.71           0.22



  Beamer Creek       Reach 5       757           100 Year_SCS 24      7.20
80.25       81.61                   81.63     0.002472       0.76       10.80
 9.32           0.21
  Beamer Creek       Reach 5       757           Future Scenario      8.64
80.25       81.84                   81.86     0.002081       0.78       12.98
 9.78           0.20



  Beamer Creek       Reach 5       831           100 Year_SCS 24      7.20
80.55       81.85                   81.90     0.005297       1.00        8.36
10.35           0.29
  Beamer Creek       Reach 5       831           Future Scenario      8.64
80.55       82.04                   82.09     0.004509       1.01       10.46
11.77           0.27



  Beamer Creek       Reach 5       893           100 Year_SCS 24      7.20
80.85       82.22                   82.32     0.008215       1.40        5.92
 5.03           0.38
  Beamer Creek       Reach 5       893           Future Scenario      8.64
80.85       82.37                   82.48     0.008368       1.51        6.67
 5.18           0.39



  Beamer Creek       Reach 5       904           100 Year_SCS 24      7.20
80.85       82.32       81.58       82.41     0.006439       1.30        6.44
 5.14           0.34
  Beamer Creek       Reach 5       904           Future Scenario      8.64
80.85       82.47       81.68       82.57     0.006645       1.41        7.22
 5.29           0.35



  Beamer Creek       Reach 5       916                              Culvert
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  Beamer Creek       Reach 5       928          100 Year_SCS 24      7.20
81.10       82.47       81.75       82.54     0.005677       1.16        6.93
 5.73           0.32
  Beamer Creek       Reach 5       928          Future Scenario      8.64
81.10       82.64       81.83       82.72     0.005434       1.23        7.95
 5.90           0.32



  Beamer Creek       Reach 5       938          100 Year_SCS 24      7.20
81.10       82.53                   82.59     0.004902       1.11        7.28
 5.79           0.30
  Beamer Creek       Reach 5       938          Future Scenario      8.64
81.10       82.70                   82.77     0.004788       1.18        8.30
 5.95           0.30



  Beamer Creek       Reach 5       1022         100 Year_SCS 24      7.20
81.68       82.91                   82.94     0.003579       0.78       10.15
11.30           0.23
  Beamer Creek       Reach 5       1022         Future Scenario      8.64
81.68       83.07                   83.10     0.003257       0.81       12.01
12.31           0.23



  Beamer Creek       Reach 5       1089         100 Year_SCS 24      7.20
82.14       83.27                   83.37     0.012476       1.45        6.35
11.08           0.44
  Beamer Creek       Reach 5       1089         Future Scenario      8.64
82.14       83.39                   83.50     0.011709       1.51        7.82
12.26           0.44



  Beamer Creek       Reach 5       1105         100 Year_SCS 24      7.20
82.25       83.46       82.88       83.54     0.007663       1.25        6.45
 6.02           0.36
  Beamer Creek       Reach 5       1105         Future Scenario      8.64
82.25       83.57       82.95       83.67     0.008242       1.37        7.11
 6.14           0.38
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Beamer Creek Reach 5 1121 Culvert

Beamer Creek Reach 5 1138 100 Year_SCS 24 7.20
82.30 83.71 82.93 83.75 0.005047 0.92 8.65
11.13 0.26
Beamer Creek Reach 5 1138 Future Scenario 8.64
82.30 83.87 83.01 83.91 0.004605 0.96 10.33
13.49 0.26

Beamer Creek Reach 5 1152 100 Year_SCS 24 7.20
82.30 83.78 83.81 0.004122 0.87 9.53
12.09 0.24
Beamer Creek Reach 5 1152 Future Scenario 8.64
82.30 83.93 83.97 0.003887 0.91 11.63
15.86 0.24

Beamer Creek Reach 5 1228 100 Year_SCS 24 7.02
82.54 84.23 84.25 0.003511 0.81 16.24
23.45 0.23
Beamer Creek Reach 5 1228 Future Scenario 8.42
82.54 84.36 84.38 0.003238 0.83 19.41
25.09 0.22

Beamer Creek Reach 5 1310 100 Year_SCS 24 7.02
82.85 84.34 84.36 0.002009 0.67 22.43
31.35 0.18
Beamer Creek Reach 5 1310 Future Scenario 8.42
82.85 84.47 84.48 0.001970 0.71 26.60
35.17 0.18

Beamer Creek Reach 5 1374 100 Year_SCS 24 7.02
83.15 84.53 84.64 0.010838 1.61 5.95
5.93 0.44
Beamer Creek Reach 5 1374 Future Scenario 8.42
83.15 84.64 84.78 0.011736 1.77 6.63
6.19 0.46

Beamer Creek	Reach 5	1392	100 Year_SCS 24	7.02					
83.15	84.73	83.99	84.81	0.006571	1.38	7.20			
6.40	0.35								
Beamer Creek	Reach 5	1392	Future Scenario	8.42					
83.15	84.87	84.09	84.96	0.006920	1.49	8.09			
6.72	0.36								
Beamer Creek	Reach 5	1405	Culvert						
Beamer Creek	Reach 5	1445	100 Year_SCS 24	7.02					
83.30	85.39	84.01	85.42	0.001699	0.84	10.89			
6.85	0.19								
Beamer Creek	Reach 5	1445	Future Scenario	8.42					
83.30	85.63	84.11	85.67	0.001694	0.90	12.88			
9.77	0.19								
Beamer Creek	Reach 5	1462	100 Year_SCS 24	7.02					
83.30	85.41		85.45	0.001623	0.83	11.09			
6.99	0.18								
Beamer Creek	Reach 5	1462	Future Scenario	8.42					
83.30	85.66		85.70	0.001620	0.89	13.17			
10.16	0.19								
Beamer Creek	Reach 5	1521	100 Year_SCS 24	7.02					
83.52	85.49		85.49	0.000426	0.36	34.08			
33.45	0.09								
Beamer Creek	Reach 5	1521	Future Scenario	8.42					
83.52	85.73		85.74	0.000354	0.36	42.89			
38.93	0.08								
Beamer Creek	Reach 5	1578	100 Year_SCS 24	7.02					
83.75	85.53		85.54	0.001385	0.53	19.24			
60.78	0.15								

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  Beamer Creek       Reach 5       1578          Future Scenario      8.42
83.75       85.76                  85.77     0.000823       0.45       35.88
82.94           0.12



  Beamer Creek       Reach 5       1597          100 Year_SCS 24      7.02
83.75       85.56       84.39      85.57     0.001322       0.52       17.11
62.12           0.14
  Beamer Creek       Reach 5       1597          Future Scenario      8.42
83.75       85.78       84.46      85.79     0.000774       0.44       37.24
84.49           0.11



  Beamer Creek       Reach 5       1615                           Culvert



  Beamer Creek       Reach 5       1633          100 Year_SCS 24      7.02
83.80       85.87       84.49      85.90     0.003034       0.77       10.21
13.78           0.18
  Beamer Creek       Reach 5       1633          Future Scenario      8.42
83.80       85.97       84.58      86.01     0.003479       0.85       12.83
37.86           0.19



  Beamer Creek       Reach 5       1649          100 Year_SCS 24      7.02
85.75       86.24       86.24      86.39     0.079560       2.10        5.60
19.58           0.99
  Beamer Creek       Reach 5       1649          Future Scenario      8.42
85.75       86.28       86.28      86.45     0.078230       2.22        6.52
21.01           1.00



  Walker Beamer Cr   Reach 1       16            100 Year_SCS 24     24.40
74.04       75.26       75.26      75.80     0.059648       3.31        8.12
 8.13           0.99
  Walker Beamer Cr   Reach 1       16            Future Scenario     29.28
74.04       75.40       75.40      76.01     0.057652       3.52        9.28
 8.46           1.00
```

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  Walker Beamer Cr   Reach 1       47            100 Year_SCS 24     24.40
74.13       76.35       75.59       76.51     0.010904       1.81       15.93
13.13           0.42
  Walker Beamer Cr   Reach 1       47            Future Scenario     29.28
74.13       76.54       75.75       76.72     0.010966       1.94       18.51
14.52           0.43



  Walker Creek       Reach 3       43            100 Year_SCS 24     17.72
75.13       76.91                   77.12     0.019089       2.36       12.00
11.58           0.59
  Walker Creek       Reach 3       43            Future Scenario     21.26
75.13       77.09                   77.32     0.018401       2.49       14.27
13.18           0.59



  Walker Creek       Reach 3       129           100 Year_SCS 24     17.72
75.63       77.79                   77.85     0.004641       1.36       26.94
38.06           0.30
  Walker Creek       Reach 3       129           Future Scenario     21.26
75.63       77.95                   78.01     0.004291       1.38       33.21
39.00           0.30



  Walker Creek       Reach 3       215           100 Year_SCS 24     17.72
76.03       78.26                   78.30     0.004853       1.20       36.09
65.17           0.27
  Walker Creek       Reach 3       215           Future Scenario     21.26
76.03       78.38                   78.42     0.004441       1.20       44.43
68.26           0.26



  Walker Creek       Reach 3       296           100 Year_SCS 24     17.72
76.46       78.61                   78.65     0.004865       1.05       31.93
43.27           0.27
  Walker Creek       Reach 3       296           Future Scenario     21.26
76.46       78.72                   78.76     0.004925       1.11       36.56
44.01           0.28



  Walker Creek       Reach 3       376           100 Year_SCS 24     17.72
76.82       79.01                   79.03     0.005102       0.98       37.95
52.18           0.25
```

Walker Creek Reach 3 376 Future Scenario 21.26
76.82 79.11 79.14 0.004979 1.02 43.42
52.53 0.25

Walker Creek Reach 3 457 100 Year_SCS 24 17.72
77.21 79.43 79.47 0.006625 1.23 28.80
44.20 0.29
Walker Creek Reach 3 457 Future Scenario 21.26
77.21 79.53 79.58 0.006869 1.30 33.55
46.22 0.30

Walker Creek Reach 3 538 100 Year_SCS 24 17.72
77.59 79.75 79.79 0.003307 1.02 31.79
41.18 0.24
Walker Creek Reach 3 538 Future Scenario 21.26
77.59 79.87 79.91 0.003448 1.08 36.74
42.44 0.24

Walker Creek Reach 3 631 100 Year_SCS 24 17.72
78.39 80.19 80.26 0.006338 1.38 24.56
36.54 0.33
Walker Creek Reach 3 631 Future Scenario 21.26
78.39 80.32 80.39 0.006187 1.43 29.31
37.93 0.33

Walker Creek Reach 3 708 100 Year_SCS 24 17.72
79.19 80.71 80.06 80.79 0.007239 1.34 18.78
27.92 0.36
Walker Creek Reach 3 708 Future Scenario 21.26
79.19 80.83 80.17 80.91 0.007125 1.40 24.11
36.65 0.36

Walker Creek Reach 3 724 100 Year_SCS 24 17.72
79.19 80.82 80.07 80.90 0.006135 1.30 15.33
36.63 0.33
Walker Creek Reach 3 724 Future Scenario 21.26
79.19 80.94 80.17 81.04 0.006842 1.44 16.62
37.36 0.36

Walker Creek	Reach 3	745					Culvert		
Walker Creek	Reach 3	766	100 Year_SCS 24				17.72		
79.27	82.08	80.38	82.14	0.002162	1.16	20.10			
45.84	0.22								
Walker Creek	Reach 3	766	Future Scenario				21.26		
79.27	82.63	80.51	82.68	0.001653	1.14	24.70			
52.23	0.20								
Walker Creek	Reach 3	767	100 Year_SCS 24				17.72		
79.30	82.14		82.15	0.000428	0.52	79.50			
52.95	0.10								
Walker Creek	Reach 3	767	Future Scenario				21.26		
79.30	82.69		82.69	0.000251	0.44	108.62			
54.33	0.08								
Walker Creek	Reach 3	781	100 Year_SCS 24				17.72		
79.40	82.18		82.19	0.000715	0.61	61.45			
44.65	0.12								
Walker Creek	Reach 3	781	Future Scenario				21.26		
79.40	82.71		82.71	0.000414	0.53	86.17			
48.85	0.10								
Walker Creek	Reach 3	946	100 Year_SCS 24				16.57		
80.20	82.28		82.31	0.002068	0.91	40.32			
43.45	0.20								
Walker Creek	Reach 3	946	Future Scenario				19.89		
80.20	82.76		82.78	0.000980	0.72	63.23			
50.99	0.14								
Walker Creek	Reach 3	1036	100 Year_SCS 24				16.57		
80.69	82.45	81.76	82.46	0.001316	0.64	60.64			
70.46	0.16								

Walker Creek	Reach 3	1036	Future Scenario					19.89
80.69	82.84	81.81	82.85	0.000622	0.51	88.87		
71.88	0.11							
Walker Creek	Reach 3	1106	100 Year_SCS 24					16.57
81.00	82.60		82.72	0.008753	1.60	12.89		
12.05	0.40							
Walker Creek	Reach 3	1106	Future Scenario					19.89
81.00	82.89		83.00	0.006882	1.59	21.74		
46.03	0.37							
Walker Creek	Reach 3	1125	100 Year_SCS 24					16.57
81.18	82.69	82.12	82.87	0.013254	1.89	8.75		
17.64	0.49							
Walker Creek	Reach 3	1125	Future Scenario					19.89
81.18	82.96	82.24	83.15	0.011066	1.93	10.31		
49.57	0.46							
Walker Creek	Reach 3	1155	Culvert					
Walker Creek	Reach 3	1159	100 Year_SCS 24					16.57
81.18	84.09	82.18	84.10	0.000556	0.53	60.98		
53.56	0.10							
Walker Creek	Reach 3	1159	Future Scenario					19.89
81.18	84.17	82.29	84.18	0.000681	0.60	65.53		
55.01	0.11							
Walker Creek	Reach 3	1181	100 Year_SCS 24					16.57
81.25	84.09		84.10	0.000568	0.53	60.94		
53.68	0.10							
Walker Creek	Reach 3	1181	Future Scenario					19.89
81.25	84.18		84.19	0.000692	0.60	65.58		
55.15	0.12							

Walker Creek	Reach 3	1244	100 Year_SCS 24	16.57	81.49	84.17		84.18	0.000803	0.54	59.29	63.07	0.12
Walker Creek	Reach 3	1244	Future Scenario	19.89	81.49	84.27		84.28	0.000899	0.59	65.55	63.70	0.13
Walker Creek	Reach 4	1325.5	100 Year_SCS 24	13.98	81.43	84.19		84.19	0.000418	0.43	61.23	42.83	0.09
Walker Creek	Reach 4	1325.5	Future Scenario	16.77	81.43	84.29		84.30	0.000499	0.48	65.63	43.59	0.10
Walker Creek	Reach 4	1397	100 Year_SCS 24	13.98	81.64	84.23		84.24	0.001130	0.67	35.83	37.78	0.14
Walker Creek	Reach 4	1397	Future Scenario	16.77	81.64	84.34		84.36	0.001294	0.74	40.06	40.26	0.16
Walker Creek	Reach 4	1467	100 Year_SCS 24	13.98	81.84	84.31		84.32	0.001046	0.70	45.79	40.84	0.14
Walker Creek	Reach 4	1467	Future Scenario	16.77	81.84	84.43		84.44	0.001151	0.76	50.74	41.87	0.15
Walker Creek	Reach 4	1527	100 Year_SCS 24	13.98	82.02	84.40		84.49	0.007696	1.39	13.41	13.38	0.32
Walker Creek	Reach 4	1527	Future Scenario	16.77	82.02	84.52		84.63	0.008591	1.53	15.15	14.55	0.34
Walker Creek	Reach 4	1538	100 Year_SCS 24	13.98	82.05	84.53	83.05	84.56	0.001680	0.78	23.08	17.67	0.17

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  Walker Creek       Reach 4       1538          Future Scenario     16.77
82.05       84.67       83.18       84.71     0.001876       0.86       25.72
18.89           0.18



  Walker Creek       Reach 4       1567                          Culvert




  Walker Creek       Reach 4       1597          100 Year_SCS 24     13.98
82.40       84.90       83.34       84.94     0.002268       0.88       15.81
60.63           0.19
  Walker Creek       Reach 4       1597          Future Scenario     16.77
82.40       85.21       83.46       85.25     0.002112       0.93       18.02
67.69           0.19



  Walker Creek       Reach 4       1613          100 Year_SCS 24     13.98
82.40       84.96                   84.97     0.000921       0.57       48.36
61.03           0.12
  Walker Creek       Reach 4       1613          Future Scenario     16.77
82.40       85.26                   85.27     0.000611       0.51       68.01
68.58           0.10



  Walker Creek       Reach 4       1698          100 Year_SCS 24     12.18
82.77       85.03                   85.04     0.000867       0.58       37.85
37.21           0.13
  Walker Creek       Reach 4       1698          Future Scenario     14.61
82.77       85.31                   85.32     0.000682       0.56       48.90
41.49           0.12



  Walker Creek       Reach 4       1798          100 Year_SCS 24     12.18
83.12       85.10                   85.11     0.000543       0.41       48.11
49.20           0.10
  Walker Creek       Reach 4       1798          Future Scenario     14.61
83.12       85.37                   85.38     0.000413       0.39       61.46
50.67           0.09
```

Walker Creek	Reach 4	1888	100 Year_SCS 24	12.18					
83.46	85.18		85.19	0.002075	0.63	33.71			
57.68	0.18								
Walker Creek	Reach 4	1888	Future Scenario	14.61					
83.46	85.42		85.43	0.001224	0.55	48.27			
60.35	0.14								
Walker Creek	Reach 4	1899	100 Year_SCS 24	12.18					
83.50	85.20		85.21	0.001798	0.62	35.39			
57.33	0.17								
Walker Creek	Reach 4	1899	Future Scenario	14.61					
83.50	85.43		85.44	0.001149	0.55	49.33			
60.54	0.14								
Walker Creek	Reach 4	1912	Culvert						
Walker Creek	Reach 4	1924	100 Year_SCS 24	12.18					
83.62	85.35	84.49	85.40	0.005566	1.01	12.52			
15.23	0.29								
Walker Creek	Reach 4	1924	Future Scenario	14.61					
83.62	85.42	84.59	85.46	0.004855	0.98	24.41			
57.53	0.27								
Walker Creek	Reach 4	1933	100 Year_SCS 24	12.18					
83.63	85.40		85.47	0.009471	1.33	17.51			
47.85	0.34								
Walker Creek	Reach 4	1933	Future Scenario	14.61					
83.63	85.46		85.54	0.010549	1.44	20.47			
50.94	0.36								
Walker Creek	Reach 4	1997	100 Year_SCS 24	12.18					
83.73	85.75		85.78	0.002827	0.76	22.03			
46.57	0.21								
Walker Creek	Reach 4	1997	Future Scenario	14.61					
83.73	85.84		85.87	0.002999	0.81	26.37			
49.76	0.22								

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  Walker Creek       Reach 4       2070          100 Year_SCS 24     12.18
83.84       85.95                   85.98     0.002570       0.79       18.87
37.33           0.20
  Walker Creek       Reach 4       2070          Future Scenario     14.61
83.84       86.05                   86.09     0.002783       0.85       23.04
42.76           0.21



  Walker Creek       Reach 4       2132          100 Year_SCS 24     12.18
84.00       86.15                   86.22     0.004873       1.17       12.10
11.62           0.27
  Walker Creek       Reach 4       2132          Future Scenario     14.61
84.00       86.28                   86.36     0.005598       1.31       13.77
18.22           0.29



  Walker Creek       Reach 4       2144          100 Year_SCS 24     12.18
83.95       86.26                   86.28     0.001690       0.68       22.01
30.86           0.17
  Walker Creek       Reach 4       2144          Future Scenario     14.61
83.95       86.41                   86.43     0.001728       0.73       27.44
41.50           0.17



  Walker Creek       Reach 4       2164                              Culvert



  Walker Creek       Reach 4       2173          100 Year_SCS 24     12.18
84.00       86.33       85.05       86.38     0.003538       1.05       14.73
22.34           0.23
  Walker Creek       Reach 4       2173          Future Scenario     14.61
84.00       86.42       85.17       86.49     0.004219       1.19       17.18
28.38           0.26



  Walker Creek       Reach 4       2184          100 Year_SCS 24     12.18
84.46       86.60                   86.65     0.003544       1.06       19.88
34.21           0.25
```

Walker Creek	Reach 4	2184	Future Scenario	14.61					
84.46	86.73		86.78	0.003463	1.09	24.76			
37.53	0.25								
Walker Creek	Reach 4	2265	100 Year_SCS 24	12.18					
84.46	86.67		86.71	0.003929	1.08	23.00			
31.93	0.24								
Walker Creek	Reach 4	2265	Future Scenario	14.61					
84.46	86.81		86.85	0.003863	1.12	27.51			
35.64	0.24								
Walker Creek	Reach 4	2357	100 Year_SCS 24	12.18					
84.91	87.00		87.04	0.003259	1.00	15.76			
20.45	0.23								
Walker Creek	Reach 4	2357	Future Scenario	14.61					
84.91	87.13		87.19	0.003472	1.08	18.81			
24.02	0.24								
Walker Creek	Reach 4	2449	100 Year_SCS 24	12.18					
85.37	87.38		87.47	0.006527	1.40	15.64			
34.78	0.32								
Walker Creek	Reach 4	2449	Future Scenario	14.61					
85.37	87.53		87.61	0.006011	1.41	21.23			
41.20	0.31								
Walker Creek	Reach 4	2541	100 Year_SCS 24	12.18					
85.83	87.81		87.83	0.002661	0.85	24.10			
23.21	0.21								
Walker Creek	Reach 4	2541	Future Scenario	14.61					
85.83	87.94		87.97	0.002778	0.92	27.21			
24.09	0.21								
Walker Creek	Reach 4	2633	100 Year_SCS 24	12.18					
86.28	88.07		88.10	0.003592	0.94	21.80			
32.24	0.24								
Walker Creek	Reach 4	2633	Future Scenario	14.61					
86.28	88.20		88.24	0.003511	0.98	26.43			
36.93	0.24								

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  Walker Creek       Reach 4       2710          100 Year_SCS 24     12.18
86.74       88.35                   88.38     0.003557       0.84       17.80
26.44           0.24
  Walker Creek       Reach 4       2710          Future Scenario     14.61
86.74       88.48                   88.51     0.003468       0.88       21.27
27.88           0.24



  Walker Creek       Reach 4       2725          100 Year_SCS 24     12.18
86.74       88.41       87.51       88.44     0.002979       0.79       19.29
27.07           0.22
  Walker Creek       Reach 4       2725          Future Scenario     14.61
86.74       88.53       87.60       88.57     0.002943       0.84       22.73
28.50           0.22



  Walker Creek       Reach 4       2750                          Culvert



  Walker Creek       Reach 4       2774          100 Year_SCS 24     12.18
86.77       88.81       87.72       88.87     0.003512       1.12       13.13
 8.95           0.26
  Walker Creek       Reach 4       2774          Future Scenario     14.61
86.77       89.04       87.82       89.11     0.003554       1.21       15.94
20.11           0.27



  Walker Creek       Reach 4       2788          100 Year_SCS 24     12.18
86.73       88.89                   88.91     0.002002       0.75       21.55
30.72           0.18
  Walker Creek       Reach 4       2788          Future Scenario     14.61
86.73       89.12                   89.15     0.001628       0.73       29.51
36.92           0.17



  Walker Creek       Reach 4       2884          100 Year_SCS 24     11.70
87.21       89.11                   89.13     0.002581       0.83       28.42
41.19           0.21
```

Walker Creek	Reach 4	2884	Future Scenario	14.04	87.21	89.30		89.32	0.002013	0.79	36.69	44.03	0.19
Walker Creek	Reach 4	2978	100 Year_SCS 24	11.70	87.65	89.40		89.41	0.003604	0.85	30.47	47.98	0.23
Walker Creek	Reach 4	2978	Future Scenario	14.04	87.65	89.53		89.55	0.003027	0.83	37.26	50.39	0.21
Walker Creek	Reach 4	3074	100 Year_SCS 24	11.70	88.03	90.09		90.17	0.007510	1.48	16.54	40.14	0.35
Walker Creek	Reach 4	3074	Future Scenario	14.04	88.03	90.19		90.28	0.008700	1.64	20.48	45.43	0.38
Walker Creek	Reach 4	3231	100 Year_SCS 24	11.70	88.44	90.53		90.55	0.001940	0.79	31.21	51.10	0.18
Walker Creek	Reach 4	3231	Future Scenario	14.04	88.44	90.65		90.68	0.001895	0.82	38.00	55.28	0.18
Walker Creek	Reach 4	3309	100 Year_SCS 24	11.70	88.64	90.68		90.72	0.002389	0.98	13.67	7.84	0.22
Walker Creek	Reach 4	3309	Future Scenario	14.04	88.64	90.80		90.86	0.002788	1.10	14.69	7.98	0.24
Walker Creek	Reach 4	3322	100 Year_SCS 24	11.70	88.64	90.71	89.40	90.75	0.002260	0.96	13.94	7.88	0.21
Walker Creek	Reach 4	3322	Future Scenario	14.04	88.64	90.84	89.49	90.90	0.002640	1.09	15.01	9.21	0.23

Walker Creek	Reach 4	3342							Culvert		
Walker Creek	Reach 4	3362		100 Year_SCS 24					11.70		
88.65	90.92		89.47	90.94	0.001292	0.78	24.66	19.58	0.16		
Walker Creek	Reach 4	3362		Future Scenario					14.04		
88.65	91.15		89.57	91.18	0.001242	0.81	28.60	22.34	0.16		
Walker Creek	Reach 4	3394		100 Year_SCS 24					11.70		
88.65	90.96			90.98	0.001292	0.79	26.05	20.07	0.16		
Walker Creek	Reach 4	3394		Future Scenario					14.04		
88.65	91.19			91.22	0.001258	0.83	31.06	22.80	0.17		
Walker Creek	Reach 4	3479		100 Year_SCS 24					11.70		
89.30	91.10			91.14	0.002832	0.99	18.64	16.38	0.23		
Walker Creek	Reach 4	3479		Future Scenario					14.04		
89.30	91.33			91.37	0.002624	1.03	22.63	19.23	0.23		
Walker Creek	Reach 4	3563		100 Year_SCS 24					11.70		
89.95	91.41			91.47	0.005400	1.18	14.45	14.71	0.31		
Walker Creek	Reach 4	3563		Future Scenario					14.04		
89.95	91.61			91.67	0.004849	1.22	17.58	16.91	0.30		
Walker Creek	Reach 4	3647		100 Year_SCS 24					11.70		
90.60	91.91			91.98	0.006876	1.24	13.26	14.55	0.35		

Walker Creek	Reach 4	3647	Future Scenario	14.04					
90.60	92.07		92.14	0.006583	1.31	15.74			
16.83	0.35								
Walker Creek	Reach 4	3731	100 Year_SCS 24	11.70					
91.25	92.47		92.52	0.006035	0.92	12.82			
15.25	0.30								
Walker Creek	Reach 4	3731	Future Scenario	14.04					
91.25	92.60		92.65	0.005610	0.97	14.96			
17.65	0.30								
Walker Creek	Reach 4	3816	100 Year_SCS 24	11.70					
91.90	93.09	92.54	93.16	0.008232	1.27	13.44			
23.39	0.37								
Walker Creek	Reach 4	3816	Future Scenario	14.04					
91.90	93.20	92.62	93.28	0.008478	1.37	16.55			
33.35	0.38								
Walker Creek	Reach 2	1346	100 Year_SCS 24	5.17					
81.68	84.21		84.21	0.000120	0.24	67.36			
69.19	0.05								
Walker Creek	Reach 2	1346	Future Scenario	6.20					
81.68	84.31		84.31	0.000128	0.26	74.57			
70.59	0.05								
Walker Creek	Reach 2	1419	100 Year_SCS 24	5.17					
82.46	84.21		84.21	0.000236	0.26	31.52			
29.32	0.07								
Walker Creek	Reach 2	1419	Future Scenario	6.20					
82.46	84.31		84.32	0.000266	0.29	34.60			
30.34	0.07								
Walker Creek	Reach 2	1493	100 Year_SCS 24	5.17					
82.46	84.24		84.25	0.001604	0.70	15.76			
17.90	0.17								
Walker Creek	Reach 2	1493	Future Scenario	6.20					
82.46	84.35		84.36	0.001729	0.76	17.73			
18.91	0.18								

```
  Walker Creek       Reach 2       1552          100 Year_SCS 24      5.17
82.85       84.36                   84.41     0.004640       1.12        6.00
 5.26           0.29
  Walker Creek       Reach 2       1552          Future Scenario      6.20
82.85       84.47                   84.54     0.005164       1.24        6.60
 5.45           0.31



  Walker Creek       Reach 2       1567          100 Year_SCS 24      5.17
82.85       84.43       83.55       84.48     0.003856       1.05        6.19
 5.38           0.27
  Walker Creek       Reach 2       1567          Future Scenario      6.20
82.85       84.55       83.64       84.61     0.004263       1.16        6.75
 5.58           0.28



  Walker Creek       Reach 2       1582                           Culvert



  Walker Creek       Reach 2       1598          100 Year_SCS 24      5.17
82.90       84.67       83.51       84.70     0.001959       0.81        7.57
 5.31           0.19
  Walker Creek       Reach 2       1598          Future Scenario      6.20
82.90       84.88       83.59       84.91     0.001942       0.87        8.57
 5.53           0.20



  Walker Creek       Reach 2       1609          100 Year_SCS 24      5.17
82.90       84.69                   84.73     0.001879       0.80        7.84
 5.34           0.19
  Walker Creek       Reach 2       1609          Future Scenario      6.20
82.90       84.90                   84.93     0.001868       0.86        8.95
 5.55           0.19



  Walker Creek       Reach 2       1683          100 Year_SCS 24      5.05
83.33       84.86                   84.88     0.002262       0.74       12.09
18.85           0.20
```

Walker Creek	Reach 2	1683	Future Scenario	6.06					
83.33	85.05		85.07	0.001765	0.71	15.93			
20.63	0.18								
Walker Creek	Reach 2	1769	100 Year_SCS 24	5.05					
83.75	85.16		85.28	0.011123	1.52	3.71			
3.09	0.41								
Walker Creek	Reach 2	1769	Future Scenario	6.06					
83.75	85.28		85.42	0.012044	1.68	4.10			
3.17	0.43								
Walker Creek	Reach 2	1855	100 Year_SCS 24	5.05					
84.18	85.66		85.69	0.002591	0.76	9.73			
13.86	0.21								
Walker Creek	Reach 2	1855	Future Scenario	6.06					
84.18	85.81		85.83	0.002465	0.79	11.95			
16.79	0.20								
Walker Creek	Reach 2	1930	100 Year_SCS 24	5.05					
84.55	85.74		85.74	0.000309	0.25	21.53			
19.14	0.07								
Walker Creek	Reach 2	1930	Future Scenario	6.06					
84.55	85.88		85.89	0.000304	0.26	24.29			
19.39	0.07								
Walker Creek	Reach 2	1940	100 Year_SCS 24	5.05					
84.60	85.70	85.46	85.95	0.028391	2.24	2.55			
2.63	0.68								
Walker Creek	Reach 2	1940	Future Scenario	6.06					
84.60	85.84	85.57	86.12	0.027530	2.39	2.91			
2.71	0.69								
Walker Creek	Reach 2	1950	Culvert						

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  Walker Creek       Reach 2       1961          100 Year_SCS 24      5.05
84.60       86.52       85.65       86.64     0.007055       1.62        4.72
 3.51           0.37
  Walker Creek       Reach 2       1961          Future Scenario      6.06
84.60       86.73       85.78       86.86     0.007049       1.74        5.47
 3.74           0.38



  Walker Creek       Reach 2       1970          100 Year_SCS 24      5.05
84.60       86.59                   86.70     0.006197       1.56        4.97
 3.59           0.35
  Walker Creek       Reach 2       1970          Future Scenario      6.06
84.60       86.80                   86.92     0.006254       1.67        5.74
 3.82           0.36



  Walker Creek       Reach 2       2050          100 Year_SCS 24      5.05
85.20       86.95                   86.96     0.001836       0.66       19.56
31.84           0.16
  Walker Creek       Reach 2       2050          Future Scenario      6.06
85.20       87.13                   87.14     0.001368       0.61       25.66
36.24           0.14



  Walker Creek       Reach 2       2120          100 Year_SCS 24      5.05
85.80       87.12                   87.26     0.012874       1.71        3.93
 3.94           0.47
  Walker Creek       Reach 2       2120          Future Scenario      6.06
85.80       87.23                   87.39     0.013823       1.87        4.39
 4.11           0.50



  Walker Creek       Reach 2       2131          100 Year_SCS 24      5.05
85.80       87.28       86.63       87.39     0.008521       1.50        4.59
 4.18           0.39
  Walker Creek       Reach 2       2131          Future Scenario      6.06
85.80       87.42       86.74       87.54     0.009031       1.64        5.16
 4.38           0.41



  Walker Creek       Reach 2       2146                             Culvert
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  Walker Creek       Reach 2       2161          100 Year_SCS 24      5.05
85.80       87.65       86.51       87.67     0.002216       0.75        6.69
11.99           0.19
  Walker Creek       Reach 2       2161          Future Scenario      6.06
85.80       87.95       86.59       87.98     0.001828       0.77        7.91
16.23           0.17



  Walker Creek       Reach 2       2169          100 Year_SCS 24      5.05
85.80       87.67                   87.69     0.001693       0.63       10.30
12.28           0.16
  Walker Creek       Reach 2       2169          Future Scenario      6.06
85.80       87.98                   87.99     0.001197       0.60       14.73
16.56           0.14



  Walker Creek       Reach 2       2241          100 Year_SCS 24      5.05
86.31       87.88                   87.96     0.010216       1.34        5.75
10.35           0.37
  Walker Creek       Reach 2       2241          Future Scenario      6.06
86.31       88.12                   88.18     0.006929       1.23        8.91
15.61           0.31



  Walker Creek       Reach 2       2320          100 Year_SCS 24      5.05
86.83       88.46                   88.52     0.005144       1.19        6.36
 8.24           0.30
  Walker Creek       Reach 2       2320          Future Scenario      6.06
86.83       88.59                   88.66     0.005309       1.28        7.60
 9.90           0.31



  Walker Creek       Reach 2       2400          100 Year_SCS 24      5.05
87.34       88.96                   89.05     0.008633       1.36        5.22
 8.94           0.36
  Walker Creek       Reach 2       2400          Future Scenario      6.06
87.34       89.10                   89.19     0.008323       1.42        6.76
12.32           0.35
```

Walker Creek	Reach 2	2479	100 Year_SCS 24	5.05					
87.85	89.36		89.38	0.002386	0.67	9.23			
12.85	0.19								
Walker Creek	Reach 2	2479	Future Scenario	6.06					
87.85	89.49		89.51	0.002323	0.71	11.05			
14.33	0.19								
Walker Creek	Reach 2	2491	100 Year_SCS 24	5.05					
87.89	89.39	88.19	89.40	0.000349	0.31	18.58			
18.27	0.08								
Walker Creek	Reach 2	2491	Future Scenario	6.06					
87.89	89.53	88.22	89.53	0.000373	0.33	20.44			
19.30	0.08								
Walker Creek	Reach 2	2504	Culvert						
Walker Creek	Reach 2	2517	100 Year_SCS 24	5.05					
88.00	89.79	88.59	89.82	0.001698	0.76	7.48			
11.05	0.18								
Walker Creek	Reach 2	2517	Future Scenario	6.06					
88.00	89.91	88.67	89.94	0.001590	0.77	11.00			
18.80	0.18								
Walker Creek	Reach 2	2523	100 Year_SCS 24	5.05					
89.46	89.78	89.78	89.91	0.091697	1.63	3.45			
14.90	0.98								
Walker Creek	Reach 2	2523	Future Scenario	6.06					
89.46	89.89		89.98	0.040489	1.35	5.28			
17.47	0.69								

Profile Output Table - Standard Table 2

River	Reach	River Sta	Profile	E.G. Elev	W.S.

Elev (m)	Vel Head (m)	Frctn Loss (m)	C & E Loss (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Top Width (m)
Beamer Creek	Reach 5	0	100 Year_SCS 24				76.66
76.64	0.02	0.13	0.01	0.04	7.17		14.45
Beamer Creek	Reach 5	0	Future Scenario				76.86
76.84	0.02	0.13	0.02	0.19	8.44	0.01	17.02
Beamer Creek	Reach 5	226	100 Year_SCS 24				78.79
78.56	0.23	1.30	0.06	1.71	5.49	0.00	10.08
Beamer Creek	Reach 5	226	Future Scenario				78.87
78.63	0.24	1.13	0.07	2.52	6.12	0.00	10.49
Beamer Creek	Reach 5	236	100 Year_SCS 24				78.96
78.91	0.05	0.07	0.11	0.54	6.42	0.25	6.35
Beamer Creek	Reach 5	236	Future Scenario				79.06
78.99	0.07	0.08	0.10	0.67	7.66	0.31	6.49
Beamer Creek	Reach 5	247	Culvert				
Beamer Creek	Reach 5	277	100 Year_SCS 24				79.15
79.12	0.03			0.13	6.96	0.11	26.17
Beamer Creek	Reach 5	277	Future Scenario				79.31
79.27	0.04			0.17	8.32	0.15	28.21

Beamer Creek	Reach 5	283	100 Year_SCS 24	79.16	79.16	0.01	0.01	0.00
1.71	5.48	0.01	28.49					
Beamer Creek	Reach 5	283	Future Scenario	79.32	79.31	0.01	0.01	0.00
2.34	6.29	0.02	29.62					
Beamer Creek	Reach 5	347	100 Year_SCS 24	79.22	79.20	0.02	0.05	0.01
0.27	6.75	0.18	11.37					
Beamer Creek	Reach 5	347	Future Scenario	79.38	79.36	0.02	0.05	0.01
0.36	8.05	0.24	11.74					
Beamer Creek	Reach 5	354	100 Year_SCS 24	79.23	79.21	0.02	0.01	0.00
0.08	7.12		11.38					
Beamer Creek	Reach 5	354	Future Scenario	79.39	79.36	0.02	0.01	0.01
0.10	8.54		11.75					
Beamer Creek	Reach 5	360	Culvert					
Beamer Creek	Reach 5	378	100 Year_SCS 24	79.89	79.87	0.02		
0.29	6.82	0.10	7.86					
Beamer Creek	Reach 5	378	Future Scenario	80.35	80.33	0.02		
0.40	8.09	0.15	19.13					
Beamer Creek	Reach 5	388	100 Year_SCS 24	79.90	79.88	0.02	0.01	0.00
0.27	6.84	0.10	7.87					
Beamer Creek	Reach 5	388	Future Scenario	80.35				

80.34 0.02 0.01 0.00 0.36 8.13 0.15
19.24

Beamer Creek Reach 5 485 100 Year_SCS 24 80.01
79.97 0.03 0.10 0.00 0.20 6.78 0.22
6.25
Beamer Creek Reach 5 485 Future Scenario 80.44
80.40 0.03 0.08 0.00 0.29 8.04 0.31
6.73

Beamer Creek Reach 5 494 100 Year_SCS 24 80.02
79.98 0.03 0.01 0.00 0.20 6.78 0.22
6.26
Beamer Creek Reach 5 494 Future Scenario 80.44
80.41 0.03 0.01 0.00 0.29 8.04 0.32
6.74

Beamer Creek Reach 5 507 Culvert

Beamer Creek Reach 5 514 100 Year_SCS 24 80.67
80.65 0.02 0.27 6.65 0.28
7.41
Beamer Creek Reach 5 514 Future Scenario 81.39
81.38 0.01 0.40 7.82 0.42
8.39

Beamer Creek Reach 5 522 100 Year_SCS 24 80.67
80.66 0.02 0.01 0.00 0.27 6.65 0.28
7.42
Beamer Creek Reach 5 522 Future Scenario 81.40
81.38 0.01 0.00 0.00 0.40 7.82 0.42
8.40

Beamer Creek Reach 5 581 100 Year_SCS 24 80.77

80.74	0.02	0.09	0.00	2.53	3.83	0.84		
21.96								
Beamer Creek	Reach 5	581		Future Scenario			81.44	
81.43	0.01	0.04	0.00	4.39	3.32	0.93		
31.85								
Beamer Creek	Reach 5	699		100 Year_SCS 24			81.10	
81.03	0.06	0.32	0.01	0.14	6.95	0.12		
7.20								
Beamer Creek	Reach 5	699		Future Scenario			81.55	
81.51	0.04	0.10	0.01	0.23	8.21	0.20		
7.91								
Beamer Creek	Reach 5	714		100 Year_SCS 24			81.19	
81.14	0.05	0.09	0.01	0.15	6.93	0.13		
7.35								
Beamer Creek	Reach 5	714		Future Scenario			81.60	
81.56	0.04	0.04	0.00	0.24	8.20	0.20		
7.98								
Beamer Creek	Reach 5	722				Culvert		
Beamer Creek	Reach 5	745		100 Year_SCS 24			81.60	
81.57	0.04				7.20			
9.24								
Beamer Creek	Reach 5	745		Future Scenario			81.84	
81.80	0.04				8.64			
9.71								
Beamer Creek	Reach 5	757		100 Year_SCS 24			81.63	
81.61	0.03	0.03	0.00	0.06	6.82	0.33		
9.32								
Beamer Creek	Reach 5	757		Future Scenario			81.86	
81.84	0.03	0.03	0.00	0.08	8.11	0.45		
9.78								

Beamer Creek	Reach 5	831	100 Year_SCS 24	81.90	81.85	0.05	0.26	0.01
0.25	6.91	0.04	10.35					
Beamer Creek	Reach 5	831	Future Scenario	82.09	82.04	0.05	0.22	0.01
0.51	8.08	0.06	11.77					
Beamer Creek	Reach 5	893	100 Year_SCS 24	82.32	82.22	0.10	0.41	0.01
0.23	6.91	0.06	5.03					
Beamer Creek	Reach 5	893	Future Scenario	82.48	82.37	0.11	0.38	0.02
0.30	8.26	0.08	5.18					
Beamer Creek	Reach 5	904	100 Year_SCS 24	82.41	82.32	0.08	0.08	0.01
0.24	6.89	0.06	5.14					
Beamer Creek	Reach 5	904	Future Scenario	82.57	82.47	0.10	0.08	0.01
0.32	8.24	0.09	5.29					
Beamer Creek	Reach 5	916	Culvert					
Beamer Creek	Reach 5	928	100 Year_SCS 24	82.54	82.47	0.07		
0.11	7.00	0.09	5.73					
Beamer Creek	Reach 5	928	Future Scenario	82.72	82.64	0.07		
0.15	8.37	0.12	5.90					
Beamer Creek	Reach 5	938	100 Year_SCS 24	82.59	82.53	0.06	0.05	0.00
0.12	6.99	0.10	5.79					
Beamer Creek	Reach 5	938	Future Scenario	82.77				

82.70	0.07	0.05	0.00	0.16	8.36	0.13		
5.95								
Beamer Creek	Reach 5	1022	100 Year_SCS 24	82.94				
82.91	0.03	0.35	0.00	0.25	6.95	0.01		
11.30								
Beamer Creek	Reach 5	1022	Future Scenario	83.10				
83.07	0.03	0.33	0.00	0.39	8.24	0.01		
12.31								
Beamer Creek	Reach 5	1089	100 Year_SCS 24	83.37				
83.27	0.10	0.41	0.02	0.34	6.68	0.18		
11.08								
Beamer Creek	Reach 5	1089	Future Scenario	83.50				
83.39	0.11	0.38	0.02	0.60	7.74	0.30		
12.26								
Beamer Creek	Reach 5	1105	100 Year_SCS 24	83.54				
83.46	0.08	0.16	0.01	0.04	6.96	0.20		
6.02								
Beamer Creek	Reach 5	1105	Future Scenario	83.67				
83.57	0.09	0.16	0.01	0.06	8.33	0.26		
6.14								
Beamer Creek	Reach 5	1121	Culvert					
Beamer Creek	Reach 5	1138	100 Year_SCS 24	83.75				
83.71	0.04		0.15	7.00	0.05			
11.13								
Beamer Creek	Reach 5	1138	Future Scenario	83.91				
83.87	0.04		0.30	8.21	0.14			
13.49								
Beamer Creek	Reach 5	1152	100 Year_SCS 24	83.81				

83.78 0.04 0.07 0.00 0.18 6.95 0.07
12.09
Beamer Creek Reach 5 1152 Future Scenario 83.97
83.93 0.04 0.06 0.00 0.34 8.14 0.16
15.86

Beamer Creek Reach 5 1228 100 Year_SCS 24 84.25
84.23 0.02 0.44 0.00 1.54 3.88 1.60
23.45
Beamer Creek Reach 5 1228 Future Scenario 84.38
84.36 0.02 0.41 0.00 1.94 4.36 2.11
25.09

Beamer Creek Reach 5 1310 100 Year_SCS 24 84.36
84.34 0.01 0.10 0.00 3.24 2.93 0.85
31.35
Beamer Creek Reach 5 1310 Future Scenario 84.48
84.47 0.01 0.10 0.00 3.90 3.35 1.17
35.17

Beamer Creek Reach 5 1374 100 Year_SCS 24 84.64
84.53 0.12 0.26 0.03 0.78 6.01 0.24
5.93
Beamer Creek Reach 5 1374 Future Scenario 84.78
84.64 0.14 0.26 0.04 0.99 7.12 0.30
6.19

Beamer Creek Reach 5 1392 100 Year_SCS 24 84.81
84.73 0.08 0.15 0.02 0.87 5.88 0.26
6.40
Beamer Creek Reach 5 1392 Future Scenario 84.96
84.87 0.10 0.16 0.03 1.15 6.93 0.34
6.72

Beamer Creek Reach 5 1405 Culvert

Beamer Creek Reach 5 1445 100 Year_SCS 24 85.42
85.39 0.03 0.49 6.32 0.21
6.85
Beamer Creek Reach 5 1445 Future Scenario 85.67
85.63 0.04 0.59 7.58 0.25
9.77

Beamer Creek Reach 5 1462 100 Year_SCS 24 85.45
85.41 0.03 0.03 0.00 0.48 6.32 0.21
6.99
Beamer Creek Reach 5 1462 Future Scenario 85.70
85.66 0.04 0.03 0.00 0.60 7.57 0.25
10.16

Beamer Creek Reach 5 1521 100 Year_SCS 24 85.49
85.49 0.00 0.04 0.00 2.68 3.90 0.44
33.45
Beamer Creek Reach 5 1521 Future Scenario 85.74
85.73 0.00 0.04 0.00 3.30 4.40 0.72
38.93

Beamer Creek Reach 5 1578 100 Year_SCS 24 85.54
85.53 0.01 0.04 0.01 0.27 6.56 0.19
60.78
Beamer Creek Reach 5 1578 Future Scenario 85.77
85.76 0.01 0.03 0.00 1.26 6.64 0.51
82.94

Beamer Creek Reach 5 1597 100 Year_SCS 24 85.57
85.56 0.01 0.03 0.00 0.16 6.63 0.23
62.12
Beamer Creek Reach 5 1597 Future Scenario 85.79
85.78 0.01 0.02 0.00 1.34 6.55 0.53
84.49

Beamer Creek Reach 5 1615 Culvert

Beamer Creek	Reach 5	1633	100 Year_SCS 24	85.90	85.87	0.03			0.13	6.89	0.00	13.78
Beamer Creek	Reach 5	1633	Future Scenario	86.01	85.97	0.04			0.27	8.07	0.07	37.86
Beamer Creek	Reach 5	1649	100 Year_SCS 24	86.39	86.24	0.16	0.13	0.04	1.27	4.56	1.18	19.58
Beamer Creek	Reach 5	1649	Future Scenario	86.45	86.28	0.17	0.15	0.04	1.67	5.29	1.46	21.01
Walker Beamer Cr	Reach 1	16	100 Year_SCS 24	75.80	75.26	0.54			0.28	23.60	0.52	8.13
Walker Beamer Cr	Reach 1	16	Future Scenario	76.01	75.40	0.61			0.38	28.19	0.71	8.46
Walker Beamer Cr	Reach 1	47	100 Year_SCS 24	76.51	76.35	0.16	0.67	0.04	0.21	23.11	1.09	13.13
Walker Beamer Cr	Reach 1	47	Future Scenario	76.72	76.54	0.18	0.67	0.04	0.29	27.22	1.77	14.52
Walker Creek	Reach 3	43	100 Year_SCS 24	77.12	76.91	0.21	0.59	0.02	2.61	12.66	2.45	11.58
Walker Creek	Reach 3	43	Future Scenario	77.32	77.09	0.23	0.58	0.02	3.24	14.83	3.20	13.18

Walker Creek	Reach 3	129	100 Year_SCS 24	77.85				
77.79	0.07	0.72	0.01	2.93	11.93	2.86		
38.06								
Walker Creek	Reach 3	129	Future Scenario	78.01				
77.95	0.06	0.68	0.02	4.79	13.03	3.44		
39.00								
Walker Creek	Reach 3	215	100 Year_SCS 24	78.30				
78.26	0.04	0.44	0.00	3.14	8.63	5.94		
65.17								
Walker Creek	Reach 3	215	Future Scenario	78.42				
78.38	0.04	0.40	0.00	5.04	9.14	7.08		
68.26								
Walker Creek	Reach 3	296	100 Year_SCS 24	78.65				
78.61	0.04	0.35	0.00	0.09	10.44	7.19		
43.27								
Walker Creek	Reach 3	296	Future Scenario	78.76				
78.72	0.04	0.34	0.00	0.14	11.76	9.36		
44.01								
Walker Creek	Reach 3	376	100 Year_SCS 24	79.03				
79.01	0.02	0.38	0.00	3.64	6.54	7.54		
52.18								
Walker Creek	Reach 3	376	Future Scenario	79.14				
79.11	0.02	0.38	0.00	4.56	7.19	9.51		
52.53								
Walker Creek	Reach 3	457	100 Year_SCS 24	79.47				
79.43	0.04	0.44	0.01	1.86	9.19	6.67		
44.20								
Walker Creek	Reach 3	457	Future Scenario	79.58				
79.53	0.05	0.44	0.01	3.00	10.28	7.98		
46.22								
Walker Creek	Reach 3	538	100 Year_SCS 24	79.79				

79.75	0.04	0.32	0.00	2.09	12.56	3.07		
41.18								
Walker Creek	Reach 3	538		Future Scenario			79.91	
79.87	0.04	0.33	0.00	3.04	14.18	4.04		
42.44								
Walker Creek	Reach 3	631		100 Year_SCS 24			80.26	
80.19	0.07	0.46	0.01	1.88	12.59	3.26		
36.54								
Walker Creek	Reach 3	631		Future Scenario			80.39	
80.32	0.07	0.47	0.01	2.78	13.99	4.49		
37.93								
Walker Creek	Reach 3	708		100 Year_SCS 24			80.79	
80.71	0.08	0.53	0.00	0.93	15.73	1.05		
27.92								
Walker Creek	Reach 3	708		Future Scenario			80.91	
80.83	0.08	0.52	0.00	1.41	17.78	2.07		
36.65								
Walker Creek	Reach 3	724		100 Year_SCS 24			80.90	
80.82	0.08	0.11	0.00	0.70	16.42	0.60		
36.63								
Walker Creek	Reach 3	724		Future Scenario			81.04	
80.94	0.10	0.12	0.01	0.90	19.60	0.76		
37.36								
Walker Creek	Reach 3	745				Culvert		
Walker Creek	Reach 3	766		100 Year_SCS 24			82.14	
82.08	0.06			1.18	15.09	1.45		
45.84								
Walker Creek	Reach 3	766		Future Scenario			82.68	
82.63	0.06			1.59	17.73	1.94		
52.23								

Walker Creek	Reach 3	767	100 Year_SCS 24	82.15	82.14	0.01	0.01	0.01
6.84	6.68	4.19	52.95					
Walker Creek	Reach 3	767	Future Scenario	82.69	82.69	0.00	0.00	0.01
9.06	6.86	5.35	54.33					
Walker Creek	Reach 3	781	100 Year_SCS 24	82.19	82.18	0.01	0.04	0.00
8.02	7.52	2.17	44.65					
Walker Creek	Reach 3	781	Future Scenario	82.71	82.71	0.01	0.02	0.00
10.10	7.82	3.34	48.85					
Walker Creek	Reach 3	946	100 Year_SCS 24	82.31	82.28	0.02	0.11	0.00
4.10	8.61	3.87	43.45					
Walker Creek	Reach 3	946	Future Scenario	82.78	82.76	0.01	0.06	0.00
6.03	8.41	5.45	50.99					
Walker Creek	Reach 3	1036	100 Year_SCS 24	82.46	82.45	0.01	0.15	0.00
8.39	5.62	2.56	70.46					
Walker Creek	Reach 3	1036	Future Scenario	82.85	82.84	0.00	0.07	0.00
10.35	5.45	4.08	71.88					
Walker Creek	Reach 3	1106	100 Year_SCS 24	82.72	82.60	0.12	0.23	0.03
1.58	14.86	0.13	12.05					
Walker Creek	Reach 3	1106	Future Scenario	83.00	82.89	0.11	0.12	0.03
1.86	17.40	0.63	46.03					
Walker Creek	Reach 3	1125	100 Year_SCS 24	82.87				

82.69	0.18	0.10	0.05		16.57				17.64
Walker Creek	Reach 3	1125		Future Scenario				83.15	
82.96	0.19	0.08	0.06		19.89				49.57
Walker Creek	Reach 3	1155						Culvert	
Walker Creek	Reach 3	1159		100 Year_SCS 24				84.10	
84.09	0.01			2.27	10.62	3.68			53.56
Walker Creek	Reach 3	1159		Future Scenario				84.18	
84.17	0.01			2.89	12.37	4.62			55.01
Walker Creek	Reach 3	1181		100 Year_SCS 24				84.10	
84.09	0.01	0.01	0.00	2.32	10.49	3.76			53.68
Walker Creek	Reach 3	1181		Future Scenario				84.19	
84.18	0.01	0.01	0.00	2.96	12.21	4.72			55.15
Walker Creek	Reach 3	1244		100 Year_SCS 24				84.18	
84.17	0.01	0.07	0.00	1.69	10.23	4.64			63.07
Walker Creek	Reach 3	1244		Future Scenario				84.28	
84.27	0.01	0.09	0.00	2.05	11.73	6.10			63.70
Walker Creek	Reach 4	1325.5		100 Year_SCS 24				84.19	
84.19	0.01	0.02	0.00	3.62	6.85	3.51			42.83
Walker Creek	Reach 4	1325.5		Future Scenario				84.30	
84.29	0.01	0.02	0.00	4.48	8.02	4.28			43.59

Walker Creek	Reach 4	1397	100 Year_SCS 24	84.24				
84.23	0.02	0.05	0.00	1.22	10.57	2.19		
37.78								
Walker Creek	Reach 4	1397	Future Scenario	84.36				
84.34	0.02	0.05	0.00	1.62	12.25	2.90		
40.26								
Walker Creek	Reach 4	1467	100 Year_SCS 24	84.32				
84.31	0.01	0.08	0.00	6.82	5.82	1.34		
40.84								
Walker Creek	Reach 4	1467	Future Scenario	84.44				
84.43	0.01	0.09	0.00	8.40	6.62	1.76		
41.87								
Walker Creek	Reach 4	1527	100 Year_SCS 24	84.49				
84.40	0.09	0.14	0.02	0.17	12.17	1.63		
13.38								
Walker Creek	Reach 4	1527	Future Scenario	84.63				
84.52	0.10	0.16	0.03	0.32	14.23	2.22		
14.55								
Walker Creek	Reach 4	1538	100 Year_SCS 24	84.56				
84.53	0.03	0.03	0.04	0.97	12.48	0.54		
17.67								
Walker Creek	Reach 4	1538	Future Scenario	84.71				
84.67	0.03	0.04	0.04	1.31	14.73	0.74		
18.89								
Walker Creek	Reach 4	1567					Culvert	
Walker Creek	Reach 4	1597	100 Year_SCS 24	84.94				
84.90	0.04				13.98			
60.63								
Walker Creek	Reach 4	1597	Future Scenario	85.25				

85.21	0.04					16.77			
67.69									
Walker Creek	Reach 4	1613		100 Year_SCS 24					84.97
84.96	0.01	0.02	0.00	4.44	9.27	0.27			
61.03									
Walker Creek	Reach 4	1613		Future Scenario					85.27
85.26	0.01	0.02	0.00	6.83	9.36	0.58			
68.58									
Walker Creek	Reach 4	1698		100 Year_SCS 24					85.04
85.03	0.01	0.07	0.00	0.78	8.33	3.07			
37.21									
Walker Creek	Reach 4	1698		Future Scenario					85.32
85.31	0.01	0.05	0.00	1.00	9.14	4.47			
41.49									
Walker Creek	Reach 4	1798		100 Year_SCS 24					85.11
85.10	0.01	0.07	0.00	0.52	8.82	2.84			
49.20									
Walker Creek	Reach 4	1798		Future Scenario					85.38
85.37	0.01	0.05	0.00	0.83	9.77	4.01			
50.67									
Walker Creek	Reach 4	1888		100 Year_SCS 24					85.19
85.18	0.01	0.08	0.00	0.01	8.71	3.46			
57.68									
Walker Creek	Reach 4	1888		Future Scenario					85.43
85.42	0.01	0.05	0.00	0.06	9.01	5.54			
60.35									
Walker Creek	Reach 4	1899		100 Year_SCS 24					85.21
85.20	0.01	0.02	0.00	0.10	8.52	3.55			
57.33									
Walker Creek	Reach 4	1899		Future Scenario					85.44
85.43	0.01	0.01	0.00	0.20	8.88	5.54			
60.54									

Walker Creek	Reach 4	1912								Culvert
Walker Creek	Reach 4	1924	100 Year_SCS 24							85.40
85.35	0.05					0.01	12.12	0.05		
15.23										
Walker Creek	Reach 4	1924	Future Scenario							85.46
85.42	0.04					0.03	12.46	2.13		
57.53										
Walker Creek	Reach 4	1933	100 Year_SCS 24							85.47
85.40	0.07	0.07		0.01		0.62	9.57	1.99		
47.85										
Walker Creek	Reach 4	1933	Future Scenario							85.54
85.46	0.08	0.06		0.01		0.84	10.76	3.01		
50.94										
Walker Creek	Reach 4	1997	100 Year_SCS 24							85.78
85.75	0.03	0.31		0.00		0.02	11.31	0.85		
46.57										
Walker Creek	Reach 4	1997	Future Scenario							85.87
85.84	0.03	0.33		0.00		0.05	13.00	1.56		
49.76										
Walker Creek	Reach 4	2070	100 Year_SCS 24							85.98
85.95	0.03	0.20		0.00		0.05	11.83	0.30		
37.33										
Walker Creek	Reach 4	2070	Future Scenario							86.09
86.05	0.04	0.21		0.00		0.08	13.74	0.79		
42.76										
Walker Creek	Reach 4	2132	100 Year_SCS 24							86.22
86.15	0.07	0.21		0.03		0.28	11.74	0.16		
11.62										
Walker Creek	Reach 4	2132	Future Scenario							86.36

86.28	0.08	0.24	0.04	0.37	14.00	0.24		
18.22								
Walker Creek	Reach 4	2144	100 Year_SCS 24	86.28				
86.26	0.02	0.03	0.03	0.02	11.67	0.49		
30.86								
Walker Creek	Reach 4	2144	Future Scenario	86.43				
86.41	0.03	0.03	0.03	0.05	13.57	1.00		
41.50								
Walker Creek	Reach 4	2164	Culvert					
Walker Creek	Reach 4	2173	100 Year_SCS 24	86.38				
86.33	0.05		0.41	11.59	0.18			
22.34								
Walker Creek	Reach 4	2173	Future Scenario	86.49				
86.42	0.07		0.74	13.64	0.22			
28.38								
Walker Creek	Reach 4	2184	100 Year_SCS 24	86.65				
86.60	0.05	0.26	0.00	1.50	10.11	0.56		
34.21								
Walker Creek	Reach 4	2184	Future Scenario	86.78				
86.73	0.05	0.28	0.01	2.32	11.29	1.00		
37.53								
Walker Creek	Reach 4	2265	100 Year_SCS 24	86.71				
86.67	0.04	0.07	0.00	4.65	7.32	0.21		
31.93								
Walker Creek	Reach 4	2265	Future Scenario	86.85				
86.81	0.04	0.06	0.00	6.15	8.07	0.39		
35.64								
Walker Creek	Reach 4	2357	100 Year_SCS 24	87.04				

87.00 0.05 0.33 0.00 0.53 11.46 0.18
20.45
Walker Creek Reach 4 2357 Future Scenario 87.19
87.13 0.05 0.34 0.00 0.99 13.32 0.30
24.02

Walker Creek Reach 4 2449 100 Year_SCS 24 87.47
87.38 0.08 0.41 0.01 1.25 10.28 0.65
34.78
Walker Creek Reach 4 2449 Future Scenario 87.61
87.53 0.08 0.41 0.01 2.02 11.14 1.45
41.20

Walker Creek Reach 4 2541 100 Year_SCS 24 87.83
87.81 0.02 0.36 0.01 4.57 7.48 0.13
23.21
Walker Creek Reach 4 2541 Future Scenario 87.97
87.94 0.03 0.35 0.01 5.81 8.64 0.17
24.09

Walker Creek Reach 4 2633 100 Year_SCS 24 88.10
88.07 0.04 0.27 0.00 2.52 9.35 0.31
32.24
Walker Creek Reach 4 2633 Future Scenario 88.24
88.20 0.04 0.27 0.00 3.53 10.64 0.44
36.93

Walker Creek Reach 4 2710 100 Year_SCS 24 88.38
88.35 0.03 0.28 0.00 0.49 11.52 0.17
26.44
Walker Creek Reach 4 2710 Future Scenario 88.51
88.48 0.04 0.27 0.00 0.93 13.40 0.29
27.88

Walker Creek Reach 4 2725 100 Year_SCS 24 88.44
88.41 0.03 0.05 0.00 0.63 11.35 0.20
27.07
Walker Creek Reach 4 2725 Future Scenario 88.57

88.53 0.03 0.05 0.00 1.10 13.19 0.32
28.50

Walker Creek Reach 4 2750 Culvert

Walker Creek Reach 4 2774 100 Year_SCS 24 88.87
88.81 0.06 0.57 11.30 0.30
8.95
Walker Creek Reach 4 2774 Future Scenario 89.11
89.04 0.07 0.54 13.70 0.38
20.11

Walker Creek Reach 4 2788 100 Year_SCS 24 88.91
88.89 0.03 0.04 0.00 0.40 11.31 0.46
30.72
Walker Creek Reach 4 2788 Future Scenario 89.15
89.12 0.02 0.03 0.00 1.03 12.70 0.88
36.92

Walker Creek Reach 4 2884 100 Year_SCS 24 89.13
89.11 0.02 0.22 0.00 1.24 7.20 3.26
41.19
Walker Creek Reach 4 2884 Future Scenario 89.32
89.30 0.02 0.17 0.00 1.87 7.71 4.47
44.03

Walker Creek Reach 4 2978 100 Year_SCS 24 89.41
89.40 0.02 0.28 0.00 0.42 4.97 6.31
47.98
Walker Creek Reach 4 2978 Future Scenario 89.55
89.53 0.02 0.23 0.00 0.56 5.30 8.18
50.39

Walker Creek Reach 4 3074 100 Year_SCS 24 90.17

90.09	0.08	0.74	0.02	1.97	8.09	1.65		
40.14								
Walker Creek	Reach 4	3074		Future Scenario			90.28	
90.19	0.09	0.71	0.02	2.75	9.43	1.87		
45.43								
Walker Creek	Reach 4	3231		100 Year_SCS 24			90.55	
90.53	0.02	0.34	0.03	1.41	8.04	2.25		
51.10								
Walker Creek	Reach 4	3231		Future Scenario			90.68	
90.65	0.02	0.35	0.04	1.85	8.83	3.37		
55.28								
Walker Creek	Reach 4	3309		100 Year_SCS 24			90.72	
90.68	0.05	0.17	0.01	0.48	11.18	0.04		
7.84								
Walker Creek	Reach 4	3309		Future Scenario			90.86	
90.80	0.06	0.18	0.01	0.61	13.38	0.05		
7.98								
Walker Creek	Reach 4	3322		100 Year_SCS 24			90.75	
90.71	0.05	0.03	0.00	0.49	11.17	0.04		
7.88								
Walker Creek	Reach 4	3322		Future Scenario			90.90	
90.84	0.06	0.04	0.00	0.59	13.41	0.04		
9.21								
Walker Creek	Reach 4	3342					Culvert	
Walker Creek	Reach 4	3362		100 Year_SCS 24			90.94	
90.92	0.02			0.76	7.75	3.20		
19.58								
Walker Creek	Reach 4	3362		Future Scenario			91.18	
91.15	0.02			1.01	8.95	4.08		
22.34								

Walker Creek	Reach 4	3394	100 Year_SCS 24	90.98	90.96	0.02	0.04	0.00	0.80	7.98	2.92	20.07
Walker Creek	Reach 4	3394	Future Scenario	91.22	91.19	0.02	0.04	0.00	1.07	9.25	3.72	22.80
Walker Creek	Reach 4	3479	100 Year_SCS 24	91.14	91.10	0.04	0.15	0.00	0.77	8.64	2.29	16.38
Walker Creek	Reach 4	3479	Future Scenario	91.37	91.33	0.04	0.15	0.00	1.05	10.12	2.88	19.23
Walker Creek	Reach 4	3563	100 Year_SCS 24	91.47	91.41	0.06	0.32	0.01	0.81	9.17	1.73	14.71
Walker Creek	Reach 4	3563	Future Scenario	91.67	91.61	0.06	0.29	0.01	1.04	10.76	2.25	16.91
Walker Creek	Reach 4	3647	100 Year_SCS 24	91.98	91.91	0.07	0.51	0.00	0.90	9.43	1.38	14.55
Walker Creek	Reach 4	3647	Future Scenario	92.14	92.07	0.07	0.47	0.00	1.11	11.16	1.77	16.83
Walker Creek	Reach 4	3731	100 Year_SCS 24	92.52	92.47	0.04	0.54	0.00	0.01	11.69	0.01	15.25
Walker Creek	Reach 4	3731	Future Scenario	92.65	92.60	0.05	0.51	0.00	0.04	13.98	0.03	17.65
Walker Creek	Reach 4	3816	100 Year_SCS 24	93.16								

93.09 0.07 0.64 0.01 0.91 10.15 0.64
23.39
Walker Creek Reach 4 3816 Future Scenario 93.28
93.20 0.08 0.62 0.01 1.19 11.93 0.93
33.35

Walker Creek Reach 2 1346 100 Year_SCS 24 84.21
84.21 0.00 0.03 0.00 1.08 0.64 3.44
69.19
Walker Creek Reach 2 1346 Future Scenario 84.31
84.31 0.00 0.03 0.00 1.30 0.71 4.19
70.59

Walker Creek Reach 2 1419 100 Year_SCS 24 84.21
84.21 0.00 0.01 0.00 1.28 3.43 0.46
29.32
Walker Creek Reach 2 1419 Future Scenario 84.32
84.31 0.00 0.01 0.00 1.56 4.04 0.60
30.34

Walker Creek Reach 2 1493 100 Year_SCS 24 84.25
84.24 0.01 0.04 0.00 0.42 2.35 2.40
17.90
Walker Creek Reach 2 1493 Future Scenario 84.36
84.35 0.01 0.04 0.00 0.55 2.70 2.94
18.91

Walker Creek Reach 2 1552 100 Year_SCS 24 84.41
84.36 0.06 0.15 0.01 0.02 4.56 0.59
5.26
Walker Creek Reach 2 1552 Future Scenario 84.54
84.47 0.07 0.16 0.02 0.02 5.42 0.76
5.45

Walker Creek Reach 2 1567 100 Year_SCS 24 84.48
84.43 0.05 0.06 0.00 0.02 4.49 0.66
5.38
Walker Creek Reach 2 1567 Future Scenario 84.61

84.55	0.06	0.07	0.01	0.02	5.34	0.84	5.58		
Walker Creek	Reach 2	1582				Culvert			
Walker Creek	Reach 2	1598	100 Year_SCS 24				84.70		
84.67	0.03			0.13	4.88	0.16	5.31		
Walker Creek	Reach 2	1598	Future Scenario				84.91		
84.88	0.04			0.17	5.82	0.21	5.53		
Walker Creek	Reach 2	1609	100 Year_SCS 24				84.73		
84.69	0.03	0.02	0.00	0.13	4.88	0.15	5.34		
Walker Creek	Reach 2	1609	Future Scenario				84.93		
84.90	0.04	0.02	0.00	0.17	5.82	0.21	5.55		
Walker Creek	Reach 2	1683	100 Year_SCS 24				84.88		
84.86	0.02	0.15	0.00	1.00	3.74	0.31	18.85		
Walker Creek	Reach 2	1683	Future Scenario				85.07		
85.05	0.02	0.13	0.00	1.45	4.07	0.54	20.63		
Walker Creek	Reach 2	1769	100 Year_SCS 24				85.28		
85.16	0.12	0.37	0.03	0.07	4.94	0.04	3.09		
Walker Creek	Reach 2	1769	Future Scenario				85.42		
85.28	0.14	0.32	0.04	0.09	5.92	0.05	3.17		
Walker Creek	Reach 2	1855	100 Year_SCS 24				85.69		

85.66 0.03 0.40 0.01 0.09 4.31 0.65
13.86
Walker Creek Reach 2 1855 Future Scenario 85.83
85.81 0.03 0.40 0.01 0.12 4.96 0.98
16.79

Walker Creek Reach 2 1930 100 Year_SCS 24 85.74
85.74 0.00 0.05 0.00 0.04 4.96 0.06
19.14
Walker Creek Reach 2 1930 Future Scenario 85.89
85.88 0.00 0.05 0.00 0.05 5.94 0.08
19.39

Walker Creek Reach 2 1940 100 Year_SCS 24 85.95
85.70 0.25 0.01 0.20 0.03 4.93 0.09
2.63
Walker Creek Reach 2 1940 Future Scenario 86.12
85.84 0.28 0.01 0.22 0.03 5.90 0.12
2.71

Walker Creek Reach 2 1950 Culvert

Walker Creek Reach 2 1961 100 Year_SCS 24 86.64
86.52 0.12 0.37 4.37 0.31
3.51
Walker Creek Reach 2 1961 Future Scenario 86.86
86.73 0.13 0.49 5.17 0.40
3.74

Walker Creek Reach 2 1970 100 Year_SCS 24 86.70
86.59 0.11 0.06 0.00 0.38 4.35 0.32
3.59
Walker Creek Reach 2 1970 Future Scenario 86.92
86.80 0.12 0.06 0.00 0.50 5.14 0.42
3.82

Walker Creek	Reach 2	2050	100 Year_SCS 24	86.96					
86.95	0.01	0.25	0.01	0.16	1.88	3.01			
31.84									
Walker Creek	Reach 2	2050	Future Scenario	87.14					
87.13	0.01	0.21	0.01	0.16	1.92	3.98			
36.24									
Walker Creek	Reach 2	2120	100 Year_SCS 24	87.26					
87.12	0.13	0.26	0.04	0.22	4.54	0.30			
3.94									
Walker Creek	Reach 2	2120	Future Scenario	87.39					
87.23	0.16	0.21	0.05	0.28	5.40	0.39			
4.11									
Walker Creek	Reach 2	2131	100 Year_SCS 24	87.39					
87.28	0.10	0.11	0.02	0.24	4.48	0.33			
4.18									
Walker Creek	Reach 2	2131	Future Scenario	87.54					
87.42	0.12	0.12	0.02	0.31	5.32	0.43			
4.38									
Walker Creek	Reach 2	2146	Culvert						
Walker Creek	Reach 2	2161	100 Year_SCS 24	87.67					
87.65	0.03				5.05				
11.99									
Walker Creek	Reach 2	2161	Future Scenario	87.98					
87.95	0.03				6.06				
16.23									
Walker Creek	Reach 2	2169	100 Year_SCS 24	87.69					
87.67	0.02	0.01	0.00	0.27	4.62	0.16			
12.28									
Walker Creek	Reach 2	2169	Future Scenario	87.99					

87.98	0.02	0.01	0.00	0.53	5.19	0.34		
16.56								
Walker Creek	Reach 2	2241	100 Year_SCS 24					87.96
87.88	0.08	0.25	0.02	0.24	4.15	0.67		
10.35								
Walker Creek	Reach 2	2241	Future Scenario					88.18
88.12	0.06	0.17	0.01	0.68	4.47	0.91		
15.61								
Walker Creek	Reach 2	2320	100 Year_SCS 24					88.52
88.46	0.06	0.56	0.00	0.46	4.39	0.20		
8.24								
Walker Creek	Reach 2	2320	Future Scenario					88.66
88.59	0.07	0.48	0.00	0.70	5.11	0.25		
9.90								
Walker Creek	Reach 2	2400	100 Year_SCS 24					89.05
88.96	0.09	0.52	0.01	0.23	4.61	0.22		
8.94								
Walker Creek	Reach 2	2400	Future Scenario					89.19
89.10	0.09	0.52	0.01	0.40	5.26	0.40		
12.32								
Walker Creek	Reach 2	2479	100 Year_SCS 24					89.38
89.36	0.02	0.33	0.01	0.15	4.73	0.17		
12.85								
Walker Creek	Reach 2	2479	Future Scenario					89.51
89.49	0.02	0.32	0.01	0.26	5.52	0.27		
14.33								
Walker Creek	Reach 2	2491	100 Year_SCS 24					89.40
89.39	0.00	0.01	0.01	0.08	4.67	0.30		
18.27								
Walker Creek	Reach 2	2491	Future Scenario					89.53
89.53	0.01	0.01	0.01	0.12	5.57	0.37		
19.30								

Walker Creek Reach 2 2504 Culvert

Walker Creek Reach 2 2517 100 Year_SCS 24 89.82
89.79 0.03 4.78 0.28
11.05
Walker Creek Reach 2 2517 Future Scenario 89.94
89.91 0.03 0.12 5.56 0.39
18.80

Walker Creek Reach 2 2523 100 Year_SCS 24 89.91
89.78 0.13 0.03 0.03 0.10 4.82 0.13
14.90
Walker Creek Reach 2 2523 Future Scenario 89.98
89.89 0.09 0.03 0.02 0.18 5.61 0.28
17.47