



# Stormwater Management Design Report

I-20 Improvement Project Design-Build  
Preparation On-Call

SCDOT Project ID# P027003

*Lexington County, South Carolina*  
August 28, 2015

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# 1 Project Summary

The South Carolina Department of Transportation (SCDOT) proposes to widen Interstate 20 (I-20) from a four-lanes to six-lanes in Lexington County, South Carolina. The project limits begin 1 mile west of U.S. 378 near mile marker 60 between the Meadow Glen Elementary and Middle Schools and ends approximately 1 mile past S-204 (Longs Pond Road). Within these limits, I-20 currently serves as an east-west four-lane divided interstate highway. The scope of the project includes adding a travel lane in each direction to I-20, improving various exit ramps, replacing or widening the parallel mainline bridges over Norfolk Southern Railroad, safety improvements to various intersections, and a potential noise wall along Ginny Lane. The purpose of the project is to improve the operation and efficiency of I-20 by increasing the capacity of the interstate. The proposed widening will be located within the existing median of I-20. It is assumed that the project limits and construction impacts will fall within the existing right-of-way for all improvements. The SCDOT has contracted with HDR | ICA to complete the drainage and outfall field surveys, pipe inspections, and preliminary hydraulic design in order to support the SCDOT with preparation of the design-build package.

I-20 is an east-west interstate route that provides a direct connection to Atlanta, Georgia with Columbia, South Carolina. Within the project limits, I-20 currently ranges from a four to six-lane divided freeway with a grassed median, jersey barrier median, and a cable median barrier. The posted speed limit of the interstate varies from 60 mph to 70 mph.

Existing drainage structures were initially located using topographic and field survey information. A field study was performed to verify the locations and sizes of the existing pipes and to evaluate the existing drainage conditions. Project mapping and U.S. Geological Survey (USGS) quadrangles of the project area were used to identify the overall drainage pattern. The land use along the project corridor is predominately developed with pockets of residential areas and wooded areas. The proposed construction for the I-20 Improvement Project will maintain the existing drainage pattern. Within the project limits, runoff generally flows towards Twelvemile Creek and Red Bank Creek. Twelvemile Creek begins in Gilbert, South Carolina and discharges into the Saluda River approximately 4 miles downstream of the Lake Murray Dam. Red Bank Creek begins in Lexington, South Carolina and transitions into the Congaree Creek and empties into the Congaree River approximately 6 miles downstream of U.S. Route 21 (Knox Abbott Drive). The watersheds for Twelvemile Creek and Red Bank Creek encompass over 31 and 32 square miles, respectively.

There were 27 outfalls studied in a pre- versus post-construction analysis as part of the project. All of the outfalls studied drain to unnamed tributaries and the ultimate receiving water bodies are Twelvemile Creek and Red Bank Creek. All of the outfalls have been reviewed regarding pre- versus post-construction conditions to determine the potential impacts from the project. The proposed construction should have no significant adverse effects downstream of the project.

Project location maps and the firmettes of the effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps are provided in Section 2.0. The following FEMA Flood Insurance Rate Maps provide complete coverage of the project area:

Lexington County FIRM Panel No. 45063C0143  
Lexington County FIRM Panel No. 45063C0144  
Lexington County FIRM Panel No. 45063C0234  
Lexington County FIRM Panel No. 45063C0241  
Lexington County FIRM Panel No. 45063C0242



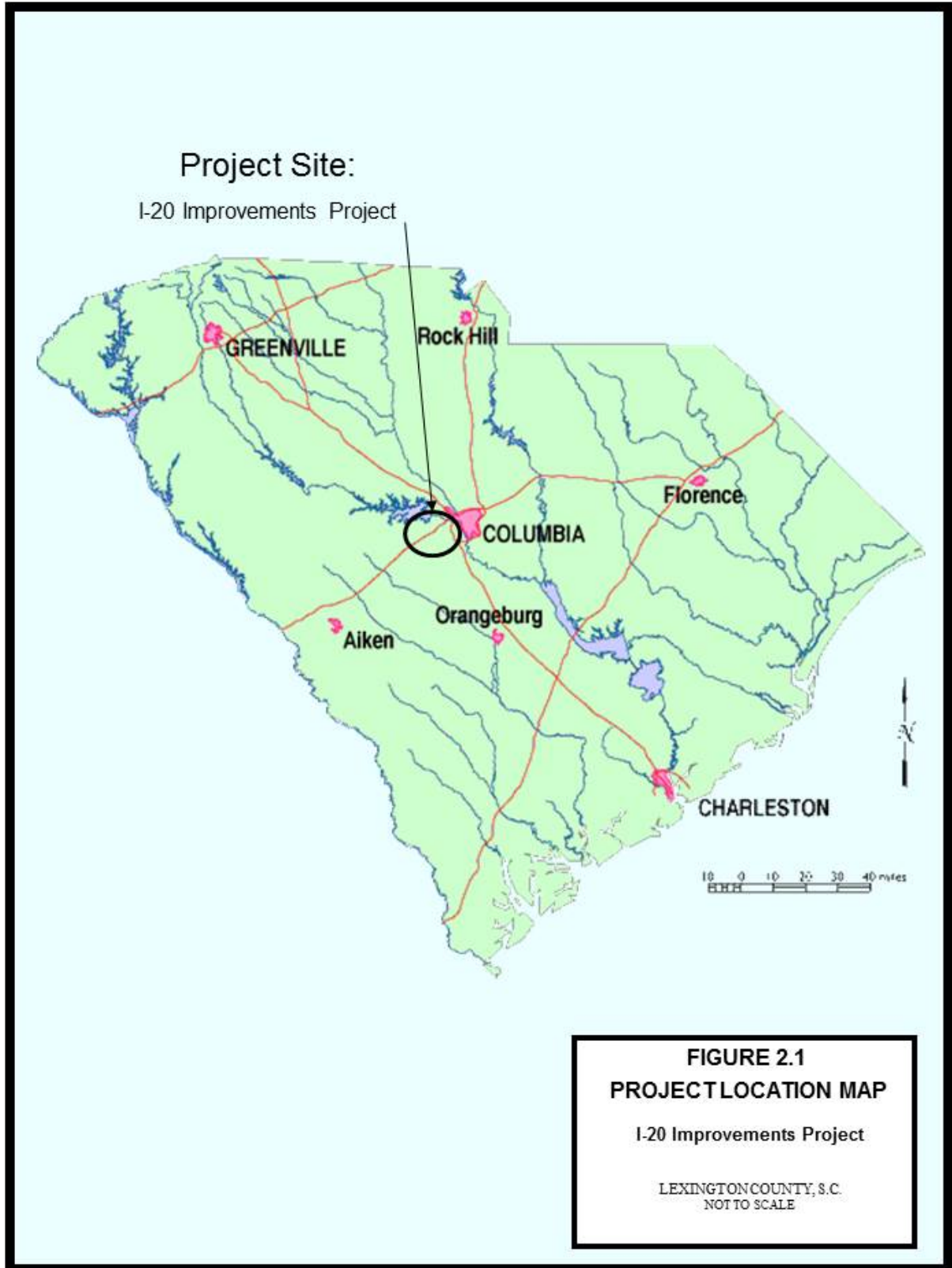
Lexington County FIRM Panel No. 45063C0252  
Lexington County FIRM Panel No. 45063C0253  
Lexington County FIRM Panel No. 45063C0254  
Lexington County FIRM Panel No. 45063C0256

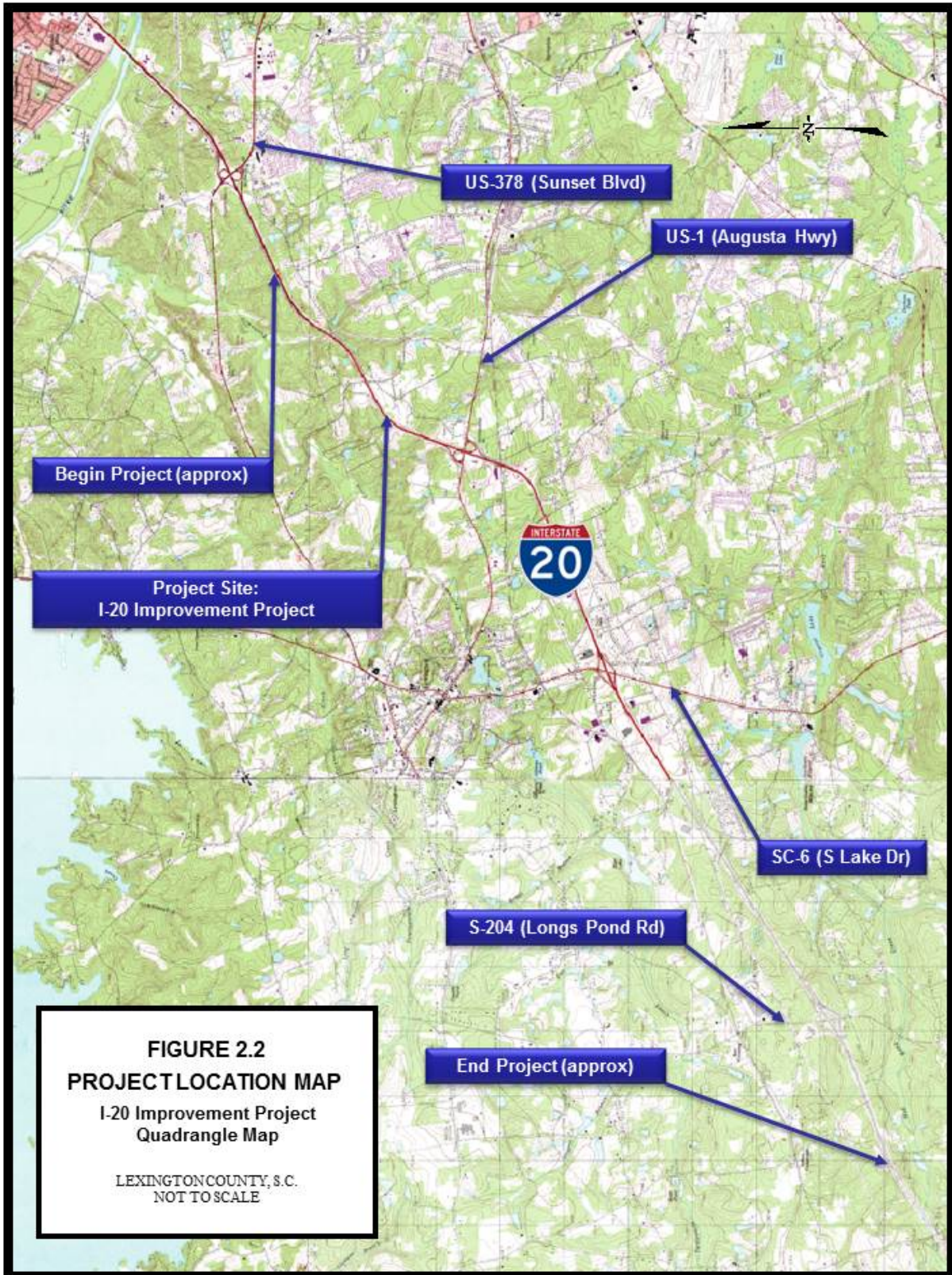
FEMA Firmettes are provided in Section 2.0 for project area for two Special Flood Hazard Areas in the vicinity of the project and one Special Flood Hazard Area crossing.

- Station 210+00 – Unnamed Tributary to Twelvemile Creek – FEMA maps indicate a Zone A Special Flood Hazard Area located downstream of the project. The floodplain is located outside of the project area and there is minimal potential for impacts as the result of the project.
- Station 265+60 – Unnamed Tributary to Twelvemile Creek – FEMA maps indicate a Zone A Special Flood Hazard Area is located downstream of the project. As a Zone A area, the limits of the floodplain and floodplain elevation are approximate. The existing cross-line will be retained for this crossing and culvert extensions are not expected. The potential impacts to the downstream floodplain are minimal.
- Station 754+85 – Unnamed Tributary to Red Bank Creek – FEMA maps indicate a Zone A Special Flood Hazard Area crosses the project area. Culvert extensions or fill within the floodplain is not anticipated for this project. Preliminary hydraulic analysis indicated the culvert satisfies design criteria. The Zone A designation indicates an analysis will be required based on the final design to verify the project will comply with SCDOT Design Requirements for Zone A floodplains. Anticipated impacts to the floodplain as a result of the project are minimal.

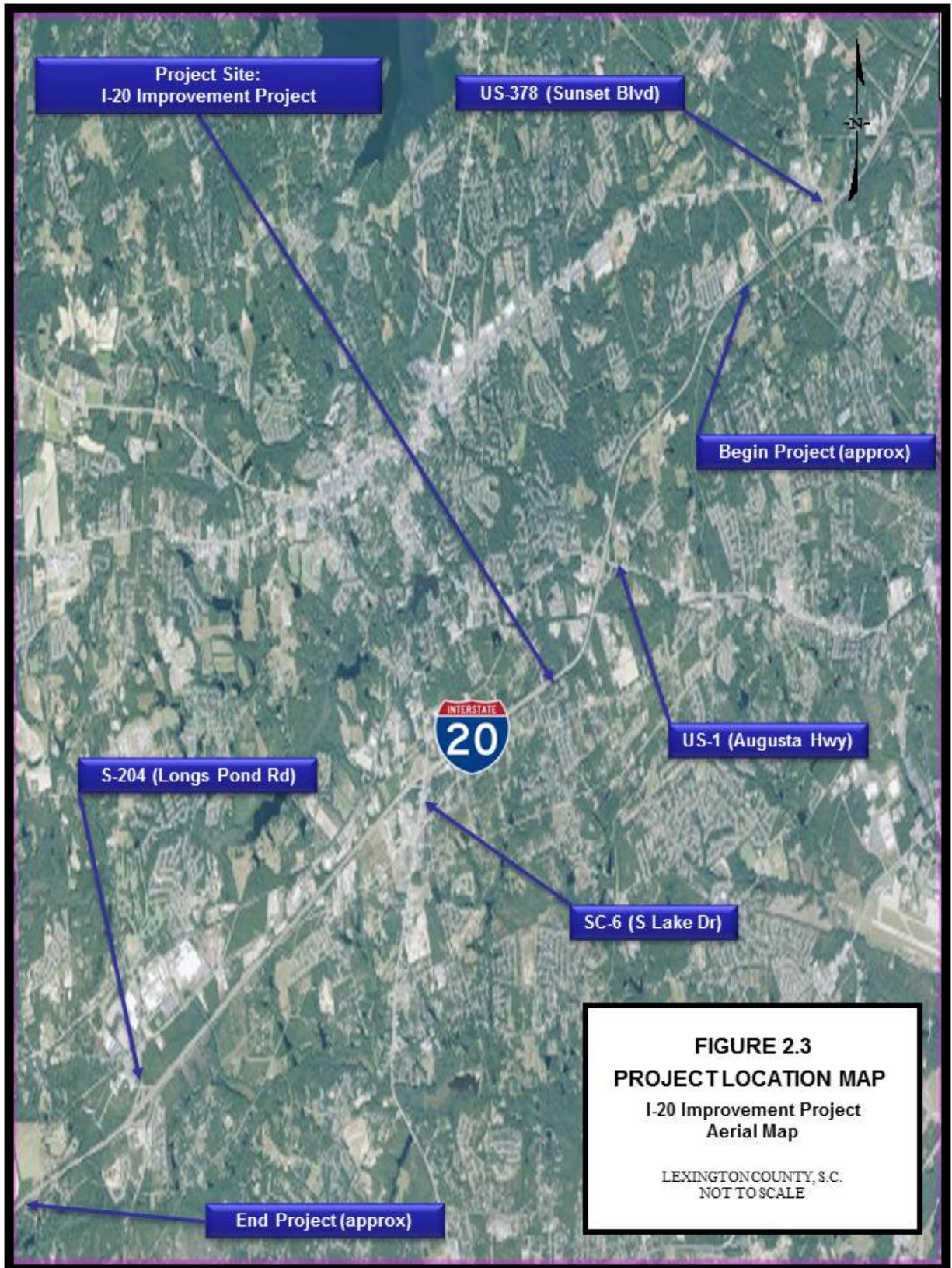
The drainage analysis and stormwater management techniques comply with SCDOT Requirements for Hydraulic Design Studies, published May 26, 2009.

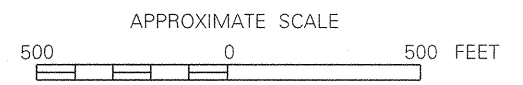
## 2 Project Location Maps











**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
 LEXINGTON COUNTY,  
 SOUTH CAROLINA  
 AND INCORPORATED AREAS

**PANEL 256 OF 575**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEXINGTON COUNTY	450129	0256	G

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

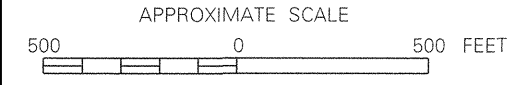
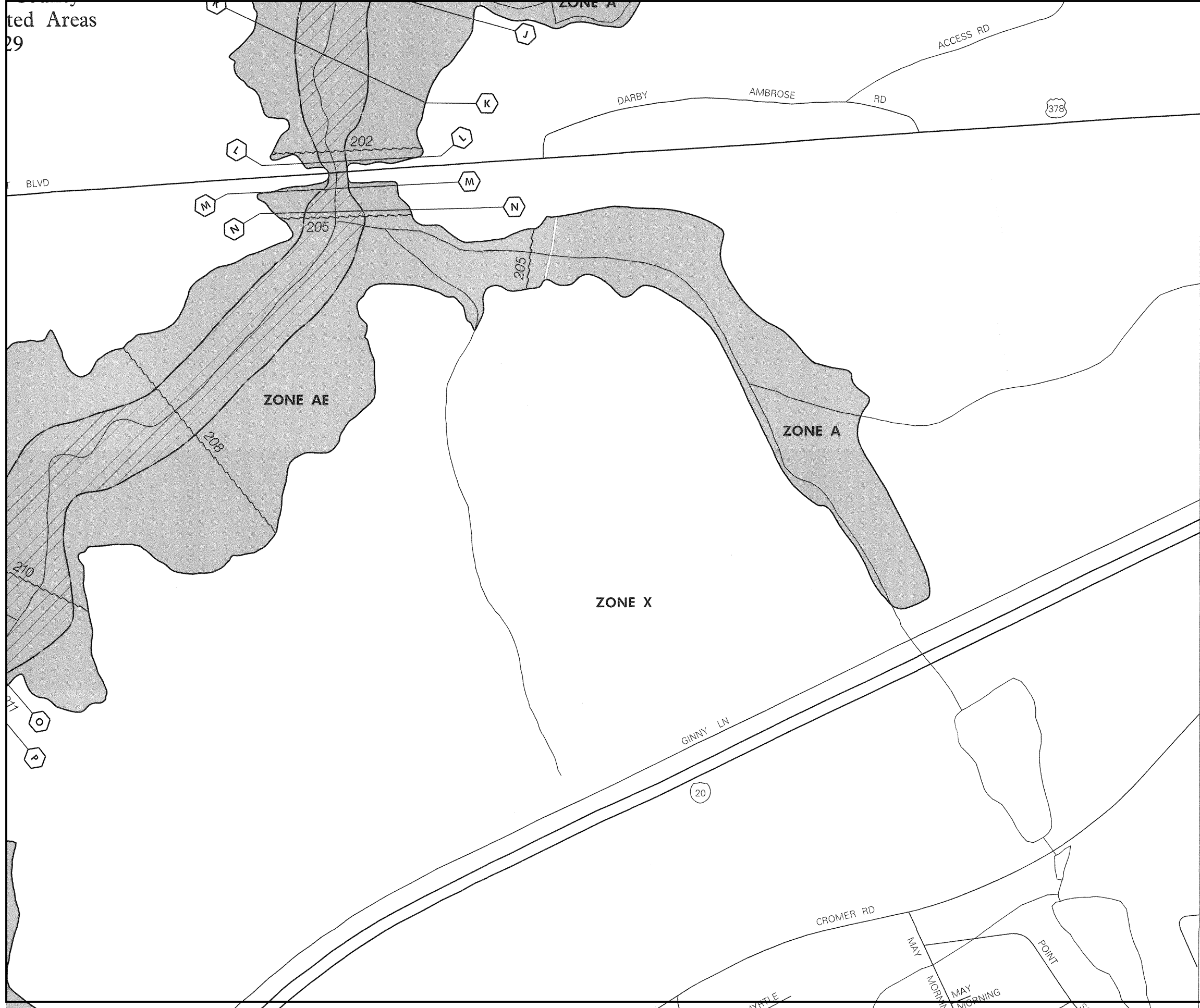
**MAP NUMBER**  
**45063C0256 G**

**MAP REVISED:**  
**FEBRUARY 9, 2000**



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM  
FLOOD INSURANCE RATE MAP  
LEXINGTON COUNTY,  
SOUTH CAROLINA  
AND INCORPORATED AREAS**

**PANEL 143 OF 575**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEXINGTON COUNTY	450129	0143	G

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**MAP NUMBER  
45063C0143 G**

**MAP REVISED:  
FEBRUARY 9, 2000**



Federal Emergency Management Agency

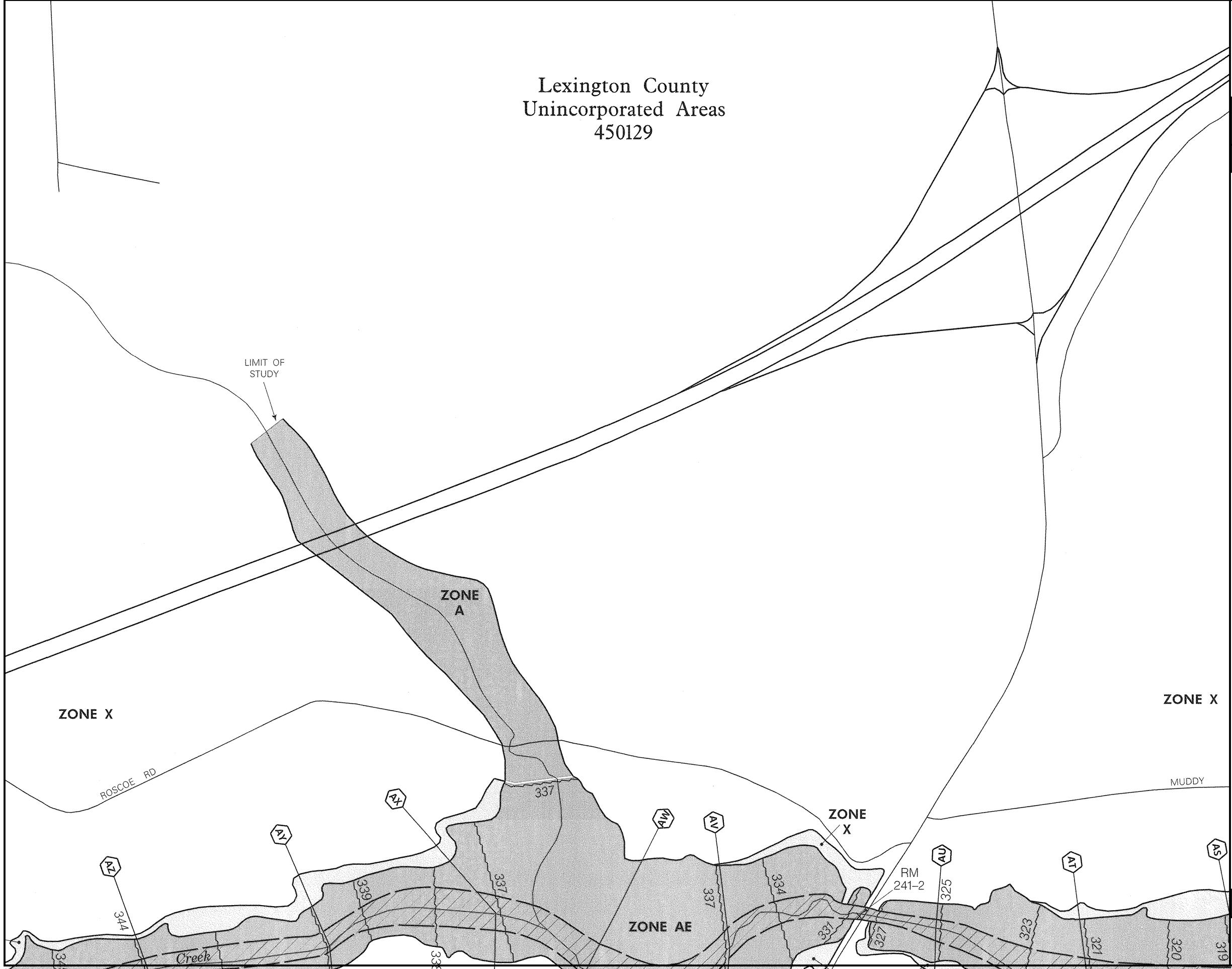
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



Lexington County  
Unincorporated Areas  
450129



APPROXIMATE SCALE  
500 0 500 FEET



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP  
LEXINGTON COUNTY,  
SOUTH CAROLINA  
AND INCORPORATED AREAS

**PANEL 241 OF 575**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEXINGTON COUNTY	450129	0241	G

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
**45063C0241 G**

**MAP REVISED:**  
**FEBRUARY 9, 2000**



Federal Emergency Management Agency

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### 3 Soils Information

The I-20 Improvement Project is located in the Sand Hills Region of South Carolina. The project corridor begins 1 mile west of U.S. 378 between the Meadow Glen Elementary and Middle Schools and ends approximately 1 mile past S-204 (Longs Pond Road).

The Soil Survey of Lexington County published by the Natural Resources Conservation Service (NRCS) indicates the presence of two predominant soil types within the project watersheds. These two soil types are Fuquay Loamy Sand (Hydrologic Soil Group C) and Lakeland Soils (Hydrologic Soil Group A).

**Figure 3-1. Hydrologic Regions of South Carolina**

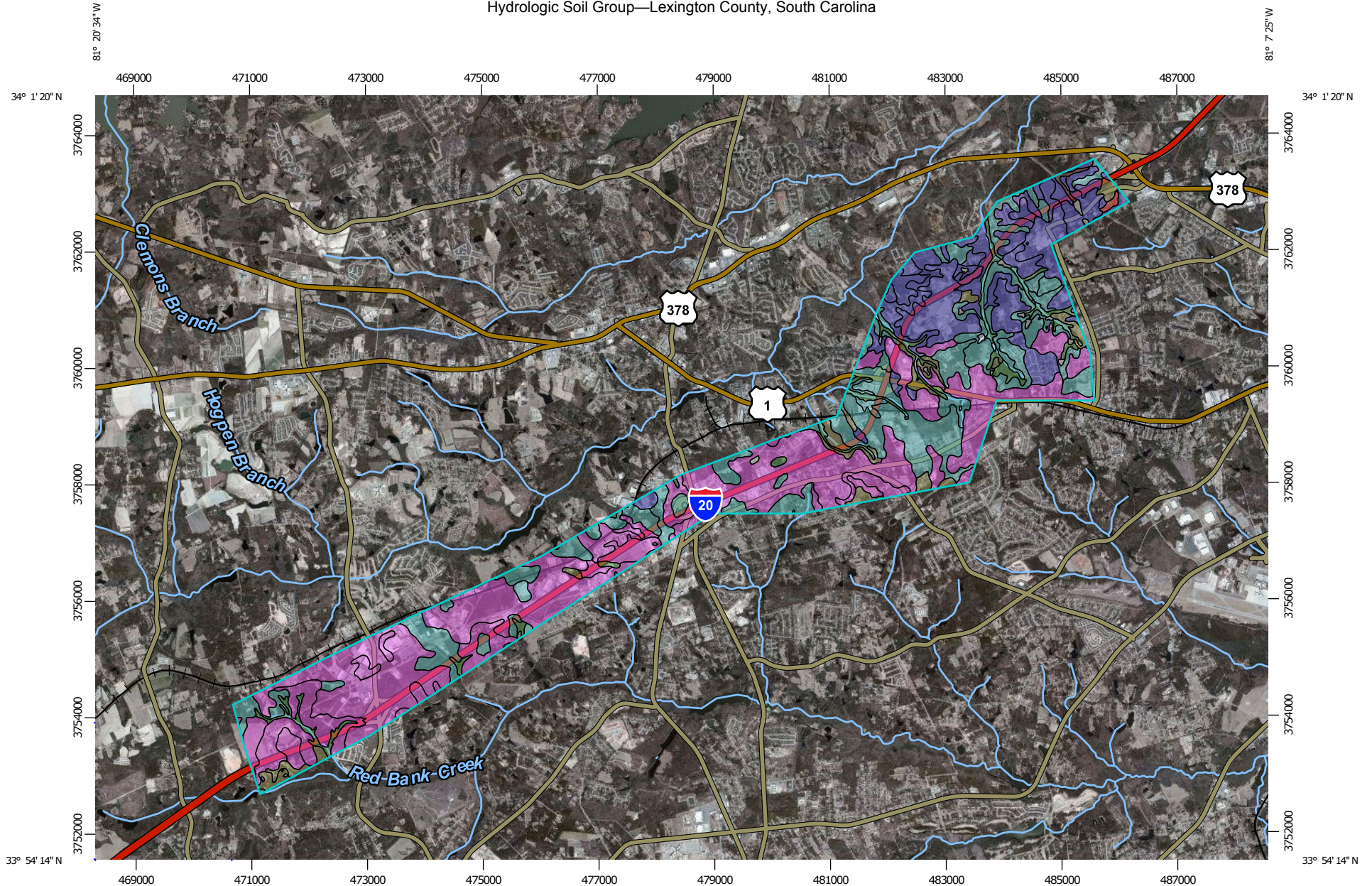


Group A Soils have a high infiltration rate when thoroughly wet and consist chiefly of deep, well drained to excessively drained sands or gravelly sands. Group B soils have a moderate infiltration rate when thoroughly wet and consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. Group C Soils have a slow infiltration rate when thoroughly wet and consist chiefly of soils having a layer that impedes the downward movement of water or soils of fine texture. Group D Soils have a very slow infiltration rate when thoroughly wet and consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a clay layer at or near the surface, and soils that are shallow over nearly impervious material. When soils are assigned to dual hydrologic groups (A/D, B/D, or C/D) the first letter represents drained areas and the second letter represents undrained areas. For this report, soils assigned to dual hydrologic groups will be modeled as Group D soils. Descriptions of the predominant soil groups can be found in this section of the report.

The land use along the project corridor is predominately developed areas with pockets of residential areas and wooded areas. Project outfalls are located at existing drainage features that flow to either Twelvemile Creek or Red Bank Creek. The proposed construction will not significantly impact the existing drainage pattern.



Hydrologic Soil Group—Lexington County, South Carolina



Map Scale: 1:92,600 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84



### MAP LEGEND

**Area of Interest (AOI)**









 Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**





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

**Soil Rating Lines**


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

**Soil Rating Points**






-  A
-  A/D
-  B
-  B/D

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


**Water Features**

 Streams and Canals

**Transportation**

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

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Lexington County, South Carolina  
 Survey Area Data: Version 13, Sep 20, 2014

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

Date(s) aerial images were photographed: Feb 26, 2010—Feb 28, 2010

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



## Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Lexington County, South Carolina (SC063)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgB	Alaga loamy sand, 0 to 4 percent slopes	A	47.5	0.7%
BnC	Blaney sand, 2 to 10 percent slopes	C	681.5	9.3%
Ch	Chenneby silty clay loam	B/D	15.0	0.2%
DoA	Dothan loamy sand, 0 to 2 percent slopes	B	105.4	1.4%
DoB	Dothan loamy sand, 2 to 6 percent slopes	B	555.3	7.6%
EnB	Enon silt loam, 2 to 6 percent slopes	D	11.4	0.2%
Eo	Enoree silt loam, 0 to 2 percent slopes, frequently flooded	A/D	0.7	0.0%
FaB	Fuquay loamy sand, 0 to 6 percent slopes	C	842.0	11.5%
FaC	Fuquay loamy sand, 6 to 10 percent slopes	C	43.0	0.6%
GeB	Georgeville very fine sandy loam, 2 to 6 percent slopes	B	89.3	1.2%
GeC	Georgeville very fine sandy loam, 6 to 10 percent slopes	B	395.6	5.4%
GeD	Georgeville very fine sandy loam, 10 to 15 percent slopes	B	175.7	2.4%
Gp	Gravel pit		3.3	0.0%
HrB	Herndon silt loam, 2 to 6 percent slopes	B	56.1	0.8%
JO	Johnston soils	A/D	256.0	3.5%
LAB	Lakeland soils, undulating	A	2,628.5	36.0%
LkD	Lakeland sand, 6 to 15 percent slopes	A	633.2	8.7%
NaD	Nason silt loam, 6 to 15 percent slopes	C	72.7	1.0%
PeA	Pelion loamy sand, 0 to 2 percent slopes	C/D	13.6	0.2%
PeB	Pelion loamy sand, 2 to 6 percent slopes	C/D	119.5	1.6%
PeC	Pelion loamy sand, 6 to 10 percent slopes	C/D	125.3	1.7%

Hydrologic Soil Group— Summary by Map Unit — Lexington County, South Carolina (SC063)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ra	Rains sandy loam	A/D	25.4	0.3%
TaE	Tatum silt loam, 15 to 25 percent slopes	C	131.8	1.8%
TrB	Troup sand, 0 to 6 percent slopes	A	136.7	1.9%
VaC	Vaucluse loamy sand, 6 to 10 percent slopes	C	46.9	0.6%
VaE	Vaucluse loamy sand, 10 to 25 percent slopes	C	14.6	0.2%
W	Water		45.5	0.6%
WaB	Wahee sandy loam, 0 to 4 percent slopes	C/D	26.6	0.4%
<b>Totals for Area of Interest</b>			<b>7,297.8</b>	<b>100.0%</b>

## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

## Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

## Report—Map Unit Description (Brief, Generated)

### Lexington County, South Carolina

**Map Unit:** AgB—Alaga loamy sand, 0 to 4 percent slopes

**Component:** Alaga (100%)

The Alaga component makes up 100 percent of the map unit. Slopes are 0 to 4 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

**Map Unit:** BnC—Blaney sand, 2 to 10 percent slopes



**Component:** Blaney (100%)

The Blaney component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on marine terraces on sandhills. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

**Map Unit:** Ch—Chenneby silty clay loam

**Component:** Chenneby (90%)

The Chenneby component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on coastal plains. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, November, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

**Component:** Paleaquults (5%)

Generated brief soil descriptions are created for major components. The Paleaquults soil is a minor component.

**Map Unit:** DoA—Dothan loamy sand, 0 to 2 percent slopes

**Component:** Norfolk (100%)

The Norfolk component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during January, February, March, April. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

**Map Unit:** DoB—Dothan loamy sand, 2 to 6 percent slopes

**Component:** Barnwell (100%)

The Barnwell component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during January, February, March, April. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** EnB—Enon silt loam, 2 to 6 percent slopes

**Component:** Enon (100%)

The Enon component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on hillslopes on Piedmont uplands. The parent material consists of clayey residuum weathered from mixed acid and basic igneous rock. Depth to a root restrictive layer, bedrock, paralithic, is 24 to 48 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** Eo—Enoree silt loam, 0 to 2 percent slopes, frequently flooded

**Component:** Enoree, frequently flooded (87%)

The Enoree, frequently flooded component makes up 87 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on piedmonts. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

**Map Unit:** FaB—Fuquay loamy sand, 0 to 6 percent slopes

**Component:** Fuquay (100%)

The Fuquay component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

**Map Unit:** FaC—Fuquay loamy sand, 6 to 10 percent slopes

**Component:** Fuquay (100%)

The Fuquay component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

**Map Unit:** GeB—Georgeville very fine sandy loam, 2 to 6 percent slopes

**Component:** Georgeville (100%)

The Georgeville component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on hillslopes on Carolina Slate Belt uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** GeC—Georgeville very fine sandy loam, 6 to 10 percent slopes

**Component:** Georgeville (100%)

The Georgeville component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on hillslopes on Carolina Slate Belt uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** GeD—Georgeville very fine sandy loam, 10 to 15 percent slopes

**Component:** Georgeville (100%)

The Georgeville component makes up 100 percent of the map unit. Slopes are 10 to 15 percent. This component is on hillslopes on Carolina Slate Belt uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

**Map Unit:** Gp—Gravel pit

**Component:** Gravel pit (100%)

Generated brief soil descriptions are created for major soil components. The Gravel pit is a miscellaneous area.

**Map Unit:** HrB—Herndon silt loam, 2 to 6 percent slopes

**Component:** Herndon (90%)

The Herndon component makes up 90 percent of the map unit. Slopes are 2 to 6 percent. This component is on interfluves on uplands. The parent material consists of residuum weathered from phyllite. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** JO—Johnston soils

**Component:** Johnston (100%)

The Johnston component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is occasionally ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, November, December. Organic matter content in the surface horizon is about 10 percent. Nonirrigated land capability classification is 7w. This soil meets hydric criteria.

**Map Unit:** LAB—Lakeland soils, undulating

**Component:** Lakeland (100%)

The Lakeland component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria.

**Map Unit:** LkD—Lakeland sand, 6 to 15 percent slopes

**Component:** Lakeland (100%)

The Lakeland component makes up 100 percent of the map unit. Slopes are 6 to 15 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

**Map Unit:** NaD—Nason silt loam, 6 to 15 percent slopes

**Component:** Nason (100%)

The Nason component makes up 100 percent of the map unit. Slopes are 6 to 15 percent. This component is on hillslopes on Carolina Slate Belt uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer, bedrock, paralithic, is 24 to 48 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** PeA—Pelion loamy sand, 0 to 2 percent slopes

**Component:** Pelion (100%)

The Pelion component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

**Map Unit:** PeB—Pelion loamy sand, 2 to 6 percent slopes

**Component:** Pelion (100%)

The Pelion component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** PeC—Pelion loamy sand, 6 to 10 percent slopes

**Component:** Pelion (100%)

The Pelion component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

**Map Unit:** Ra—Rains sandy loam

**Component:** Rains (100%)

The Rains component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions on coastal plains. The parent material consists of loamy fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

**Map Unit:** TaE—Tatum silt loam, 15 to 25 percent slopes

**Component:** Tatum (100%)

The Tatum component makes up 100 percent of the map unit. Slopes are 15 to 25 percent. This component is on hillslopes on Carolina Slate Belt uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer, bedrock, paralithic, is 24 to 48 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

**Map Unit:** TrB—Troup sand, 0 to 6 percent slopes

**Component:** Troup (100%)



The Troup component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

**Map Unit:** VaC—Vaucluse loamy sand, 6 to 10 percent slopes

**Component:** Vaucluse (100%)

The Vaucluse component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** VaE—Vaucluse loamy sand, 10 to 25 percent slopes

**Component:** Vaucluse (100%)

The Vaucluse component makes up 100 percent of the map unit. Slopes are 10 to 25 percent. This component is on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

**Map Unit:** W—Water

**Component:** Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

**Map Unit:** WaB—Wahee sandy loam, 0 to 4 percent slopes



**Component: Wahee (96%)**

The Wahee component makes up 96 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces on coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, December. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

**Component: Lumbee (2%)**

Generated brief soil descriptions are created for major components. The Lumbee soil is a minor component.

**Component: Rains (2%)**

Generated brief soil descriptions are created for major components. The Rains soil is a minor component.

**Data Source Information**

Soil Survey Area: Lexington County, South Carolina

Survey Area Data: Version 13, Sep 20, 2014

## 4 Stormwater Analysis

The stormwater management and roadway drainage analysis for this project have been completed according to the SCDOT *Requirements for Hydraulic Design Studies*, published May 26, 2009. Specific design standards and analysis techniques are discussed below.

### **Pre- versus Post-Construction (Watershed) Analysis:**

Drainage areas for this project were delineated using field surveys of the project area provided by SCDOT. Drainage areas were also studied with the U.S. Geological Survey's topographic quadrangles at a scale of 1:24,000.

Watersheds were analyzed based on their size with the appropriate method as described in the SCDOT *Requirements for Hydraulic Design Studies* (May 2009). The time of concentration for each watershed was calculated based on the methodology outlined in the Soil Conservation Service's Urban Hydrology for Small Watersheds (Technical Release 55) "TR-55" publication, dated June 1986. The time of concentration, watershed size, and land uses were used to develop peak runoff volumes for the design rainfall events.

There were 27 outfalls studied in a pre- versus post-construction analysis as part of the project. All of the outfalls studied drain to unnamed tributaries and the ultimate receiving water bodies are Twelvemile Creek and Red Bank Creek. All of the outfalls have been reviewed regarding pre- versus post-construction conditions to determine the potential impacts from the project. Based on the limited increase in pavement area compared to that of each outfall drainage area, no detention is required for the project. The proposed construction should have no significant adverse effects downstream of the project.

### **Cross-Line Analysis:**

Cross-lines were analyzed according to the SCDOT's *Requirements for Hydraulic Design Studies*, dated May 26, 2009. Design storms were selected based on the roadway classifications. Cross-line pipes along I-20 will be analyzed for the 50-year and 100-year design storms. The Federal Highway Administration's HY-8 program was used to evaluate the performance of the existing cross-lines. Calculations and HY-8 output is located in Section 4.2 of this report.

### **Cross-line Drainage System:**

Cross-line drainage systems on the project were analyzed for the 50-year and 100-year design storms. GEOPAK Drainage was used to analyze the existing cross-line drainage systems.

### **Rainfall Depths (SCS Method):**

Rainfall depths for use in the SCS Method for determining peak runoff volumes were obtained from South Carolina Department of Health and Control (SCDHEC). The project is located in Lexington County. The rainfall depths for Lexington County will be used for the analysis and are provided in the table below.

**Table 4-1. 24-Hour Rainfall Depths (SCDHEC)**

County Name	Return Period 24 Hour Storm Event (Inches)						
	1	2	5	10	25	50	100
Lexington, SC	3.1	3.6	4.5	5.3	6.4	7.3	8.3

**Rainfall Intensity Values (Rational Method):**

The SCDOT has provided coefficients used to calculate rainfall intensity values for areas throughout the state. The coefficients that describe Lexington County are provided in the table below.

**Table 4-2. Lexington Rainfall Coefficients**

Frequency	a	b	c
2-Year	243.38820	35.11116	1.03249
5-Year	257.20585	32.95479	1.01898
10-Year	266.59333	31.54121	1.00995
25-Year	279.10068	29.68983	0.99799
50-Year	287.98860	28.36995	0.98949
100-Year	295.95202	27.15897	0.98180

$$\text{Intensity Equation} - i = a / (b + tc)^c$$

The storm water management and roadway drainage analysis required for this project are provided in this section.

## 4.1 Pre- Versus Post-Construction Analysis

There were 27 outfalls studied in a pre- versus post-construction analysis as part of the project. All of the outfalls studied drain to unnamed tributaries and the ultimate receiving water bodies are Twelvemile Creek and Red Bank Creek. All of the outfalls have been reviewed regarding pre- versus post-construction conditions to determine the potential impacts from the project. The proposed construction should have no significant adverse effects downstream of the project. The watershed hydrologic analyses are provided in this section.

**Outfall #1 [Rt.] Sta.229+00 (Ginny Lane)**  
**Outfall Ditch Btw. Meadow Glen Schools**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #1 is approximately 31 acres. The existing watershed includes, grassed areas, residential areas and paved areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 30.56

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
3.74	0.90	Pavements & Roofs
1.00	0.25	Grass Shoulders
5.47	0.30	Meadows & Pasture Land
8.56	0.50	Suburban, Normal Residential
11.79	0.15	Woodland & Forest
0.00	0.20	Unimproved Areas

Weighted c-value = 0.37

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 0.891 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.375
10 year	3.000
25 year	3.386
50 year	3.685
100 year	3.976

Peak Runoff, Q =

$$Q = C_f C I A$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.37	2.37	30.56	=	26.85	cfs
10	1	0.37	3.00	30.56	=	33.92	cfs
25	1.1	0.37	3.39	30.56	=	42.11	cfs
50	1.2	0.37	3.69	30.56	=	50.00	cfs
100	1.25	0.37	3.98	30.56	=	56.18	cfs

**Outfall #1 [Rt.] Sta.229+00 (Ginny Lane)**  
**Outfall Ditch Btw. Meadow Glen Schools****Continued**

Runoff from the existing watershed flows overland and then through a cross-line drainage system under I-20 and discharges into an outfall ditch that runs between the Meadow Glen Schools.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #1.

Proposed Conditions Total Drainage Area = 30.56 acres

Additional Impervious Area = 0.69 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
4.43	-	0.90	Pavements & Roofs	
0.31	-	0.25	Grass Shoulders	
5.47	-	0.30	Meadows & Pasture Land	
8.56	-	0.50	Suburban, Normal Residential	
11.79	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.38

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.891 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.375
10 year	3.000
25 year	3.386
50 year	3.685
100 year	3.976

**Outfall #1 [Rt.] Sta.229+00 (Ginny Lane)**  
**Outfall Ditch Btw. Meadow Glen Schools****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.38	2.37	30.56	=	27.92 cfs
10	1	0.38	3.00	30.56	=	35.26 cfs
25	1.1	0.38	3.39	30.56	=	43.78 cfs
50	1.2	0.38	3.69	30.56	=	51.98 cfs
100	1.25	0.38	3.98	30.56	=	58.41 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	26.85	27.92	1.07	3.97%
10	33.92	35.26	1.35	3.97%

The additional 1.35 cfs runoff for the 10-year design storm will be collected by an outfall ditch that flows between Meadow Glen Elementary and Middle Schools. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 1 Pre-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 229+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	880.000	50.000
9. Watercourse slope, ft/ft	0.017	0.240
10. Average velocity, ft/s	2.106	9.959
11. Computed Tc, hr	0.116	0.001

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.116</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 0.891 hr = 53.475 min**



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 1 Post-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 229+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr = 0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	880.000	65.000
9. Watercourse slope, ft/ft	0.017	0.185
10. Average velocity, ft/s	2.106	8.734
11. Computed Tc, hr	0.116	0.002

<b>Total Shallow Conc. Flow Tc, hr = 0.116</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
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**Time of Concentration = 0.891 hr = 53.475 min**



**OUTFALL NO. 1 (PRE)**  
DA = 1,331,194 SF (30.56 AC)  
IMPERV AREA = 162,914 SF  
CN = 0.37  
Tc = 0.89 hr

**OUTFALL NO. 1 (POST)**  
DA = 1,331,194 SF (30.56 AC)  
IMPERV AREA = 192,971 SF  
CN = 0.38  
Tc = 0.89 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 1 STA. 229 + 00**  
**SCALE: 1" = 1000'**



**Outfall #2 [Rt.] Sta.248+50 (Ginny Lane)**

**Outfall ditch that runs behind Wellesley subdivision**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #2 is approximately 40 acres. The existing watershed includes, grassed areas, residential areas, paved areas and large wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 39.90

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
4.50	0.90	Pavements & Roofs
2.50	0.25	Grass Shoulders
8.09	0.30	Meadows & Pasture Land
2.00	0.50	Suburban, Normal Residential
22.81	0.15	Woodland & Forest
0.00	0.20	Unimproved Areas

Weighted c-value = 0.29

Rainfall Intensity, I =

Lexington, SC

Time of Concentration, tc = 0.903 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.356
10 year	2.976
25 year	3.358
50 year	3.655
100 year	3.943

Peak Runoff, Q =

$Q = C_f CIA$

Design Storm	Cf	C	I	A	=	Q	
2	1	0.29	2.36	39.90	=	27.15	cfs
10	1	0.29	2.98	39.90	=	34.30	cfs
25	1.1	0.29	3.36	39.90	=	42.57	cfs
50	1.2	0.29	3.66	39.90	=	50.55	cfs
100	1.25	0.29	3.94	39.90	=	56.79	cfs

**Outfall #2 [Rt.] Sta.248+50 (Ginny Lane)****Outfall ditch that runs behind Wellesley subdivision****Continued**

Runoff from the existing watershed sheet flows overland and then through a box culvert under I-20 and discharges to an outfall ditch behind the Wellesley subdivision.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #2.

Proposed Conditions Total Drainage Area = 39.90 acres

Additional Impervious Area = 1.22 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
5.72	-	0.90	Pavements & Roofs	
1.28	-	0.25	Grass Shoulders	
8.09	-	0.30	Meadows & Pasture Land	
2.00	-	0.50	Suburban, Normal Residential	
22.81	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.31

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.903 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.356
10 year	2.976
25 year	3.358
50 year	3.655
100 year	3.943

**Outfall #2 [Rt.] Sta.248+50 (Ginny Lane)****Outfall ditch that runs behind Wellesley subdivision****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.31	2.36	39.90	=	29.02 cfs
10	1	0.31	2.98	39.90	=	36.66 cfs
25	1.1	0.31	3.36	39.90	=	45.50 cfs
50	1.2	0.31	3.66	39.90	=	54.02 cfs
100	1.25	0.31	3.94	39.90	=	60.70 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	27.15	29.02	1.87	6.88%
10	34.30	36.66	2.36	6.88%

The additional 2.36 cfs runoff for the 10-year design storm will be collected by an outfall ditch that runs behind the Wellesley subdivision. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 2 Post-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 248+50  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1565.000	120.000
9. Watercourse slope, ft/ft	0.045	0.117
10. Average velocity, ft/s	3.412	6.943
11. Computed Tc, hr	0.127	0.005

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.127</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 0.903 hr = 54.156 min**



**OUTFALL NO. 2 (PRE)**

**DA = 1,738,044 SF (39.90 AC)**

**IMPERV AREA = 196,020 SF**

**CN = 0.29**

**Tc = 0.90 hr**

**OUTFALL NO. 2 (POST)**

**DA = 1,738,044 SF (39.90 AC)**

**IMPERV AREA = 249,163 SF**

**CN = 0.31**

**Tc = 0.90 hr**

**I-20 IMPROVEMENT  
PROJECT**

**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 2 STA. 248+50**

**SCALE: 1" = 1000'**



**Outfall #3 [Rt.] Sta.250+00 (Ginny Lane)**

**Outfall ditch that runs behind the Wellesley subdivision**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #3 is approximately 6 acres. The existing watershed includes, grassed areas, paved areas and large wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 5.54

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
0.30	- 0.90	Pavements & Roofs
0.36	- 0.25	Grass Shoulders
0.00	- 0.30	Meadows & Pasture Land
0.00	- 0.50	Suburban, Normal Residential
4.88	- 0.15	Woodland & Forest
0.00	- 0.20	Unimproved Areas
Weighted c-value =		0.20

Rainfall Intensity, I =

Lexington, SC

Time of Concentration, tc = 0.817 hours

See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.505
10 year	3.168
25 year	3.578
50 year	3.896
100 year	4.204

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.20	2.51	5.54	=	2.74	cfs
10	1	0.20	3.17	5.54	=	3.46	cfs
25	1.1	0.20	3.58	5.54	=	4.30	cfs
50	1.2	0.20	3.90	5.54	=	5.10	cfs
100	1.25	0.20	4.20	5.54	=	5.74	cfs

**Outfall #3 [Rt.] Sta.250+00 (Ginny Lane)****Outfall ditch that runs behind the Wellesley subdivision****Continued**

Runoff from the existing watershed sheet flows overland to a cross-line drainage system under I-20 and discharges into an outfall ditch behind the Wellesley subdivision.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #3.

Proposed Conditions Total Drainage Area = 5.54 acres

Additional Impervious Area = 0.10 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
0.40	-	0.90	Pavements & Roofs	
0.26	-	0.25	Grass Shoulders	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.50	Suburban, Normal Residential	
4.88	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
Weighted c-value =				0.21

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.817 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.505
10 year	3.168
25 year	3.578
50 year	3.896
100 year	4.204

**Outfall #3 [Rt.] Sta.250+00 (Ginny Lane)****Outfall ditch that runs behind the Wellesley subdivision****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.21	2.51	5.54	=	2.90 cfs
10	1	0.21	3.17	5.54	=	3.67 cfs
25	1.1	0.21	3.58	5.54	=	4.55 cfs
50	1.2	0.21	3.90	5.54	=	5.41 cfs
100	1.25	0.21	4.20	5.54	=	6.08 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	2.74	2.90	0.16	5.95%
10	3.46	3.67	0.21	5.95%

The additional 0.21 cfs runoff for the 10-year design storm will be collected by an outfall ditch that runs behind the Wellesley subdivision. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
 WATERSHED: 3 Pre-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 250+00  
 CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	760.000	90.000
9. Watercourse slope, ft/ft	0.099	0.367
10. Average velocity, ft/s	5.068	12.309
11. Computed Tc, hr	0.042	0.002

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.042</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 0.817 hr = 49.012 min**

Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 3 Post-Construction          DATE: 8/26/2015

APPROXIMATE STATION: Sta. 250+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	760.000	120.000
9. Watercourse slope, ft/ft	0.099	0.275
10. Average velocity, ft/s	5.068	10.660
11. Computed Tc, hr	0.042	0.003

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.042</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration =                      0.817 hr =                      49.012 min**





**OUTFALL NO. 3 (PRE)**  
**DA = 241,322 SF (5.54 AC)**  
**IMPERV AREA = 13,068 SF**  
**CN = 0.20**  
**Tc = 0.82 hr**

**OUTFALL NO. 3 (POST)**  
**DA = 241,322 SF (5.54 AC)**  
**IMPERV AREA = 17,424 SF**  
**CN = 0.21**  
**Tc = 0.82 hr**



**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 3 STA. 250+00**  
**SCALE: 1" = 1000'**



**Outfall #4 [Rt.] Sta.258+00 (I-20)**

**[Outfall ditch that runs behind Lexington Pet Lodge]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #4 is approximately 9 acres. The existing watershed includes, grassed areas, residential areas, paved areas and large wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 8.73

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description
1.12	-	0.90	Pavements & Roofs
0.53	-	0.25	Grass Shoulders
0.00	-	0.30	Meadows & Pasture Land
0.36	-	0.50	Suburban, Normal Residential
6.72	-	0.15	Woodland & Forest
0.00	-	0.20	Unimproved Areas

Weighted c-value = 0.27

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 1.158 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.001
10 year	2.521
25 year	2.841
50 year	3.089
100 year	3.328

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.27	2.00	8.73	=	4.66	cfs
10	1	0.27	2.52	8.73	=	5.87	cfs
25	1.1	0.27	2.84	8.73	=	7.28	cfs
50	1.2	0.27	3.09	8.73	=	8.63	cfs
100	1.25	0.27	3.33	8.73	=	9.69	cfs

**Outfall #4 [Rt.] Sta.258+00 (I-20)**  
**[Outfall ditch that runs behind Lexington Pet Lodge]**

**Continued**

Runoff from the existing watershed flows overland to a cross-line under I-20 and discharges into an outfall ditch that runs behind Lexington Pet Lodge.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #4.

Proposed Conditions Total Drainage Area = 8.73 acres

Additional Impervious Area = 0.50 acres

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres		C-value	Description
1.62	-	0.90	Pavements & Roofs
0.03	-	0.25	Grass Shoulders
0.00	-	0.30	Meadows & Pasture Land
0.36	-	0.50	Suburban, Normal Residential
6.72	-	0.15	Woodland & Forest
0.00	-	0.20	Unimproved Areas
Weighted c-value =			0.30

Rainfall Intensity, I =

Lexington, SC

Time of Concentration, tc = 1.158 hours

See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.001
10 year	2.521
25 year	2.841
50 year	3.089
100 year	3.328



**Outfall #4 [Rt.] Sta.258+00 (I-20)****[Outfall ditch that runs behind Lexington Pet Lodge]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.30	2.00	8.73	=	5.31 cfs
10	1	0.30	2.52	8.73	=	6.69 cfs
25	1.1	0.30	2.84	8.73	=	8.29 cfs
50	1.2	0.30	3.09	8.73	=	9.83 cfs
100	1.25	0.30	3.33	8.73	=	11.04 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	4.66	5.31	0.65	13.96%
10	5.87	6.69	0.82	13.96%

The additional 0.82 cfs runoff for the 10-year design storm will be collected by an outfall ditch that runs behind Lexington Pet Lodge. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 4 Pre-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 258+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

	Segment	1	
1. Surface description		Undeveloped	
2. Manning's roughness coeff., n		0.800	0.000
3. Flow length, ft		100.000	0.000
4. Two-yr 24-hr rainfall, in		3.600	3.600
5. Land slope, ft/ft		0.005	0.000
6. Computed Tc, hr		1.023	0.000

<b>Total Sheet Flow Tc, hr = 1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

	Segment	2	
7. Surface description (paved or unpaved)		Unpaved	Paved
8. Flow length, ft		1545.000	90.000
9. Watercourse slope, ft/ft		0.039	0.122
10. Average velocity, ft/s		3.180	7.107
11. Computed Tc, hr		0.135	0.004

<b>Total Shallow Conc. Flow Tc, hr = 0.135</b>
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**CHANNEL FLOW:**

	Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>		0.000	0.000
13. Wetted Perimeter, ft		0.000	0.000
14. Hydraulic Radius, ft		10.000	0.000
15. Channel Slope, ft/ft		0.000	0.000
16. Manning's roughness coeff., n		0.100	0.000
17. Velocity, ft/s		0.002	0.000
18. Flow Length, ft		0.000	0.000
19. Computed Tc, hr		0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
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**Time of Concentration = 1.158 hr = 69.472 min**

Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 4 Post-Construction          DATE: 8/26/2015

APPROXIMATE STATION: Sta. 258+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

	Segment	1	
1. Surface description		Undeveloped	
2. Manning's roughness coeff., n		0.800	0.000
3. Flow length, ft		100.000	0.000
4. Two-yr 24-hr rainfall, in		3.600	3.600
5. Land slope, ft/ft		0.005	0.000
6. Computed Tc, hr		1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

	Segment	2	
7. Surface description (paved or unpaved)		Unpaved	Paved
8. Flow length, ft		1545.000	130.000
9. Watercourse slope, ft/ft		0.039	0.085
10. Average velocity, ft/s		3.180	5.913
11. Computed Tc, hr		0.135	0.006

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.135</b>
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**CHANNEL FLOW:**

	Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>		0.000	0.000
13. Wetted Perimeter, ft		0.000	0.000
14. Hydraulic Radius, ft		10.000	0.000
15. Channel Slope, ft/ft		0.000	0.000
16. Manning's roughness coeff., n		0.000	0.000
17. Velocity, ft/s		218.702	0.000
18. Flow Length, ft		0.000	0.000
19. Computed Tc, hr		0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.158 hr = 69.472 min**





**OUTFALL NO. 4 (PRE)**  
DA = 380,279 SF (8.73 AC)  
IMPERV AREA = 48,787 SF  
CN = 0.27  
Tc = 1.16 hr

**OUTFALL NO. 4 (POST)**  
DA = 380,279 SF (8.73 AC)  
IMPERV AREA = 70,567 SF  
CN = 0.30  
Tc = 1.16 hr



**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 4 STA. 258+00**  
**SCALE: 1" = 1000'**



**Outfall #6 [Rt.] Sta.306+00 (Baskin Hills Road)**  
**Outfall ditch to small pond just off Baskin Hills Road**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #6 is approximately 8 acres. The existing watershed includes grassed areas and paved areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 8.14

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
0.71	-	0.90	Pavements & Roofs	
0.79	-	0.25	Grass Shoulders	
2.65	-	0.30	Meadows & Pasture Land	
1.92	-	0.50	Suburban, Normal Residential	
2.07	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
				Weighted c-value = 0.36

Rainfall Intensity, I =  
Lexington, SC

Time of Concentration, tc = 0.768 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.599
10 year	3.289
25 year	3.716
50 year	4.048
100 year	4.370

Peak Runoff, Q =

$Q = C_f CIA$

Design Storm	Cf	C	I	A	=	Q	
2	1	0.36	2.60	8.14	=	7.54	cfs
10	1	0.36	3.29	8.14	=	9.55	cfs
25	1.1	0.36	3.72	8.14	=	11.86	cfs
50	1.2	0.36	4.05	8.14	=	14.10	cfs
100	1.25	0.36	4.37	8.14	=	15.85	cfs

**Outfall #6 [Rt.] Sta.306+00 (Baskin Hills Road)****Outfall ditch to small pond just off Baskin Hills Road****Continued**

Runoff from the existing watershed flows overland to a cross-line drainage system under I-20 to an outfall ditch off of Baskin Hills Road.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #6.

Proposed Conditions Total Drainage Area = 8.14 acres

Additional Impervious Area = 0.19 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
0.90	-	0.90	Pavements & Roofs	
0.60	-	0.25	Grass Shoulders	
2.65	-	0.30	Meadows & Pasture Land	
1.92	-	0.50	Suburban, Normal Residential	
2.07	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.37

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.768 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.599
10 year	3.289
25 year	3.716
50 year	4.048
100 year	4.370

**Outfall #6 [Rt.] Sta.306+00 (Baskin Hills Road)**  
**Outfall ditch to small pond just off Baskin Hills Road****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.37	2.60	8.14	=	7.86 cfs
10	1	0.37	3.29	8.14	=	9.95 cfs
25	1.1	0.37	3.72	8.14	=	12.37 cfs
50	1.2	0.37	4.05	8.14	=	14.70 cfs
100	1.25	0.37	4.37	8.14	=	16.53 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	7.54	7.86	0.32	4.26%
10	9.55	9.95	0.41	4.26%

The additional 0.41 cfs runoff for the 10-year design storm will be collected by an outfall ditch just off Baskin Hills Road. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.





Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
 WATERSHED: 6 Post-Construction        DATE: 8/26/2015

APPROXIMATE STATION: Sta. 306+00  
 CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Open/ROW	
2. Manning's roughness coeff., n	0.400	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	0.587	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.587</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1400.000	52.500
9. Watercourse slope, ft/ft	0.018	0.076
10. Average velocity, ft/s	2.156	5.611
11. Computed Tc, hr	0.180	0.003

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.180</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration =                      0.768 hr =                      46.072 min**



**OUTFALL NO. 5 (PRE)**  
**DA = 1684 AC (2.63 SQ. MI)**  
**IMPERV AREA = 655.08 AC**

**OUTFALL NO. 5 (POST)**  
**DA = 1684 AC (2.63 SQ. MI)**  
**IMPERV AREA = 658.28 AC**

**I-20 IMPROVEMENT  
PROJECT**

**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 5 STA. 265 + 60**

**SCALE: 1" = 2500'**



**Outfall #7 [Rt.] Sta.310+00 (Baskin Hills Road)**  
**Outfall ditch to a small pond just off Baskin Hills Road**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #7 is approximately 6 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and residential areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 5.34

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
0.71	- 0.90	Pavements & Roofs
1.04	- 0.25	Grass Shoulders
2.69	- 0.30	Meadows & Pasture Land
0.00	- 0.50	Suburban, Normal Residential
0.90	- 0.15	Woodland & Forest
0.00	- 0.20	Unimproved Areas
Weighted c-value =		0.34

Rainfall Intensity, I =  
 Lexington, SC

Time of Concentration, tc = 0.688 hours  
 See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.768
10 year	3.509
25 year	3.968
50 year	4.325
100 year	4.672

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.34	2.77	5.34	=	5.10	cfs
10	1	0.34	3.51	5.34	=	6.46	cfs
25	1.1	0.34	3.97	5.34	=	8.04	cfs
50	1.2	0.34	4.33	5.34	=	9.56	cfs
100	1.25	0.34	4.67	5.34	=	10.75	cfs

**Outfall #7 [Rt.] Sta.310+00 (Baskin Hills Road)****Outfall ditch to a small pond just off Baskin Hills Road****Continued**

Runoff from the existing watershed flows overland to a cross-line under I-20 and discharges into an outfall ditch off of Baskin Hills Road.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #7.

Proposed Conditions Total Drainage Area = 5.34 acres

Additional Impervious Area = 0.30 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
1.01	-	0.90	Pavements & Roofs	
0.74	-	0.25	Grass Shoulders	
2.69	-	0.30	Meadows & Pasture Land	
0.00	-	0.50	Suburban, Normal Residential	
0.90	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.38

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.688 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.768
10 year	3.509
25 year	3.968
50 year	4.325
100 year	4.672



**Outfall #7 [Rt.] Sta.310+00 (Baskin Hills Road)**  
**Outfall ditch to a small pond just off Baskin Hills Road**

**Continued**

Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.38	2.77	5.34	=	5.64 cfs
10	1	0.38	3.51	5.34	=	7.15 cfs
25	1.1	0.38	3.97	5.34	=	8.89 cfs
50	1.2	0.38	4.33	5.34	=	10.57 cfs
100	1.25	0.38	4.67	5.34	=	11.89 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	5.10	5.64	0.54	10.59%
10	6.46	7.15	0.68	10.59%

The additional 0.68 cfs runoff for the 10-year design storm will be collected by an outfall ditch that flows to a small pond off of Baskin Hills Road. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 7 Post-Construction          DATE: 8/26/2015

APPROXIMATE STATION: Sta. 310+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Open/ROW	
2. Manning's roughness coeff., n	0.400	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	0.587	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.587</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	945.000	130.000
9. Watercourse slope, ft/ft	0.026	0.065
10. Average velocity, ft/s	2.624	5.198
11. Computed Tc, hr	0.100	0.007

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.100</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration =                      0.688 hr =                      41.252 min**



**OUTFALL NO. 7 (PRE)**  
DA = 232,610 SF (5.34 AC)  
IMPERV AREA = 30,928 SF  
CN = 0.34  
Tc = 0.69 hr

**OUTFALL NO. 7 (POST)**  
DA = 232,610 SF (5.34 AC)  
IMPERV AREA = 43,996 SF  
CN = 0.38  
Tc = 0.69 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 7 STA. 310+00**  
**SCALE: 1" = 1000'**



**Outfall #8 [Rt.] Sta.315+00 (Baskin Hills Road)**  
**Outfall ditch to small pond off Baskin Hills Road**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #8 is approximately 9 acres. The existing watershed includes, grassed areas, paved areas, and wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 8.58

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres		C-value	Description
1.00	-	0.90	Pavements & Roofs
1.00	-	0.25	Grass Shoulders
4.83	-	0.30	Meadows & Pasture Land
0.00	-	0.50	Suburban, Normal Residential
1.75	-	0.15	Woodland & Forest
0.00	-	0.20	Unimproved Areas
			Weighted c-value = 0.33

Rainfall Intensity, I =  
 Lexington, SC

Time of Concentration, tc = 0.712 hours  
 See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.715
10 year	3.440
25 year	3.889
50 year	4.238
100 year	4.577

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	Cf	C	I	A	=	Q	
2	1	0.33	2.72	8.58	=	7.77	cfs
10	1	0.33	3.44	8.58	=	9.84	cfs
25	1.1	0.33	3.89	8.58	=	12.24	cfs
50	1.2	0.33	4.24	8.58	=	14.55	cfs
100	1.25	0.33	4.58	8.58	=	16.37	cfs



**Outfall #8 [Rt.] Sta.315+00 (Baskin Hills Road)**  
**Outfall ditch to small pond off Baskin Hills Road**

**Continued**

Runoff from the existing watershed flows overland to a cross-line drainage system under I-20 and discharges into an outfall ditch and then flows to a small pond off of Baskin Hills Road.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #8.

Proposed Conditions Total Drainage Area = 8.58 acres  
 Additional Impervious Area = 0.36 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description
1.36	-	0.90	Pavements & Roofs
0.64	-	0.25	Grass Shoulders
4.83	-	0.30	Meadows & Pasture Land
0.00	-	0.50	Suburban, Normal Residential
1.75	-	0.15	Woodland & Forest
0.00	-	0.20	Unimproved Areas
Weighted c-value =			0.36

**Rainfall Intensity, I =**  
 Lexington, SC

Time of Concentration, tc = 0.712 hours  
 See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.715
10 year	3.440
25 year	3.889
50 year	4.238
100 year	4.577

**Outfall #8 [Rt.] Sta.315+00 (Baskin Hills Road)**  
**Outfall ditch to small pond off Baskin Hills Road****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.36	2.72	8.58	=	8.41 cfs
10	1	0.36	3.44	8.58	=	10.65 cfs
25	1.1	0.36	3.89	8.58	=	13.24 cfs
50	1.2	0.36	4.24	8.58	=	15.74 cfs
100	1.25	0.36	4.58	8.58	=	17.71 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	7.77	8.41	0.64	8.18%
10	9.84	10.65	0.81	8.18%

The additional 0.81 cfs runoff for the 10-year design storm will be collected by an outfall ditch that flows to a small pond off of Baskin Hills Road. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 8 Post-Construction DATE: 8/26/2015

APPROXIMATE STATION: Sta. 315+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Open/ROW	
2. Manning's roughness coeff., n	0.400	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	0.587	0.000

<b>Total Sheet Flow Tc, hr = 0.587</b>
--

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1160.000	130.000
9. Watercourse slope, ft/ft	0.026	0.050
10. Average velocity, ft/s	2.595	4.546
11. Computed Tc, hr	0.124	0.008

<b>Total Shallow Conc. Flow Tc, hr = 0.124</b>
--

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
--

**Time of Concentration = 0.712 hr = 42.701 min**



**OUTFALL NO. 8 (PRE)**  
**DA = 373,745 SF (8.58 AC)**  
**IMPERV AREA = 43,560 SF**  
**CN = 0.33**  
**Tc = 0.71 hr**

**OUTFALL NO. 8 (POST)**  
**DA = 373,745 SF (8.58 AC)**  
**IMPERV AREA = 59,242 SF**  
**CN = 0.36**  
**Tc = 0.71 hr**

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 8 STA. 315+00**  
**SCALE: 1" = 1000'**





**Outfall #9 - Lt. Sta. 340+25****Unnamed Tributary to Twelvemile Creek****Pre-Construction Runoff**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #9 is approximately 600 acres. The existing watershed includes, grassed areas, paved areas, large wooded areas, commercial areas, and residential areas adjacent to I-20.

Drainage Area (acres) = 591.85

**Curve Number, CN =**

Hydraulic Soil Group:

Acres		CN	Description
39.89	C	92.00	IA (Paved-Open Ditches)
81.30	A	30.00	Woods (Good)
248.17	C	70.00	Woods (Good)
48.20	A	54.00	Residential (1/2 Acre)
38.05	C	80.00	Residential (1/2 Acre)
22.15	A	89.00	Commercial and Business
3.87	C	94.00	Commercial and Business
57.64	A	39.00	Open Space (Good)
52.58	C	74.00	Open Space (Good)

Weighted CN-value = 63.5

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.704 hours  
See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 5.74$  in

$I_a = 0.2(S) = 1.15$  in

Outfall #9 - Lt. Sta. 340+25

## Unnamed Tributary to Twelvemile Creek

## Continued

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	5.74	=	0.7	in
10	5.30	5.74	=	1.7	in
25	6.40	5.74	=	2.5	in
50	7.30	5.74	=	3.2	in
100	8.30	5.74	=	4.0	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	1.15	0.32	198.9	cs/in
10	5.30	1.15	0.22	224.5	cs/in
25	6.40	1.15	0.18	233.1	cs/in
50	7.30	1.15	0.16	238.3	cs/in
100	8.30	1.15	0.14	242.9	cs/in

Pond Factor,  $F_p$  =

5.00 acres = 0.8%

 $F_p = 0.90$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	198.9	0.92	0.7	0.900	121.5	cfs
10	224.5	0.92	1.7	0.900	325.7	cfs
25	233.1	0.92	2.5	0.900	486.8	cfs
50	238.3	0.92	3.2	0.900	631.2	cfs
100	242.9	0.92	4.0	0.900	802.1	cfs

Runoff from the existing watershed flows overland and into a stream then flows through a box culvert under I-20 and continues through the same stream to Twelvemile Creek.

**Outfall #9 - Lt. Sta. 340+25****Unnamed Tributary to Twelvemile Creek****Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #9.

**Watershed Analysis**

Drainage Area (acres) = 591.85 SCS Method

Additional Impervious Area = 3.59 Acres

**Curve Number, CN =**

Hydraulic Soil Group:

Acres		CN	Description
43.48	C	92.00	IA (Paved-Open Ditches)
81.30	A	30.00	Woods (Good)
248.17	C	70.00	Woods (Good)
48.20	A	54.00	Residential (1/2 Acre)
38.05	C	80.00	Residential (1/2 Acre)
22.15	A	89.00	Commercial and Business
3.87	C	94.00	Commercial and Business
54.05	A	39.00	Open Space (Good)
52.58	C	74.00	Open Space (Good)

Weighted CN-value = 63.9

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.704 hours

See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for :

Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 5.66$  in

$I_a = 0.2(S) = 1.13$  in



Outfall #9 - Lt. Sta. 340+25

## Unnamed Tributary to Twelvemile Creek

## Continued

Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	5.66	=	0.7	in
10	5.30	5.66	=	1.8	in
25	6.40	5.66	=	2.5	in
50	7.30	5.66	=	3.2	in
100	8.30	5.66	=	4.0	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	1.13	0.31	200.7	csm/in
10	5.30	1.13	0.21	225.2	csm/in
25	6.40	1.13	0.18	233.7	csm/in
50	7.30	1.13	0.16	238.8	csm/in
100	8.30	1.13	0.14	243.4	csm/in

Pond Factor,  $F_p$  =

5 acres = 0.8%

 $F_p = 0.9$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	200.7	0.92	0.7	0.900	125.1	cfs
10	225.2	0.92	1.8	0.900	331.3	cfs
25	233.7	0.92	2.5	0.900	493.8	cfs
50	238.8	0.92	3.2	0.900	639.3	cfs
100	243.4	0.92	4.0	0.900	811.2	cfs

Percent Increase =

Design Storm	$Q_{pre}$	$Q_{post}$	$Q_{increase}$	% Increase
2	121.5	125.1	3.63	2.90%
10	325.7	331.3	5.60	1.72%
25	486.8	493.8	7.01	1.44%
50	631.2	639.3	8.05	1.27%
100	802.1	811.2	9.09	1.13%

The additional 5.60 cfs runoff for the 10-year design storm will be collected by a stream that flows under I-20 at . approximate Sta. 340+00. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 9 Post-Construction              DATE: 8/27/2015

APPROXIMATE STATION: Sta. 340+25  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.775</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	7500.000	110.000
9. Watercourse slope, ft/ft	0.019	0.023
10. Average velocity, ft/s	2.243	3.065
11. Computed Tc, hr	0.929	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.929</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.704 hr = 102.231 min**



**OUTFALL NO. 9 (PRE)**  
DA = 25,780,986 SF (591.85 AC)  
IMPERV AREA = 1,737,608 SF  
CN = 63.5  
Tc = 1.70 hr

**OUTFALL NO. 9 (POST)**  
DA = 25,780,986 SF (591.85 AC)  
IMPERV AREA = 1,893,989 SF  
CN = 63.9  
Tc = 1.70 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 9 STA. 340 + 25**  
**SCALE: 1" = 2500'**



**Outfall #10 - Lt. Sta. 376+00****Pre-Construction Runoff**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #10 is approximately 263 acres. The existing watershed includes, residential areas, large grassed areas and undeveloped areas adjacent to I-20.

Drainage Area (acres) = 263.21

**Curve Number, CN =**

Hydraulic Soil Group:

Acres		CN	Description
8.34	C	92.00	IA (Paved-Open Ditches)
9.70	A	30.00	Woods (Good)
105.77	C	70.00	Woods (Good)
20.52	A	89.00	Commercial and Business
38.67	C	94.00	Commercial and Business
8.14	A	54.00	Residential (1/2 Acre)
25.12	C	80.00	Residential (1/2 Acre)
45.27	C	74.00	Open Space (Good)

Weighted CN-value = 74.9

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.473 hours

See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 3.35$  in

$I_a = 0.2(S) = 0.67$  in

**Outfall #10 - Lt. Sta. 376+00****Continued**Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	3.35	=	1.4	in
10	5.30	3.35	=	2.7	in
25	6.40	3.35	=	3.6	in
50	7.30	3.35	=	4.4	in
100	8.30	3.35	=	5.3	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	0.67	0.19	255.6	cs/in
10	5.30	0.67	0.13	271.4	cs/in
25	6.40	0.67	0.10	277.5	cs/in
50	7.30	0.67	0.09	278.7	cs/in
100	8.30	0.67	0.08	278.7	cs/in

Pond Factor,  $F_p$  =

0.00 acres = 0.0%

 $F_p = 1.00$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	255.6	0.41	1.4	1.000	143.8	cfs
10	271.4	0.41	2.7	1.000	300.1	cfs
25	277.5	0.41	3.6	1.000	412.9	cfs
50	278.7	0.41	4.4	1.000	505.2	cfs
100	278.7	0.41	5.3	1.000	608.2	cfs

Runoff from the existing watershed sheet flows overland to a 6' X 6' box culvert under I-20 and discharges into a stream.

**Outfall #10 - Lt. Sta. 376+00****Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #10.

**Watershed Analysis**

Drainage Area (acres) = 263.21 SCS Method

Additional Impervious Area = 0.83 Acres

Curve Number, CN =

Hydraulic Soil Group:

Acres		CN	Description
9.17	C	92.00	IA (Paved-Open Ditches)
9.70	A	30.00	Woods (Good)
105.77	C	70.00	Woods (Good)
20.52	A	89.00	Commercial and Business
38.67	C	94.00	Commercial and Business
8.14	A	54.00	Residential (1/2 Acre)
25.12	C	80.00	Residential (1/2 Acre)
44.44	C	74.00	Open Space (Good)

Weighted CN-value = 75.0

Time of Concentration,  $t_c$  =

Time of Concentration,  $t_c$  = 1.473 hours  
See Time of Concentration Worksheet

24 Hour Rainfall, P -

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Initial Abstraction,  $I_a$  =

$S = (1000/CN) - 10 = 3.34$  in

$I_a = 0.2(S) = 0.67$  in



**Outfall #10 - Lt. Sta. 376+00****Continued**Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	3.34	=	1.4	in
10	5.30	3.34	=	2.7	in
25	6.40	3.34	=	3.6	in
50	7.30	3.34	=	4.4	in
100	8.30	3.34	=	5.3	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	0.67	0.19	255.7	csm/in
10	5.30	0.67	0.13	271.6	csm/in
25	6.40	0.67	0.10	277.6	csm/in
50	7.30	0.67	0.09	278.7	csm/in
100	8.30	0.67	0.08	278.7	csm/in

Pond Factor,  $F_p$  =

0 acres = 0.0%

 $F_p = 1.0$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	255.7	0.41	1.4	1.000	144.3	cfs
10	271.6	0.41	2.7	1.000	300.8	cfs
25	277.6	0.41	3.6	1.000	413.7	cfs
50	278.7	0.41	4.4	1.000	506.0	cfs
100	278.7	0.41	5.3	1.000	608.9	cfs

Percent Increase =

Design Storm	$Q_{pre}$	$Q_{post}$	$Q_{increase}$	% Increase
2	143.8	144.3	0.47	0.32%
10	300.1	300.8	0.68	0.23%
25	412.9	413.7	0.79	0.19%
50	505.2	506.0	0.72	0.14%
100	608.2	608.9	0.77	0.13%

The additional 0.68 cfs runoff for the 10-year design storm will be collected by an unnamed tributary (stream) and ultimately discharging into Twelvemile Creek. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 10 Pre-Construction DATE: 8/31/2015

APPROXIMATE STATION: Sta. 376+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3945.000	150.000
9. Watercourse slope, ft/ft	0.023	0.073
10. Average velocity, ft/s	2.437	5.505
11. Computed Tc, hr	0.450	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.450</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.473 hr = 88.354 min**

Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 10 Post-Construction DATE: 8/31/2015

APPROXIMATE STATION: Sta. 376+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr = 1.023</b>
--

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3945.000	180.000
9. Watercourse slope, ft/ft	0.023	0.061
10. Average velocity, ft/s	2.437	5.025
11. Computed Tc, hr	0.450	0.000

<b>Total Shallow Conc. Flow Tc, hr = 0.450</b>
--

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
--

**Time of Concentration = 1.473 hr = 88.354 min**



**OUTFALL NO. 10 (PRE)**  
DA = 11,465,636 SF (263.21 AC)  
IMPERV AREA = 363,290 SF  
CN = 74.9  
Tc = 1.47 hr

**OUTFALL NO. 10 (POST)**  
DA = 11,465,636 SF (263.21 AC)  
IMPERV AREA = 399,445 SF  
CN = 75.0  
Tc = 1.47 hr

I-20 IMPROVEMENT  
PROJECT  
PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 10 STA. 374 + 90  
SCALE: 1" = 1000'



**Outfall #11 - Lt. Sta. 412+50****Unnamed Tributary (stream) to Twelvemile Creek****Pre-Construction Runoff**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #11 is approximately 160 acres. The existing watershed includes, residential areas, large grassed areas and undeveloped areas adjacent to I-20.

Drainage Area (acres) = 163.33

**Curve Number, CN =**

Hydraulic Soil Group:

Acres		CN	Description
14.85	C	92.00	IA (Paved-Open Ditches)
47.63	A	30.00	Woods (Good)
33.79	C	70.00	Woods (Good)
38.48	A	54.00	Residential (1/2 Acre)
28.58	C	80.00	Residential (1/2 Acre)
0.00	C	0.00	
0.00	C	0.00	
0.00	C	0.00	

Weighted CN-value = 58.3

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.395 hours  
See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 7.15$  in

$I_a = 0.2(S) = 1.43$  in

**Outfall #11 - Lt. Sta. 412+50****Unnamed Tributary (stream) to Twelvemile Creek****Continued**Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	7.15	=	0.5	in
10	5.30	7.15	=	1.4	in
25	6.40	7.15	=	2.0	in
50	7.30	7.15	=	2.6	in
100	8.30	7.15	=	3.4	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	1.43	0.40	190.3	csm/in
10	5.30	1.43	0.27	243.4	csm/in
25	6.40	1.43	0.22	255.1	csm/in
50	7.30	1.43	0.20	262.3	csm/in
100	8.30	1.43	0.17	268.6	csm/in

Pond Factor,  $F_p$  =

0.00 acres = 0.0%

 $F_p = 1.00$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	190.3	0.26	0.5	1.000	24.5	cfs
10	243.4	0.26	1.4	1.000	84.4	cfs
25	255.1	0.26	2.0	1.000	132.7	cfs
50	262.3	0.26	2.6	1.000	177.2	cfs
100	268.6	0.26	3.4	1.000	230.8	cfs

Runoff from the existing watershed flows overland to an existing box culvert at approx. Sta. 412+50 along I-20 and discharges into an unnamed tributary (stream).

**Outfall #11 - Lt. Sta. 412+50**

Unnamed Tributary (stream) to Twelvemile Creek

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #11.

**Watershed Analysis**

Drainage Area (acres) = 163.33 SCS Method

Additional Impervious Area = 3.03 Acres

**Curve Number, CN =**

Hydraulic Soil Group:

Acres		CN	Description
17.88	C	92.00	IA (Paved-Open Ditches)
44.60	A	30.00	Woods (Good)
33.79	C	70.00	Woods (Good)
38.48	A	54.00	Residential (1/2 Acre)
28.58	C	80.00	Residential (1/2 Acre)
0.00	C	0.00	
0.00	C	0.00	
0.00	C	0.00	

Weighted CN-value = 59.5

**Time of Concentration,  $t_c$  =**Time of Concentration,  $t_c$  = 1.395 hours

See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for :

Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =** $S = (1000/CN) - 10 = 6.82$  in $I_a = 0.2(S) = 1.36$  in



**Outfall #11 - Lt. Sta. 412+50**

Unnamed Tributary (stream) to Twelvemile Creek

**Continued**Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	6.82	=	0.6	in
10	5.30	6.82	=	1.4	in
25	6.40	6.82	=	2.1	in
50	7.30	6.82	=	2.8	in
100	8.30	6.82	=	3.5	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	1.36	0.38	198.8	csm/in
10	5.30	1.36	0.26	246.5	csm/in
25	6.40	1.36	0.21	257.7	csm/in
50	7.30	1.36	0.19	264.7	csm/in
100	8.30	1.36	0.16	270.8	csm/in

Pond Factor,  $F_p$  =

0 acres = 0.0%

 $F_p = 1.0$ Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	198.8	0.26	0.6	1.000	28.0	cfs
10	246.5	0.26	1.4	1.000	90.7	cfs
25	257.7	0.26	2.1	1.000	140.8	cfs
50	264.7	0.26	2.8	1.000	186.7	cfs
100	270.8	0.26	3.5	1.000	241.8	cfs

Percent Increase =

Design Storm	$Q_{pre}$	$Q_{post}$	$Q_{increase}$	% Increase
2	24.5	28.0	3.49	12.45%
10	84.4	90.7	6.22	7.36%
25	132.7	140.8	8.09	6.09%
50	177.2	186.7	9.51	5.37%
100	230.8	241.8	10.97	4.75%

The additional 6.22 cfs runoff for the 10-year design storm will be collected by an unnamed tributary (stream), at approx. Sta. 412+50 along I-20, that ultimately discharges into Twelvemile Creek. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 11 Post-Construction DATE: 8/31/2015

APPROXIMATE STATION: 412+50  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3600.000	0.000
9. Watercourse slope, ft/ft	0.028	#DIV/0!
10. Average velocity, ft/s	2.689	#DIV/0!
11. Computed Tc, hr	0.372	#DIV/0!

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.372</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.395 hr = 83.686 min**



**OUTFALL NO. 11 (PRE)**  
DA = 7,114,655 SF (163.33 AC)  
IMPERV AREA = 646,866 SF  
CN = 58.3  
Tc = 1.40 hr

**OUTFALL NO. 11 (POST)**  
DA = 7,114,655 SF (163.33 AC)  
IMPERV AREA = 778,853 SF  
CN = 59.5  
Tc = 1.40 hr

I-20 IMPROVEMENT  
PROJECT  
PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 11 STA. 412 + 50  
SCALE: 1" = 1000'



**Outfall #12 [Rt.] Sta.445+00 (I-20)**  
**[Outfall ditch]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #12 is approximately 45 acres. The existing watershed includes, residential areas, large grassed areas and undeveloped areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 45.00

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
4.75	-	0.90	Pavements & Roofs	
7.45	-	0.25	Grass Shoulders	
13.90	-	0.50	Suburban, Normal Residential	
13.90	-	0.30	Meadows & Pasture Land	
5.00	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
Weighted c-value =				0.40

Rainfall Intensity, I =  
Lexington, SC

Time of Concentration,  $t_c$  = 1.398 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	1.751
10 year	2.203
25 year	2.481
50 year	2.696
100 year	2.904

Peak Runoff, Q =

$Q = C_f CIA$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.40	1.75	45.00	=	31.54	cfs
10	1	0.40	2.20	45.00	=	39.67	cfs
25	1.1	0.40	2.48	45.00	=	49.15	cfs
50	1.2	0.40	2.70	45.00	=	58.26	cfs
100	1.25	0.40	2.90	45.00	=	65.37	cfs

**Outfall #12 [Rt.] Sta.445+00 (I-20)**  
**[Outfall ditch]****Continued**

Runoff from the existing watershed flows overland to a crossing at Sta. 445+00 under I-20 and discharges into an outfall ditch that runs along Railroad Avenue off I-20.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #12.

Proposed Conditions Total Drainage Area = 45.00 acres  
Additional Impervious Area = 1.55 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
6.30	-	0.90	Pavements & Roofs	
5.90	-	0.25	Grass Shoulders	
13.90	-	0.50	Suburban, Normal Residential	
13.90	-	0.30	Meadows & Pasture Land	
5.00	-	0.15	Woodland & Forest	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.42

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.398 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.751
10 year	2.203
25 year	2.481
50 year	2.696
100 year	2.904

**Outfall #12 [Rt.] Sta.445+00 (I-20)**  
**[Outfall ditch]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.42	1.75	45.00	=	33.30 cfs
10	1	0.42	2.20	45.00	=	41.89 cfs
25	1.1	0.42	2.48	45.00	=	51.90 cfs
50	1.2	0.42	2.70	45.00	=	61.52 cfs
100	1.25	0.42	2.90	45.00	=	69.02 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	31.54	33.30	1.76	5.59%
10	39.67	41.89	2.22	5.59%

The additional 2.22 cfs runoff for the 10-year design storm will be collected by an outfall ditch at Sta. 445+00. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.





Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
 WATERSHED: 12 Post-Construction        DATE: 8/31/2015

APPROXIMATE STATION: Sta. 445+00  
 CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.003	0.000
6. Computed Tc, hr	1.255	0.000
<b>Total Sheet Flow Tc, hr =</b>		<b>1.255</b>

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1114.000	100.000
9. Watercourse slope, ft/ft	0.018	0.020
10. Average velocity, ft/s	2.162	2.875
11. Computed Tc, hr	0.143	0.010
<b>Total Shallow Conc. Flow Tc, hr =</b>		<b>0.143</b>

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000
<b>Total Channel Flow Tc, hr =</b>		<b>0.000</b>

**Time of Concentration = 1.398 hr = 83.876 min**



**OUTFALL NO. 12 (PRE)**  
DA = 1,960,200 SF (45.00 AC)  
IMPERV AREA = 206,910 SF  
CN = 0.40  
Tc = 1.40 hr

**OUTFALL NO. 12 (POST)**  
DA = 1,960,200 SF (45.00 AC)  
IMPERV AREA = 274,428 SF  
CN = 0.42  
Tc = 1.40 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 12 STA. 445 + 00**  
**SCALE: 1" = 1000'**



**Outfall #13 [Rt.] Sta.451+00 (I-20)**  
**[Outfall Ditch]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #13 is approximately 30 acres. The existing watershed includes large commercial areas, residential areas, large grassed areas and undeveloped areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 30.23

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
4.00	-	0.90	Pavements & Roofs
8.68	-	0.25	Grass Shoulders
4.88	-	0.85	City Business Areas
9.14	-	0.50	Suburban, Normal Residential
3.53	-	0.30	Meadows & Pasture Land
0.00	-	0.20	Unimproved Areas

Weighted c-value = 0.51

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.328 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.818
10 year	2.288
25 year	2.577
50 year	2.800
100 year	3.017

**Peak Runoff, Q =**

$$Q = C_f C I A$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.51	1.82	30.23	=	28.26	cfs
10	1	0.51	2.29	30.23	=	35.57	cfs
25	1.1	0.51	2.58	30.23	=	44.06	cfs
50	1.2	0.51	2.80	30.23	=	52.24	cfs
100	1.25	0.51	3.02	30.23	=	58.62	cfs

**Outfall #13 [Rt.] Sta.451+00 (I-20)**  
**[Outfall Ditch]****Continued**

Runoff from the existing watershed flows overland along I-20 to a crossing at approx. Sta. 451+00 and discharges into an outfall ditch off I-20.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #13.

Proposed Conditions Total Drainage Area = 30.23 acres  
Additional Impervious Area = 1.57 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
5.57	-	0.90	Pavements & Roofs	
7.11	-	0.25	Grass Shoulders	
4.88	-	0.85	City Business Areas	
9.14	-	0.50	Suburban, Normal Residential	
3.53	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.55

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.328 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.818
10 year	2.288
25 year	2.577
50 year	2.800
100 year	3.017



**Outfall #13 [Rt.] Sta.451+00 (I-20)**  
**[Outfall Ditch]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.55	1.82	30.23	=	30.12 cfs
10	1	0.55	2.29	30.23	=	37.90 cfs
25	1.1	0.55	2.58	30.23	=	46.96 cfs
50	1.2	0.55	2.80	30.23	=	55.67 cfs
100	1.25	0.55	3.02	30.23	=	62.47 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	28.26	30.12	1.86	6.56%
10	35.57	37.90	2.33	6.56%

The additional 2.33 cfs runoff for the 10-year design storm will be collected by an outfall ditch of I-20 at approx. Sta. 451+00. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 13 Post-Construction DATE: 8/31/2015

APPROXIMATE STATION: Sta. 451+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.003	0.000
6. Computed Tc, hr	1.255	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.255</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
	Unpaved	Paved
7. Surface description (paved or unpaved)		
8. Flow length, ft	710.000	122.000
9. Watercourse slope, ft/ft	0.028	0.049
10. Average velocity, ft/s	2.708	4.508
11. Computed Tc, hr	0.073	0.008

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.073</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.328 hr = 79.657 min**



**OUTFALL NO. 13 (PRE)**  
DA = 1,316,819 SF (30.23 AC)  
IMPERV AREA = 174,240 SF  
C = 0.51  
Tc = 1.33 hr

**OUTFALL NO. 13 (POST)**  
DA = 1,316,819 SF (30.23 AC)  
IMPERV AREA = 242,629 SF  
C = 0.55  
Tc = 1.33 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 13 STA. 451+00**  
**SCALE: 1" = 1000'**



**Outfall #14 [Rt.] Sta.472+50 (Burton Road)**  
**[Outfall Ditch]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #14 is approximately 12 acres. The existing watershed includes large commercial areas, residential areas and large grassed areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 11.69

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description	
2.00	-	0.90	Pavements & Roofs	
3.20	-	0.25	Grass Shoulders	
6.49	-	0.85	City Business Areas	
0.00	-	0.50	Suburban, Normal Residential	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
				Weighted c-value = 0.69

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.881 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.393
10 year	3.023
25 year	3.412
50 year	3.714
100 year	4.006

**Peak Runoff, Q =**

$$Q = C_f C I A$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.69	2.39	11.69	=	19.42	cfs
10	1	0.69	3.02	11.69	=	24.54	cfs
25	1.1	0.69	3.41	11.69	=	30.46	cfs
50	1.2	0.69	3.71	11.69	=	36.17	cfs
100	1.25	0.69	4.01	11.69	=	40.65	cfs

**Outfall #14 [Rt.] Sta.472+50 (Burton Road)**  
**[Outfall Ditch]****Continued**

Runoff from the existing watershed flows overland to a crossing at approx. Sta. 472+50 along I-20 and discharges into an outfall ditch off Burton Road.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #14.

Proposed Conditions Total Drainage Area = 11.69 acres  
Additional Impervious Area = 0.86 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
2.86	-	0.90	Pavements & Roofs	
2.34	-	0.25	Grass Shoulders	
6.49	-	0.85	City Business Areas	
0.00	-	0.50	Suburban, Normal Residential	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.74

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 0.881 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.393
10 year	3.023
25 year	3.412
50 year	3.714
100 year	4.006

**Outfall #14 [Rt.] Sta.472+50 (Burton Road)**  
**[Outfall Ditch]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.74	2.39	11.69	=	20.76 cfs
10	1	0.74	3.02	11.69	=	26.23 cfs
25	1.1	0.74	3.41	11.69	=	32.56 cfs
50	1.2	0.74	3.71	11.69	=	38.66 cfs
100	1.25	0.74	4.01	11.69	=	43.45 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	19.42	20.76	1.34	6.89%
10	24.54	26.23	1.69	6.89%

The additional 1.69 cfs runoff for the 10-year design storm will be collected by an outfall ditch at approx. Sta. 472+50 off Burton Road. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

8/31/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 14 Pre-Construction DATE: 8/31/2015

APPROXIMATE STATION: Sta. 472+50  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Open/ROW	
2. Manning's roughness coeff., n	0.400	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.003	0.000
6. Computed Tc, hr	0.721	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.721</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
	Unpaved	Paved
7. Surface description (paved or unpaved)		
8. Flow length, ft	1200.000	92.000
9. Watercourse slope, ft/ft	0.017	0.043
10. Average velocity, ft/s	2.083	4.239
11. Computed Tc, hr	0.160	0.006

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.160</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 0.881 hr = 52.843 min**



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
 WATERSHED: 14 Post-Construction        DATE: 8/31/2015

APPROXIMATE STATION: Sta. 472+50  
 CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Open/ROW	
2. Manning's roughness coeff., n	0.400	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.003	0.000
6. Computed Tc, hr	0.721	0.000
<b>Total Sheet Flow Tc, hr =</b>		<b>0.721</b>

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1200.000	127.000
9. Watercourse slope, ft/ft	0.017	0.031
10. Average velocity, ft/s	2.083	3.608
11. Computed Tc, hr	0.160	0.010
<b>Total Shallow Conc. Flow Tc, hr =</b>		<b>0.160</b>

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000
<b>Total Channel Flow Tc, hr =</b>		<b>0.000</b>

**Time of Concentration = 0.881 hr = 52.843 min**



**OUTFALL NO. 14 (PRE)**  
DA = 509,216 SF (11.69 AC)  
IMPERV AREA = 87,120 SF  
C = 0.69  
Tc = 0.88 hr

**OUTFALL NO. 14 (POST)**  
DA = 509,216 SF (11.69 AC)  
IMPERV AREA = 124,582 SF  
C = 0.74  
Tc = 0.88 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 14 STA. 472 + 50**  
**SCALE: 1" = 1000'**



**Outfall #15 [Rt.] Sta.508+20 (I-20)**  
**[Outfall ditch]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #15 is approximately 57 acres. The existing watershed includes large areas of pavement and large grassed areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 57.43

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
12.75	- 0.90	Pavements & Roofs
15.96	- 0.25	Grass Shoulders
12.75	- 0.15	Woodland & Forest
15.97	- 0.85	City Business Areas
0.00	- 0.30	Meadows & Pasture Land
0.00	- 0.20	Unimproved Areas

Weighted c-value = 0.54

Rainfall Intensity, I =  
Lexington, SC

Time of Concentration, tc = 1.224 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	1.925
10 year	2.424
25 year	2.731
50 year	2.969
100 year	3.199

Peak Runoff, Q =

$$Q = C_f C I A$$

Design Storm	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.54	1.93	57.43	=	59.59	cfs
10	1	0.54	2.42	57.43	=	75.04	cfs
25	1.1	0.54	2.73	57.43	=	93.00	cfs
50	1.2	0.54	2.97	57.43	=	110.28	cfs
100	1.25	0.54	3.20	57.43	=	123.77	cfs

**Outfall #15 [Rt.] Sta.508+20 (I-20)**  
**[Outfall ditch]****Continued**

Runoff from the existing watershed flows overland to a box culvert along I-20 at approx. Sta. 508+20 and discharges into an outfall ditch off I-20.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #15.

Proposed Conditions Total Drainage Area = 57.43 acres  
Additional Impervious Area = 2.10 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
14.85	-	0.90	Pavements & Roofs	
13.86	-	0.25	Grass Shoulders	
12.75	-	0.15	Woodland & Forest	
15.97	-	0.85	City Business Areas	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.56

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.224 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.925
10 year	2.424
25 year	2.731
50 year	2.969
100 year	3.199



**Outfall #15 [Rt.] Sta.508+20 (I-20)**  
**[Outfall ditch]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.56	1.93	57.43	=	62.22 cfs
10	1	0.56	2.42	57.43	=	78.35 cfs
25	1.1	0.56	2.73	57.43	=	97.10 cfs
50	1.2	0.56	2.97	57.43	=	115.15 cfs
100	1.25	0.56	3.20	57.43	=	129.23 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	59.59	62.22	2.63	4.41%
10	75.04	78.35	3.31	4.41%

The additional 3.31 cfs runoff for the 10-year design storm will be collected by an outfall ditch at approx. Sta. 508+20 off I-20. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

8/31/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 15 Post-Construction        DATE: 8/31/2015

APPROXIMATE STATION: Sta. 508+20  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1685.000	130.000
9. Watercourse slope, ft/ft	0.021	0.008
10. Average velocity, ft/s	2.325	1.783
11. Computed Tc, hr	0.201	0.020

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.201</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.224 hr = 73.451 min**



**OUTFALL NO. 15 (PRE)**  
DA = 2,501,651 SF (57.43 AC)  
IMPERV AREA = 555,390 SF  
C = 0.54  
Tc = 1.22 hr

**OUTFALL NO. 15 (POST)**  
DA = 2,501,651 SF (57.43 AC)  
IMPERV AREA = 646,866 SF  
C = 0.56  
Tc = 1.22 hr

I-20 IMPROVEMENT  
PROJECT

PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 15 STA. 508 + 20

SCALE: 1" = 1000'



**Outfall #16 [Rt.] Sta.527+70 (I-20)**  
**[Outfall ditch]**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #16 is approximately 21 acres. The existing watershed includes commercial areas, parking areas and large grassed areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 21.20

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
3.95	- 0.90	Pavements & Roofs
8.06	- 0.85	City Business Areas
5.02	- 0.25	Grass Shoulders
0.00	- 0.50	Suburban, Normal Residential
4.17	- 0.30	Meadows & Pasture Land
0.00	- 0.20	Unimproved Areas
Weighted c-value =		0.61

Rainfall Intensity, I =  
Lexington, SC

Time of Concentration,  $t_c$  = 1.128 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.037
10 year	2.566
25 year	2.892
50 year	3.145
100 year	3.390

Peak Runoff, Q =

$Q = C_f CIA$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.61	2.04	21.20	=	26.30	cfs
10	1	0.61	2.57	21.20	=	33.14	cfs
25	1.1	0.61	2.89	21.20	=	41.08	cfs
50	1.2	0.61	3.15	21.20	=	48.73	cfs
100	1.25	0.61	3.39	21.20	=	54.71	cfs

**Outfall #16 [Rt.] Sta.527+70 (I-20)**  
**[Outfall ditch]****Continued**

Runoff from the existing watershed flows overland to a crossing at approx. Sta. 527+70 along I-20 and discharges into an outfall ditch off I-20

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #16.

Proposed Conditions Total Drainage Area = 21.20 acres  
Additional Impervious Area = 1.12 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
5.07	-	0.90	Pavements & Roofs	
8.06	-	0.85	City Business Areas	
3.90	-	0.25	Grass Shoulders	
0.00	-	0.50	Suburban, Normal Residential	
4.17	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
			Weighted c-value =	0.64

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.128 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.037
10 year	2.566
25 year	2.892
50 year	3.145
100 year	3.390

**Outfall #16 [Rt.] Sta.527+70 (I-20)**  
**[Outfall ditch]****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.64	2.04	21.20	=	27.78 cfs
10	1	0.64	2.57	21.20	=	35.01 cfs
25	1.1	0.64	2.89	21.20	=	43.40 cfs
50	1.2	0.64	3.15	21.20	=	51.48 cfs
100	1.25	0.64	3.39	21.20	=	57.79 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	26.30	27.78	1.48	5.64%
10	33.14	35.01	1.87	5.64%

The additional 1.87 cfs runoff for the 10-year design storm will be collected by an outfall ditch at approx. Sta. 527+70 off I-20. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.





Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 16 Post-Construction DATE: 8/31/2015

APPROXIMATE STATION: Sta. 527+70  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	825.000	115.000
9. Watercourse slope, ft/ft	0.018	0.017
10. Average velocity, ft/s	2.176	2.681
11. Computed Tc, hr	0.105	0.012

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.105</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.128 hr = 67.694 min**



**OUTFALL NO. 16 (PRE)**  
DA = 923,472 SF (21.20 AC)  
IMPERV AREA = 172,062 SF  
C = 0.61  
Tc = 1.13 hr

**OUTFALL NO. 16 (POST)**  
DA = 923,472 SF (21.20 AC)  
IMPERV AREA = 220,849 SF  
C = 0.64  
Tc = 1.13 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 16 STA. 527+70**  
**SCALE: 1" = 1000'**



**Outfall #17 [Lt.] Sta.547+00 (I-20)****Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #17 is approximately 16 acres. The existing watershed includes, grassed areas, paved areas, and wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 15.75

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
7.85	-	0.90	Pavements & Roofs
5.40	-	0.15	Woodland & Forest
2.50	-	0.25	Grass Shoulders
0.00	-	0.50	Suburban, Normal Residential
0.00	-	0.30	Meadows & Pasture Land
0.00	-	0.20	Unimproved Areas

Weighted c-value = 0.54

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.305 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.840
10 year	2.316
25 year	2.609
50 year	2.835
100 year	3.054

**Peak Runoff, Q =**

$$Q = C_f C I A$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.54	1.84	15.75	=	15.64	cfs
10	1	0.54	2.32	15.75	=	19.69	cfs
25	1.1	0.54	2.61	15.75	=	24.39	cfs
50	1.2	0.54	2.84	15.75	=	28.92	cfs
100	1.25	0.54	3.05	15.75	=	32.45	cfs

**Outfall #17 [Lt.] Sta.547+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to a crossing at approx. Sta. 547+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #17.

Proposed Conditions Total Drainage Area = 15.75 acres

Additional Impervious Area = 0.70 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
8.55	-	0.90	Pavements & Roofs	
5.40	-	0.15	Woodland & Forest	
1.80	-	0.25	Grass Shoulders	
0.00	-	0.50	Suburban, Normal Residential	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
Weighted c-value =				0.57

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.305 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.840
10 year	2.316
25 year	2.609
50 year	2.835
100 year	3.054



**Outfall #17 [Lt.] Sta.547+00 (I-20)**

Outfall ditch

Continued

Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.57	1.84	15.75	=	16.48 cfs
10	1	0.57	2.32	15.75	=	20.74 cfs
25	1.1	0.57	2.61	15.75	=	25.70 cfs
50	1.2	0.57	2.84	15.75	=	30.47 cfs
100	1.25	0.57	3.05	15.75	=	34.19 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	15.64	16.48	0.84	5.35%
10	19.69	20.74	1.05	5.35%

The additional 1.05 cfs runoff for the 10-year design storm will be collected by an existing closed drainage system and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 17 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION: Sta. 547+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.003	0.000
6. Computed Tc, hr	1.255	0.000

<b>Total Sheet Flow Tc, hr = 1.255</b>
--

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	635.000	0.000
9. Watercourse slope, ft/ft	0.047	1.000
10. Average velocity, ft/s	3.507	20.328
11. Computed Tc, hr	0.050	0.000

<b>Total Shallow Conc. Flow Tc, hr = 0.050</b>
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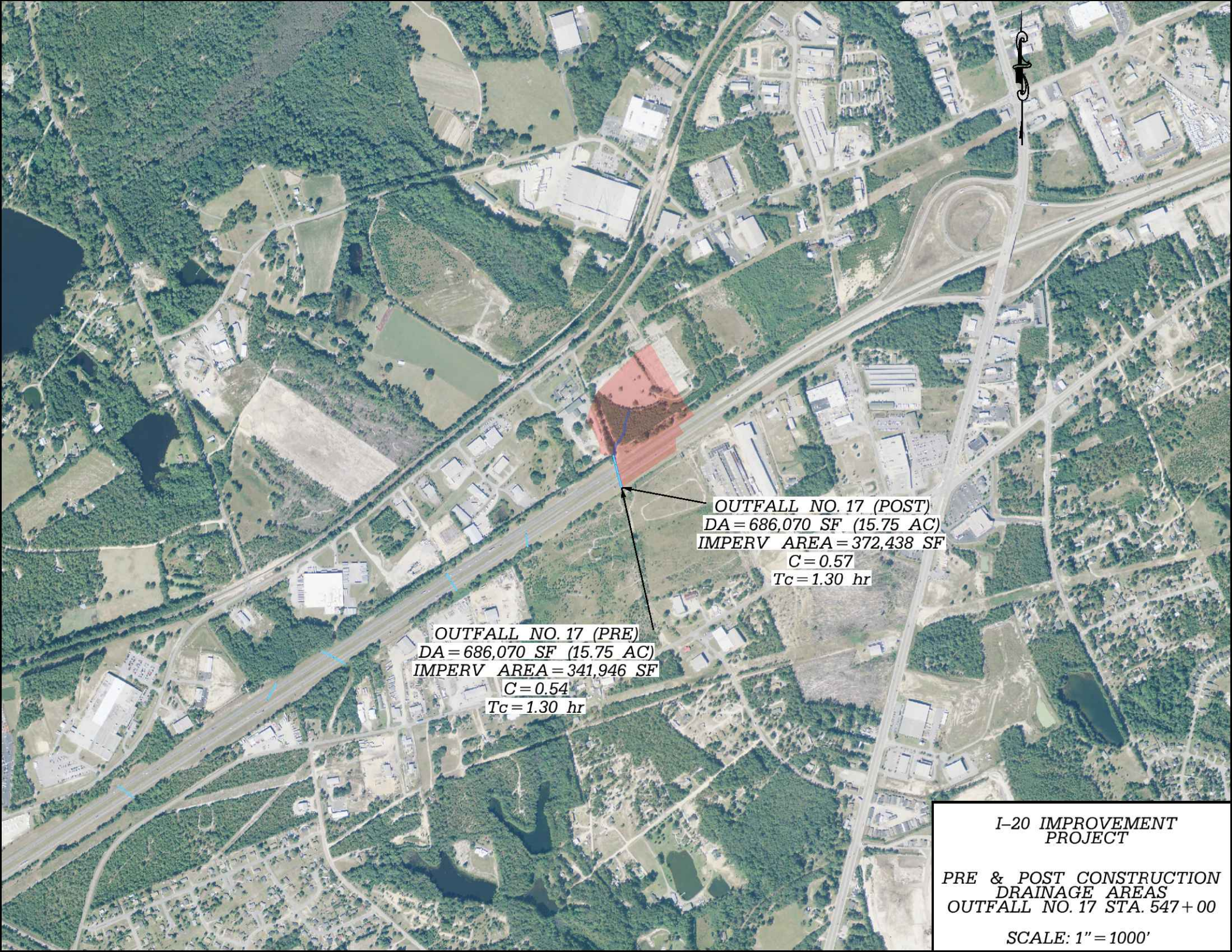
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
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**Time of Concentration = 1.305 hr = 78.305 min**





**OUTFALL NO. 17 (POST)**  
DA = 686,070 SF (15.75 AC)  
IMPERV AREA = 372,438 SF  
C = 0.57  
Tc = 1.30 hr

**OUTFALL NO. 17 (PRE)**  
DA = 686,070 SF (15.75 AC)  
IMPERV AREA = 341,946 SF  
C = 0.54  
Tc = 1.30 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 17 STA. 547+00**  
**SCALE: 1" = 1000'**



**Outfall #18 Lt. Sta. 564+00 (I-20)**

**Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #18 is approximately 23 acres. The existing watershed includes, grassed areas, large wooded areas, and paved areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 22.94

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
1.41	0.90	Pavements & Roofs
4.69	0.15	Woodland & Forest
8.05	0.25	Grass Shoulders
8.79	0.70	Industrial Areas, Light
0.00	0.00	
0.00	0.00	

Weighted c-value = 0.44

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 1.219 hours  
See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	1.931
10 year	2.431
25 year	2.739
50 year	2.978
100 year	3.209

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.44	1.93	22.94	=	19.57	cfs
10	1	0.44	2.43	22.94	=	24.65	cfs
25	1.1	0.44	2.74	22.94	=	30.55	cfs
50	1.2	0.44	2.98	22.94	=	36.23	cfs
100	1.25	0.44	3.21	22.94	=	40.66	cfs

**Outfall #18 Lt. Sta. 564+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to a closed drainage system at approx. Sta. 564+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #18.

Proposed Conditions Total Drainage Area = 22.94 acres

Additional Impervious Area = 1.09 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
2.50	-	0.90	Pavements & Roofs	
4.69	-	0.15	Woodland & Forest	
6.96	-	0.25	Grass Shoulders	
8.79	-	0.70	Industrial Areas, Light	
0.00	-	0.00		
0.00	-	0.00		
				Weighted c-value = 0.47

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.219 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.931
10 year	2.431
25 year	2.739
50 year	2.978
100 year	3.209

**Outfall #18 Lt. Sta. 564+00 (I-20)****Outfall ditch****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.47	1.93	22.94	=	20.94 cfs
10	1	0.47	2.43	22.94	=	26.37 cfs
25	1.1	0.47	2.74	22.94	=	32.68 cfs
50	1.2	0.47	2.98	22.94	=	38.76 cfs
100	1.25	0.47	3.21	22.94	=	43.50 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	19.57	20.94	1.37	6.99%
10	24.65	26.37	1.72	6.99%

The additional 1.72 cfs runoff for the 10-year design storm will be collected by an existing closed drainage system and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 18

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 564+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr = 1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1729.000	0.000
9. Watercourse slope, ft/ft	0.023	1.000
10. Average velocity, ft/s	2.447	20.328
11. Computed Tc, hr	0.196	0.000

<b>Total Shallow Conc. Flow Tc, hr = 0.196</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
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**Time of Concentration = 1.219 hr = 73.150 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 18 Post-Construction        DATE: 9/1/2015

APPROXIMATE STATION: Sta. 564+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

	Segment	1	
1. Surface description		Undeveloped	
2. Manning's roughness coeff., n		0.800	0.000
3. Flow length, ft		100.000	0.000
4. Two-yr 24-hr rainfall, in		3.600	3.600
5. Land slope, ft/ft		0.005	0.000
6. Computed Tc, hr		1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

	Segment	2	
7. Surface description (paved or unpaved)		Unpaved	Paved
8. Flow length, ft		1729.000	0.000
9. Watercourse slope, ft/ft		0.023	1.000
10. Average velocity, ft/s		2.447	20.328
11. Computed Tc, hr		0.196	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.196</b>
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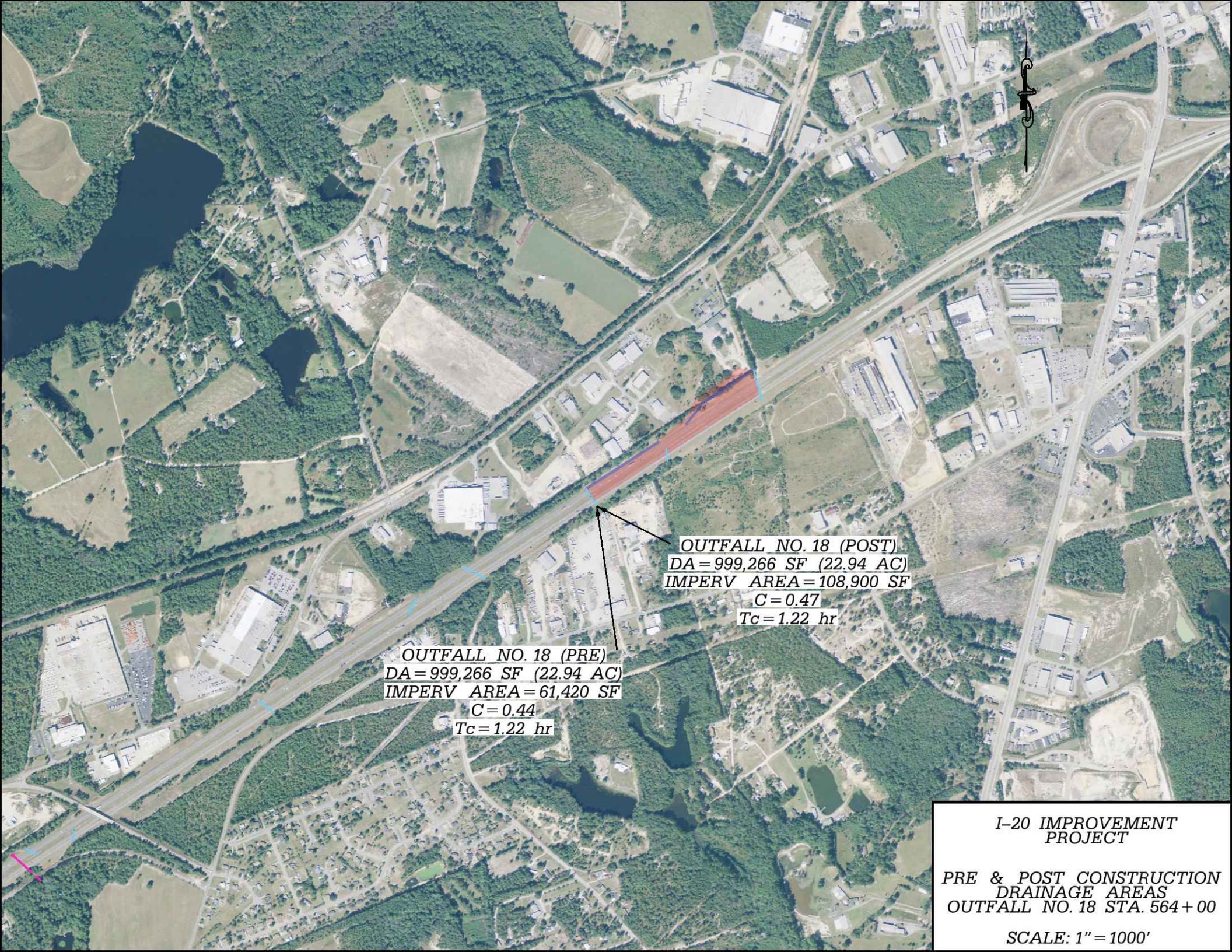
**CHANNEL FLOW:**

	Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>		0.000	0.000
13. Wetted Perimeter, ft		0.000	0.000
14. Hydraulic Radius, ft		10.000	0.000
15. Channel Slope, ft/ft		0.000	0.000
16. Manning's roughness coeff., n		0.000	0.000
17. Velocity, ft/s		218.702	0.000
18. Flow Length, ft		0.000	0.000
19. Computed Tc, hr		0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.219 hr = 73.150 min**





**OUTFALL NO. 18 (POST)**  
DA = 999,266 SF (22.94 AC)  
IMPERV AREA = 108,900 SF  
C = 0.47  
Tc = 1.22 hr

**OUTFALL NO. 18 (PRE)**  
DA = 999,266 SF (22.94 AC)  
IMPERV AREA = 61,420 SF  
C = 0.44  
Tc = 1.22 hr

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 18 STA. 564 + 00**  
**SCALE: 1" = 1000'**



**Outfall #19 Rt. Sta. 577+00 (I-20)****Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #19 is approximately 26 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and commercial development adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 25.78

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres		C-value	Description
2.49	-	0.90	Pavements & Roofs
7.07	-	0.15	Woodland & Forest
8.90	-	0.70	Industrial Areas, Light
6.72	-	0.25	Grass Shoulders
0.60	-	0.50	Suburban, Normal Residential
0.00	-	0.00	

Weighted c-value = 0.45

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 1.058 hours

See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	2.127
10 year	2.681
25 year	3.023
50 year	3.288
100 year	3.544

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.45	2.13	25.78	=	24.48	cfs
10	1	0.45	2.68	25.78	=	30.87	cfs
25	1.1	0.45	3.02	25.78	=	38.28	cfs
50	1.2	0.45	3.29	25.78	=	45.42	cfs
100	1.25	0.45	3.54	25.78	=	51.00	cfs



**Outfall #19 Rt. Sta. 577+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed sheet flows overland to a closed drainage system at approx. Sta. 577+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition and drainage reconstruction. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #19.

Proposed Conditions Total Drainage Area = 25.78 acres

Additional Impervious Area = 2.37 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
4.86	-	0.90	Pavements & Roofs	
7.07	-	0.15	Woodland & Forest	
8.90	-	0.70	Industrial Areas, Light	
4.35	-	0.25	Grass Shoulders	
0.60	-	0.50	Suburban, Normal Residential	
0.00	-	0.00		
				Weighted c-value = 0.51

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.058 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.127
10 year	2.681
25 year	3.023
50 year	3.288
100 year	3.544

**Outfall #19 Rt. Sta. 577+00 (I-20)**

Outfall ditch

Continued

Peak Runoff, Q =

Q = C <sub>f</sub> CIA						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.51	2.13	25.78	=	27.76 cfs
10	1	0.51	2.68	25.78	=	35.00 cfs
25	1.1	0.51	3.02	25.78	=	43.40 cfs
50	1.2	0.51	3.29	25.78	=	51.50 cfs
100	1.25	0.51	3.54	25.78	=	57.83 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	24.48	27.76	3.28	13.38%
10	30.87	35.00	4.13	13.38%

The additional 4.13 cfs runoff for the 10-year design storm will be collected by an existing closed drainage system and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 19

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION:  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	422.000	0.000
9. Watercourse slope, ft/ft	0.043	1.000
10. Average velocity, ft/s	3.346	20.328
11. Computed Tc, hr	0.035	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.035</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.058 hr = 63.476 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 19 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION:  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	422.000	0.000
9. Watercourse slope, ft/ft	0.043	1.000
10. Average velocity, ft/s	3.346	20.328
11. Computed Tc, hr	0.035	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.035</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.058 hr = 63.476 min**



**OUTFALL NO. 19 (PRE)**  
**DA = 1,122,977 SF (25.78 AC)**  
**IMPERV AREA = 108,464 SF**  
**C = 0.45**  
**T<sub>c</sub> = 1.06 hr**

**OUTFALL NO. 19 (POST)**  
**DA = 1,122,977 SF (25.78 AC)**  
**IMPERV AREA = 211,702 SF**  
**C = 0.51**  
**T<sub>c</sub> = 1.06 hr**

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 19 STA. 577+00**  
**SCALE: 1" = 1000'**



**Outfall #20 Lt. Sta. 624+00 (I-20)****Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #20 is approximately 90 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and commercial development adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 90.59

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
12.62	-	0.90	Pavements & Roofs
22.95	-	0.15	Woodland & Forest
29.26	-	0.70	Industrial Areas, Light
25.76	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted c-value = 0.46

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.087 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.089
10 year	2.633
25 year	2.968
50 year	3.228
100 year	3.479

**Peak Runoff, Q =**

$$Q = C_f C I A$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.46	2.09	90.59	=	87.14	cfs
10	1	0.46	2.63	90.59	=	109.84	cfs
25	1.1	0.46	2.97	90.59	=	136.21	cfs
50	1.2	0.46	3.23	90.59	=	161.59	cfs
100	1.25	0.46	3.48	90.59	=	181.43	cfs

**Outfall #20 Lt. Sta. 624+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed sheet flows overland to a crossline at approx. Sta. 624+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition and drainage reconstruction. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #20.

Proposed Conditions Total Drainage Area = 90.59 acres

Additional Impervious Area = 5.74 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
18.36	-	0.90	Pavements & Roofs
22.95	-	0.15	Woodland & Forest
29.26	-	0.70	Industrial Areas, Light
20.02	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
Weighted c-value =			0.50

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.087 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	2.089
10 year	2.633
25 year	2.968
50 year	3.228
100 year	3.479

**Outfall #20 Lt. Sta. 624+00 (I-20)**

Outfall ditch

Continued

Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.50	2.09	90.59	=	94.93 cfs
10	1	0.50	2.63	90.59	=	119.67 cfs
25	1.1	0.50	2.97	90.59	=	148.39 cfs
50	1.2	0.50	3.23	90.59	=	176.04 cfs
100	1.25	0.50	3.48	90.59	=	197.66 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	87.14	94.93	7.79	8.94%
10	109.84	119.67	9.82	8.94%

The additional 9.82 cfs runoff for the 10-year design storm will be collected by an existing closed drainage system and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 20

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION:  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

**Total Sheet Flow Tc, hr = 1.023**

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1026.000	0.000
9. Watercourse slope, ft/ft	0.076	1.000
10. Average velocity, ft/s	4.449	20.328
11. Computed Tc, hr	0.064	0.000

**Total Shallow Conc. Flow Tc, hr = 0.064**

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

**Total Channel Flow Tc, hr = 0.000**

**Time of Concentration = 1.087 hr = 65.218 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 20 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION:  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	1026.000	0.000
9. Watercourse slope, ft/ft	0.076	1.000
10. Average velocity, ft/s	4.448	20.328
11. Computed Tc, hr	0.064	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.064</b>
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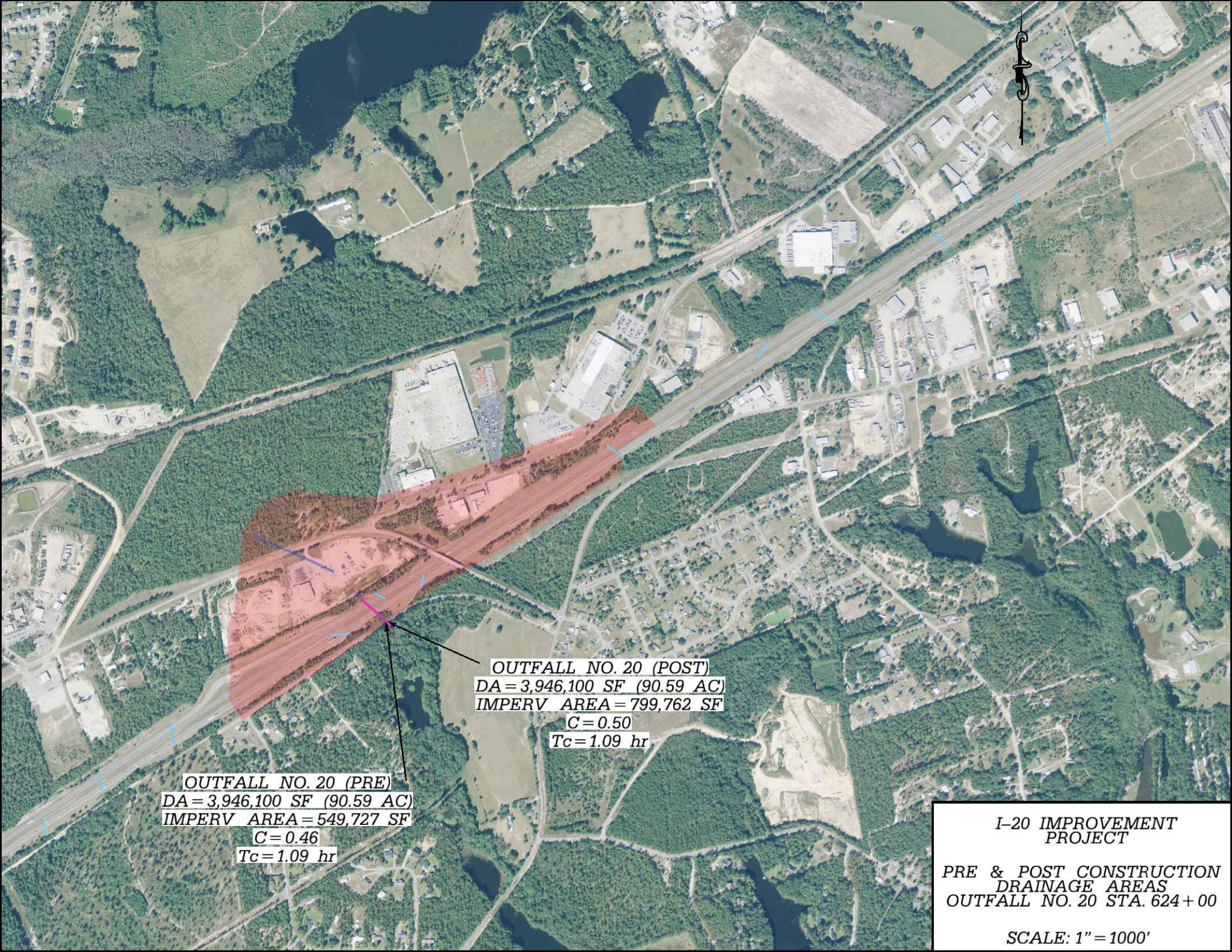
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.087 hr = 65.218 min**





**OUTFALL NO. 20 (POST)**  
DA = 3,946,100 SF (90.59 AC)  
IMPERV AREA = 799,762 SF  
C = 0.50  
Tc = 1.09 hr

**OUTFALL NO. 20 (PRE)**  
DA = 3,946,100 SF (90.59 AC)  
IMPERV AREA = 549,727 SF  
C = 0.46  
Tc = 1.09 hr

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 20 STA. 624 + 00**  
**SCALE: 1" = 1000'**



**Lexington County I-20 Widening - Outfall #21**  
**Unnamed tributary (stream) to Red Bank Creek****Pre-Construction Runoff**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #21 is approximately 300 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and industrialized areas adjacent to I-20.

Drainage Area (acres) = 299.16

**Curve Number, CN =**

Hydraulic Soil Group: C

Acres		CN	Description
50.50	-	92.00	IA (Paved-Open Ditches)
138.50	-	70.00	Woods (Good)
50.50	-	91.00	Industrial
59.66	-	74.00	Open Space (Good)
0.00	-	74.00	Open Space (Good)
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted CN-value = 78.1

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.436 hours  
See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 2.81$  in

$I_a = 0.2(S) = 0.56$  in



**Lexington County I-20 Widening - Outfall #21**

Unnamed tributary (stream) to Red Bank Creek

Continued

Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	2.81	=	1.6	in
10	5.30	2.81	=	3.0	in
25	6.40	2.81	=	3.9	in
50	7.30	2.81	=	4.8	in
100	8.30	2.81	=	5.7	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	0.56	0.16	267.8	csm/in
10	5.30	0.56	0.11	281.7	csm/in
25	6.40	0.56	0.09	283.5	csm/in
50	7.30	0.56	0.08	283.5	csm/in
100	8.30	0.56	0.07	283.5	csm/in

Pond Factor,  $F_p$  =

$$1.40 \text{ acres} = 0.5\%$$

$$F_p = 0.95$$

Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	267.8	0.47	1.6	0.950	187.6	cfs
10	281.7	0.47	3.0	0.950	372.0	cfs
25	283.5	0.47	3.9	0.950	496.0	cfs
50	283.5	0.47	4.8	0.950	598.5	cfs
100	283.5	0.47	5.7	0.950	714.5	cfs

Runoff from the existing watershed flows overland to an existing box culvert at approx. Sta. 666+50 along I-20 and discharges into an unnamed tributary (stream).

**Lexington County I-20 Widening - Outfall #21**  
**Unnamed tributary (stream) to Red Bank Creek****Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #21.

**Watershed Analysis**

Drainage Area (acres) = 299.16 SCS Method

Additional Impervious Area = 4.58 Acres

**Curve Number, CN =**

Hydraulic Soil Group: C

Acres		CN	Description
55.08	-	92.00	IA (Paved-Open Ditches)
138.50	-	70.00	Woods (Good)
50.50	-	91.00	Industrial
55.08	-	74.00	Open Space (Good)
0.00	-	74.00	Open Space (Good)
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted CN-value = 78.3

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.436 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 2.77$  in

$I_a = 0.2(S) = 0.55$  in

**Lexington County I-20 Widening - Outfall #21**  
**Unnamed tributary (stream) to Red Bank Creek****Continued**Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	2.77	=	1.6	in
10	5.30	2.77	=	3.0	in
25	6.40	2.77	=	4.0	in
50	7.30	2.77	=	4.8	in
100	8.30	2.77	=	5.7	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	0.55	0.15	268.5	csm/in
10	5.30	0.55	0.10	282.2	csm/in
25	6.40	0.55	0.09	283.5	csm/in
50	7.30	0.55	0.08	283.5	csm/in
100	8.30	0.55	0.07	283.5	csm/in

Pond Factor,  $F_p$  =

1.4 acres = 0.5%

$F_p = 0.95$

Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	268.5	0.47	1.6	0.950	190.4	cfs
10	282.2	0.47	3.0	0.950	375.9	cfs
25	283.5	0.47	4.0	0.950	499.6	cfs
50	283.5	0.47	4.8	0.950	602.3	cfs
100	283.5	0.47	5.7	0.950	718.6	cfs

Percent Increase =

Design Storm	$Q_{pre}$	$Q_{post}$	$Q_{increase}$	% Increase
2	187.6	190.4	2.77	1.45%
10	372.0	375.9	3.86	1.04%
25	496.0	499.6	3.62	0.73%
50	598.5	602.3	3.88	0.65%
100	714.5	718.6	4.12	0.58%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #21. However the drainage area remains approximately the same. The additional 3.86 cfs runoff for the 10-year design storm will be collected by a stream that flows to Red Bank Creek. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 21

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 666+50  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	4225.000	0.000
9. Watercourse slope, ft/ft	0.031	1.000
10. Average velocity, ft/s	2.841	20.328
11. Computed Tc, hr	0.413	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.413</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.436 hr = 86.159 min**



Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 21 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION: Sta. 666+50  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.050	0.000
6. Computed Tc, hr	0.407	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.407</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
	Unpaved	Paved
7. Surface description (paved or unpaved)		
8. Flow length, ft	4225.000	0.000
9. Watercourse slope, ft/ft	0.031	1.000
10. Average velocity, ft/s	2.841	20.328
11. Computed Tc, hr	0.413	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.413</b>
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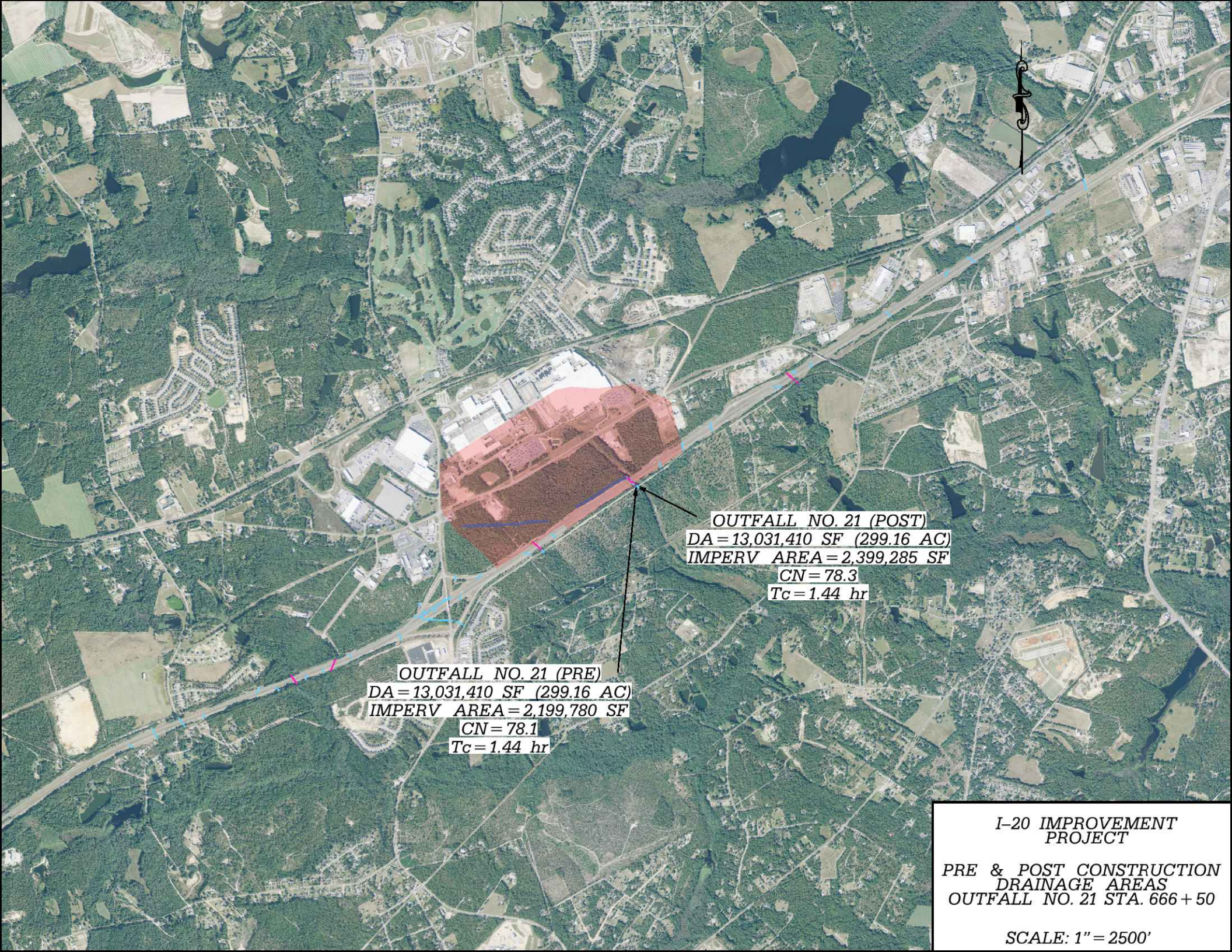
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.436 hr = 86.159 min**





**OUTFALL NO. 21 (POST)**  
DA = 13,031,410 SF (299.16 AC)  
IMPERV AREA = 2,399,285 SF  
CN = 78.3  
Tc = 1.44 hr

**OUTFALL NO. 21 (PRE)**  
DA = 13,031,410 SF (299.16 AC)  
IMPERV AREA = 2,199,780 SF  
CN = 78.1  
Tc = 1.44 hr

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 21 STA. 666 + 50**  
  
SCALE: 1" = 2500'



**Outfall #22 Rt. Sta. 692+00 (I-20)****Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #22 is approximately 36 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and commercial areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 36.18

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description		
4.37	-	0.90	Pavements & Roofs		
11.15	-	0.25	Grass Shoulders		
0.29	-	0.47	Unpaved Road, Silty Soils		
0.38	-	0.55	Gravel Pavements		
0.12	-	0.70	Industrial Areas, Light		
19.87	-	0.15	Woodland & Forest		
				Weighted c-value =	0.28

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.262 hours  
See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.884
10 year	2.372
25 year	2.672
50 year	2.905
100 year	3.129

**Peak Runoff, Q =**

$$Q = C_f CIA$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.28	1.88	36.18	=	19.08	cfs
10	1	0.28	2.37	36.18	=	24.02	cfs
25	1.1	0.28	2.67	36.18	=	29.77	cfs
50	1.2	0.28	2.90	36.18	=	35.30	cfs
100	1.25	0.28	3.13	36.18	=	39.62	cfs

**Outfall #22 Rt. Sta. 692+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to a box culvert at approx. Sta. 692+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #22.

Proposed Conditions Total Drainage Area = 36.18 acres

Additional Impervious Area = 2.49 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
6.86	-	0.90	Pavements & Roofs	
8.66	-	0.25	Grass Shoulders	
0.29	-	0.47	Unpaved Road, Silty Soils	
0.38	-	0.55	Gravel Pavements	
0.12	-	0.70	Industrial Areas, Light	
19.87	-	0.15	Woodland & Forest	
			Weighted c-value =	0.32

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.262 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.884
10 year	2.372
25 year	2.672
50 year	2.905
100 year	3.129



**Outfall #22 Rt. Sta. 692+00 (I-20)****Outfall ditch****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A							
Design	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.32	1.88	36.18	=	22.14	cfs
10	1	0.32	2.37	36.18	=	27.87	cfs
25	1.1	0.32	2.67	36.18	=	34.54	cfs
50	1.2	0.32	2.90	36.18	=	40.95	cfs
100	1.25	0.32	3.13	36.18	=	45.96	cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	19.08	22.14	3.05	16.01%
10	24.02	27.87	3.85	16.01%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #22. However the drainage area remains approximately the same. The additional 3.85 cfs runoff for the 10-year design storm will be collected by an existing box culvert and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 22

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 692+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	2552.000	0.000
9. Watercourse slope, ft/ft	0.034	1.000
10. Average velocity, ft/s	2.962	20.328
11. Computed Tc, hr	0.239	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.239</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.262 hr = 75.734 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening                      ENGINEER:  
WATERSHED: 22 Post-Construction        DATE: 9/1/2015

APPROXIMATE STATION: Sta. 692+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

	Segment	1	
1. Surface description		Undeveloped	
2. Manning's roughness coeff., n		0.800	0.000
3. Flow length, ft		100.000	0.000
4. Two-yr 24-hr rainfall, in		3.600	3.600
5. Land slope, ft/ft		0.050	0.000
6. Computed Tc, hr		0.407	0.000
		<b>Total Sheet Flow Tc, hr = 0.407</b>	

**SHALLOW CONCENTRATED FLOW:**

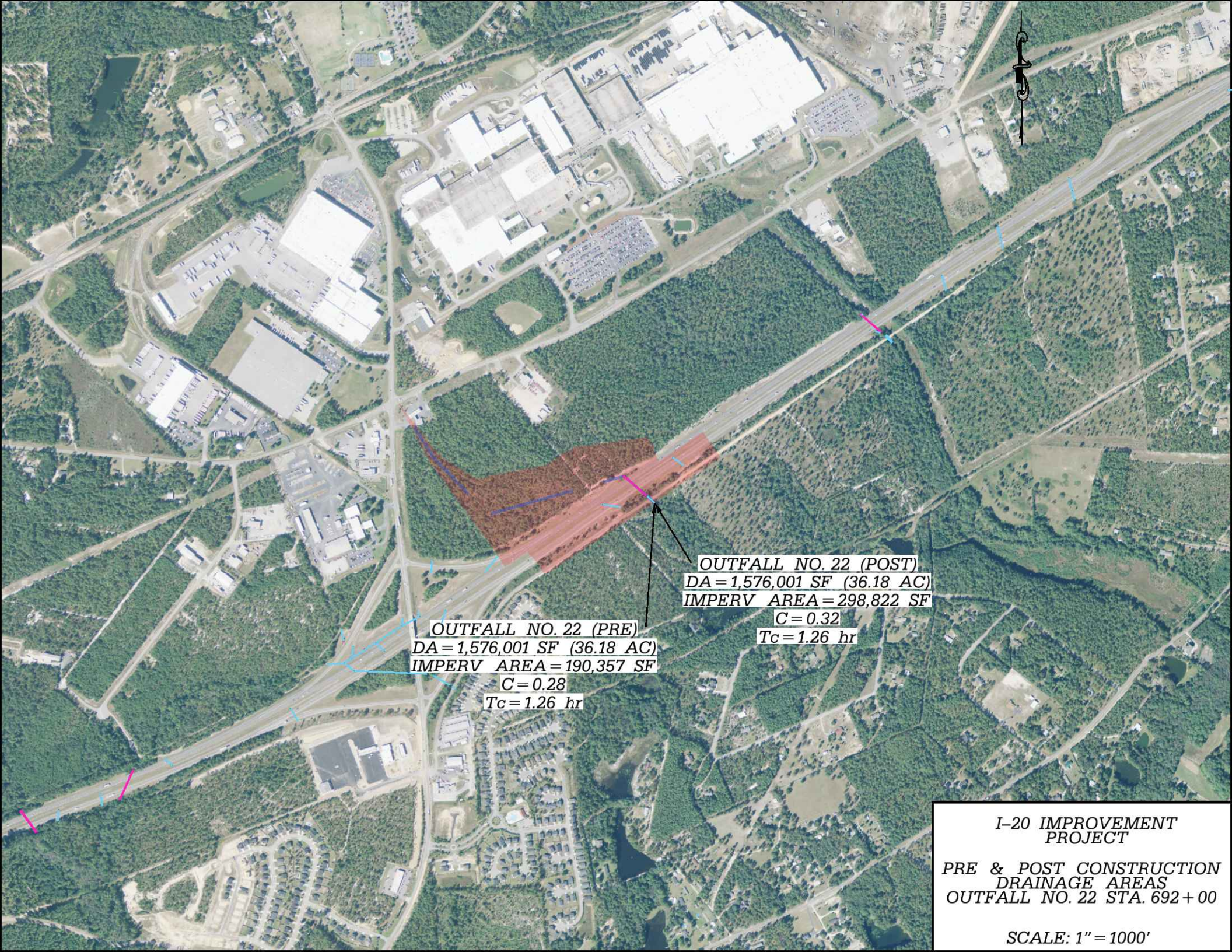
	Segment	2	
7. Surface description (paved or unpaved)		Unpaved	Paved
8. Flow length, ft		2552.000	0.000
9. Watercourse slope, ft/ft		0.034	1.000
10. Average velocity, ft/s		2.962	20.328
11. Computed Tc, hr		0.239	0.000
		<b>Total Shallow Conc. Flow Tc, hr = 0.239</b>	

**CHANNEL FLOW:**

	Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>		0.000	0.000
13. Wetted Perimeter, ft		0.000	0.000
14. Hydraulic Radius, ft		10.000	0.000
15. Channel Slope, ft/ft		0.000	0.000
16. Manning's roughness coeff., n		0.000	0.000
17. Velocity, ft/s		218.702	0.000
18. Flow Length, ft		0.000	0.000
19. Computed Tc, hr		0.000	0.000
		<b>Total Channel Flow Tc, hr = 0.000</b>	

**Time of Concentration = 1.262 hr = 75.734 min**





**OUTFALL NO. 22 (POST)**  
**DA = 1,576,001 SF (36.18 AC)**  
**IMPERV AREA = 298,822 SF**  
**C = 0.32**  
**Tc = 1.26 hr**

**OUTFALL NO. 22 (PRE)**  
**DA = 1,576,001 SF (36.18 AC)**  
**IMPERV AREA = 190,357 SF**  
**C = 0.28**  
**Tc = 1.26 hr**

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 22 STA. 692 + 00**  
**SCALE: 1" = 1000'**



**Outfall #23 Lt. Sta. 747+00 (I-20)**

**Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #23 is approximately 99 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, and commercial areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 99.75

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description
20.37	-	0.90	Pavements & Roofs
24.04	-	0.15	Woodland & Forest
24.13	-	0.70	Industrial Areas, Light
31.21	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted c-value = 0.47

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 1.317 hours

See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	1.828
10 year	2.300
25 year	2.591
50 year	2.816
100 year	3.034

Peak Runoff, Q =

$$Q = C_f CIA$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.47	1.83	99.75	=	85.24	cfs
10	1	0.47	2.30	99.75	=	107.27	cfs
25	1.1	0.47	2.59	99.75	=	132.91	cfs
50	1.2	0.47	2.82	99.75	=	157.59	cfs
100	1.25	0.47	3.03	99.75	=	176.83	cfs

**Outfall #23 Lt. Sta. 747+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to an existing box culvert at approx. Sta. 747+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #23.

Proposed Conditions Total Drainage Area = 99.75 acres

Additional Impervious Area = 5.50 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres	-	C-value	Description
25.87	-	0.90	Pavements & Roofs
24.04	-	0.15	Woodland & Forest
24.13	-	0.70	Industrial Areas, Light
25.71	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
Weighted c-value =			0.50

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.317 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.828
10 year	2.300
25 year	2.591
50 year	2.816
100 year	3.034

**Outfall #23 Lt. Sta. 747+00 (I-20)****Outfall ditch****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A						
Design	C <sub>f</sub>	C	I	A	=	Q
2	1	0.50	1.83	99.75	=	91.77 cfs
10	1	0.50	2.30	99.75	=	115.50 cfs
25	1.1	0.50	2.59	99.75	=	143.10 cfs
50	1.2	0.50	2.82	99.75	=	169.67 cfs
100	1.25	0.50	3.03	99.75	=	190.38 cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	85.24	91.77	6.53	7.67%
10	107.27	115.50	8.22	7.67%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #23. However the drainage area remains approximately the same. The additional 8.22 cfs runoff for the 10-year design storm will be collected by an existing box culvert and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 23

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 747+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3019.000	0.000
9. Watercourse slope, ft/ft	0.031	1.000
10. Average velocity, ft/s	2.847	20.328
11. Computed Tc, hr	0.295	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.295</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.317 hr = 79.047 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 23 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION: Sta. 747+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.050	0.000
6. Computed Tc, hr	0.407	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.407</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3019.000	0.000
9. Watercourse slope, ft/ft	0.031	1.000
10. Average velocity, ft/s	2.847	20.328
11. Computed Tc, hr	0.295	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.295</b>
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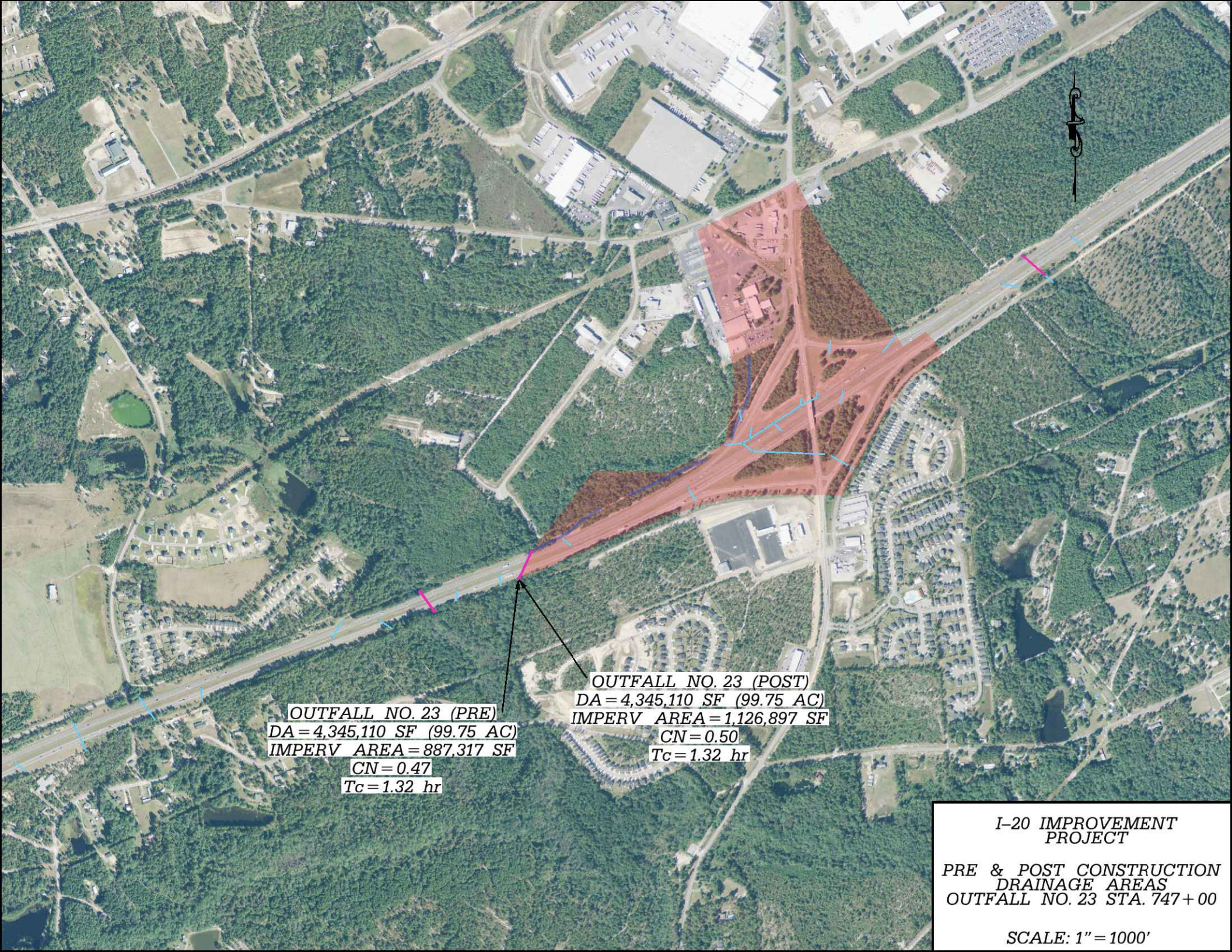
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.317 hr = 79.047 min**





**OUTFALL NO. 23 (PRE)**  
**DA = 4,345,110 SF (99.75 AC)**  
**IMPERV AREA = 887,317 SF**  
**CN = 0.47**  
**Tc = 1.32 hr**

**OUTFALL NO. 23 (POST)**  
**DA = 4,345,110 SF (99.75 AC)**  
**IMPERV AREA = 1,126,897 SF**  
**CN = 0.50**  
**Tc = 1.32 hr**

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 23 STA. 747+00**  
**SCALE: 1" = 1000'**



**Lexington County I-20 Widening - Outfall #24**  
**Unnamed tributary (stream) to Red Bank Creek****Pre-Construction Runoff**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #24 is approximately 404 acres. The existing watershed includes, grassed areas, paved areas, wooded areas, commercial areas, and residential areas adjacent to I-20.

Drainage Area (acres) = 404.18

**Curve Number, CN =**

Hydraulic Soil Group: A

Acres		CN	Description
12.32	-	83.00	IA (Paved-Open Ditches)
275.82	-	30.00	Woods (Good)
16.04	-	89.00	Commercial and Business
100.00	-	54.00	Residential (1/2 Acre)
0.00	-	39.00	Open Space (Good)
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted CN-value = 39.9

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.430 hours  
See Time of Concentration Worksheet

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 15.07$  in

$I_a = 0.2(S) = 3.01$  in



**Lexington County I-20 Widening - Outfall #24**

Unnamed tributary (stream) to Red Bank Creek

Continued

Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	15.07	=	0.0	in
10	5.30	15.07	=	0.3	in
25	6.40	15.07	=	0.6	in
50	7.30	15.07	=	0.9	in
100	8.30	15.07	=	1.4	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	3.01	0.50	132.5	csm/in
10	5.30	3.01	0.50	132.5	csm/in
25	6.40	3.01	0.47	147.8	csm/in
50	7.30	3.01	0.41	179.0	csm/in
100	8.30	3.01	0.36	203.1	csm/in

Pond Factor,  $F_p$  =

$$7.27 \text{ acres} = 1.8\%$$

$$F_p = 0.82$$

Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	132.5	0.63	0.0	0.820	1.5	cfs
10	132.5	0.63	0.3	0.820	20.7	cfs
25	147.8	0.63	0.6	0.820	47.6	cfs
50	179.0	0.63	0.9	0.820	88.0	cfs
100	203.1	0.63	1.4	0.820	144.4	cfs

Runoff from the existing watershed flows overland to a box culvert at approx. Sta. 755+00 along I-20 and discharges into an unnamed tributary (stream).

**Lexington County I-20 Widening - Outfall #24**  
**Unnamed tributary (stream) to Red Bank Creek****Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #24.

**Watershed Analysis**

Drainage Area (acres) = 404.18 SCS Method

Additional Impervious Area = 2.80 Acres

**Curve Number, CN =**

Hydraulic Soil Group: A

Acres		CN	Description
15.12	-	83.00	IA (Paved-Open Ditches)
273.02	-	30.00	Woods (Good)
16.04	-	89.00	Commercial and Business
100.00	-	54.00	Residential (1/2 Acre)
0.00	-	39.00	Open Space (Good)
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted CN-value = 40.3

**Time of Concentration,  $t_c$  =**

Time of Concentration,  $t_c$  = 1.430 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**24 Hour Rainfall, P -**

SCDHEC Rainfall for : Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

**Maximum Retention, S: Initial Abstraction,  $I_a$  =**

$S = (1000/CN) - 10 = 14.84$  in

$I_a = 0.2(S) = 2.97$  in

**Lexington County I-20 Widening - Outfall #24**  
**Unnamed tributary (stream) to Red Bank Creek****Continued**Runoff, Q =

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	14.84	=	0.0	in
10	5.30	14.84	=	0.3	in
25	6.40	14.84	=	0.6	in
50	7.30	14.84	=	1.0	in
100	8.30	14.84	=	1.4	in

Unit Peak Discharge,  $q_u$ 

Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	2.97	0.50	132.5	csm/in
10	5.30	2.97	0.50	132.5	csm/in
25	6.40	2.97	0.46	151.8	csm/in
50	7.30	2.97	0.41	182.4	csm/in
100	8.30	2.97	0.36	205.8	csm/in

Pond Factor,  $F_p$  =

7.27 acres = 1.8%

$F_p = 0.82$

Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$	$A_m$	Q	$F_p$	$q_p$	
2	132.5	0.63	0.0	0.820	1.8	cfs
10	132.5	0.63	0.3	0.820	21.7	cfs
25	151.8	0.63	0.6	0.820	50.7	cfs
50	182.4	0.63	1.0	0.820	92.5	cfs
100	205.8	0.63	1.4	0.820	150.2	cfs

Percent Increase =

Design Storm	$Q_{pre}$	$Q_{post}$	$Q_{increase}$	% Increase
2	1.5	1.8	0.27	14.94%
10	20.7	21.7	1.06	5.15%
25	47.6	50.7	3.11	6.54%
50	88.0	92.5	4.50	5.11%
100	144.4	150.2	5.79	4.01%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #24. However the drainage area remains approximately the same. The additional 1.06 cfs runoff for the 10-year design storm will be collected by a stream that ultimately discharges into Red Bank Creek. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.



Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 24

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 755+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3900.000	0.000
9. Watercourse slope, ft/ft	0.027	1.000
10. Average velocity, ft/s	2.660	20.328
11. Computed Tc, hr	0.407	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.407</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.430 hr = 85.810 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening                      ENGINEER:  
 WATERSHED: 24 Post-Construction        DATE: 9/1/2015

APPROXIMATE STATION: Sta. 755+00  
 CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.050	0.000
6. Computed Tc, hr	0.407	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.407</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3900.000	0.000
9. Watercourse slope, ft/ft	0.027	1.000
10. Average velocity, ft/s	2.660	20.328
11. Computed Tc, hr	0.407	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.407</b>
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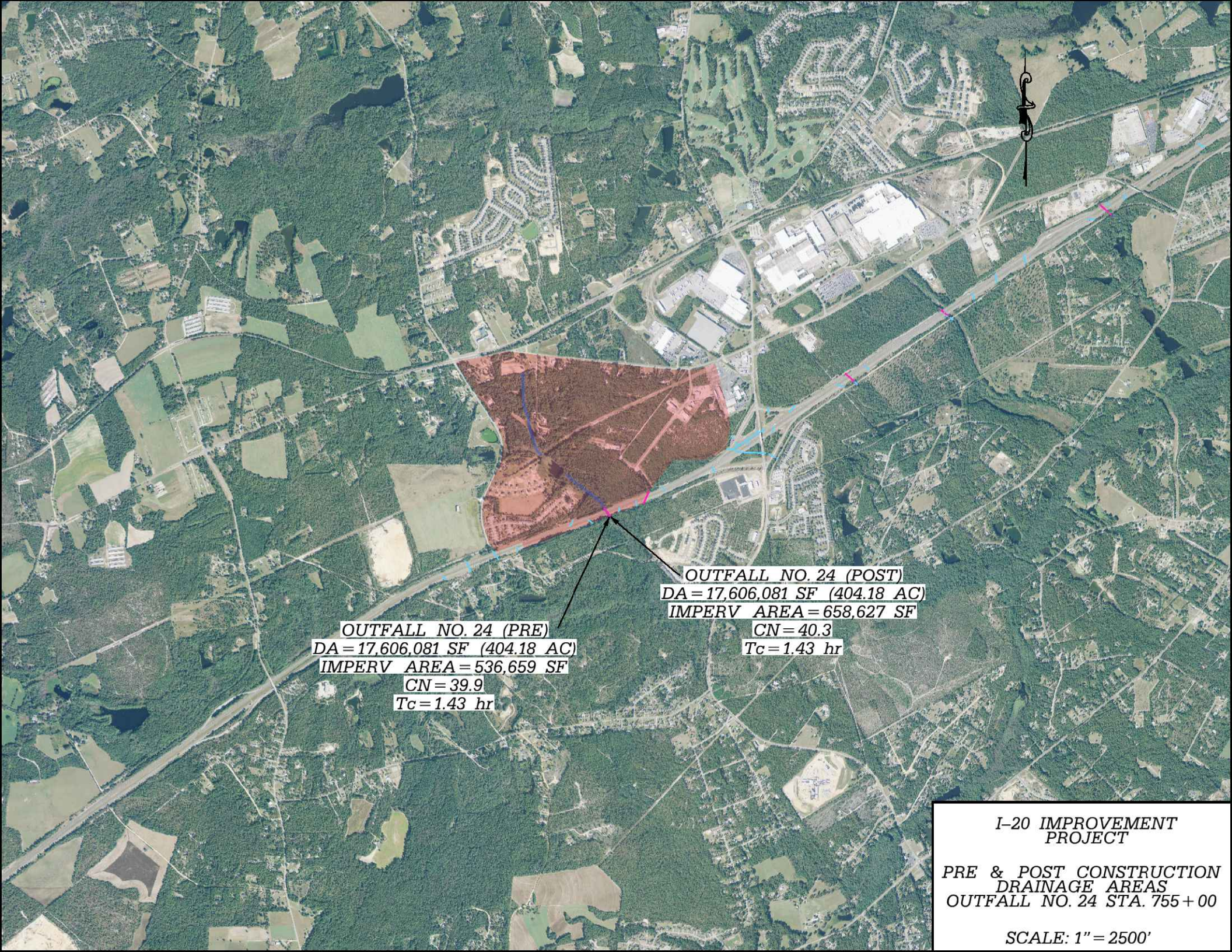
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.430 hr = 85.810 min**





**OUTFALL NO. 24 (PRE)**  
DA = 17,606,081 SF (404.18 AC)  
IMPERV AREA = 536,659 SF  
CN = 39.9  
Tc = 1.43 hr

**OUTFALL NO. 24 (POST)**  
DA = 17,606,081 SF (404.18 AC)  
IMPERV AREA = 658,627 SF  
CN = 40.3  
Tc = 1.43 hr

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 24 STA. 755 + 00**  
**SCALE: 1" = 2500'**



**Outfall #25 Rt. Sta. 782+00 (I-20)**

**Outfall ditch**

The widening will take place from U.S. Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #25 is approximately 40 acres. The existing watershed includes, grassed areas, large wooded areas, and paved areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 43.30

Runoff Coefficient, C =

Topography: Rolling (2% - 10%)

Acres	C-value	Description
3.34	- 0.90	Pavements & Roofs
32.08	- 0.25	Grass Shoulders
2.40	- 0.53	Unpaved Road, Clay Soils
5.48	- 0.15	Woodland & Forest
0.00	- 0.00	
0.00	- 0.00	

Weighted c-value = 0.30

Rainfall Intensity, I =

Lexington, SC

Time of Concentration,  $t_c$  = 1.308 hours

See Time of Concentration Worksheet

Rainfall Intensity

Design Storm	(in/hr)
2 year	1.838
10 year	2.313
25 year	2.605
50 year	2.831
100 year	3.050

Peak Runoff, Q =

$Q = C_f C I A$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.30	1.84	43.30	=	24.11	cfs
10	1	0.30	2.31	43.30	=	30.34	cfs
25	1.1	0.30	2.61	43.30	=	37.60	cfs
50	1.2	0.30	2.83	43.30	=	44.58	cfs
100	1.25	0.30	3.05	43.30	=	50.02	cfs



**Outfall #25 Rt. Sta. 782+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to a crossing at approx. Sta. 782+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #25.

Proposed Conditions Total Drainage Area = 43.30 acres

Additional Impervious Area = 1.70 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description	
5.04	-	0.90	Pavements & Roofs	
30.38	-	0.25	Grass Shoulders	
2.40	-	0.53	Unpaved Road, Clay Soils	
5.48	-	0.15	Woodland & Forest	
0.00	-	0.30	Meadows & Pasture Land	
0.00	-	0.20	Unimproved Areas	
Weighted c-value =				0.33

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.308 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.838
10 year	2.313
25 year	2.605
50 year	2.831
100 year	3.050

**Outfall #25 Rt. Sta. 782+00 (I-20)****Outfall ditch****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A							
Design	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.33	1.84	43.30	=	26.14	cfs
10	1	0.33	2.31	43.30	=	32.90	cfs
25	1.1	0.33	2.61	43.30	=	40.76	cfs
50	1.2	0.33	2.83	43.30	=	48.33	cfs
100	1.25	0.33	3.05	43.30	=	54.23	cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	24.11	26.14	2.03	8.42%
10	30.34	32.90	2.56	8.42%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #25. However the drainage area remains approximately the same. The additional 2.56 cfs runoff for the 10-year design storm will be collected by an existing crossing and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 25

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 782+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
----------------------------------	--------------

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3129.680	0.000
9. Watercourse slope, ft/ft	0.036	1.000
10. Average velocity, ft/s	3.052	20.328
11. Computed Tc, hr	0.285	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.285</b>
--	--------------

**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
------------------------------------	--------------

**Time of Concentration = 1.308 hr = 78.463 min**



Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 25 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION: Sta. 782+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.010	0.000
6. Computed Tc, hr	0.775	0.000

<b>Total Sheet Flow Tc, hr = 0.775</b>
--

**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	3129.680	0.000
9. Watercourse slope, ft/ft	0.036	1.000
10. Average velocity, ft/s	3.052	20.328
11. Computed Tc, hr	0.285	0.000

<b>Total Shallow Conc. Flow Tc, hr = 0.285</b>
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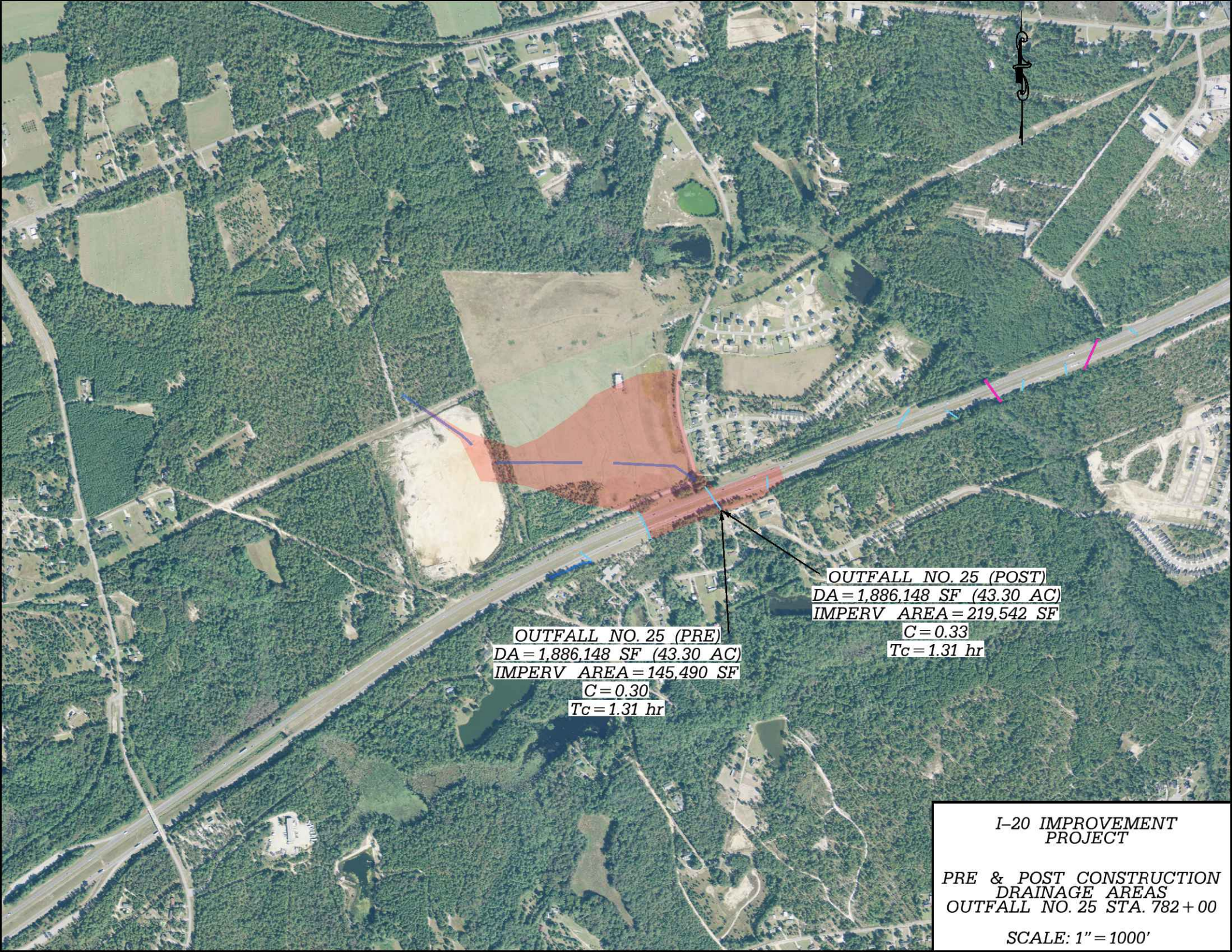
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr = 0.000</b>
--

**Time of Concentration = 1.308 hr = 78.463 min**





**OUTFALL NO. 25 (PRE)**  
DA = 1,886,148 SF (43.30 AC)  
IMPERV AREA = 145,490 SF  
C = 0.30  
Tc = 1.31 hr

**OUTFALL NO. 25 (POST)**  
DA = 1,886,148 SF (43.30 AC)  
IMPERV AREA = 219,542 SF  
C = 0.33  
Tc = 1.31 hr

**I-20 IMPROVEMENT PROJECT**  
**PRE & POST CONSTRUCTION DRAINAGE AREAS**  
**OUTFALL NO. 25 STA. 782 + 00**  
**SCALE: 1" = 1000'**



**Outfall #26 Lt. Sta. 788+00 (I-20)****Outfall ditch**

The widening will take place from U.S Route 378 to Longs Pond Road which is approximately 14 miles. The existing watersheds along the interstate are primarily developed areas along with large wooded areas. The total drainage area to Outfall #26 is approximately 20 acres. The existing watershed includes, grassed areas, paved areas, and wooded areas adjacent to I-20.

**Pre-Construction Runoff**

Drainage Area (acres) = 18.53

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
2.67	-	0.90	Pavements & Roofs
4.03	-	0.25	Grass Shoulders
2.85	-	0.70	Industrial Areas, Light
8.98	-	0.15	Woodland & Forest
0.00	-	0.00	
0.00	-	0.00	

Weighted c-value = 0.36

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.272 hours

See Time of Concentration Worksheet

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.874
10 year	2.359
25 year	2.658
50 year	2.889
100 year	3.112

**Peak Runoff, Q =**

$$Q = C_f CIA$$

Design Storm	$C_f$	C	I	A	=	Q	
2	1	0.36	1.87	18.53	=	12.66	cfs
10	1	0.36	2.36	18.53	=	15.93	cfs
25	1.1	0.36	2.66	18.53	=	19.74	cfs
50	1.2	0.36	2.89	18.53	=	23.41	cfs
100	1.25	0.36	3.11	18.53	=	26.27	cfs

**Outfall #26 Lt. Sta. 788+00 (I-20)****Outfall ditch****Continued**

Runoff from the existing watershed flows overland to a crossing at approx. Sta. 788+00 along I-20 and discharges into an outfall ditch.

**Post-Construction Runoff**

The proposed construction within the watershed includes pavement addition. The proposed construction results in an increase in impervious area as a result of the addition of traffic lanes on I-20 and drains to Outfall #26.

Proposed Conditions Total Drainage Area = 18.53 acres

Additional Impervious Area = 1.59 acres

**Runoff Coefficient, C =**

Topography: Rolling (2% - 10%)

Acres		C-value	Description
4.26	-	0.90	Pavements & Roofs
2.44	-	0.25	Grass Shoulders
2.85	-	0.70	Industrial Areas, Light
8.98	-	0.15	Woodland & Forest
0.00	-	0.00	
0.00	-	0.00	
Weighted c-value =			0.42

**Rainfall Intensity, I =**

Lexington, SC

Time of Concentration,  $t_c$  = 1.272 hours

Pre-Construction  $T_c$  = Post-Construction  $T_c$

**Rainfall Intensity**

Design Storm	(in/hr)
2 year	1.874
10 year	2.359
25 year	2.658
50 year	2.889
100 year	3.112



**Outfall #26 Lt. Sta. 788+00 (I-20)****Outfall ditch****Continued**Peak Runoff, Q =

Q = C <sub>f</sub> CI A							
Design	C <sub>f</sub>	C	I	A	=	Q	
2	1	0.42	1.87	18.53	=	14.59	cfs
10	1	0.42	2.36	18.53	=	18.37	cfs
25	1.1	0.42	2.66	18.53	=	22.76	cfs
50	1.2	0.42	2.89	18.53	=	26.99	cfs
100	1.25	0.42	3.11	18.53	=	30.29	cfs

Percent Increase =

Design Storm	Q <sub>pre</sub>	Q <sub>post</sub>	Q <sub>increase</sub>	% Increase
2	12.66	14.59	1.94	15.31%
10	15.93	18.37	2.44	15.31%

The increased flows are a result of the proposed addition of pavement and will drain to Outfall #26. However the drainage area remains approximately the same. The additional 2.44 cfs runoff for the 10-year design storm will be collected by a closed drainage system and conveyed to the outfall. The additional pavement will have no significant adverse effect downstream of the outfall. No additional detention is necessary in this area.

Time of Concentration  
(Pre-Construction)

9/1/2015

PROJECT: I-20 Widening  
WATERSHED: 26

ENGINEER:  
DATE: 9/1/2015

APPROXIMATE STATION: Sta. 788+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.005	0.000
6. Computed Tc, hr	1.023	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>1.023</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	2619.000	0.000
9. Watercourse slope, ft/ft	0.033	1.000
10. Average velocity, ft/s	2.922	20.328
11. Computed Tc, hr	0.249	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.249</b>
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**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.100	0.000
17. Velocity, ft/s	0.002	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
------------------------------------	--------------

**Time of Concentration = 1.272 hr = 76.312 min**

Time of Concentration  
(Post-Construction)

9/1/2015

PROJECT: I-20 Widening ENGINEER:  
WATERSHED: 26 Post-Construction DATE: 9/1/2015

APPROXIMATE STATION: Sta. 788+00  
CITY/COUNTY: Lexington, SC

**SHEET FLOW:**

Segment	1	
1. Surface description	Undeveloped	
2. Manning's roughness coeff., n	0.800	0.000
3. Flow length, ft	100.000	0.000
4. Two-yr 24-hr rainfall, in	3.600	3.600
5. Land slope, ft/ft	0.020	0.000
6. Computed Tc, hr	0.587	0.000

<b>Total Sheet Flow Tc, hr =</b>	<b>0.587</b>
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**SHALLOW CONCENTRATED FLOW:**

Segment	2	
7. Surface description (paved or unpaved)	Unpaved	Paved
8. Flow length, ft	2912.000	0.000
9. Watercourse slope, ft/ft	0.039	1.000
10. Average velocity, ft/s	3.178	20.328
11. Computed Tc, hr	0.255	0.000

<b>Total Shallow Conc. Flow Tc, hr =</b>	<b>0.255</b>
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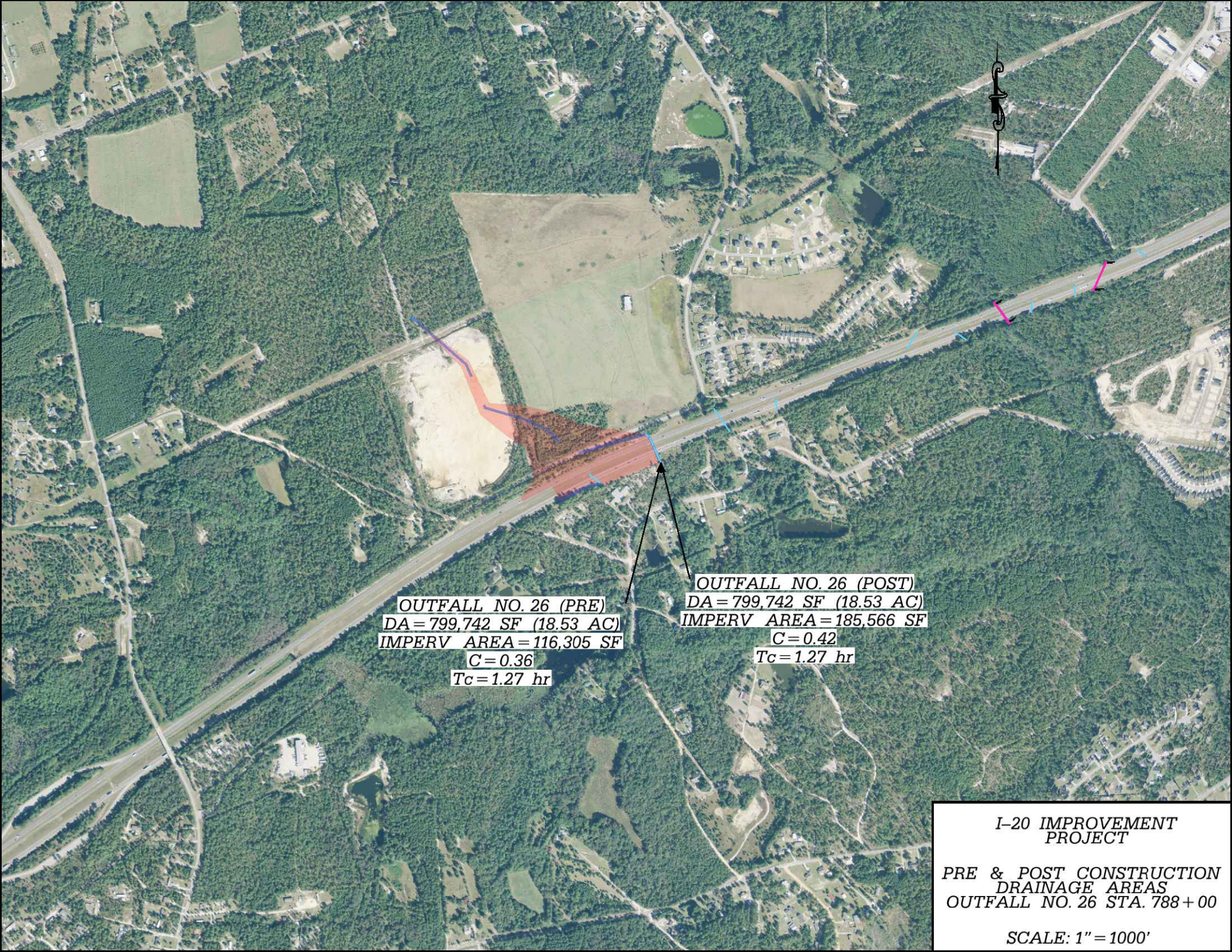
**CHANNEL FLOW:**

Segment		
12. Cross Sectional Flow Area, ft <sup>2</sup>	0.000	0.000
13. Wetted Perimeter, ft	0.000	0.000
14. Hydraulic Radius, ft	10.000	0.000
15. Channel Slope, ft/ft	0.000	0.000
16. Manning's roughness coeff., n	0.000	0.000
17. Velocity, ft/s	218.702	0.000
18. Flow Length, ft	0.000	0.000
19. Computed Tc, hr	0.000	0.000

<b>Total Channel Flow Tc, hr =</b>	<b>0.000</b>
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**Time of Concentration = 1.272 hr = 76.312 min**





**OUTFALL NO. 26 (PRE)**  
**DA = 799,742 SF (18.53 AC)**  
**IMPERV AREA = 116,305 SF**  
**C = 0.36**  
**Tc = 1.27 hr**

**OUTFALL NO. 26 (POST)**  
**DA = 799,742 SF (18.53 AC)**  
**IMPERV AREA = 185,566 SF**  
**C = 0.42**  
**Tc = 1.27 hr**

**I-20 IMPROVEMENT  
PROJECT**  
**PRE & POST CONSTRUCTION  
DRAINAGE AREAS  
OUTFALL NO. 26 STA. 788+00**  
**SCALE: 1" = 1000'**



## 4.2 Cross-line Analysis

Cross-lines were designed according to the SCDOT's *Requirements for Hydraulic Design Studies*, dated May 26, 2009. All existing cross-lines along I-20 were analyzed for the 50-year and 100-year design storms. The Federal Highway Administration's HY-8 program was used to evaluate the performance of the existing cross-lines. The hydrologic and hydraulic analysis for the project cross-lines are found in this section.

**LOCATION:** Lt. Sta. 229+15  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 23.64 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
1.00	-	0.90	Pavements & Roofs
9.42	-	0.15	Woodland & Forest
6.97	-	0.50	Suburban, Normal Residential
6.25	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.31

**TIME OF CONCENTRATION:**

<u>Sheet Flow</u>		<u>Shallow Concentrated Flow</u>			<u>Channel Flow</u>	
Segment	1	Segment	Unpaved	Paved	Segment	
Roughness coeff., n	0.8		2		Roughness coeff., n	0.012
Length, (< 100) (ft)	100.0	Surface	16.1345	20.3282	Flow length, (ft)	0
2yr/24hr rainfall (in)	3.60	Length, (ft)	1351	0	Channel slope, (ft/ft)	0.0001
Land slope, (ft/ft)	0.0100	Course slope, (ft/ft)	0.0481	0.003	X-sect. area, (sq ft)	0.00
Travel time, (hr)	0.775	Velocity, (fps)	3.53857	1.11342	Wet. perimeter, (ft)	0.00
		Travel time, (hr)	0.106	0	Hydraulic radius, (ft)	1.00
					Travel time, (hr)	0.000

Time of Concentration = 0.881 hr I (50 Yr)= 3.71  
 52.9 min I (100 Yr)= 4.00  
 Design Q (50 Yr)= 32.79 cfs  
 Maximum Q (100 Yr)= 36.85 cfs

Run 1: 36" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	297.69	295.03	282.20	3.00	0.89	YES
100	297.89	295.03	282.20	3.00	0.95	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 32.79 cfs

Maximum Flow: 36.85 cfs



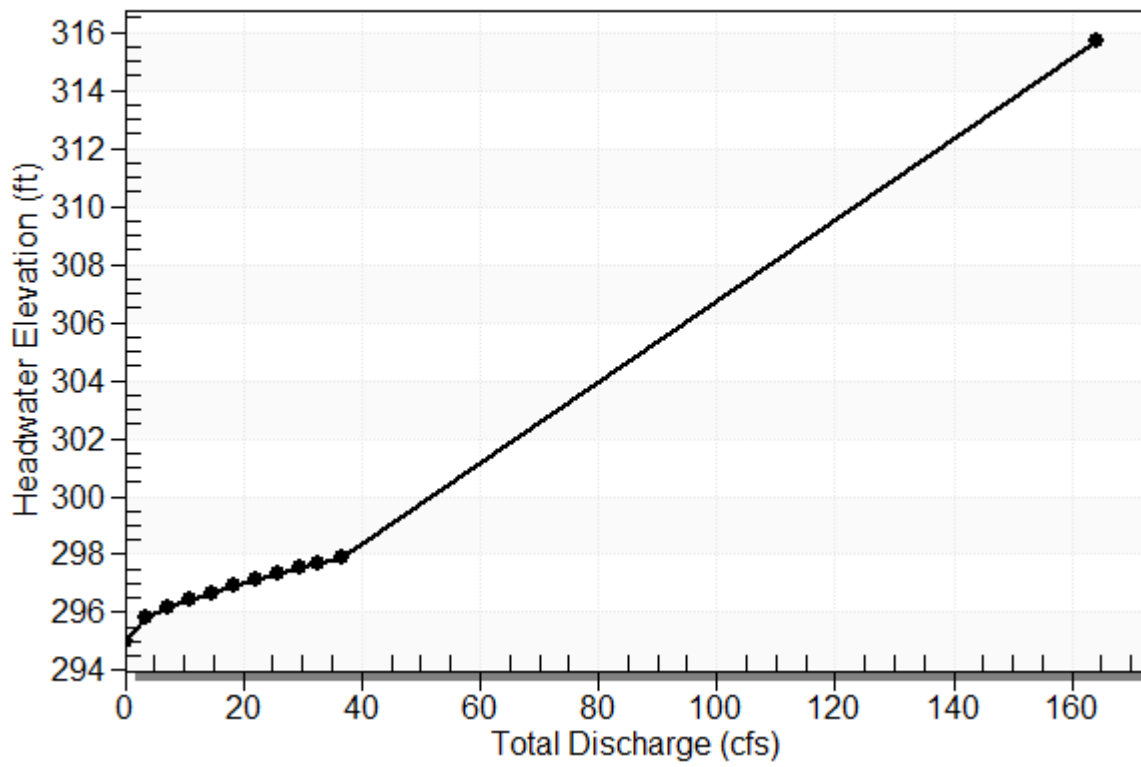
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 56**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 229+15 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
295.03	0.00	0.00	0.00	1
295.82	3.69	3.69	0.00	1
296.16	7.37	7.37	0.00	1
296.42	11.06	11.06	0.00	1
296.68	14.74	14.74	0.00	1
296.92	18.43	18.43	0.00	1
297.13	22.11	22.11	0.00	1
297.33	25.80	25.80	0.00	1
297.52	29.48	29.48	0.00	1
297.69	32.79	32.79	0.00	1
297.89	36.85	36.85	0.00	1
315.00	164.24	164.24	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 56

### Total Rating Curve

Crossing: Crossing 56



**Table 2 - Culvert Summary Table: Lt. Sta. 229+15**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	295.03	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
3.69	3.69	295.82	0.789	0.0*	1-S2n	0.312	0.594	0.312	0.358	11.769	2.322
7.37	7.37	296.16	1.126	0.0*	1-S2n	0.436	0.849	0.436	0.515	11.261	2.832
11.06	11.06	296.42	1.394	0.0*	1-S2n	0.555	1.051	0.555	0.631	12.333	3.169
14.74	14.74	296.68	1.650	0.0*	1-S2n	0.630	1.219	0.630	0.728	13.524	3.426
18.43	18.43	296.92	1.889	0.0*	1-S2n	0.706	1.375	0.706	0.811	14.403	3.637
22.11	22.11	297.13	2.104	0.0*	1-S2n	0.781	1.512	0.781	0.885	15.055	3.818
25.80	25.80	297.33	2.302	0.0*	1-S2n	0.847	1.635	0.863	0.953	15.420	3.976
29.48	29.48	297.52	2.491	0.0*	1-S2n	0.904	1.754	0.907	1.014	16.280	4.118
32.79	32.79	297.69	2.657	0.0*	1-S2n	0.955	1.856	0.964	1.066	16.651	4.235
36.85	36.85	297.89	2.862	0.0*	1-S2n	1.018	1.970	1.025	1.125	17.239	4.365

\* Full Flow Headwater elevation is below inlet invert.



\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 295.03 ft, Outlet Elevation (invert): 282.20 ft

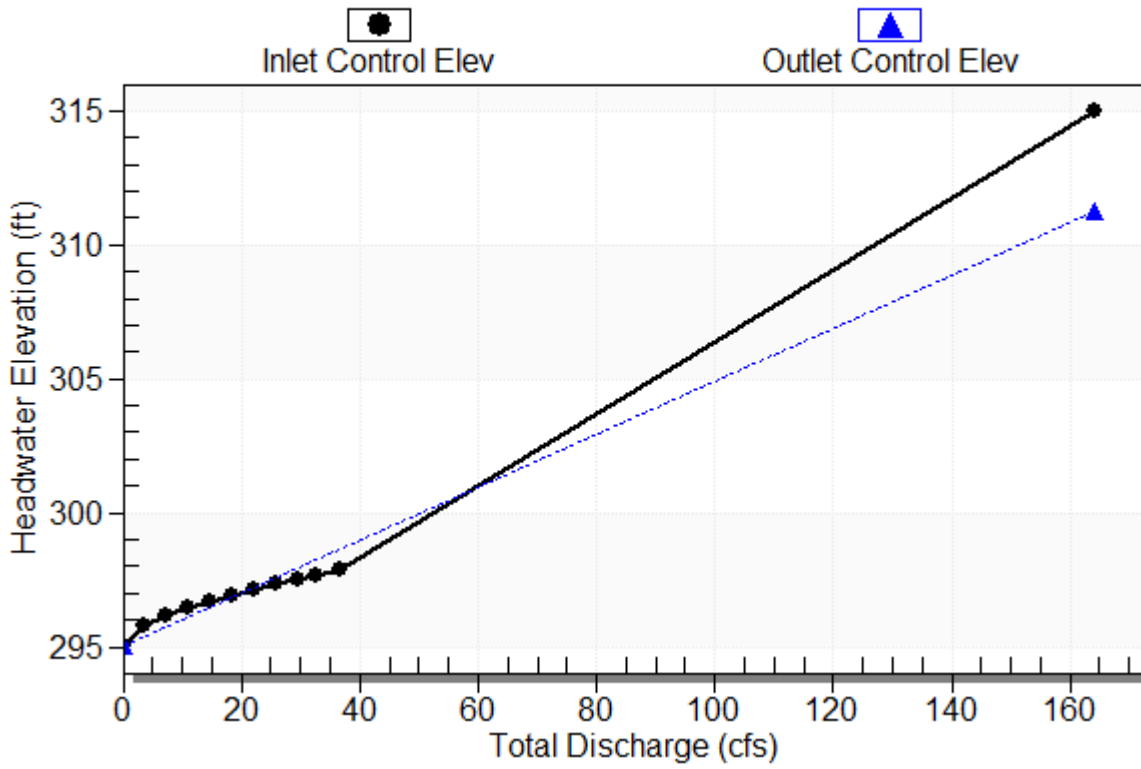
Culvert Length: 311.13 ft, Culvert Slope: 0.0413

\*\*\*\*\*

Culvert Performance Curve Plot: Lt. Sta. 229+15

### Performance Curve

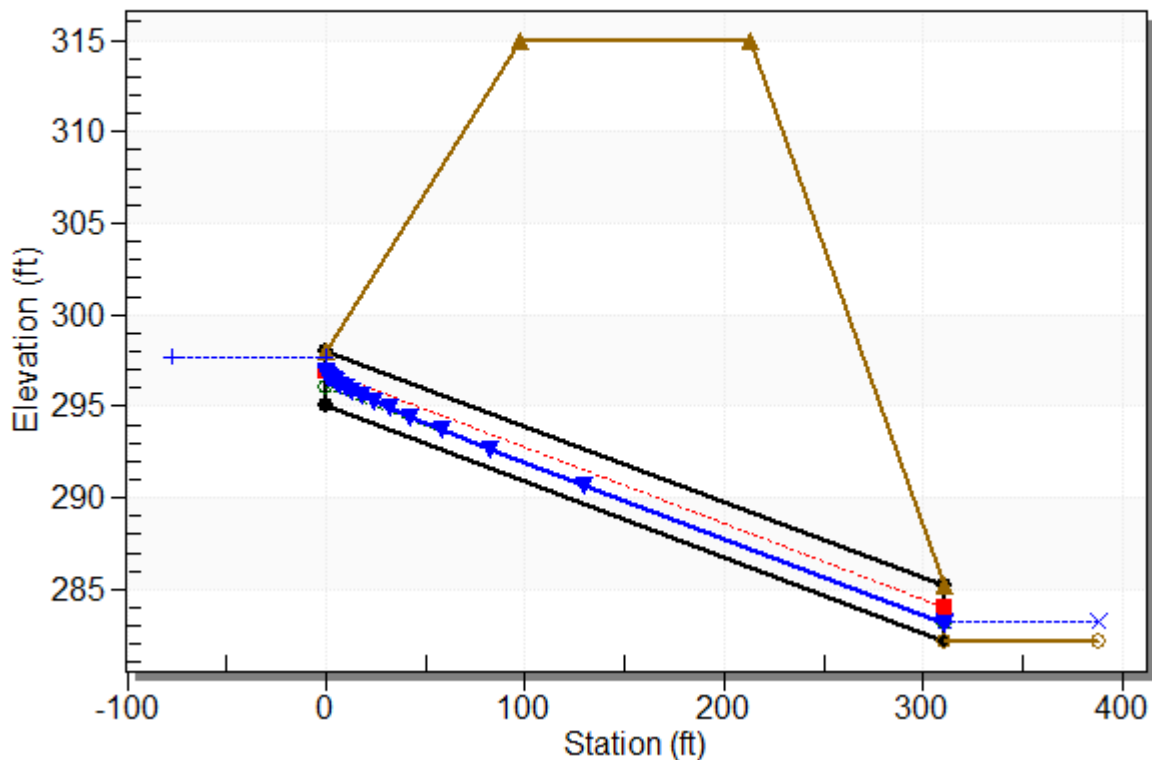
Culvert: Lt. Sta. 229+15



## Water Surface Profile Plot for Culvert: Lt. Sta. 229+15

Crossing - Crossing 56, Design Discharge - 32.8 cfs

Culvert - Lt. Sta. 229+15, Culvert Discharge - 32.8 cfs



### Site Data - Lt. Sta. 229+15

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 295.03 ft

Outlet Station: 310.87 ft

Outlet Elevation: 282.20 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 229+15

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 56)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	282.20	0.00	0.00	0.00	0.00
3.69	282.56	0.36	2.32	0.45	0.79
7.37	282.71	0.51	2.83	0.64	0.83
11.06	282.83	0.63	3.17	0.79	0.85
14.74	282.93	0.73	3.43	0.91	0.86
18.43	283.01	0.81	3.64	1.01	0.88
22.11	283.09	0.89	3.82	1.10	0.89
25.80	283.15	0.95	3.98	1.19	0.90
29.48	283.21	1.01	4.12	1.27	0.90
32.79	283.27	1.07	4.23	1.33	0.91
36.85	283.33	1.13	4.37	1.40	0.92



### **Tailwater Channel Data - Crossing 56**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 4.00 (4:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 282.20 ft

### **Roadway Data for Crossing: Crossing 56**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 315.00 ft

Roadway Surface: Paved

Roadway Top Width: 115.00 ft

**LOCATION:** Lt. Sta. 248+65  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 36.68 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
1.82	-	0.90	Pavements & Roofs
19.18	-	0.20	Unimproved Areas
15.68	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.26

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0030
Travel time, (hr)	0.721

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	1935	0
Course slope, (ft/ft)	0.0465	0.003
Velocity, (fps)	3.47966	1.11342
Travel time, (hr)	0.154	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.875 hr I (50 Yr)= 3.73  
 52.5 min I (100 Yr)= 4.02  
 Design Q (50 Yr)= 42.04 cfs  
 Maximum Q (100 Yr)= 47.24 cfs

Run 1: 4' X 4' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	265.39	262.92	249.14	4.00	0.62	YES
100	265.59	262.92	249.14	4.00	0.67	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 42.04 cfs

Maximum Flow: 47.24 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 17**

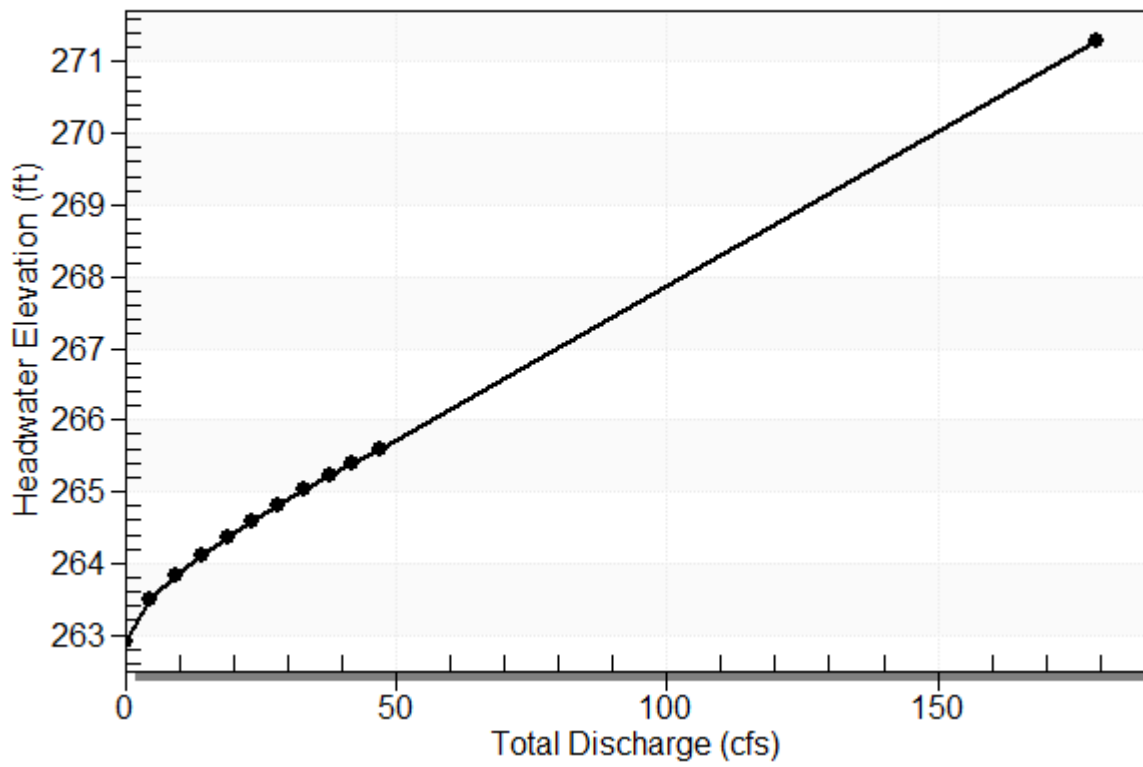
Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 248+65 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
262.92	0.00	0.00	0.00	1
263.49	4.72	4.72	0.00	1
263.83	9.45	9.45	0.00	1
264.11	14.17	14.17	0.00	1
264.36	18.90	18.90	0.00	1
264.59	23.62	23.62	0.00	1
264.81	28.34	28.34	0.00	1
265.02	33.07	33.07	0.00	1
265.21	37.79	37.79	0.00	1
265.39	42.04	42.04	0.00	1
265.59	47.24	47.24	0.00	1
271.00	179.38	179.38	0.00	Overtopping



# Rating Curve Plot for Crossing: Crossing 17

## Total Rating Curve

Crossing: Crossing 17



**Table 2 - Culvert Summary Table: Lt. Sta. 248+65**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	262.92	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
4.72	4.72	263.49	0.573	0.0*	1-S2n	0.092	0.351	0.092	0.356	12.791	3.954
9.45	9.45	263.83	0.909	0.0*	1-S2n	0.185	0.557	0.231	0.537	10.247	4.972
14.17	14.17	264.11	1.191	0.0*	1-S2n	0.277	0.731	0.277	0.681	12.791	5.649
18.90	18.90	264.36	1.443	0.0*	1-S2n	0.367	0.885	0.367	0.805	12.884	6.167
23.62	23.62	264.59	1.675	0.0*	1-S2n	0.416	1.027	0.416	0.915	14.208	6.590
28.34	28.34	264.81	1.891	0.0*	1-S2n	0.465	1.160	0.488	1.016	14.517	6.949
33.07	33.07	265.02	2.097	0.0*	1-S2n	0.514	1.285	0.514	1.108	16.098	7.263
37.79	37.79	265.21	2.295	0.0*	1-S2n	0.562	1.405	0.601	1.194	15.710	7.543
42.04	42.04	265.39	2.465	0.0*	1-S2n	0.607	1.508	0.618	1.268	17.006	7.772
47.24	47.24	265.59	2.667	0.0*	1-S2n	0.660	1.630	0.660	1.352	17.883	8.027

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 262.92 ft, Outlet Elevation (invert): 249.14 ft

Culvert Length: 269.73 ft, Culvert Slope: 0.0512

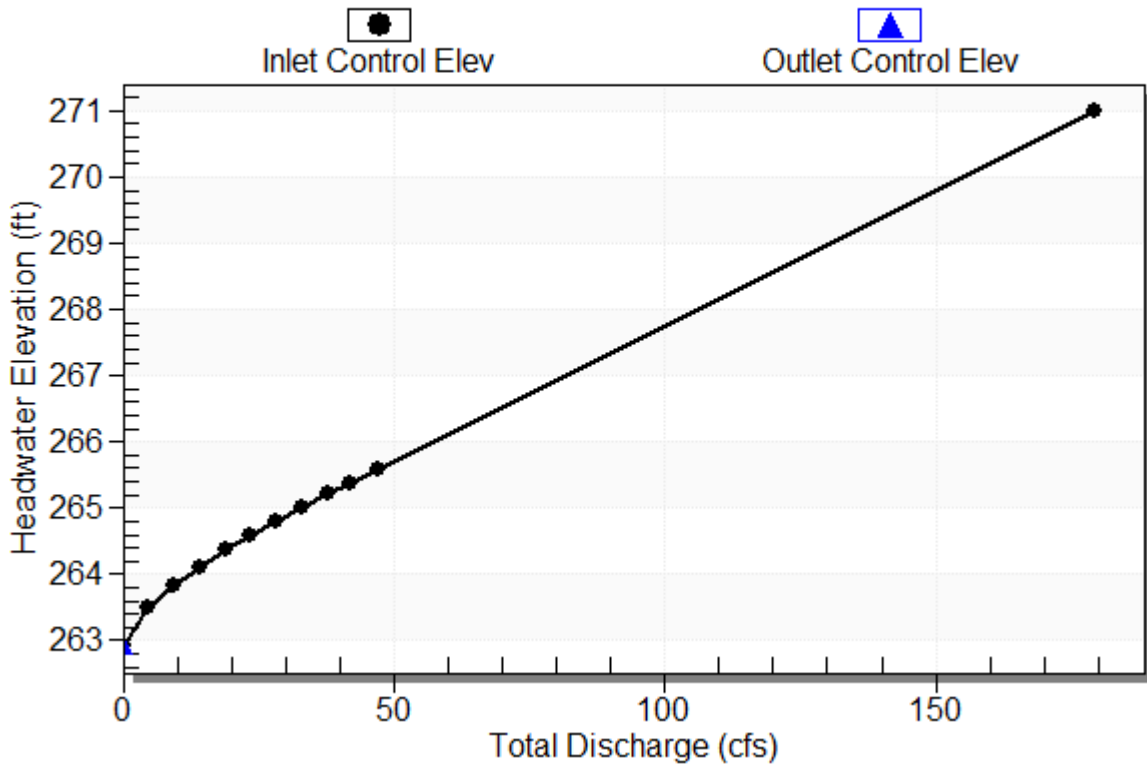
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# Culvert Performance Curve Plot: Lt. Sta. 248+65

## Performance Curve

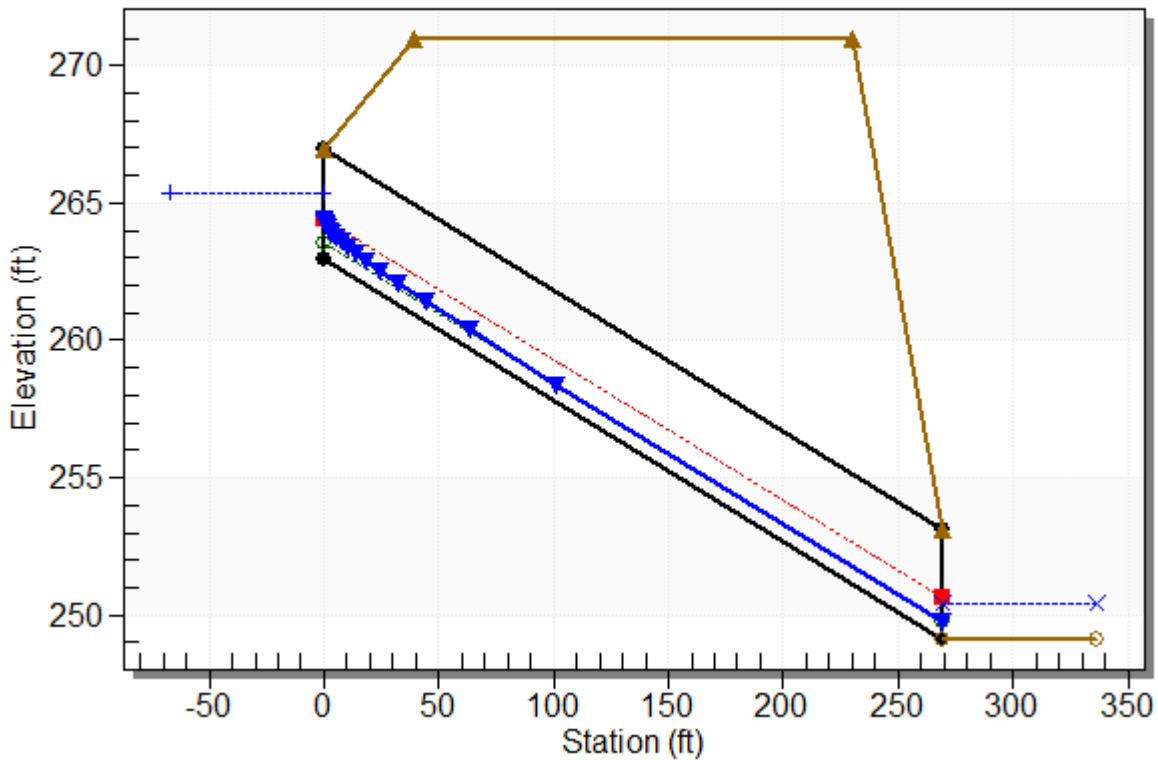
Culvert: Lt. Sta. 248+65



## Water Surface Profile Plot for Culvert: Lt. Sta. 248+65

### Crossing - Crossing 17, Design Discharge - 42.0 cfs

Culvert - Lt. Sta. 248+65, Culvert Discharge - 42.0 cfs



### Site Data - Lt. Sta. 248+65

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 262.92 ft

Outlet Station: 269.38 ft

Outlet Elevation: 249.14 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 248+65

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90 & 15° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 17)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	249.14	0.00	0.00	0.00	0.00
4.72	249.50	0.36	3.95	1.11	1.23
9.45	249.68	0.54	4.97	1.68	1.28
14.17	249.82	0.68	5.65	2.13	1.31
18.90	249.95	0.81	6.17	2.51	1.33
23.62	250.06	0.92	6.59	2.86	1.35
28.34	250.16	1.02	6.95	3.17	1.36
33.07	250.25	1.11	7.26	3.46	1.37
37.79	250.33	1.19	7.54	3.73	1.38
42.04	250.41	1.27	7.77	3.95	1.39
47.24	250.49	1.35	8.03	4.22	1.39

### **Tailwater Channel Data - Crossing 17**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0500

Channel Manning's n: 0.0375

Channel Invert Elevation: 249.14 ft

### **Roadway Data for Crossing: Crossing 17**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 271.00 ft

Roadway Surface: Paved

Roadway Top Width: 190.00 ft



**LOCATION:** Lt. Sta. 250+15  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 5.06 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
0.14	-	0.90	Pavements & Roofs
4.92	-	0.20	Unimproved Areas
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.22

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	495	0
Course slope, (ft/ft)	0.0646	0.003
Velocity, (fps)	4.10083	1.11342
Travel time, (hr)	0.034	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.056 hr I (50 Yr)= 3.29  
 63.4 min I (100 Yr)= 3.55

Design Q (50 Yr)= 4.38 cfs  
 Maximum Q (100 Yr)= 4.92 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	284.08	283.17	249.89	2.00	0.45	YES
100	284.14	283.17	249.89	2.00	0.48	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 4.38 cfs

Maximum Flow: 4.92 cfs

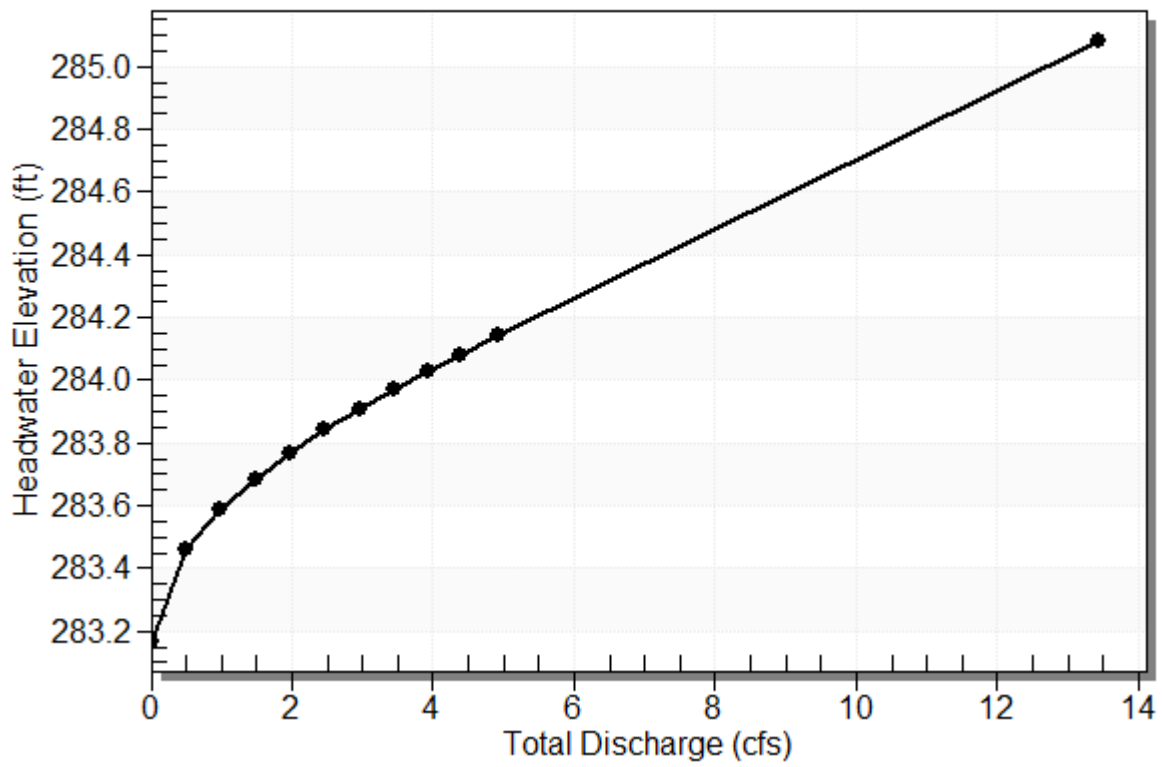
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 18**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 250+15 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
283.17	0.00	0.00	0.00	1
283.46	0.49	0.49	0.00	1
283.59	0.98	0.98	0.00	1
283.68	1.48	1.48	0.00	1
283.77	1.97	1.97	0.00	1
283.84	2.46	2.46	0.00	1
283.91	2.95	2.95	0.00	1
283.97	3.44	3.44	0.00	1
284.03	3.94	3.94	0.00	1
284.08	4.38	4.38	0.00	1
284.14	4.92	4.92	0.00	1
285.00	13.43	13.43	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 18

## Total Rating Curve

Crossing: Crossing 18





**Table 2 - Culvert Summary Table: Lt. Sta. 250+15**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	283.17	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.49	0.49	283.46	0.289	0.0*	1-S2n	0.060	0.237	0.060	0.092	6.241	1.737
0.98	0.98	283.59	0.415	0.0*	1-S2n	0.121	0.337	0.121	0.139	7.796	2.256
1.48	1.48	283.68	0.513	0.0*	1-S2n	0.181	0.417	0.181	0.177	10.385	2.621
1.97	1.97	283.77	0.595	0.0*	1-S2n	0.200	0.481	0.200	0.211	13.993	2.909
2.46	2.46	283.84	0.671	0.0*	1-S2n	0.219	0.541	0.219	0.241	18.073	3.152
2.95	2.95	283.91	0.738	0.0*	1-S2n	0.238	0.596	0.238	0.269	13.494	3.361
3.44	3.44	283.97	0.801	0.0*	1-S2n	0.257	0.647	0.257	0.295	14.094	3.546
3.94	3.94	284.03	0.860	0.0*	1-S2n	0.276	0.691	0.276	0.319	14.580	3.715
4.38	4.38	284.08	0.912	0.0*	1-S2n	0.292	0.732	0.292	0.340	14.946	3.854
4.92	4.92	284.14	0.971	0.0*	1-S2n	0.313	0.776	0.313	0.365	15.320	4.009

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 283.17 ft, Outlet Elevation (invert): 249.89 ft

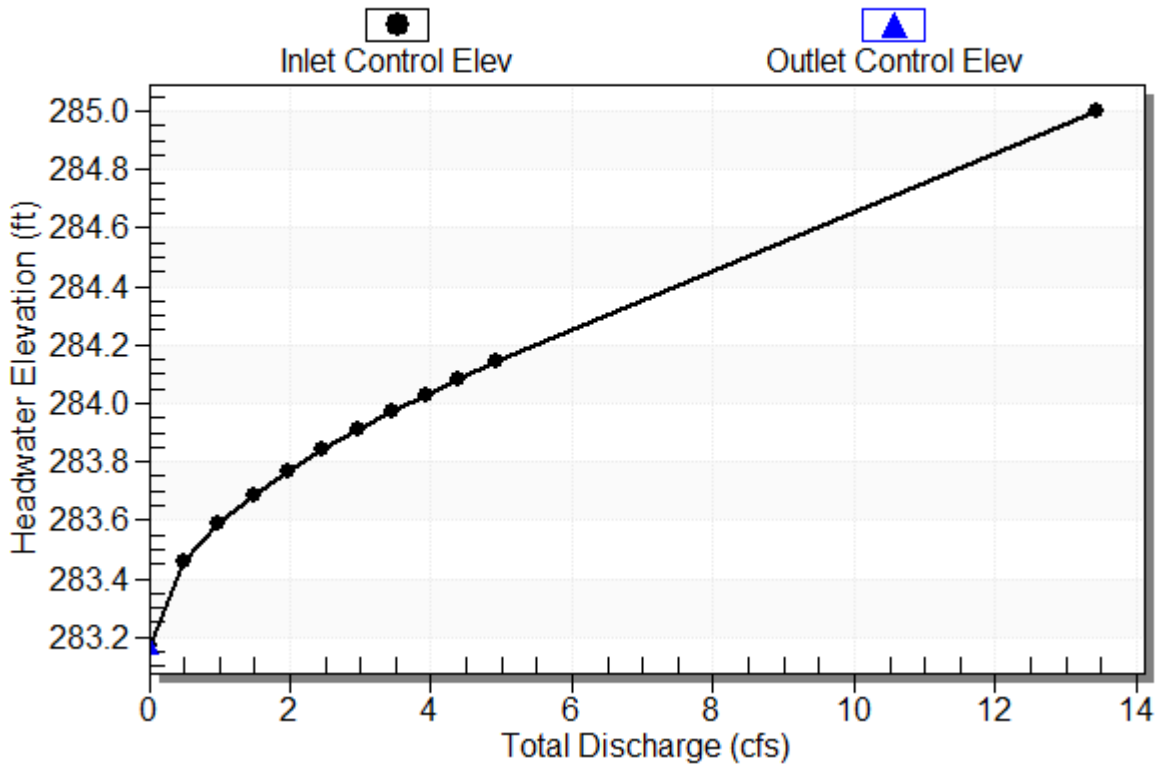
Culvert Length: 269.82 ft, Culvert Slope: 0.1243

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# Culvert Performance Curve Plot: Lt. Sta. 250+15

## Performance Curve

Culvert: Lt. Sta. 250+15

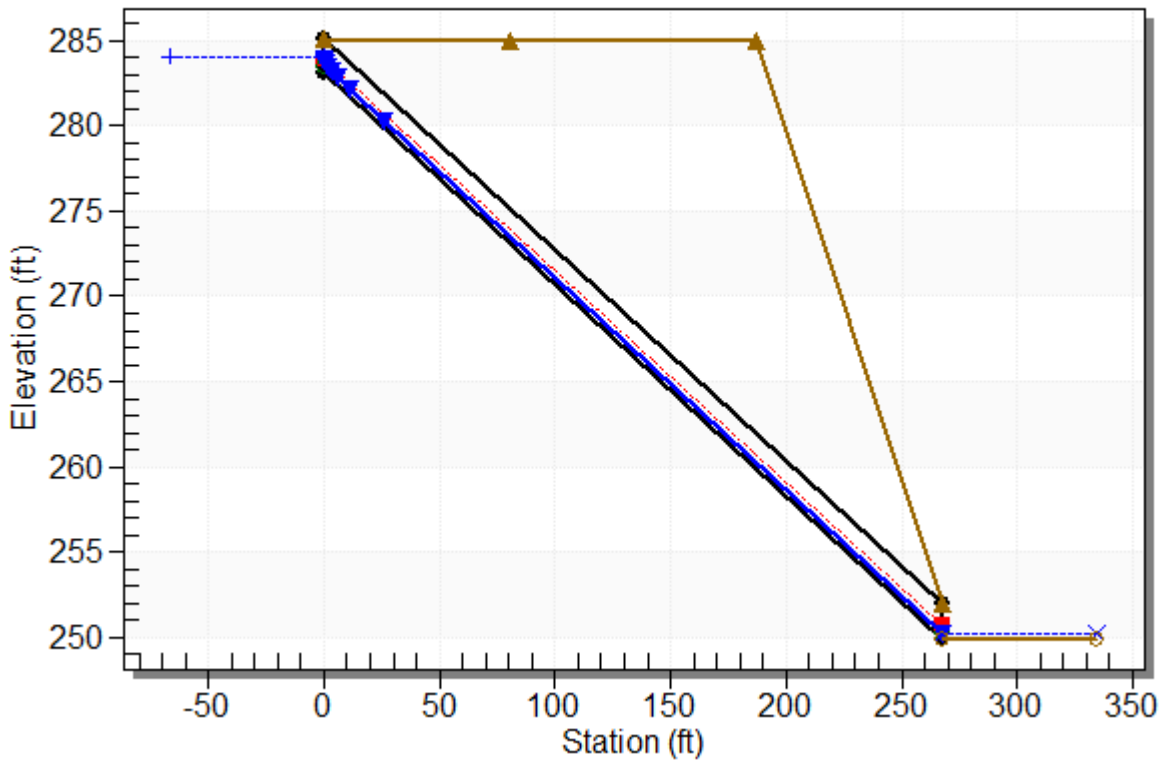




## Water Surface Profile Plot for Culvert: Lt. Sta. 250+15

### Crossing - Crossing 18, Design Discharge - 4.4 cfs

Culvert - Lt. Sta. 250+15, Culvert Discharge - 4.4 cfs



### Site Data - Lt. Sta. 250+15

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 283.17 ft

Outlet Station: 267.76 ft

Outlet Elevation: 249.89 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 250+15

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 18)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	249.89	0.00	0.00	0.00	0.00
0.49	249.98	0.09	1.74	0.29	1.03
0.98	250.03	0.14	2.26	0.43	1.09
1.48	250.07	0.18	2.62	0.55	1.13
1.97	250.10	0.21	2.91	0.66	1.15
2.46	250.13	0.24	3.15	0.75	1.17
2.95	250.16	0.27	3.36	0.84	1.19
3.44	250.18	0.29	3.55	0.92	1.20
3.94	250.21	0.32	3.72	1.00	1.21
4.38	250.23	0.34	3.85	1.06	1.22
4.92	250.25	0.36	4.01	1.14	1.23

### **Tailwater Channel Data - Crossing 18**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0500

Channel Manning's n: 0.0375

Channel Invert Elevation: 249.89 ft

### **Roadway Data for Crossing: Crossing 18**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 285.00 ft

Roadway Surface: Paved

Roadway Top Width: 106.00 ft



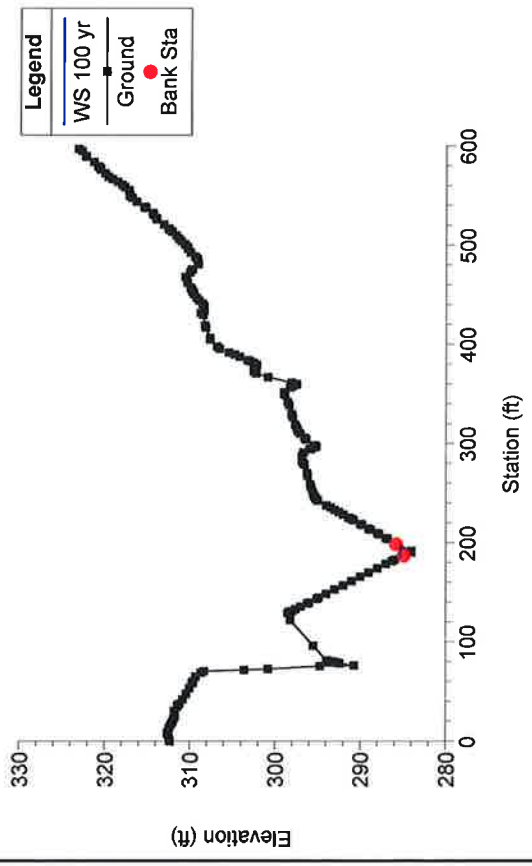
*HEC-RAS Output  
Station 248+70*



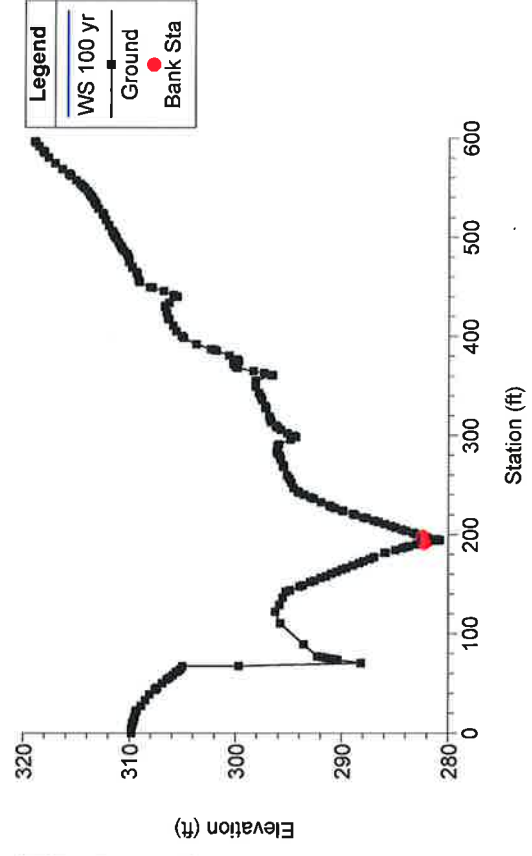
HEC-RAS Plan: 29 & 34A River: Ditch #29 & #34A Reach: Ditch #29 & #34A

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #29 & #34A	1369.38	50 yr	42.04	284.00	285.31	285.31	285.72	0.027030	5.16	8.44	11.41	1.00
Ditch #29 & #34A	1369.38	100 yr	47.24	284.00	285.39	285.39	285.81	0.026094	5.28	9.36	12.03	0.99
Ditch #29 & #34A	1319.38	50 yr	42.04	280.80	282.72	282.72	283.26	0.027103	5.92	7.46	8.55	0.99
Ditch #29 & #34A	1319.38	100 yr	47.24	280.80	282.81	282.81	283.39	0.026085	6.12	8.27	9.08	0.99
Ditch #29 & #34A	1269.38	50 yr	42.04	278.10	280.02	280.02	280.53	0.029848	5.69	7.38	7.58	1.02
Ditch #29 & #34A	1269.38	100 yr	47.24	278.10	280.12	280.12	280.65	0.028991	5.80	8.14	7.94	1.01
Ditch #29 & #34A	1219.38	50 yr	42.04	275.60	277.53	277.48	277.99	0.025682	5.41	7.78	7.73	0.95
Ditch #29 & #34A	1219.38	100 yr	47.24	275.60	277.62	277.58	278.11	0.025759	5.57	8.48	8.07	0.96
Ditch #29 & #34A	1169.38	50 yr	42.04	274.10	276.08	276.08	276.60	0.029841	5.77	7.29	7.21	1.01
Ditch #29 & #34A	1169.38	100 yr	47.24	274.10	276.17	276.17	276.72	0.029479	5.97	7.92	7.53	1.01
Ditch #29 & #34A	1119.38	50 yr	42.04	272.60	274.41	274.41	274.97	0.026823	6.03	7.18	7.40	1.00
Ditch #29 & #34A	1119.38	100 yr	47.24	272.60	274.50	274.50	275.10	0.025872	6.24	7.90	7.75	0.99
Ditch #29 & #34A	1069.38	50 yr	42.04	271.70	272.79	272.79	273.16	0.029025	4.93	8.52	11.49	1.01
Ditch #29 & #34A	1069.38	100 yr	47.24	271.70	272.86	272.86	273.25	0.028220	5.07	9.33	11.81	1.00
Ditch #29 & #34A	1019.38	50 yr	42.04	270.10	270.93	270.93	271.15	0.033064	3.79	11.08	25.17	1.01
Ditch #29 & #34A	1019.38	100 yr	47.24	270.10	270.96	270.96	271.20	0.032555	3.94	12.00	25.48	1.01
Ditch #29 & #34A	969.38	50 yr	42.04	268.20	269.71		269.79	0.003202	2.32	26.67	43.73	0.37
Ditch #29 & #34A	969.38	100 yr	47.24	268.20	269.81		269.89	0.002976	2.36	31.29	47.66	0.38
Ditch #29 & #34A	919.38	50 yr	42.04	267.60	269.29		269.52	0.008588	4.24	17.04	18.95	0.61
Ditch #29 & #34A	919.38	100 yr	47.24	267.60	269.39		269.64	0.008476	4.40	18.96	19.60	0.61
Ditch #29 & #34A	869.38	50 yr	42.04	266.90	268.43	268.37	268.86	0.021152	5.30	8.90	11.92	0.88
Ditch #29 & #34A	869.38	100 yr	47.24	266.90	268.52	268.46	268.98	0.021287	5.51	9.91	12.94	0.89
Ditch #29 & #34A	819.38	50 yr	42.04	265.30	267.07	267.07	267.61	0.029680	5.88	7.17	7.26	1.01
Ditch #29 & #34A	819.38	100 yr	47.24	265.30	267.17	267.17	267.74	0.028798	6.05	7.89	7.97	1.00
Ditch #29 & #34A	769.38	50 yr	42.04	264.00	265.62	265.62	266.14	0.026320	5.64	7.63	8.02	0.99
Ditch #29 & #34A	769.38	100 yr	47.24	264.00	265.70	265.70	266.26	0.026104	6.05	8.35	8.28	1.00
Ditch #29 & #34A	600		Culvert									
Ditch #29 & #34A	350	50 yr	42.04	250.80	250.80		250.84	0.028226		26.37	34.69	0.00
Ditch #29 & #34A	350	100 yr	47.24	250.80	250.89		250.93	0.026501	0.73	29.58	38.25	0.61
Ditch #29 & #34A	300	50 yr	42.04	247.00	248.73	248.73	249.30	0.031577	6.03	6.97	6.26	1.01
Ditch #29 & #34A	300	100 yr	47.24	247.00	248.83	248.83	249.43	0.031516	6.20	7.61	6.54	1.01
Ditch #29 & #34A	250	50 yr	42.04	244.40	245.74	245.74	246.23	0.028454	5.61	7.49	7.79	1.01
Ditch #29 & #34A	250	100 yr	47.24	244.40	245.83	245.83	246.35	0.027859	5.77	8.19	8.00	1.00
Ditch #29 & #34A	200	50 yr	42.04	243.00	245.72		245.73	0.000738	1.23	93.23	88.38	0.17
Ditch #29 & #34A	200	100 yr	47.24	243.00	245.80		245.81	0.000783	1.29	100.55	92.85	0.18
Ditch #29 & #34A	150	50 yr	42.04	245.00	245.63		245.65	0.005807	1.78	45.50	45.96	0.41
Ditch #29 & #34A	150	100 yr	47.24	245.00	245.71		245.73	0.006014	1.93	49.02	48.24	0.43
Ditch #29 & #34A	100	50 yr	42.04	244.00	245.00		245.19	0.015375	3.46	12.46	18.85	0.74
Ditch #29 & #34A	100	100 yr	47.24	244.00	245.07		245.26	0.014863	3.57	13.63	19.63	0.74
Ditch #29 & #34A	50	50 yr	42.04	242.80	244.32		244.46	0.013430	4.41	26.21	34.83	0.72
Ditch #29 & #34A	50	100 yr	47.24	242.80	244.36		244.52	0.014351	4.68	27.88	35.50	0.75
Ditch #29 & #34A	0	50 yr	42.04	241.00	243.11	243.11	243.55	0.023651	5.50	10.85	22.83	0.85
Ditch #29 & #34A	0	100 yr	47.24	241.00	243.24	243.24	243.65	0.020014	5.40	14.28	28.82	0.79

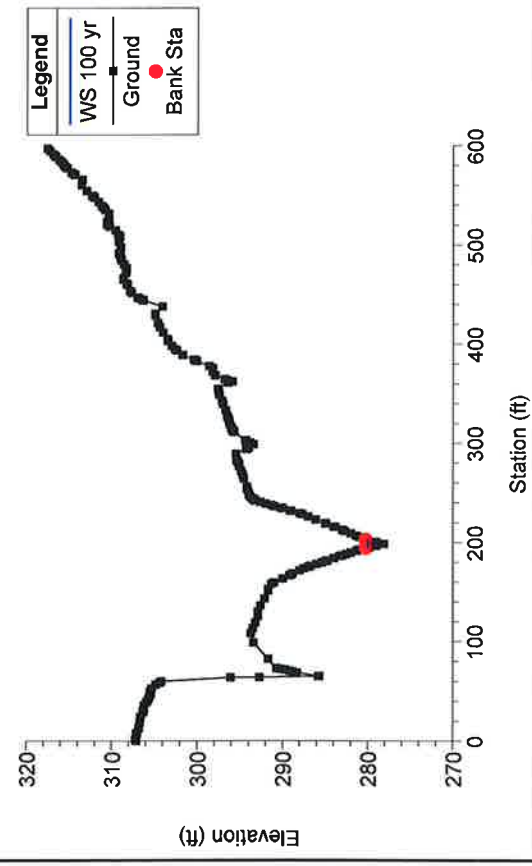
Ditch #29 & #34A Plan: Plan 01 9/1/2015  
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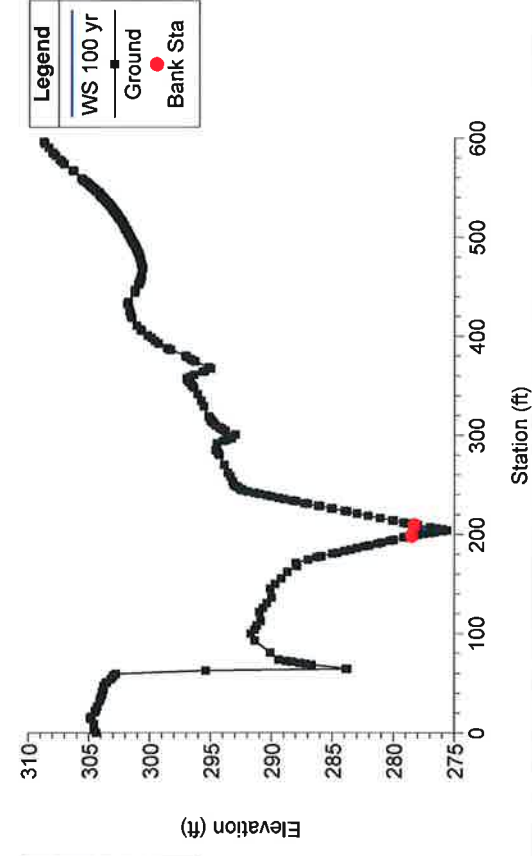
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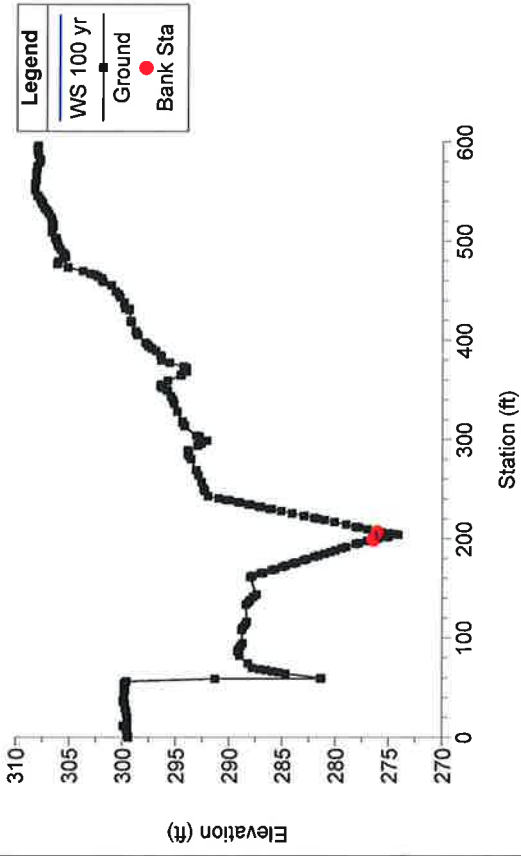
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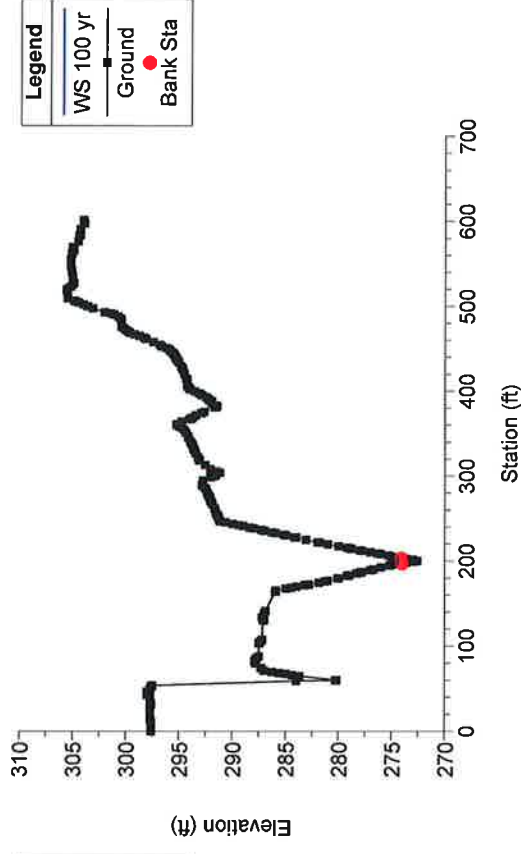
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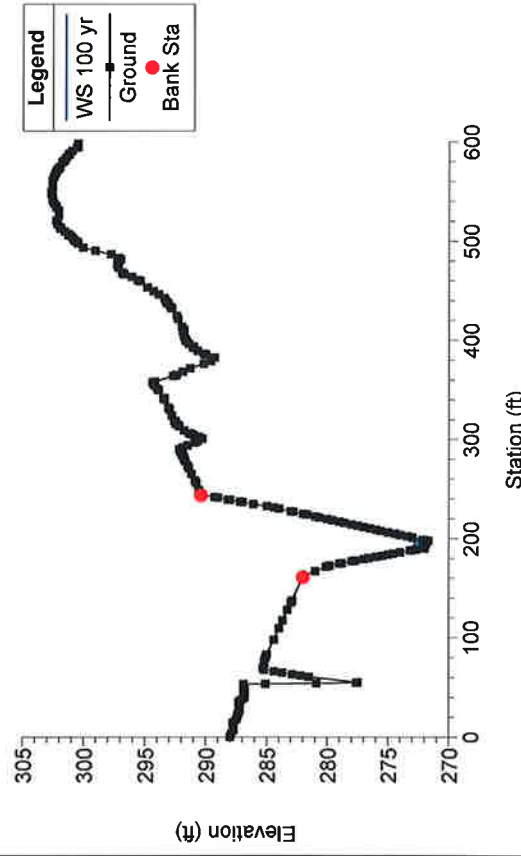
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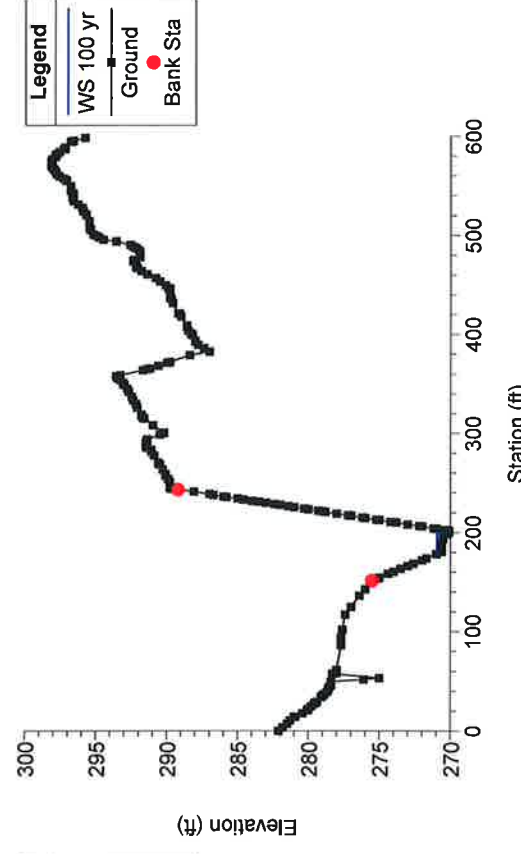
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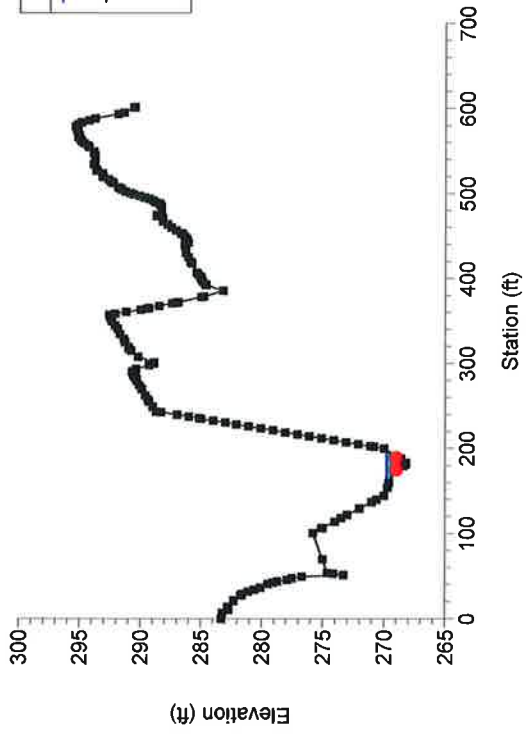
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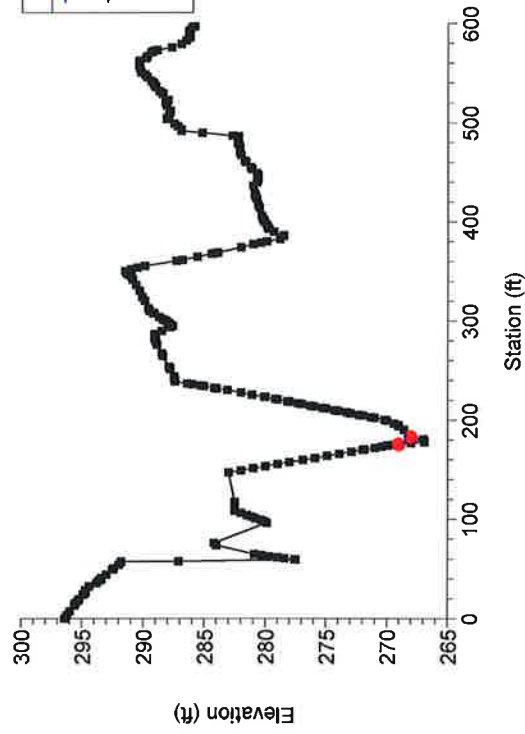
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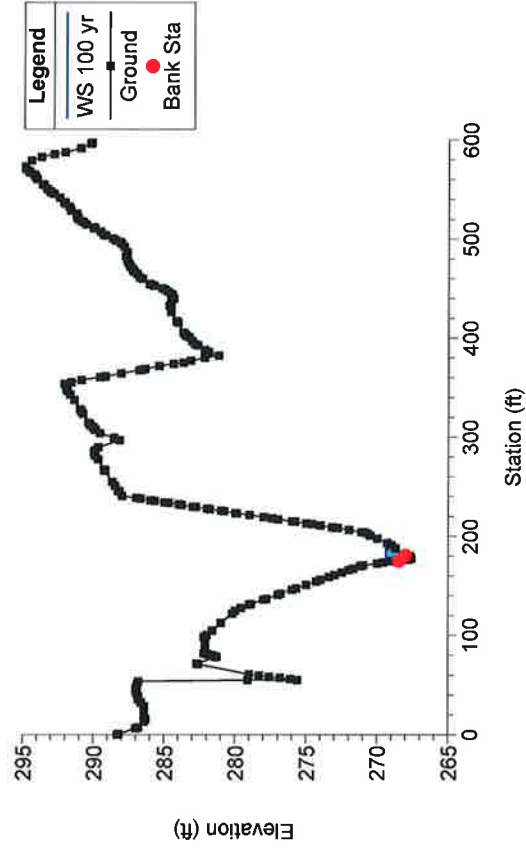
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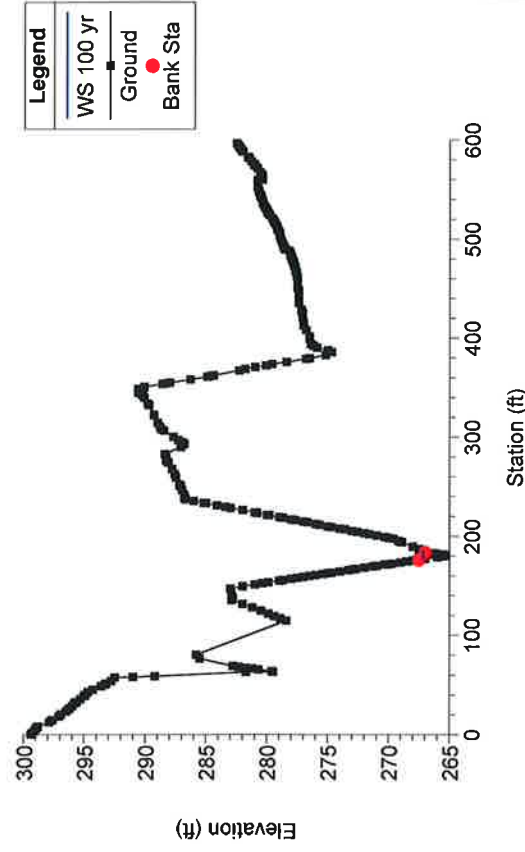
Ditch #29 & #34A Plan: Plan 01 9/1/2015  
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Ditch #29 & #34A Plan: Plan 01 9/1/2015  
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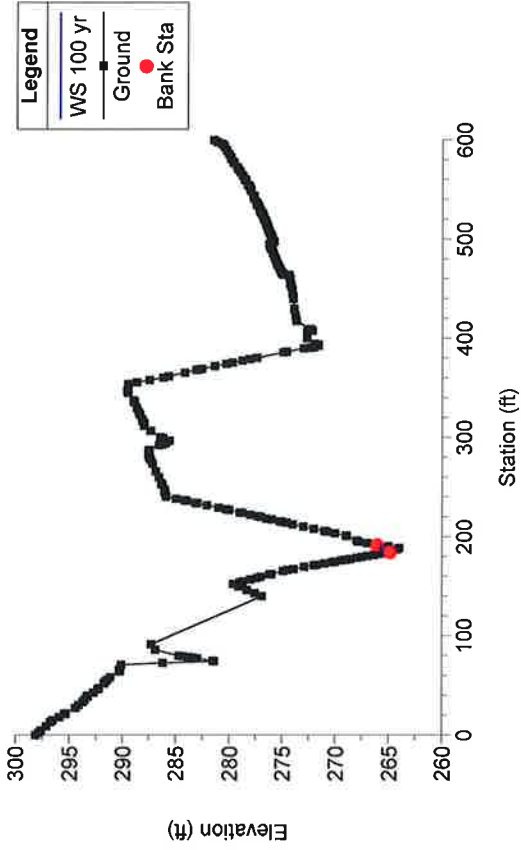


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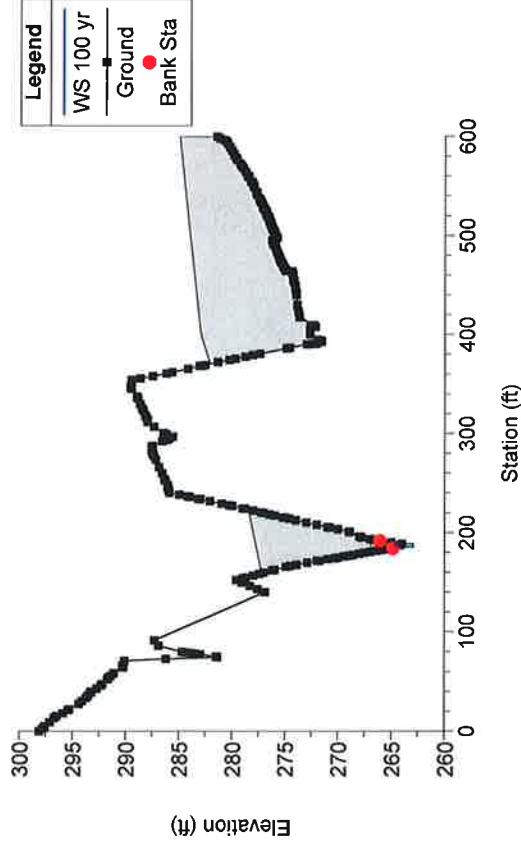




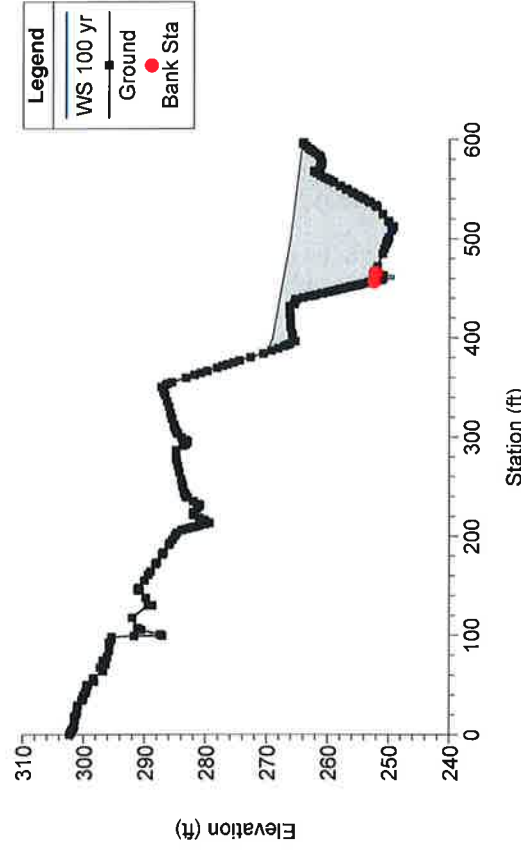
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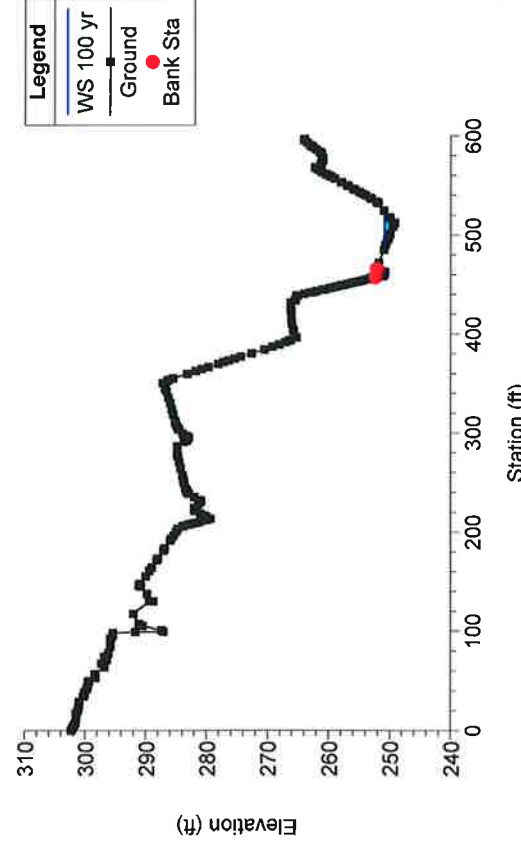
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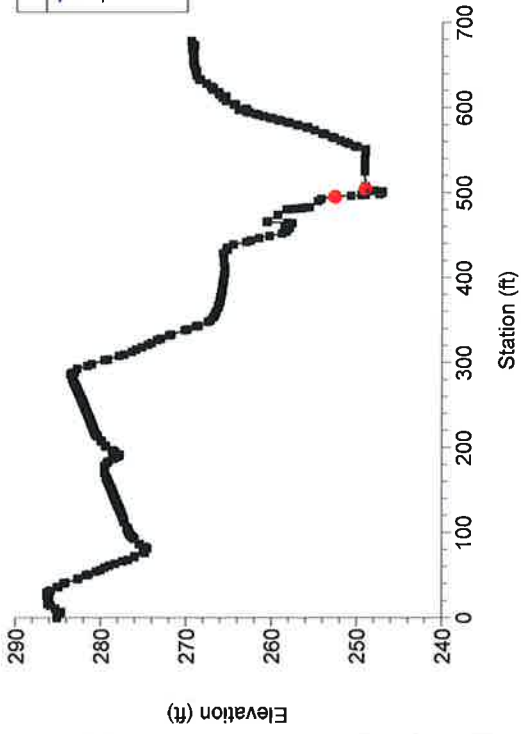
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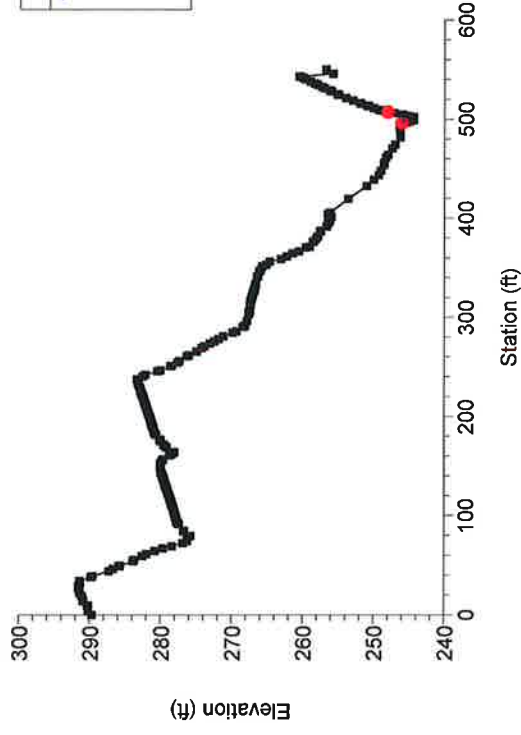
Ditch #29 & #34A Plan: Plan 01 9/1/2015



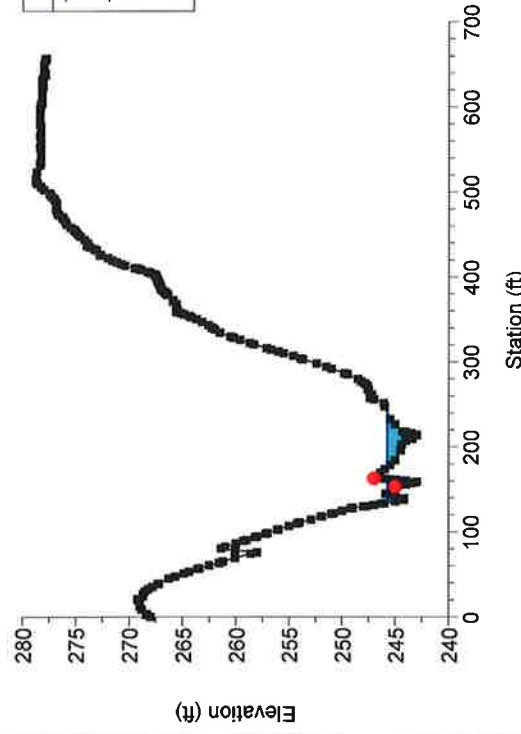
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300



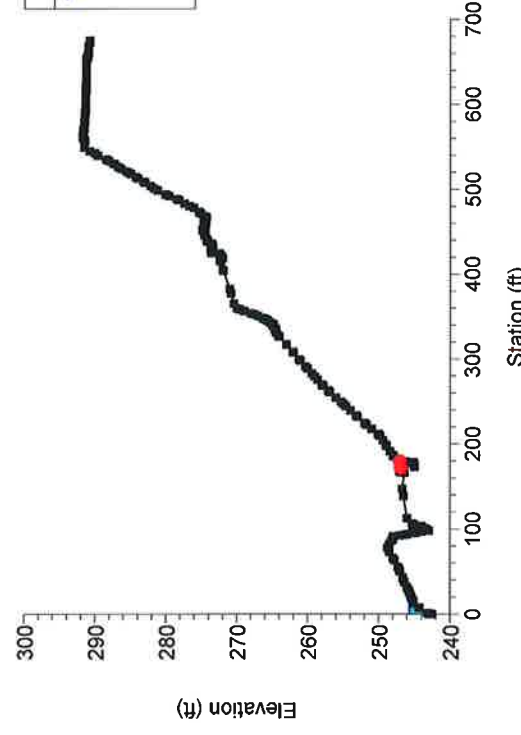
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250



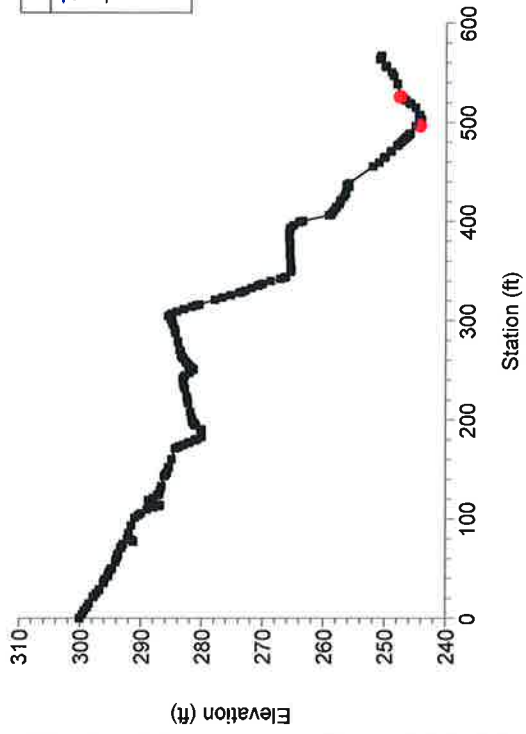
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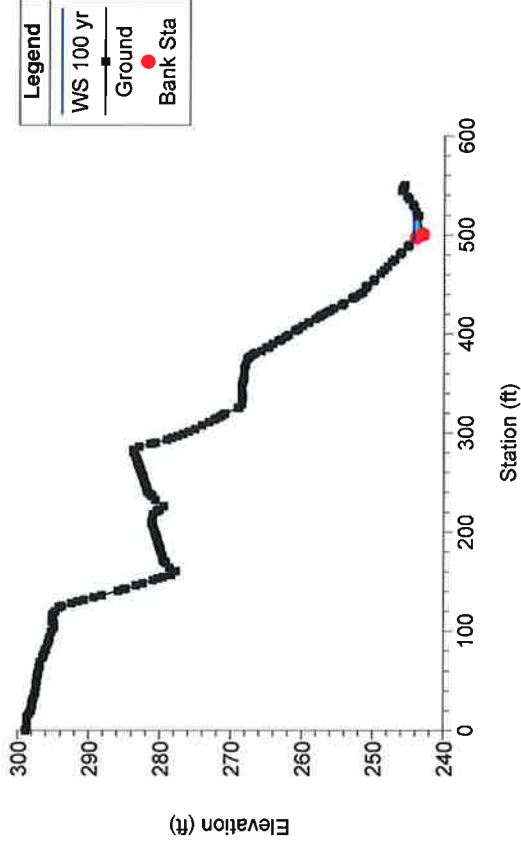
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150



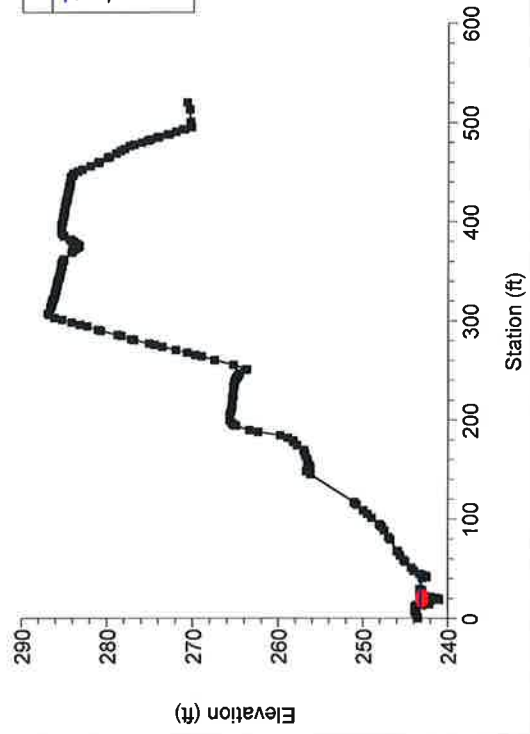
Ditch #29 & #34A Plan: Plan 01 9/1/2015  
100



Ditch #29 & #34A Plan: Plan 01 9/1/2015  
50



Ditch #29 & #34A Plan: Plan 01 9/1/2015  
0



**LOCATION:** Rt. Sta. 256+98  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 7.59 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
0.59	-	0.90	Pavements & Roofs
6.13	-	0.20	Unimproved Areas
0.87	-	0.50	Suburban, Normal Residential
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	
Weighted C-Value:		0.29	

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	1356	0
Course slope, (ft/ft)	0.0483	0.003
Velocity, (fps)	3.54592	1.11342
Travel time, (hr)	0.106	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.129 hr I (50 Yr)= 3.14  
 67.7 min I (100 Yr)= 3.39

Design Q (50 Yr)= 8.27 cfs  
 Maximum Q (100 Yr)= 9.28 cfs

Run 1: 30" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	265.82	264.56	253.67	2.50	0.50	YES
100	265.91	264.56	253.67	2.50	0.54	



# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 8.27 cfs

Maximum Flow: 9.28 cfs

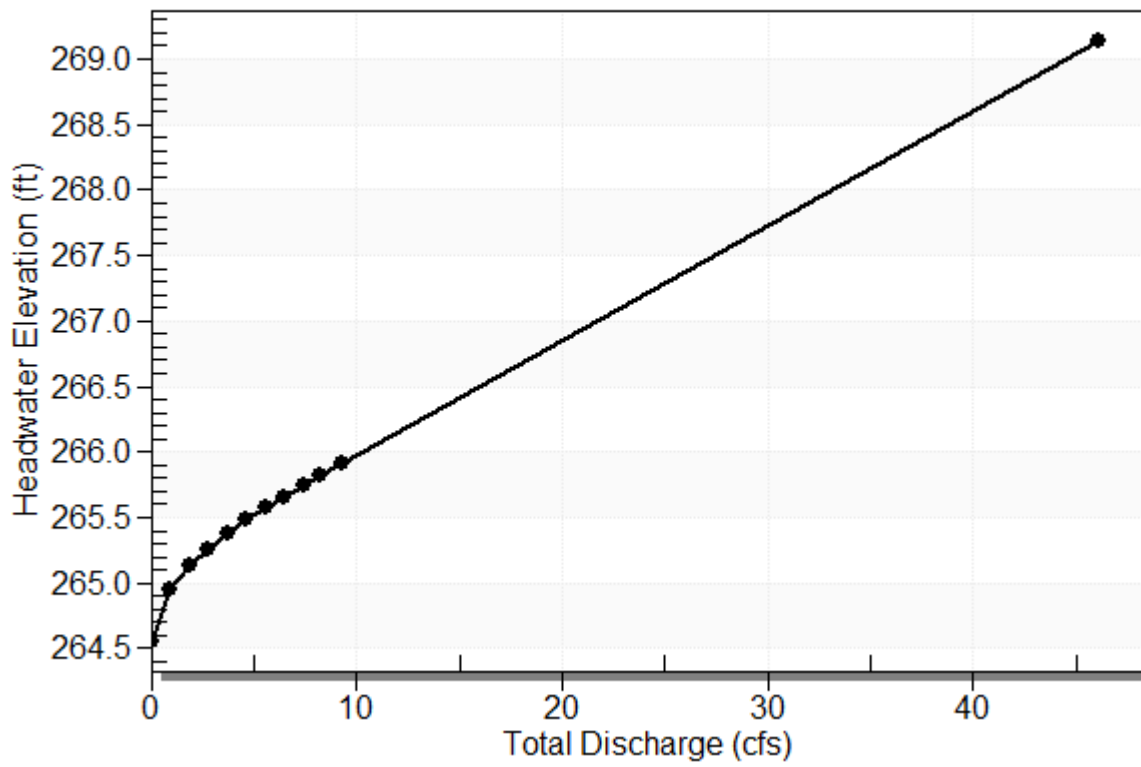
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 16**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 256+98 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
264.56	0.00	0.00	0.00	1
264.95	0.93	0.93	0.00	1
265.13	1.86	1.86	0.00	1
265.26	2.78	2.78	0.00	1
265.38	3.71	3.71	0.00	1
265.48	4.64	4.64	0.00	1
265.57	5.57	5.57	0.00	1
265.66	6.50	6.50	0.00	1
265.74	7.42	7.42	0.00	1
265.82	8.27	8.27	0.00	1
265.91	9.28	9.28	0.00	1
269.00	46.07	46.07	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 16

## Total Rating Curve

Crossing: Crossing 16



**Table 2 - Culvert Summary Table: Rt. Sta. 256+98**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	264.56	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.93	0.93	264.95	0.394	0.0*	1-S2n	0.116	0.309	0.116	0.121	5.484	1.868
1.86	1.86	265.13	0.570	0.0*	1-S2n	0.229	0.439	0.229	0.183	8.358	2.426
2.78	2.78	265.26	0.702	0.0*	1-S2n	0.265	0.543	0.265	0.233	12.893	2.817
3.71	3.71	265.38	0.818	0.0*	1-S2n	0.301	0.630	0.301	0.277	10.663	3.128
4.64	4.64	265.48	0.923	0.0*	1-S2n	0.337	0.705	0.337	0.317	11.326	3.389
5.57	5.57	265.57	1.013	0.0*	1-S2n	0.373	0.776	0.385	0.354	11.322	3.615
6.50	6.50	265.66	1.100	0.0*	1-S2n	0.410	0.842	0.410	0.388	12.192	3.816
7.42	7.42	265.74	1.182	0.0*	1-S2n	0.446	0.901	0.446	0.420	12.490	3.996
8.27	8.27	265.82	1.256	0.0*	1-S2n	0.469	0.954	0.488	0.448	12.405	4.147
9.28	9.28	265.91	1.350	0.0*	1-S2n	0.493	1.012	0.493	0.480	13.742	4.313



\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 264.56 ft, Outlet Elevation (invert): 253.67 ft

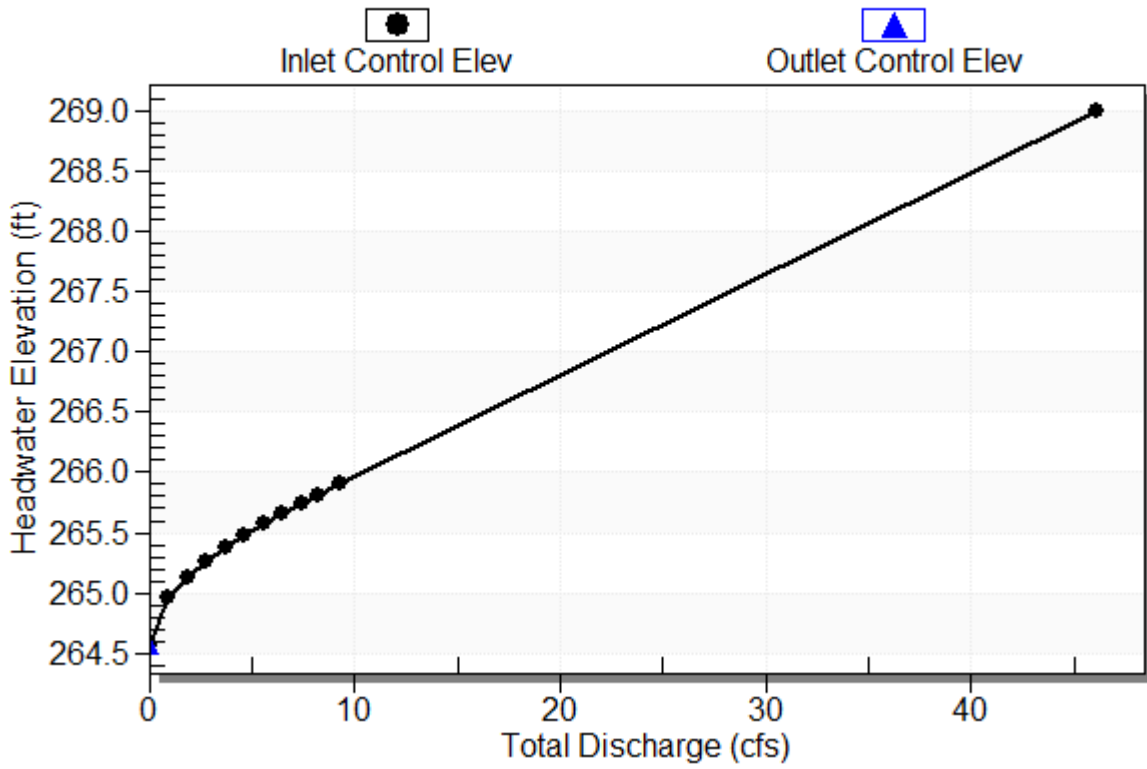
Culvert Length: 192.18 ft, Culvert Slope: 0.0568

\*\*\*\*\*

Culvert Performance Curve Plot: Rt. Sta. 256+98

### Performance Curve

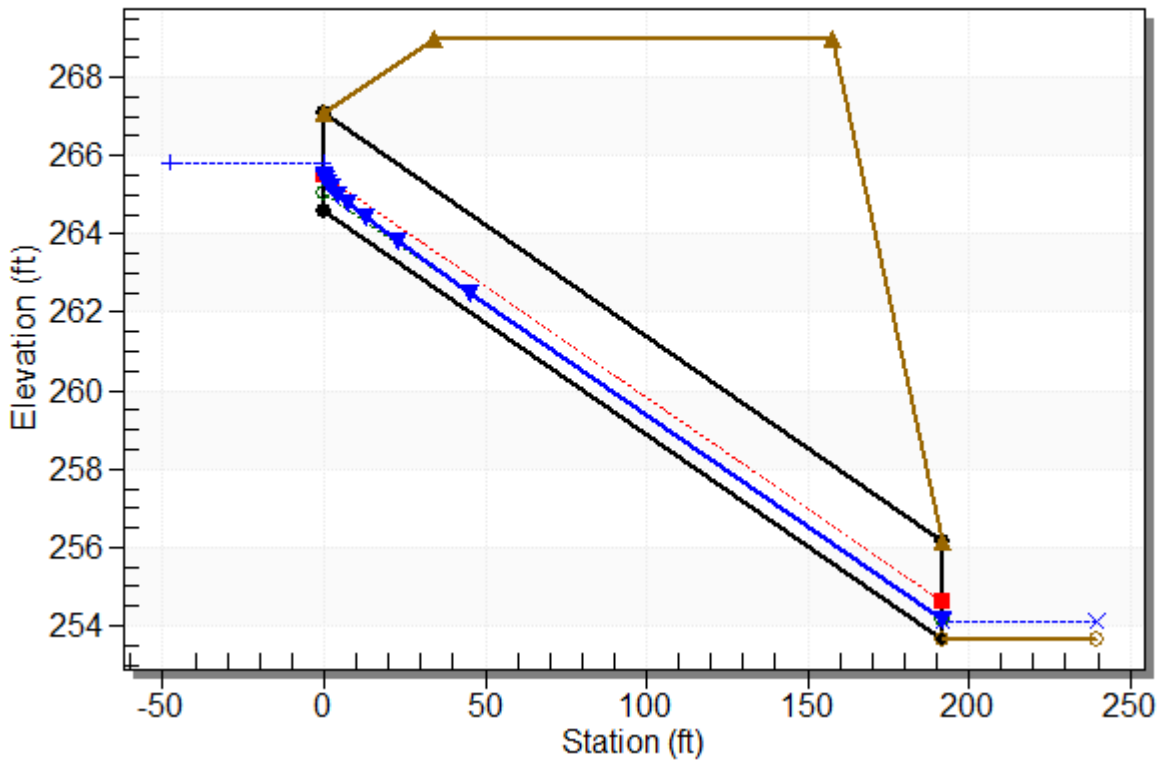
Culvert: Rt. Sta. 256+98



## Water Surface Profile Plot for Culvert: Rt. Sta. 256+98

### Crossing - Crossing 16, Design Discharge - 8.3 cfs

Culvert - Rt. Sta. 256+98, Culvert Discharge - 8.3 cfs



### Site Data - Rt. Sta. 256+98

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 264.56 ft

Outlet Station: 191.87 ft

Outlet Elevation: 253.67 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 256+98

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 16)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	253.67	0.00	0.00	0.00	0.00
0.93	253.79	0.12	1.87	0.30	0.96
1.86	253.85	0.18	2.43	0.46	1.02
2.78	253.90	0.23	2.82	0.58	1.06
3.71	253.95	0.28	3.13	0.69	1.08
4.64	253.99	0.32	3.39	0.79	1.10
5.57	254.02	0.35	3.62	0.88	1.11
6.50	254.06	0.39	3.82	0.97	1.13
7.42	254.09	0.42	4.00	1.05	1.14
8.27	254.12	0.45	4.15	1.12	1.15
9.28	254.15	0.48	4.31	1.20	1.15

### **Tailwater Channel Data - Crossing 16**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0400

Channel Manning's n: 0.0375

Channel Invert Elevation: 253.67 ft

### **Roadway Data for Crossing: Crossing 16**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 269.00 ft

Roadway Surface: Paved

Roadway Top Width: 124.00 ft



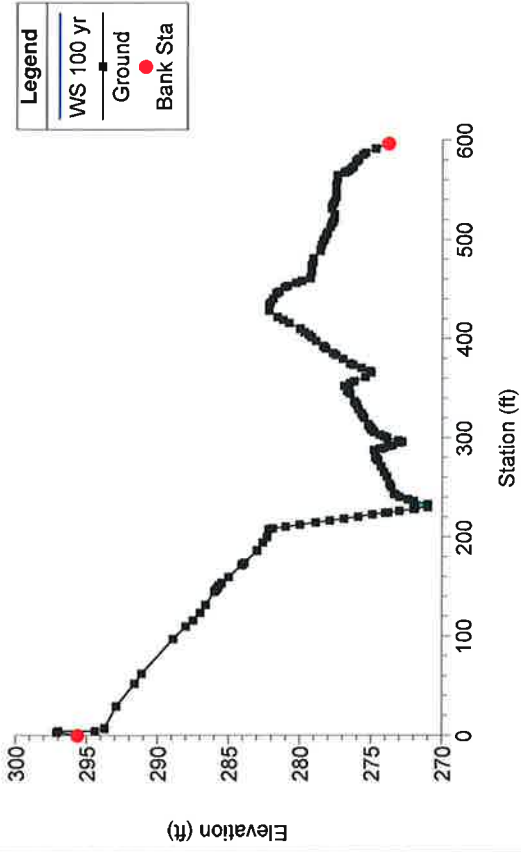
*HEC-RAS Output  
Station 257+00*

HEC-RAS Plan: 27 & 28 River: Ditch #27 & #28 Reach: Ditch #27 & #28

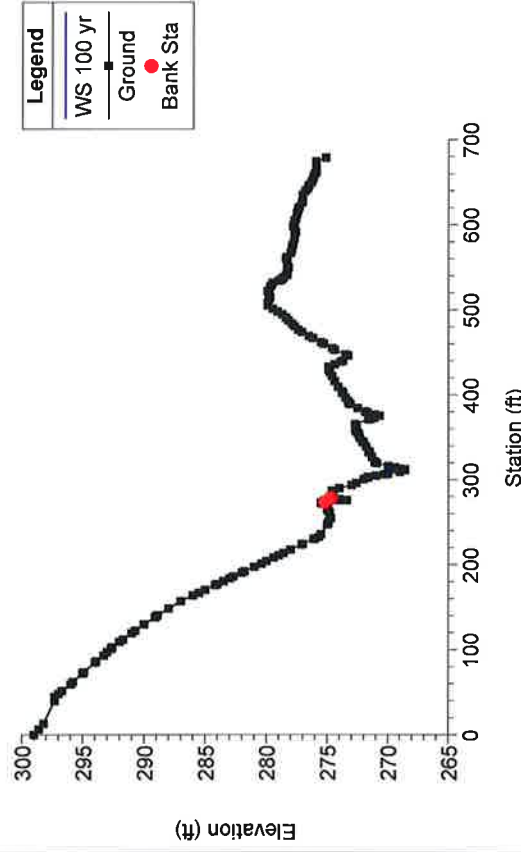
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #27 & #28	691.88	50 yr	8.27	271.00	271.78		271.86	0.009247	2.26	3.66	6.65	0.54
Ditch #27 & #28	691.88	100 yr	9.28	271.00	271.83		271.92	0.009096	2.32	4.00	6.91	0.54
Ditch #27 & #28	641.88	50 yr	8.27	277.80	270.99		271.03	0.036348		5.08	7.36	0.00
Ditch #27 & #28	641.88	100 yr	9.28	277.80	271.06		271.10	0.035308		5.61	7.74	0.00
Ditch #27 & #28	591.88	50 yr	8.27	273.40	269.98		270.00	0.013260		7.39	8.92	0.00
Ditch #27 & #28	591.88	100 yr	9.28	273.40	270.05		270.07	0.013470		8.03	9.32	0.00
Ditch #27 & #28	541.88	50 yr	8.27	269.00	267.90	267.90	268.11	0.360717		2.22	5.26	0.00
Ditch #27 & #28	541.88	100 yr	9.28	269.00	267.94	267.94	268.16	0.355374		2.43	5.51	0.00
Ditch #27 & #28	500		Culvert									
Ditch #27 & #28	350	50 yr	8.27	255.00	255.51	255.48	255.68	0.030373	3.38	2.44	6.00	0.93
Ditch #27 & #28	350	100 yr	9.28	255.00	255.54	255.52	255.73	0.030600	3.52	2.64	6.14	0.95
Ditch #27 & #28	300	50 yr	8.27	253.00	253.79	253.79	254.03	0.035794	3.89	2.13	4.63	1.01
Ditch #27 & #28	300	100 yr	9.28	253.00	253.84	253.84	254.06	0.035262	3.98	2.33	4.83	1.01
Ditch #27 & #28	250	50 yr	8.27	250.40	251.11	251.11	251.36	0.036801	4.00	2.07	4.23	1.01
Ditch #27 & #28	250	100 yr	9.28	250.40	251.15	251.15	251.42	0.036185	4.13	2.25	4.32	1.01
Ditch #27 & #28	200	50 yr	8.27	248.00	248.49	248.49	248.70	0.035758	3.70	2.23	5.27	1.00
Ditch #27 & #28	200	100 yr	9.28	248.00	248.53	248.53	248.75	0.035396	3.84	2.42	5.34	1.01
Ditch #27 & #28	150	50 yr	8.27	245.70	246.17	246.17	246.36	0.036389	3.51	2.35	6.24	1.01
Ditch #27 & #28	150	100 yr	9.28	245.70	246.20	246.20	246.41	0.035630	3.63	2.55	6.31	1.01
Ditch #27 & #28	100	50 yr	8.27	243.50	244.05	244.01	244.18	0.028981	2.91	2.84	8.21	0.87
Ditch #27 & #28	100	100 yr	9.28	243.50	244.07	244.04	244.22	0.027216	3.03	3.06	8.33	0.88
Ditch #27 & #28	50	50 yr	8.27	242.10	242.79	242.73	242.90	0.024033	2.68	3.08	9.18	0.82
Ditch #27 & #28	50	100 yr	9.28	242.10	242.82	242.76	242.94	0.023814	2.75	3.37	9.60	0.82
Ditch #27 & #28	0	50 yr	8.27	240.80	241.27	241.27	241.40	0.037923	2.93	2.82	10.45	1.00
Ditch #27 & #28	0	100 yr	9.28	240.80	241.29	241.29	241.43	0.036635	3.06	3.03	10.66	1.01



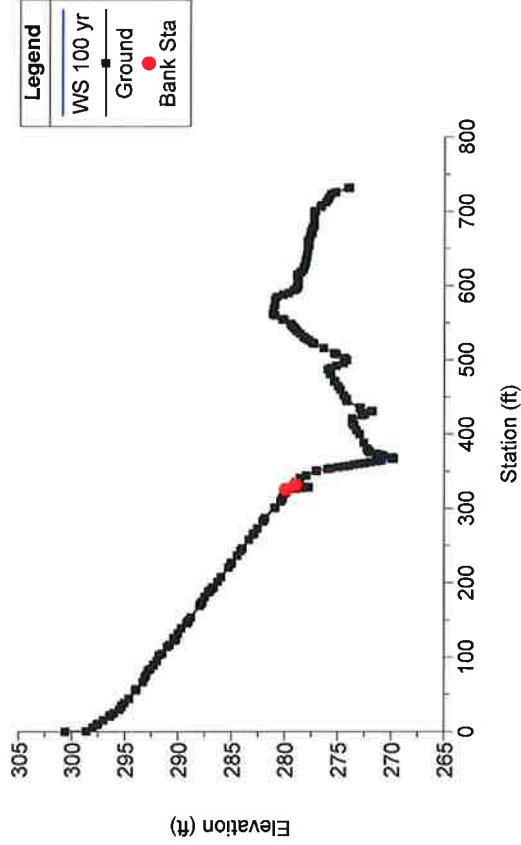
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
691.88



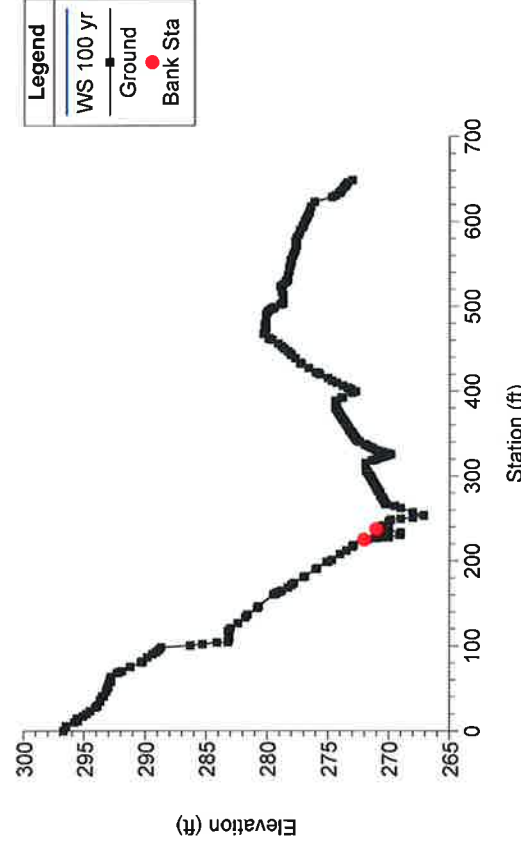
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
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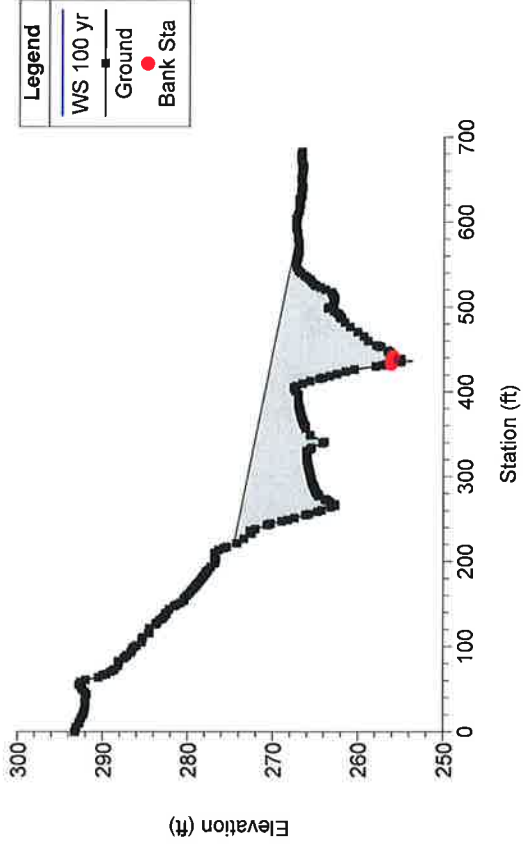
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
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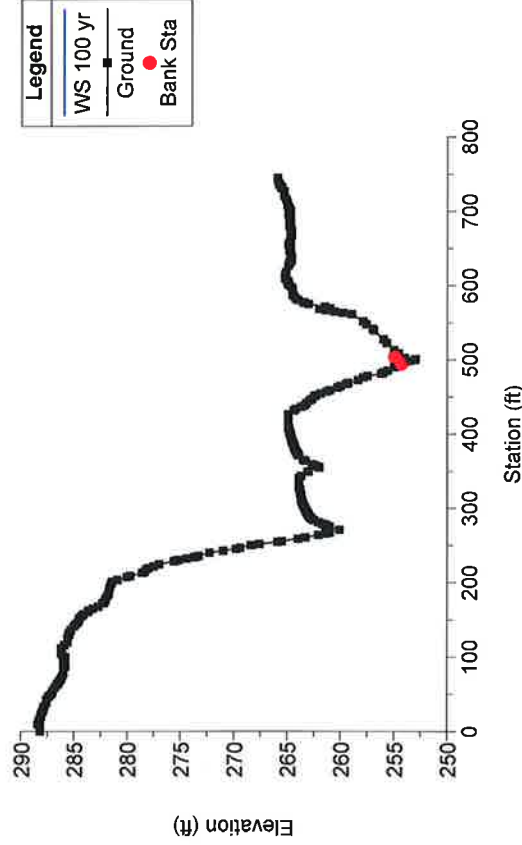
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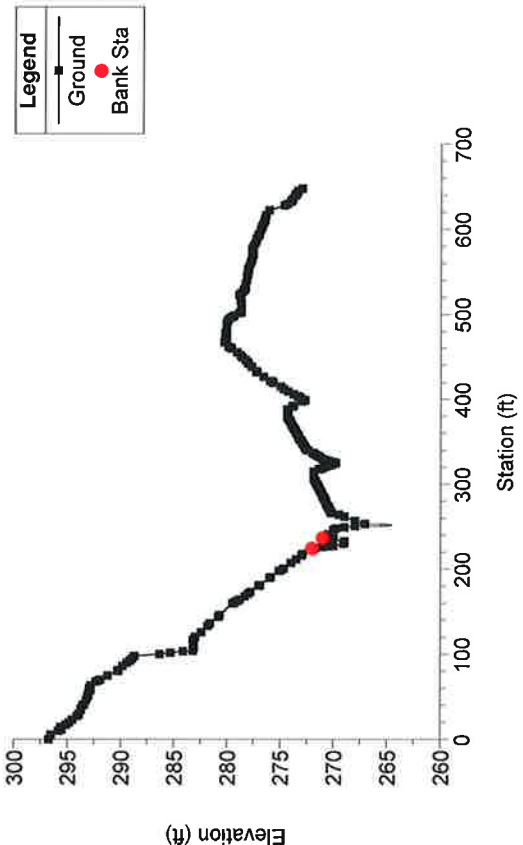
Ditch #27 & #28 Plan: Plan 01 9/1/2015



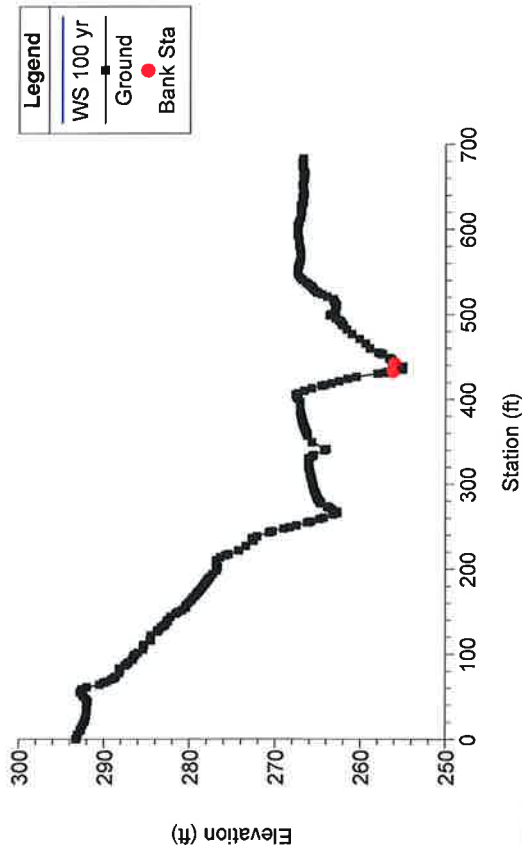
Ditch #27 & #28 Plan: Plan 01 9/1/2015



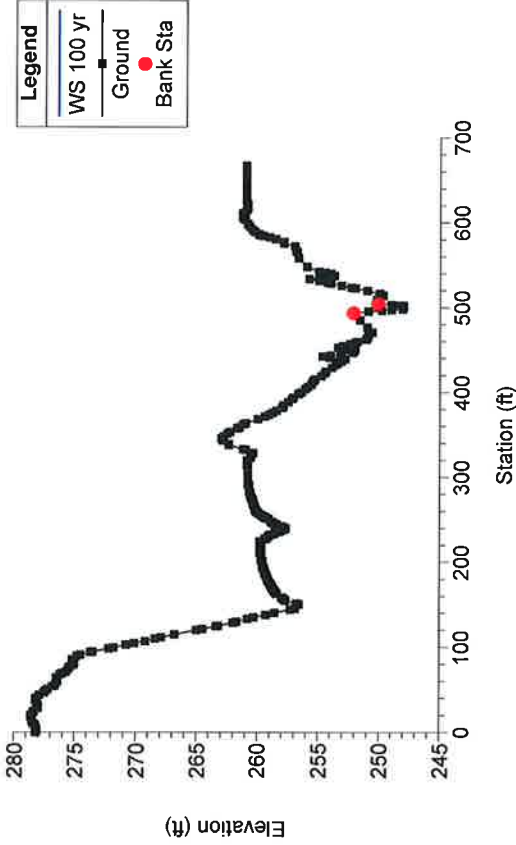
Ditch #27 & #28 Plan: Plan 01 9/1/2015



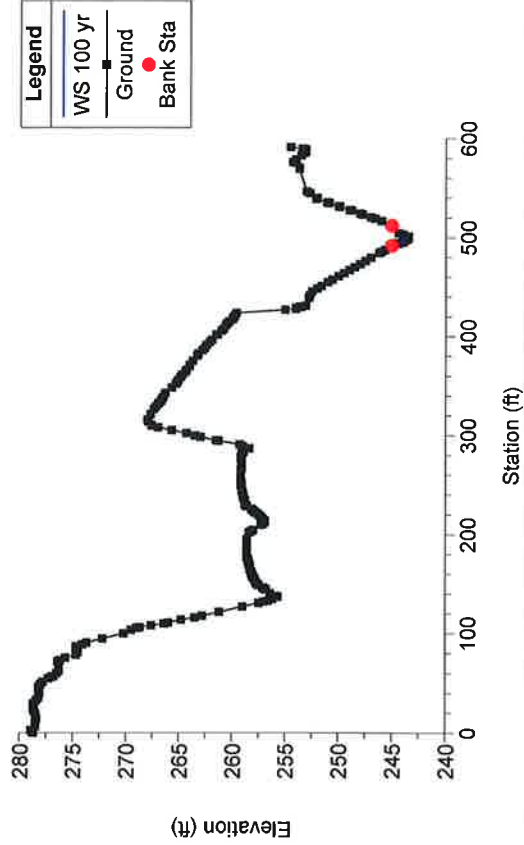
Ditch #27 & #28 Plan: Plan 01 9/1/2015



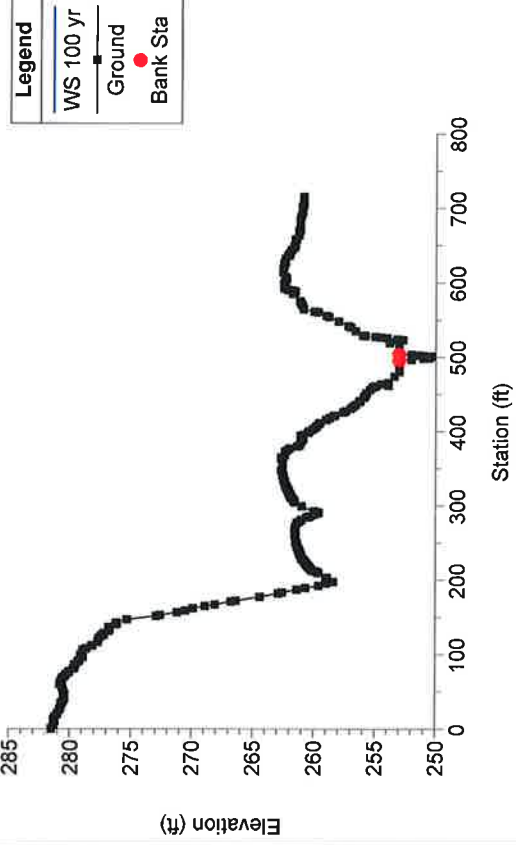
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
200



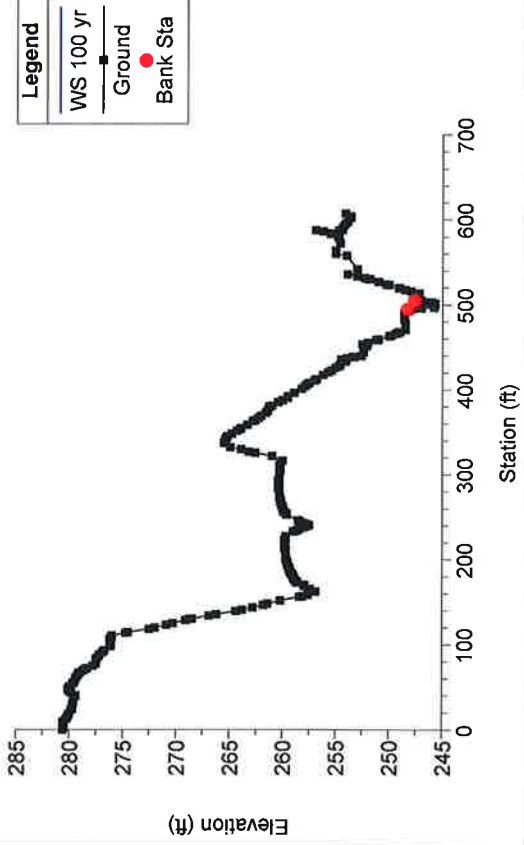
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
100



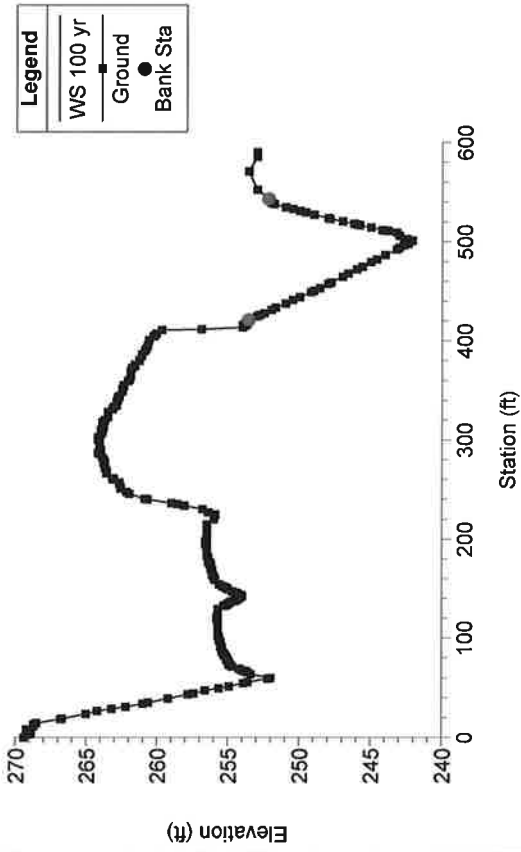
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
250



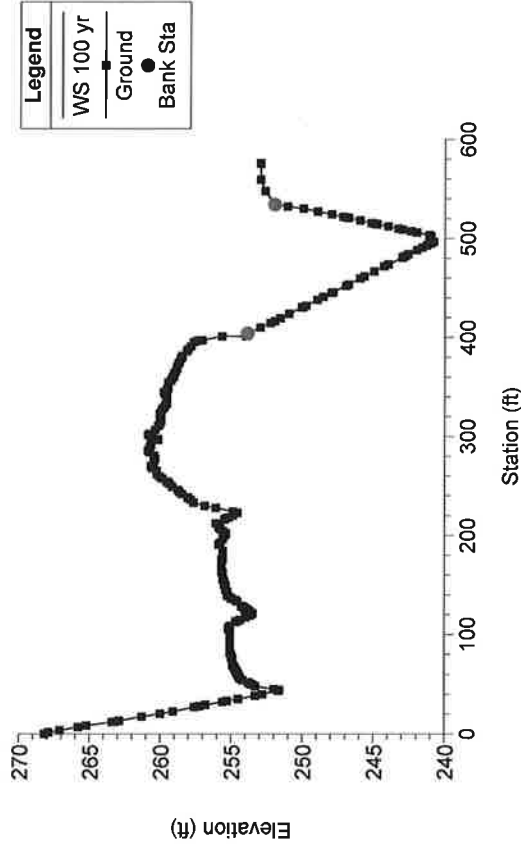
Ditch #27 & #28 Plan: Plan 01 9/1/2015  
150



Ditch #27 & #28 Plan: Plan 01 9/1/2015  
50



Ditch #27 & #28 Plan: Plan 01 9/1/2015  
0





**Cross-Line Sta. 265+60 (I-20)**

The pre-construction drainage area to the cross-line is approximately 2.50 square miles. The pre-construction drainage area includes a 12' X 12' box culvert at Sta. 265+60. The watershed encompasses an unnamed tributary (stream) that ultimately discharges into Twelvemile Creek and is characterized by large areas of developed land and small pockets of residential and wooded areas.

**Pre-Construction Runoff**

Drainage Area (acres) = 1600 acres  
2.50 square miles

Flow rates were determined from the USGS, *Estimating the Magnitude and Frequency of Floods in Small Urban Streams in South Carolina, 2001*. In the regression equations, IA is percent impervious area and BDF is the basin development factor. For pre-construction, IA and BDF were given values of 40.6% and 9 respectively. For post-construction, IA and BDF were given values of 40.8% and 9 respectively.

Design Storm	Regression Equation	Flow (cfs)
2	$34.8(L^{1.40})(10^{0.0158IA})(10^{0.0319BDF})$	545.29
10	$57.1(L^{1.45})(10^{0.0138IA})(10^{0.0337BDF})$	787.40
25	$65.7(L^{1.47})(10^{0.0131IA})(10^{0.0356BDF})$	890.46
50	$71.0(L^{1.48})(10^{0.0127IA})(10^{0.0369BDF})$	956.47
100	$75.6(L^{1.50})(10^{0.0124IA})(10^{0.0384BDF})$	1030.53

**Post-Construction Runoff**

Within the watershed the proposed design includes the widening of I-20 for approximately 0.88 miles. The proposed design will utilize the existing 12' X 12' reinforced concrete box culvert at the Sta. 265+60 crossing. The proposed runoff will be captured in median and roadside ditches and conveyed to the outfall. Reinforced concrete box culverts and pipes are used to convey runoff under I-20. Existing outfall ditches are utilized where possible to carry the proposed runoff to the outfall. The proposed construction does not impact the overall drainage pattern.

Drainage Area (acres) = 1600 acres  
2.50 square miles

Additional Pavement Area = 3.2 acres

The additional pavement area accounts for 0.20% of the watershed. Due to the size of the watershed and the hydraulic timing, the post construction peak discharges will not have a significant adverse impact on the downstream/adjacent properties. Runoff will sheet flow from the proposed roadways and be collected in roadside and median ditches before entering the unnamed stream.

Design Storm	Regression Equation	Flow (cfs)
2	$34.8(L^{1.40})(10^{0.0158IA})(10^{0.0319BDF})$	549.27
10	$57.1(L^{1.45})(10^{0.0138IA})(10^{0.0337BDF})$	792.42
25	$65.7(L^{1.47})(10^{0.0131IA})(10^{0.0356BDF})$	895.85
50	$71.0(L^{1.48})(10^{0.0127IA})(10^{0.0369BDF})$	962.08
100	$75.6(L^{1.50})(10^{0.0124IA})(10^{0.0384BDF})$	1036.43

Run 1: 12' X 12' RC Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	242.27	232.46	230.38	12.00	0.82	YES
100	243.10	232.46	230.38	12.00	0.89	

Upstream of the 12' x 12' culvert, a 96" pipe was identified as an existing cross-line for a Frontage Road. The upstream pipe was not modeled but likely results in overtopping of the Frontage Road. The upstream overtopping has no significant impact on the hydraulic conditions for the I-20 crossing.

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 962.08 cfs

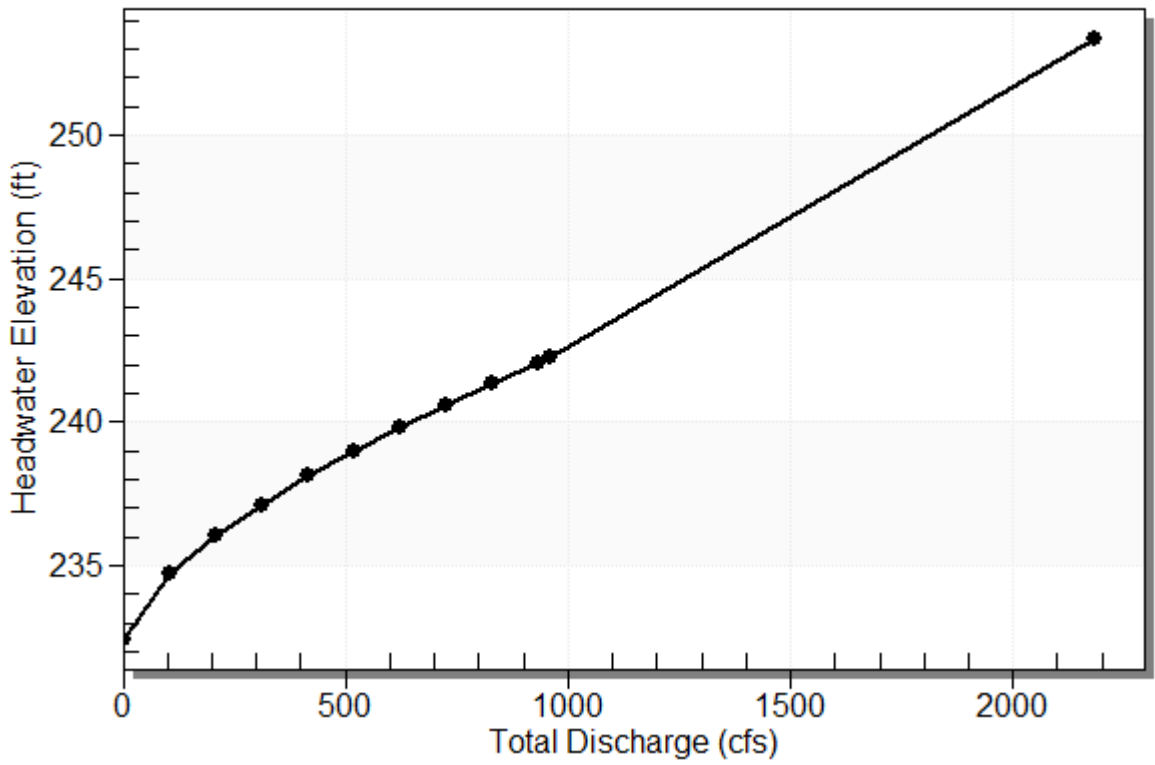
Maximum Flow: 1036.43 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 15 (Lt. Sta. 265+80) Post**

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 15 Post Discharge (cfs)	Roadway Discharge (cfs)	Iterations
232.46	0.00	0.00	0.00	1
234.70	103.64	103.64	0.00	1
236.02	207.29	207.29	0.00	1
237.13	310.93	310.93	0.00	1
238.11	414.57	414.57	0.00	1
239.00	518.22	518.22	0.00	1
239.83	621.86	621.86	0.00	1
240.61	725.50	725.50	0.00	1
241.36	829.14	829.14	0.00	1
242.07	932.79	932.79	0.00	1
242.27	962.08	962.08	0.00	1
251.00	2184.27	2184.27	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 15 (Lt. Sta. 265+80) Post

Total Rating Curve  
Crossing: Crossing 15 (Lt. Sta. 265+80) Post





**Table 2 - Culvert Summary Table: Culvert 15 Post**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	232.46	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
103.64	103.64	234.70	2.243	0.0*	1-S2n	0.649	1.323	0.817	1.250	10.574	5.718
207.29	207.29	236.02	3.560	0.074	1-S2n	1.201	2.100	1.315	1.852	13.133	7.127
310.93	310.93	237.13	4.665	0.792	1-S2n	1.545	2.752	1.771	2.319	14.630	8.060
414.57	414.57	238.11	5.652	1.467	1-S2n	1.889	3.334	2.196	2.712	15.732	8.773
518.22	518.22	239.00	6.545	2.122	1-S2n	2.224	3.869	2.600	3.057	16.611	9.357
621.86	621.86	239.83	7.370	2.769	1-S2n	2.502	4.369	2.986	3.368	17.357	9.854
725.50	725.50	240.61	8.151	3.415	1-S2n	2.780	4.842	3.358	3.652	18.006	10.291
829.14	829.14	241.36	8.896	4.066	1-S2n	3.059	5.293	3.718	3.915	18.585	10.680
932.79	932.79	242.07	9.614	4.725	1-S2n	3.330	5.725	4.067	4.161	19.111	11.033
962.08	962.08	242.27	9.814	4.913	1-S2n	3.401	5.844	4.165	4.227	19.250	11.127

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 232.46 ft, Outlet Elevation (invert): 230.38 ft

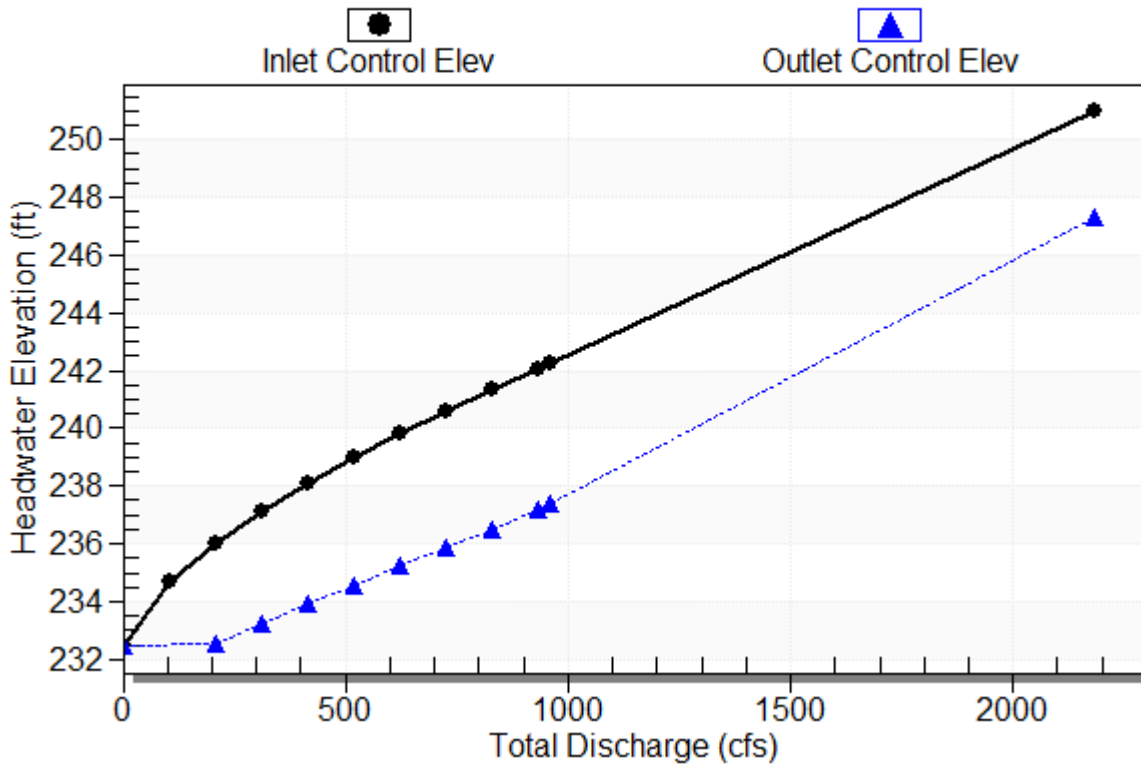
Culvert Length: 162.62 ft, Culvert Slope: 0.0128

\*\*\*\*\*

# Culvert Performance Curve Plot: Culvert 15 Post

## Performance Curve

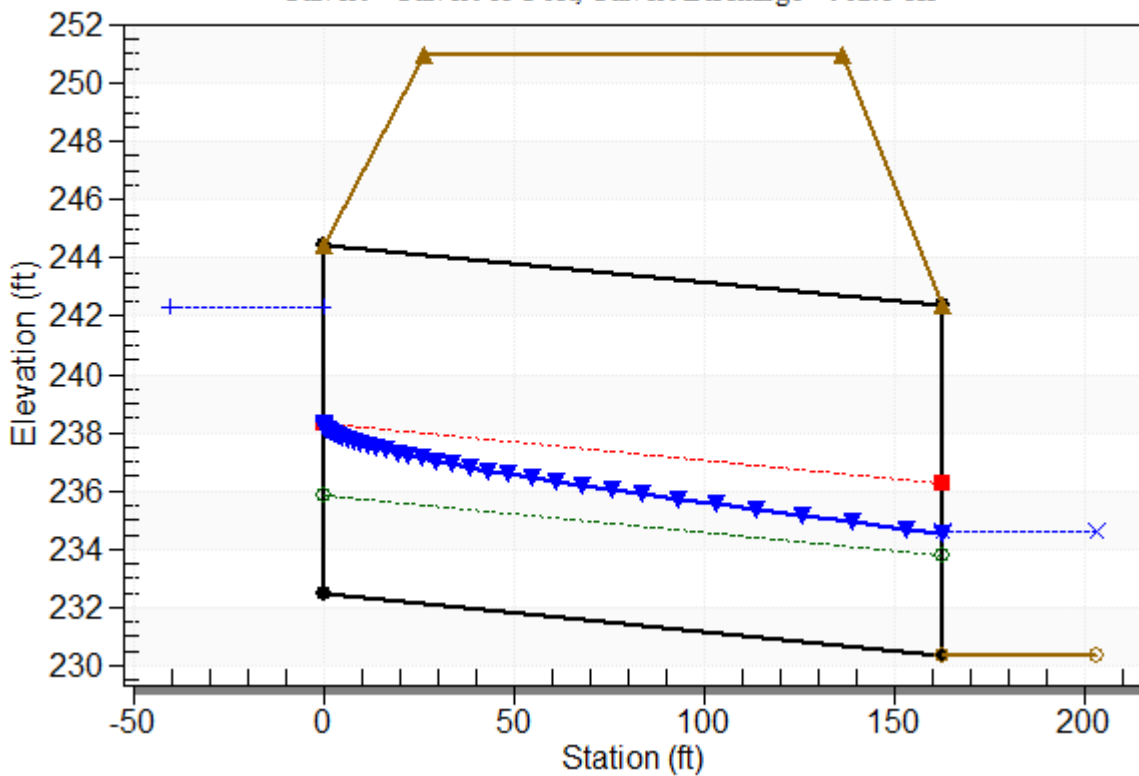
Culvert: Culvert 15 Post





## Water Surface Profile Plot for Culvert: Culvert 15 Post

Crossing - Crossing 15 (Lt. Sta. 265+80) Post, Design Discharge - 962.1 cfs  
Culvert - Culvert 15 Post, Culvert Discharge - 962.1 cfs



### Site Data - Culvert 15 Post

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 232.46 ft

Outlet Station: 162.61 ft

Outlet Elevation: 230.38 ft

Number of Barrels: 1

### Culvert Data Summary - Culvert 15 Post

Barrel Shape: Concrete Box

Barrel Span: 12.00 ft

Barrel Rise: 12.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90 & 15° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 15 (Lt. Sta. 265+80))**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	230.38	0.00	0.00	0.00	0.00
103.64	231.63	1.25	5.72	1.56	0.98
207.29	232.23	1.85	7.13	2.31	1.03
310.93	232.70	2.32	8.06	2.89	1.05
414.57	233.09	2.71	8.77	3.38	1.07
518.22	233.44	3.06	9.36	3.82	1.09
621.86	233.75	3.37	9.85	4.20	1.10
725.50	234.03	3.65	10.29	4.56	1.11
829.14	234.29	3.91	10.68	4.89	1.12
932.79	234.54	4.16	11.03	5.19	1.13
962.08	234.61	4.23	11.13	5.28	1.13

### **Tailwater Channel Data - Crossing 15 (Lt. Sta. 265+80) Post**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 12.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 230.38 ft

### **Roadway Data for Crossing: Crossing 15 (Lt. Sta. 265+80) Post**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 251.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft



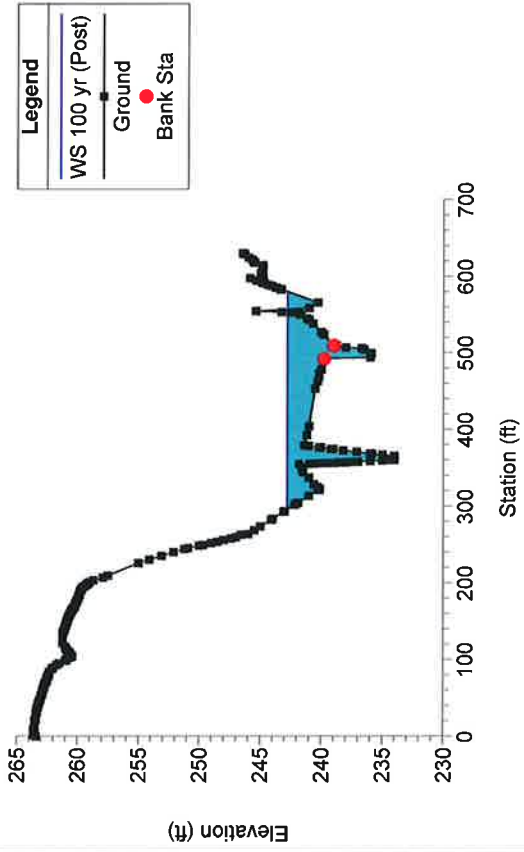
*HEC-RAS Output*  
*Station 265+60*

HEC-RAS Plan: 23 & 26B River: Ditch #23 & #26B Reach: Ditch #23 & #26B

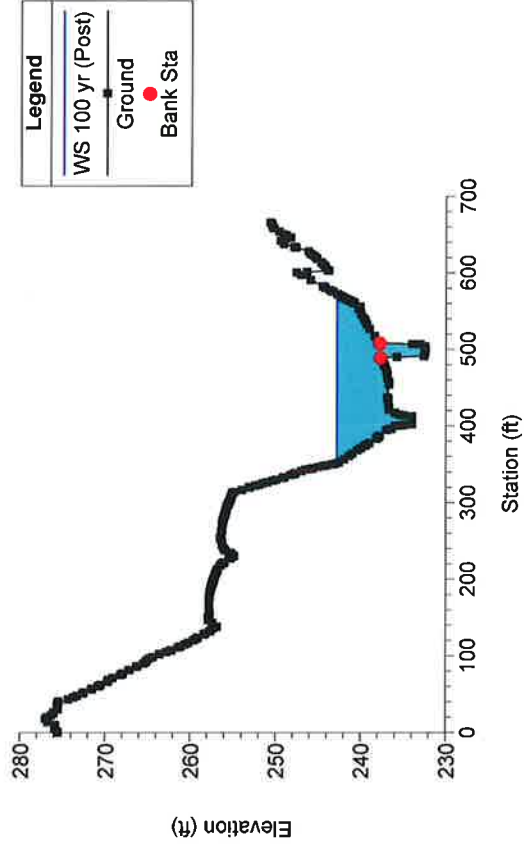
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #23 & #26B	715	50 yr (Post)	962.08	235.90	242.31		242.54	0.002789	5.25	568.56	272.08	0.39
Ditch #23 & #26B	715	100 yr (Post)	1036.43	235.90	242.85		243.01	0.001854	4.56	740.32	281.63	0.33
Ditch #23 & #26B	665	50 yr (Post)	962.08	232.40	242.39		242.44	0.000371	2.53	1027.58	216.37	0.15
Ditch #23 & #26B	665	100 yr (Post)	1036.43	232.40	242.90		242.94	0.000332	2.48	1138.44	221.94	0.14
Ditch #23 & #26B	615	50 yr (Post)	962.08	232.00	242.38		242.42	0.000390	2.60	1098.13	196.64	0.15
Ditch #23 & #26B	615	100 yr (Post)	1036.43	232.00	242.89		242.92	0.000356	2.57	1198.85	201.48	0.14
Ditch #23 & #26B	565	50 yr (Post)	962.08	232.80	242.30	236.54	242.39	0.000339	2.87	666.48	121.50	0.17
Ditch #23 & #26B	565	100 yr (Post)	1036.43	232.80	242.80	236.69	242.90	0.000318	2.88	729.12	125.95	0.16
Ditch #23 & #26B	500		Culvert									
Ditch #23 & #26B	400	50 yr (Post)	962.08	229.00	234.63		235.43	0.006944	7.22	133.86	30.92	0.59
Ditch #23 & #26B	400	100 yr (Post)	1036.43	229.00	234.71		235.62	0.007583	7.63	136.43	31.28	0.62
Ditch #23 & #26B	350	50 yr (Post)	962.08	229.00	234.77		235.10	0.002386	4.77	296.37	160.73	0.38
Ditch #23 & #26B	350	100 yr (Post)	1036.43	229.00	234.90		235.25	0.002467	4.95	316.99	164.11	0.39
Ditch #23 & #26B	300	50 yr (Post)	962.08	229.00	233.79	233.79	234.82	0.010084	8.72	215.98	166.40	0.77
Ditch #23 & #26B	300	100 yr (Post)	1036.43	229.00	233.98	233.98	234.97	0.009454	8.70	247.52	179.48	0.75
Ditch #23 & #26B	250	50 yr (Post)	962.08	228.90	233.11	233.11	234.09	0.010011	8.63	224.28	163.87	0.77
Ditch #23 & #26B	250	100 yr (Post)	1036.43	228.90	233.24	233.24	234.23	0.009983	8.80	245.23	168.60	0.78
Ditch #23 & #26B	200	50 yr (Post)	962.08	227.80	231.78	231.78	232.56	0.012833	8.22	268.86	197.02	0.84
Ditch #23 & #26B	200	100 yr (Post)	1036.43	227.80	231.86	231.86	232.67	0.013020	8.44	286.18	200.31	0.85
Ditch #23 & #26B	150	50 yr (Post)	962.08	225.00	229.99		231.36	0.012831	9.36	102.74	25.19	0.82
Ditch #23 & #26B	150	100 yr (Post)	1036.43	225.00	230.18	229.62	231.62	0.012993	9.64	107.72	28.36	0.83
Ditch #23 & #26B	100	50 yr (Post)	962.08	225.00	229.28	228.99	230.87	0.014591	9.45	102.86	38.62	0.89
Ditch #23 & #26B	100	100 yr (Post)	1036.43	225.00	229.36	229.17	230.90	0.015849	9.97	106.10	44.97	0.93
Ditch #23 & #26B	50	50 yr (Post)	962.08	223.70	229.48	227.72	230.04	0.004632	6.05	178.06	129.42	0.52
Ditch #23 & #26B	50	100 yr (Post)	1036.43	223.70	229.62	227.90	230.22	0.004734	6.26	197.97	142.10	0.53
Ditch #23 & #26B	0	50 yr (Post)	962.08	223.00	229.19	227.73	229.80	0.005004	6.43	217.28	140.34	0.55
Ditch #23 & #26B	0	100 yr (Post)	1036.43	223.00	229.34	227.93	229.97	0.005003	6.58	239.69	144.07	0.55



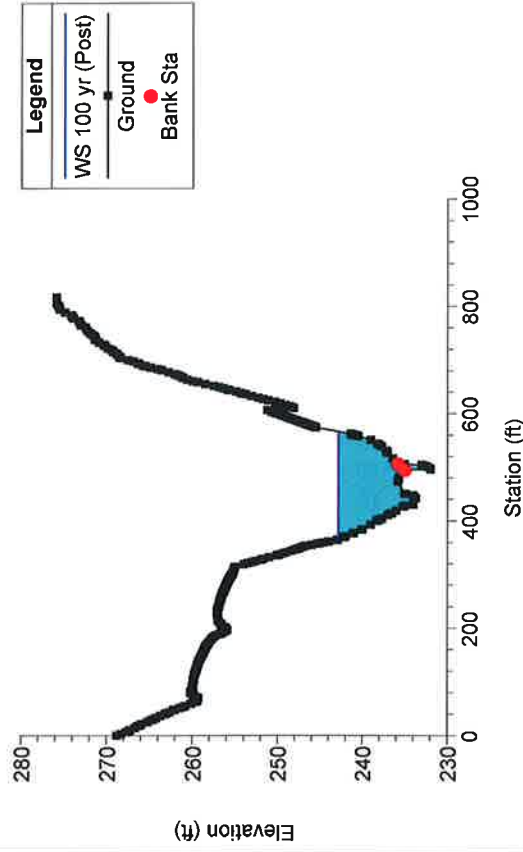
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715



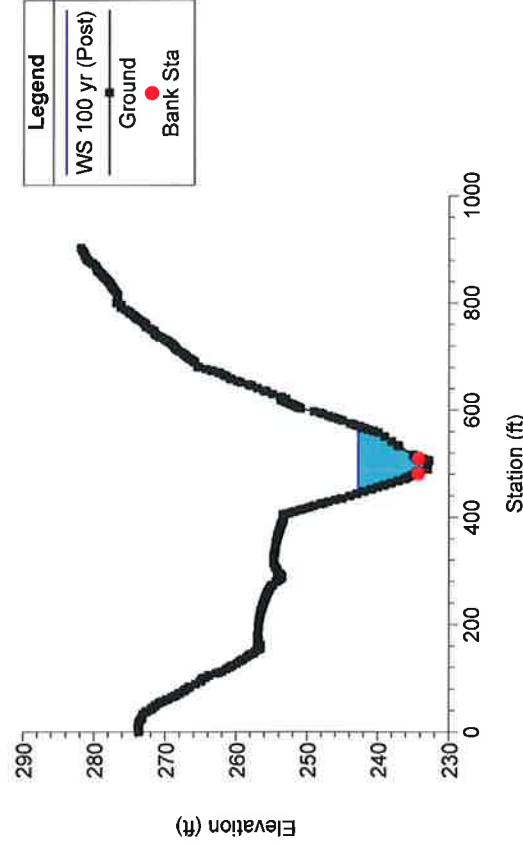
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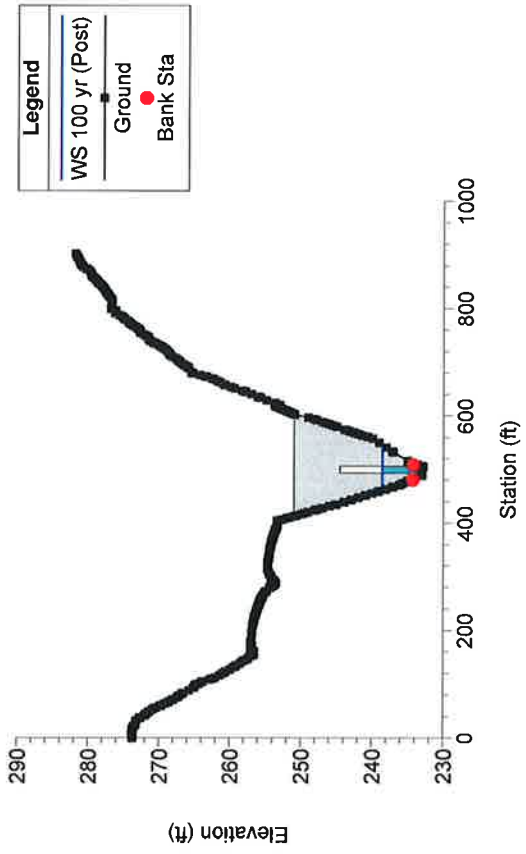
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615



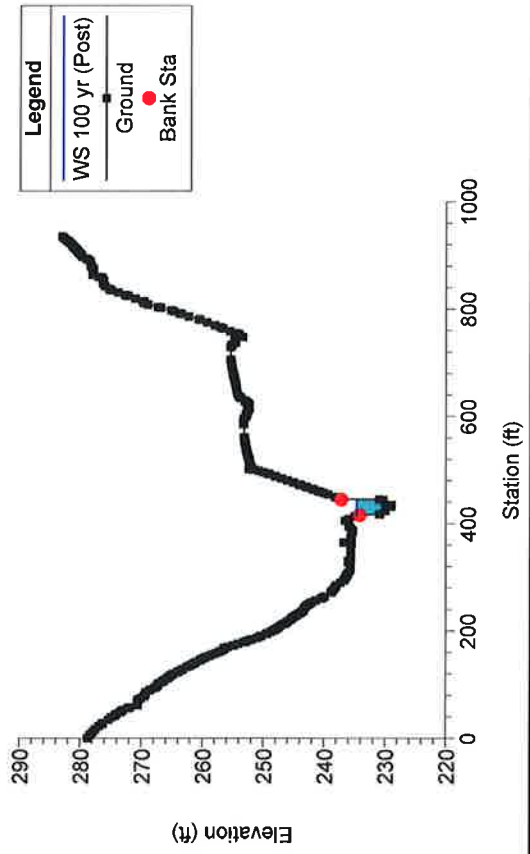
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565



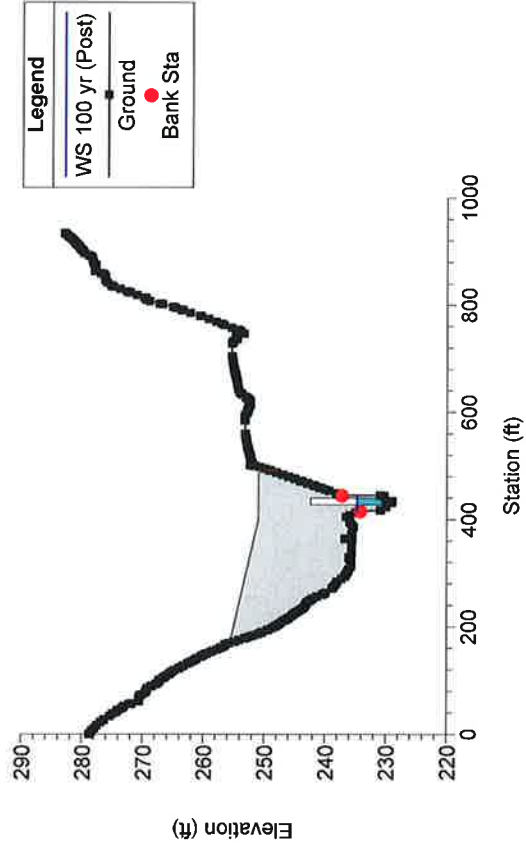
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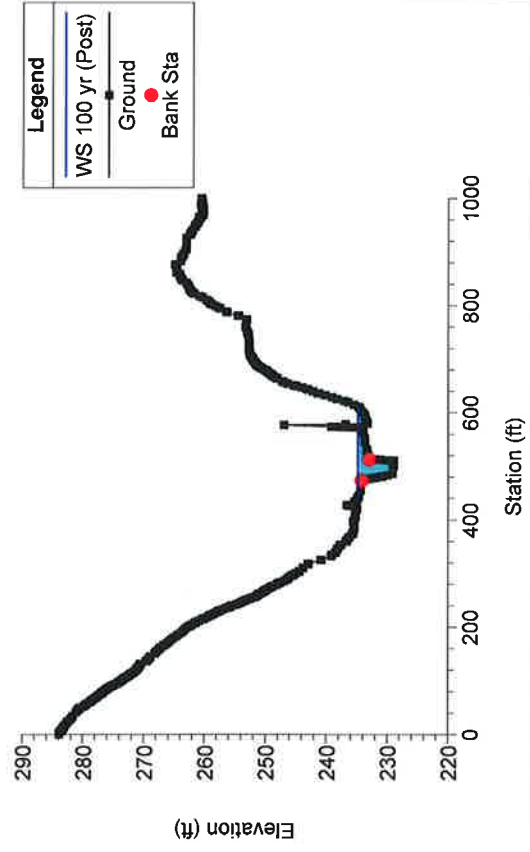
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350



Ditch #23 & #26B Plan: Plan 01 9/1/2015

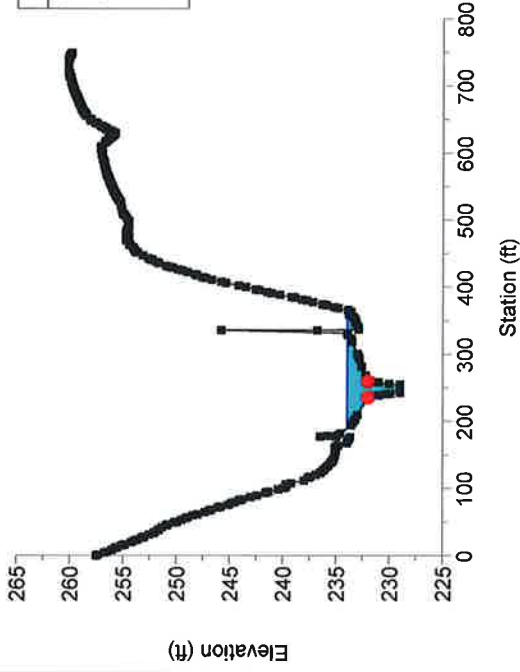


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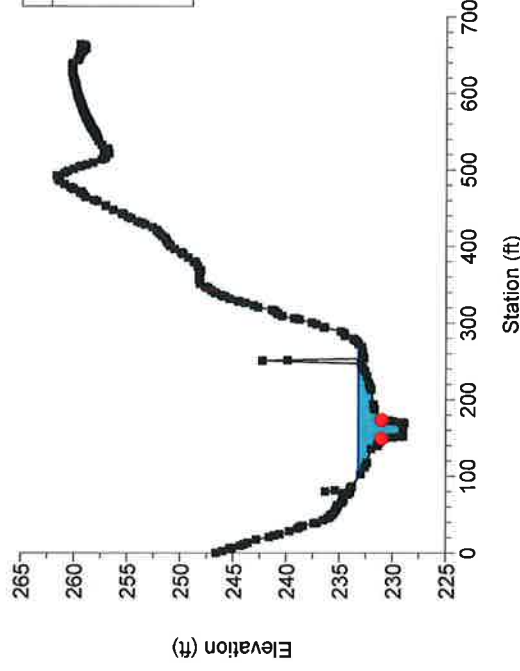
Ditch #23 & #26B Plan: Plan 01 9/1/2015

300



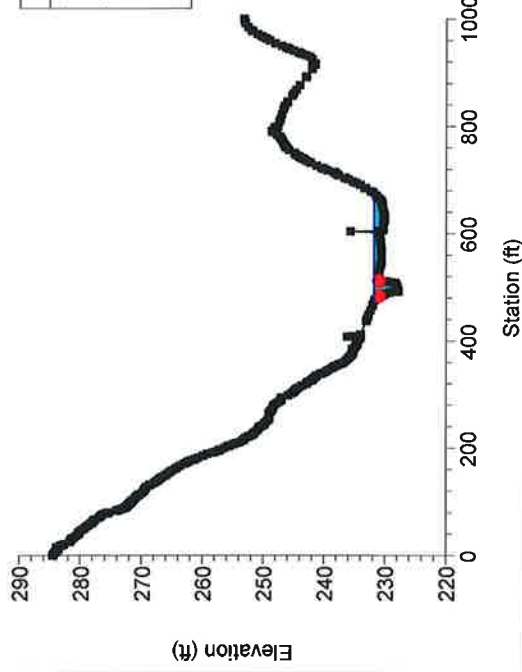
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250



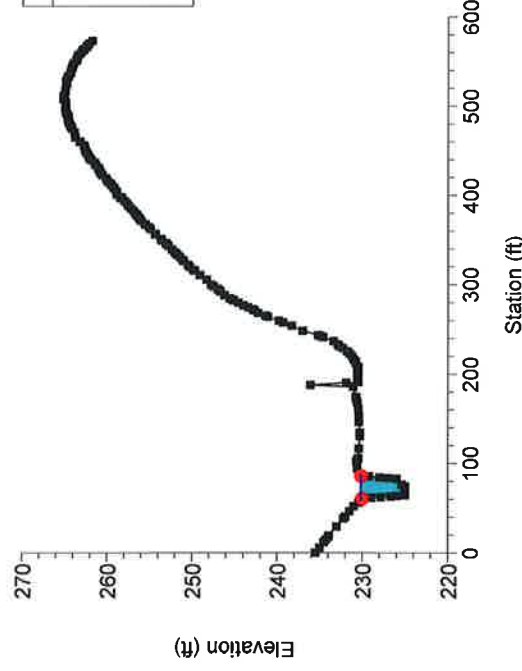
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200

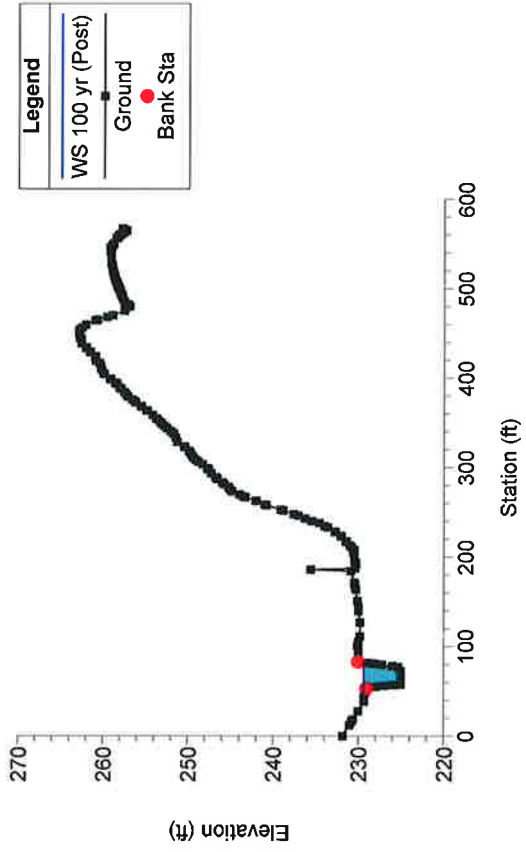


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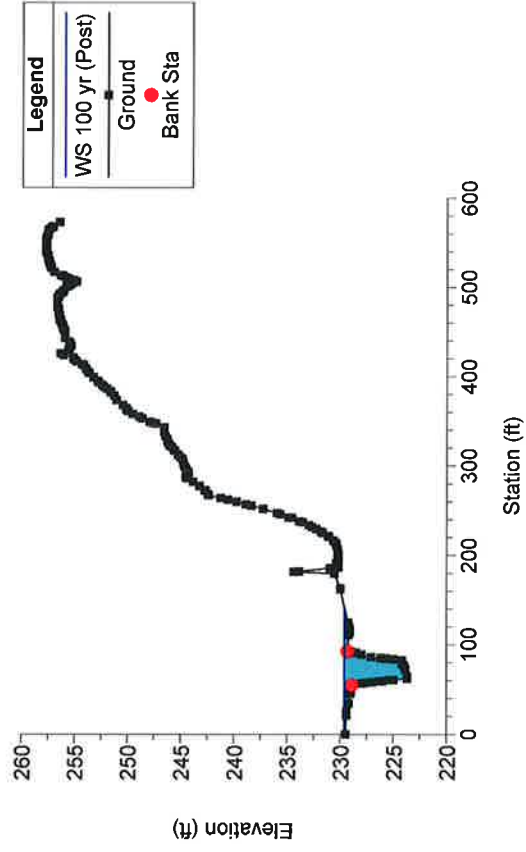
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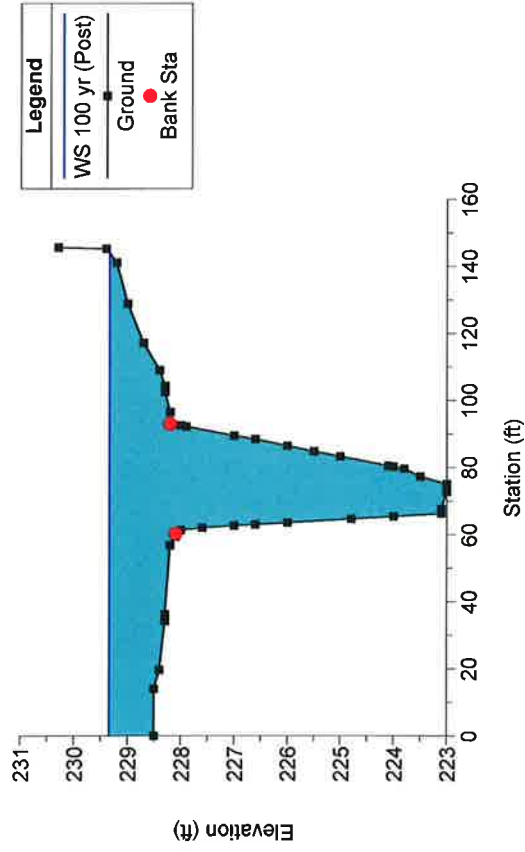
Ditch #23 & #26B Plan: Plan 01 9/1/2015  
100



Ditch #23 & #26B Plan: Plan 01 9/1/2015  
50



Ditch #23 & #26B Plan: Plan 01 9/1/2015  
0



**LOCATION:** Rt. Sta. 271+07  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 7.71 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Flat (0% - 2%)

Acres	C-Value	Description
1.06	0.90	Pavements & Roofs
4.98	0.10	Woodland & Forest
1.67	0.45	Suburban, Normal Residential
0.00	0.00	
0.00	0.00	
0.00	0.00	
Weighted C-Value:		0.29

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0100
Travel time, (hr)	0.445

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
2		
Surface	16.1345	20.3282
Length, (ft)	861	0
Course slope, (ft/ft)	0.0360	0.003
Velocity, (fps)	3.0615	1.11342
Travel time, (hr)	0.078	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.523 hr      I (50 Yr)= 5.03  
 31.4 min      I (100 Yr)= 5.44

Design      Q (50 Yr)= 13.30 cfs  
 Maximum      Q (100 Yr)= 14.99 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	260.73	258.85	240.17	2.00	0.94	YES
100	260.89	258.85	240.17	2.00	1.02	



# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 13.3 cfs

Maximum Flow: 14.99 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 14**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 271+07 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
258.85	0.00	0.00	0.00	1
259.39	1.50	1.50	0.00	1
259.63	3.00	3.00	0.00	1
259.82	4.50	4.50	0.00	1
260.01	6.00	6.00	0.00	1
260.18	7.50	7.50	0.00	1
260.33	8.99	8.99	0.00	1
260.47	10.49	10.49	0.00	1
260.61	11.99	11.99	0.00	1
260.73	13.30	13.30	0.00	1
260.89	14.99	14.99	0.00	1
263.00	29.68	29.68	0.00	Overtopping

## Rating Curve Plot for Crossing: Crossing 14

**Table 2 - Culvert Summary Table: Rt. Sta. 271+07**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	258.85	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1.50	1.50	259.39	0.542	0.0*	1-S2n	0.206	0.420	0.206	0.267	10.731	2.807
3.00	3.00	259.63	0.781	0.0*	1-S2n	0.286	0.601	0.301	0.424	9.830	3.535
4.50	4.50	259.82	0.971	0.0*	1-S2n	0.365	0.743	0.365	0.561	11.464	4.007
6.00	6.00	260.01	1.158	0.0*	1-S2n	0.414	0.865	0.414	0.688	12.639	4.357
7.50	7.50	260.18	1.326	0.0*	1-S2n	0.463	0.973	0.463	0.809	13.479	4.634
8.99	8.99	260.33	1.478	0.0*	1-S2n	0.512	1.068	0.512	0.925	14.104	4.862
10.49	10.49	260.47	1.620	0.0*	1-S2n	0.557	1.158	0.557	1.038	14.714	5.055
11.99	11.99	260.61	1.758	0.0*	1-S2n	0.594	1.239	0.594	1.149	15.478	5.220
13.30	13.30	260.73	1.879	0.0*	1-S2n	0.626	1.310	0.656	1.244	14.789	5.348
14.99	14.99	260.89	2.042	0.0*	5-S2n	0.667	1.391	0.667	1.364	16.276	5.493

\* Full Flow Headwater elevation is below inlet invert.



\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 258.85 ft, Outlet Elevation (invert): 240.17 ft

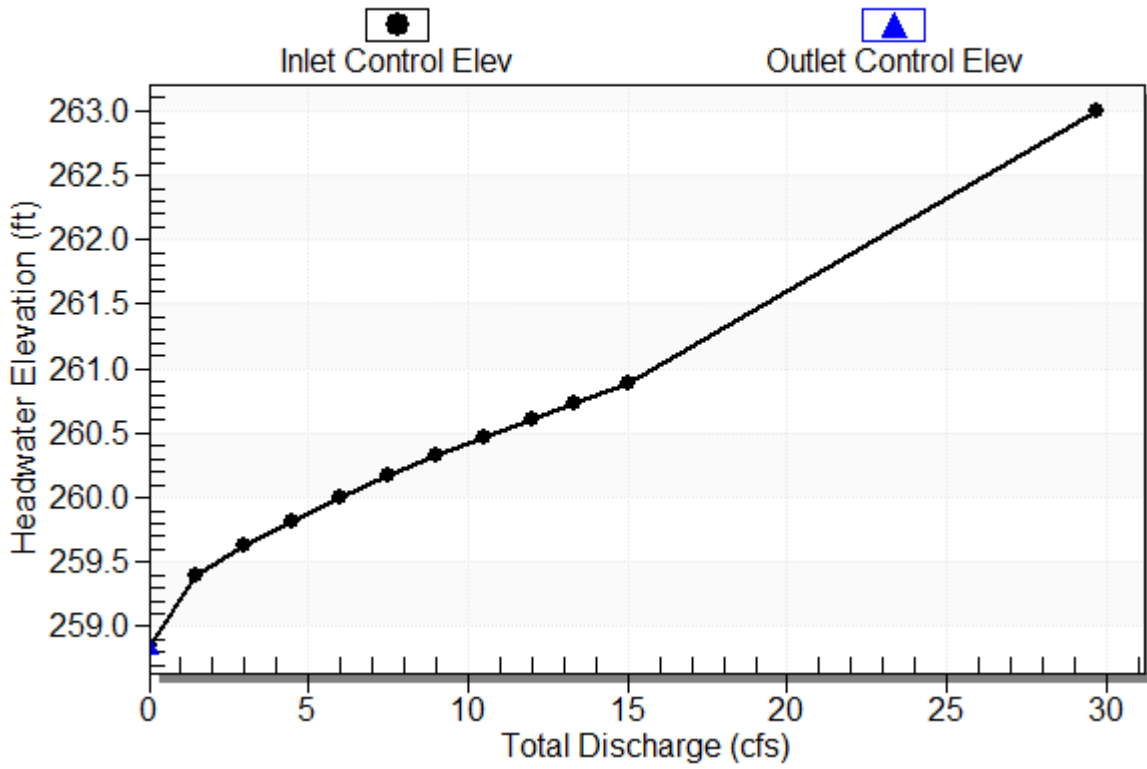
Culvert Length: 296.81 ft, Culvert Slope: 0.0631

\*\*\*\*\*

Culvert Performance Curve Plot: Rt. Sta. 271+07

### Performance Curve

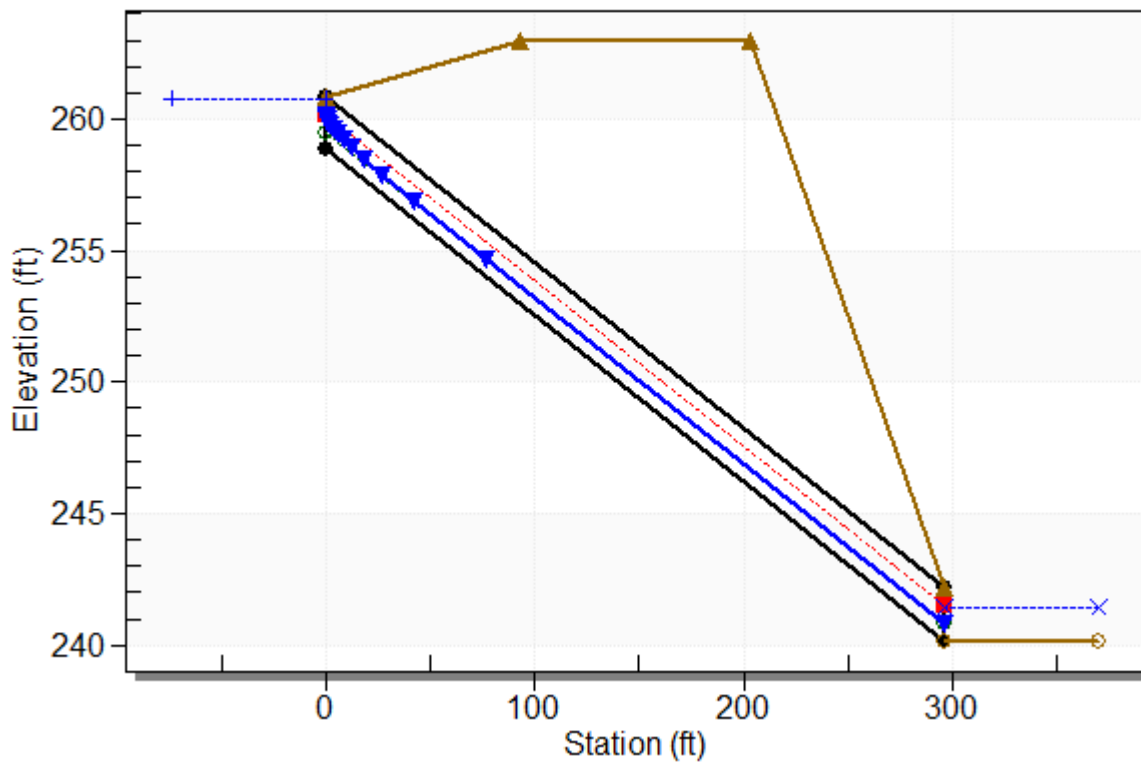
Culvert: Rt. Sta. 271+07



## Water Surface Profile Plot for Culvert: Rt. Sta. 271+07

### Crossing - Crossing 14, Design Discharge - 13.3 cfs

Culvert - Rt. Sta. 271+07, Culvert Discharge - 13.3 cfs



## Site Data - Rt. Sta. 271+07

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 258.85 ft

Outlet Station: 296.22 ft

Outlet Elevation: 240.17 ft

Number of Barrels: 1

## Culvert Data Summary - Rt. Sta. 271+07

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 14)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	240.17	0.00	0.00	0.00	0.00
1.50	240.44	0.27	2.81	0.67	0.96
3.00	240.59	0.42	3.53	1.06	0.96
4.50	240.73	0.56	4.01	1.40	0.94
6.00	240.86	0.69	4.36	1.72	0.93
7.50	240.98	0.81	4.63	2.02	0.91
8.99	241.09	0.92	4.86	2.31	0.89
10.49	241.21	1.04	5.05	2.59	0.87
11.99	241.32	1.15	5.22	2.87	0.86
13.30	241.41	1.24	5.35	3.10	0.85
14.99	241.53	1.36	5.49	3.41	0.83

### **Tailwater Channel Data - Crossing 14**

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 ft

Channel Slope: 0.0400

Channel Manning's n: 0.0375

Channel Invert Elevation: 240.17 ft

### **Roadway Data for Crossing: Crossing 14**

Roadway Profile Shape: Constant Roadway Elevation


Crest Length: 145.00 ft

Crest Elevation: 263.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft





*HEC-RAS Output  
Station 276+50*

HEC-RAS Plan: Plan 01 River: Ditch #25 & #26A Reach: Ditch #25 & #26A

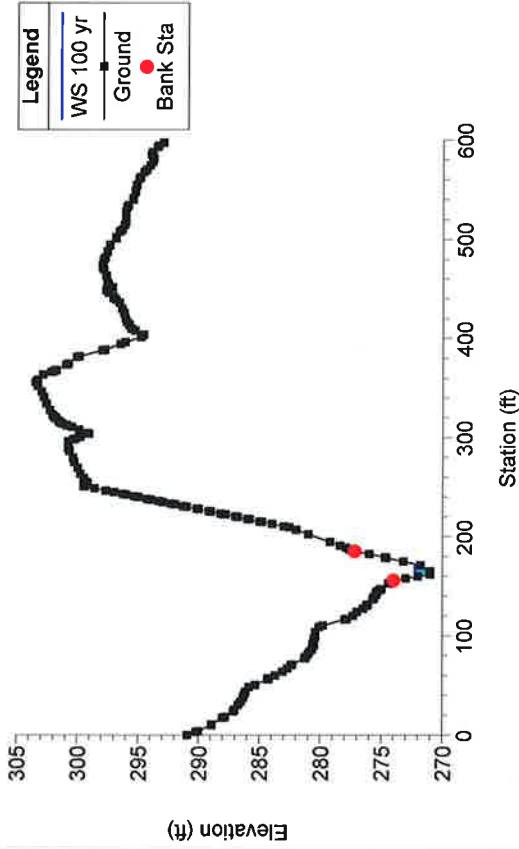
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #25 & #26A	1734.62	50 yr	56.57	271.00	272.22	272.22	272.65	0.027735	5.24	10.79	12.89	1.01
Ditch #25 & #26A	1734.62	100 yr	63.60	271.00	272.30	272.30	272.75	0.027196	5.40	11.78	13.23	1.01
Ditch #25 & #26A	1684.62	50 yr	56.57	269.70	271.27		271.55	0.013136	4.25	13.30	12.22	0.72
Ditch #25 & #26A	1684.62	100 yr	63.60	269.70	271.37		271.66	0.012977	4.37	14.54	12.67	0.72
Ditch #25 & #26A	1634.62	50 yr	56.57	268.80	270.30	270.21	270.71	0.021522	5.14	11.00	10.97	0.90
Ditch #25 & #26A	1634.62	100 yr	63.60	268.80	270.38	270.30	270.82	0.021681	5.32	11.96	11.38	0.91
Ditch #25 & #26A	1584.62	50 yr	56.57	267.50	268.99	268.99	269.49	0.027103	5.69	9.95	10.06	1.01
Ditch #25 & #26A	1584.62	100 yr	63.60	267.50	269.09	269.09	269.61	0.026678	5.82	10.92	10.53	1.01
Ditch #25 & #26A	1534.62	50 yr	56.57	265.70	267.35	267.35	267.86	0.027261	5.74	10.18	10.76	1.01
Ditch #25 & #26A	1534.62	100 yr	63.60	265.70	267.45	267.45	267.98	0.026563	5.86	11.27	11.69	1.01
Ditch #25 & #26A	1484.62	50 yr	56.57	264.00	265.70	265.70	266.22	0.027374	5.80	9.76	9.55	1.01
Ditch #25 & #26A	1484.62	100 yr	63.60	264.00	265.79	265.79	266.34	0.026985	5.95	10.69	9.94	1.01
Ditch #25 & #26A	1434.62	50 yr	56.57	262.30	262.31		262.32	0.001912	0.08	82.88	50.14	0.13
Ditch #25 & #26A	1434.62	100 yr	63.60	262.30	262.57		262.57	0.001600	0.39	96.12	54.98	0.18
Ditch #25 & #26A	1384.62	50 yr	56.57	260.60	262.32		262.32	0.000013	0.14	493.55	106.40	0.02
Ditch #25 & #26A	1384.62	100 yr	63.60	260.60	262.57		262.57	0.000014	0.16	520.84	108.67	0.02
Ditch #25 & #26A	1334.62	50 yr	56.57	260.00	262.31	252.87	262.32	0.000002	0.08	963.46	165.83	0.01
Ditch #25 & #26A	1334.62	100 yr	63.60	260.00	262.57	252.95	262.57	0.000003	0.09	1006.08	169.89	0.01
Ditch #25 & #26A	1200		Culvert									
Ditch #25 & #26A	1050	50 yr	56.57	249.00	247.06		247.06	0.000004		1061.95	308.81	0.00
Ditch #25 & #26A	1050	100 yr	63.60	249.00	247.16		247.16	0.000005		1093.11	312.87	0.00
Ditch #25 & #26A	1000	50 yr	56.57	245.60	246.76		247.03	0.022752	4.93	19.59	22.15	0.90
Ditch #25 & #26A	1000	100 yr	63.60	245.60	246.85		247.13	0.021738	5.03	21.57	22.61	0.89
Ditch #25 & #26A	950	50 yr	56.57	244.60	246.17		246.36	0.008308	3.53	16.03	13.47	0.57
Ditch #25 & #26A	950	100 yr	63.60	244.60	246.26		246.47	0.008416	3.69	17.24	13.61	0.58
Ditch #25 & #26A	900	50 yr	56.57	244.00	245.59	245.37	245.84	0.013263	4.00	14.14	14.43	0.71
Ditch #25 & #26A	900	100 yr	63.60	244.00	245.66	245.44	245.93	0.013814	4.21	15.09	14.67	0.73
Ditch #25 & #26A	850	50 yr	56.57	243.80	244.89		245.14	0.014724	3.97	14.25	16.06	0.74
Ditch #25 & #26A	850	100 yr	63.60	243.80	244.99		245.24	0.013671	4.03	15.79	16.44	0.72
Ditch #25 & #26A	800	50 yr	56.57	243.00	244.54		244.68	0.005482	3.00	18.88	15.08	0.47
Ditch #25 & #26A	800	100 yr	63.60	243.00	244.65		244.80	0.005492	3.11	20.47	15.47	0.48
Ditch #25 & #26A	750	50 yr	56.57	242.30	243.86		244.21	0.017838	4.74	11.92	11.20	0.81
Ditch #25 & #26A	750	100 yr	63.60	242.30	243.98		244.33	0.016692	4.77	13.33	11.80	0.79
Ditch #25 & #26A	700	50 yr	56.57	241.60	243.66		243.79	0.003742	2.87	20.72	15.55	0.40
Ditch #25 & #26A	700	100 yr	63.60	241.60	243.79		243.92	0.003708	2.98	22.76	16.33	0.40
Ditch #25 & #26A	650	50 yr	56.57	247.00	243.46		243.49	0.008143		41.40	26.11	0.00
Ditch #25 & #26A	650	100 yr	63.60	247.00	243.59		243.62	0.008454		44.91	27.63	0.00
Ditch #25 & #26A	600	50 yr	56.57	241.00	242.96		243.13	0.006009	3.33	17.00	11.72	0.49
Ditch #25 & #26A	600	100 yr	63.60	241.00	243.06		243.25	0.006150	3.49	18.24	12.38	0.50
Ditch #25 & #26A	550	50 yr	56.57	241.00	242.38		242.68	0.014010	4.37	12.94	11.79	0.74
Ditch #25 & #26A	550	100 yr	63.60	241.00	242.47		242.79	0.014158	4.55	13.98	12.06	0.74
Ditch #25 & #26A	500	50 yr	56.57	240.00	241.65	241.44	241.94	0.015364	4.27	13.23	13.13	0.75
Ditch #25 & #26A	500	100 yr	63.60	240.00	241.73	241.52	242.04	0.015533	4.44	14.32	13.49	0.76
Ditch #25 & #26A	450	50 yr	56.57	239.10	240.46	240.46	240.90	0.028606	5.32	10.64	12.37	1.01
Ditch #25 & #26A	450	100 yr	63.60	239.10	240.53	240.53	241.00	0.028083	5.50	11.56	12.55	1.01
Ditch #25 & #26A	400	50 yr	56.57	238.00	239.17		239.22	0.006440	2.47	51.14	59.72	0.47
Ditch #25 & #26A	400	100 yr	63.60	238.00	239.26		239.31	0.006171	2.51	56.44	61.99	0.47
Ditch #25 & #26A	350	50 yr	56.57	237.00	238.82		238.90	0.006353	3.01	37.16	29.31	0.47
Ditch #25 & #26A	350	100 yr	63.60	237.00	238.89		238.98	0.006851	3.20	39.30	29.81	0.49
Ditch #25 & #26A	300	50 yr	56.57	237.00	238.66		238.70	0.002484	2.06	64.33	88.19	0.31
Ditch #25 & #26A	300	100 yr	63.60	237.00	238.72		238.76	0.002691	2.19	69.87	94.05	0.33
Ditch #25 & #26A	250	50 yr	56.57	237.20	238.40	238.16	238.48	0.008757	2.28	24.86	44.95	0.54
Ditch #25 & #26A	250	100 yr	63.60	237.20	238.45	238.19	238.54	0.008775	2.34	27.13	46.98	0.54

HEC-RAS Plan: Plan 01 River: Ditch #25 & #26A Reach: Ditch #25 & #26A (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #25 & #26A	200	50 yr	56.57	236.80	237.45	237.45	237.70	0.032089	3.99	14.18	29.26	1.01
Ditch #25 & #26A	200	100 yr	63.60	236.80	237.49	237.49	237.76	0.031277	4.13	15.38	29.50	1.01
Ditch #25 & #26A	150	50 yr	56.57	234.00	235.72		235.78	0.001766	1.93	29.29	19.33	0.28
Ditch #25 & #26A	150	100 yr	63.60	234.00	235.84		235.90	0.001788	2.02	31.54	19.64	0.28
Ditch #25 & #26A	100	50 yr	56.57	234.00	235.04	235.04	235.51	0.028029	5.54	10.22	10.84	1.01
Ditch #25 & #26A	100	100 yr	63.60	234.00	235.12	235.12	235.63	0.027312	5.71	11.13	11.00	1.00
Ditch #25 & #26A	50	50 yr	56.57	233.60	234.33		234.36	0.008173	2.08	40.86	34.99	0.51
Ditch #25 & #26A	50	100 yr	63.60	233.60	234.41		234.45	0.008173	2.25	43.73	35.37	0.52
Ditch #25 & #26A	0	50 yr	56.57	233.00	233.73	233.15	233.82	0.015012	3.18	28.81	27.75	0.71
Ditch #25 & #26A	0	100 yr	63.60	233.00	233.81	233.18	233.90	0.015004	3.36	30.87	28.19	0.72

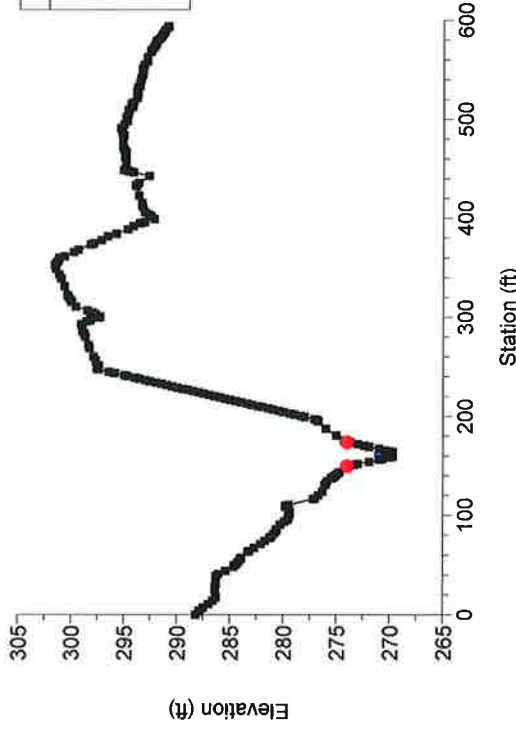
Ditch #25 & #26A Plan: Plan 01 9/1/2015

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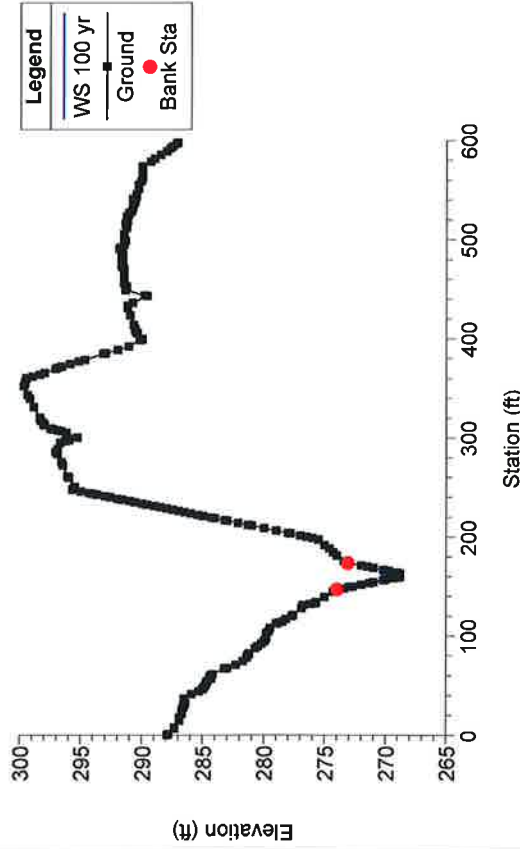
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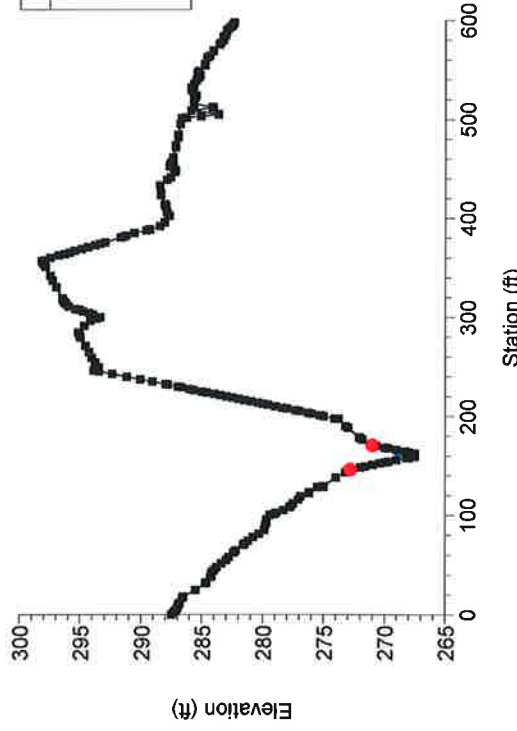
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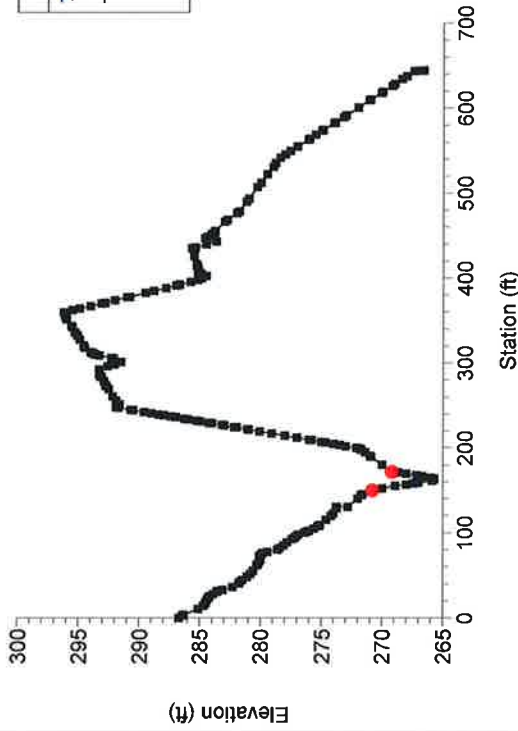


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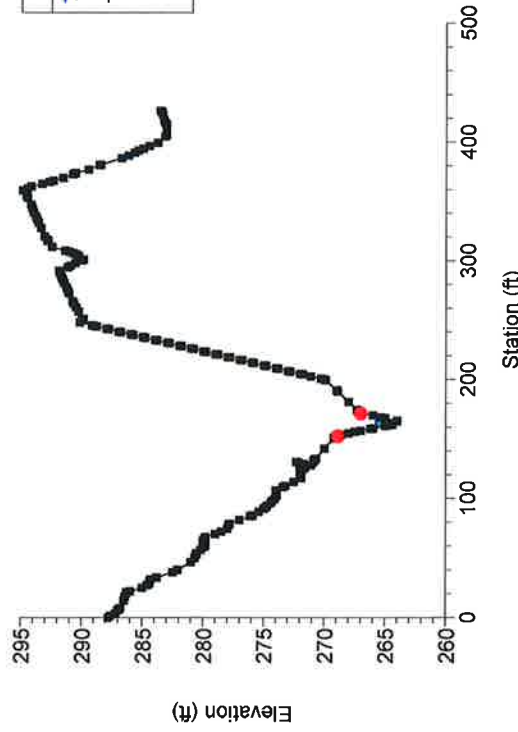
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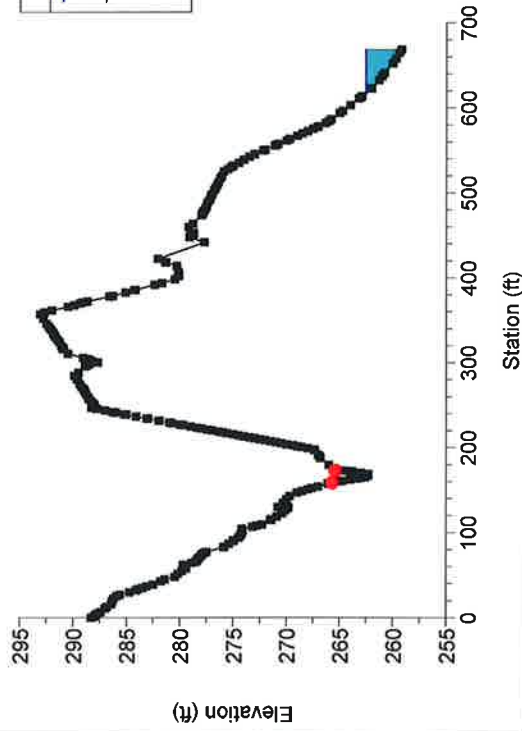
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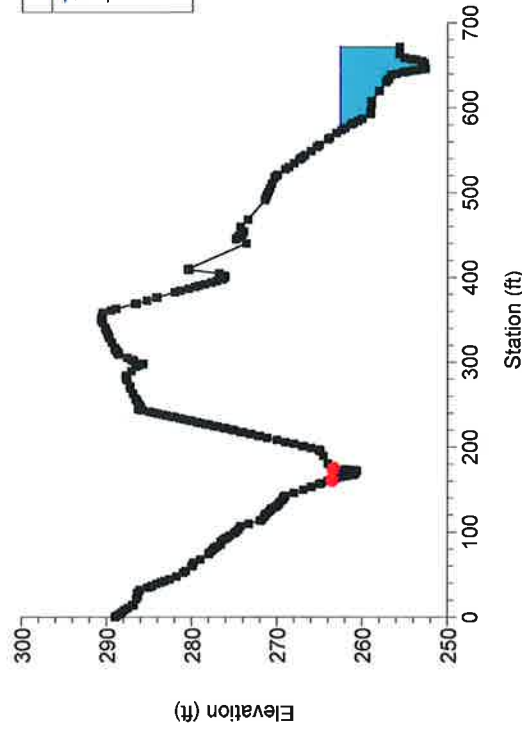
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Ditch #25 & #26A Plan: Plan 01 9/1/2015  
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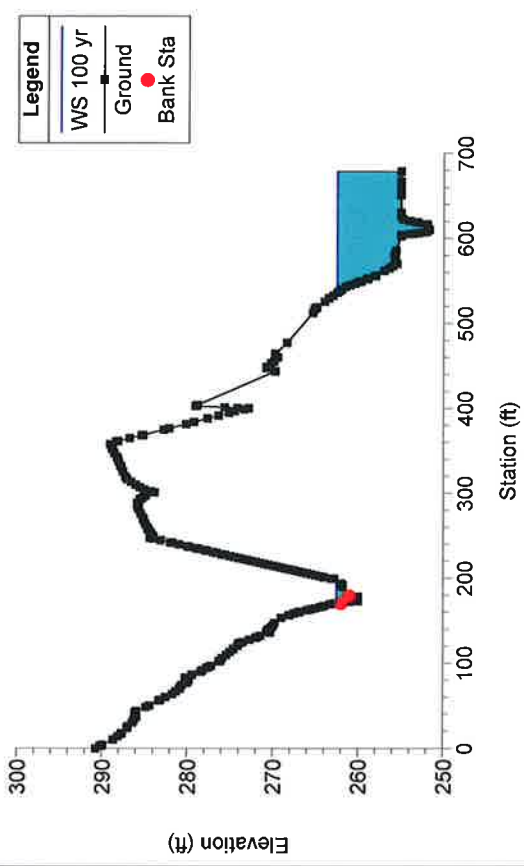
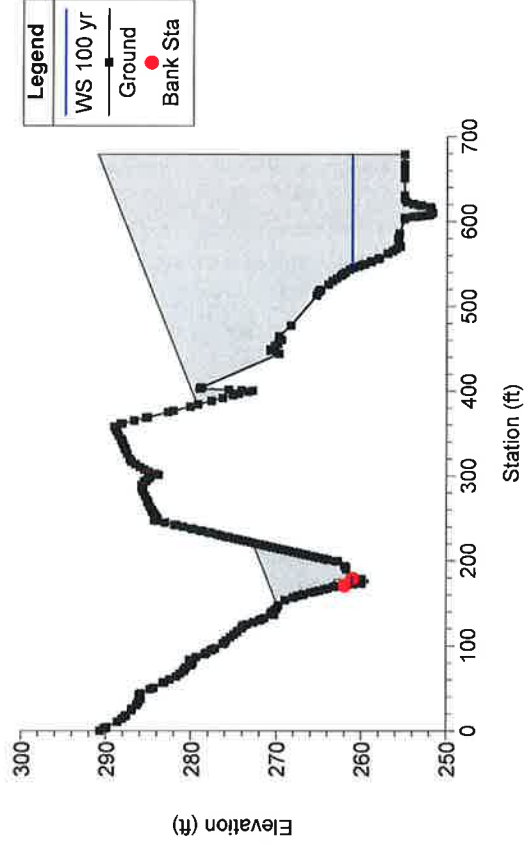
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Ditch #25 & #26A Plan: Plan 01 9/1/2015

Ditch #25 & #26A Plan: Plan 01 9/1/2015  
1334.62



**Legend**

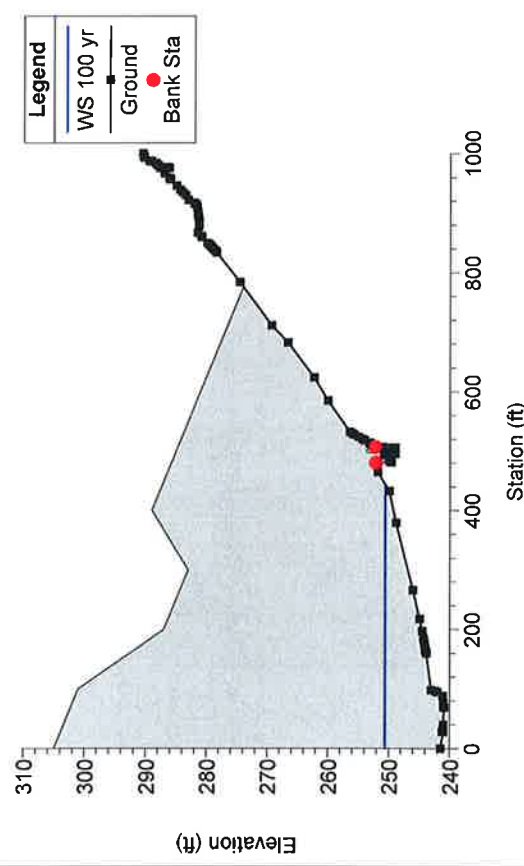
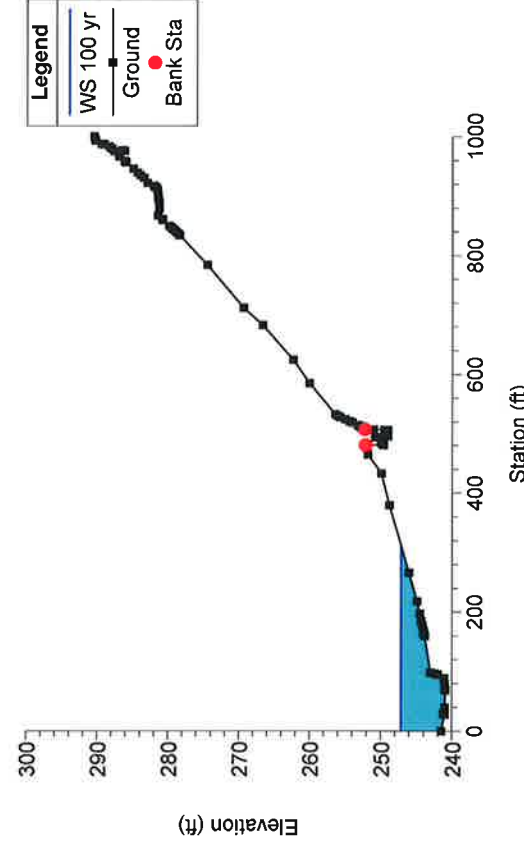
- WS 100 yr
- Ground
- Bank Sta

**Legend**

- WS 100 yr
- Ground
- Bank Sta

Ditch #25 & #26A Plan: Plan 01 9/1/2015

Ditch #25 & #26A Plan: Plan 01 9/1/2015



**Legend**

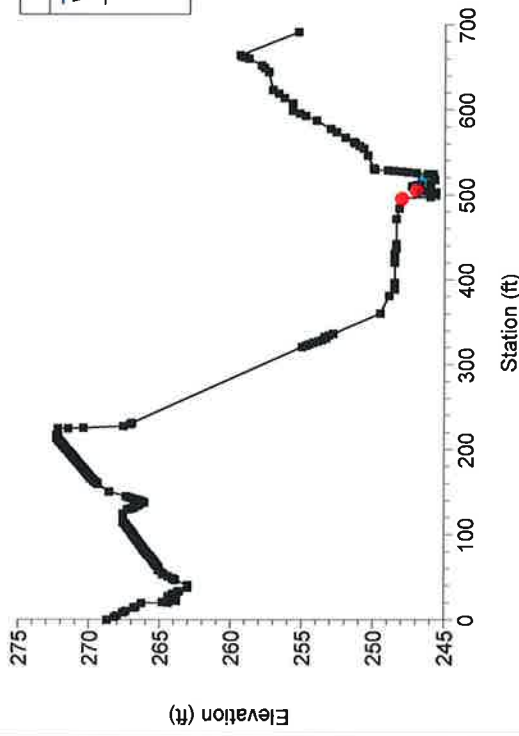
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- Ground
- Bank Sta

**Legend**

- WS 100 yr
- Ground
- Bank Sta

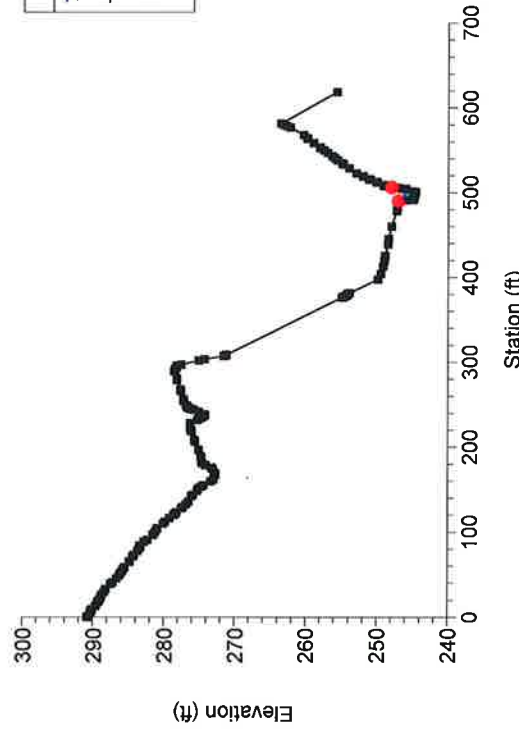
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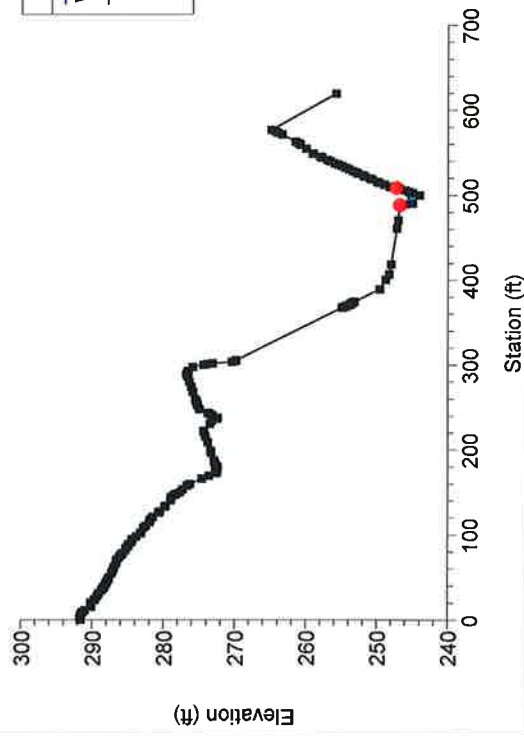
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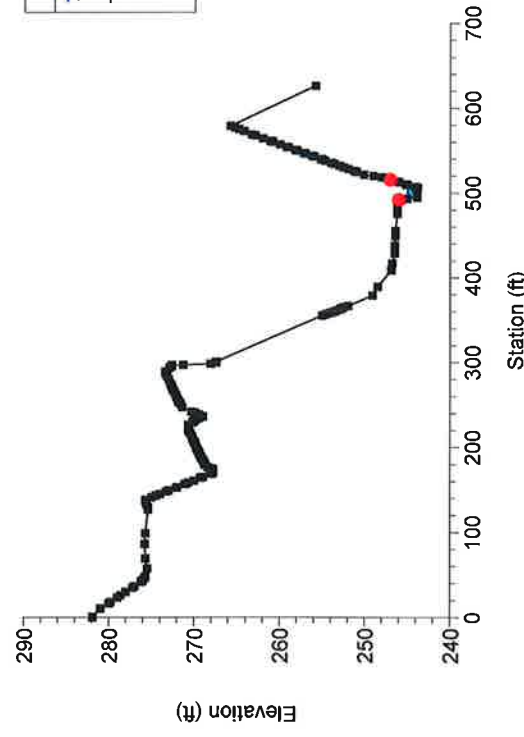
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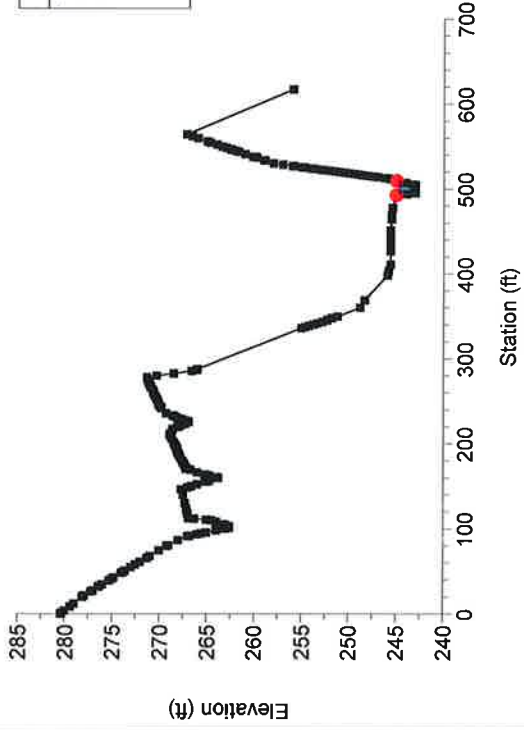
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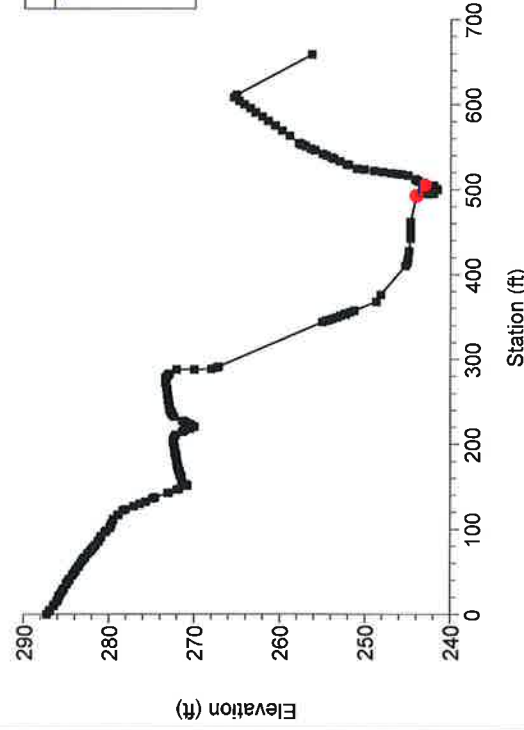
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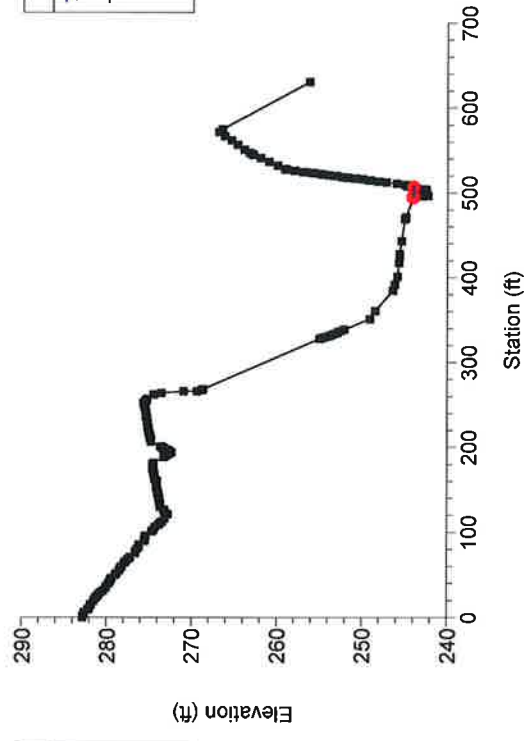
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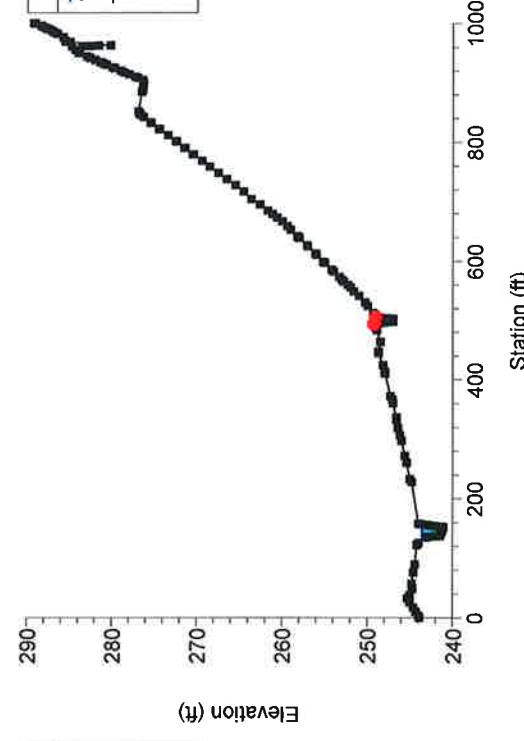
Ditch #25 & #26A Plan: Plan 01 9/1/2015

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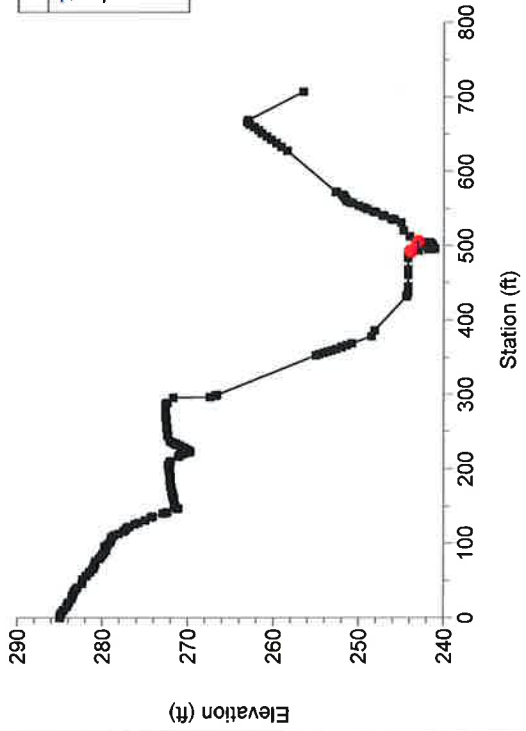


Ditch #25 & #26A Plan: Plan 01 9/1/2015

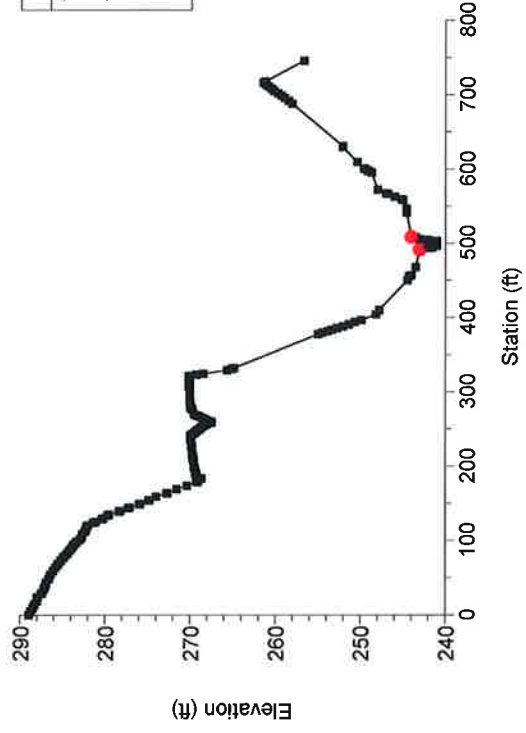
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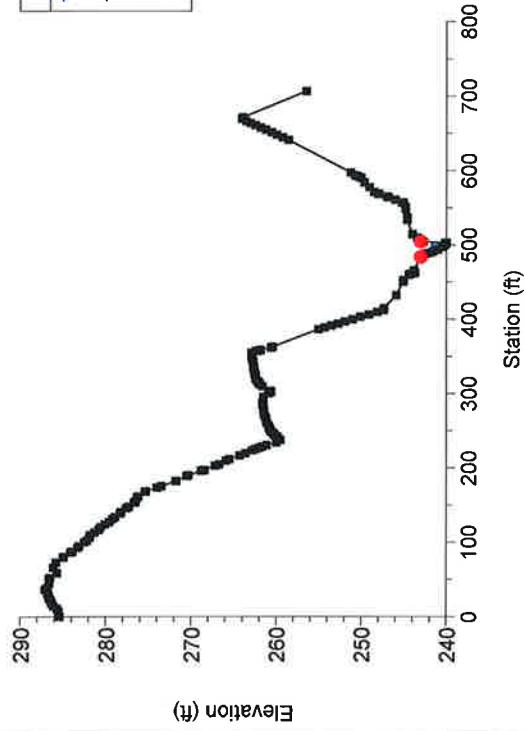
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
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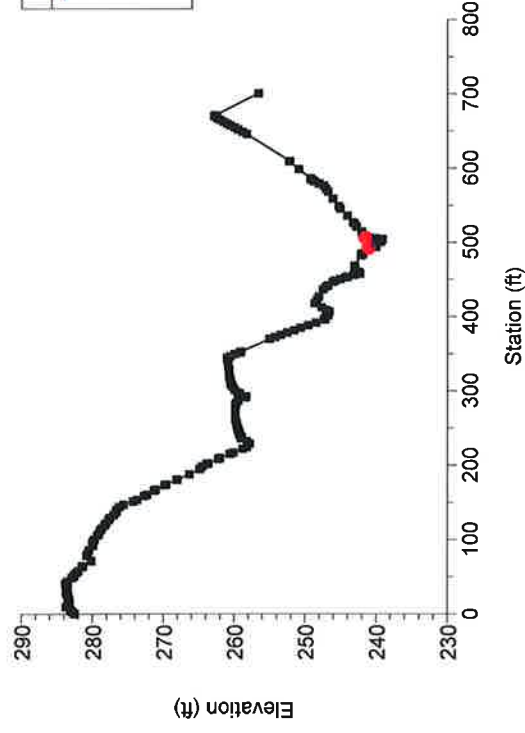
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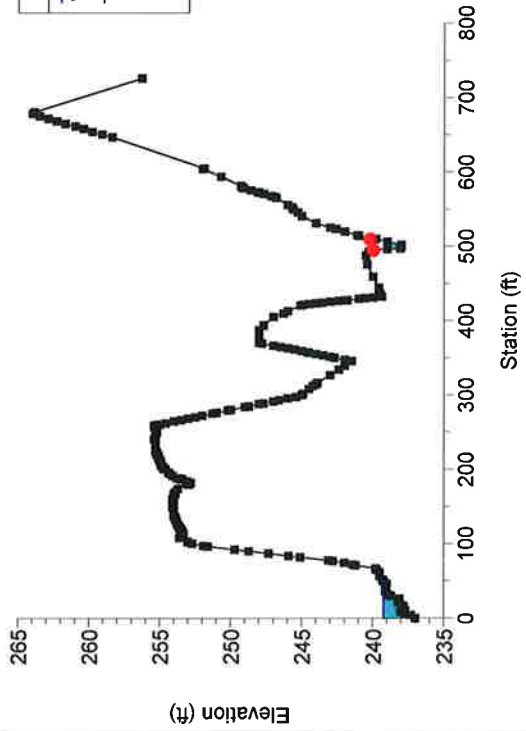
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
500



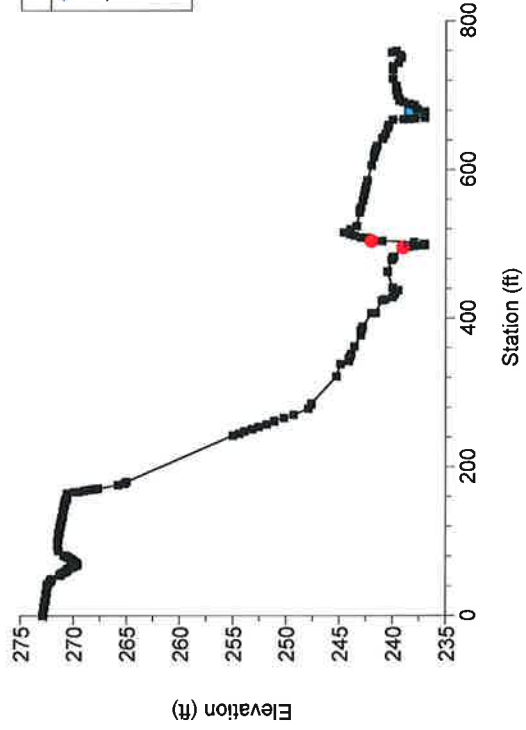
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
450



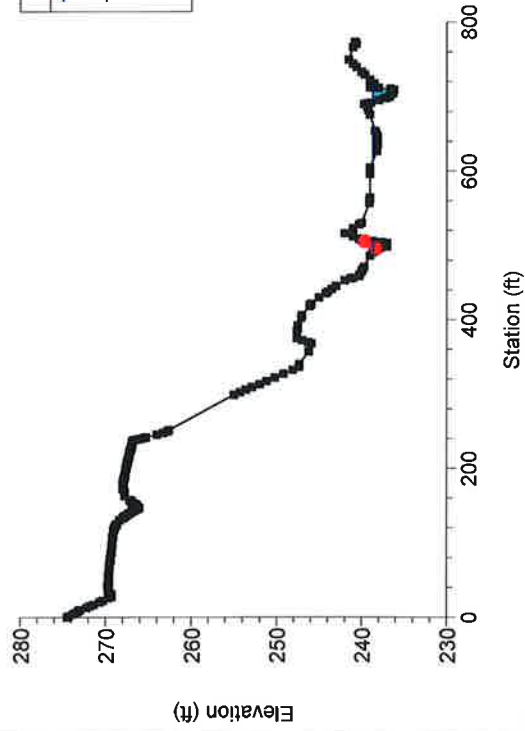
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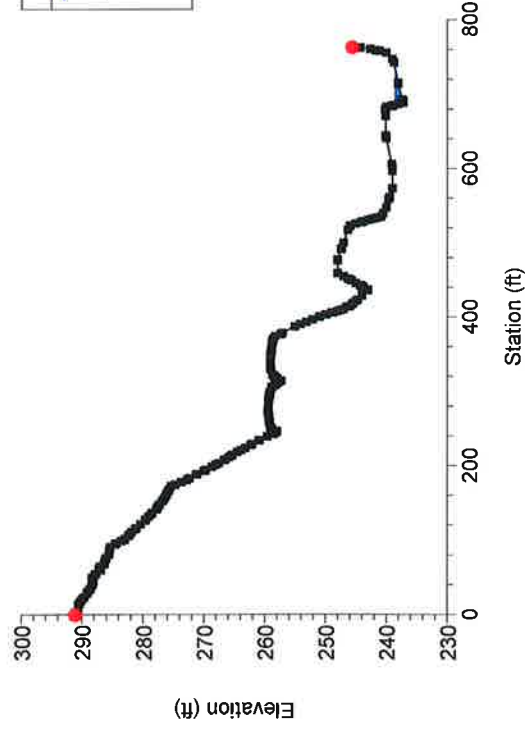
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
350



Ditch #25 & #26A Plan: Plan 01 9/1/2015  
300

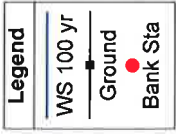
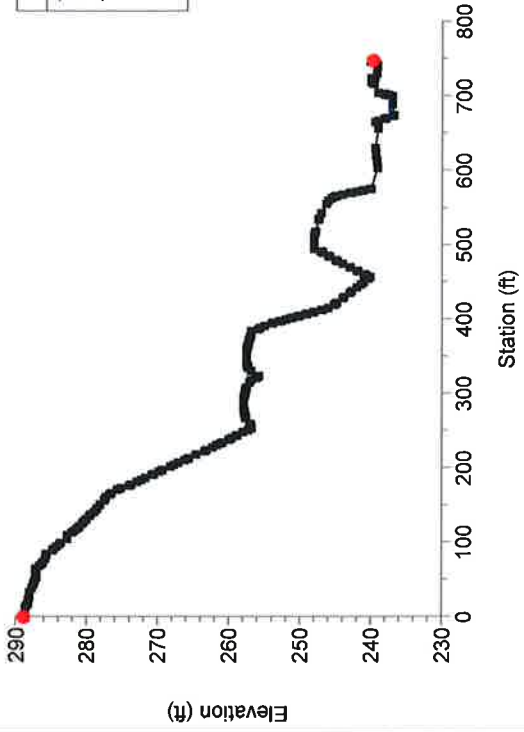


Ditch #25 & #26A Plan: Plan 01 9/1/2015  
250

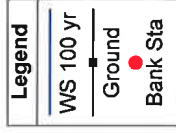
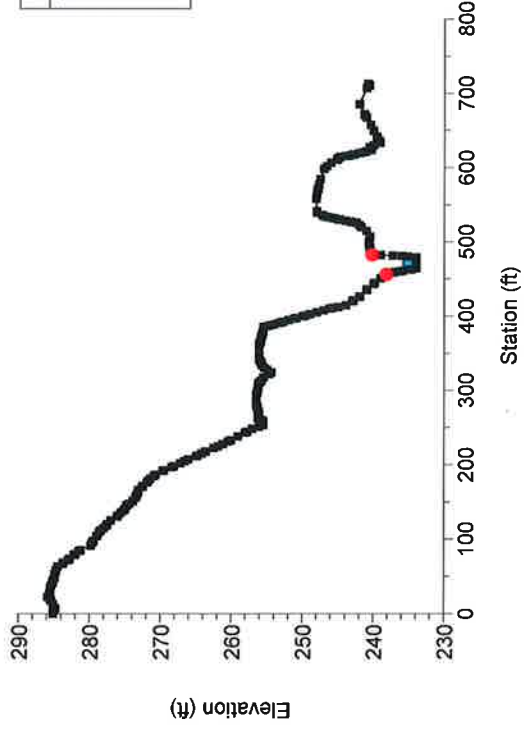




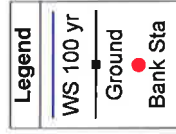
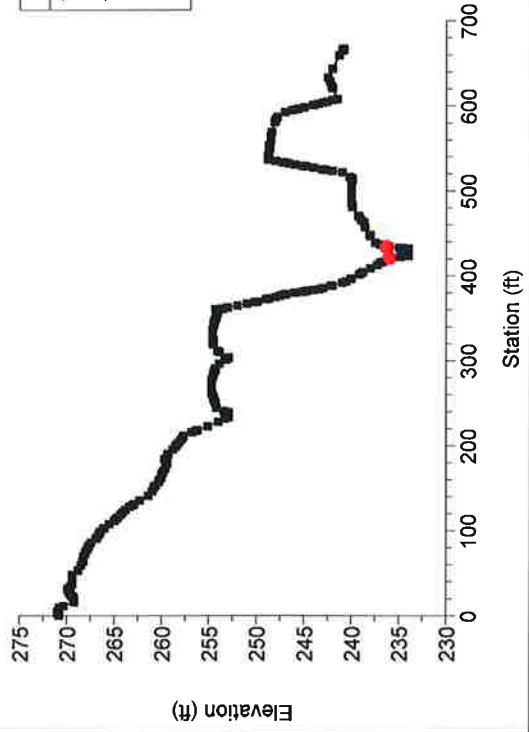
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
200



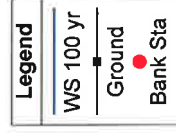
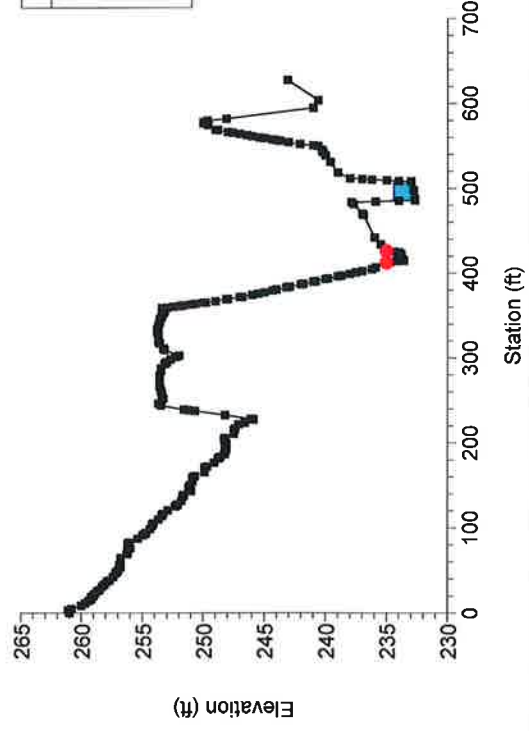
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
150



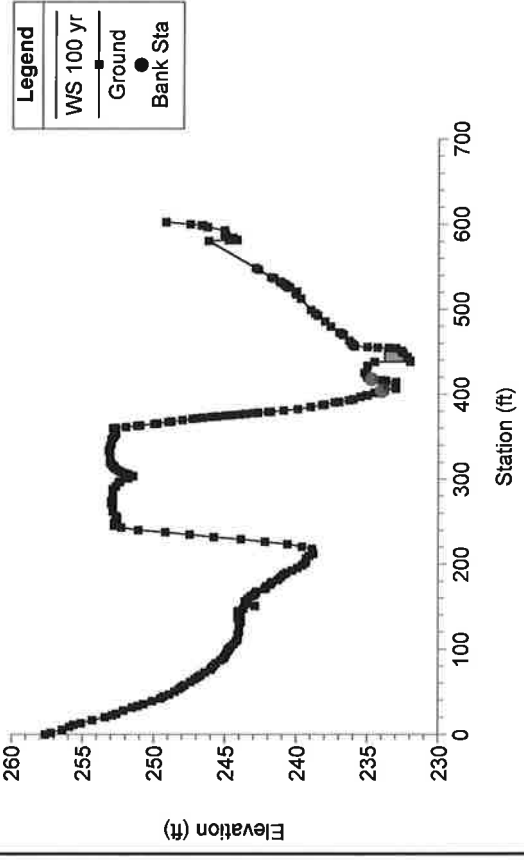
Ditch #25 & #26A Plan: Plan 01 9/1/2015  
100



Ditch #25 & #26A Plan: Plan 01 9/1/2015  
50



Ditch #25 & #26A Plan: Plan 01 9/1/2015  
0



**LOCATION:** Rt. Sta. 275+80  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 47.12 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	C-Value	Description
1.07	0.90	Pavements & Roofs
34.30	0.15	Woodland & Forest
11.75	0.50	Suburban, Normal Residential
0.00	0.00	
0.00	0.00	
0.00	0.00	
Weighted C-Value:		0.25

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	0.587

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	2130	0
Course slope, (ft/ft)	0.0286	0.003
Velocity, (fps)	2.73043	1.11342
Travel time, (hr)	0.217	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.804 hr I (50 Yr)= 3.93  
 48.3 min I (100 Yr)= 4.25

Design Q (50 Yr)= 56.57 cfs  
 Maximum Q (100 Yr)= 63.60 cfs

Run 1: 4' X 4' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	262.24	259.19	249.68	4.00	0.76	YES
100	262.49	259.19	249.68	4.00	0.83	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 56.57 cfs

Maximum Flow: 63.6 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 13**

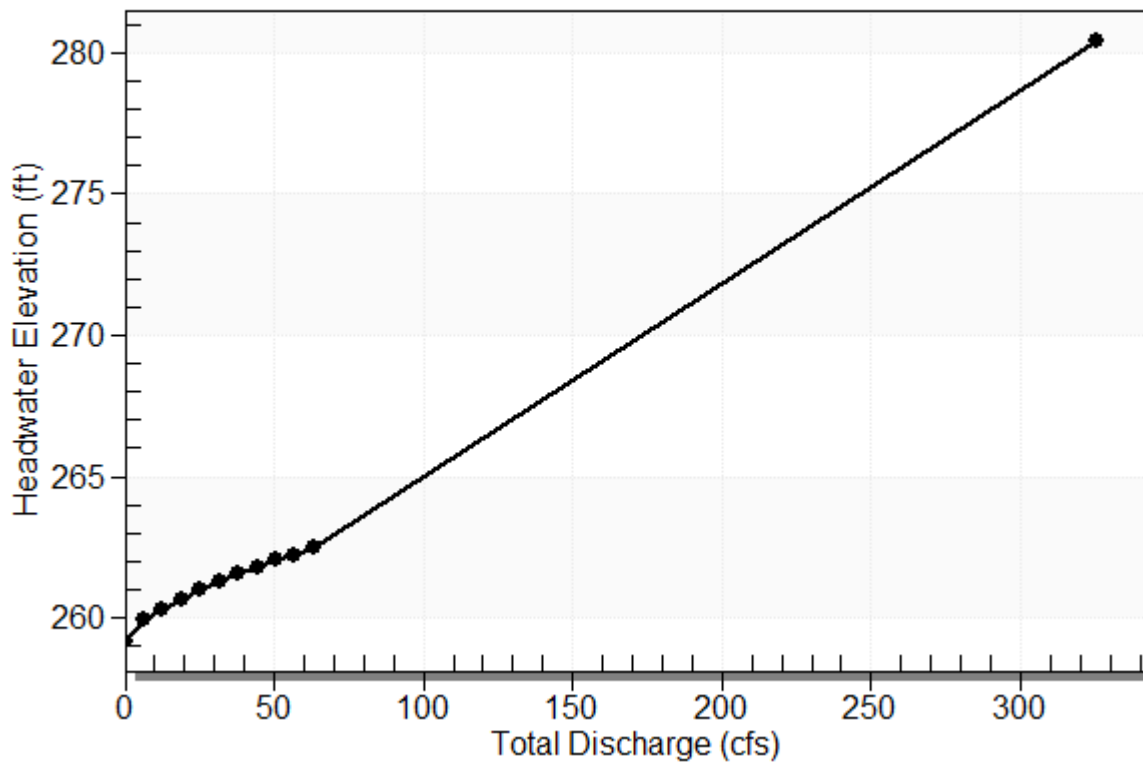
Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 275+80 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
259.19	0.00	0.00	0.00	1
259.90	6.36	6.36	0.00	1
260.32	12.72	12.72	0.00	1
260.67	19.08	19.08	0.00	1
260.98	25.44	25.44	0.00	1
261.27	31.80	31.80	0.00	1
261.54	38.16	38.16	0.00	1
261.79	44.52	44.52	0.00	1
262.03	50.88	50.88	0.00	1
262.24	56.57	56.57	0.00	1
262.49	63.60	63.60	0.00	1
280.00	325.63	325.63	0.00	Overtopping



# Rating Curve Plot for Crossing: Crossing 13

## Total Rating Curve

Crossing: Crossing 13



**Table 2 - Culvert Summary Table: Rt. Sta. 275+80**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	259.19	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
6.36	6.36	259.90	0.711	0.0*	1-S2n	0.154	0.428	0.154	0.360	10.337	3.379
12.72	12.72	260.32	1.128	0.0*	1-S2n	0.308	0.680	0.308	0.537	10.337	4.248
19.08	19.08	260.67	1.478	0.0*	1-S2n	0.415	0.891	0.415	0.675	11.480	4.828
25.44	25.44	260.98	1.791	0.0*	1-S2n	0.497	1.079	0.497	0.793	12.796	5.272
31.80	31.80	261.27	2.078	0.0*	1-S2n	0.579	1.252	0.579	0.897	13.740	5.636
38.16	38.16	261.54	2.345	0.0*	1-S2n	0.660	1.414	0.660	0.990	14.451	5.948
44.52	44.52	261.79	2.598	0.0*	1-S2n	0.739	1.567	0.739	1.076	15.062	6.220
50.88	50.88	262.03	2.839	0.0*	1-S2n	0.805	1.713	0.805	1.156	15.803	6.464
56.57	56.57	262.24	3.047	0.0*	1-S2n	0.864	1.838	0.864	1.223	16.371	6.662
63.60	63.60	262.49	3.296	0.0*	1-S2n	0.937	1.988	0.961	1.301	16.538	6.886

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 259.19 ft, Outlet Elevation (invert): 249.68 ft

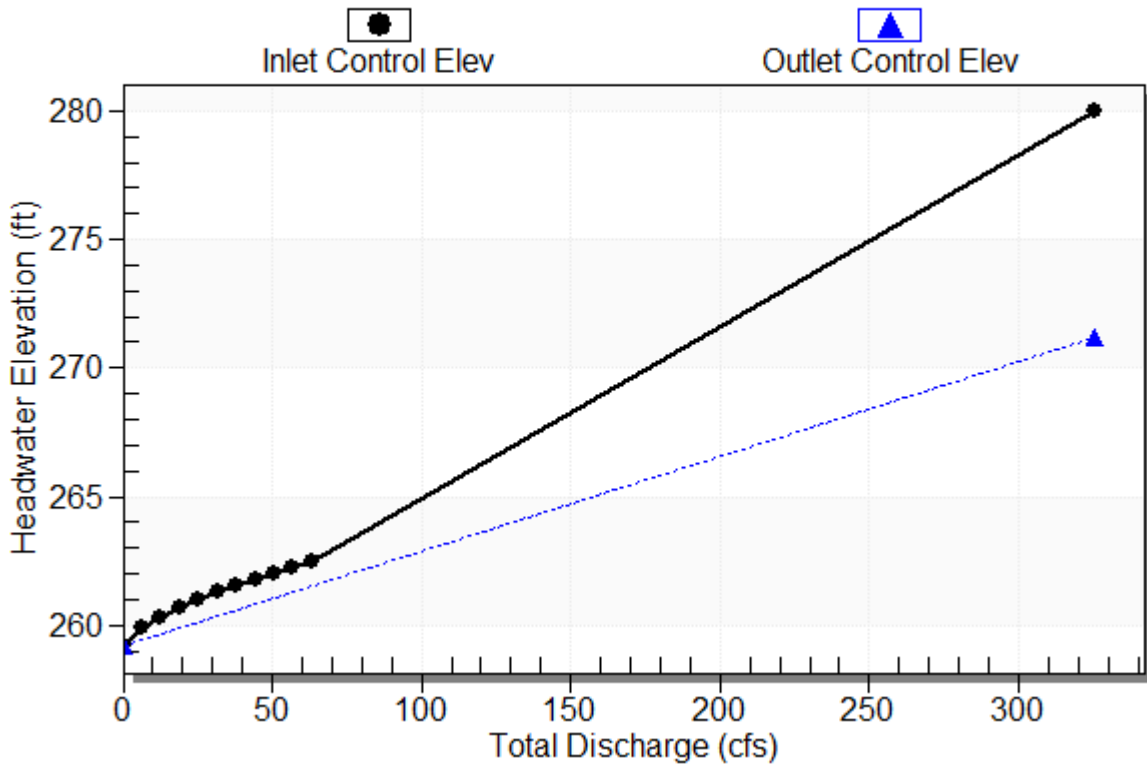
Culvert Length: 284.78 ft, Culvert Slope: 0.0334

\*\*\*\*\*

Culvert Performance Curve Plot: Rt. Sta. 275+80

### Performance Curve

Culvert: Rt. Sta. 275+80

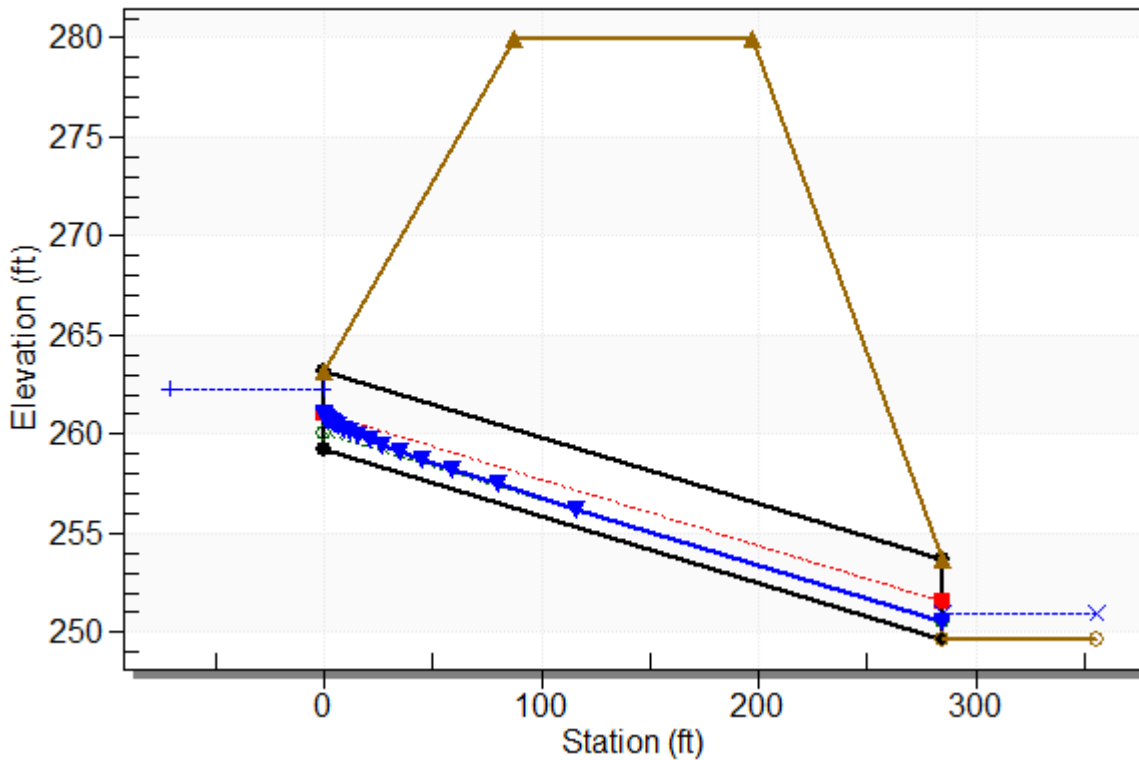




## Water Surface Profile Plot for Culvert: Rt. Sta. 275+80

### Crossing - Crossing 13, Design Discharge - 56.6 cfs

Culvert - Rt. Sta. 275+80, Culvert Discharge - 56.6 cfs



### Site Data - Rt. Sta. 275+80

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 259.19 ft

Outlet Station: 284.62 ft

Outlet Elevation: 249.68 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 275+80

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90 & 15° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 13)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	249.68	0.00	0.00	0.00	0.00
6.36	250.04	0.36	3.38	0.79	1.06
12.72	250.22	0.54	4.25	1.17	1.12
19.08	250.36	0.68	4.83	1.48	1.15
25.44	250.47	0.79	5.27	1.73	1.17
31.80	250.58	0.90	5.64	1.96	1.19
38.16	250.67	0.99	5.95	2.16	1.20
44.52	250.76	1.08	6.22	2.35	1.22
50.88	250.84	1.16	6.46	2.52	1.23
56.57	250.90	1.22	6.66	2.67	1.23
63.60	250.98	1.30	6.89	2.84	1.24

### **Tailwater Channel Data - Crossing 13**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.50 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0350

Channel Manning's n: 0.0375

Channel Invert Elevation: 249.68 ft

### **Roadway Data for Crossing: Crossing 13**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 280.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft

**LOCATION:** Lt. Sta. 292+15  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 4.56 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	C-Value	Description
1.28	0.90	Pavements & Roofs
1.60	0.15	Woodland & Forest
1.68	0.25	Grass Shoulders
0.00	0.00	
0.00	0.00	
0.00	0.00	

Weighted C-Value: 0.40

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	0.587

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	1016	0
Course slope, (ft/ft)	0.0285	0.003
Velocity, (fps)	2.72382	1.11342
Travel time, (hr)	0.104	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.691 hr I (50 Yr)= 4.31  
 41.5 min I (100 Yr)= 4.66

Design Q (50 Yr)= 9.38 cfs  
 Maximum Q (100 Yr)= 10.55 cfs

Run 1: 18" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	353.63	351.76	327.16	1.50	1.25	NO
100	353.86	351.76	327.16	1.50	1.40	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 9.38 cfs

Maximum Flow: 10.55 cfs



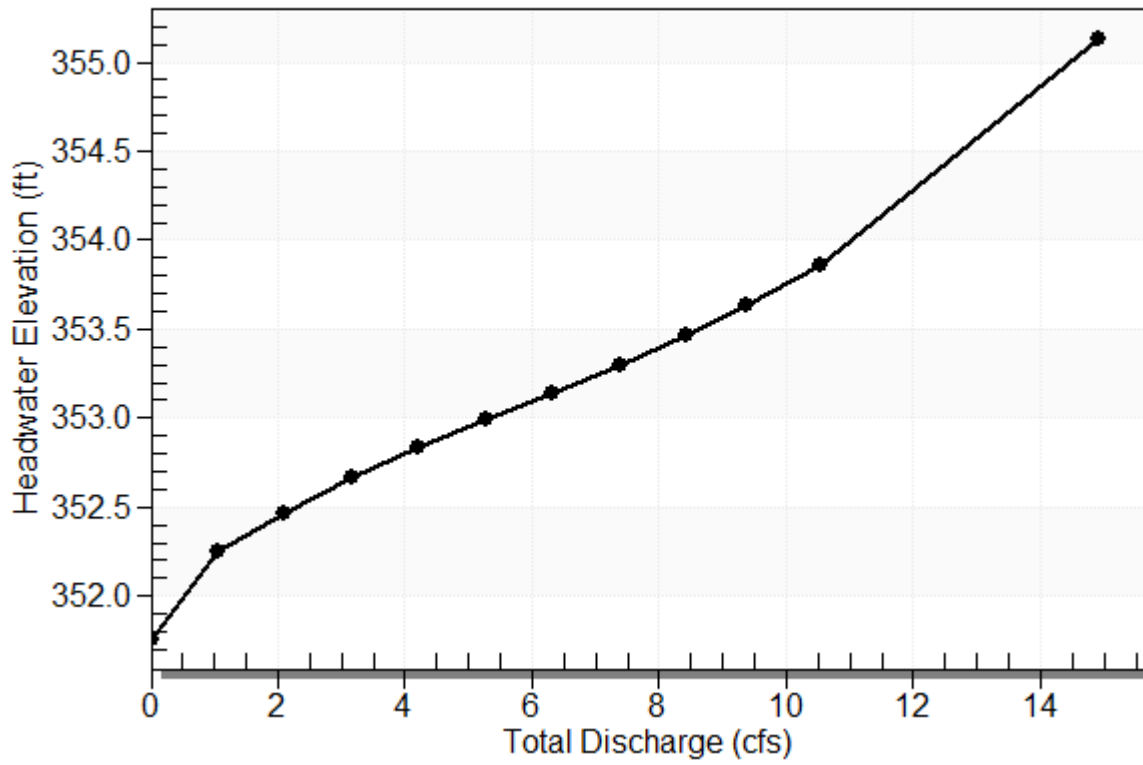
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 12**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 292+15 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
351.76	0.00	0.00	0.00	1
352.25	1.06	1.06	0.00	1
352.46	2.11	2.11	0.00	1
352.66	3.17	3.17	0.00	1
352.83	4.22	4.22	0.00	1
352.99	5.28	5.28	0.00	1
353.14	6.33	6.33	0.00	1
353.29	7.39	7.39	0.00	1
353.46	8.44	8.44	0.00	1
353.63	9.38	9.38	0.00	1
353.86	10.55	10.55	0.00	1
355.00	14.91	14.91	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 12

## Total Rating Curve

Crossing: Crossing 12



**Table 2 - Culvert Summary Table: Lt. Sta. 292+15**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	351.76	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1.06	1.06	352.25	0.487	0.0*	1-S2n	0.177	0.380	0.177	0.090	14.449	1.920
2.11	2.11	352.46	0.705	0.0*	1-S2n	0.259	0.546	0.259	0.137	10.273	2.512
3.17	3.17	352.66	0.902	0.0*	1-S2n	0.315	0.677	0.315	0.175	12.069	2.933
4.22	4.22	352.83	1.073	0.0*	1-S2n	0.365	0.786	0.365	0.208	12.604	3.271
5.28	5.28	352.99	1.227	0.0*	1-S2n	0.413	0.882	0.413	0.238	13.323	3.560
6.33	6.33	353.14	1.378	0.0*	1-S2n	0.451	0.967	0.451	0.265	14.276	3.812
7.39	7.39	353.29	1.533	0.0*	5-S2n	0.489	1.049	0.489	0.291	14.705	4.037
8.44	8.44	353.46	1.703	0.0*	5-S2n	0.527	1.121	0.527	0.315	15.206	4.241
9.38	9.38	353.63	1.870	0.0*	5-S2n	0.559	1.182	0.559	0.336	15.664	4.408
10.55	10.55	353.86	2.102	0.0*	5-S2n	0.594	1.247	0.594	0.360	16.269	4.602

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 351.76 ft, Outlet Elevation (invert): 327.16 ft

Culvert Length: 319.60 ft, Culvert Slope: 0.0772

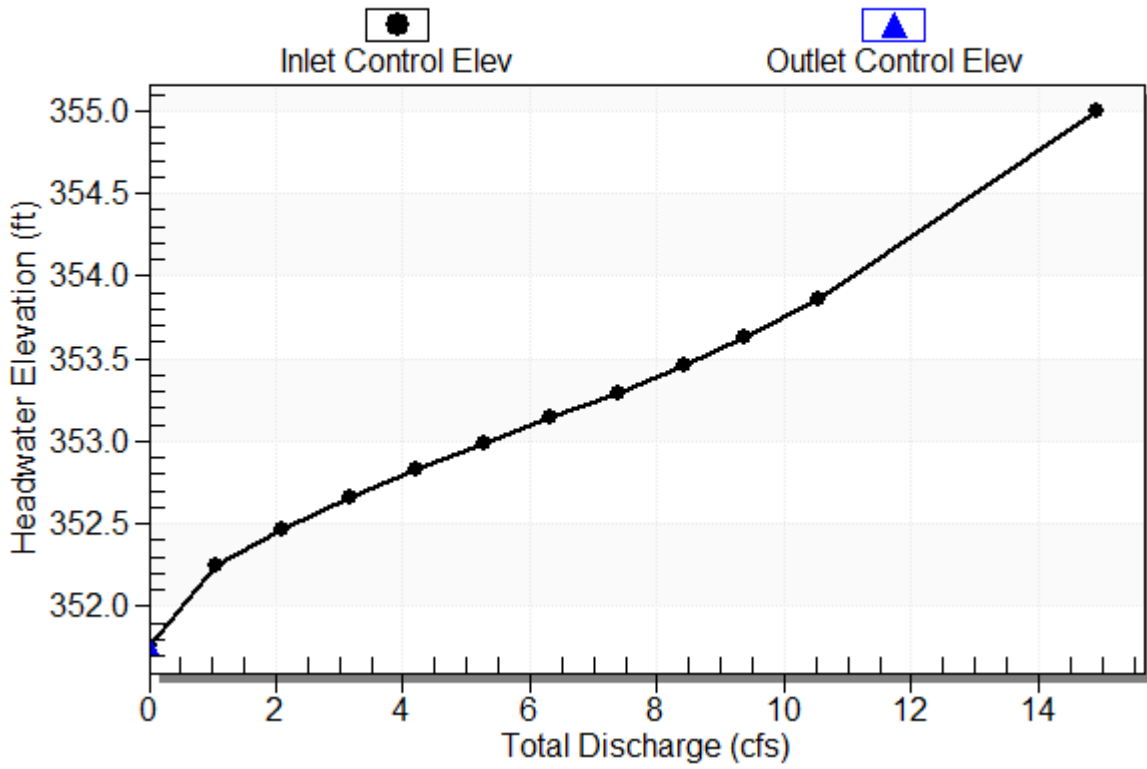
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# Culvert Performance Curve Plot: Lt. Sta. 292+15

## Performance Curve

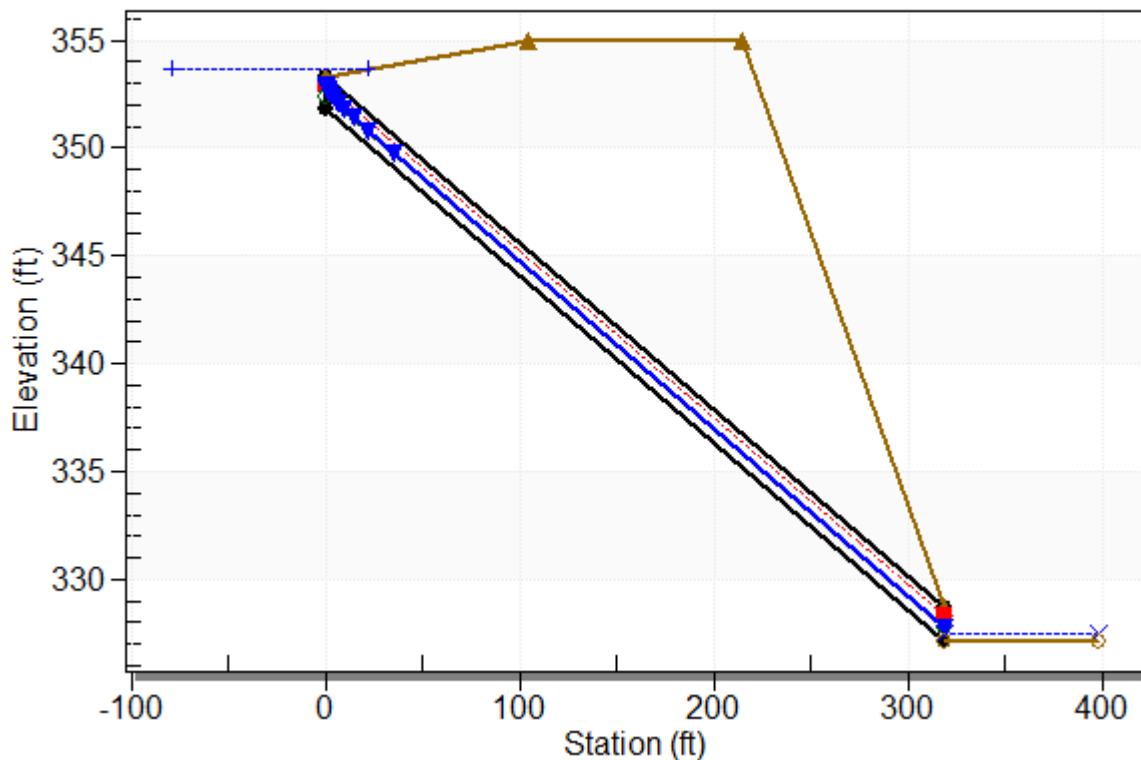
Culvert: Lt. Sta. 292+15



## Water Surface Profile Plot for Culvert: Lt. Sta. 292+15

### Crossing - Crossing 12, Design Discharge - 9.4 cfs

Culvert - Lt. Sta. 292+15, Culvert Discharge - 9.4 cfs



### Site Data - Lt. Sta. 292+15

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 351.76 ft

Outlet Station: 318.65 ft

Outlet Elevation: 327.16 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 292+15

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 12)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	327.16	0.00	0.00	0.00	0.00
1.06	327.25	0.09	1.92	0.34	1.13
2.11	327.30	0.14	2.51	0.51	1.21
3.17	327.33	0.17	2.93	0.65	1.25
4.22	327.37	0.21	3.27	0.78	1.29
5.28	327.40	0.24	3.56	0.89	1.31
6.33	327.43	0.27	3.81	0.99	1.33
7.39	327.45	0.29	4.04	1.09	1.35
8.44	327.48	0.32	4.24	1.18	1.36
9.38	327.50	0.34	4.41	1.26	1.38
10.55	327.52	0.36	4.60	1.35	1.39

### **Tailwater Channel Data - Crossing 12**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 6.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0600

Channel Manning's n: 0.0375

Channel Invert Elevation: 327.16 ft

### **Roadway Data for Crossing: Crossing 12**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 355.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft

**Location:** Lt. Sta. 340+46  
**HY8 File Name:** .INP  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

Drainage Area (acres) = 530.74

Curve Number, CN =

Acres		CN	Description
29.89	C	92.00	IA (Paved-Open Ditches)
70.89	A	30.00	Woods (Good)
243.17	C	70.00	Woods (Good)
48.20	A	54.00	Residential (1/2 Acre)
38.05	C	80.00	Residential (1/2 Acre)
22.15	A	89.00	Commercial and Business
3.87	C	94.00	Commercial and Business
37.09	A	39.00	Open Space (Good)
32.02	C	74.00	Open Space (Good)

Weighted CN-value = 63.5

Time of Concentration,  $t_c$  = 2.177 hrs.

<u>Sheet Flow</u>	
Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0030
Travel time, (hr)	1.255

<u>Shallow Concentrated Flow</u>		
Segment	Unpaved	Paved
Surface (unpaved)	16.1345	20.3282
Length, (ft)	7291.23	0.00
Course slope, (ft/ft)	0.0185	0.0000
Velocity, (fps)	2.1954	0.0643
Travel time, (hr)	0.923	0.000

<u>Channel Flow</u>	
Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

24 Hour Rainfall, P -

SCDHEC Rainfall for: Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Initial Abstraction,  $I_a$  =

$$S = (1000/CN) - 10 = 5.75 \text{ in}$$

$$I_a = 0.2(S) = 1.15 \text{ in}$$



**Location:** Lt. Sta. 340+46  
**HY8 File Name:** .INP  
**Continued**

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	5.75	=	0.7	in
10	5.30	5.75	=	1.7	in
25	6.40	5.75	=	2.5	in
50	7.30	5.75	=	3.2	in
100	8.30	5.75	=	4.0	in

Unit Peak Discharge, q<sub>u</sub>  
 Rainfall Distribution Type II

Design Storm	P	I <sub>a</sub>	I <sub>a</sub> / p (max 0.50)	q <sub>u</sub>	
2	3.60	1.15	0.32	168.2	csm/in
10	5.30	1.15	0.22	189.2	csm/in
25	6.40	1.15	0.18	196.2	csm/in
50	7.30	1.15	0.16	200.5	csm/in
100	8.30	1.15	0.14	204.3	csm/in

Pond Factor, F<sub>p</sub> =

5.41 acres = 1.0%                      F<sub>p</sub> = 0.8

Peak Discharge, q<sub>p</sub> =

$$q_p = q_u A_m Q F_p$$

Design Storm	q <sub>u</sub> (csm/in)	A <sub>m</sub> (mi <sub>2</sub> )	Q (in)	F <sub>p</sub>	q <sub>p</sub> (cfs)	
2	168.2	0.83	0.7	0.800	81.6	cfs
10	189.2	0.83	1.7	0.800	218.3	cfs
25	196.2	0.83	2.5	0.800	326.2	cfs
50	200.5	0.83	3.2	0.800	422.8	cfs
100	204.3	0.83	4.0	0.800	537.1	cfs

Run 1: 8' X 8' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	312.32	305.00	296.00	8.00	0.91	YES
100	313.71	305.00	296.00	8.00	1.09	

Run 2: 10' X 10' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	313.97	305.00	296.00	10.00	0.90	YES
100	315.13	305.00	296.00	10.00	1.01	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 422.8 cfs

Maximum Flow: 537.1 cfs

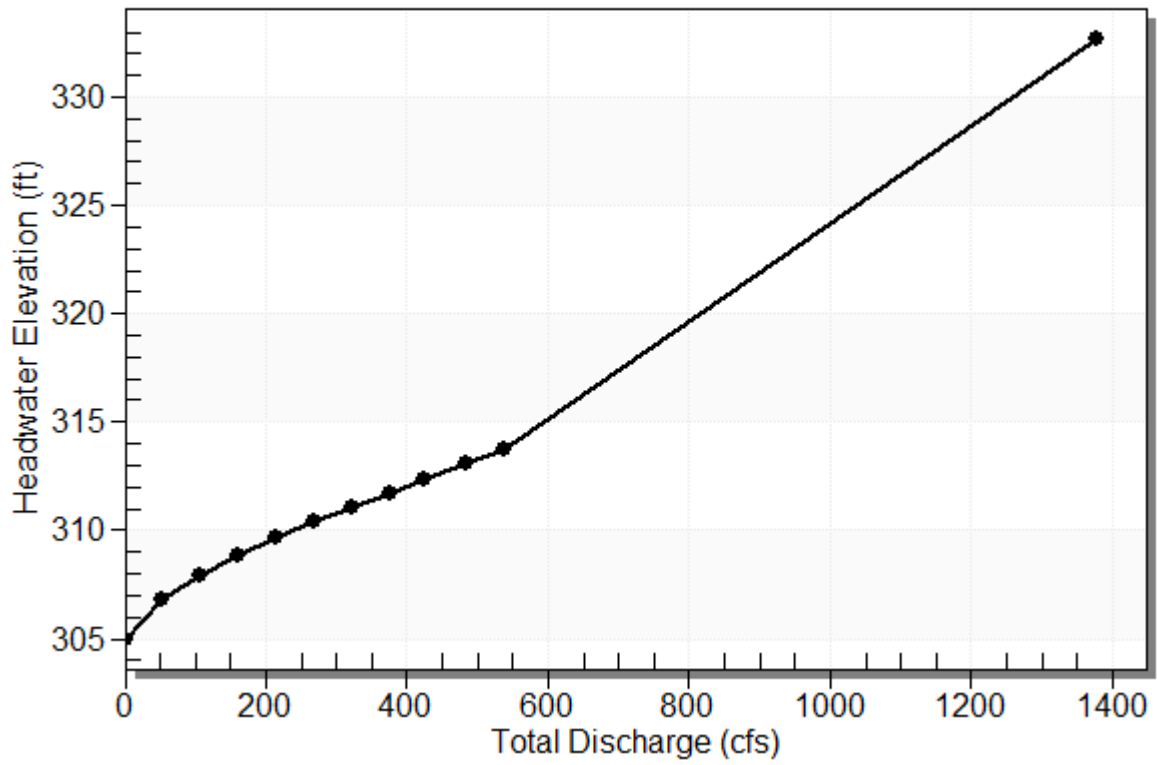
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 2**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 340+46 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
305.00	0.00	0.00	0.00	1
306.84	53.71	53.71	0.00	1
307.91	107.42	107.42	0.00	1
308.82	161.13	161.13	0.00	1
309.63	214.84	214.84	0.00	1
310.38	268.55	268.55	0.00	1
311.08	322.26	322.26	0.00	1
311.75	375.97	375.97	0.00	1
312.32	422.80	422.80	0.00	1
313.05	483.39	483.39	0.00	1
313.71	537.10	537.10	0.00	1
330.00	1378.00	1378.00	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 2

## Total Rating Curve

Crossing: Crossing 2



**Table 2 - Culvert Summary Table: Lt. Sta. 340+46**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	305.00	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
53.71	53.71	306.84	1.835	0.0*	1-S2n	0.353	1.119	0.436	1.318	15.409	4.075
107.42	107.42	307.91	2.913	0.0*	1-S2n	0.705	1.776	0.735	2.092	18.264	5.134
161.13	161.13	308.82	3.818	0.0*	1-S2n	0.902	2.327	0.982	2.767	20.511	5.823
214.84	214.84	309.63	4.629	0.0*	1-S2n	1.089	2.819	1.218	3.392	22.040	6.334
268.55	268.55	310.38	5.376	0.0*	1-S2n	1.276	3.271	1.451	3.985	23.137	6.739
322.26	322.26	311.08	6.076	0.0*	1-S2n	1.462	3.694	1.675	4.557	24.051	7.072
375.97	375.97	311.75	6.745	0.0*	1-S2n	1.613	4.093	1.893	5.113	24.825	7.354
422.80	422.80	312.32	7.315	0.0*	1-S2n	1.745	4.427	2.082	5.588	25.387	7.567
483.39	483.39	313.05	8.048	0.0*	5-S2n	1.915	4.840	2.322	6.191	26.024	7.808
537.10	537.10	313.71	8.707	0.0*	5-S2n	2.066	5.192	2.530	6.717	26.533	7.996



\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 305.00 ft, Outlet Elevation (invert): 296.00 ft

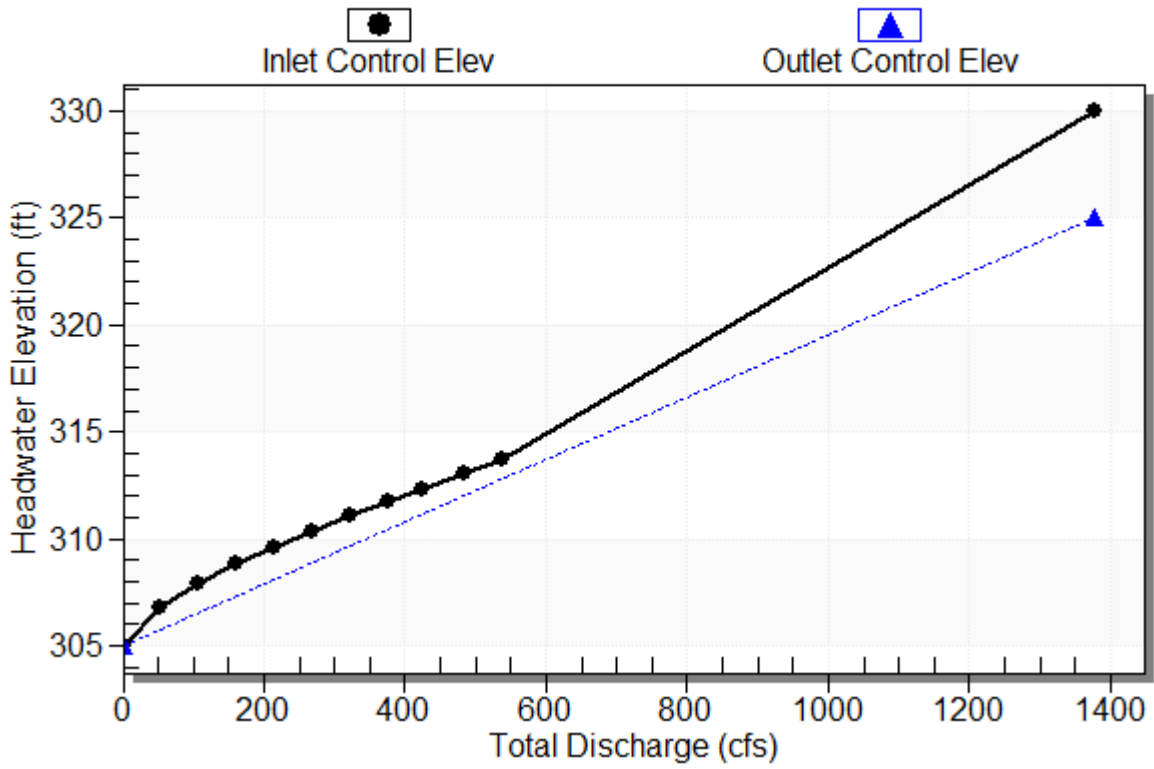
Culvert Length: 200.20 ft, Culvert Slope: 0.0450

\*\*\*\*\*

Culvert Performance Curve Plot: Lt. Sta. 340+46

### Performance Curve

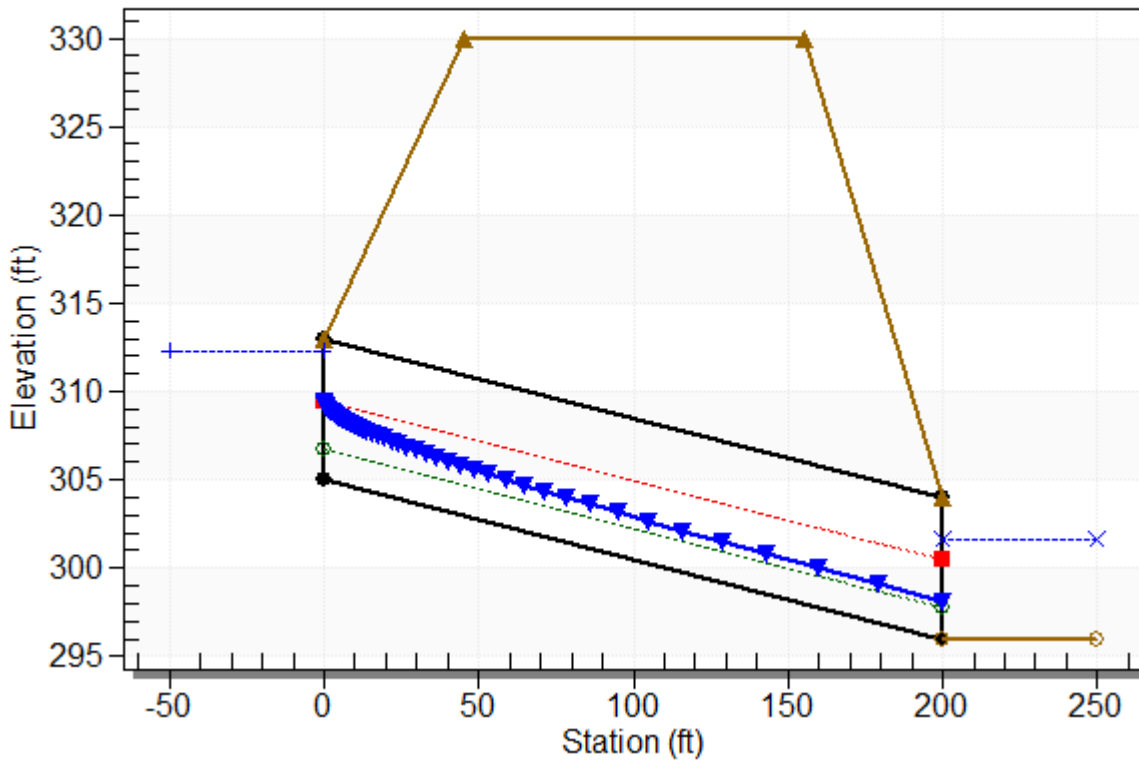
Culvert: Lt. Sta. 340+46



## Water Surface Profile Plot for Culvert: Lt. Sta. 340+46

### Crossing - Crossing 2, Design Discharge - 422.8 cfs

Culvert - Lt. Sta. 340+46, Culvert Discharge - 422.8 cfs



### Site Data - Lt. Sta. 340+46

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 305.00 ft

Outlet Station: 200.00 ft

Outlet Elevation: 296.00 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 340+46

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 8.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 2)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	296.00	0.00	0.00	0.00	0.00
53.71	297.32	1.32	4.08	0.82	0.63
107.42	298.09	2.09	5.13	1.31	0.63
161.13	298.77	2.77	5.82	1.73	0.62
214.84	299.39	3.39	6.33	2.12	0.61
268.55	299.99	3.99	6.74	2.49	0.59
322.26	300.56	4.56	7.07	2.84	0.58
375.97	301.11	5.11	7.35	3.19	0.57
422.80	301.59	5.59	7.57	3.49	0.56
483.39	302.19	6.19	7.81	3.86	0.55
537.10	302.72	6.72	8.00	4.19	0.54



### **Tailwater Channel Data - Crossing 2**

Tailwater Channel Option: Rectangular Channel

Bottom Width: 10.00 ft

Channel Slope: 0.0100

Channel Manning's n: 0.0375

Channel Invert Elevation: 296.00 ft

### **Roadway Data for Crossing: Crossing 2**


Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 330.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft

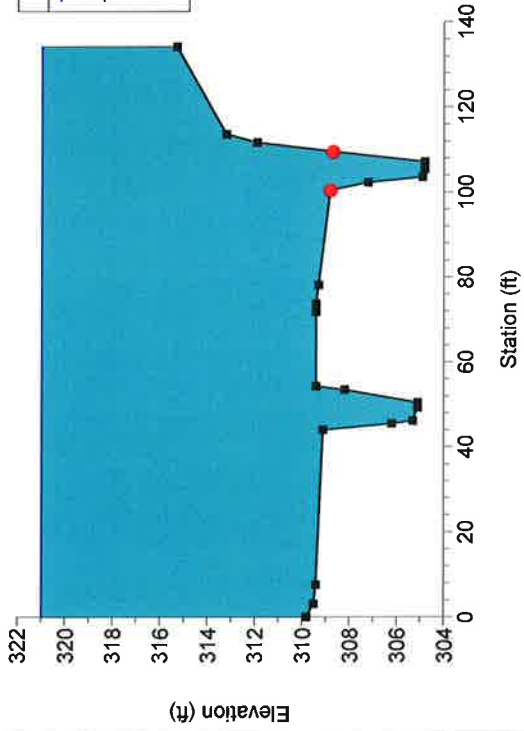


*HEC-RAS Output  
Station 340+25*

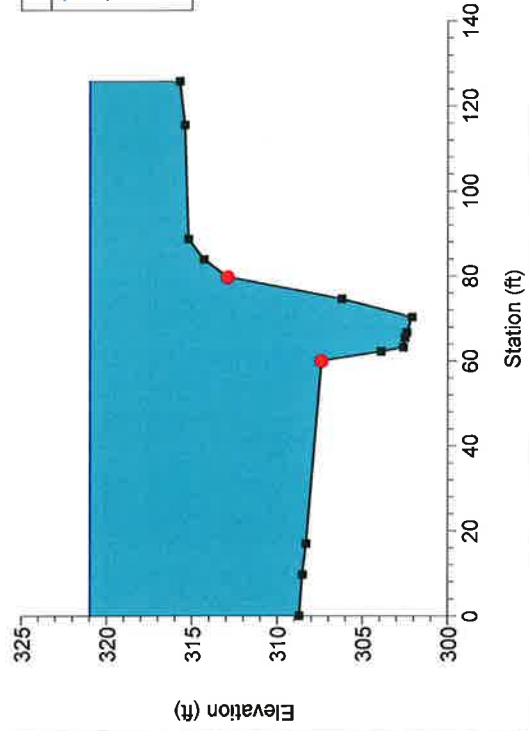
HEC-RAS Plan: Plan 01 River: Ditch #2 & #33 Reach: Ditch #2 & #33

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #2 & #33	1008.81	50 yr	422.80	304.60	319.19		319.20	0.000033	0.90	1280.91	134.20	0.04
Ditch #2 & #33	1008.81	100 yr	537.10	304.80	320.99		320.99	0.000032	0.96	1521.68	134.20	0.04
Ditch #2 & #33	958.81	50 yr	422.80	303.60	319.19		319.20	0.000024	0.81	1400.36	157.10	0.04
Ditch #2 & #33	958.81	100 yr	537.10	303.60	320.99		320.99	0.000024	0.87	1682.23	157.10	0.04
Ditch #2 & #33	908.81	50 yr	422.80	302.10	319.19		319.20	0.000023	0.83	1134.85	125.80	0.04
Ditch #2 & #33	908.81	100 yr	537.10	302.10	320.98		320.99	0.000023	0.90	1360.50	125.80	0.04
Ditch #2 & #33	858.81	50 yr	422.80	301.80	319.19		319.19	0.000017	0.74	1259.15	132.00	0.03
Ditch #2 & #33	858.81	100 yr	537.10	301.80	320.98		320.99	0.000017	0.81	1495.92	132.00	0.04
Ditch #2 & #33	808.81	50 yr	422.80	308.50	315.50	315.50	318.86	0.086945	14.69	28.77	4.30	1.00
Ditch #2 & #33	808.81	100 yr	537.10	308.50	316.67	316.67	320.59	0.096826	15.90	33.78	4.30	1.00
Ditch #2 & #33	758.81	50 yr	422.80	300.00	307.30		307.59	0.002919	4.73	175.15	98.40	0.36
Ditch #2 & #33	758.81	100 yr	537.10	300.00	308.63		308.80	0.001543	3.98	322.04	122.64	0.27
Ditch #2 & #33	708.81	50 yr	422.80	299.80	307.29		307.46	0.001376	3.52	197.71	95.28	0.28
Ditch #2 & #33	708.81	100 yr	537.10	299.80	308.61		308.74	0.000814	3.16	350.11	132.53	0.22
Ditch #2 & #33	658.81	50 yr	422.80	299.60	307.33		307.40	0.000359	2.11	258.79	106.49	0.15
Ditch #2 & #33	658.81	100 yr	537.10	299.60	308.63		308.69	0.000271	2.08	425.03	146.08	0.13
Ditch #2 & #33	608.81	50 yr	422.80	299.70	307.34	301.91	307.38	0.000233	1.59	281.10	68.98	0.12
Ditch #2 & #33	608.81	100 yr	537.10	299.70	308.64	302.23	308.68	0.000194	1.62	384.92	89.59	0.11
Ditch #2 & #33	600		Culvert									
Ditch #2 & #33	400	50 yr	422.80	296.00	300.85		301.19	0.003883	5.73	167.23	61.88	0.47
Ditch #2 & #33	400	100 yr	537.10	296.00	301.42		301.81	0.003903	6.21	204.12	67.87	0.48
Ditch #2 & #33	350	50 yr	422.80	296.00	300.82		301.03	0.001661	3.79	139.06	42.76	0.32
Ditch #2 & #33	350	100 yr	537.10	296.00	301.39		301.65	0.001738	4.21	163.38	43.43	0.34
Ditch #2 & #33	300	50 yr	422.80	296.00	300.17		300.83	0.008742	6.52	64.81	21.69	0.67
Ditch #2 & #33	300	100 yr	537.10	296.00	300.63		301.42	0.009434	7.15	75.08	23.07	0.70
Ditch #2 & #33	250	50 yr	422.80	295.40	299.78		300.37	0.008707	6.21	68.04	25.48	0.67
Ditch #2 & #33	250	100 yr	537.10	295.40	300.23		300.93	0.009063	6.69	80.23	27.66	0.69
Ditch #2 & #33	200	50 yr	422.80	295.00	299.11	298.60	299.86	0.011294	6.98	60.90	29.49	0.76
Ditch #2 & #33	200	100 yr	537.10	295.00	299.49	299.03	300.40	0.011446	7.69	77.43	58.59	0.78
Ditch #2 & #33	150	50 yr	422.80	294.60	298.82	298.07	299.34	0.007339	5.86	89.63	79.43	0.62
Ditch #2 & #33	150	100 yr	537.10	294.60	299.40	298.54	299.88	0.005592	5.81	144.74	111.47	0.56
Ditch #2 & #33	100	50 yr	422.80	294.20	298.01	297.70	298.85	0.011906	7.42	66.51	41.45	0.80
Ditch #2 & #33	100	100 yr	537.10	294.20	298.86	298.15	299.55	0.007135	6.88	109.99	61.79	0.64
Ditch #2 & #33	50	50 yr	422.80	293.20	298.00		298.40	0.004047	5.37	131.27	73.14	0.49
Ditch #2 & #33	50	100 yr	537.10	293.20	298.91		299.23	0.002623	5.01	203.64	82.20	0.41
Ditch #2 & #33	0	50 yr	422.80	293.00	297.71	295.93	298.17	0.005003	5.42	78.02	17.90	0.46
Ditch #2 & #33	0	100 yr	537.10	293.00	298.51	296.38	299.03	0.005000	5.82	92.31	17.90	0.45

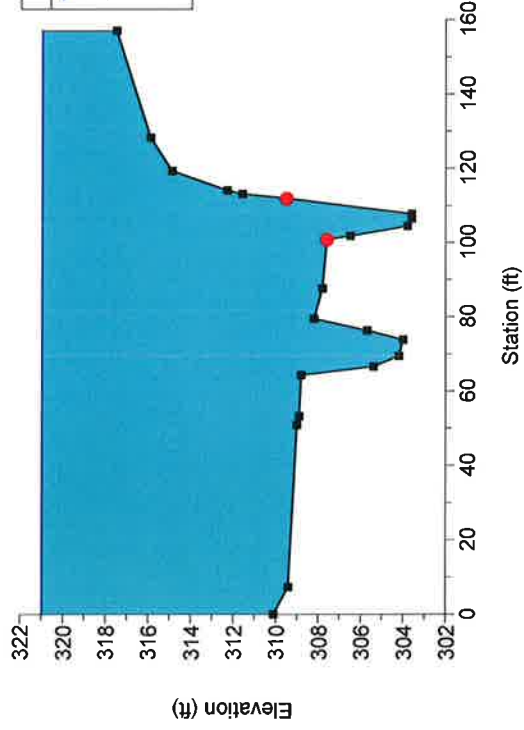
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
1008.81



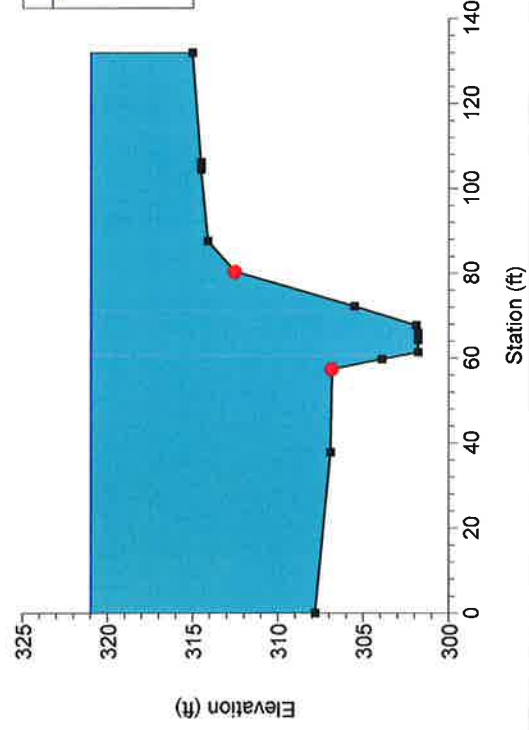
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
908.81



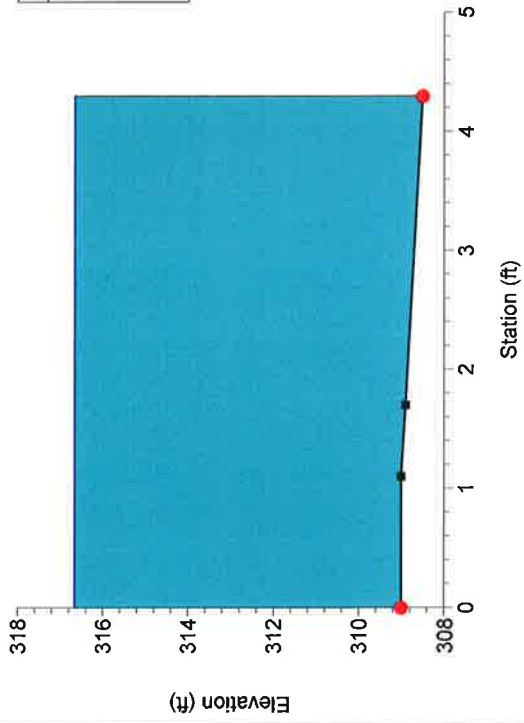
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
958.81



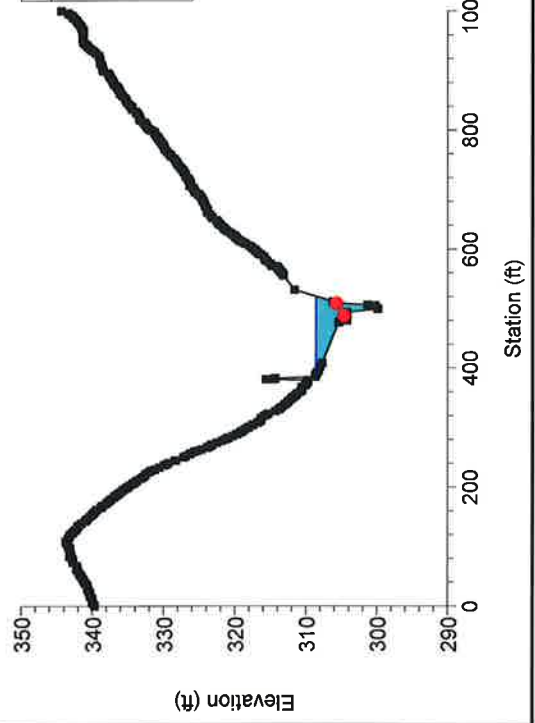
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858.81



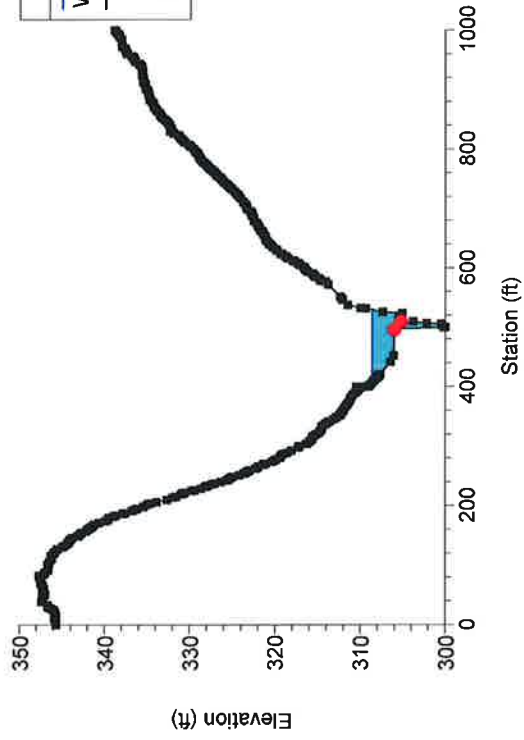
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
808.81



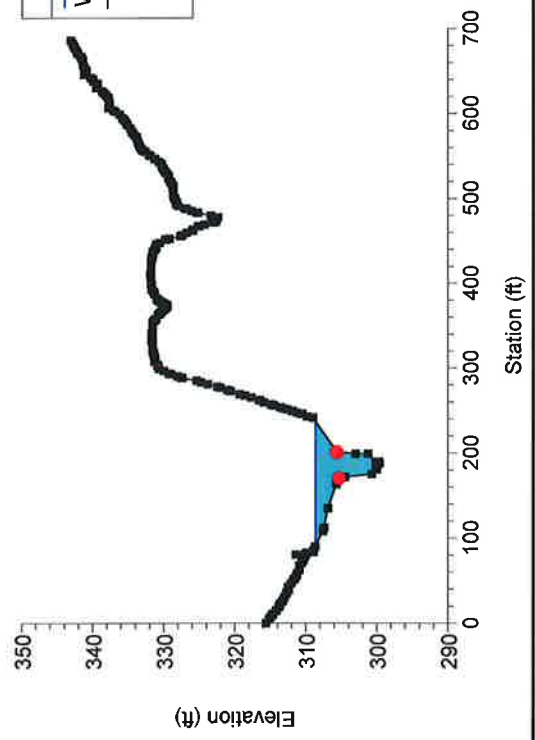
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708.81



Ditch #2 & #33 Plan: Plan 01 9/1/2015  
758.81

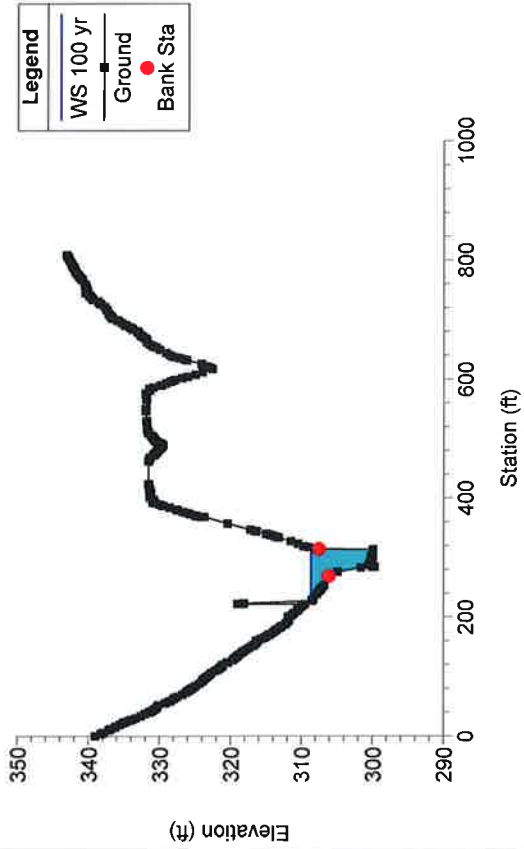


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658.81

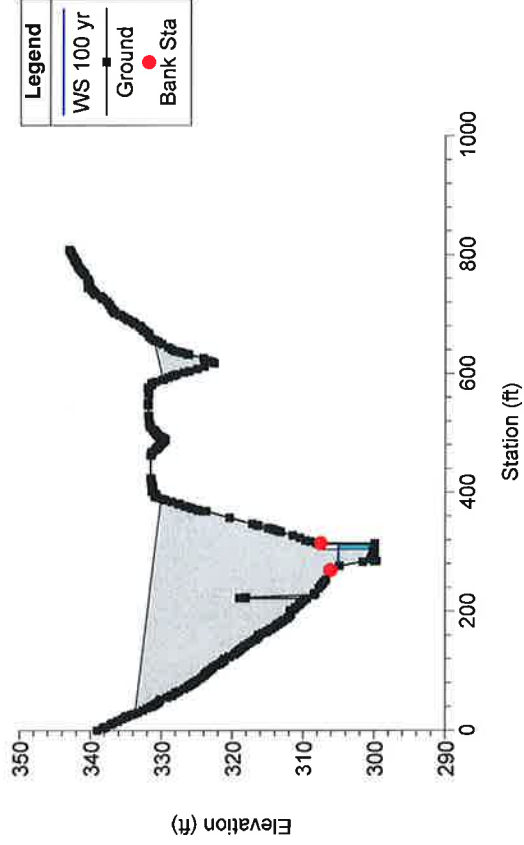




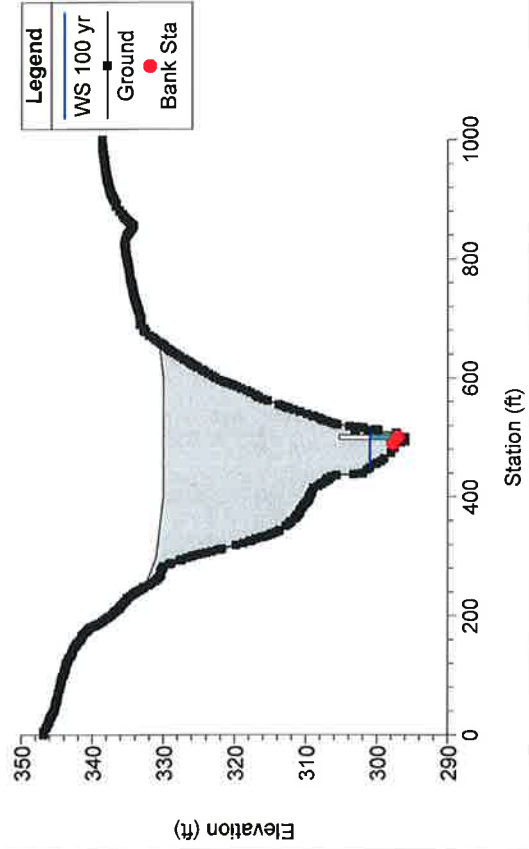
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
608.81



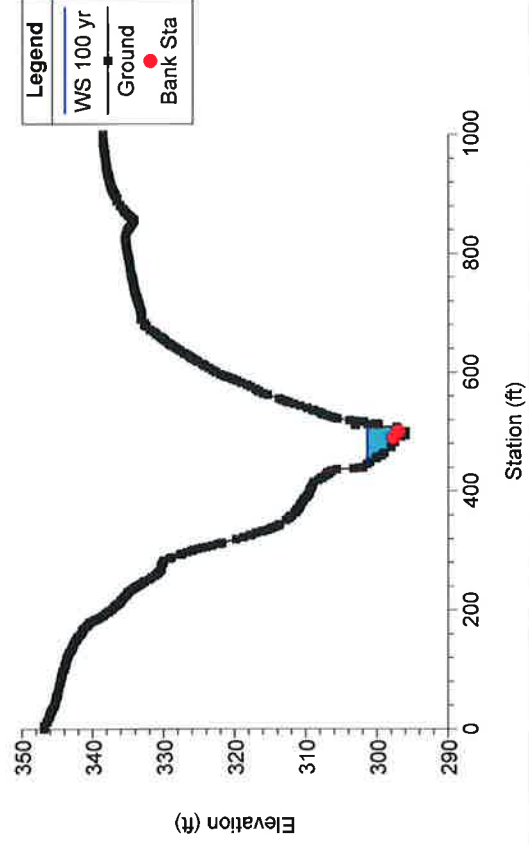
Ditch #2 & #33 Plan: Plan 01 9/1/2015



Ditch #2 & #33 Plan: Plan 01 9/1/2015

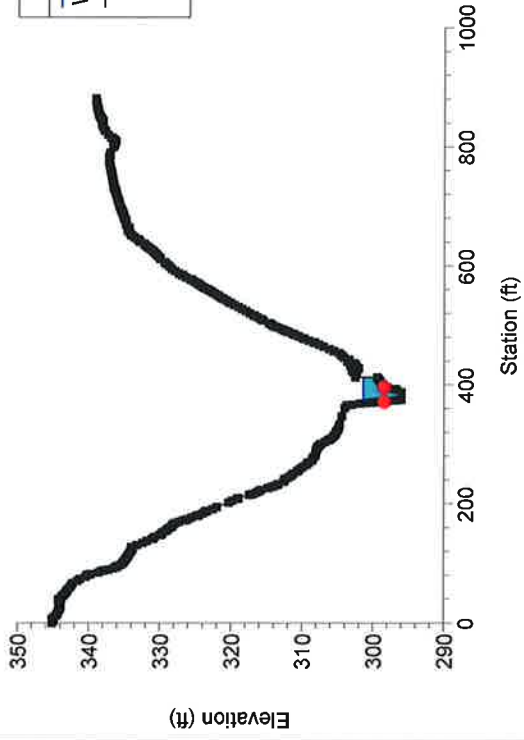


Ditch #2 & #33 Plan: Plan 01 9/1/2015  
400



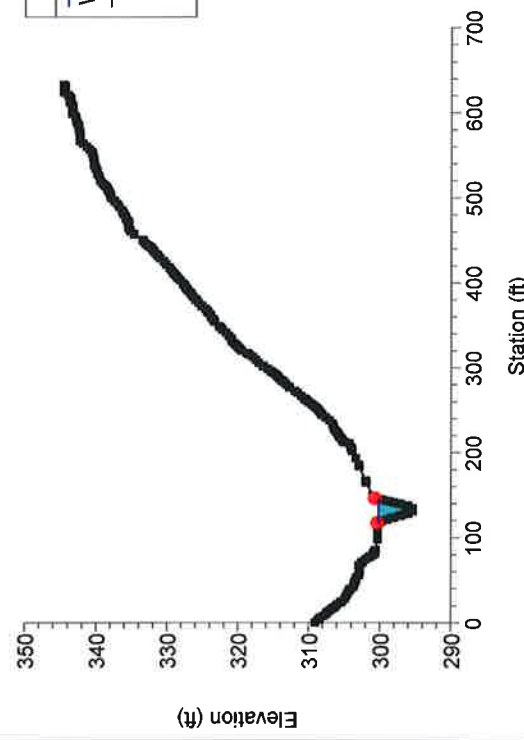
Ditch #2 & #33 Plan: Plan 01 9/1/2015

350



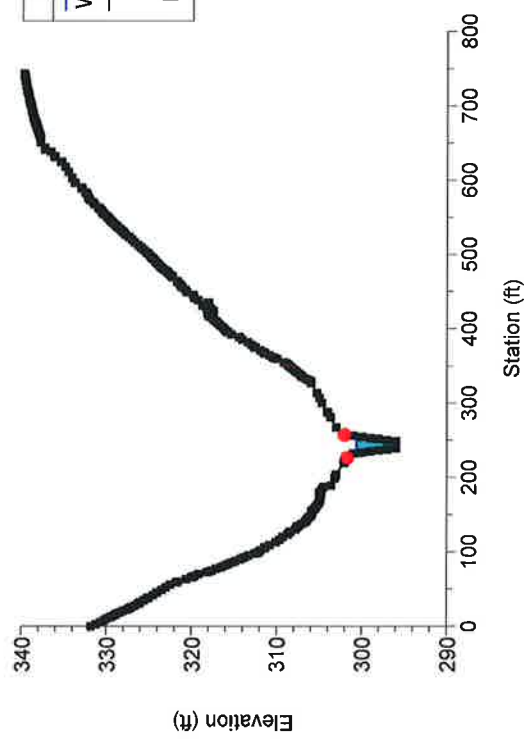
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250



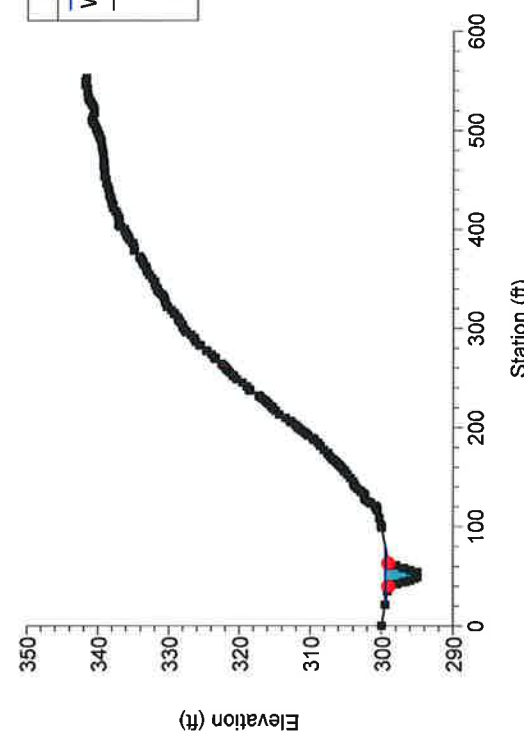
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300

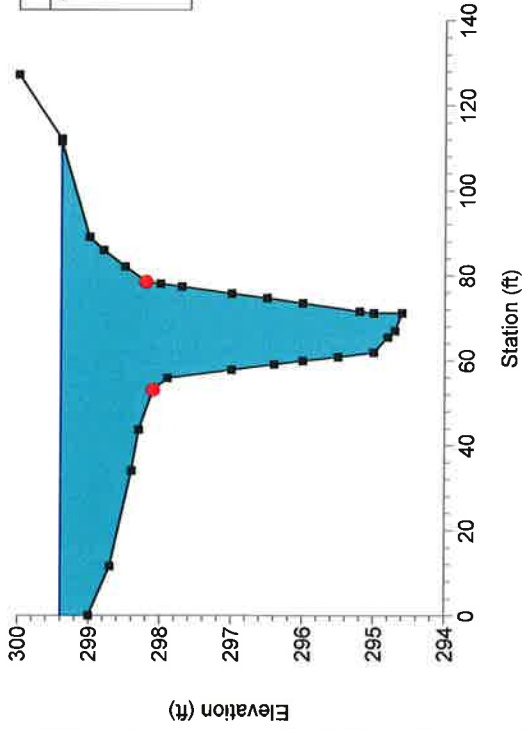


Ditch #2 & #33 Plan: Plan 01 9/1/2015

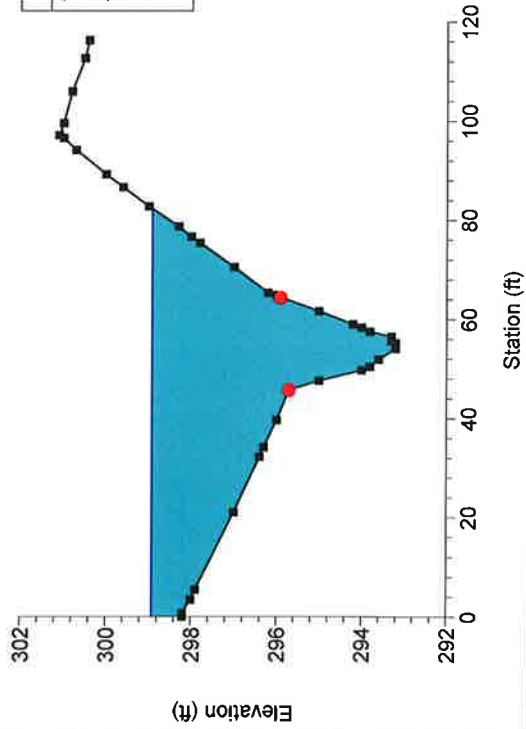
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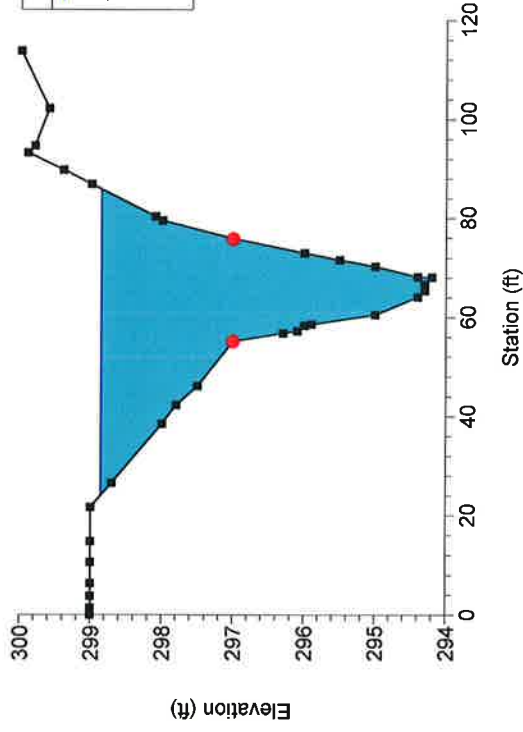
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
150



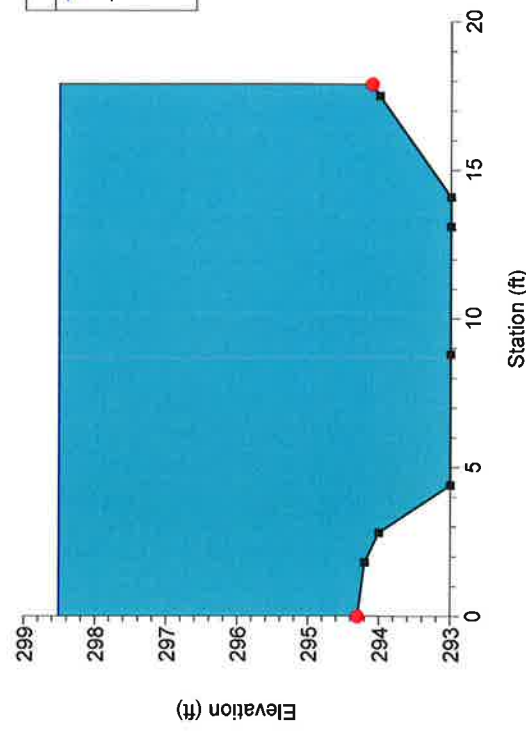
Ditch #2 & #33 Plan: Plan 01 9/1/2015  
50



Ditch #2 & #33 Plan: Plan 01 9/1/2015  
100



Ditch #2 & #33 Plan: Plan 01 9/1/2015  
0



**LOCATION:** Lt. Sta. 353+18  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 27.57 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
6.38	-	0.90	Pavements & Roofs
11.41	-	0.15	Woodland & Forest
1.67	-	0.70	Industrial Areas, Light
8.11	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.39

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	981	0
Course slope, (ft/ft)	0.0306	0.003
Velocity, (fps)	2.82238	1.11342
Travel time, (hr)	0.097	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.119 hr I (50 Yr)= 3.16  
 67.2 min I (100 Yr)= 3.41  
 Design Q (50 Yr)= 40.42 cfs  
 Maximum Q (100 Yr)= 45.37 cfs

Run 1: 36" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	343.16	340.07	335.97	3.00	1.03	YES
100	343.43	340.07	335.97	3.00	1.12	

**LOCATION:** Rt. Sta. 353+20  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 3.85 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
0.70	-	0.90	Pavements & Roofs
3.15	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.37

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0100
Travel time, (hr)	0.445

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	1200	0
Course slope, (ft/ft)	0.0192	0.003
Velocity, (fps)	2.23566	1.11342
Travel time, (hr)	0.149	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.594 hr I (50 Yr)= 4.70  
 35.7 min I (100 Yr)= 5.08

Design Q (50 Yr)= 7.99 cfs  
 Maximum Q (100 Yr)= 9.00 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	343.38	341.96	335.97	2.00	0.71	YES
100	343.48	341.96	335.97	2.00	0.76	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 7.99 cfs

Maximum Flow: 9 cfs



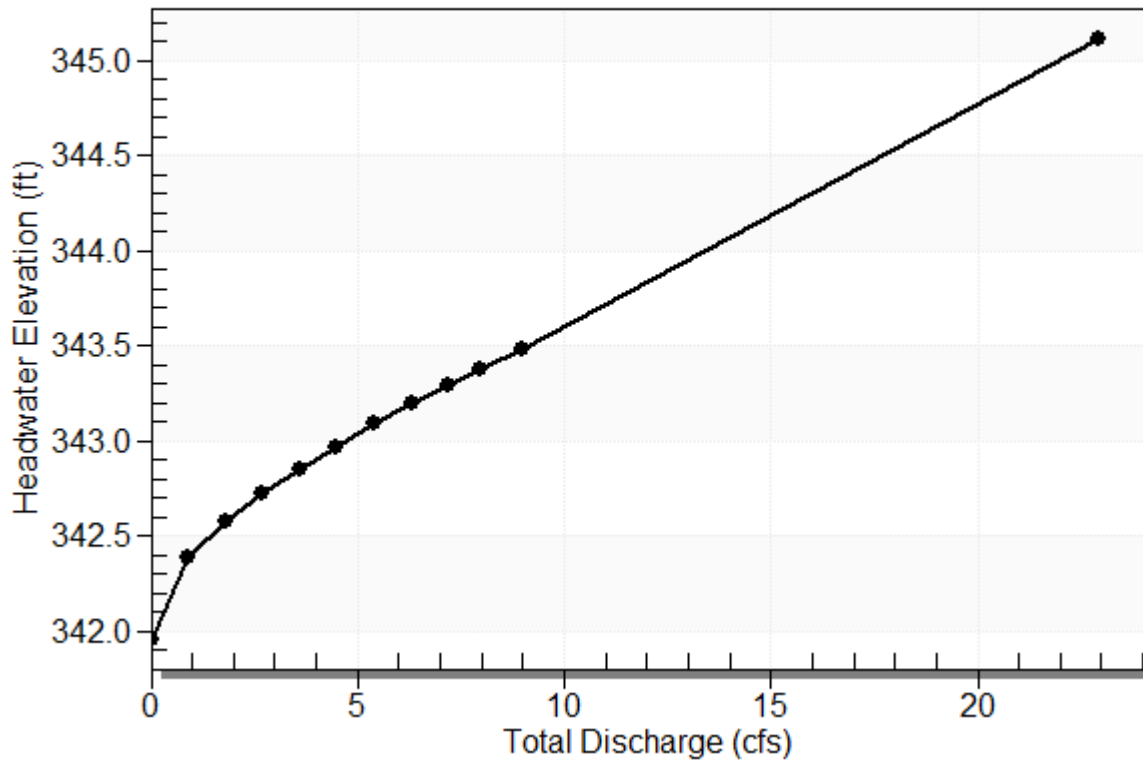
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 4**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 353+20 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
341.96	0.00	0.00	0.00	1
342.39	0.90	0.90	0.00	1
342.58	1.80	1.80	0.00	1
342.73	2.70	2.70	0.00	1
342.85	3.60	3.60	0.00	1
342.97	4.50	4.50	0.00	1
343.09	5.40	5.40	0.00	1
343.20	6.30	6.30	0.00	1
343.30	7.20	7.20	0.00	1
343.38	7.99	7.99	0.00	1
343.48	9.00	9.00	0.00	1
345.00	22.92	22.92	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 4

## Total Rating Curve

Crossing: Crossing 4



**Table 2 - Culvert Summary Table: Rt. Sta. 353+20**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	341.96	0.000	0.000	0-NF	0.000	0.000	2.000	-0.260	0.000	0.000
0.90	0.90	342.39	0.429	0.0*	1-JS1f	0.209	0.321	2.000	-0.215	0.300	0.000
1.80	1.80	342.58	0.617	0.0*	1-JS1f	0.293	0.462	2.000	-0.170	0.600	0.000
2.70	2.70	342.73	0.769	0.0*	1-JS1f	0.372	0.569	2.000	-0.125	0.900	0.000
3.60	3.60	342.85	0.892	0.0*	1-JS1f	0.423	0.659	2.000	-0.080	1.200	0.000
4.50	4.50	342.97	1.009	0.0*	1-JS1f	0.474	0.743	2.000	-0.035	1.500	0.000
5.40	5.40	343.09	1.127	0.0*	1-JS1f	0.525	0.817	2.000	0.009	1.800	0.000
6.30	6.30	343.20	1.236	0.028	1-JS1f	0.569	0.888	2.000	0.054	2.100	0.000
7.20	7.20	343.30	1.337	0.154	1-JS1f	0.608	0.953	2.000	0.099	2.400	0.000
7.99	7.99	343.38	1.420	0.273	1-JS1f	0.641	1.006	2.000	0.139	2.664	0.000
9.00	9.00	343.48	1.520	0.731	1-JS1f	0.685	1.069	2.000	0.189	3.001	0.000

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 341.96 ft, Outlet Elevation (invert): 335.97 ft

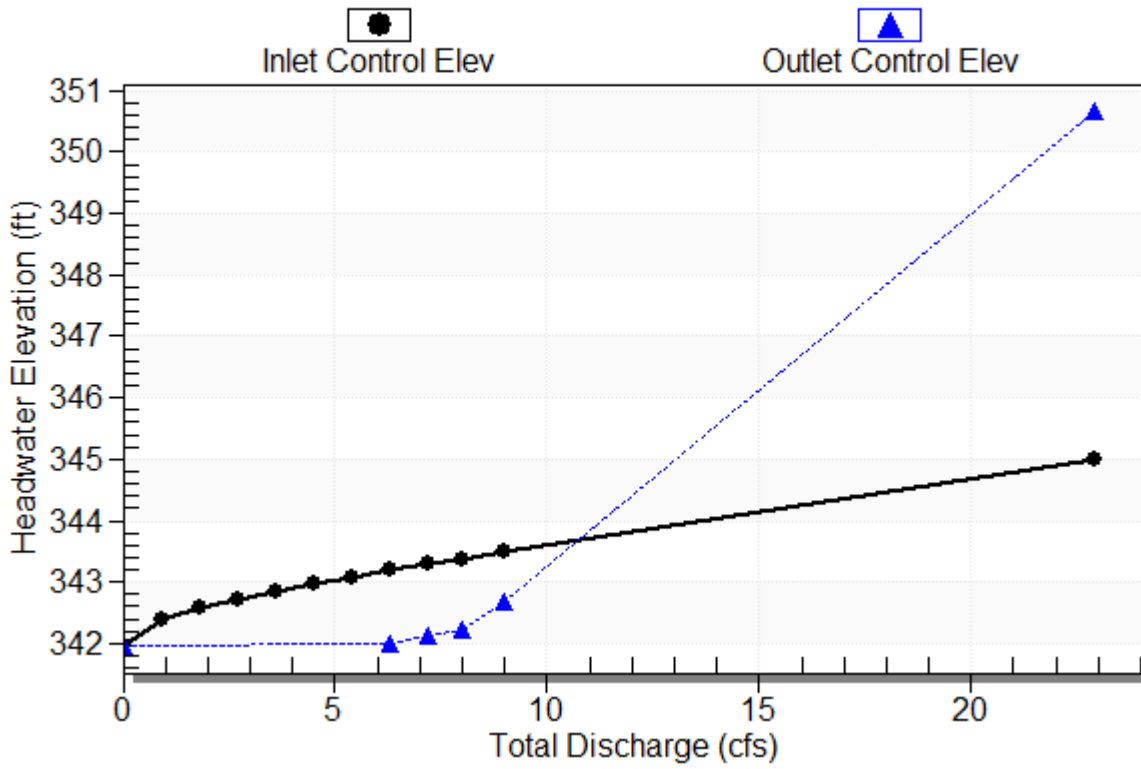
Culvert Length: 288.73 ft, Culvert Slope: 0.0208

\*\*\*\*\*

# Culvert Performance Curve Plot: Rt. Sta. 353+20

## Performance Curve

Culvert: Rt. Sta. 353+20

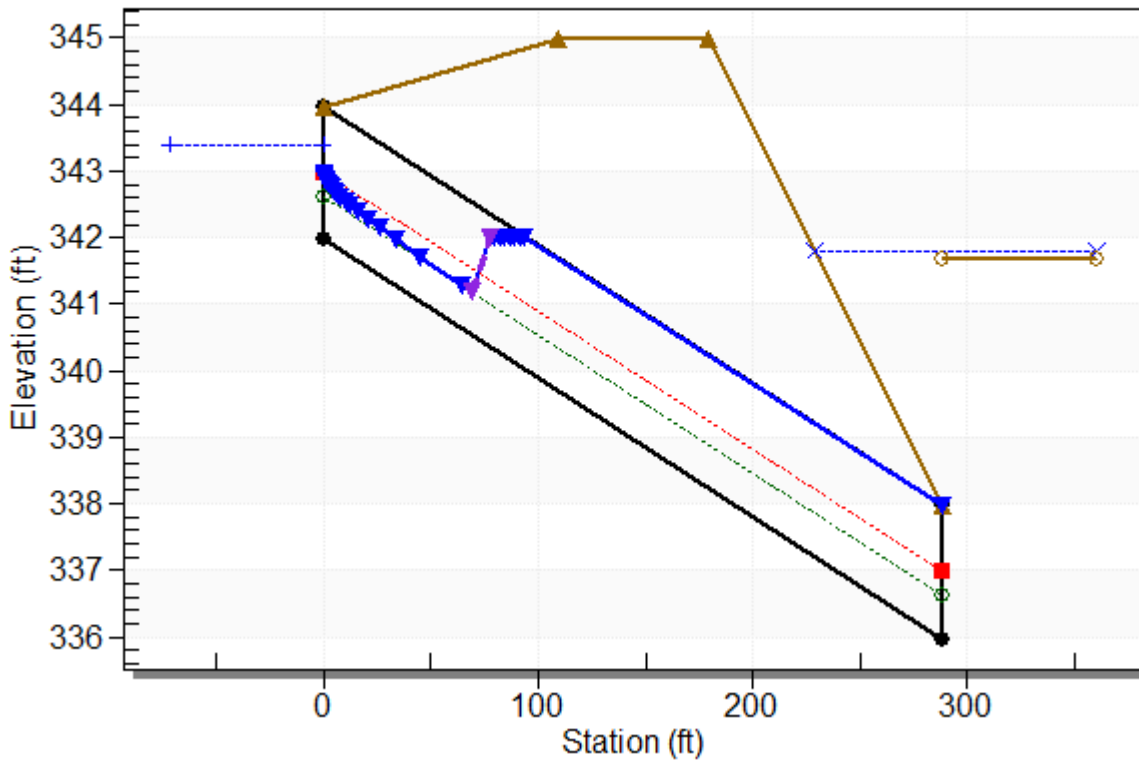




## Water Surface Profile Plot for Culvert: Rt. Sta. 353+20

### Crossing - Crossing 4, Design Discharge - 8.0 cfs

Culvert - Rt. Sta. 353+20, Culvert Discharge - 8.0 cfs



### Site Data - Rt. Sta. 353+20

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 341.96 ft

Outlet Station: 288.67 ft

Outlet Elevation: 335.97 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 353+20

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE







### **Tailwater Channel Data - Crossing 4**

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 341.67 ft

### **Roadway Data for Crossing: Crossing 4**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 345.00 ft

Roadway Surface: Paved

Roadway Top Width: 70.00 ft

**Location:** Rt. Sta. 374+90  
**HY8 File Name:** .INP  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

Drainage Area (acres) = 261.53

Curve Number, CN =

Acres	HSG	CN	Description
8.34	C	92.00	IA (Paved-Open Ditches)
9.70	A	30.00	Woods (Good)
105.77	C	70.00	Woods (Good)
20.52	A	89.00	Commercial and Business
38.67	C	94.00	Commercial and Business
8.14	A	51.00	Residential (1 Acre)
25.12	C	79.00	Residential (1 Acre)
45.27	C	74.00	Open Space (Good)

Weighted CN-value = 75.2

Time of Concentration,  $t_c$  = 1.436 hrs.

<u>Sheet Flow</u>	
Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

<u>Shallow Concentrated Flow</u>		
Segment	Unpaved	Paved
Surface (unpaved)	16.1345	20.3282
Length, (ft)	3658.00	0.00
Course slope, (ft/ft)	0.0232	0.0000
Velocity, (fps)	2.4595	0.0643
Travel time, (hr)	0.413	0.000

<u>Channel Flow</u>	
Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

24 Hour Rainfall, P -

SCDHEC Rainfall for: Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Initial Abstraction,  $I_a$  =

$$S = (1000/CN) - 10 = 3.29 \text{ in}$$

$$I_a = 0.2(S) = 0.66 \text{ in}$$



**Location:** Rt. Sta. 374+90  
**HY8 File Name:** .INP  
**Continued**

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	3.29	=	1.4	in
10	5.30	3.29	=	2.7	in
25	6.40	3.29	=	3.6	in
50	7.30	3.29	=	4.4	in
100	8.30	3.29	=	5.3	in

Unit Peak Discharge, q<sub>u</sub>  
 Rainfall Distribution Type II

Design Storm	P	I <sub>a</sub>	I <sub>a</sub> / p (max 0.50)	q <sub>u</sub>	
2	3.60	0.66	0.18	260.6	csm/in
10	5.30	0.66	0.12	276.6	csm/in
25	6.40	0.66	0.10	282.6	csm/in
50	7.30	0.66	0.09	283.5	csm/in
100	8.30	0.66	0.08	283.5	csm/in

Pond Factor, F<sub>p</sub> =

0 acres = 0.0%                      F<sub>p</sub> = 1.0

Peak Discharge, q<sub>p</sub> =

$$q_p = q_u A_m Q F_p$$

Design Storm	q <sub>u</sub> (csm/in)	A <sub>m</sub> (mi <sup>2</sup> )	Q (in)	F <sub>p</sub>	q <sub>p</sub> (cfs)	
2	260.6	0.41	1.4	1.000	147.8	cfs
10	276.6	0.41	2.7	1.000	306.8	cfs
25	282.6	0.41	3.6	1.000	421.3	cfs
50	283.5	0.41	4.4	1.000	514.2	cfs
100	283.5	0.41	5.3	1.000	618.5	cfs

Run 1: 6' X 6' RC Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	364.65	352.90	349.40	6.00	1.96	Redesign
100	368.10	352.90	349.40	6.00	2.53	

The HY-8 analysis summarized above was based on roadway data from I-20 as the roadway elevations. The analysis was also performed with the Frontage Road elevations used as the overtopping elevation. The results of the analysis indicates the Frontage Road overtops for approximately the 10-year storm.

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 514.2 cfs

Maximum Flow: 618.5 cfs

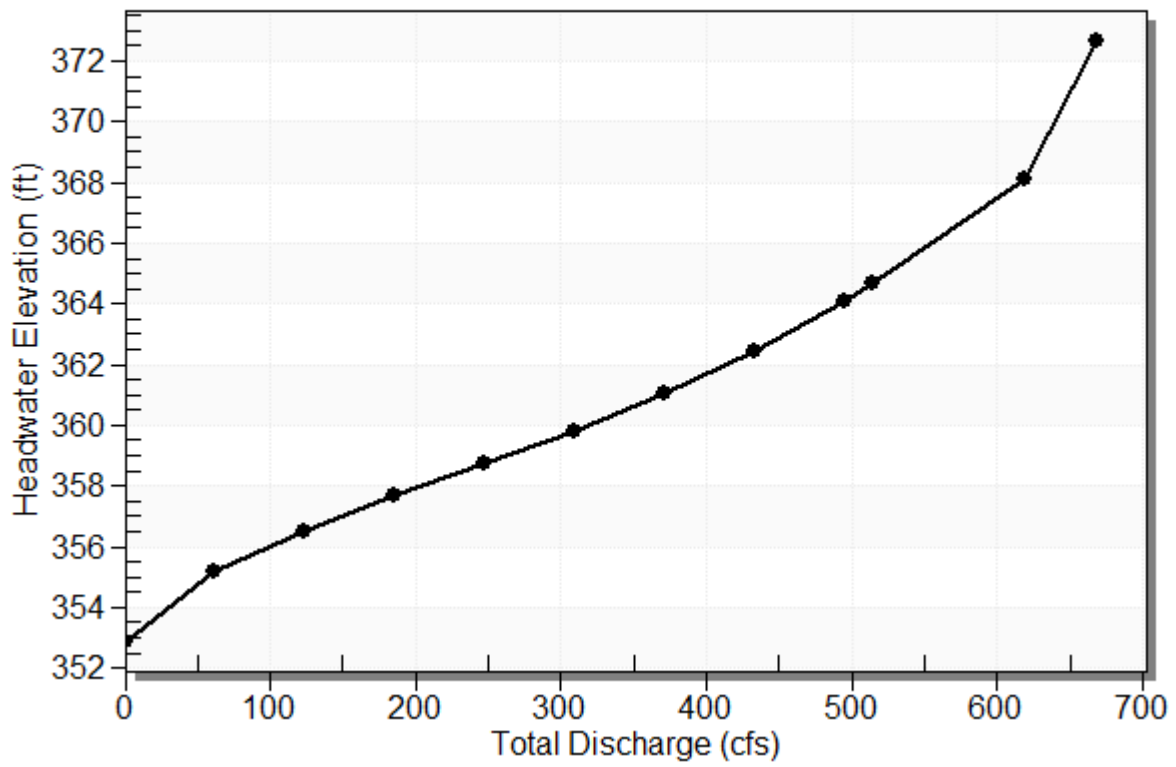
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 19**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 374+90 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
352.90	0.00	0.00	0.00	1
355.16	61.85	61.85	0.00	1
356.51	123.70	123.70	0.00	1
357.65	185.55	185.55	0.00	1
358.71	247.40	247.40	0.00	1
359.81	309.25	309.25	0.00	1
361.03	371.10	371.10	0.00	1
362.45	432.95	432.95	0.00	1
364.09	494.80	494.80	0.00	1
364.65	514.20	514.20	0.00	1
368.10	618.50	618.50	0.00	1
370.00	668.47	668.47	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 19

## Total Rating Curve

Crossing: Crossing 19



**Table 2 - Culvert Summary Table: Rt. Sta. 374+90**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	352.90	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
61.85	61.85	355.16	2.262	0.0*	1-S2n	0.924	1.489	0.924	1.423	11.154	5.539
123.70	123.70	356.51	3.613	0.0*	1-S2n	1.496	2.363	1.541	2.034	13.379	6.705
185.55	185.55	357.65	4.753	0.462	1-S2n	1.994	3.097	2.070	2.489	14.936	7.472
247.40	247.40	358.71	5.810	1.790	1-S2n	2.457	3.752	2.570	2.862	16.043	8.059
309.25	309.25	359.81	6.906	3.257	5-S2n	2.900	4.353	3.048	3.185	16.911	8.541
371.10	371.10	361.03	8.131	5.420	5-S2n	3.329	4.916	3.510	3.471	17.621	8.954
432.95	432.95	362.45	9.546	6.936	5-S2n	3.746	5.448	3.959	3.730	18.226	9.317
494.80	494.80	364.09	11.187	8.632	5-S2n	4.155	5.955	4.397	3.968	18.757	9.641
514.20	514.20	364.65	11.752	9.146	5-S2n	4.283	6.000	4.532	4.039	18.911	9.736
618.50	618.50	368.10	15.203	12.116	5-S2n	4.958	6.000	5.203	4.394	19.814	10.207

\* Full Flow Headwater elevation is below inlet invert.



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Straight Culvert

Inlet Elevation (invert): 352.90 ft, Outlet Elevation (invert): 349.40 ft

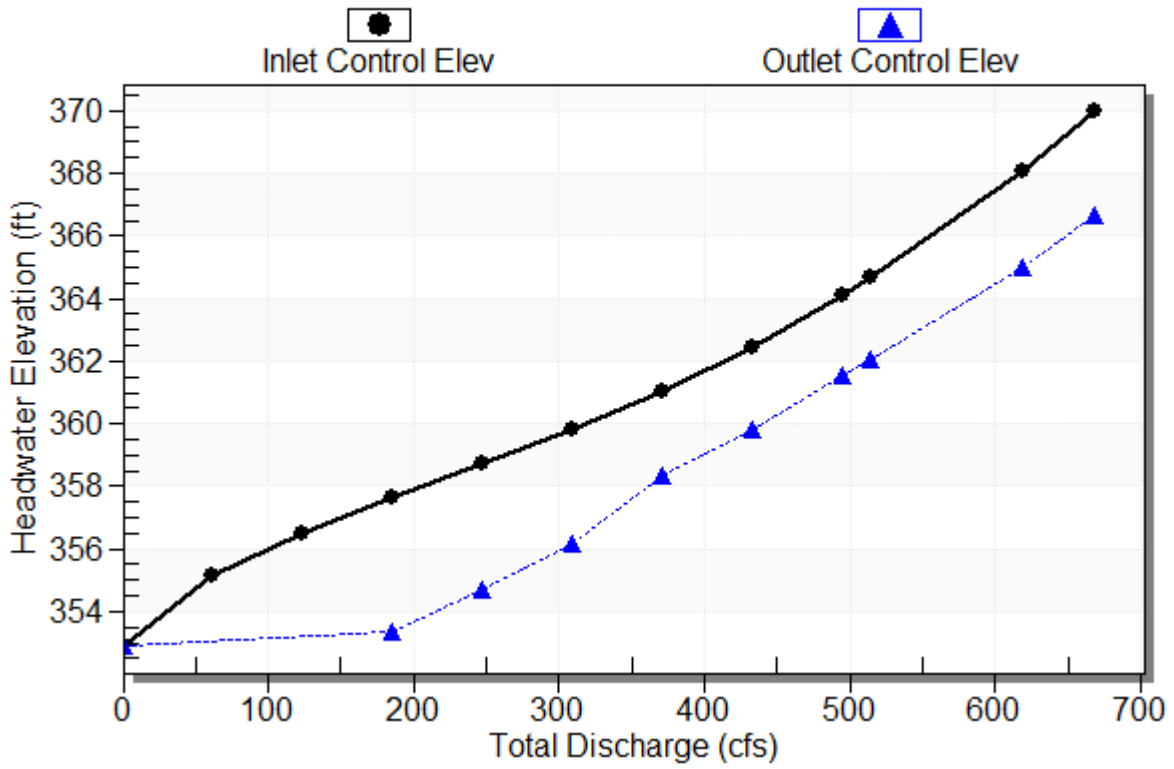
Culvert Length: 287.02 ft, Culvert Slope: 0.0122

\*\*\*\*\*

# Culvert Performance Curve Plot: Rt. Sta. 374+90

## Performance Curve

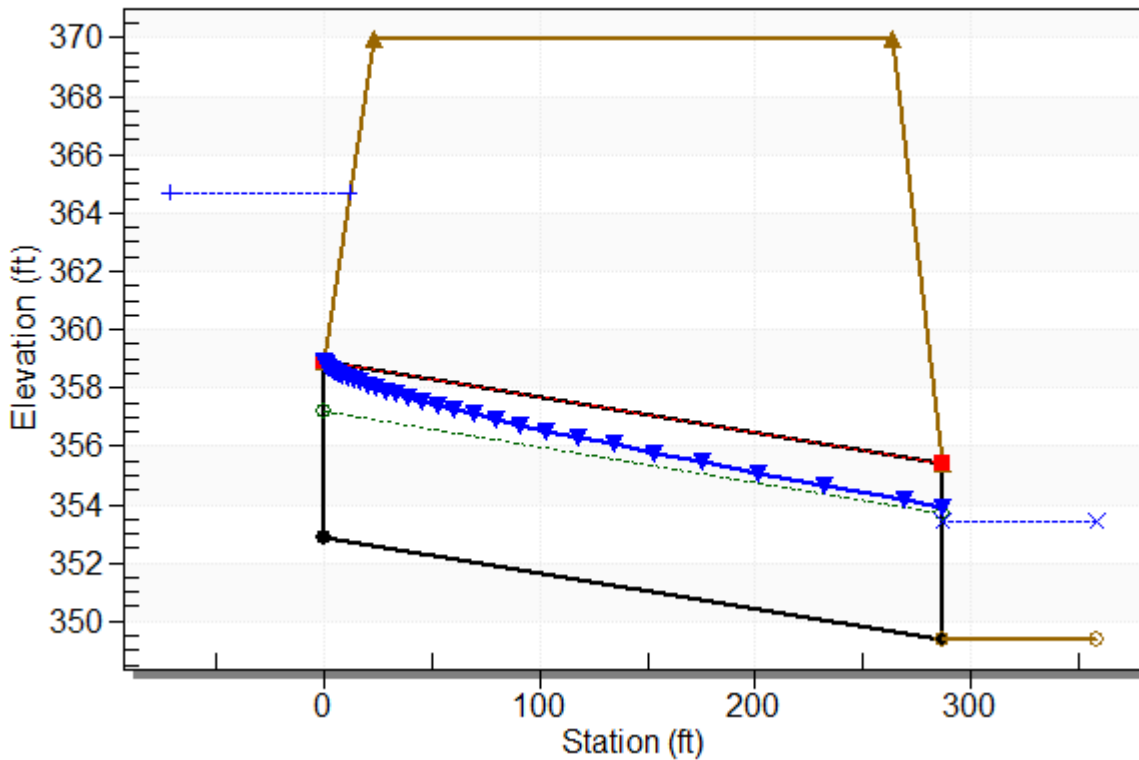
Culvert: Rt. Sta. 374+90



## Water Surface Profile Plot for Culvert: Rt. Sta. 374+90

Crossing - Crossing 19 , Design Discharge - 514.2 cfs

Culvert - Rt. Sta. 374+90, Culvert Discharge - 514.2 cfs



### Site Data - Rt. Sta. 374+90

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 352.90 ft

Outlet Station: 287.00 ft

Outlet Elevation: 349.40 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 374+90

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 6.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 19 )**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	349.40	0.00	0.00	0.00	0.00
61.85	350.82	1.42	5.54	1.78	0.96
123.70	351.43	2.03	6.71	2.54	1.00
185.55	351.89	2.49	7.47	3.11	1.02
247.40	352.26	2.86	8.06	3.57	1.04
309.25	352.58	3.18	8.54	3.97	1.05
371.10	352.87	3.47	8.95	4.33	1.07
432.95	353.13	3.73	9.32	4.65	1.07
494.80	353.37	3.97	9.64	4.95	1.08
514.20	353.44	4.04	9.74	5.04	1.09
618.50	353.79	4.39	10.21	5.48	1.10

### **Tailwater Channel Data - Crossing 19**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 349.40 ft

### **Roadway Data for Crossing: Crossing 19**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 370.00 ft

Roadway Surface: Paved

Roadway Top Width: 240.00 ft

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 421.3 cfs

Maximum Flow: 514.2 cfs



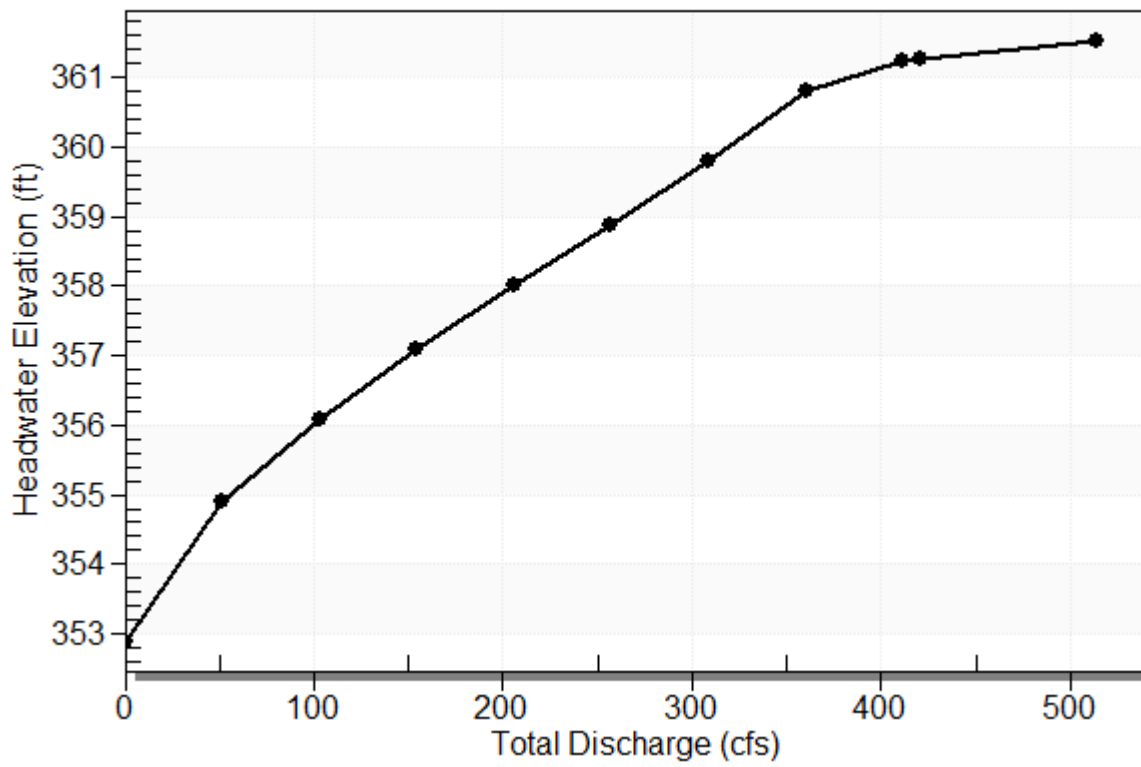
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 19 Frontage Road**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 374+90 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
352.90	0.00	0.00	0.00	1
354.90	51.42	51.42	0.00	1
356.08	102.84	102.84	0.00	1
357.10	154.26	154.26	0.00	1
358.00	205.68	205.68	0.00	1
358.88	257.10	257.10	0.00	1
359.79	308.52	308.52	0.00	1
360.80	359.94	359.94	0.00	1
361.22	411.36	379.99	31.16	7
361.26	421.30	381.71	39.42	5
361.54	514.20	394.35	119.65	5
361.00	369.60	369.60	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 19 Frontage Road

## Total Rating Curve

Crossing: Crossing 19 Frontage Road



**Table 2 - Culvert Summary Table: Rt. Sta. 374+90**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	352.90	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
51.42	51.42	354.90	2.000	0.0*	1-S2n	0.812	1.316	0.848	1.291	10.100	5.256
102.84	102.84	356.08	3.183	0.0*	1-S2n	1.314	2.090	1.343	1.852	12.764	6.377
154.26	154.26	357.10	4.196	0.0*	1-S2n	1.750	2.738	1.806	2.272	14.238	7.114
205.68	205.68	358.00	5.099	0.880	1-S2n	2.151	3.317	2.235	2.617	15.334	7.678
257.10	257.10	358.88	5.977	2.011	1-S2n	2.528	3.849	2.645	2.916	16.200	8.141
308.52	308.52	359.79	6.893	3.239	5-S2n	2.895	4.346	3.042	3.181	16.903	8.536
359.94	359.94	360.80	7.898	5.165	5-S2n	3.253	4.817	3.428	3.421	17.500	8.884
411.36	379.99	361.22	8.322	5.627	5-S2n	3.389	4.994	3.576	3.642	17.709	9.195
421.30	381.71	361.26	8.359	5.667	5-S2n	3.401	5.009	3.589	3.683	17.726	9.251
514.20	394.35	361.54	8.639	5.969	5-S2n	3.486	5.119	3.681	4.039	17.858	9.736

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 352.90 ft, Outlet Elevation (invert): 349.40 ft

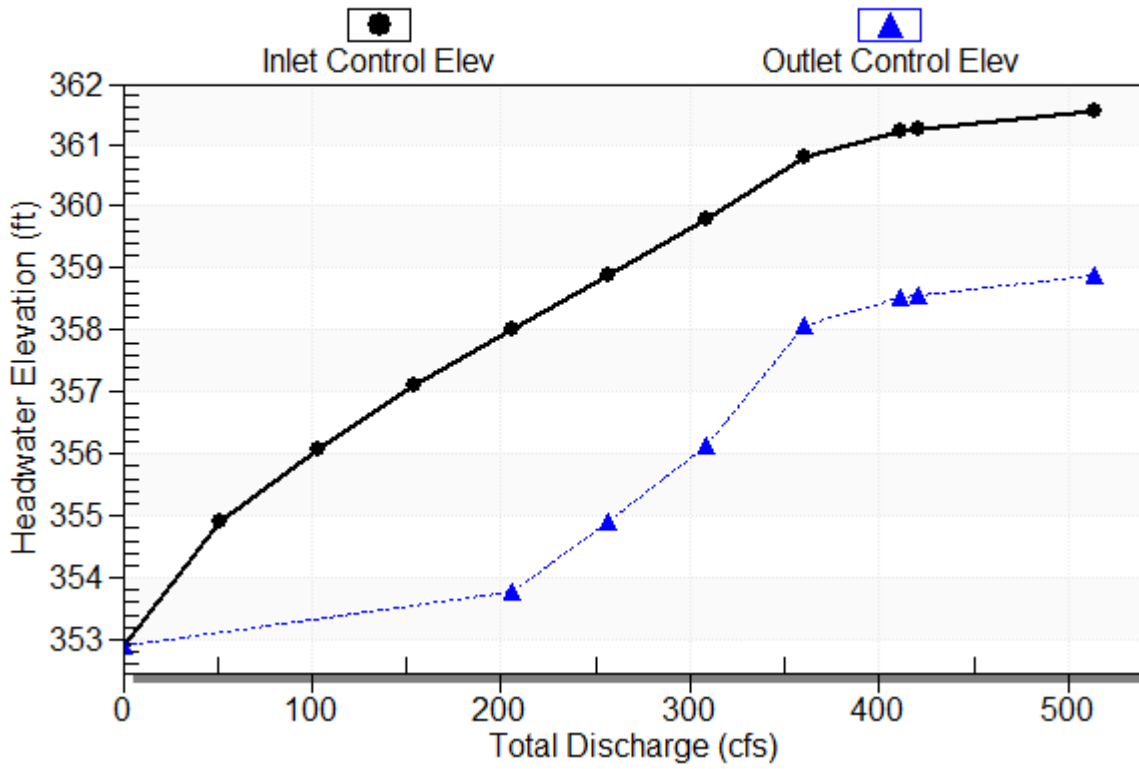
Culvert Length: 287.02 ft, Culvert Slope: 0.0122

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# Culvert Performance Curve Plot: Rt. Sta. 374+90

## Performance Curve

Culvert: Rt. Sta. 374+90

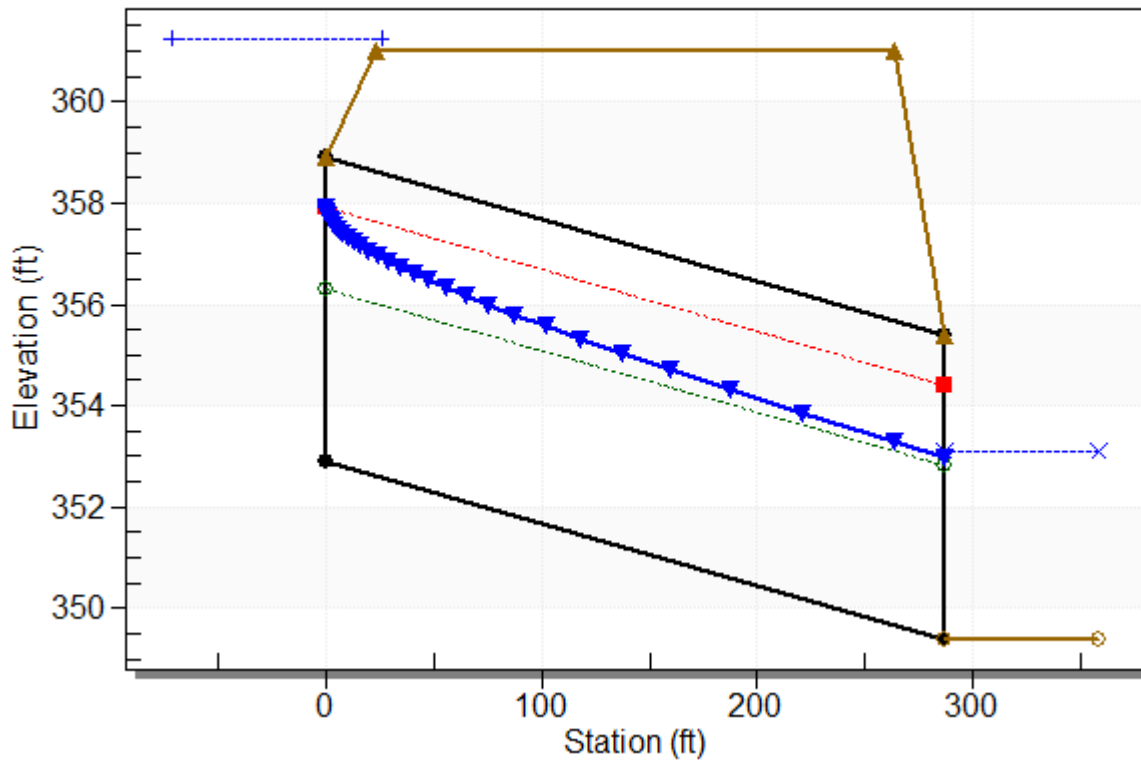




## Water Surface Profile Plot for Culvert: Rt. Sta. 374+90

Crossing - Crossing 19 Frontage Road, Design Discharge - 421.3 cfs

Culvert - Rt. Sta. 374+90, Culvert Discharge - 381.7 cfs



### Site Data - Rt. Sta. 374+90

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 352.90 ft

Outlet Station: 287.00 ft

Outlet Elevation: 349.40 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 374+90

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 6.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 19 Frontage Road)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	349.40	0.00	0.00	0.00	0.00
51.42	350.69	1.29	5.26	1.61	0.94
102.84	351.25	1.85	6.38	2.31	0.99
154.26	351.67	2.27	7.11	2.84	1.01
205.68	352.02	2.62	7.68	3.27	1.03
257.10	352.32	2.92	8.14	3.64	1.04
308.52	352.58	3.18	8.54	3.97	1.05
359.94	352.82	3.42	8.88	4.27	1.06
411.36	353.04	3.64	9.19	4.55	1.07
421.30	353.08	3.68	9.25	4.60	1.07
514.20	353.44	4.04	9.74	5.04	1.09

### **Tailwater Channel Data - Crossing 19 Frontage Road**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 349.40 ft

### **Roadway Data for Crossing: Crossing 19 Frontage Road**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 361.00 ft

Roadway Surface: Paved

Roadway Top Width: 240.00 ft

**LOCATION:** Lt. Sta. 401+05  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 9.1 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
1.99	-	0.90	Pavements & Roofs
1.72	-	0.20	Unimproved Areas
1.15	-	0.70	Industrial Areas, Light
4.24	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.44

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	0.587

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	1104	0
Course slope, (ft/ft)	0.0330	0.003
Velocity, (fps)	2.93098	1.11342
Travel time, (hr)	0.105	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.692 hr I (50 Yr)= 4.31  
 41.5 min I (100 Yr)= 4.65

Design Q (50 Yr)= 20.68 cfs  
 Maximum Q (100 Yr)= 23.27 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	396.23	393.49	392.37	2.00	1.37	NO
100	396.59	393.49	392.37	2.00	1.55	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 20.68 cfs

Maximum Flow: 23.27 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 5**

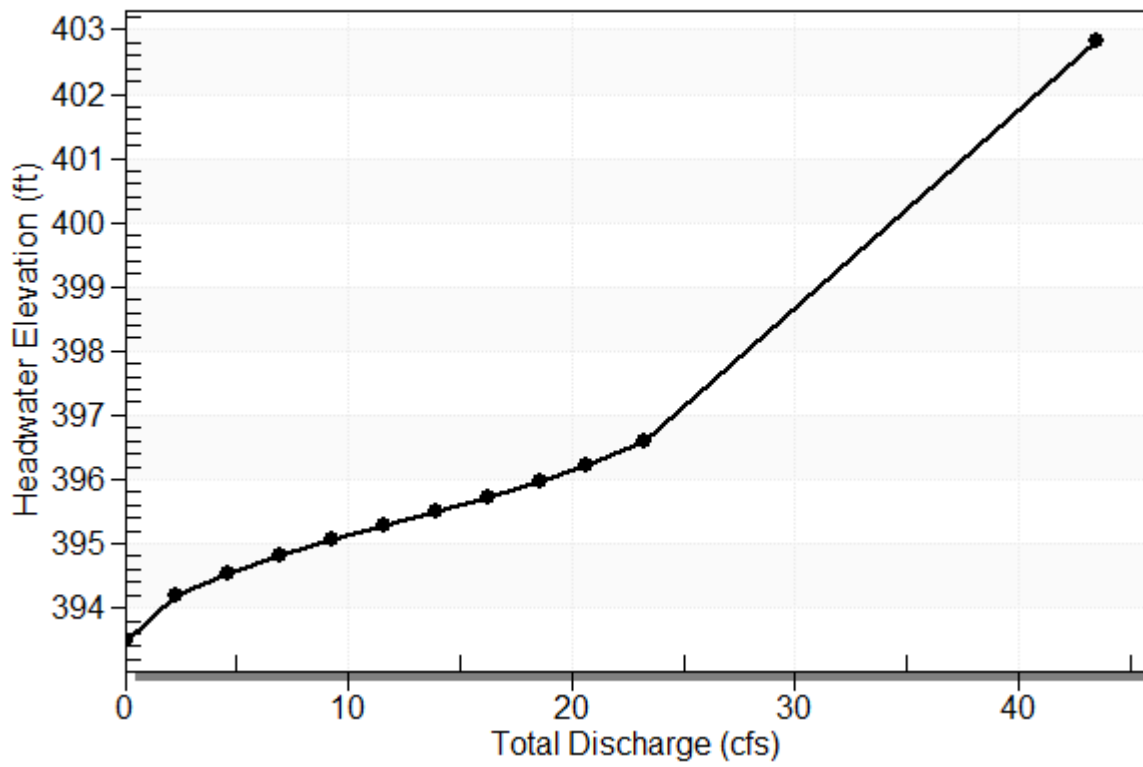
Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 401+05 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
393.49	0.00	0.00	0.00	1
394.21	2.33	2.33	0.00	1
394.53	4.65	4.65	0.00	1
394.82	6.98	6.98	0.00	1
395.05	9.31	9.31	0.00	1
395.27	11.64	11.64	0.00	1
395.49	13.96	13.96	0.00	1
395.72	16.29	16.29	0.00	1
395.98	18.62	18.62	0.00	1
396.23	20.68	20.68	0.00	1
396.59	23.27	23.27	0.00	1
402.50	43.52	43.52	0.00	Overtopping



# Rating Curve Plot for Crossing: Crossing 5

## Total Rating Curve

Crossing: Crossing 5



**Table 2 - Culvert Summary Table: Lt. Sta. 401+05**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	393.49	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
2.33	2.33	394.21	0.717	0.0*	1-S2n	0.436	0.526	0.436	0.190	4.560	5.139
4.65	4.65	394.53	1.043	0.0*	1-S2n	0.626	0.756	0.632	0.282	5.438	6.423
6.98	6.98	394.82	1.326	0.027	1-S2n	0.780	0.938	0.780	0.354	6.144	7.274
9.31	9.31	395.05	1.563	0.339	1-S2n	0.918	1.087	0.918	0.415	6.615	7.928
11.64	11.64	395.27	1.780	0.681	1-S2n	1.046	1.220	1.046	0.468	7.001	8.462
13.96	13.96	395.49	1.997	1.059	1-S2n	1.172	1.342	1.172	0.516	7.303	8.918
16.29	16.29	395.72	2.229	1.469	5-S2n	1.300	1.450	1.300	0.560	7.531	9.316
18.62	18.62	395.98	2.486	2.143	5-S2n	1.435	1.551	1.435	0.601	7.721	9.674
20.68	20.68	396.23	2.742	2.530	5-S2n	1.576	1.629	1.576	0.635	7.800	9.962
23.27	23.27	396.59	3.104	2.947	7-M2c	2.000	1.714	1.714	0.675	8.121	10.291

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 393.49 ft, Outlet Elevation (invert): 392.37 ft

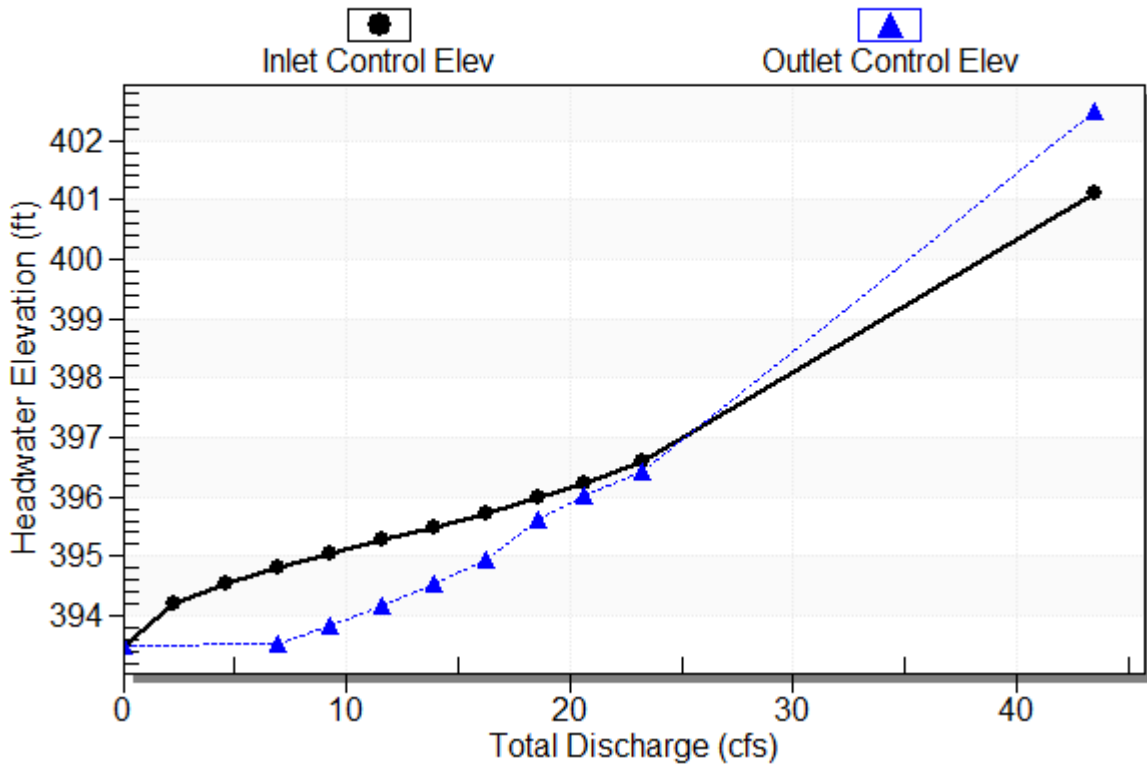
Culvert Length: 145.25 ft, Culvert Slope: 0.0077

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Culvert Performance Curve Plot: Lt. Sta. 401+05

### Performance Curve

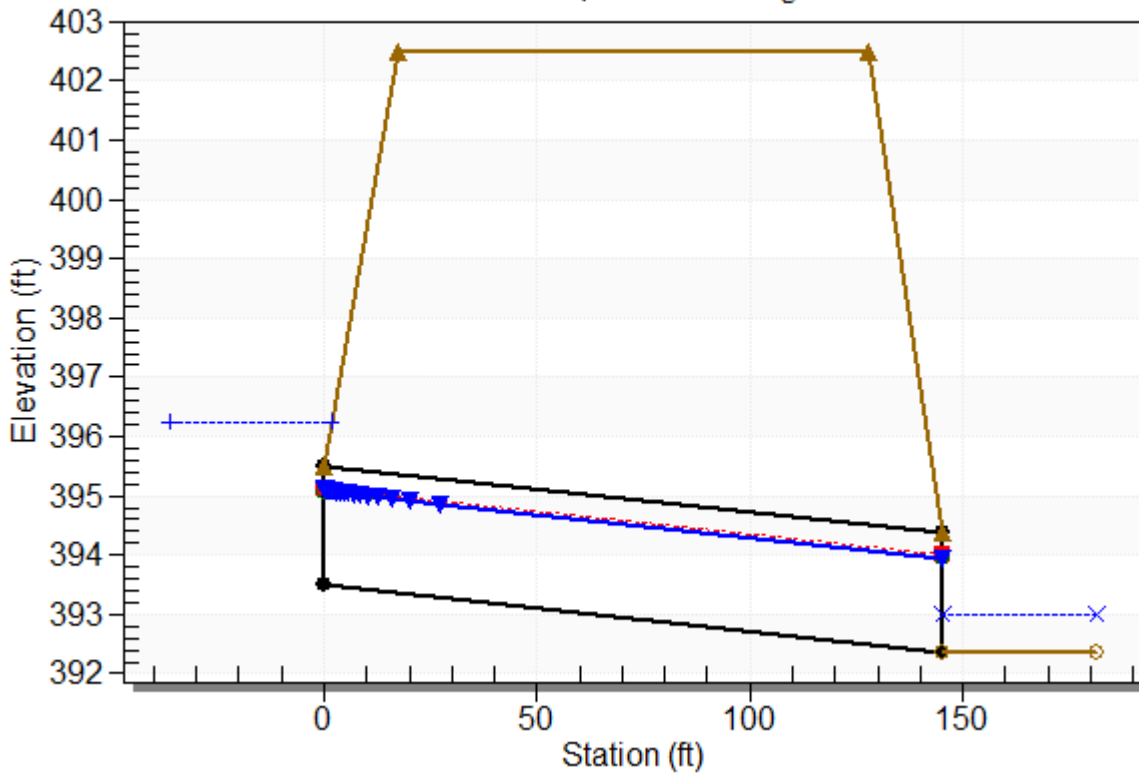
Culvert: Lt. Sta. 401+05



## Water Surface Profile Plot for Culvert: Lt. Sta. 401+05

### Crossing - Crossing 5, Design Discharge - 20.7 cfs

Culvert - Lt. Sta. 401+05, Culvert Discharge - 20.7 cfs



## Site Data - Lt. Sta. 401+05

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 393.49 ft

Outlet Station: 145.25 ft

Outlet Elevation: 392.37 ft

Number of Barrels: 1

## Culvert Data Summary - Lt. Sta. 401+05

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 5)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	392.37	0.00	0.00	0.00	0.00
2.33	392.56	0.19	5.14	0.24	2.24
4.65	392.65	0.28	6.42	0.35	2.35
6.98	392.72	0.35	7.27	0.44	2.42
9.31	392.78	0.41	7.93	0.52	2.47
11.64	392.84	0.47	8.46	0.58	2.50
13.96	392.89	0.52	8.92	0.64	2.53
16.29	392.93	0.56	9.32	0.70	2.56
18.62	392.97	0.60	9.67	0.75	2.58
20.68	393.00	0.63	9.96	0.79	2.60
23.27	393.04	0.67	10.29	0.84	2.61

### **Tailwater Channel Data - Crossing 5**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0120

Channel Invert Elevation: 392.37 ft

### **Roadway Data for Crossing: Crossing 5**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 402.50 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft

**Location:** Lt. Sta. 412+60  
**HY8 File Name:** .INP  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

Drainage Area (acres) = 142.05

Curve Number, CN =

Acres	HSG	CN	Description
10.59	C	92.00	IA (Paved-Open Ditches)
43.37	A	30.00	Woods (Good)
29.53	C	70.00	Woods (Good)
34.23	A	54.00	Residential (1/2 Acre)
24.33	C	80.00	Residential (1/2 Acre)
		0.00	
		0.00	
		0.00	

Weighted CN-value = 57.3

Time of Concentration,  $t_c$  = 1.370 hrs.

<u>Sheet Flow</u>		<u>Shallow Concentrated Flow</u>			<u>Channel Flow</u>	
Segment	1		Unpaved	Paved	Segment	
Roughness coeff., n	0.8	Segment			Roughness coeff., n	0.012
Length, (< 100) (ft)	100.0	Surface (unpaved)	16.1345	20.3282	Flow length, (ft)	0
2yr/24hr rainfall (in)	3.60	Length, (ft)	3377.92	0.00	Channel slope, (ft/ft)	0.0001
Land slope, (ft/ft)	0.0050	Course slope, (ft/ft)	0.0281	0.0000	X-sect. area, (sq ft)	0.00
Travel time, (hr)	1.023	Velocity, (fps)	2.7058	0.0643	Wet. perimeter, (ft)	0.00
		Travel time, (hr)	0.347	0.000	Hydraulic radius, (ft)	1.00
					Travel time, (hr)	0.000

24 Hour Rainfall, P -

SCDHEC Rainfall for: Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Initial Abstraction,  $I_a$  =

$$S = (1000/CN) - 10 = 7.46 \text{ in}$$

$$I_a = 0.2(S) = 1.49 \text{ in}$$

**Location:** Lt. Sta. 412+60  
**HY8 File Name:** .INP  
**Continued**

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	7.46	=	0.5	in
10	5.30	7.46	=	1.3	in
25	6.40	7.46	=	1.9	in
50	7.30	7.46	=	2.5	in
100	8.30	7.46	=	3.2	in

Unit Peak Discharge, q<sub>u</sub>  
 Rainfall Distribution Type II

Design Storm	P	I <sub>a</sub>	I <sub>a</sub> / p (max 0.50)	q <sub>u</sub>	
2	3.60	1.49	0.41	182.9	csm/in
10	5.30	1.49	0.28	243.4	csm/in
25	6.40	1.49	0.23	255.6	csm/in
50	7.30	1.49	0.20	263.2	csm/in
100	8.30	1.49	0.18	269.8	csm/in

Pond Factor, F<sub>p</sub> =

0 acres = 0.0%                      F<sub>p</sub> = 1.0

Peak Discharge, q<sub>p</sub> =

$$q_p = q_u A_m Q F_p$$

Design Storm	q <sub>u</sub> (csm/in)	A <sub>m</sub>	(mi <sub>2</sub> )	Q (in)	F <sub>p</sub>	q <sub>p</sub> (cfs)	
2	182.9	0.22		0.5	1.000	18.9	cfs
10	243.4	0.22		1.3	1.000	69.6	cfs
25	255.6	0.22		1.9	1.000	110.6	cfs
50	263.2	0.22		2.5	1.000	148.6	cfs
100	269.8	0.22		3.2	1.000	194.6	cfs

Run 1: 4' X 4' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	370.30	364.29	363.44	4.00	1.50	No
100	372.79	364.29	363.44	4.00	2.13	

Run 2: 8' X 8' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	369.04	364.29	363.44	8.00	0.59	YES
100	370.00	364.29	363.44	8.00	0.71	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 148.6 cfs

Maximum Flow: 194.6 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 6**

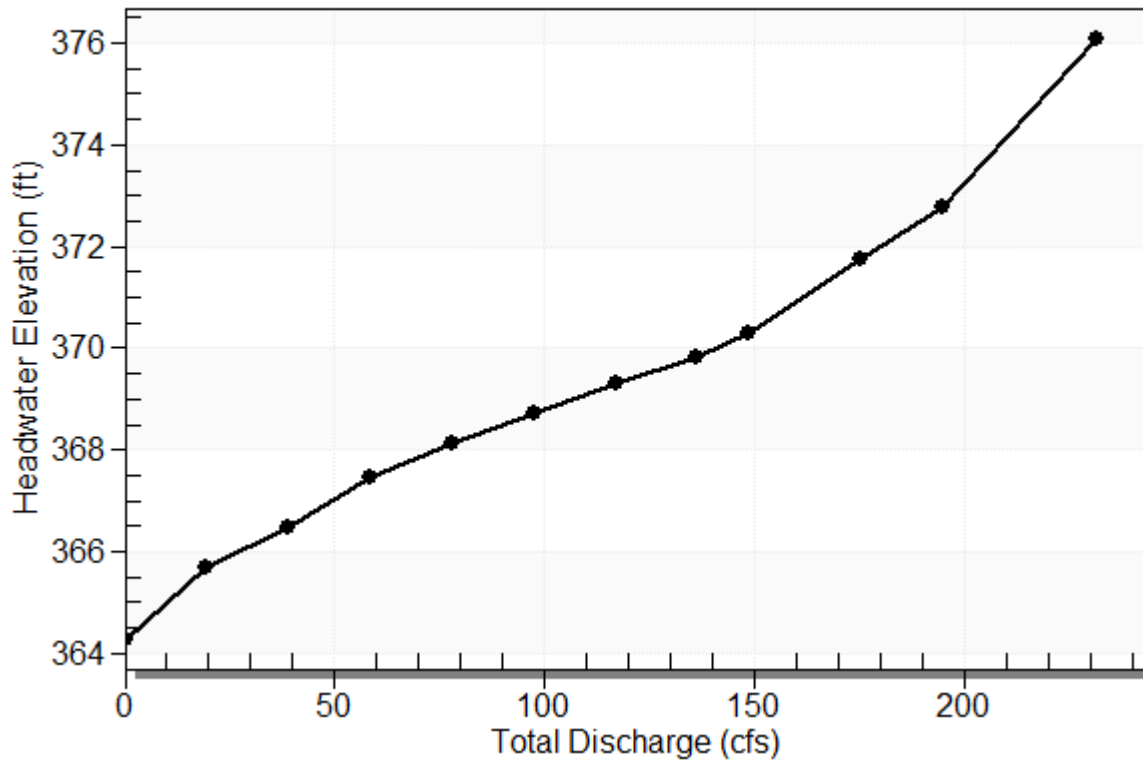
Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 412+60 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
364.29	0.00	0.00	0.00	1
365.67	19.46	19.46	0.00	1
366.49	38.92	38.92	0.00	1
367.47	58.38	58.38	0.00	1
368.12	77.84	77.84	0.00	1
368.73	97.30	97.30	0.00	1
369.29	116.76	116.76	0.00	1
369.83	136.22	136.22	0.00	1
370.30	148.60	148.60	0.00	1
371.76	175.14	175.14	0.00	1
372.79	194.60	194.60	0.00	1
375.00	231.43	231.43	0.00	Overtopping



Rating Curve Plot for Crossing: Crossing 6

### Total Rating Curve

Crossing: Crossing 6



**Table 2 - Culvert Summary Table: Lt. Sta. 412+60**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	364.29	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
19.46	19.46	365.67	1.382	0.106	1-S2n	0.873	0.902	0.873	0.637	5.570	3.694
38.92	38.92	366.49	2.201	0.796	1-S2n	1.429	1.433	1.429	0.947	6.807	4.624
58.38	58.38	367.47	2.894	3.176	2-M2c	1.924	1.877	1.877	1.188	7.775	5.242
77.84	77.84	368.12	3.517	3.832	2-M2c	2.392	2.274	2.274	1.392	8.557	5.715
97.30	97.30	368.73	4.129	4.435	7-M2c	2.845	2.639	2.639	1.572	9.218	6.103
116.76	116.76	369.29	4.777	5.003	7-M2c	3.288	2.980	2.980	1.734	9.796	6.434
136.22	136.22	369.83	5.498	5.543	7-M2c	4.000	3.302	3.302	1.882	10.312	6.724
148.60	148.60	370.30	6.006	5.875	7-M2c	4.000	3.500	3.500	1.971	10.615	6.891
175.14	175.14	371.76	7.247	7.472	7-M2c	4.000	3.905	3.905	2.148	11.213	7.217
194.60	194.60	372.79	8.299	8.495	6-FFc	4.000	4.000	4.000	2.269	12.163	7.431

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 364.29 ft, Outlet Elevation (invert): 363.44 ft

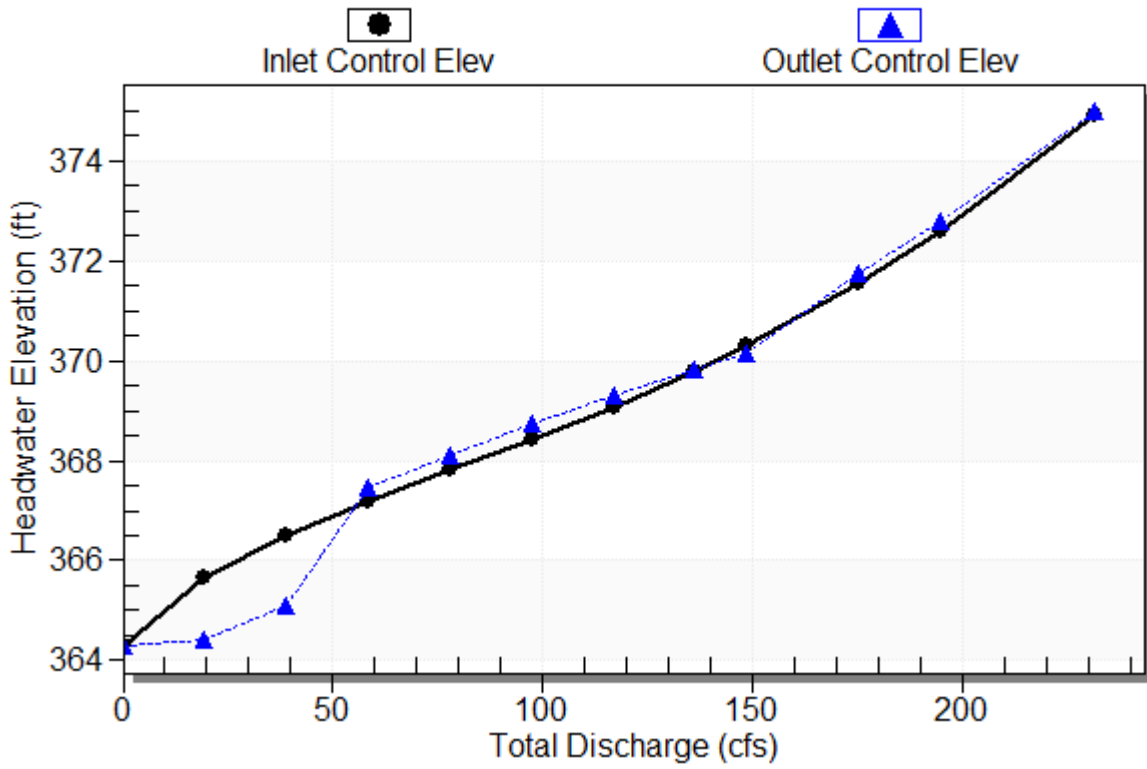
Culvert Length: 222.00 ft, Culvert Slope: 0.0038

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Culvert Performance Curve Plot: Lt. Sta. 412+60

### Performance Curve

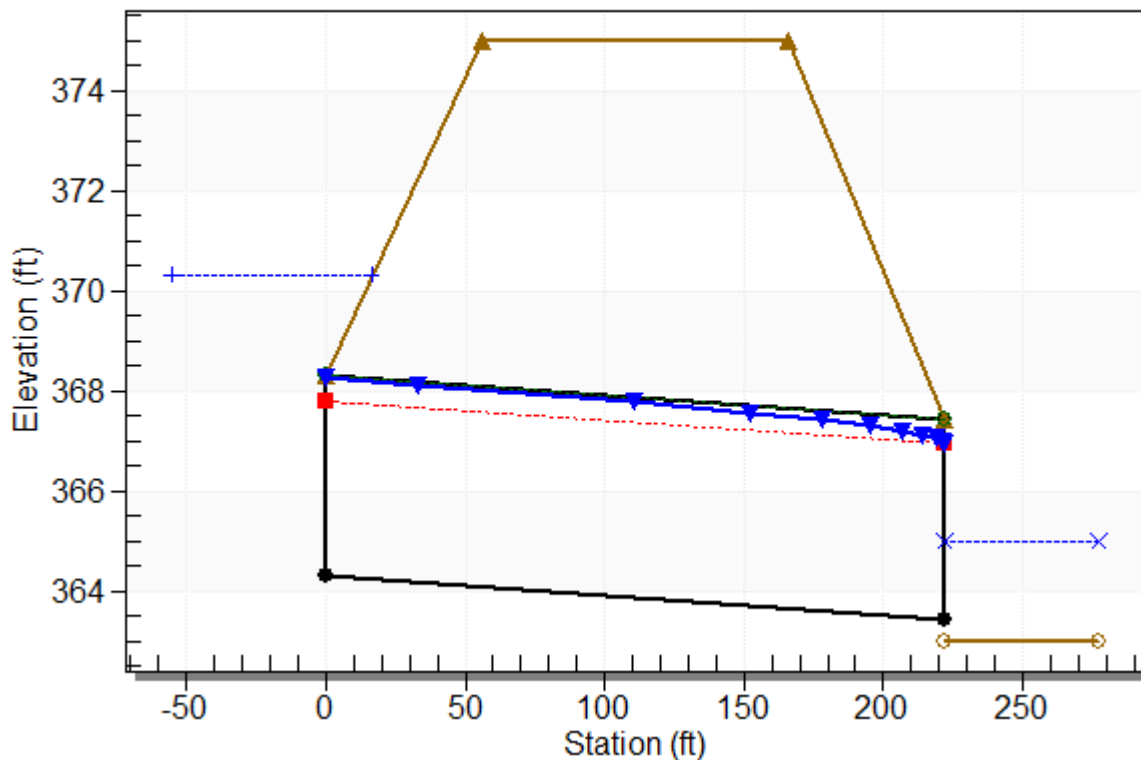
Culvert: Lt. Sta. 412+60



## Water Surface Profile Plot for Culvert: Lt. Sta. 412+60

### Crossing - Crossing 6, Design Discharge - 148.6 cfs

Culvert - Lt. Sta. 412+60, Culvert Discharge - 148.6 cfs



### Site Data - Lt. Sta. 412+60

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 364.29 ft

Outlet Station: 222.00 ft

Outlet Elevation: 363.44 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 412+60

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 6)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	363.00	0.00	0.00	0.00	0.00
19.46	363.64	0.64	3.69	0.79	0.88
38.92	363.95	0.95	4.62	1.18	0.92
58.38	364.19	1.19	5.24	1.48	0.95
77.84	364.39	1.39	5.72	1.74	0.97
97.30	364.57	1.57	6.10	1.96	0.98
116.76	364.73	1.73	6.43	2.16	0.99
136.22	364.88	1.88	6.72	2.35	1.00
148.60	364.97	1.97	6.89	2.46	1.01
175.14	365.15	2.15	7.22	2.68	1.02
194.60	365.27	2.27	7.43	2.83	1.03



### **Tailwater Channel Data - Crossing 6**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 7.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 363.00 ft

### **Roadway Data for Crossing: Crossing 6**


Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 375.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft



*HEC-RAS Output  
Station 412+50*

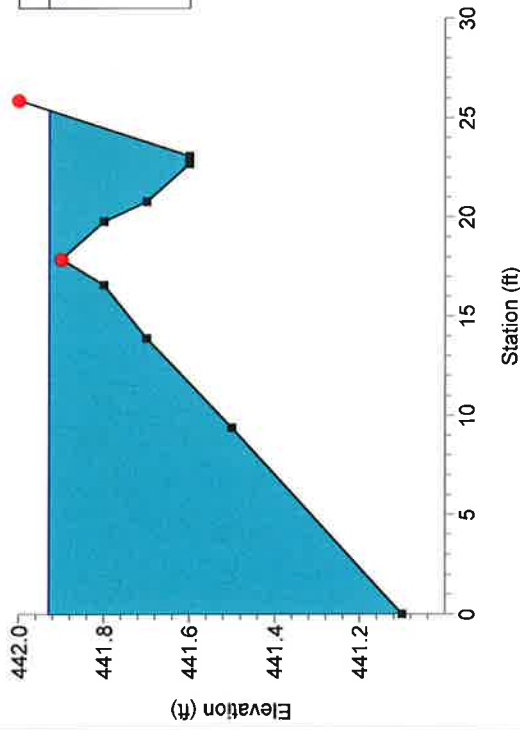


*HEC-RAS Output  
Station 472+50*

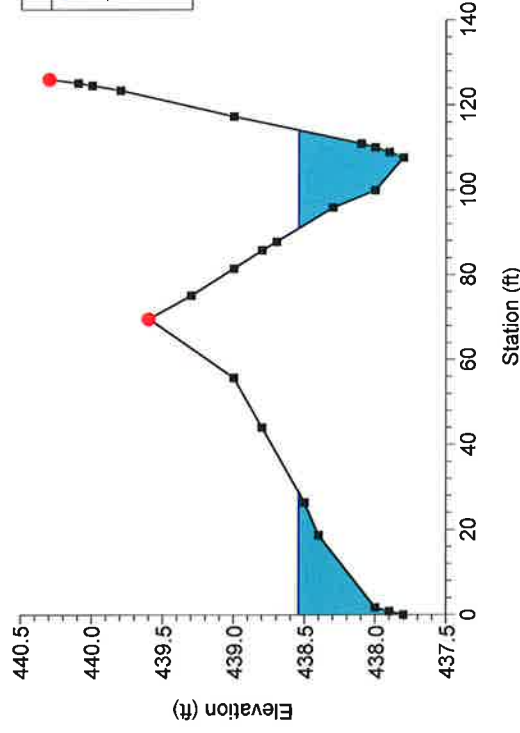
HEC-RAS Plan: Plan 01 River: Ditch #12 & #13 Reach: Ditch #12 & #13

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #12 & #13	1066.91	50 yr	30.60	441.60	441.90	441.90	442.13	0.277249	5.56	8.59	25.16	2.46
Ditch #12 & #13	1066.91	100 yr	34.39	441.60	441.93	441.93	442.19	0.258547	5.92	9.36	25.41	2.44
Ditch #12 & #13	1016.91	50 yr	30.60	437.80	438.51	438.43	438.62	0.020528	2.86	15.98	49.41	0.79
Ditch #12 & #13	1016.91	100 yr	34.39	437.80	438.55	438.47	438.66	0.020565	2.94	17.69	52.28	0.79
Ditch #12 & #13	966.91	50 yr	30.60	436.70	437.13	437.13	437.25	0.038279	2.87	10.68	41.54	1.00
Ditch #12 & #13	966.91	100 yr	34.39	436.70	437.15	437.15	437.29	0.038678	2.98	11.56	42.61	1.01
Ditch #12 & #13	916.91	50 yr	30.60	434.40	434.97	434.97	435.13	0.037722	3.17	9.65	31.76	1.01
Ditch #12 & #13	916.91	100 yr	34.39	434.40	435.00	435.00	435.17	0.037365	3.27	10.51	32.77	1.02
Ditch #12 & #13	866.91	50 yr	30.60	431.40	431.82		431.82	0.000003	0.02	842.99	334.23	0.01
Ditch #12 & #13	866.91	100 yr	34.39	431.40	431.86		431.86	0.000003	0.03	856.19	334.88	0.01
Ditch #12 & #13	816.91	50 yr	30.60	431.10	431.64	431.64	431.80	0.036185	3.25	9.44	30.13	1.01
Ditch #12 & #13	816.91	100 yr	34.39	431.10	431.67	431.67	431.84	0.034655	3.31	10.47	32.27	0.99
Ditch #12 & #13	766.91	50 yr	30.60	429.10	429.47	429.47	429.55	0.039849	2.20	13.89	82.62	0.95
Ditch #12 & #13	766.91	100 yr	34.39	429.10	429.48	429.48	429.57	0.043532	2.35	14.62	84.23	0.99
Ditch #12 & #13	716.91	50 yr	30.60	431.10	425.15		425.18	0.061430		19.83	52.87	0.00
Ditch #12 & #13	716.91	100 yr	34.39	431.10	425.19		425.23	0.057048		22.25	55.51	0.00
Ditch #12 & #13	666.91	50 yr	30.60	424.00	425.02		425.03	0.000931	0.88	72.61	115.85	0.18
Ditch #12 & #13	666.91	100 yr	34.39	424.00	425.05		425.06	0.001048	0.95	76.01	118.23	0.20
Ditch #12 & #13	616.91	50 yr	30.60	424.50	424.93		424.94	0.003897	0.96	31.85	115.11	0.32
Ditch #12 & #13	616.91	100 yr	34.39	424.50	424.95		424.97	0.003830	1.00	34.47	116.19	0.32
Ditch #12 & #13	566.91	50 yr	30.60	424.00	424.35	424.35	424.49	0.037665	2.95	10.37	38.10	1.00
Ditch #12 & #13	566.91	100 yr	34.39	424.00	424.37	424.37	424.52	0.037508	3.07	11.19	38.63	1.01
Ditch #12 & #13	550		Culvert									
Ditch #12 & #13	350	50 yr	30.60	418.00	417.03		417.04	0.002702		68.04	104.76	0.00
Ditch #12 & #13	350	100 yr	34.39	418.00	417.09		417.09	0.002676		73.83	109.33	0.00
Ditch #12 & #13	300	50 yr	30.60	417.00	416.95		416.95	0.001051		91.64	106.96	0.00
Ditch #12 & #13	300	100 yr	34.39	417.00	417.00		417.01	0.001124	0.03	97.17	113.30	0.08
Ditch #12 & #13	250	50 yr	30.60	415.80	416.72		416.81	0.021560	3.31	21.78	54.90	0.82
Ditch #12 & #13	250	100 yr	34.39	415.80	416.76		416.85	0.020577	3.30	24.45	58.41	0.80
Ditch #12 & #13	200	50 yr	30.60	414.00	415.17	415.17	415.52	0.029841	4.76	6.44	9.37	1.01
Ditch #12 & #13	200	100 yr	34.39	414.00	415.23	415.23	415.60	0.029344	4.89	7.03	9.68	1.01
Ditch #12 & #13	150	50 yr	30.60	412.10	413.23	413.23	413.61	0.029545	4.91	6.23	8.46	1.01
Ditch #12 & #13	150	100 yr	34.39	412.10	413.30	413.30	413.69	0.029065	5.04	6.83	8.81	1.01
Ditch #12 & #13	100	50 yr	30.60	410.30	411.38	411.35	411.71	0.026359	4.61	6.63	9.12	0.95
Ditch #12 & #13	100	100 yr	34.39	410.30	411.45	411.41	411.80	0.025346	4.71	7.30	9.42	0.94
Ditch #12 & #13	50	50 yr	30.60	409.30	410.76	410.43	410.92	0.009403	3.21	9.54	10.39	0.59
Ditch #12 & #13	50	100 yr	34.39	409.30	410.84		411.01	0.009524	3.33	10.34	10.75	0.60
Ditch #12 & #13	0	50 yr	30.60	409.00	409.99	409.89	410.25	0.020011	4.07	7.52	10.27	0.84
Ditch #12 & #13	0	100 yr	34.39	409.00	410.06	409.96	410.33	0.020004	4.21	8.18	10.61	0.84

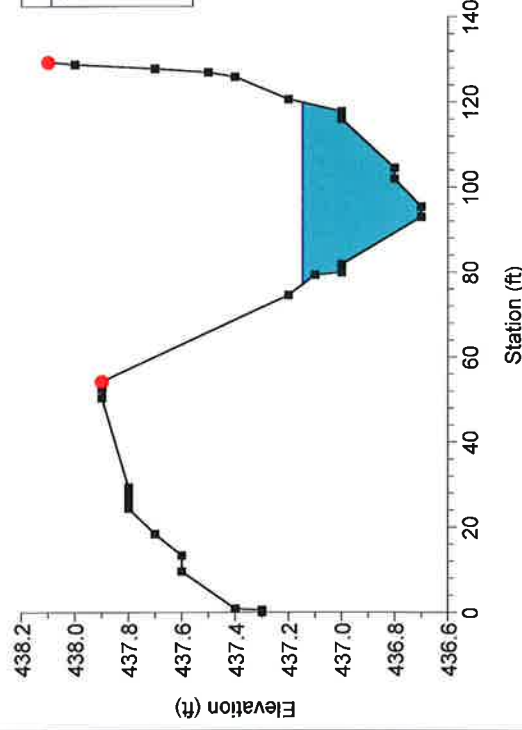
Ditch #12 & #13 Plan: Plan 01 9/1/2015  
1066.91



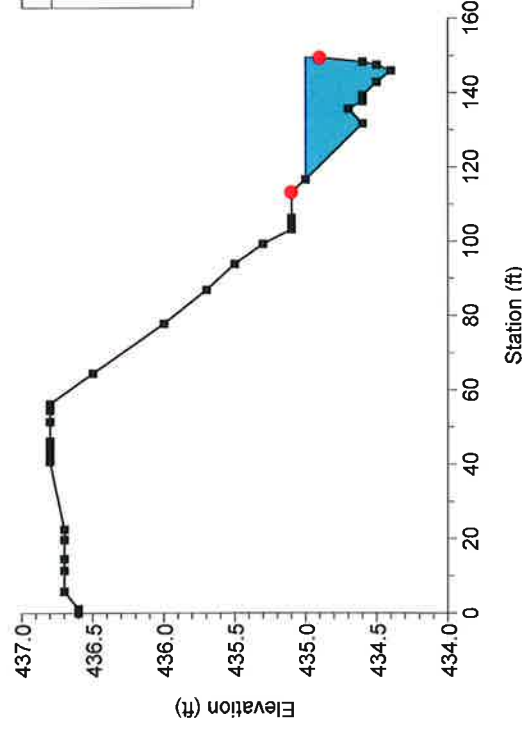
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1016.91



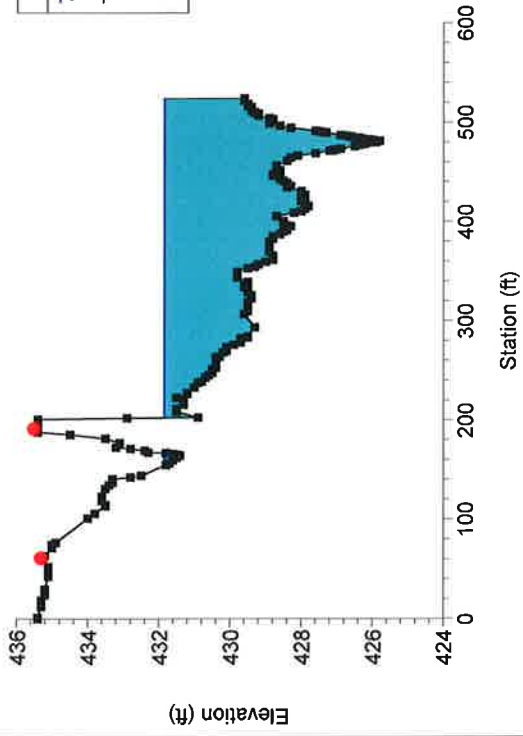
Ditch #12 & #13 Plan: Plan 01 9/1/2015  
966.91



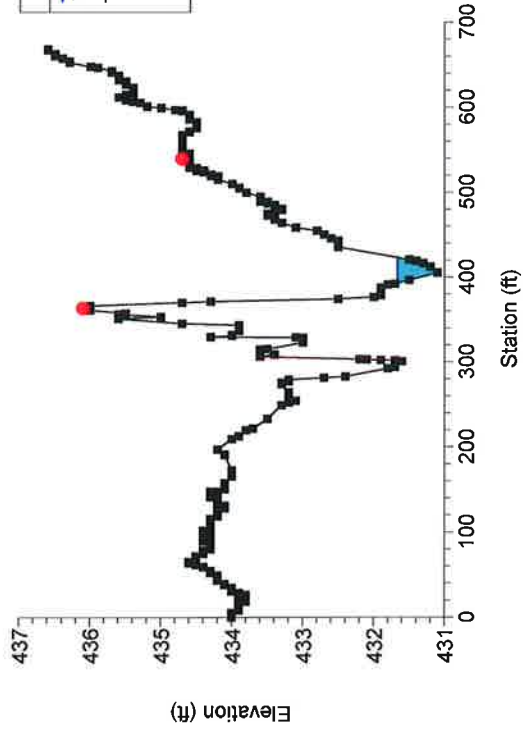
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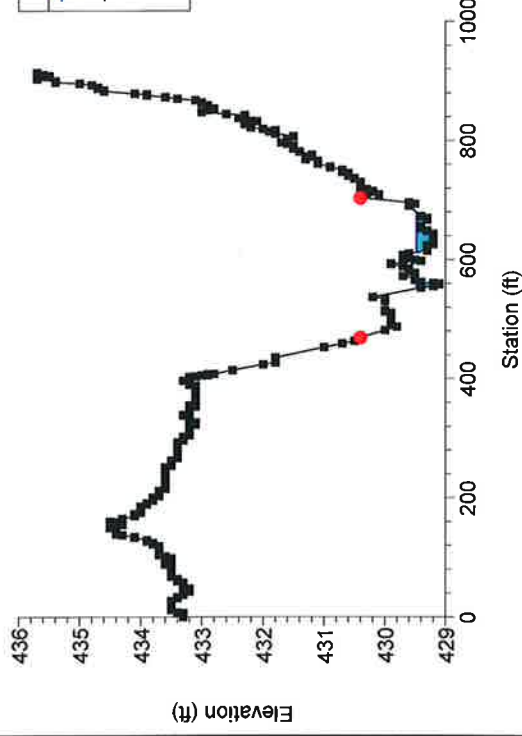
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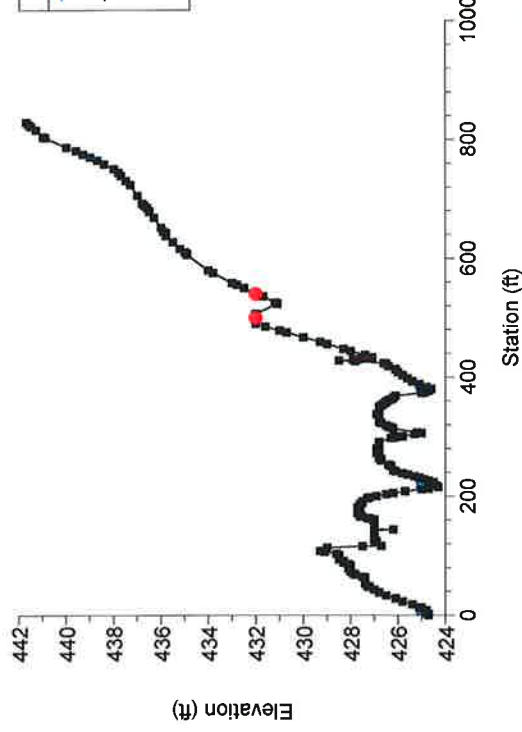
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816.91



Ditch #12 & #13 Plan: Plan 01 9/1/2015  
766.91

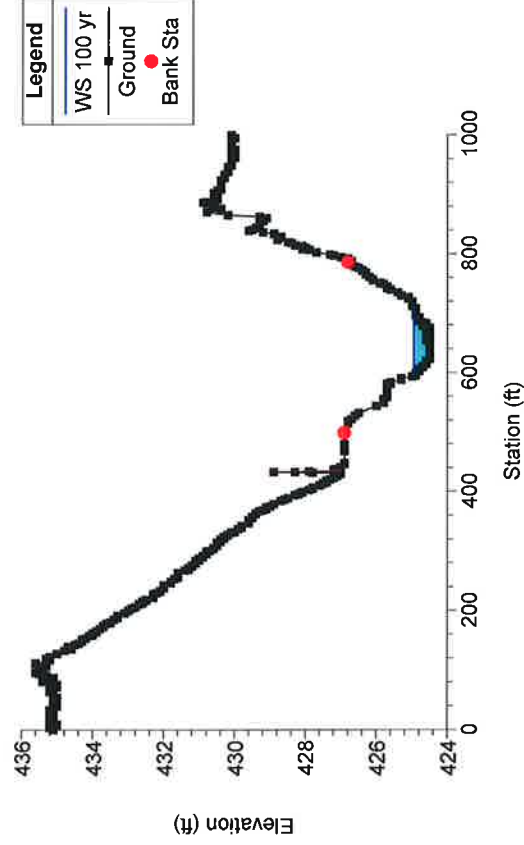
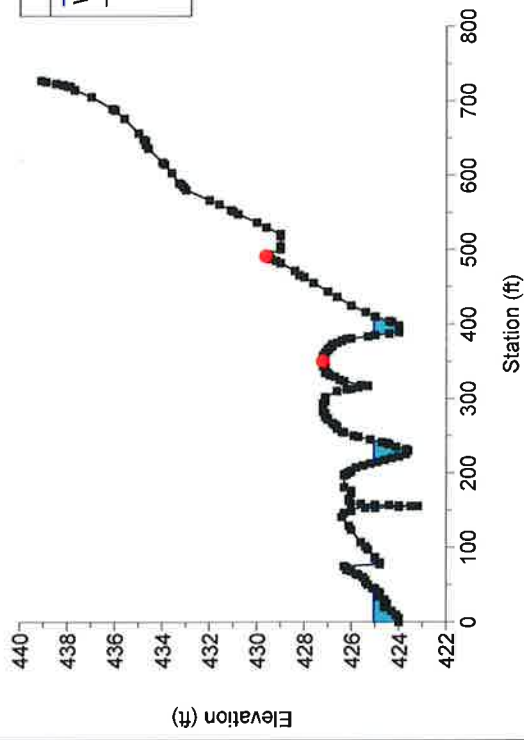


Ditch #12 & #13 Plan: Plan 01 9/1/2015  
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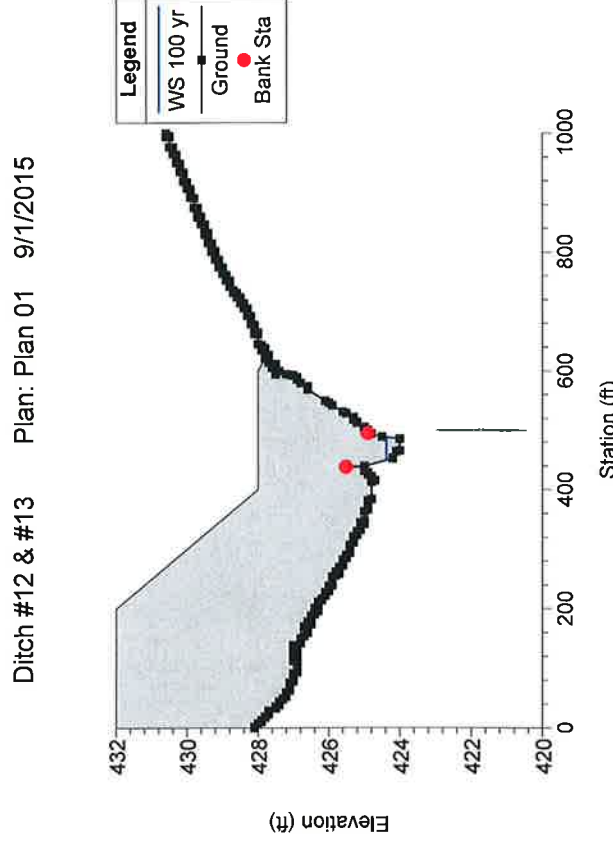
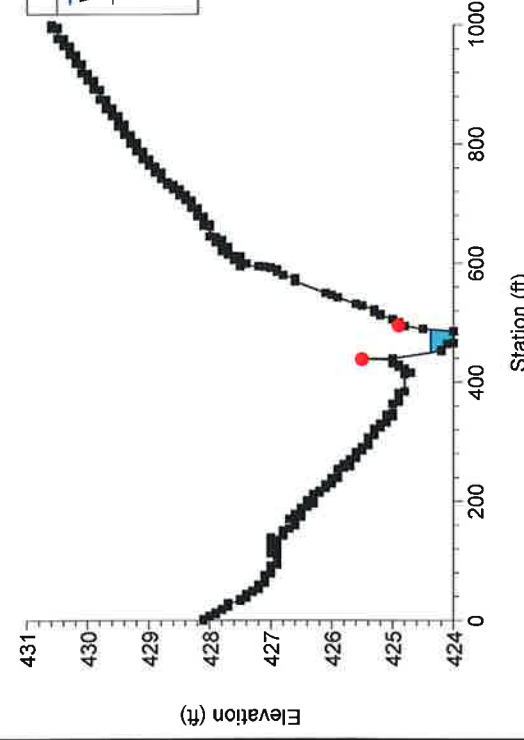




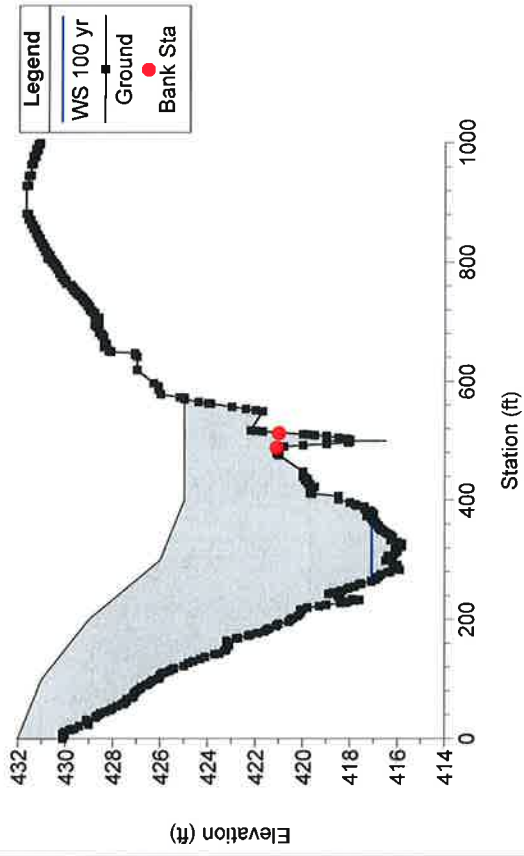
Ditch #12 & #13 Plan: Plan 01 9/1/2015  
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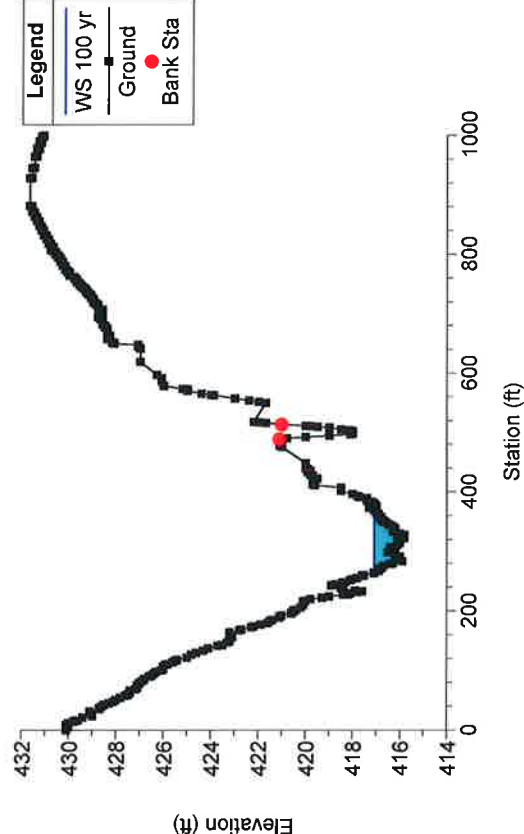
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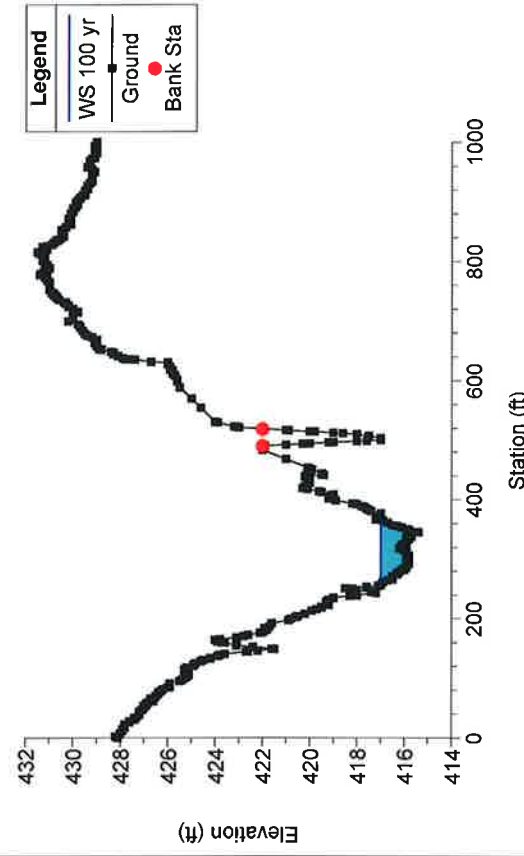
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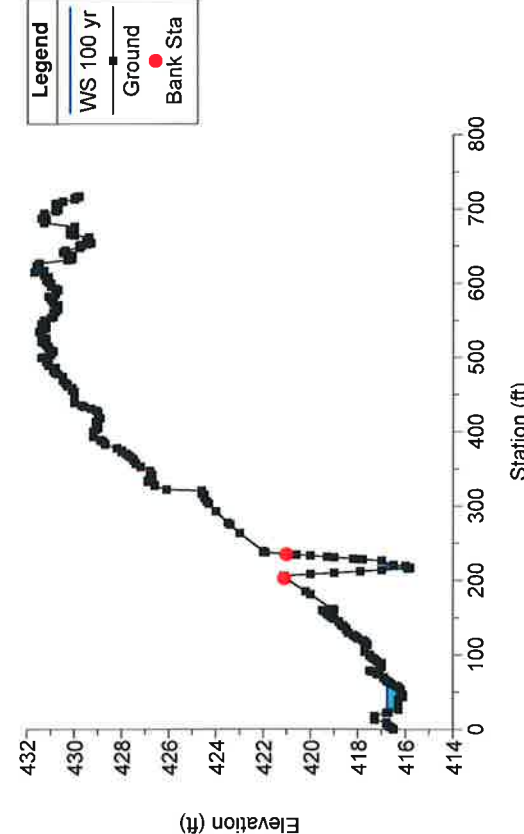
Ditch #12 & #13 Plan: Plan 01 9/1/2015



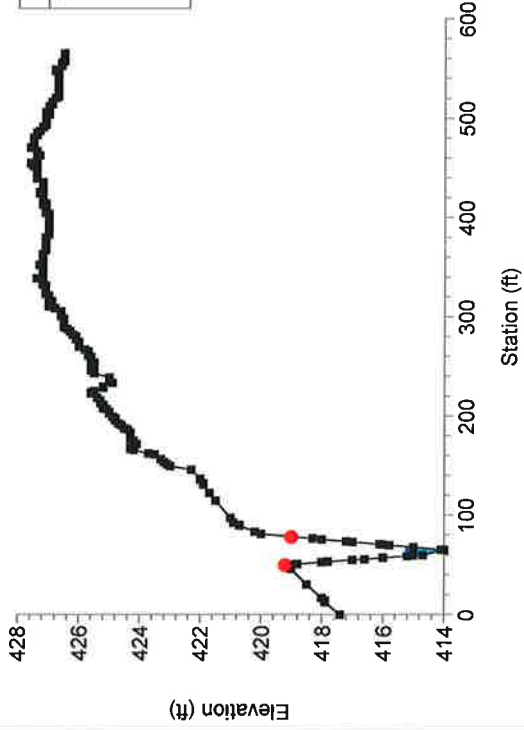
Ditch #12 & #13 Plan: Plan 01 9/1/2015



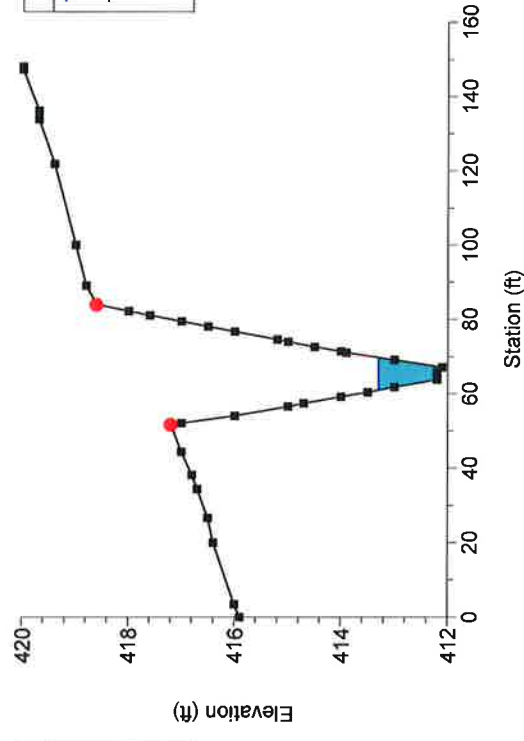
Ditch #12 & #13 Plan: Plan 01 9/1/2015



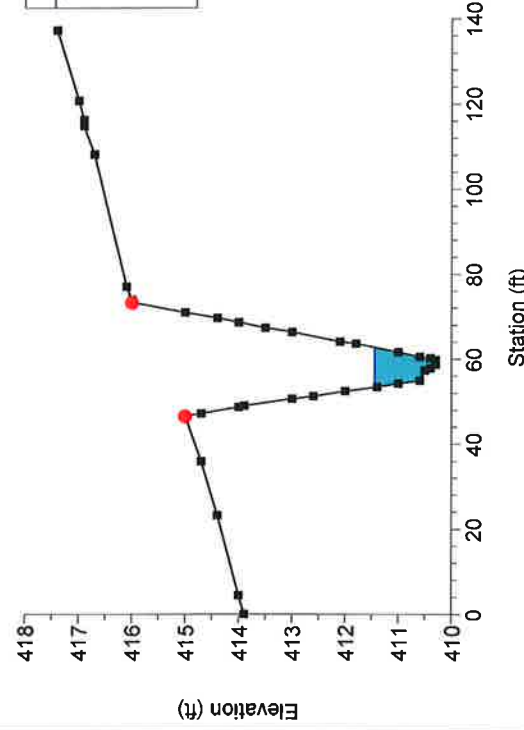
Ditch #12 & #13 Plan: Plan 01 9/1/2015



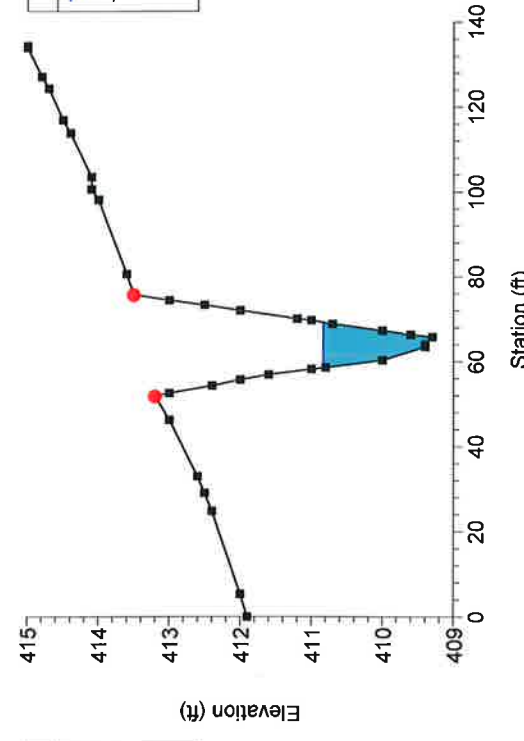
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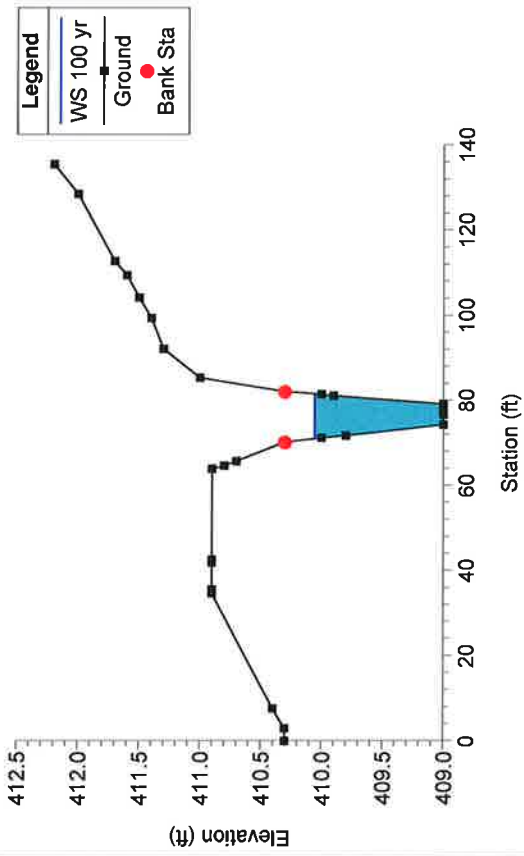
Ditch #12 & #13 Plan: Plan 01 9/1/2015



Ditch #12 & #13 Plan: Plan 01 9/1/2015



Ditch #12 & #13 Plan: Plan 01 9/1/2015  
0

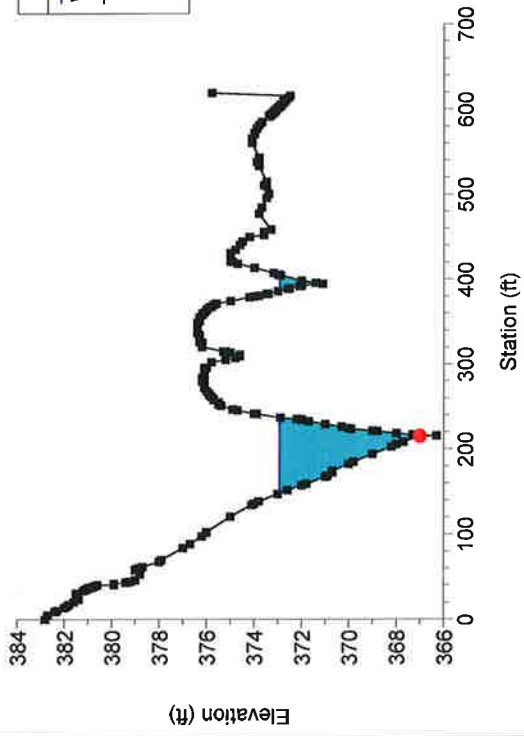


HEC-RAS Plan: 8 & 9 River: Ditch #8 & #9 Reach: Ditch #8 & #9

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #8 & #9	724	50 yr	148.60	366.30	372.56		372.57	0.000746	2.25	236.88	99.36	0.16
Ditch #8 & #9	724	100 yr	194.60	366.30	372.95		372.97	0.000868	2.53	280.07	121.71	0.18
Ditch #8 & #9	674	50 yr	148.60	368.10	372.55		372.56	0.000163	0.80	206.24	110.91	0.09
Ditch #8 & #9	674	100 yr	194.60	368.10	372.94		372.95	0.000162	0.89	250.44	114.98	0.10
Ditch #8 & #9	624	50 yr	148.60	369.00	372.54		372.55	0.000135	0.71	211.63	101.80	0.08
Ditch #8 & #9	624	100 yr	194.60	369.00	372.93		372.94	0.000133	0.78	252.62	107.33	0.09
Ditch #8 & #9	574	50 yr	148.60	370.00	372.54		372.54	0.000115	0.67	240.03	129.80	0.08
Ditch #8 & #9	574	100 yr	194.60	370.00	372.93		372.94	0.000115	0.74	292.96	140.48	0.08
Ditch #8 & #9	524	50 yr	148.60	370.00	372.53		372.54	0.000126	0.70	246.40	138.62	0.08
Ditch #8 & #9	524	100 yr	194.60	370.00	372.92		372.93	0.000124	0.78	303.00	151.93	0.08
Ditch #8 & #9	474	50 yr	148.60	370.00	372.49		372.52	0.000968	2.06	207.23	131.00	0.23
Ditch #8 & #9	474	100 yr	194.60	370.00	372.88		372.92	0.000903	2.19	262.12	150.62	0.23
Ditch #8 & #9	424	50 yr	148.60	371.20	372.01	372.01	372.35	0.027572	4.74	35.17	58.24	1.00
Ditch #8 & #9	424	100 yr	194.60	371.20	372.88	372.15	372.82	0.004832	3.09	78.34	73.39	0.47
Ditch #8 & #9	400		Culvert									
Ditch #8 & #9	200	50 yr	148.60	365.00	366.45		366.55	0.011218	3.91	104.84	149.62	0.67
Ditch #8 & #9	200	100 yr	194.60	365.00	366.63		366.74	0.010612	4.22	131.90	157.92	0.67
Ditch #8 & #9	150	50 yr	148.60	364.30	365.42	365.42	365.76	0.021929	5.22	51.89	90.65	0.94
Ditch #8 & #9	150	100 yr	194.60	364.30	365.56	365.56	365.96	0.021958	5.73	65.36	98.75	0.98
Ditch #8 & #9	100	50 yr	148.60	362.60	363.84	363.81	364.09	0.018872	4.42	59.16	116.03	0.85
Ditch #8 & #9	100	100 yr	194.60	362.60	363.95	363.93	364.26	0.020484	4.97	71.82	122.59	0.90
Ditch #8 & #9	50	50 yr	148.60	362.10	362.91	362.84	363.05	0.021675	3.01	49.42	126.87	0.81
Ditch #8 & #9	50	100 yr	194.60	362.10	362.99	362.93	363.16	0.021807	3.27	60.70	143.82	0.83
Ditch #8 & #9	0	50 yr	148.60	361.00	361.89	361.83	362.01	0.020001	2.81	53.22	136.32	0.78
Ditch #8 & #9	0	100 yr	194.60	361.00	361.96	361.89	362.11	0.020017	3.12	63.27	140.25	0.80

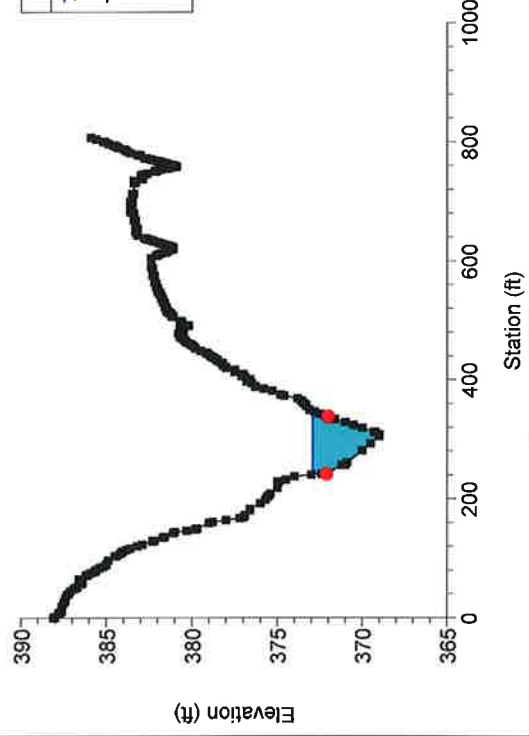
Ditch #8 & #9 Plan: Plan 01 9/1/2015

724



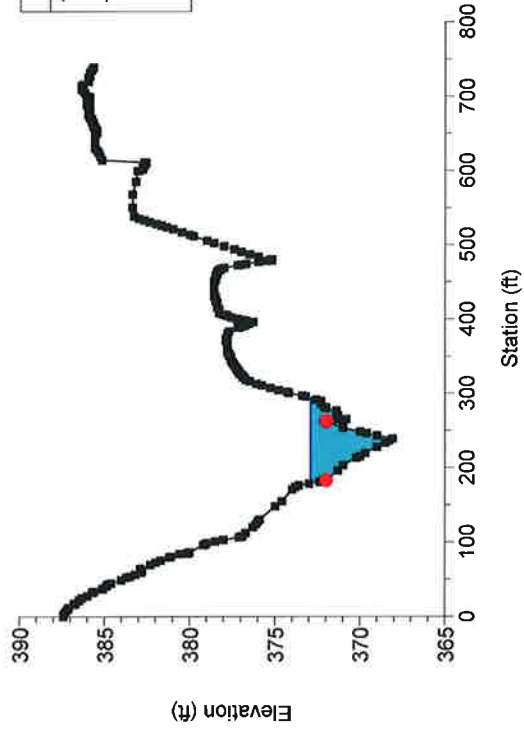
Ditch #8 & #9 Plan: Plan 01 9/1/2015

624



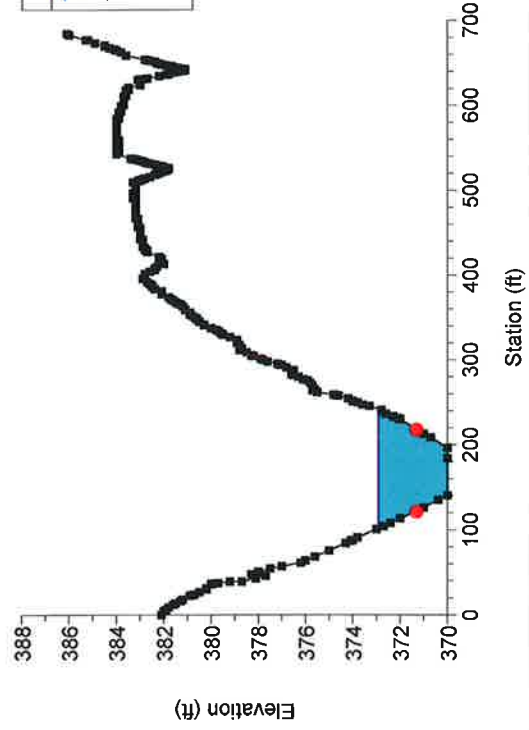
Ditch #8 & #9 Plan: Plan 01 9/1/2015

674



Ditch #8 & #9 Plan: Plan 01 9/1/2015

574



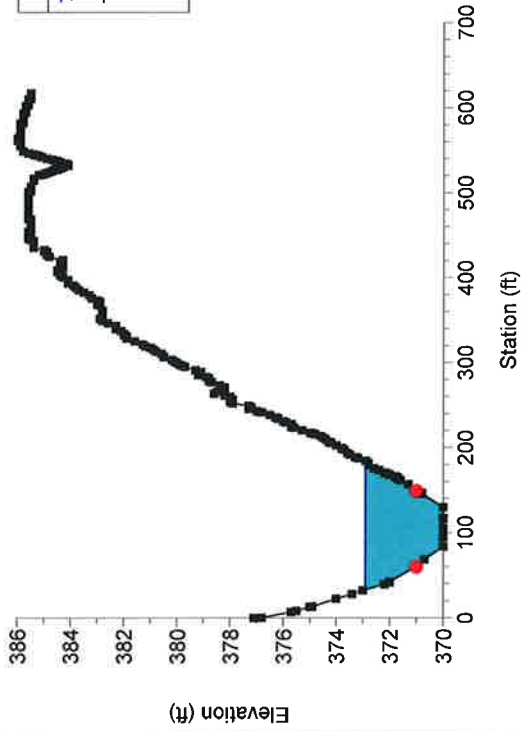


Ditch #8 & #9

Plan: Plan 01 9/1/2015

524

474

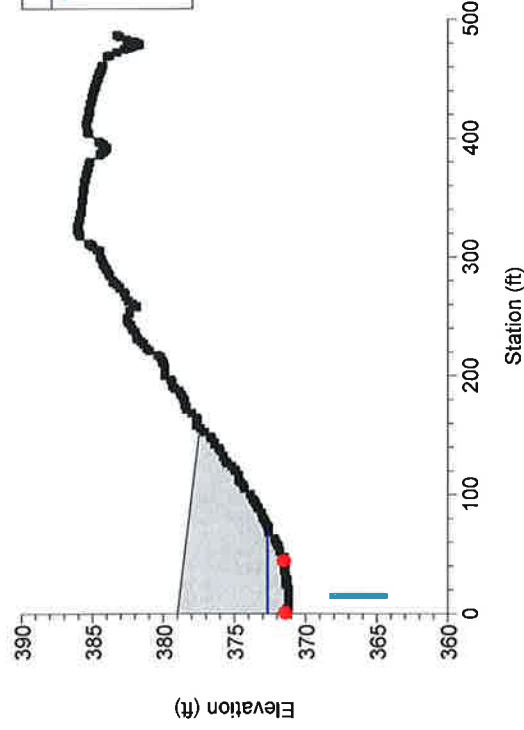
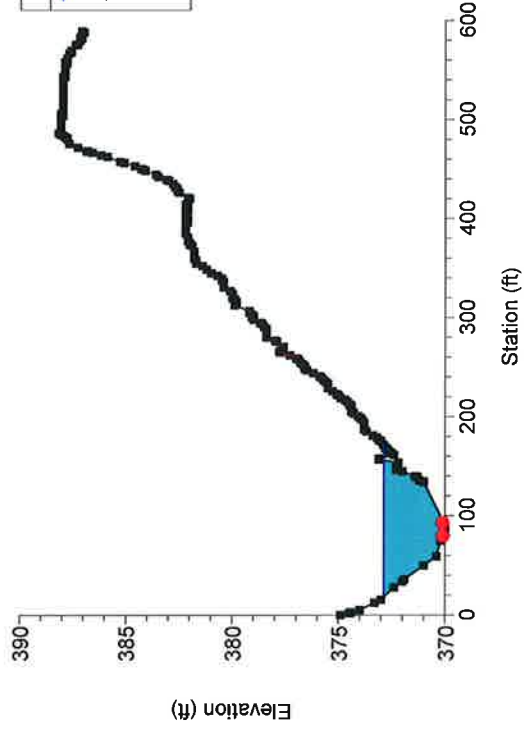
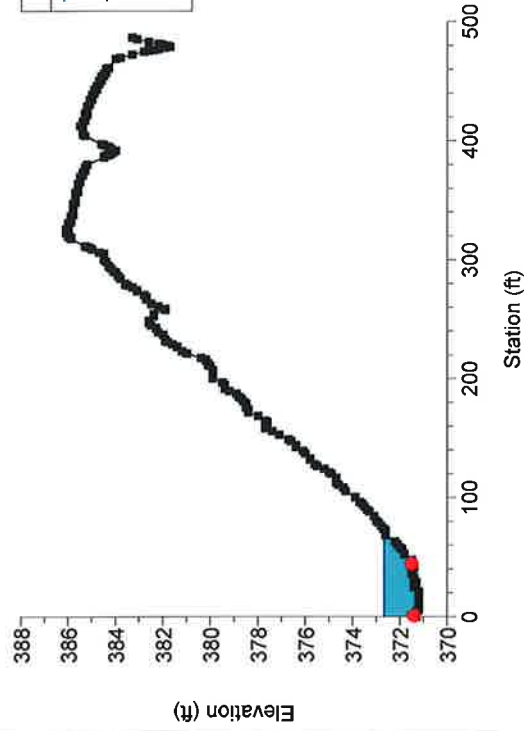


Ditch #8 & #9

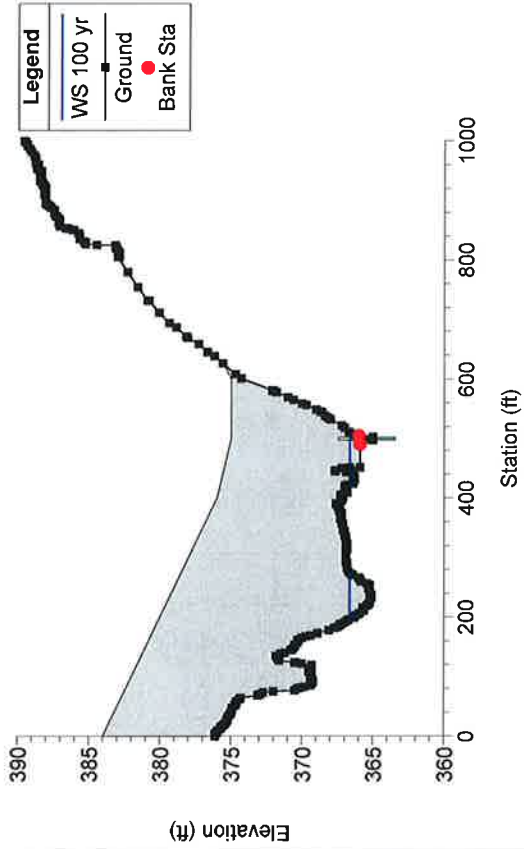
Plan: Plan 01 9/1/2015

424

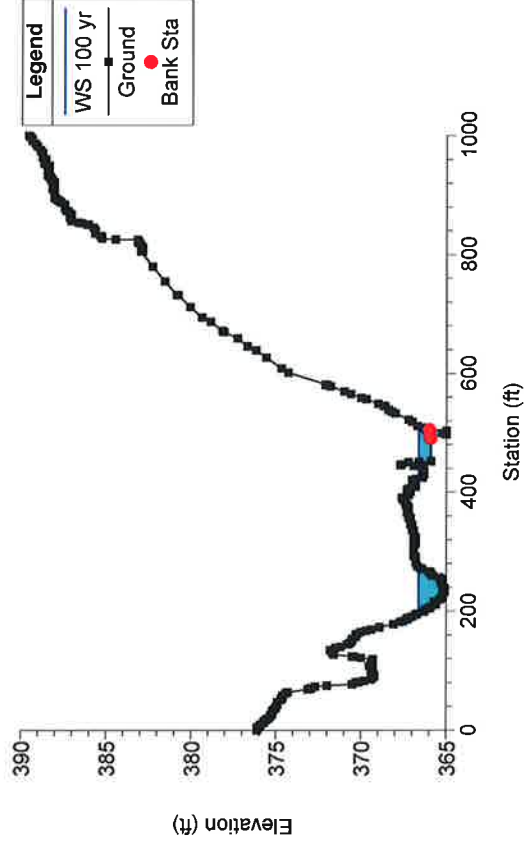
474



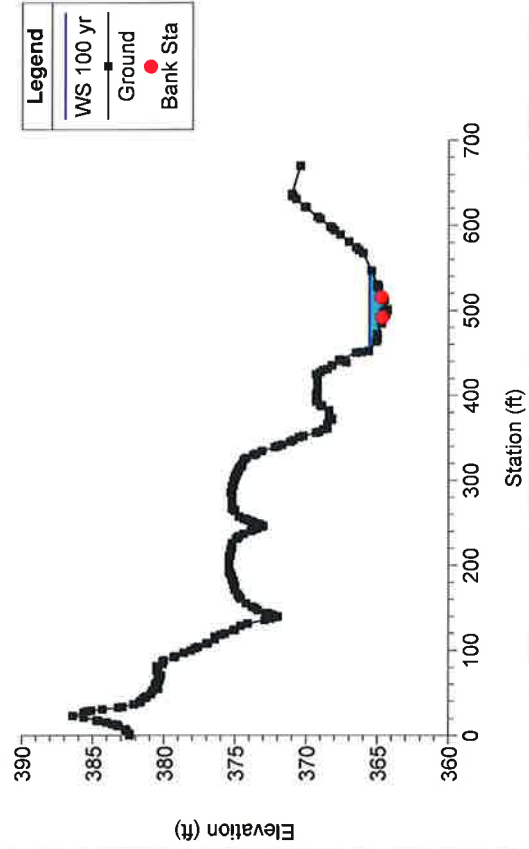
Ditch #8 & #9 Plan: Plan 01 9/1/2015



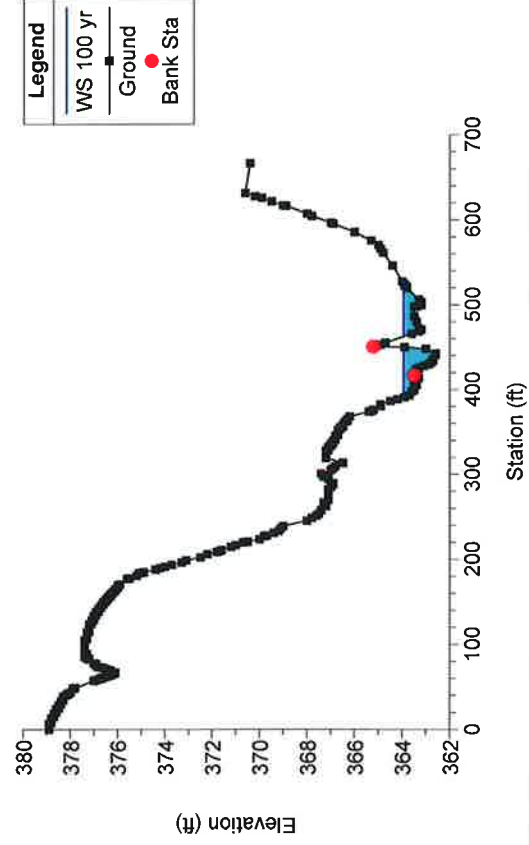
Ditch #8 & #9 Plan: Plan 01 9/1/2015



Ditch #8 & #9 Plan: Plan 01 9/1/2015

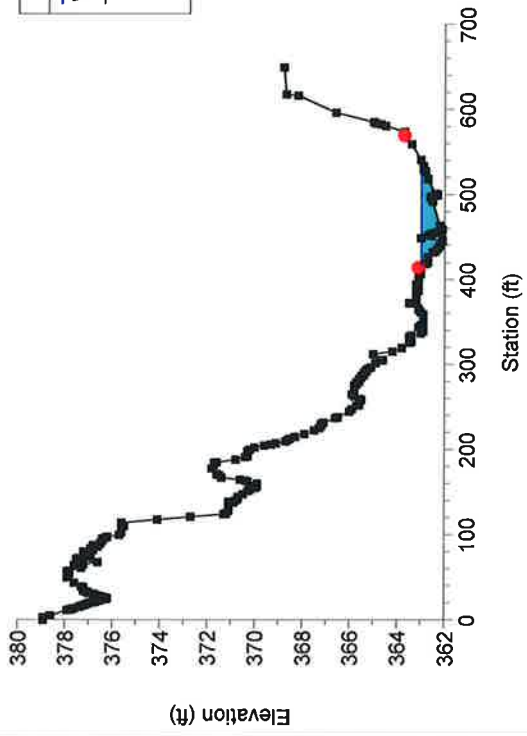


Ditch #8 & #9 Plan: Plan 01 9/1/2015



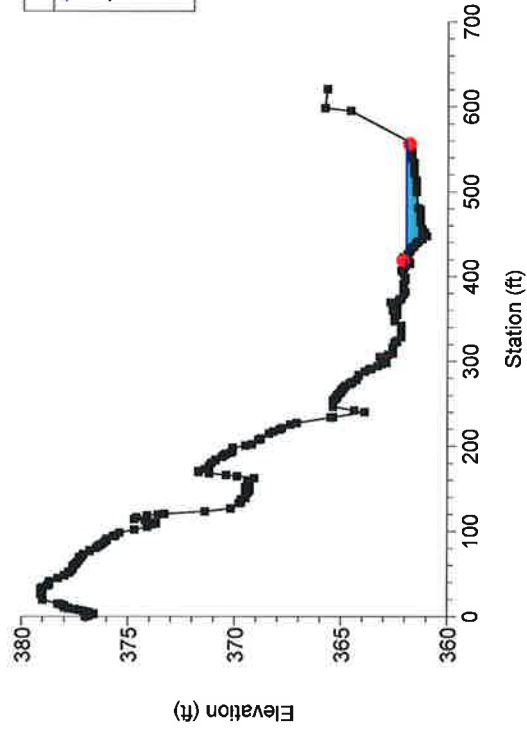
Ditch #8 & #9 Plan: Plan 01 9/1/2015

50



Ditch #8 & #9 Plan: Plan 01 9/1/2015

0



**LOCATION:** Lt. Sta. 439+80  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 3.79 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
1.38	-	0.90	Pavements & Roofs
2.41	-	0.50	Suburban, Normal Residential
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	
Weighted C-Value:		0.65	

**TIME OF CONCENTRATION:**

<u>Sheet Flow</u>		<u>Shallow Concentrated Flow</u>			<u>Channel Flow</u>	
Segment	1	Segment	Unpaved	Paved	Segment	
Roughness coeff., n	0.8	Surface	16.1345	20.3282	Roughness coeff., n	0.012
Length, (< 100) (ft)	100.0	Length, (ft)	591	0	Flow length, (ft)	0
2yr/24hr rainfall (in)	3.60	Course slope, (ft/ft)	0.0321	0.003	Channel slope, (ft/ft)	0.0001
Land slope, (ft/ft)	0.0100	Velocity, (fps)	2.89293	1.11342	X-sect. area, (sq ft)	0.00
Travel time, (hr)	0.775	Travel time, (hr)	0.057	0	Wet. perimeter, (ft)	0.00
					Hydraulic radius, (ft)	1.00
					Travel time, (hr)	0.000

Time of Concentration = 0.832 hr I (50 Yr)= 3.85  
 49.9 min I (100 Yr)= 4.16  
 Design Q (50 Yr)= 11.31 cfs  
 Maximum Q (100 Yr)= 12.71 cfs

Run 1: 18" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	399.65	396.42	396.04	1.50	2.15	NO
100	400.01	396.42	396.04	1.50	2.39	
*H <sub>w</sub> /D > 1.2 Try 30" Smooth Wall Pipe						

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 11.31 cfs

Maximum Flow: 12.71 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 7**

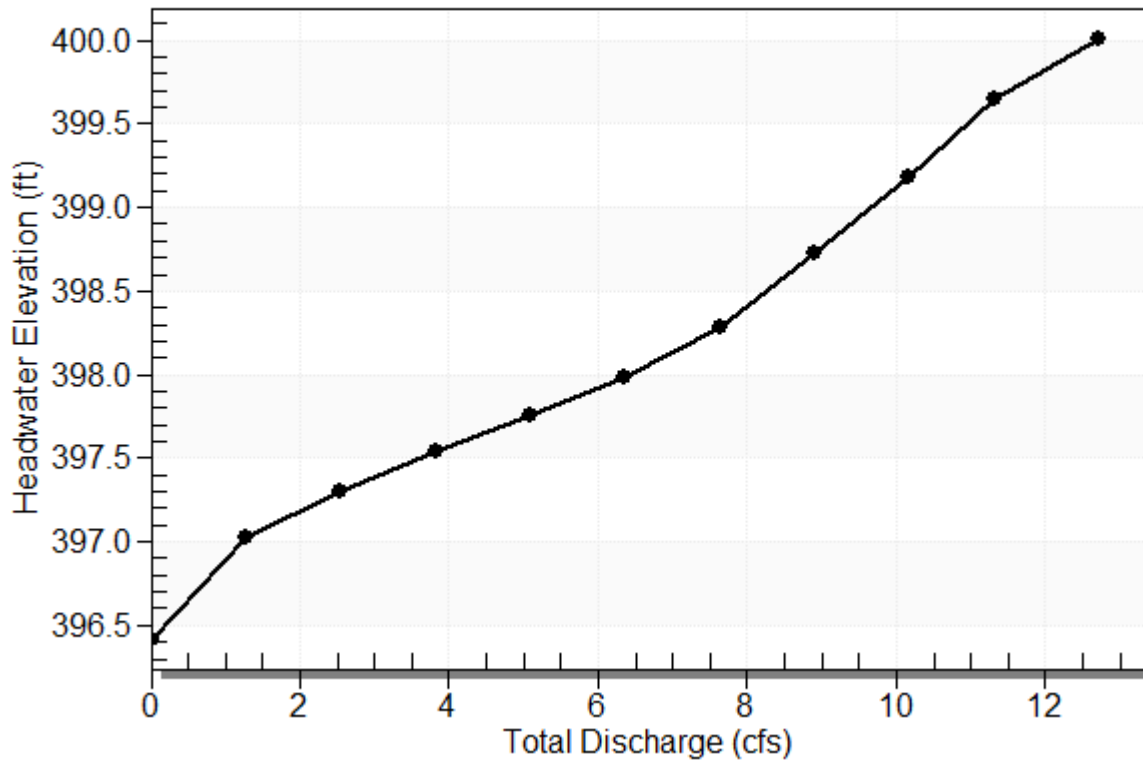
Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 439+80 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
396.42	0.00	0.00	0.00	1
397.03	1.27	1.27	0.00	1
397.30	2.54	2.54	0.00	1
397.54	3.81	3.81	0.00	1
397.76	5.08	5.08	0.00	1
397.98	6.36	6.36	0.00	1
398.29	7.63	7.63	0.00	1
398.72	8.90	8.90	0.00	1
399.19	10.17	10.17	0.00	1
399.65	11.31	11.31	0.00	1
400.01	12.71	12.13	0.47	24
400.00	12.13	12.13	0.00	Overtopping



# Rating Curve Plot for Crossing: Crossing 7

## Total Rating Curve

Crossing: Crossing 7



**Table 2 - Culvert Summary Table: Lt. Sta. 439+80**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	396.42	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1.27	1.27	397.03	0.575	0.605	3-M2t	0.473	0.419	0.434	0.434	3.000	1.022
2.54	2.54	397.30	0.842	0.883	3-M2t	0.695	0.601	0.627	0.627	3.631	1.245
3.81	3.81	397.54	1.066	1.116	3-M2t	0.888	0.747	0.773	0.773	4.156	1.392
5.08	5.08	397.76	1.256	1.335	3-M2t	1.089	0.863	0.893	0.893	4.638	1.505
6.36	6.36	397.98	1.437	1.564	3-M2t	1.500	0.969	0.997	0.997	5.097	1.597
7.63	7.63	398.29	1.627	1.867	7-M2t	1.500	1.066	1.089	1.089	5.547	1.675
8.90	8.90	398.72	1.838	2.301	7-M2t	1.500	1.150	1.174	1.174	5.998	1.744
10.17	10.17	399.19	2.079	2.767	7-M2t	1.500	1.227	1.251	1.251	6.458	1.806
11.31	11.31	399.65	2.326	3.228	7-M2t	1.500	1.284	1.316	1.316	6.885	1.856
12.71	12.13	400.01	2.522	3.594	7-M2t	1.500	1.319	1.390	1.390	7.101	1.913

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 396.42 ft, Outlet Elevation (invert): 396.04 ft

Culvert Length: 146.93 ft, Culvert Slope: 0.0026

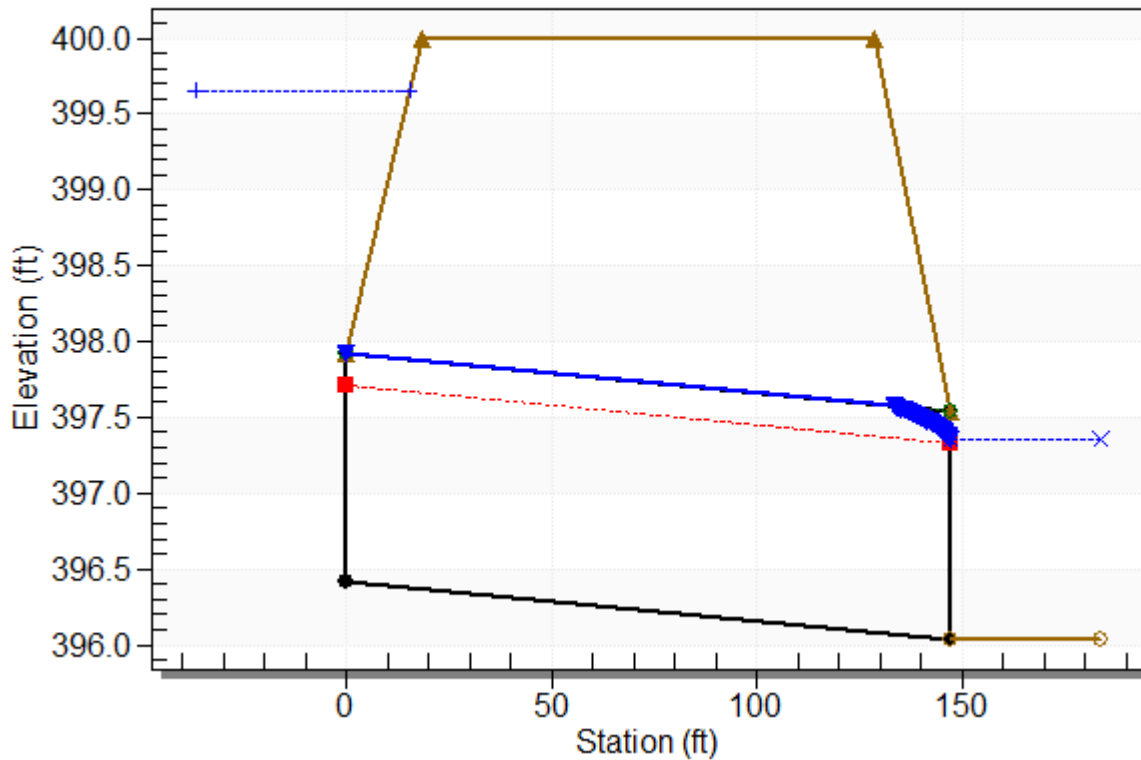
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**Culvert Performance Curve Plot: Lt. Sta. 439+80**

## Water Surface Profile Plot for Culvert: Lt. Sta. 439+80

### Crossing - Crossing 7, Design Discharge - 11.3 cfs

Culvert - Lt. Sta. 439+80, Culvert Discharge - 11.3 cfs



### Site Data - Lt. Sta. 439+80

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 396.42 ft

Outlet Station: 146.93 ft

Outlet Elevation: 396.04 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 439+80

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 7)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	396.04	0.00	0.00	0.00	0.00
1.27	396.47	0.43	1.02	0.15	0.31
2.54	396.67	0.63	1.25	0.22	0.33
3.81	396.81	0.77	1.39	0.27	0.33
5.08	396.93	0.89	1.50	0.31	0.34
6.36	397.04	1.00	1.60	0.34	0.35
7.63	397.13	1.09	1.68	0.37	0.35
8.90	397.21	1.17	1.74	0.40	0.35
10.17	397.29	1.25	1.81	0.43	0.35
11.31	397.36	1.32	1.86	0.45	0.36
12.71	397.43	1.39	1.91	0.48	0.36

### **Tailwater Channel Data - Crossing 7**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0055

Channel Manning's n: 0.0500

Channel Invert Elevation: 396.04 ft

### **Roadway Data for Crossing: Crossing 7**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 400.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft



**LOCATION:** Lt. Sta. 461+00  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 7.12 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
2.07	-	0.90	Pavements & Roofs
2.76	-	0.85	City Business Areas
2.29	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.67

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0030
Travel time, (hr)	0.721

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	1200	0
Course slope, (ft/ft)	0.0167	0.003
Velocity, (fps)	2.08295	1.11342
Travel time, (hr)	0.160	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.881 hr I (50 Yr)= 3.71  
 52.8 min I (100 Yr)= 4.01  
 Design Q (50 Yr)= 21.31 cfs  
 Maximum Q (100 Yr)= 23.95 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	417.86	415.03	413.83	2.00	1.42	NO
100	418.26	415.03	413.83	2.00	1.62	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 21.31 cfs

Maximum Flow: 23.95 cfs

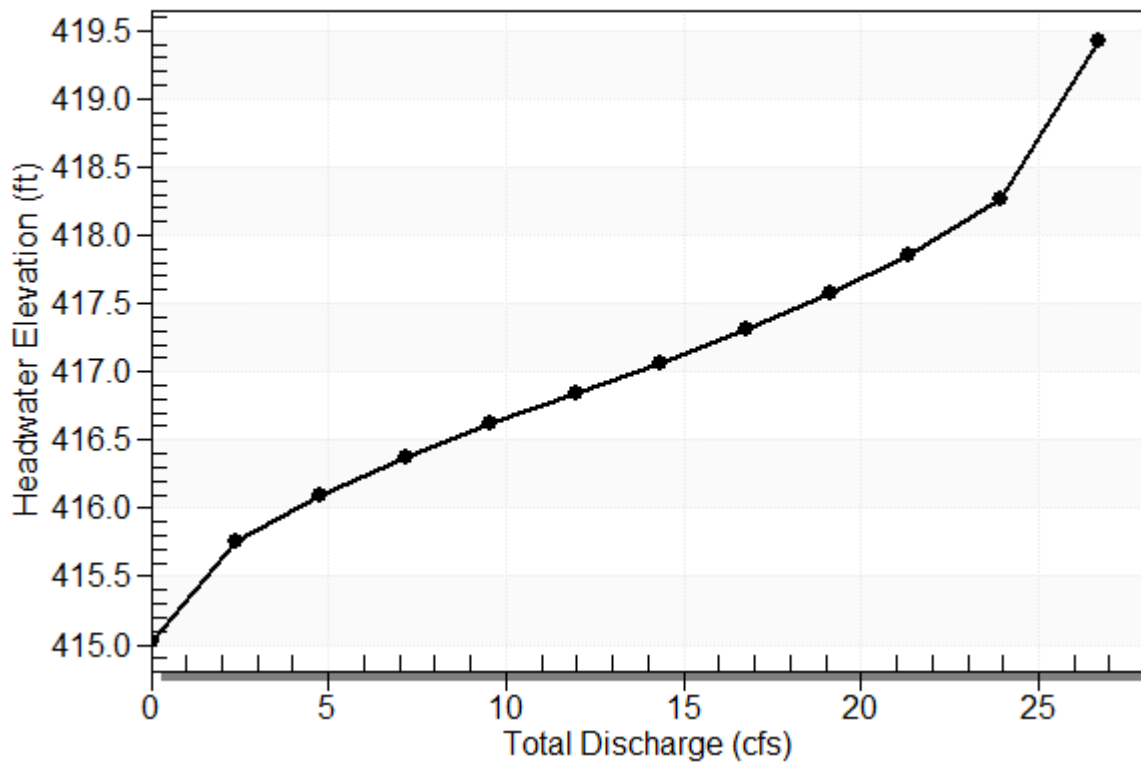
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 8**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 461+00 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
415.03	0.00	0.00	0.00	1
415.76	2.40	2.40	0.00	1
416.09	4.79	4.79	0.00	1
416.38	7.19	7.19	0.00	1
416.62	9.58	9.58	0.00	1
416.84	11.98	11.98	0.00	1
417.07	14.37	14.37	0.00	1
417.31	16.77	16.77	0.00	1
417.58	19.16	19.16	0.00	1
417.86	21.31	21.31	0.00	1
418.26	23.95	23.95	0.00	1
419.00	26.68	26.68	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 8

## Total Rating Curve

Crossing: Crossing 8



**Table 2 - Culvert Summary Table: Lt. Sta. 461+00**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	415.03	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
2.40	2.40	415.76	0.728	0.0*	1-S2n	0.447	0.534	0.447	0.624	4.521	2.052
4.79	4.79	416.09	1.062	0.0*	1-S2n	0.644	0.765	0.650	0.809	5.386	2.440
7.19	7.19	416.38	1.348	0.0*	1-S2n	0.803	0.952	0.803	0.942	6.088	2.700
9.58	9.58	416.62	1.590	0.324	1-S2n	0.946	1.103	0.946	1.049	6.558	2.902
11.98	11.98	416.84	1.812	0.696	1-S2n	1.080	1.238	1.080	1.141	6.921	3.068
14.37	14.37	417.07	2.037	1.110	5-S2n	1.213	1.362	1.213	1.221	7.215	3.211
16.77	16.77	417.31	2.280	1.564	5-S2n	1.351	1.474	1.352	1.294	7.429	3.338
19.16	19.16	417.58	2.551	2.271	5-S2n	1.501	1.573	1.501	1.360	7.560	3.451
21.31	21.31	417.86	2.826	2.748	7-M2c	1.670	1.651	1.651	1.416	7.683	3.544
23.95	23.95	418.26	3.207	3.229	7-M2c	2.000	1.733	1.733	1.479	8.280	3.649

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 415.03 ft, Outlet Elevation (invert): 413.83 ft

Culvert Length: 163.11 ft, Culvert Slope: 0.0074

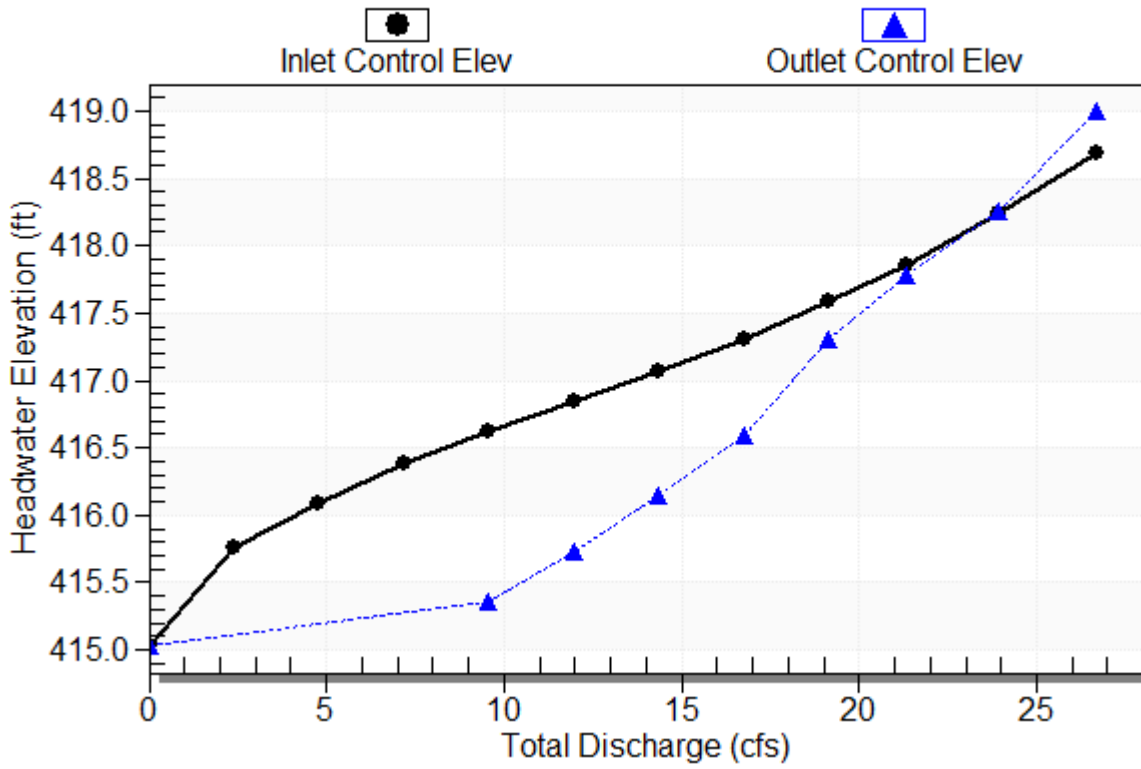
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# Culvert Performance Curve Plot: Lt. Sta. 461+00

## Performance Curve

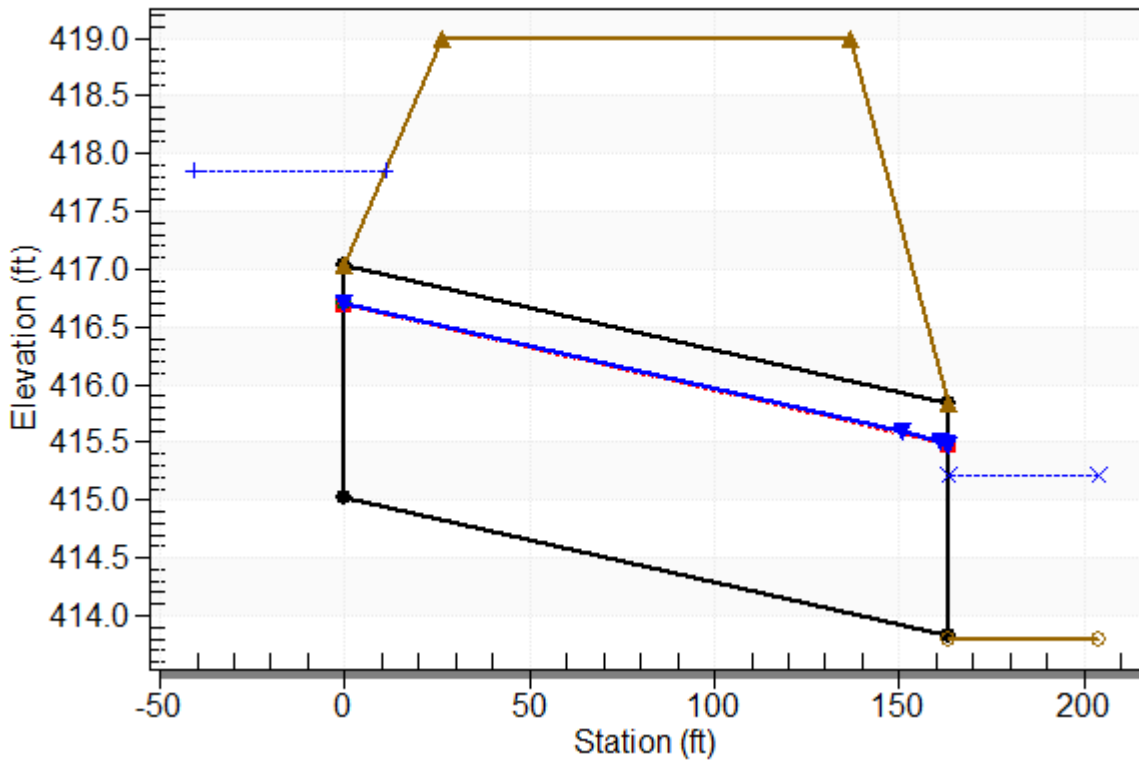
Culvert: Lt. Sta. 461+00



## Water Surface Profile Plot for Culvert: Lt. Sta. 461+00

### Crossing - Crossing 8, Design Discharge - 21.3 cfs

Culvert - Lt. Sta. 461+00, Culvert Discharge - 21.3 cfs



## Site Data - Lt. Sta. 461+00

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 415.03 ft

Outlet Station: 163.11 ft

Outlet Elevation: 413.83 ft

Number of Barrels: 1

## Culvert Data Summary - Lt. Sta. 461+00

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 8)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	413.80	0.00	0.00	0.00	0.00
2.40	414.42	0.62	2.05	0.53	0.65
4.79	414.61	0.81	2.44	0.69	0.68
7.19	414.74	0.94	2.70	0.80	0.69
9.58	414.85	1.05	2.90	0.89	0.71
11.98	414.94	1.14	3.07	0.97	0.72
14.37	415.02	1.22	3.21	1.04	0.72
16.77	415.09	1.29	3.34	1.10	0.73
19.16	415.16	1.36	3.45	1.15	0.74
21.31	415.22	1.42	3.54	1.20	0.74
23.95	415.28	1.48	3.65	1.26	0.75

### **Tailwater Channel Data - Crossing 8**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.0136

Channel Manning's n: 0.0375

Channel Invert Elevation: 413.80 ft

### **Roadway Data for Crossing: Crossing 8**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 419.00 ft

Roadway Surface: Paved

Roadway Top Width: 110.00 ft

**LOCATION:** Lt. Sta. 472+40  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 9.16 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
2.34	-	0.90	Pavements & Roofs
1.53	-	0.15	Woodland & Forest
5.29	-	0.85	City Business Areas
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.75

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.4
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0030
Travel time, (hr)	0.721

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	1166	0
Course slope, (ft/ft)	0.0172	0.003
Velocity, (fps)	2.11311	1.11342
Travel time, (hr)	0.153	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.874 hr I (50 Yr)= 3.73  
 52.4 min I (100 Yr)= 4.03  
 Design Q (50 Yr)= 30.60 cfs  
 Maximum Q (100 Yr)= 34.39 cfs

Run 1: 30" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	423.40	420.46	416.48	2.50	1.18	YES
100	423.72	420.46	416.48	2.50	1.30	
*H <sub>w</sub> /D > 1.2 Try 30" Smooth Wall Pipe						

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 30.6 cfs

Maximum Flow: 34.39 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 9**

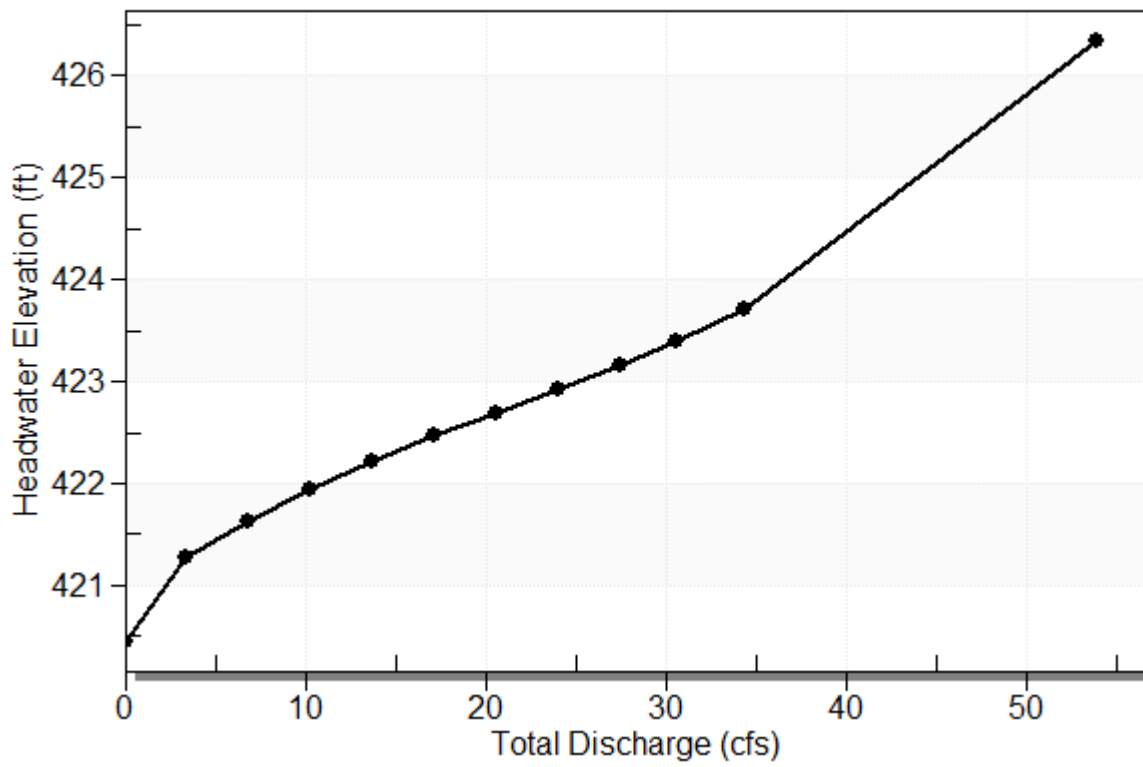
Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 472+40 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
420.46	0.00	0.00	0.00	1
421.27	3.44	3.44	0.00	1
421.63	6.88	6.88	0.00	1
421.95	10.32	10.32	0.00	1
422.22	13.76	13.76	0.00	1
422.46	17.20	17.20	0.00	1
422.69	20.63	20.63	0.00	1
422.92	24.07	24.07	0.00	1
423.16	27.51	27.51	0.00	1
423.40	30.60	30.60	0.00	1
423.72	34.39	34.39	0.00	1
426.00	53.94	53.94	0.00	Overtopping



# Rating Curve Plot for Crossing: Crossing 9

## Total Rating Curve

Crossing: Crossing 9



**Table 2 - Culvert Summary Table: Lt. Sta. 472+40**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	420.46	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
3.44	3.44	421.27	0.811	0.0*	1-S2n	0.392	0.606	0.392	0.159	6.835	1.906
6.88	6.88	421.63	1.173	0.0*	1-S2n	0.560	0.864	0.560	0.241	8.292	2.484
10.32	10.32	421.95	1.490	0.0*	1-S2n	0.698	1.072	0.698	0.307	9.229	2.894
13.76	13.76	422.22	1.763	0.0*	1-S2n	0.806	1.248	0.822	0.364	9.754	3.219
17.20	17.20	422.46	2.004	0.0*	1-S2n	0.913	1.397	0.934	0.416	10.295	3.495
20.63	20.63	422.69	2.233	0.0*	1-S2n	1.005	1.540	1.032	0.463	10.774	3.735
24.07	24.07	422.92	2.462	0.0*	1-S2n	1.096	1.667	1.096	0.508	11.614	3.948
27.51	27.51	423.16	2.703	0.0*	5-S2n	1.184	1.786	1.198	0.549	11.840	4.141
30.60	30.60	423.40	2.938	0.0*	5-S2n	1.260	1.883	1.260	0.585	12.348	4.301
34.39	34.39	423.72	3.256	0.472	5-S2n	1.352	1.991	1.381	0.626	12.360	4.482

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 420.46 ft, Outlet Elevation (invert): 416.48 ft

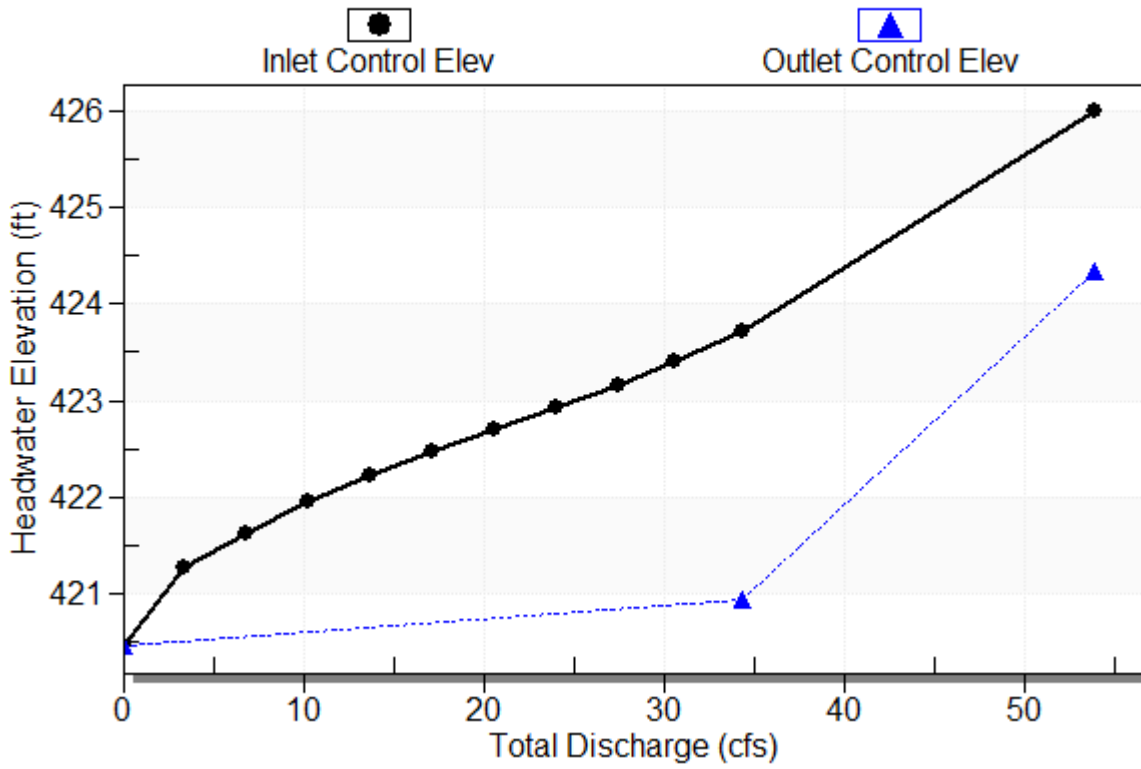
Culvert Length: 216.95 ft, Culvert Slope: 0.0183

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# Culvert Performance Curve Plot: Lt. Sta. 472+40

## Performance Curve

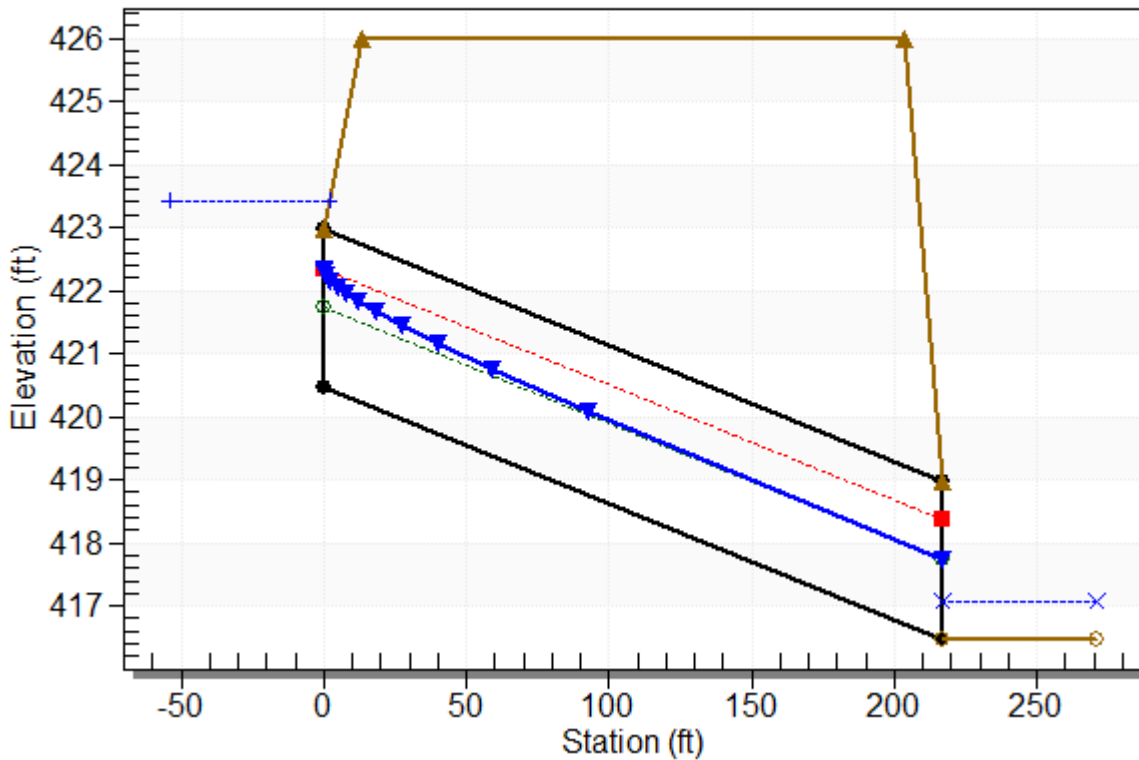
Culvert: Lt. Sta. 472+40



## Water Surface Profile Plot for Culvert: Lt. Sta. 472+40

Crossing - Crossing 9 , Design Discharge - 30.6 cfs

Culvert - Lt. Sta. 472+40, Culvert Discharge - 30.6 cfs



### Site Data - Lt. Sta. 472+40

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 420.46 ft

Outlet Station: 216.91 ft

Outlet Elevation: 416.48 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 472+40

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 9 )**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	416.48	0.00	0.00	0.00	0.00
3.44	416.64	0.16	1.91	0.28	0.85
6.88	416.72	0.24	2.48	0.42	0.91
10.32	416.79	0.31	2.89	0.54	0.94
13.76	416.84	0.36	3.22	0.64	0.97
17.20	416.90	0.42	3.50	0.73	0.99
20.63	416.94	0.46	3.74	0.81	1.00
24.07	416.99	0.51	3.95	0.89	1.02
27.51	417.03	0.55	4.14	0.96	1.03
30.60	417.06	0.58	4.30	1.02	1.04
34.39	417.11	0.63	4.48	1.09	1.05



### **Tailwater Channel Data - Crossing 9**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 11.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0280

Channel Manning's n: 0.0375

Channel Invert Elevation: 416.48 ft

### **Roadway Data for Crossing: Crossing 9**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 426.00 ft

Roadway Surface: Paved

Roadway Top Width: 190.00 ft

**LOCATION:** Lt. Sta. 508+20  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 57.43 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Flat (0% - 2%)

Acres	C-Value	Description
12.08	0.90	Pavements & Roofs
13.07	0.10	Woodland & Forest
19.04	0.25	Grass Shoulders
12.34	0.50	Industrial Areas, Light
0.90	0.45	Suburban, Normal Residential
0.00	0.00	

Weighted C-Value: 0.41

**TIME OF CONCENTRATION:**

<u>Sheet Flow</u>		<u>Shallow Concentrated Flow</u>			<u>Channel Flow</u>	
Segment	1	Segment	Unpaved	Paved	Segment	
Roughness coeff., n	0.8	Surface	2		Roughness coeff., n	0.012
Length, (< 100) (ft)	100.0	Length, (ft)	16.1345	20.3282	Flow length, (ft)	0
2yr/24hr rainfall (in)	3.60	Course slope, (ft/ft)	1519	0	Channel slope, (ft/ft)	0.0001
Land slope, (ft/ft)	0.0050	Velocity, (fps)	0.0283	0.003	X-sect. area, (sq ft)	0.00
Travel time, (hr)	1.023	Travel time, (hr)	2.71424	1.11342	Wet. perimeter, (ft)	0.00
			0.155	0	Hydraulic radius, (ft)	1.00
					Travel time, (hr)	0.000

Time of Concentration = 1.178 hr I (50 Yr)= 3.05  
 70.7 min I (100 Yr)= 3.29

Design Q (50 Yr)= 86.08 cfs  
 Maximum Q (100 Yr)= 96.62 cfs

Run 1: 4' X 4' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	391.42	387.65	386.69	4.00	0.94	YES
100	391.75	387.65	386.69	4.00	1.03	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 86.08 cfs

Maximum Flow: 96.62 cfs

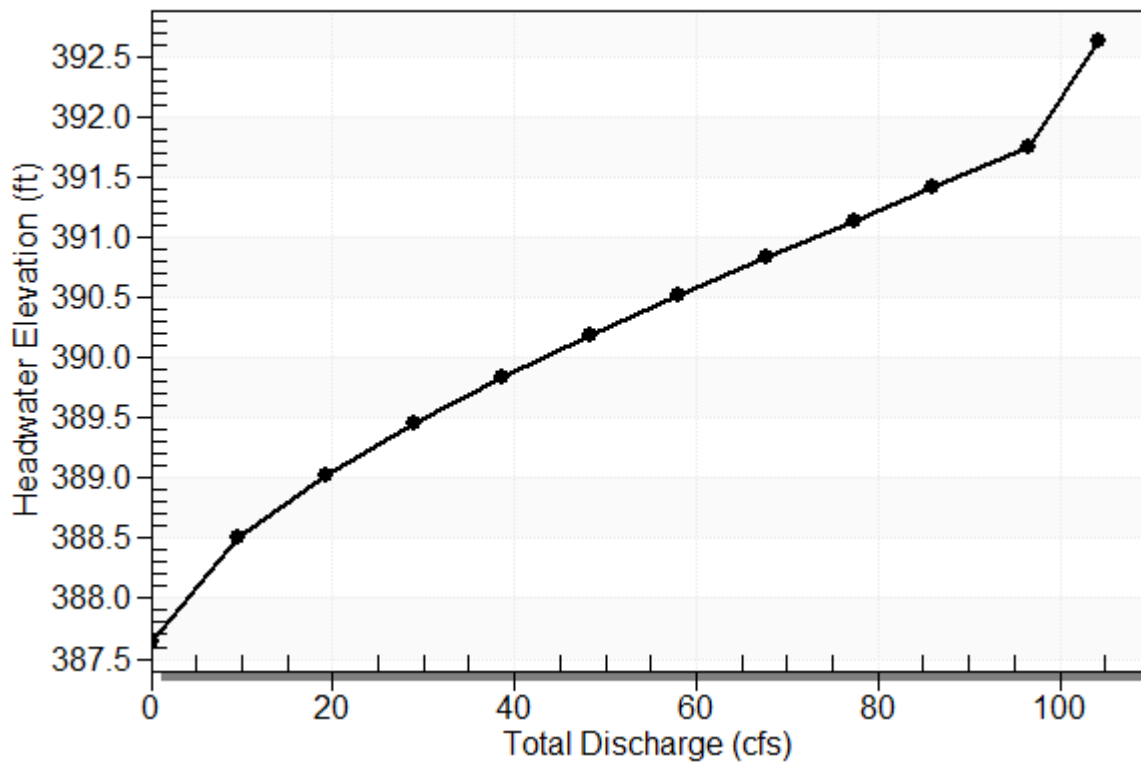
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 10**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 508+20 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
387.65	0.00	0.00	0.00	1
388.51	9.66	9.66	0.00	1
389.02	19.32	19.32	0.00	1
389.45	28.99	28.99	0.00	1
389.84	38.65	38.65	0.00	1
390.19	48.31	48.31	0.00	1
390.53	57.97	57.97	0.00	1
390.84	67.63	67.63	0.00	1
391.15	77.30	77.30	0.00	1
391.42	86.08	86.08	0.00	1
391.75	96.62	96.62	0.00	1
392.00	104.24	104.24	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 10

## Total Rating Curve

Crossing: Crossing 10



**Table 2 - Culvert Summary Table: Lt. Sta. 508+20**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	387.65	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
9.66	9.66	388.51	0.865	0.0*	1-S2n	0.468	0.566	0.468	0.345	5.164	2.620
19.32	19.32	389.02	1.373	0.0*	1-S2n	0.758	0.898	0.758	0.520	6.377	3.367
28.99	28.99	389.45	1.799	0.324	1-S2n	0.998	1.177	1.005	0.660	7.214	3.882
38.65	38.65	389.84	2.187	0.655	1-S2n	1.222	1.426	1.229	0.780	7.864	4.285
48.31	48.31	390.19	2.545	0.990	1-S2n	1.437	1.655	1.437	0.888	8.405	4.620
57.97	57.97	390.53	2.877	1.334	1-S2n	1.639	1.868	1.646	0.987	8.804	4.908
67.63	67.63	390.84	3.191	1.690	1-S2n	1.838	2.071	1.846	1.078	9.157	5.162
77.30	77.30	391.15	3.496	2.061	1-S2n	2.030	2.263	2.040	1.163	9.474	5.390
86.08	86.08	391.42	3.770	2.411	1-S2n	2.203	2.432	2.203	1.237	9.768	5.579
96.62	96.62	391.75	4.103	2.850	5-S2n	2.405	2.627	2.412	1.321	10.014	5.788

\* Full Flow Headwater elevation is below inlet invert.



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Straight Culvert

Inlet Elevation (invert): 387.65 ft, Outlet Elevation (invert): 386.69 ft

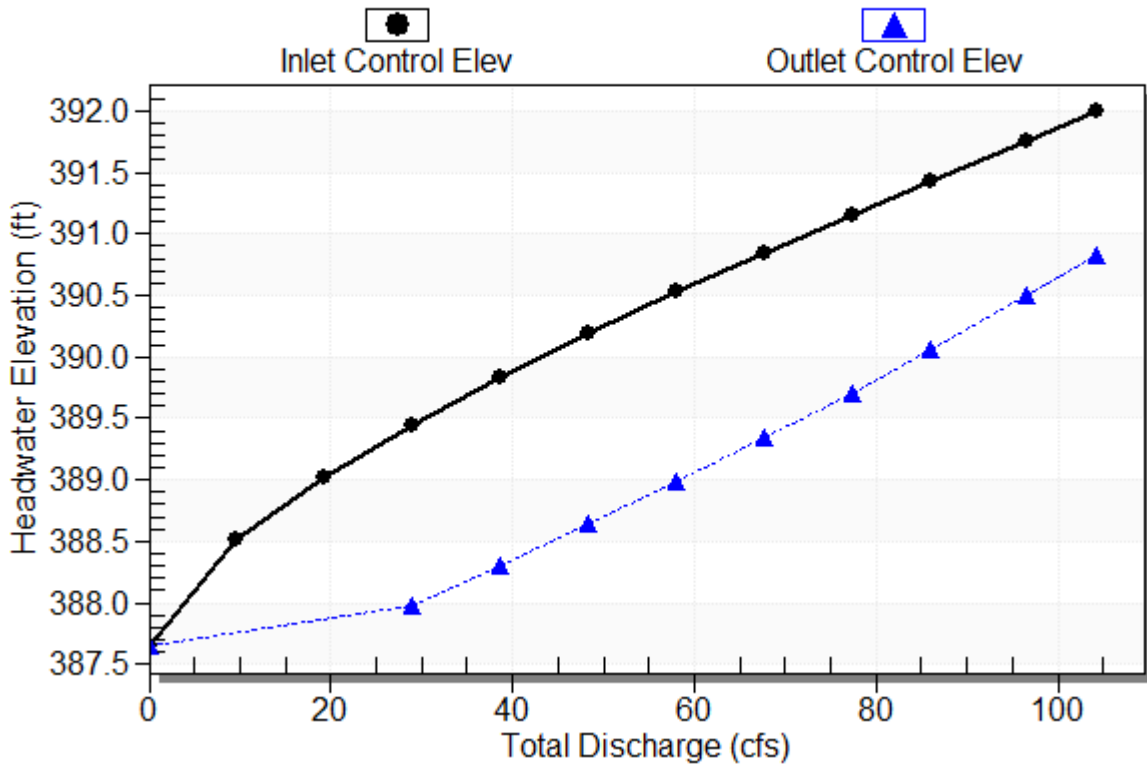
Culvert Length: 165.01 ft, Culvert Slope: 0.0058

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# Culvert Performance Curve Plot: Lt. Sta. 508+20

## Performance Curve

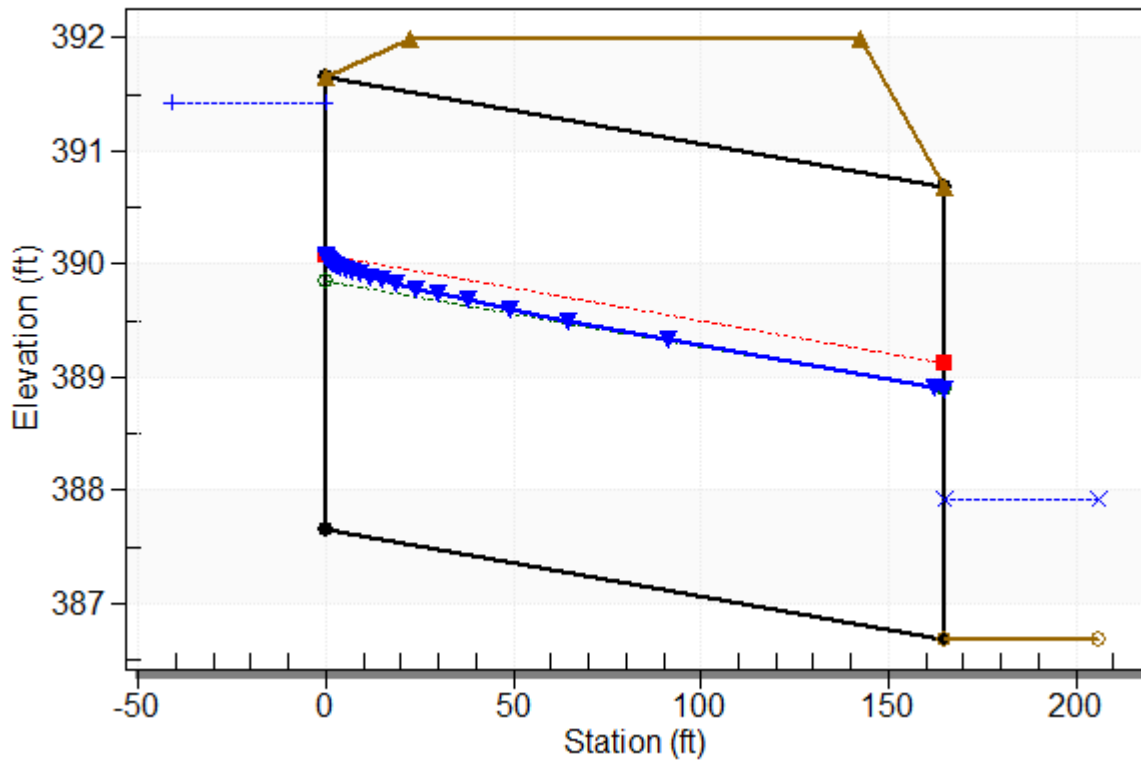
Culvert: Lt. Sta. 508+20



## Water Surface Profile Plot for Culvert: Lt. Sta. 508+20

### Crossing - Crossing 10, Design Discharge - 86.1 cfs

Culvert - Lt. Sta. 508+20, Culvert Discharge - 86.1 cfs



## Site Data - Lt. Sta. 508+20

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 387.65 ft

Outlet Station: 165.01 ft

Outlet Elevation: 386.69 ft

Number of Barrels: 1

## Culvert Data Summary - Lt. Sta. 508+20

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 10)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	386.69	0.00	0.00	0.00	0.00
9.66	387.04	0.35	2.62	0.43	0.81
19.32	387.21	0.52	3.37	0.65	0.86
28.99	387.35	0.66	3.88	0.82	0.89
38.65	387.47	0.78	4.29	0.97	0.91
48.31	387.58	0.89	4.62	1.11	0.93
57.97	387.68	0.99	4.91	1.23	0.94
67.63	387.77	1.08	5.16	1.35	0.95
77.30	387.85	1.16	5.39	1.45	0.96
86.08	387.93	1.24	5.58	1.54	0.97
96.62	388.01	1.32	5.79	1.65	0.98

### **Tailwater Channel Data - Crossing 10**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 10.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0375

Channel Invert Elevation: 386.69 ft

### **Roadway Data for Crossing: Crossing 10**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 392.00 ft

Roadway Surface: Paved

Roadway Top Width: 120.00 ft

**LOCATION:** Lt. Sta. 527+77  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 18.03 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
2.23	-	0.90	Pavements & Roofs
2.74	-	0.15	Woodland & Forest
7.87	-	0.70	Industrial Areas, Light
0.47	-	0.50	Suburban, Normal Residential
4.72	-	0.25	Grass Shoulders
0.00	-	0.00	

Weighted C-Value: 0.52

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0100
Travel time, (hr)	0.775

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	653	0
Course slope, (ft/ft)	0.0260	0.003
Velocity, (fps)	2.60161	1.11342
Travel time, (hr)	0.070	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 0.845 hr I (50 Yr)= 3.81  
 50.7 min I (100 Yr)= 4.11  
 Design Q (50 Yr)= 42.75 cfs  
 Maximum Q (100 Yr)= 48.05 cfs

Run 1: 30" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	411.34	407.23	405.29	2.50	1.64	NO
100	411.98	407.23	405.29	2.50	1.90	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 42.75 cfs

Maximum Flow: 48.05 cfs



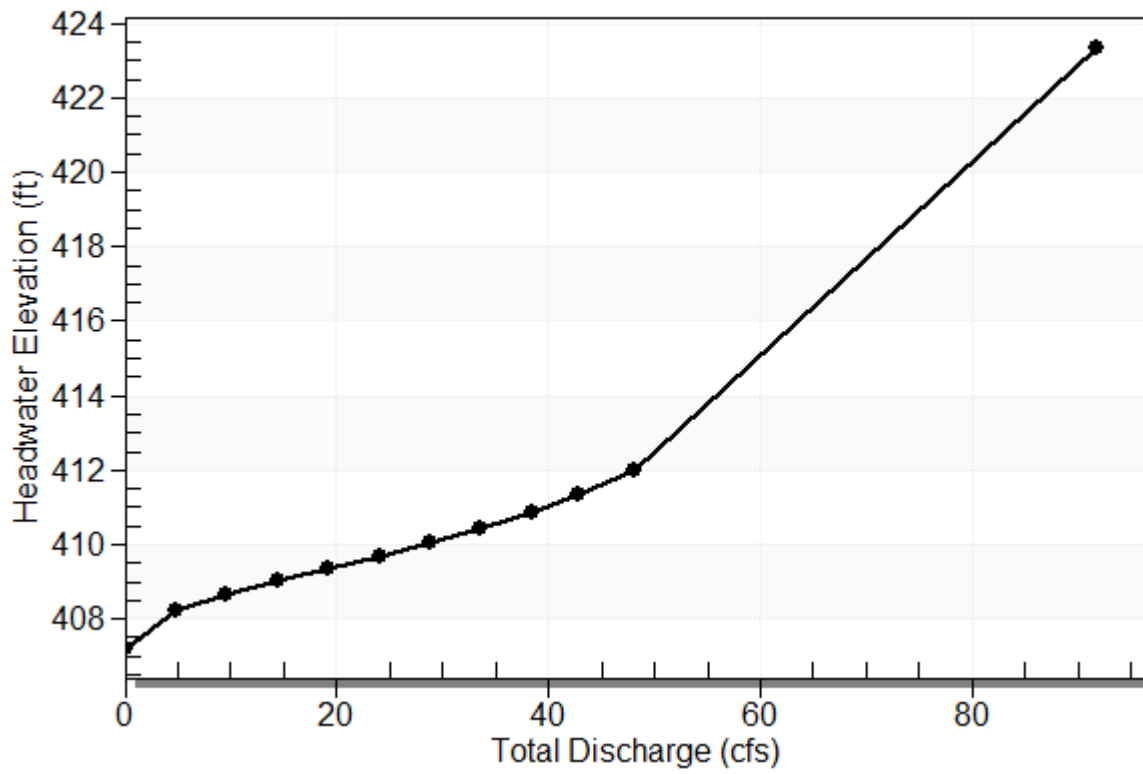
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 11**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 527+77 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
407.23	0.00	0.00	0.00	1
408.21	4.80	4.80	0.00	1
408.67	9.61	9.61	0.00	1
409.05	14.41	14.41	0.00	1
409.38	19.22	19.22	0.00	1
409.70	24.02	24.02	0.00	1
410.04	28.83	28.83	0.00	1
410.43	33.63	33.63	0.00	1
410.88	38.44	38.44	0.00	1
411.34	42.75	42.75	0.00	1
411.98	48.05	48.05	0.00	1
422.00	91.79	91.79	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 11

## Total Rating Curve

Crossing: Crossing 11



**Table 2 - Culvert Summary Table: Lt. Sta. 527+77**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	407.23	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
4.80	4.80	408.21	0.980	0.0*	1-S2n	0.535	0.718	0.535	0.360	6.172	3.088
9.61	9.61	408.67	1.437	0.0*	1-S2n	0.769	1.032	0.769	0.467	7.465	3.672
14.41	14.41	409.05	1.820	0.0*	1-S2n	0.958	1.278	0.958	0.544	8.349	4.064
19.22	19.22	409.38	2.149	0.165	1-S2n	1.126	1.482	1.126	0.606	8.963	4.367
24.02	24.02	409.70	2.468	0.699	1-S2n	1.281	1.665	1.294	0.658	9.370	4.617
28.83	28.83	410.04	2.811	1.290	5-S2n	1.434	1.828	1.444	0.705	9.820	4.833
33.63	33.63	410.43	3.199	2.203	5-S2n	1.586	1.970	1.601	0.747	10.127	5.023
38.44	38.44	410.88	3.647	2.848	5-S2n	1.749	2.093	1.758	0.785	10.433	5.193
42.75	42.75	411.34	4.106	3.484	5-S2n	1.912	2.184	1.917	0.817	10.605	5.333
48.05	48.05	411.98	4.746	4.341	5-S2n	2.188	2.274	2.188	0.854	10.577	5.491

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 407.23 ft, Outlet Elevation (invert): 405.29 ft

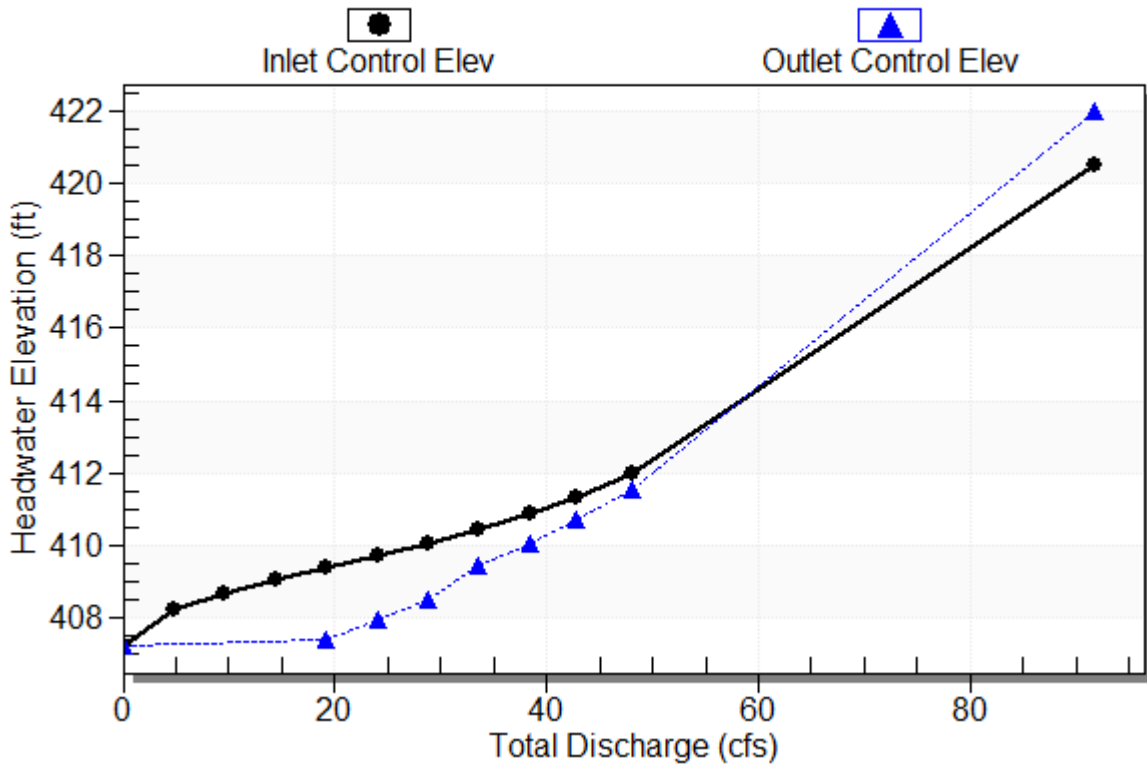
Culvert Length: 181.32 ft, Culvert Slope: 0.0107

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Culvert Performance Curve Plot: Lt. Sta. 527+77

### Performance Curve

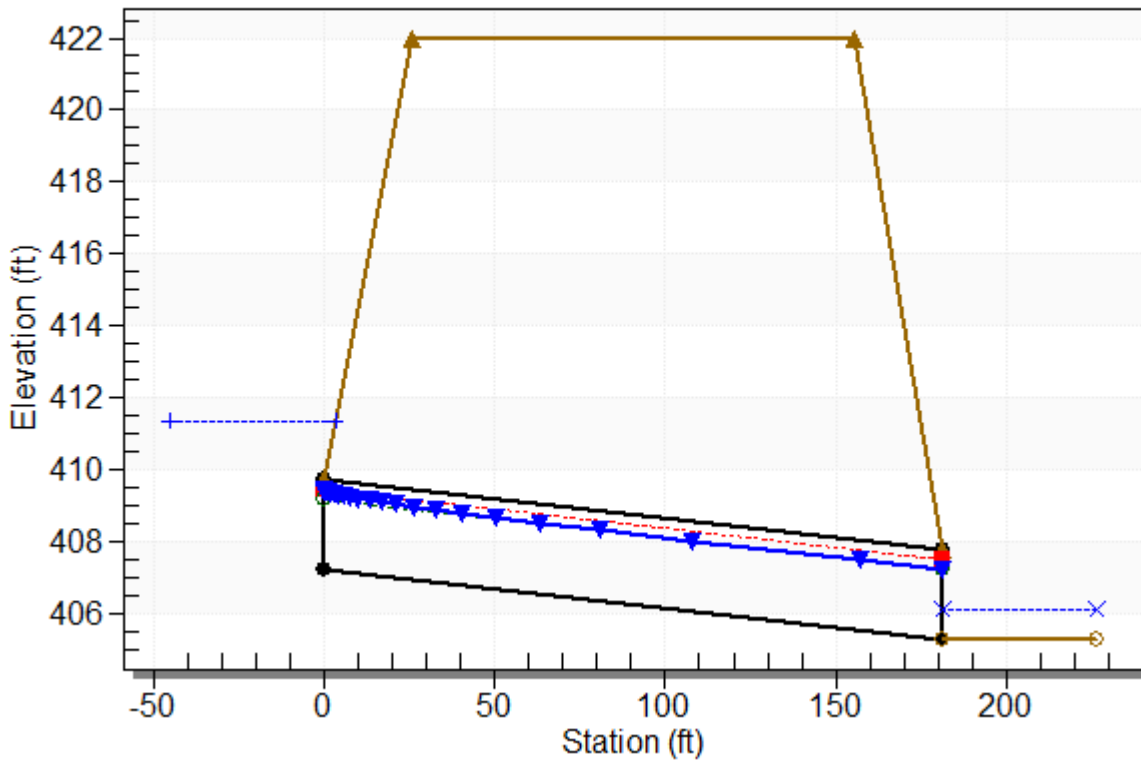
Culvert: Lt. Sta. 527+77



### Water Surface Profile Plot for Culvert: Lt. Sta. 527+77

#### Crossing - Crossing 11, Design Discharge - 42.8 cfs

Culvert - Lt. Sta. 527+77, Culvert Discharge - 42.8 cfs



### Site Data - Lt. Sta. 527+77

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 407.23 ft

Outlet Station: 181.31 ft

Outlet Elevation: 405.29 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 527+77

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 11)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	405.29	0.00	0.00	0.00	0.00
4.80	405.65	0.36	3.09	1.35	1.28
9.61	405.76	0.47	3.67	1.75	1.34
14.41	405.83	0.54	4.06	2.04	1.37
19.22	405.90	0.61	4.37	2.27	1.40
24.02	405.95	0.66	4.62	2.47	1.42
28.83	406.00	0.71	4.83	2.64	1.43
33.63	406.04	0.75	5.02	2.80	1.45
38.44	406.08	0.79	5.19	2.94	1.46
42.75	406.11	0.82	5.33	3.06	1.47
48.05	406.14	0.85	5.49	3.20	1.48

### **Tailwater Channel Data - Crossing 11**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 12.00 (1:1)

Channel Slope: 0.0600

Channel Manning's n: 0.0375

Channel Invert Elevation: 405.29 ft

### **Roadway Data for Crossing: Crossing 11**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 422.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

**LOCATION:** Lt. Sta. 576+67  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 24.35 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	C-Value	Description
4.39	0.90	Pavements & Roofs
6.81	0.15	Woodland & Forest
8.05	0.70	Industrial Areas, Light
5.10	0.25	Grass Shoulders
0.00	0.00	
0.00	0.00	

Weighted C-Value: 0.49

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	422	0
Course slope, (ft/ft)	0.0308	0.003
Velocity, (fps)	2.83159	1.11342
Travel time, (hr)	0.041	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.064 hr I (50 Yr)= 3.27  
 63.9 min I (100 Yr)= 3.53  
 Design Q (50 Yr)= 46.69 cfs  
 Maximum Q (100 Yr)= 52.43 cfs

Run 1: 36" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	387.48	382.17	381.71	3.00	1.77	NO
100	388.39	382.17	381.71	3.00	2.07	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 46.69 cfs

Maximum Flow: 52.43 cfs

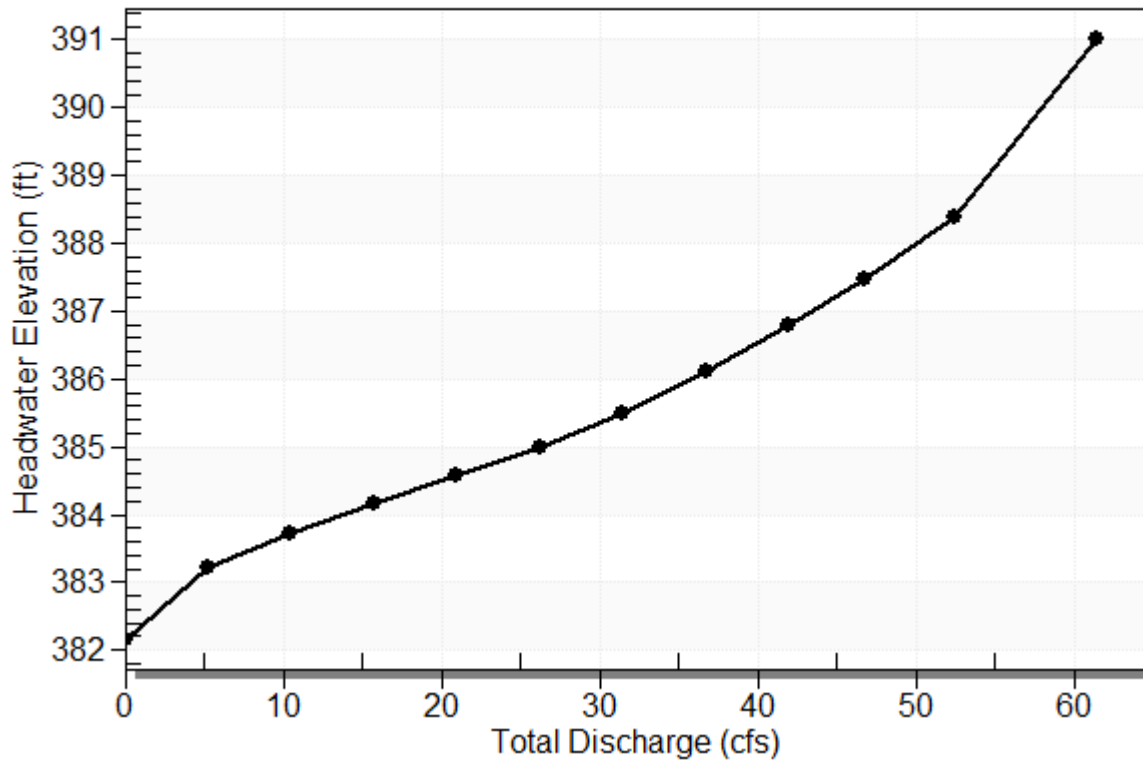
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 36**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 576+67 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
382.17	0.00	0.00	0.00	1
383.21	5.24	5.24	0.00	1
383.72	10.49	10.49	0.00	1
384.16	15.73	15.73	0.00	1
384.57	20.97	20.97	0.00	1
384.98	26.22	26.22	0.00	1
385.49	31.46	31.46	0.00	1
386.12	36.70	36.70	0.00	1
386.80	41.94	41.94	0.00	1
387.48	46.69	46.69	0.00	1
388.39	52.43	52.43	0.00	1
390.00	61.44	61.44	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 36

## Total Rating Curve

Crossing: Crossing 36



**Table 2 - Culvert Summary Table: Lt. Sta. 576+67**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	382.17	0.000	0.000	0-NF	0.000	0.000	0.100	0.000	0.000	0.000
5.24	5.24	383.21	0.969	1.035	3-M1t	0.830	0.714	1.020	0.920	2.473	0.000
10.49	10.49	383.72	1.402	1.551	3-M1t	1.193	1.023	1.629	1.529	2.675	0.000
15.73	15.73	384.16	1.776	1.988	3-M1t	1.505	1.263	2.017	1.917	3.112	0.000
20.97	20.97	384.57	2.099	2.398	3-M1t	1.800	1.471	2.360	2.260	3.516	0.000
26.22	26.22	384.98	2.383	2.812	3-M1t	2.107	1.648	2.674	2.574	3.941	0.000
31.46	31.46	385.49	2.649	3.316	7-M1t	2.487	1.816	2.978	2.878	4.455	0.000
36.70	36.70	386.12	2.914	3.953	4-FFf	3.000	1.966	3.000	3.177	5.192	0.000
41.94	41.94	386.80	3.189	4.629	4-FFf	3.000	2.107	3.000	3.505	5.934	0.000
46.69	46.69	387.48	3.456	5.309	4-FFf	3.000	2.223	3.000	3.830	6.605	0.000
52.43	52.43	388.39	3.811	6.963	4-FFf	3.000	2.351	3.000	4.259	7.417	0.000



\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 382.17 ft, Outlet Elevation (invert): 381.71 ft

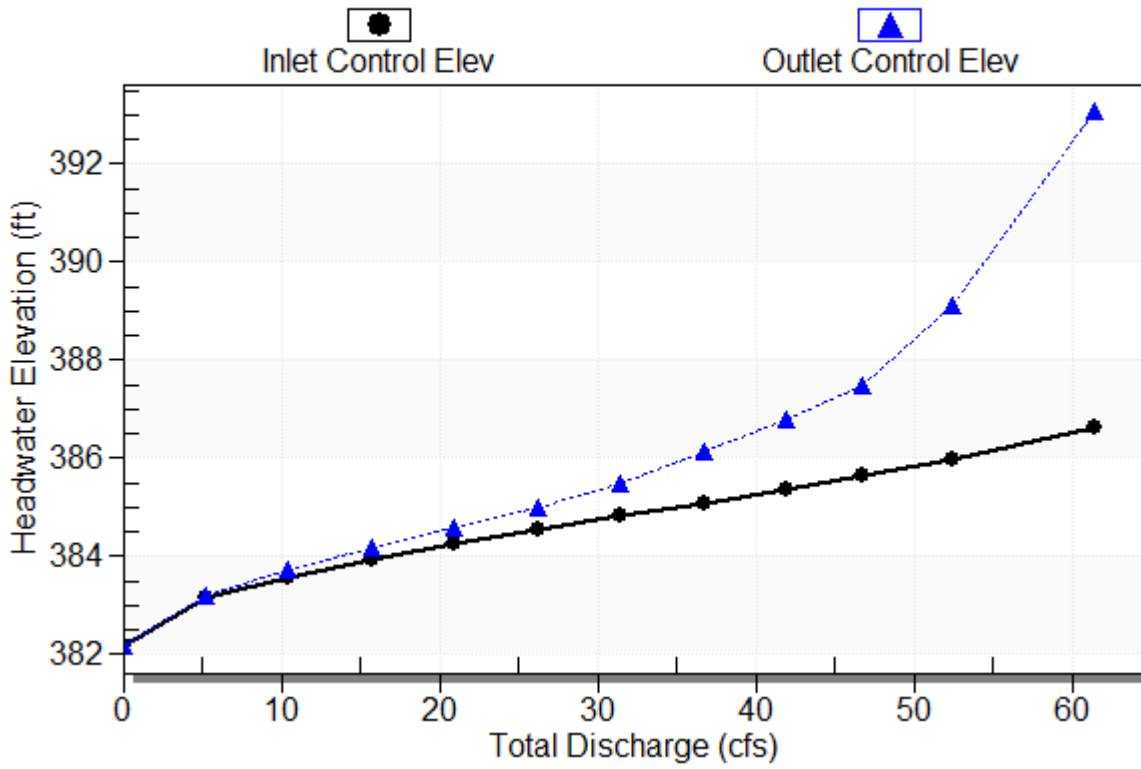
Culvert Length: 247.10 ft, Culvert Slope: 0.0019

\*\*\*\*\*

# Culvert Performance Curve Plot: Lt. Sta. 576+67

## Performance Curve

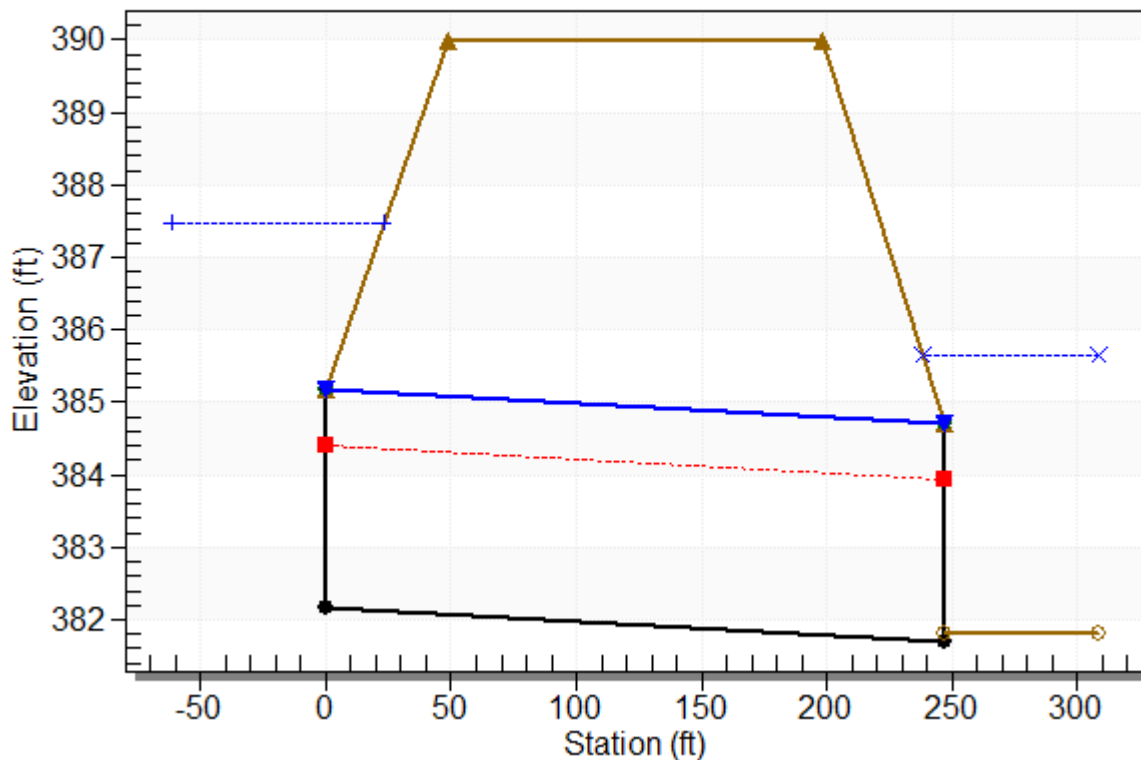
Culvert: Lt. Sta. 576+67



## Water Surface Profile Plot for Culvert: Lt. Sta. 576+67

### Crossing - Crossing 36, Design Discharge - 46.7 cfs

Culvert - Lt. Sta. 576+67, Culvert Discharge - 46.7 cfs



## Site Data - Lt. Sta. 576+67

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 382.17 ft

Outlet Station: 247.10 ft

Outlet Elevation: 381.71 ft

Number of Barrels: 1

## Culvert Data Summary - Lt. Sta. 576+67

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 36)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
0.00	381.81	-7069797073369245200 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 .00	0.00
7.35	383.10	-7069797073369245200 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 .00	0.00
14.70	383.66	-7069797073369245200 00000000000000000000 .00	0.00





### **Tailwater Channel Data - Crossing 36**

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 381.81 ft

### **Roadway Data for Crossing: Crossing 36**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 390.00 ft

Roadway Surface: Paved

Roadway Top Width: 150.00 ft



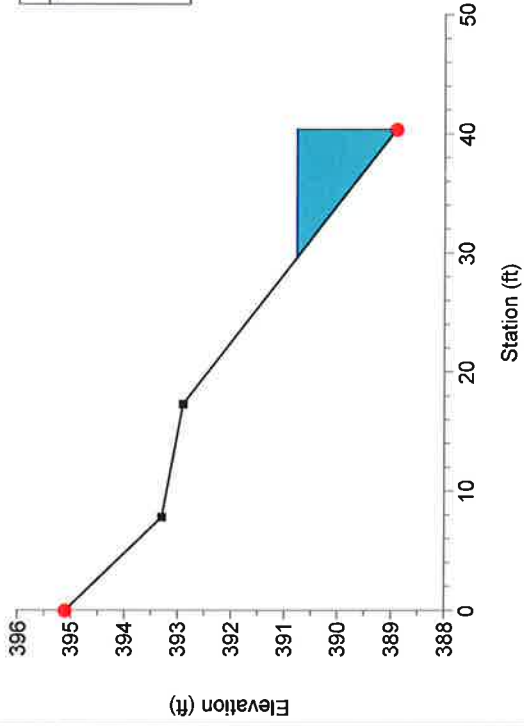


*HEC-RAS Output  
Station 576+00*

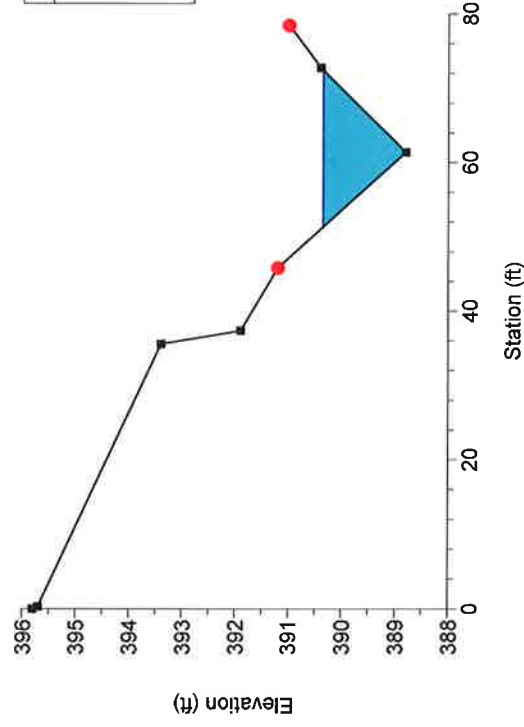
HEC-RAS Plan: Plan 02 River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	997.1	50-yr	46.69	388.90	390.72	390.64	391.09	0.018963	4.89	9.55	10.50	0.90
Reach-1	997.1	100-yr	52.43	388.90	390.78	390.72	391.19	0.020112	5.15	10.19	10.85	0.94
Reach-1	947.1	50-yr	46.69	388.80	390.30		390.44	0.007806	3.07	15.21	20.33	0.63
Reach-1	947.1	100-yr	52.43	388.80	390.36		390.52	0.007904	3.17	16.52	21.18	0.63
Reach-1	897.1	50-yr	46.69	388.40	389.79		389.97	0.011321	3.46	13.50	19.95	0.74
Reach-1	897.1	100-yr	52.43	388.40	389.85		390.04	0.011273	3.55	14.75	20.86	0.74
Reach-1	847.1	50-yr	46.69	387.50	388.85	388.85	389.20	0.021504	4.71	9.91	14.80	1.01
Reach-1	847.1	100-yr	52.43	387.50	388.92	388.92	389.28	0.021081	4.81	10.89	15.52	1.01
Reach-1	797.1	50-yr	46.69	386.20	387.20	387.20	387.33	0.017678	3.27	19.35	65.67	0.71
Reach-1	797.1	100-yr	52.43	386.20	387.22	387.22	387.36	0.018935	3.43	20.79	67.07	0.74
Reach-1	747.1	50-yr	46.69	384.70	386.32		386.32	0.000048	0.38	126.96	94.52	0.06
Reach-1	747.1	100-yr	52.43	384.70	386.95		386.95	0.000018	0.29	187.81	98.59	0.04
Reach-1	697.1	50-yr	46.69	383.30	386.32		386.32	0.000017	0.24	193.37	81.82	0.03
Reach-1	697.1	100-yr	52.43	383.30	386.95		386.95	0.000011	0.21	247.02	88.42	0.02
Reach-1	647.1	50-yr	46.69	382.60	386.32		386.32	0.000013	0.22	211.10	83.33	0.02
Reach-1	647.1	100-yr	52.43	382.60	386.95		386.95	0.000009	0.20	266.15	91.19	0.02
Reach-1	597.1	50-yr	46.69	382.30	386.32	382.97	386.32	0.000004	0.18	257.34	86.38	0.02
Reach-1	597.1	100-yr	52.43	382.30	386.95	383.12	386.95	0.000003	0.17	313.80	92.69	0.02
Reach-1	450		Culvert									
Reach-1	350	50-yr	46.69	382.70	383.92		383.94	0.000730	1.08	46.55	59.93	0.20
Reach-1	350	100-yr	52.43	382.70	384.02		384.03	0.000645	1.06	52.15	60.07	0.19
Reach-1	300	50-yr	46.69	381.00	383.89		383.91	0.000497	1.13	45.47	42.20	0.14
Reach-1	300	100-yr	52.43	381.00	383.96		384.00	0.000519	1.19	49.43	43.46	0.15
Reach-1	250	50-yr	46.69	381.00	383.86		383.88	0.000554	1.25	43.74	37.50	0.15
Reach-1	250	100-yr	52.43	381.00	383.95		383.98	0.000582	1.32	47.21	38.79	0.15
Reach-1	200	50-yr	46.69	381.00	383.82		383.85	0.000828	1.44	36.74	30.97	0.18
Reach-1	200	100-yr	52.43	381.00	383.91		383.94	0.000874	1.53	39.54	32.73	0.19
Reach-1	150	50-yr	46.69	380.90	383.77		383.80	0.000921	1.50	33.98	26.20	0.19
Reach-1	150	100-yr	52.43	380.90	383.86		383.89	0.000986	1.60	36.22	27.27	0.20
Reach-1	100	50-yr	46.69	380.80	383.74		383.76	0.000656	1.29	38.40	28.35	0.16
Reach-1	100	100-yr	52.43	380.80	383.82		383.85	0.000711	1.38	40.77	29.75	0.17
Reach-1	50	50-yr	46.69	380.60	383.71		383.73	0.000632	1.27	37.29	21.35	0.15
Reach-1	50	100-yr	52.43	380.60	383.78		383.81	0.000706	1.38	38.97	22.15	0.16
Reach-1	0	50-yr	46.69	381.70	383.29	383.29	383.62	0.013572	5.05	11.59	19.77	0.60
Reach-1	0	100-yr	52.43	381.70	383.36	383.36	383.69	0.013468	5.17	12.87	20.08	0.60

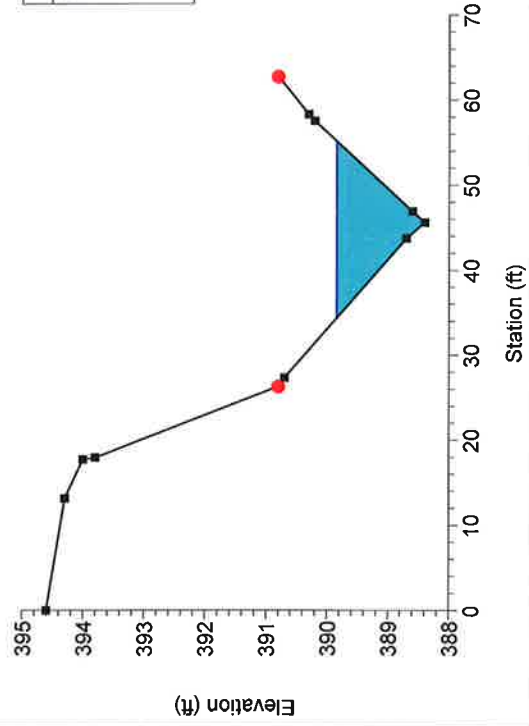
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
997.1



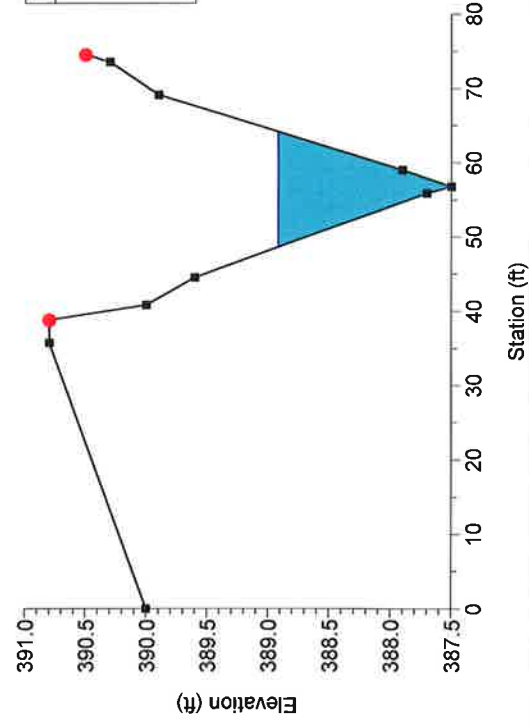
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947.1



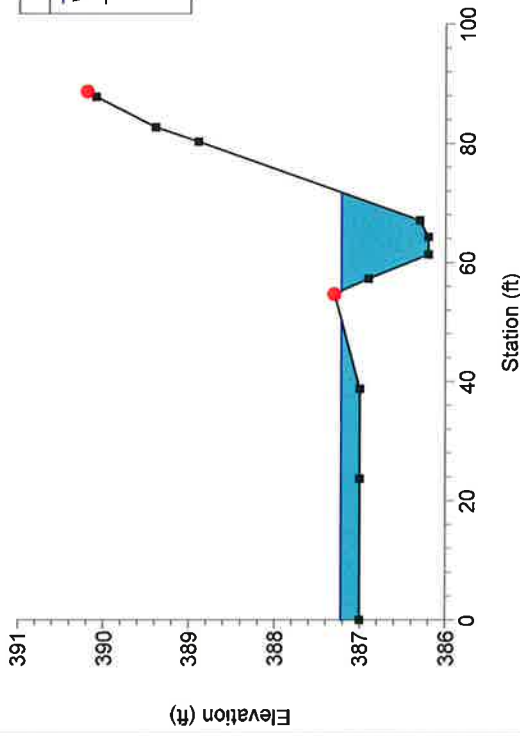
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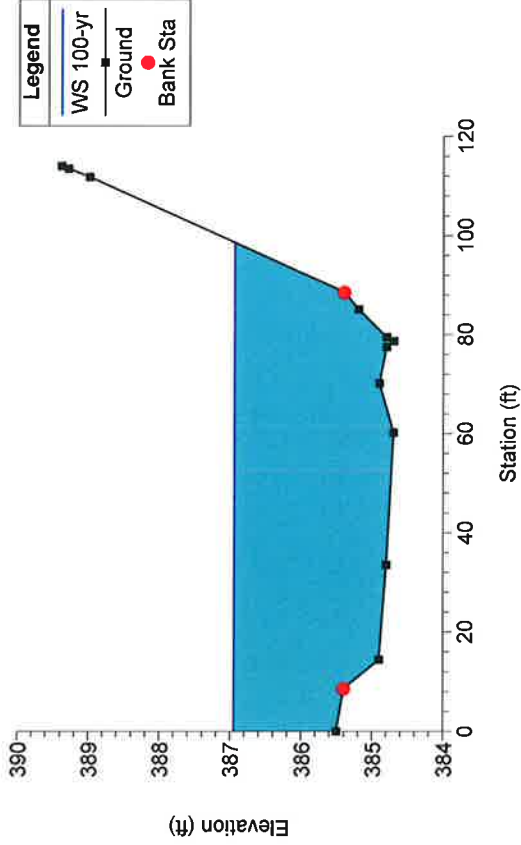
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
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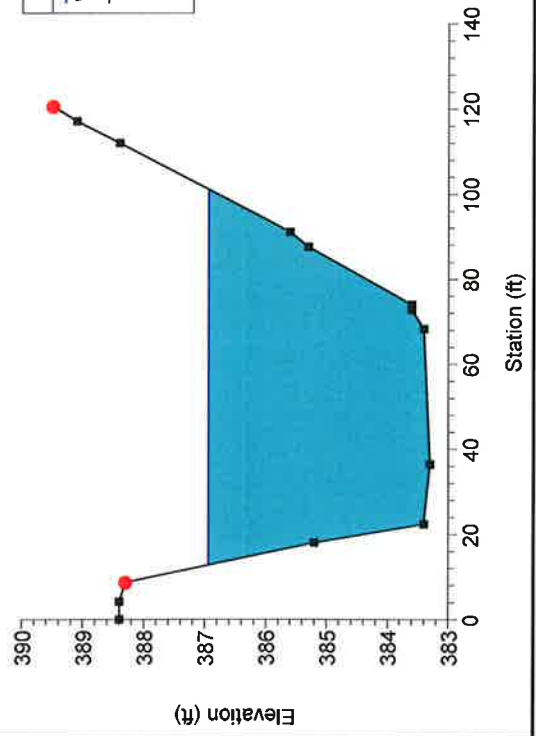
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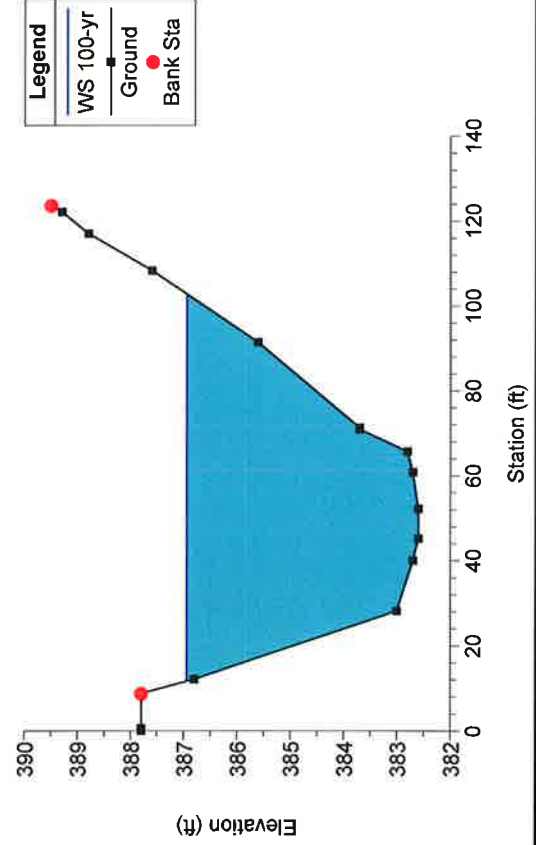
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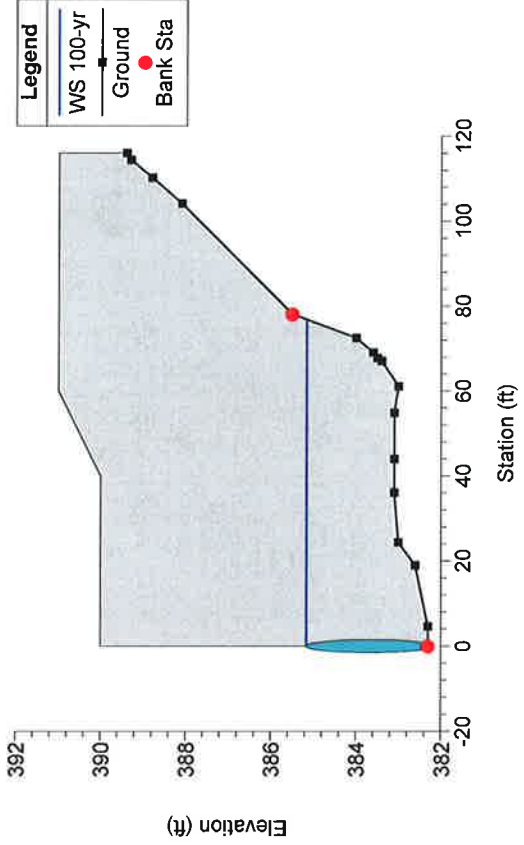
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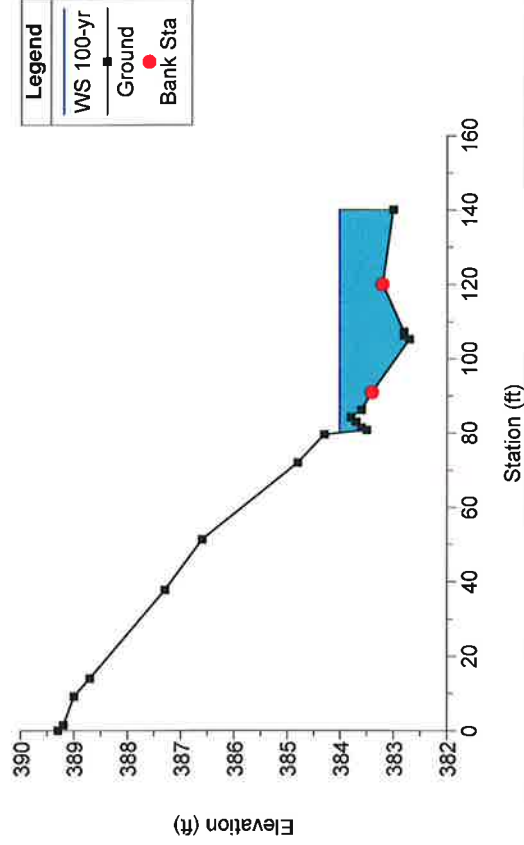
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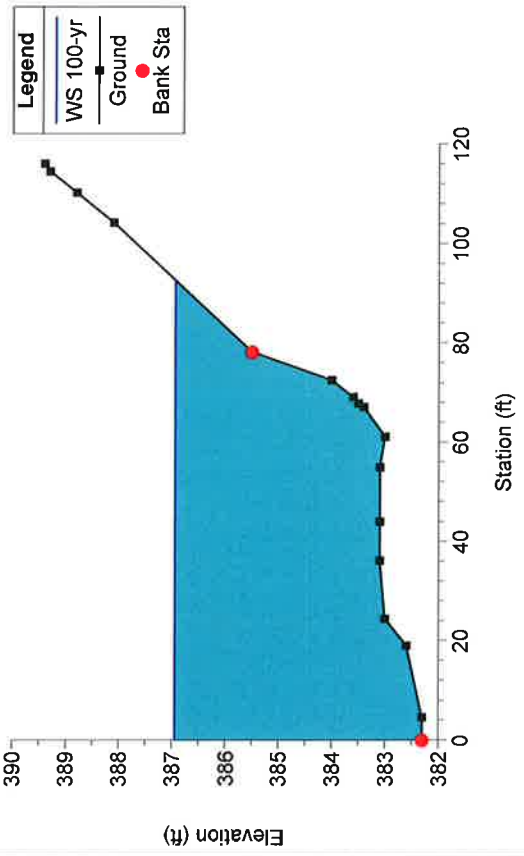
Ditch #38 & #39 Plan: Plan 02 9/1/2015



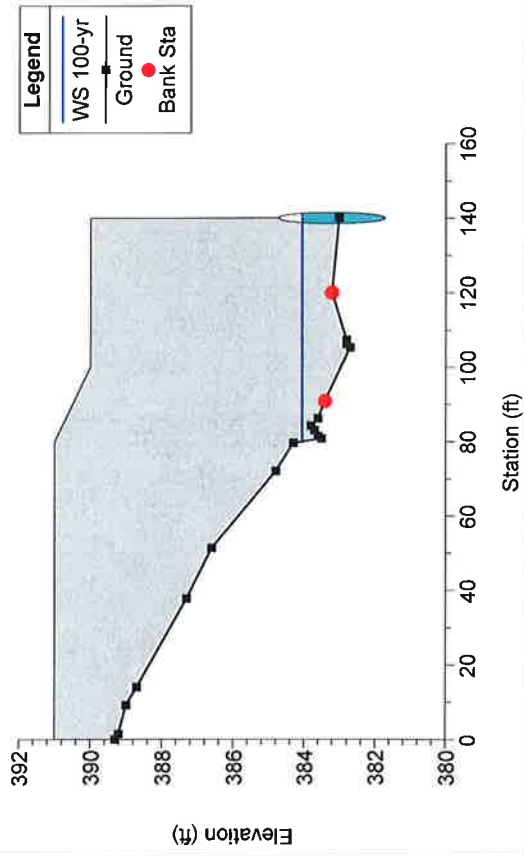
Ditch #38 & #39 Plan: Plan 02 9/1/2015



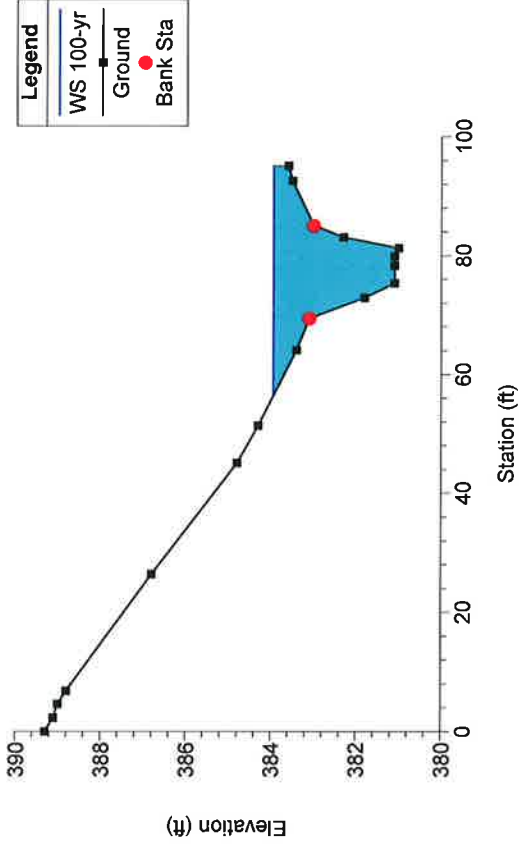
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
597.1



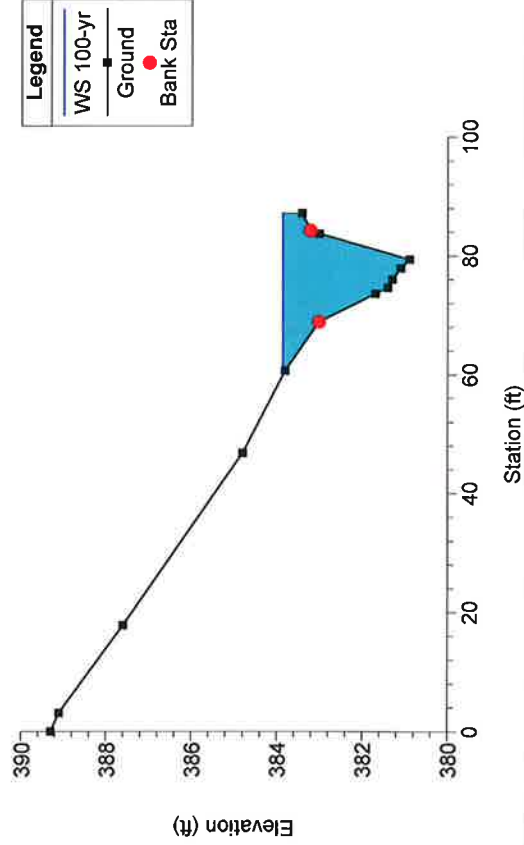
Ditch #38 & #39 Plan: Plan 02 9/1/2015



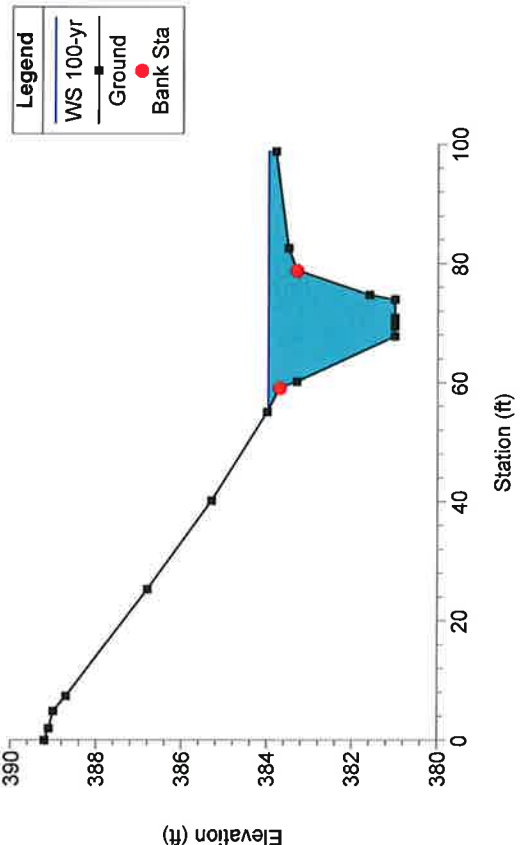
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
250



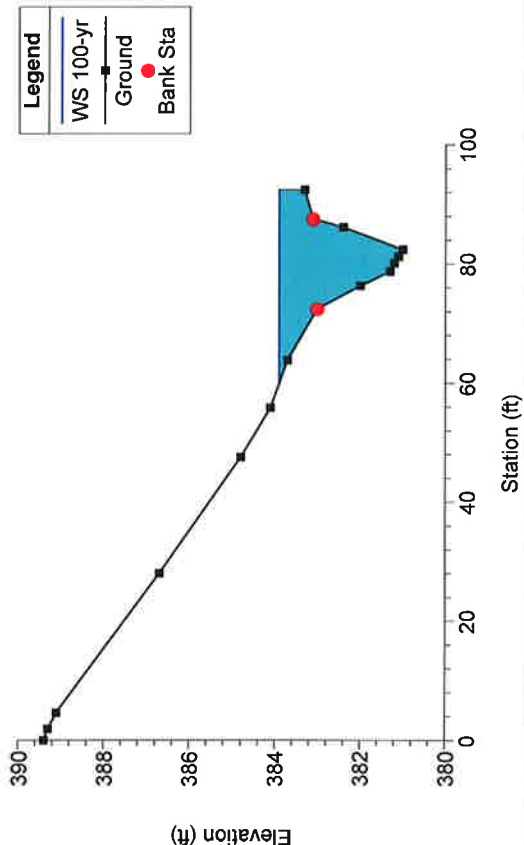
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
150



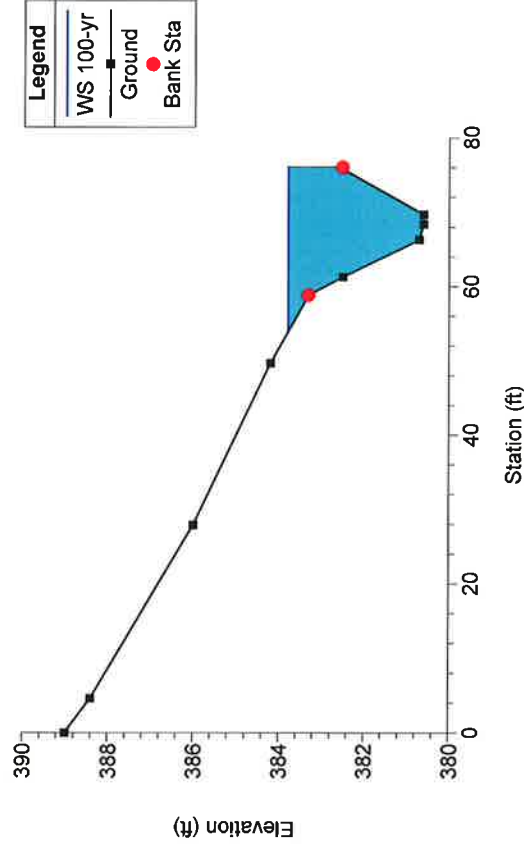
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
300



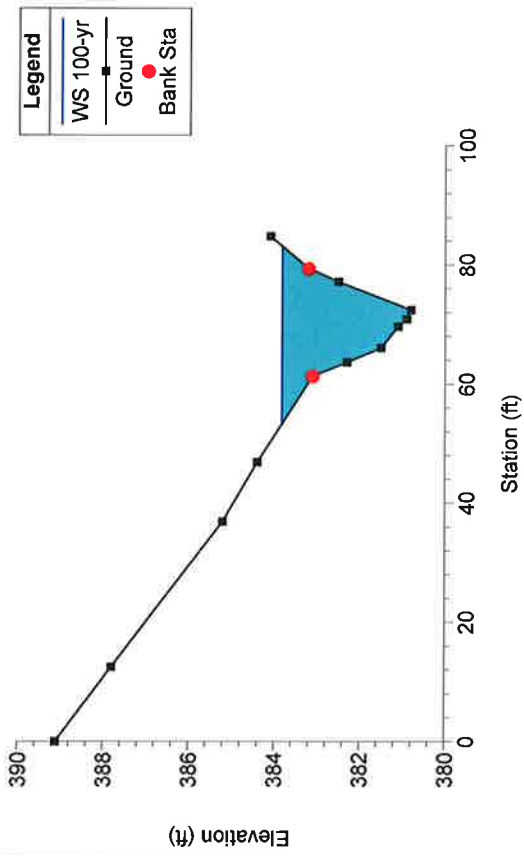
Ditch #38 & #39 Plan: Plan 02 9/1/2015  
200



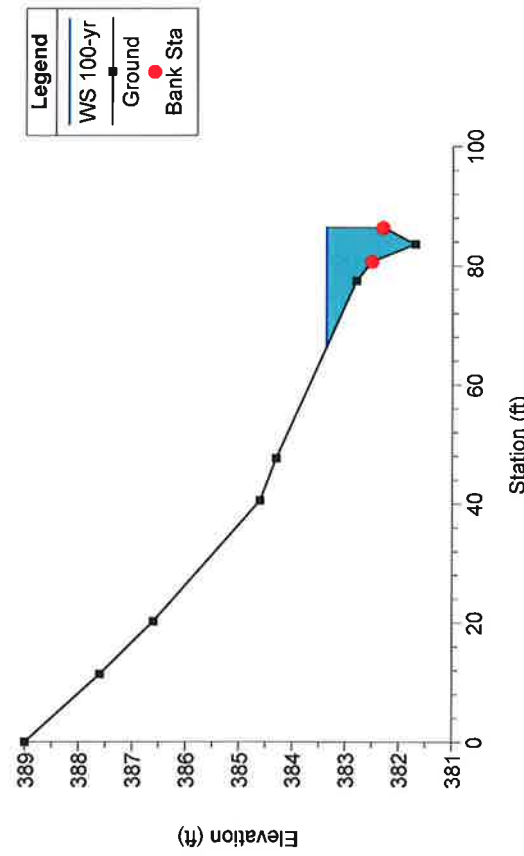
Ditch #38 & #39 Plan: Plan 02 9/1/2015



Ditch #38 & #39 Plan: Plan 02 9/1/2015



Ditch #38 & #39 Plan: Plan 02 9/1/2015





**LOCATION:** Lt. Sta. 598+75  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 15.49 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
2.06	-	0.90	Pavements & Roofs
10.04	-	0.15	Woodland & Forest
3.39	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.27

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	716	0
Course slope, (ft/ft)	0.0182	0.003
Velocity, (fps)	2.17666	1.11342
Travel time, (hr)	0.091	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.114 hr I (50 Yr)= 3.17  
 66.9 min I (100 Yr)= 3.42

Design Q (50 Yr)= 16.02 cfs  
 Maximum Q (100 Yr)= 17.98 cfs

Run 1: 24" Smooth Wall Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	393.39	390.59	390.41	2.00	1.40	NO
100	393.80	390.59	390.41	2.00	1.61	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 16.02 cfs

Maximum Flow: 17.98 cfs

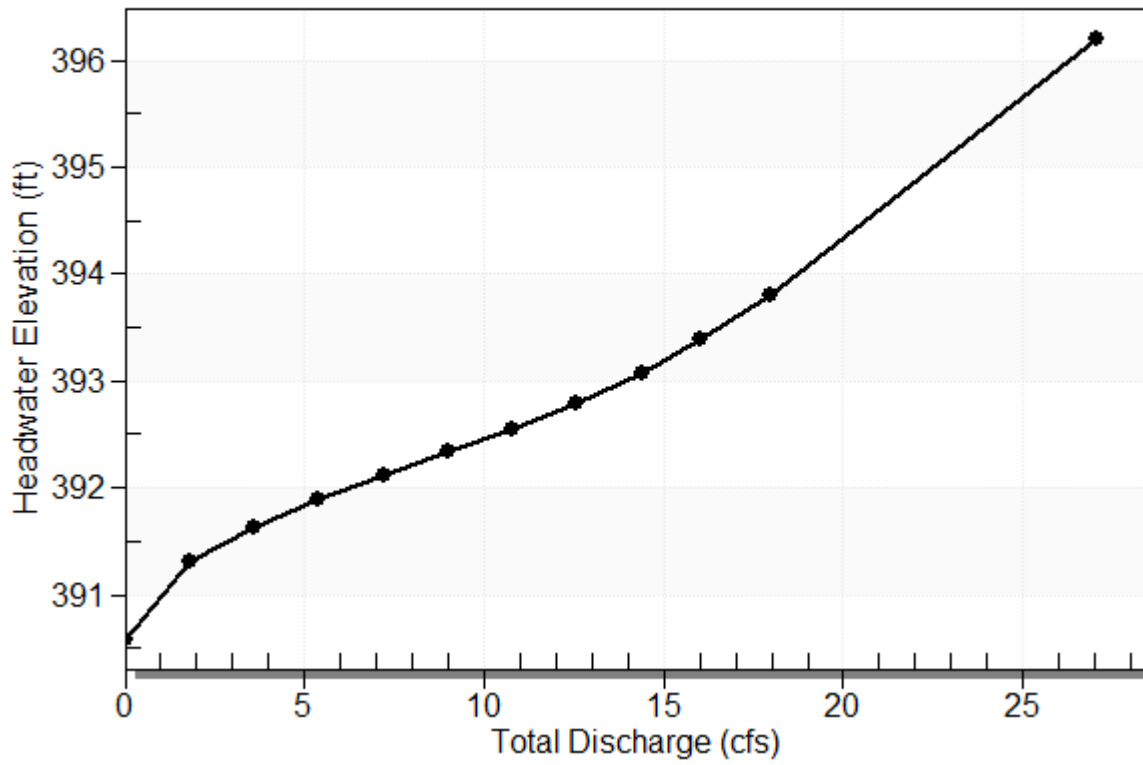
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 37**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 598+75 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
390.59	0.00	0.00	0.00	1
391.32	1.80	1.80	0.00	1
391.63	3.60	3.60	0.00	1
391.88	5.39	5.39	0.00	1
392.11	7.19	7.19	0.00	1
392.33	8.99	8.99	0.00	1
392.55	10.79	10.79	0.00	1
392.78	12.59	12.59	0.00	1
393.08	14.38	14.38	0.00	1
393.39	16.02	16.02	0.00	1
393.80	17.98	17.98	0.00	1
396.00	27.06	27.06	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 37

## Total Rating Curve

Crossing: Crossing 37



**Table 2 - Culvert Summary Table: Lt. Sta. 598+75**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	390.59	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1.80	1.80	391.32	0.627	0.726	3-M2t	0.658	0.462	0.578	0.578	2.388	1.792
3.60	3.60	391.63	0.906	1.039	3-M2t	0.968	0.658	0.750	0.750	3.342	2.131
5.39	5.39	391.88	1.143	1.294	3-M2t	1.245	0.816	0.873	0.873	4.094	2.359
7.19	7.19	392.11	1.349	1.524	3-M2t	1.558	0.952	0.973	0.973	4.745	2.535
8.99	8.99	392.33	1.531	1.744	2-M2c	2.000	1.068	1.068	1.057	5.267	2.680
10.79	10.79	392.55	1.699	1.962	2-M2c	2.000	1.174	1.174	1.132	5.627	2.805
12.59	12.59	392.78	1.864	2.195	7-M2c	2.000	1.273	1.273	1.200	5.964	2.915
14.38	14.38	393.08	2.032	2.485	7-M2c	2.000	1.363	1.363	1.261	6.309	3.014
16.02	16.02	393.39	2.193	2.804	7-M2c	2.000	1.438	1.438	1.313	6.625	3.097
17.98	17.98	393.80	2.400	3.211	7-M2c	2.000	1.526	1.526	1.371	6.993	3.187

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 390.59 ft, Outlet Elevation (invert): 390.41 ft

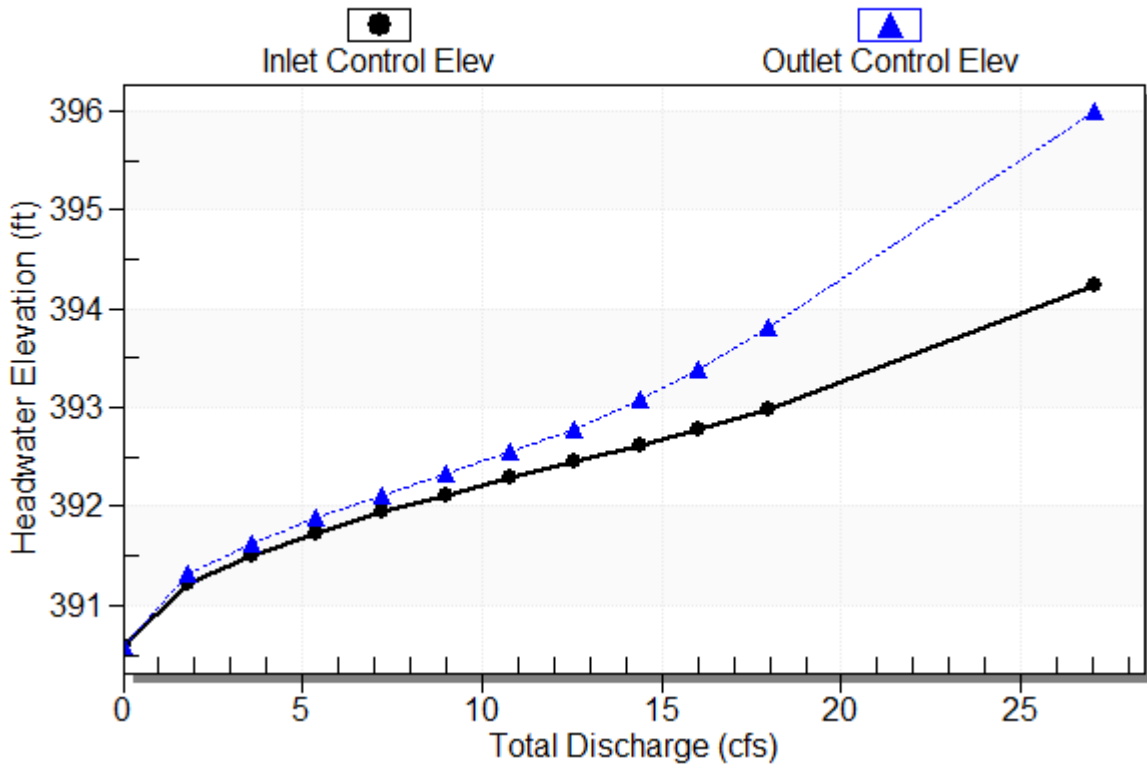
Culvert Length: 188.20 ft, Culvert Slope: 0.0010

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Culvert Performance Curve Plot: Lt. Sta. 598+75

### Performance Curve

Culvert: Lt. Sta. 598+75

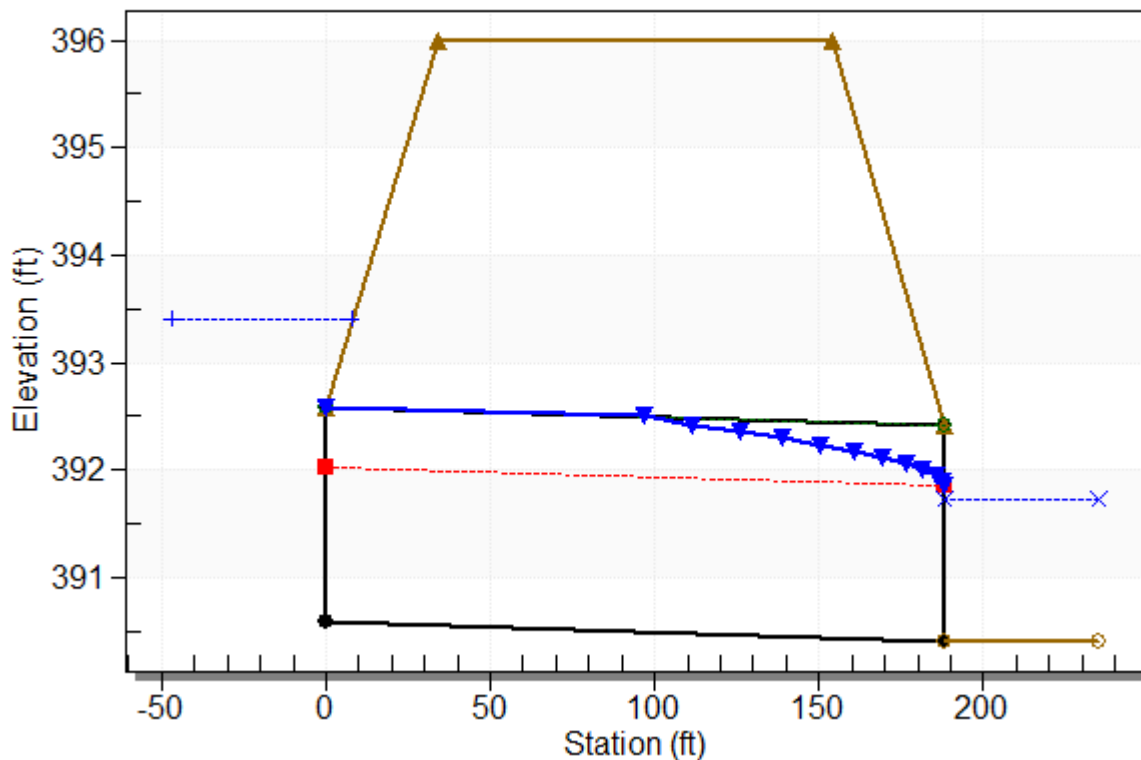




## Water Surface Profile Plot for Culvert: Lt. Sta. 598+75

### Crossing - Crossing 37, Design Discharge - 16.0 cfs

Culvert - Lt. Sta. 598+75, Culvert Discharge - 16.0 cfs



## Site Data - Lt. Sta. 598+75

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 390.59 ft

Outlet Station: 188.20 ft

Outlet Elevation: 390.41 ft

Number of Barrels: 1

## Culvert Data Summary - Lt. Sta. 598+75

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 37)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	390.41	0.00	0.00	0.00	0.00
1.80	390.99	0.58	1.79	0.36	0.59
3.60	391.16	0.75	2.13	0.47	0.61
5.39	391.28	0.87	2.36	0.54	0.63
7.19	391.38	0.97	2.53	0.61	0.64
8.99	391.47	1.06	2.68	0.66	0.65
10.79	391.54	1.13	2.81	0.71	0.66
12.59	391.61	1.20	2.92	0.75	0.66
14.38	391.67	1.26	3.01	0.79	0.67
16.02	391.72	1.31	3.10	0.82	0.67
17.98	391.78	1.37	3.19	0.86	0.68

### **Tailwater Channel Data - Crossing 37**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0350

Channel Invert Elevation: 390.41 ft

### **Roadway Data for Crossing: Crossing 37**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 396.00 ft

Roadway Surface: Paved

Roadway Top Width: 120.00 ft

**LOCATION:** Rt. Sta. 624+65  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 75 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	C-Value	Description
12.50	0.90	Pavements & Roofs
25.00	0.15	Woodland & Forest
37.50	0.70	Industrial Areas, Light
0.00	0.00	
0.00	0.00	
0.00	0.00	

Weighted C-Value: 0.55

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	C-Value	
	Unpaved	Paved
Surface	16.1345	20.3282
Length, (ft)	1026	0
Course slope, (ft/ft)	0.0765	0.003
Velocity, (fps)	4.46258	1.11342
Travel time, (hr)	0.064	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.087 hr I (50 Yr)= 3.23  
 65.2 min I (100 Yr)= 3.48  
 Design Q (50 Yr)= 159.78 cfs  
 Maximum Q (100 Yr)= 179.40 cfs

Run 1: 5' X 5' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	368.32	363.54	349.72	5.00	0.96	YES
100	368.77	363.54	349.72	5.00	1.05	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 159.78 cfs

Maximum Flow: 179.4 cfs

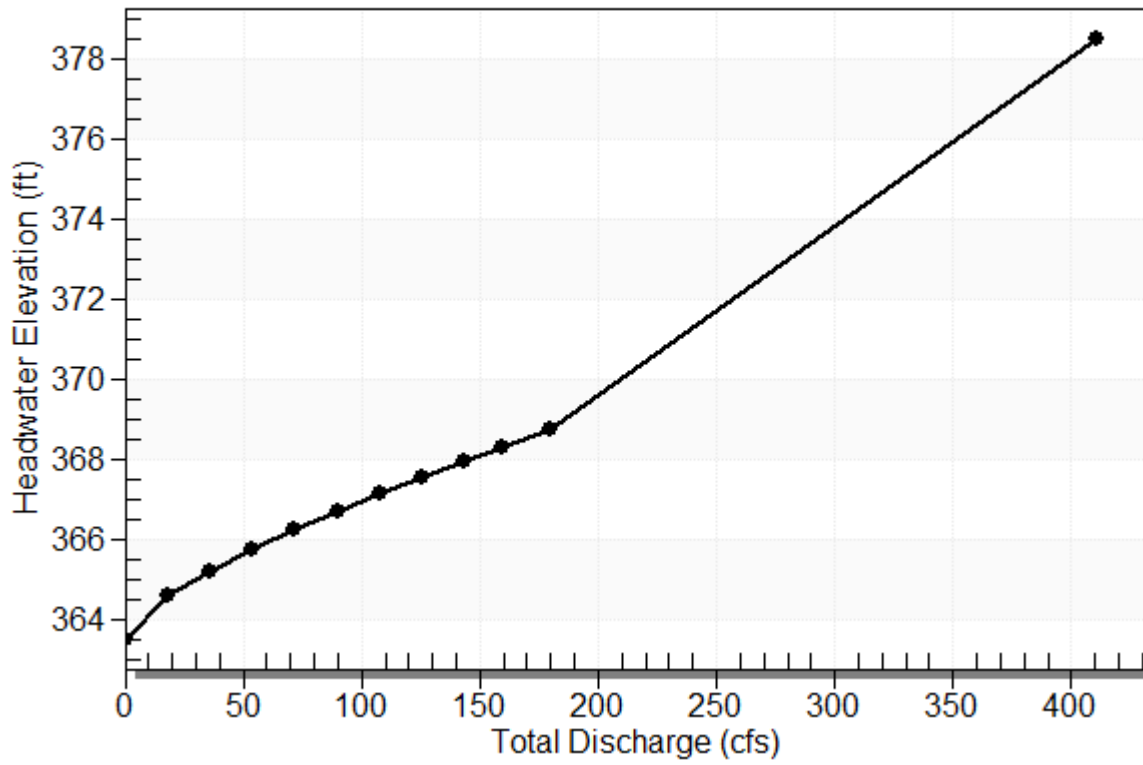
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 38**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 624+65 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
363.54	0.00	0.00	0.00	1
364.61	17.94	17.94	0.00	1
365.23	35.88	35.88	0.00	1
365.76	53.82	53.82	0.00	1
366.24	71.76	71.76	0.00	1
366.71	89.70	89.70	0.00	1
367.14	107.64	107.64	0.00	1
367.55	125.58	125.58	0.00	1
367.95	143.52	143.52	0.00	1
368.32	159.78	159.78	0.00	1
368.77	179.40	179.40	0.00	1
377.00	410.85	410.85	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 38

## Total Rating Curve

Crossing: Crossing 38



**Table 2 - Culvert Summary Table: Rt. Sta. 624+65**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	363.54	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
17.94	17.94	364.61	1.066	0.0*	1-S2n	0.216	0.737	0.216	0.538	16.643	2.073
35.88	35.88	365.23	1.692	0.0*	1-S2n	0.431	1.169	0.464	0.811	15.462	2.662
53.82	53.82	365.76	2.217	0.0*	1-S2n	0.556	1.532	0.556	1.029	19.343	3.067
71.76	71.76	366.24	2.703	0.0*	1-S2n	0.671	1.856	0.671	1.216	21.396	3.384
89.70	89.70	366.71	3.168	0.0*	1-S2n	0.785	2.154	0.827	1.384	21.695	3.647
107.64	107.64	367.14	3.600	0.0*	1-S2n	0.899	2.432	0.937	1.538	22.968	3.873
125.58	125.58	367.55	4.011	0.0*	1-S2n	0.994	2.696	1.052	1.679	23.864	4.073
143.52	143.52	367.95	4.413	0.0*	1-S2n	1.086	2.947	1.168	1.812	24.585	4.252
159.78	159.78	368.32	4.778	0.0*	1-S2n	1.170	3.165	1.265	1.926	25.268	4.400
179.40	179.40	368.77	5.228	0.0*	5-S2n	1.271	3.419	1.387	2.057	25.862	4.563



\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 363.54 ft, Outlet Elevation (invert): 349.72 ft

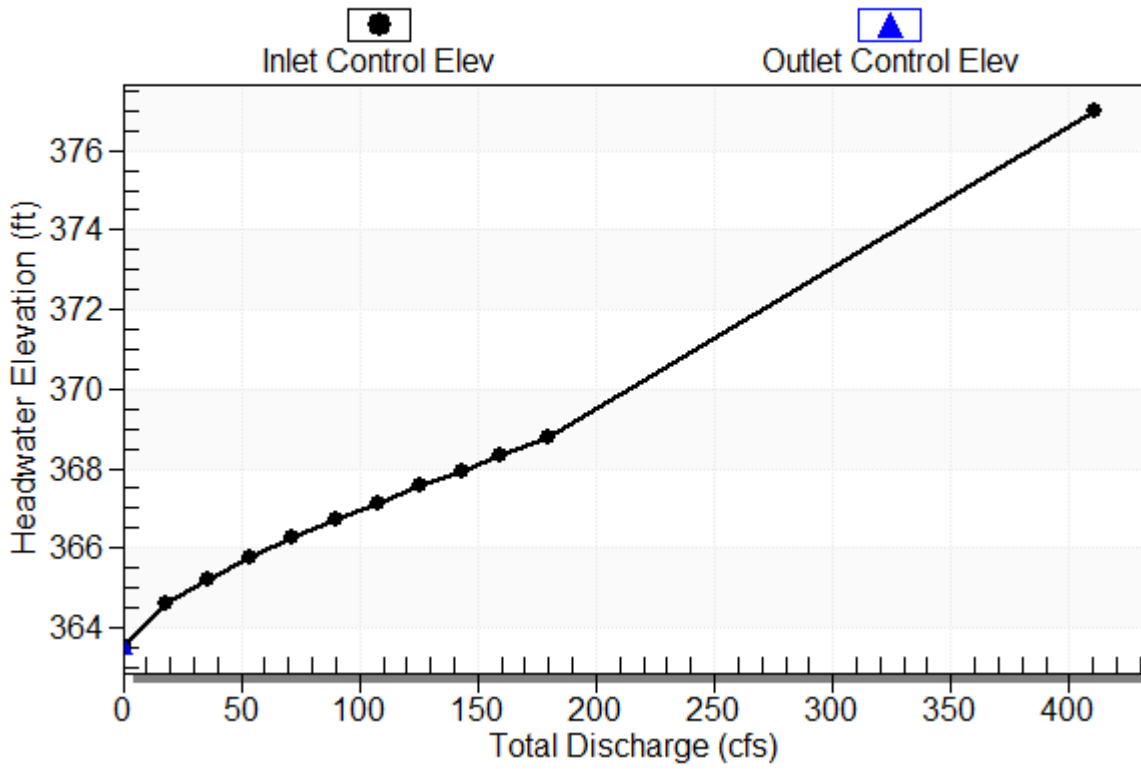
Culvert Length: 215.31 ft, Culvert Slope: 0.0643

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# Culvert Performance Curve Plot: Rt. Sta. 624+65

## Performance Curve

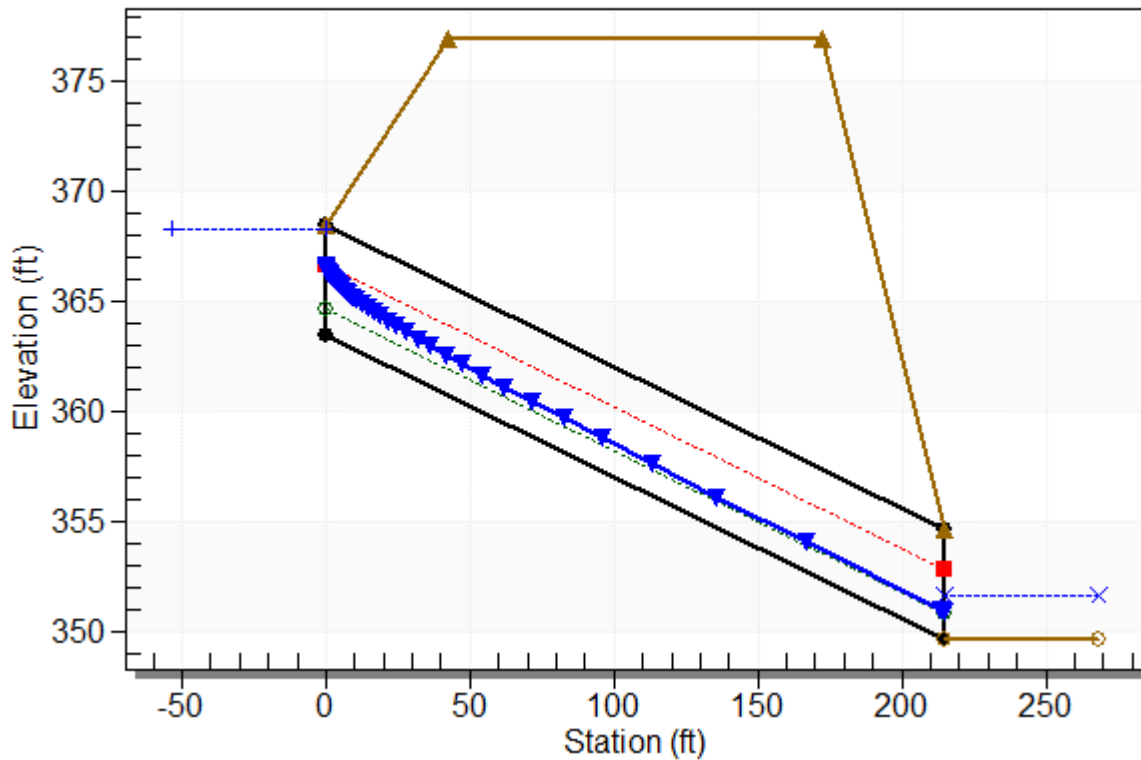
Culvert: Rt. Sta. 624+65



## Water Surface Profile Plot for Culvert: Rt. Sta. 624+65

Crossing - Crossing 38, Design Discharge - 159.8 cfs

Culvert - Rt. Sta. 624+65, Culvert Discharge - 159.8 cfs



### Site Data - Rt. Sta. 624+65

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 363.54 ft

Outlet Station: 214.87 ft

Outlet Elevation: 349.72 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 624+65

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 38)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	349.72	0.00	0.00	0.00	0.00
17.94	350.26	0.54	2.07	0.34	0.51
35.88	350.53	0.81	2.66	0.51	0.55
53.82	350.75	1.03	3.07	0.64	0.56
71.76	350.94	1.22	3.38	0.76	0.58
89.70	351.10	1.38	3.65	0.86	0.59
107.64	351.26	1.54	3.87	0.96	0.60
125.58	351.40	1.68	4.07	1.05	0.60
143.52	351.53	1.81	4.25	1.13	0.61
159.78	351.65	1.93	4.40	1.20	0.61
179.40	351.78	2.06	4.56	1.28	0.62

### **Tailwater Channel Data - Crossing 38**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 15.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0450

Channel Invert Elevation: 349.72 ft

### **Roadway Data for Crossing: Crossing 38**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 377.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

**Location:** Lt. Sta. 667+20  
**HY8 File Name:** .INP  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

Drainage Area (acres) = 290.00

Curve Number, CN =

Acres	HSG	CN	Description
2.75	C	92.00	IA (Paved-Open Ditches)
84.95	A	30.00	Woods (Good)
46.00	C	70.00	Woods (Good)
98.00	A	81.00	Industrial
48.00	C	91.00	Industrial
7.55	A	39.00	Open Space (Good)
2.75	C	74.00	Open Space (Good)

Weighted CN-value = 64.9

Time of Concentration,  $t_c$  = 1.418 hrs.

<u>Sheet Flow</u>	
Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

<u>Shallow Concentrated Flow</u>		
Segment	Unpaved	Paved
Surface (unpaved)	16.1345	20.3282
Length, (ft)	3843.30	0.00
Course slope, (ft/ft)	0.0281	0.0000
Velocity, (fps)	2.7047	0.0643
Travel time, (hr)	0.395	0.000

<u>Channel Flow</u>	
Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

24 Hour Rainfall, P -

SCDHEC Rainfall for: Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Initial Abstraction,  $I_a$  =

$$S = (1000/CN) - 10 = 5.40 \text{ in}$$

$$I_a = 0.2(S) = 1.08 \text{ in}$$

**Location:** Lt. Sta. 667+20  
**HY8 File Name:** .INP  
**Continued**

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	5.40	=	0.8	in
10	5.30	5.40	=	1.8	in
25	6.40	5.40	=	2.6	in
50	7.30	5.40	=	3.3	in
100	8.30	5.40	=	4.1	in

Unit Peak Discharge,  $q_u$   
 Rainfall Distribution Type II

Design Storm	P	$I_a$	$I_a / p$ (max 0.50)	$q_u$	
2	3.60	1.08	0.30	233.4	csm/in
10	5.30	1.08	0.20	257.4	csm/in
25	6.40	1.08	0.17	266.6	csm/in
50	7.30	1.08	0.15	272.3	csm/in
100	8.30	1.08	0.13	277.3	csm/in

Pond Factor,  $F_p$  =

$$1.4 \text{ acres} = 0.5\% \quad F_p = 0.9$$

Peak Discharge,  $q_p$  =

$$q_p = q_u A_m Q F_p$$

Design Storm	$q_u$ (csm/in)	$A_m$	$(mi_2)$	Q (in)	$F_p$	$q_p$ (cfs)	
2	233.4	0.45		0.8	0.930	78.8	cfs
10	257.4	0.45		1.8	0.930	200.6	cfs
25	266.6	0.45		2.6	0.930	296.5	cfs
50	272.3	0.45		3.3	0.930	381.9	cfs
100	277.3	0.45		4.1	0.930	482.4	cfs

Run 1: 5' X 5' Box Culvert						
YEAR	$H_w$	IN	OUT	RISE	$H_w/D$	<1.2
50	356.20	344.00	342.11	5.00	2.44	Redesign
100	361.68	344.00	342.11	5.00	3.54	



# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 381.9 cfs

Maximum Flow: 482.4 cfs

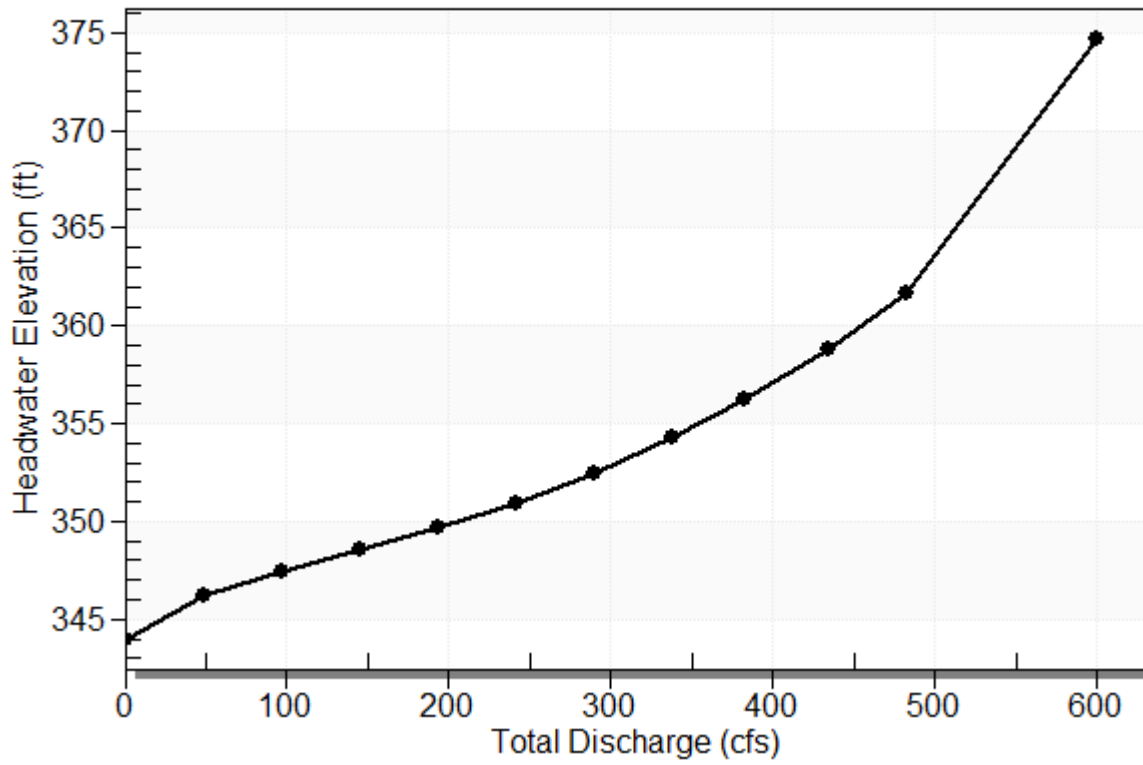
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 40**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 667+20 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
344.00	0.00	0.00	0.00	1
346.17	48.24	48.24	0.00	1
347.47	96.48	96.48	0.00	1
348.58	144.72	144.72	0.00	1
349.69	192.96	192.96	0.00	1
350.95	241.20	241.20	0.00	1
352.46	289.44	289.44	0.00	1
354.27	337.68	337.68	0.00	1
356.20	381.90	381.90	0.00	1
358.80	434.16	434.16	0.00	1
361.68	482.40	482.40	0.00	1
370.00	600.21	600.21	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 40

## Total Rating Curve

Crossing: Crossing 40



**Table 2 - Culvert Summary Table: Lt. Sta. 667+20**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	344.00	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
48.24	48.24	346.17	2.172	0.0*	1-S2n	1.041	1.425	1.053	1.644	9.164	2.756
96.48	96.48	347.47	3.475	1.062	1-S2n	1.695	2.261	1.724	2.464	11.190	3.415
144.72	144.72	348.58	4.580	2.315	1-S2n	2.282	2.963	2.327	3.107	12.438	3.847
192.96	192.96	349.69	5.690	3.715	5-S2n	2.832	3.590	2.889	3.653	13.357	4.175
241.20	241.20	350.95	6.954	5.743	5-S2n	3.364	4.165	3.434	4.134	14.048	4.442
289.44	289.44	352.46	8.464	7.354	5-S2n	3.882	4.704	3.953	4.569	14.644	4.669
337.68	337.68	354.27	10.270	9.089	5-S2n	4.392	5.000	4.466	4.967	15.123	4.868
381.90	381.90	356.20	12.198	11.064	4-FFf	5.000	5.000	5.000	5.307	15.276	5.030
434.16	434.16	358.80	14.805	13.675	4-FFf	5.000	5.000	5.000	5.682	17.366	5.204
482.40	482.40	361.68	17.680	16.319	4-FFf	5.000	5.000	5.000	6.007	19.296	5.351

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 344.00 ft, Outlet Elevation (invert): 342.11 ft

Culvert Length: 229.06 ft, Culvert Slope: 0.0083

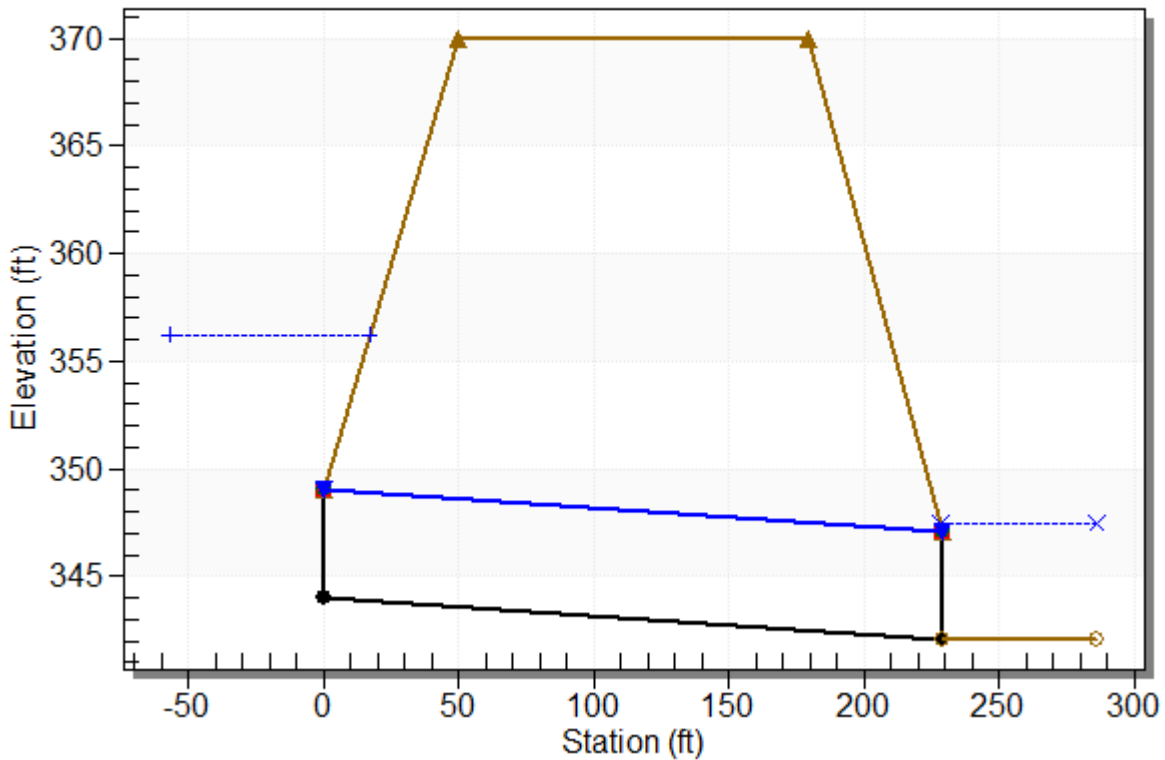
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**Culvert Performance Curve Plot: Lt. Sta. 667+20**

## Water Surface Profile Plot for Culvert: Lt. Sta. 667+20

Crossing - Crossing 40, Design Discharge - 381.9 cfs

Culvert - Lt. Sta. 667+20, Culvert Discharge - 381.9 cfs



### Site Data - Lt. Sta. 667+20

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 344.00 ft

Outlet Station: 229.05 ft

Outlet Elevation: 342.11 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 667+20

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 40)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	342.11	0.00	0.00	0.00	0.00
48.24	343.75	1.64	2.76	0.51	0.41
96.48	344.57	2.46	3.42	0.77	0.42
144.72	345.22	3.11	3.85	0.97	0.43
192.96	345.76	3.65	4.17	1.14	0.44
241.20	346.24	4.13	4.44	1.29	0.44
289.44	346.68	4.57	4.67	1.43	0.45
337.68	347.08	4.97	4.87	1.55	0.45
381.90	347.42	5.31	5.03	1.66	0.45
434.16	347.79	5.68	5.20	1.77	0.45
482.40	348.12	6.01	5.35	1.87	0.46

### **Tailwater Channel Data - Crossing 40**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 9.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0450

Channel Invert Elevation: 342.11 ft

### **Roadway Data for Crossing: Crossing 40**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 370.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

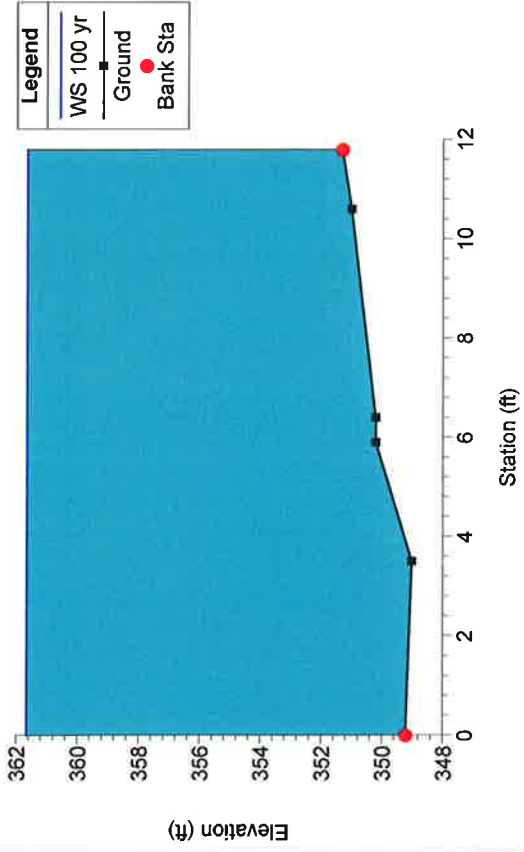


*HEC-RAS Output*  
*Station 667+00*

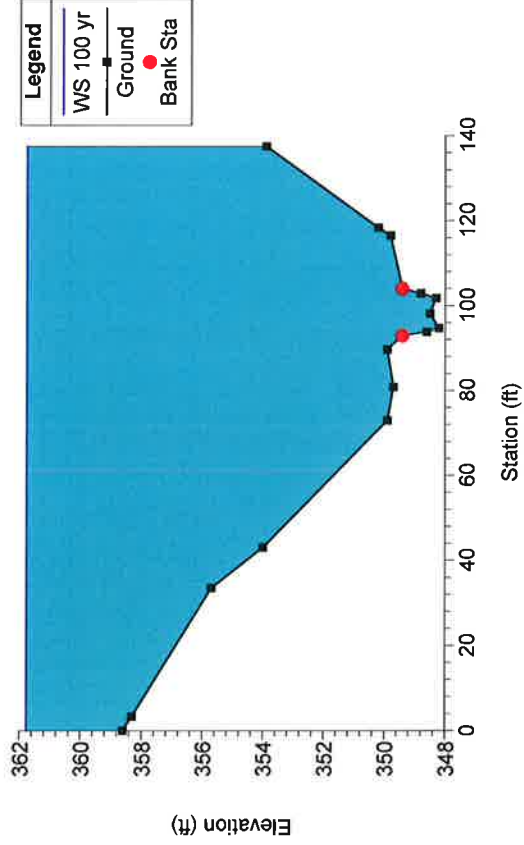
HEC-RAS Plan: Plan 01 River: Ditch #47 & #46 Reach: Ditch #47 & #46

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #47 & #46	679.05	50 yr	381.90	349.00	356.61		356.98	0.004158	4.89	78.15	11.80	0.33
Ditch #47 & #46	679.05	100 yr	482.40	349.00	361.66		361.85	0.001580	3.50	137.69	11.80	0.18
Ditch #47 & #46	829.05	50 yr	381.90	348.20	356.83		356.86	0.000172	1.83	600.37	117.15	0.11
Ditch #47 & #46	829.05	100 yr	482.40	348.20	361.78		361.79	0.000037	1.16	1263.08	137.50	0.06
Ditch #47 & #46	579.05	50 yr	381.90	347.20	356.83		356.85	0.000106	1.51	745.80	137.15	0.09
Ditch #47 & #46	579.05	100 yr	482.40	347.20	361.78		361.79	0.000025	0.98	1463.33	145.60	0.05
Ditch #47 & #46	529.05	50 yr	381.90	346.70	356.82		356.84	0.000106	1.59	758.26	143.50	0.09
Ditch #47 & #46	529.05	100 yr	482.40	346.70	361.78		361.79	0.000025	1.02	1469.39	143.50	0.05
Ditch #47 & #46	479.05	50 yr	381.90	346.20	356.82		356.84	0.000103	1.64	794.84	155.71	0.09
Ditch #47 & #46	479.05	100 yr	482.40	346.20	361.78		361.78	0.000024	1.02	1624.26	177.98	0.05
Ditch #47 & #46	429.05	50 yr	381.90	345.50	356.82		356.83	0.000080	1.54	828.32	149.94	0.08
Ditch #47 & #46	429.05	100 yr	482.40	345.50	361.78		361.78	0.000022	1.02	1631.68	175.36	0.05
Ditch #47 & #46	379.05	50 yr	381.90	344.70	356.82		356.83	0.000050	1.28	955.28	184.88	0.07
Ditch #47 & #46	379.05	100 yr	482.40	344.70	361.78		361.78	0.000014	0.86	1982.30	217.01	0.04
Ditch #47 & #46	329.05	50 yr	381.90	343.30	356.82		356.82	0.000046	1.18	1326.27	264.98	0.06
Ditch #47 & #46	329.05	100 yr	482.40	343.30	361.78		361.78	0.000010	0.69	2693.85	289.12	0.03
Ditch #47 & #46	279.05	50 yr	381.90	342.60	356.82	345.44	356.82	0.000008	0.52	2406.03	398.09	0.03
Ditch #47 & #46	279.05	100 yr	482.40	342.60	361.78	345.72	361.78	0.000002	0.36	4534.65	467.75	0.01
Ditch #47 & #46	100		Culvert									
Ditch #47 & #46	50	50 yr	381.90	342.10	349.16	349.16	350.09	0.036474	9.50	75.11	38.13	0.64
Ditch #47 & #46	50	100 yr	482.40	342.10	349.56	349.56	350.53	0.038593	10.15	91.07	42.03	0.66
Ditch #47 & #46	40	50 yr	381.90	338.90	345.95		346.09	0.001333	3.02	126.42	28.11	0.25
Ditch #47 & #46	40	100 yr	482.40	338.90	346.49		346.67	0.001648	3.38	143.60	36.23	0.28
Ditch #47 & #46	30	50 yr	381.90	339.70	345.94		346.08	0.001016	3.13	144.83	42.47	0.25
Ditch #47 & #46	30	100 yr	482.40	339.70	346.47		346.66	0.001139	3.54	169.46	49.62	0.26
Ditch #47 & #46	20	50 yr	381.90	340.30	345.76		346.05	0.002571	4.96	154.63	58.51	0.38
Ditch #47 & #46	20	100 yr	482.40	340.30	346.27		346.62	0.002800	5.51	185.24	62.56	0.40
Ditch #47 & #46	10	50 yr	381.90	340.30	345.57	344.10	346.01	0.003802	5.78	126.34	64.95	0.46
Ditch #47 & #46	10	100 yr	482.40	340.30	346.08	344.61	346.58	0.003947	6.30	163.13	76.03	0.48
Ditch #47 & #46	0	50 yr	381.90	340.40	344.64	344.64	345.86	0.017004	11.06	86.87	45.48	0.96
Ditch #47 & #46	0	100 yr	482.40	340.40	345.15	345.15	346.43	0.016255	11.69	112.41	55.14	0.96

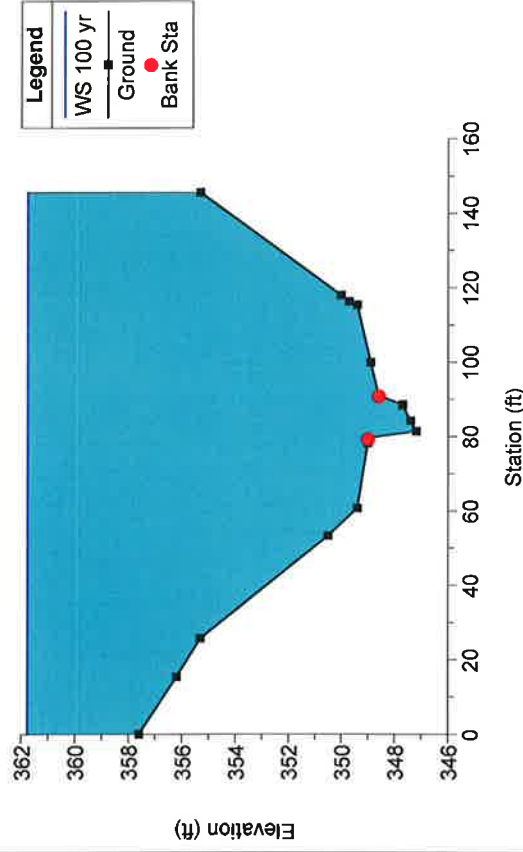
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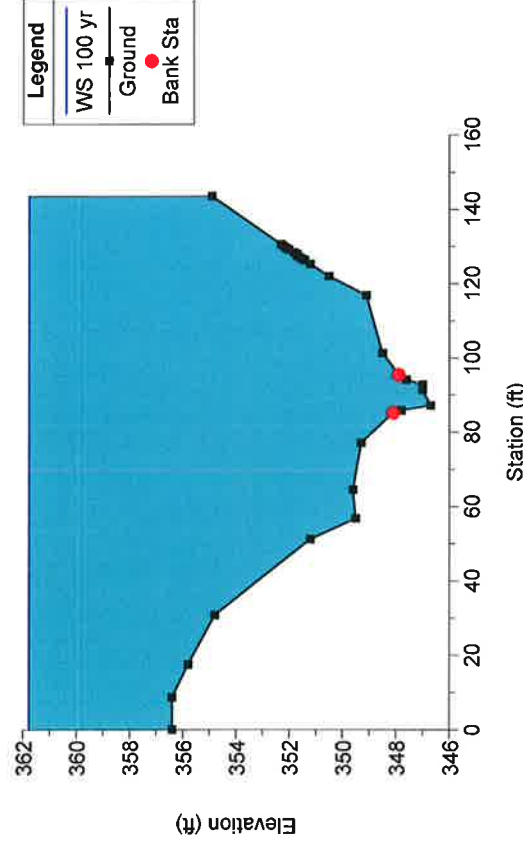
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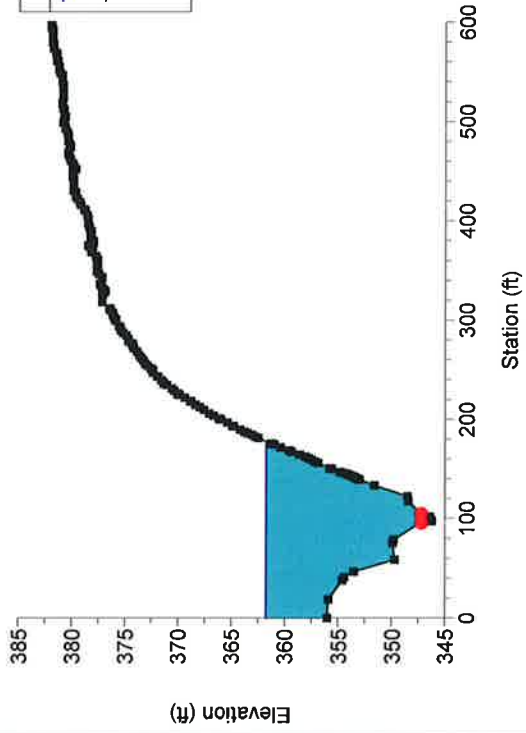
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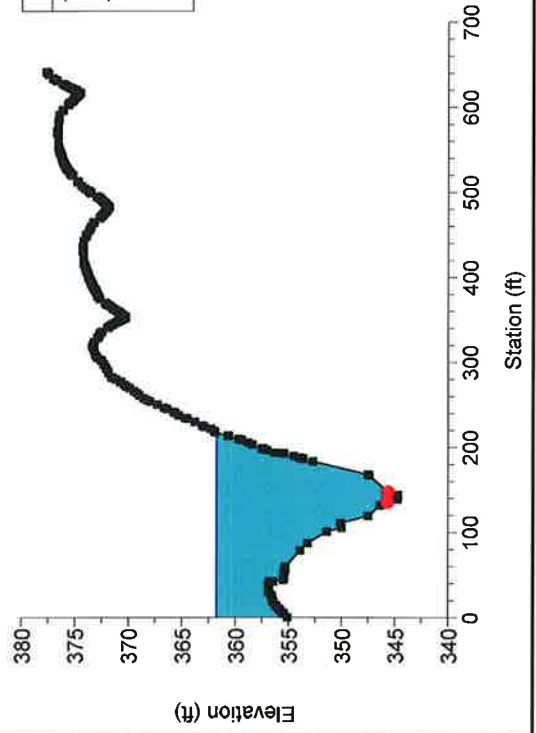
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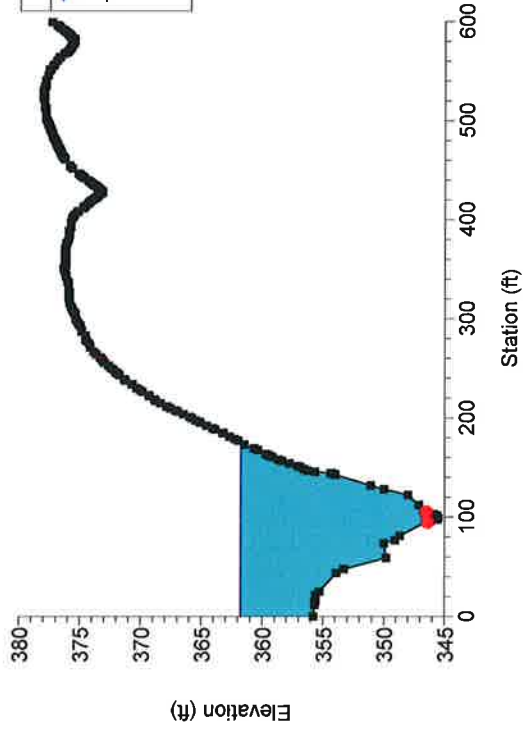
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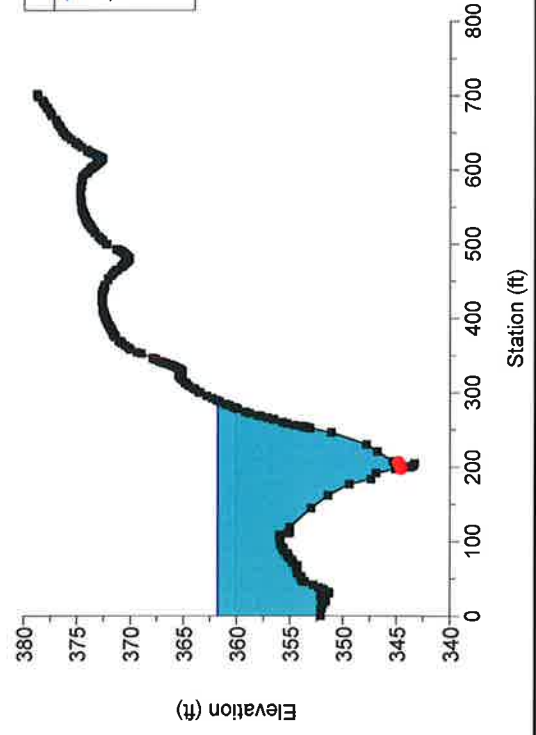
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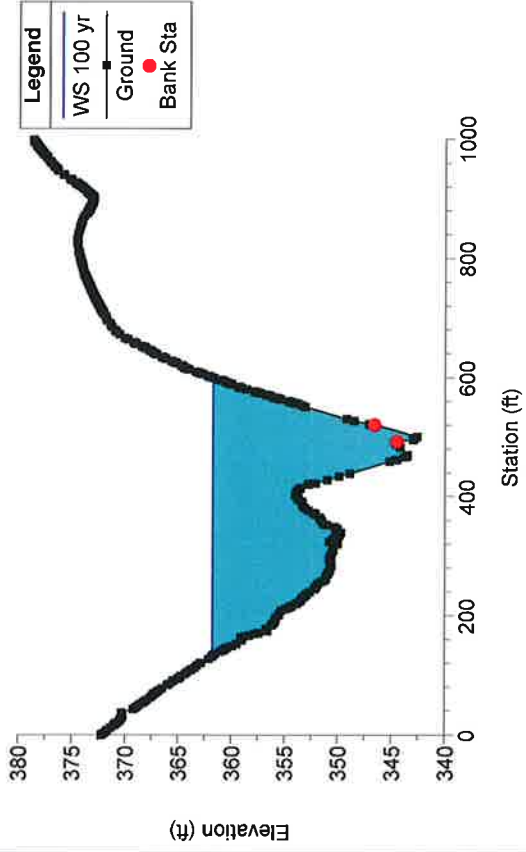
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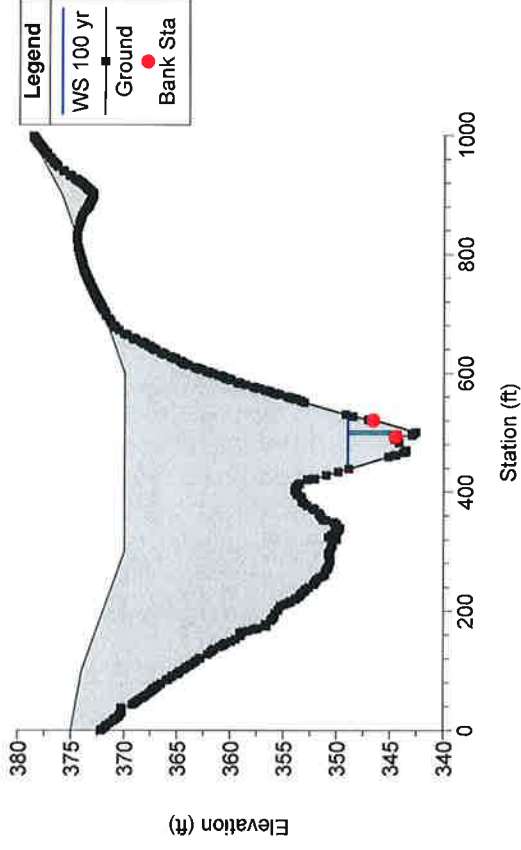
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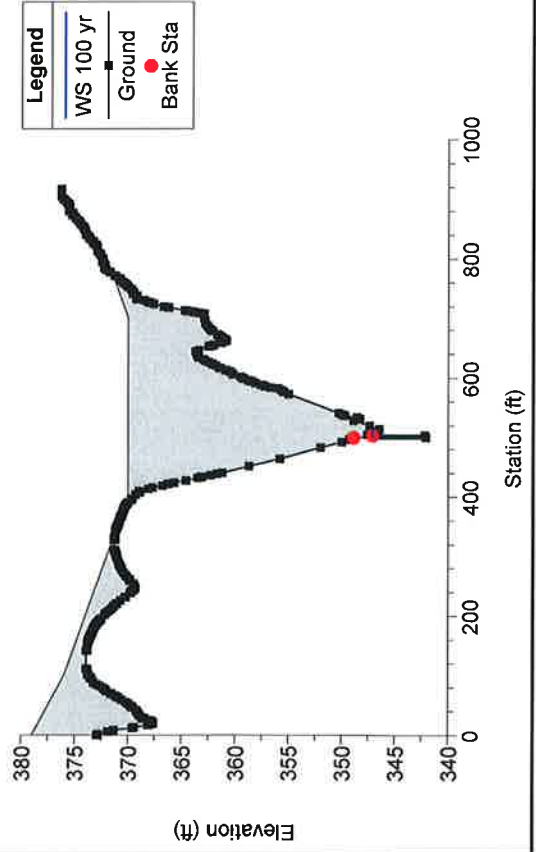
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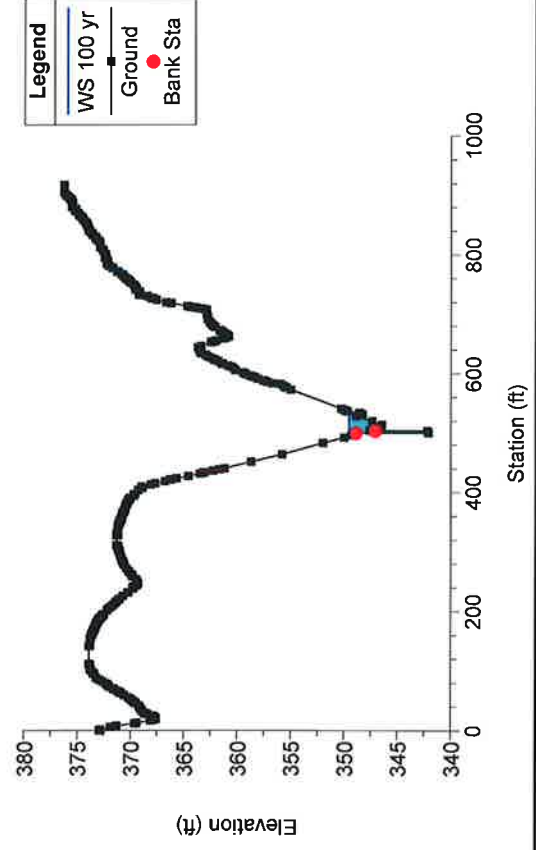
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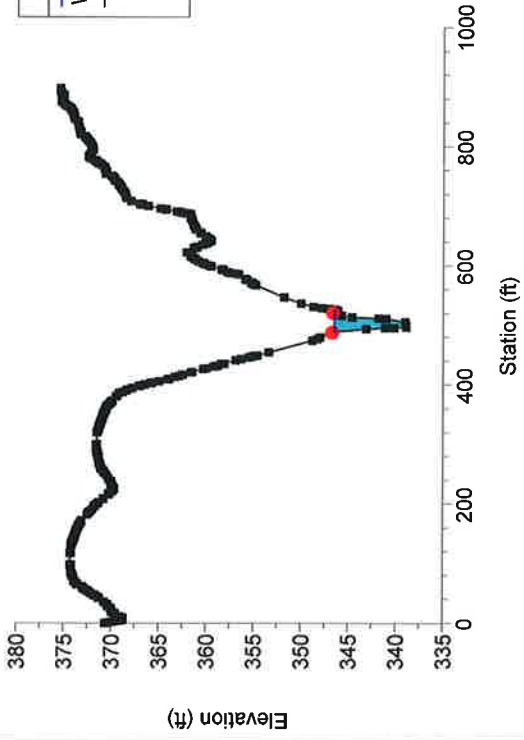
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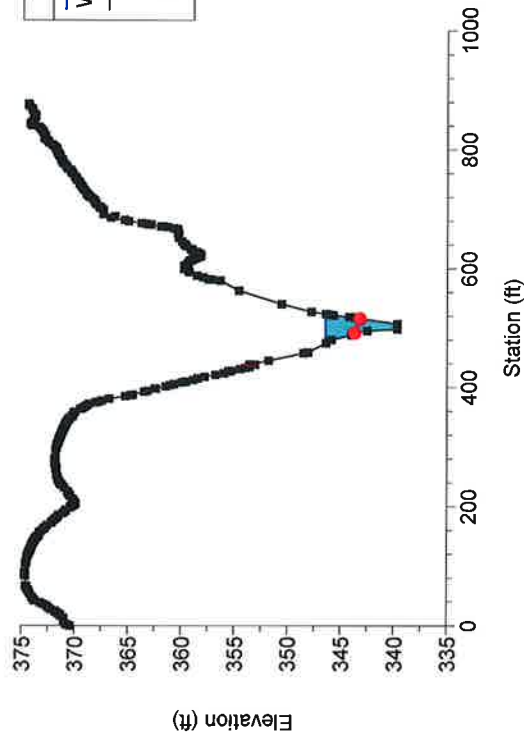
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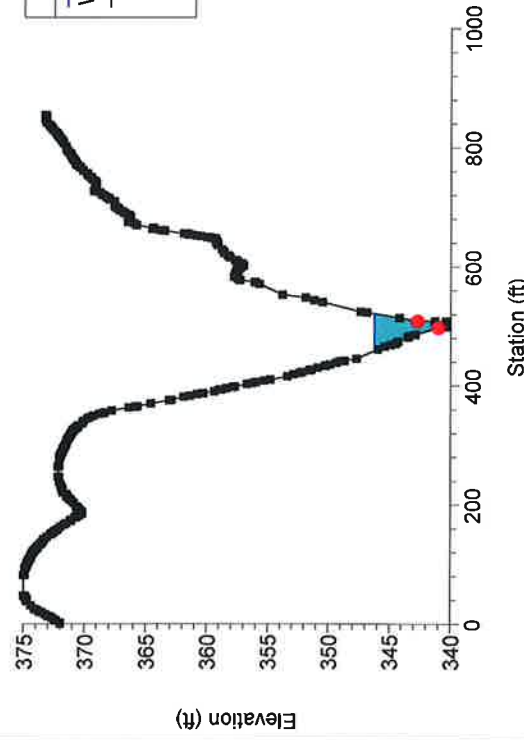
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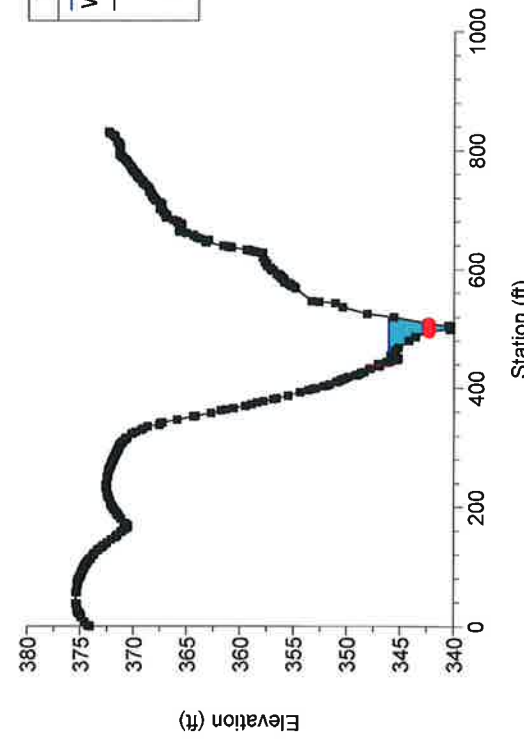
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20



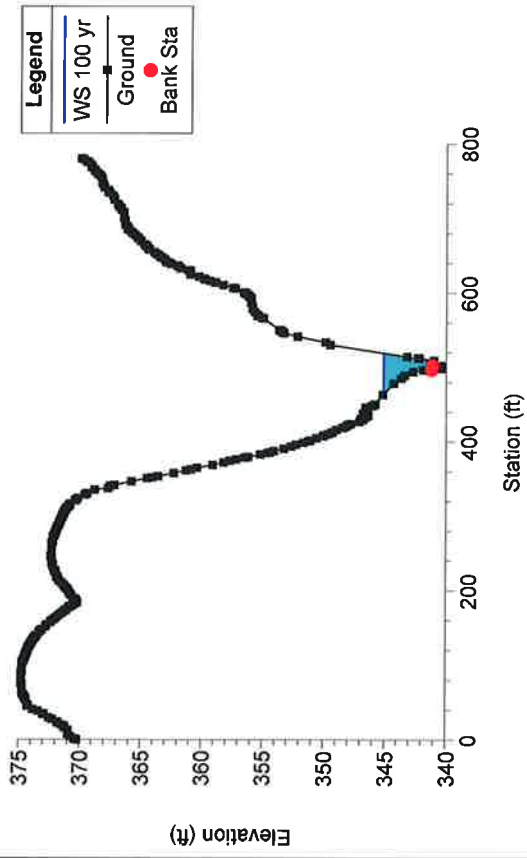
Ditch #47 & #46 Plan: Plan 01 9/1/2015  
10





Ditch #47 & #46 Plan: Plan 01 9/1/2015

0



**LOCATION:** Lt. Sta. 692+80  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 16.88 acres

**RUNOFF COEFFICIENT, C=**  
**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
0.87	-	0.90	Pavements & Roofs
13.56	-	0.20	Unimproved Areas
2.45	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.24

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved Paved	
	2	
Surface	16.1345	20.3282
Length, (ft)	2187	0
Course slope, (ft/ft)	0.0366	0.003
Velocity, (fps)	3.08671	1.11342
Travel time, (hr)	0.197	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.220 hr I (50 Yr)= 2.98  
 73.2 min I (100 Yr)= 3.21  
 Design Q (50 Yr)= 14.67 cfs  
 Maximum Q (100 Yr)= 16.47 cfs

Run 1: 4' X 4' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	406.87	405.82	381.50	4.00	0.26	YES
100	406.96	405.82	381.50	4.00	0.28	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 14.67 cfs

Maximum Flow: 16.47 cfs

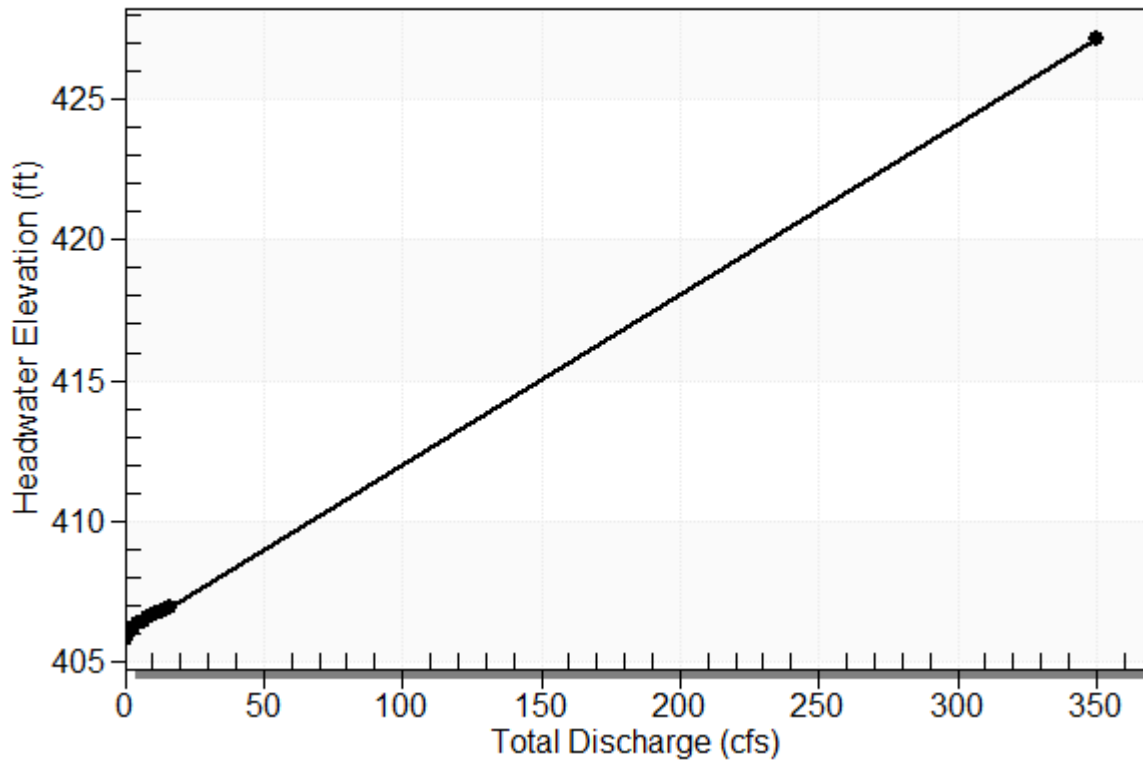
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 41**

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 692+80 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
405.82	0.00	0.00	0.00	1
406.06	1.65	1.65	0.00	1
406.21	3.29	3.29	0.00	1
406.33	4.94	4.94	0.00	1
406.44	6.59	6.59	0.00	1
406.54	8.23	8.23	0.00	1
406.63	9.88	9.88	0.00	1
406.72	11.53	11.53	0.00	1
406.80	13.18	13.18	0.00	1
406.87	14.67	14.67	0.00	1
406.96	16.47	16.47	0.00	1
427.00	350.24	350.24	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 41

## Total Rating Curve

Crossing: Crossing 41



**Table 2 - Culvert Summary Table: Lt. Sta. 692+80**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	405.82	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1.65	1.65	406.06	0.245	0.0*	1-S2n	0.024	0.174	0.024	0.094	17.473	2.111
3.29	3.29	406.21	0.389	0.0*	1-S2n	0.047	0.276	0.047	0.142	17.473	2.745
4.94	4.94	406.33	0.509	0.0*	1-S2n	0.071	0.362	0.071	0.181	17.473	3.194
6.59	6.59	406.44	0.617	0.0*	1-S2n	0.094	0.438	0.094	0.215	17.473	3.551
8.23	8.23	406.54	0.716	0.0*	1-S2n	0.118	0.509	0.118	0.245	17.473	3.850
9.88	9.88	406.63	0.808	0.0*	1-S2n	0.141	0.574	0.141	0.272	17.473	4.113
11.53	11.53	406.72	0.896	0.0*	1-S2n	0.165	0.637	0.165	0.298	17.473	4.344
13.18	13.18	406.80	0.979	0.0*	1-S2n	0.189	0.696	0.189	0.323	17.473	4.555
14.67	14.67	406.87	1.052	0.0*	1-S2n	0.210	0.748	0.210	0.343	17.473	4.731
16.47	16.47	406.96	1.136	0.0*	1-S2n	0.236	0.807	0.292	0.367	14.080	4.924

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 405.82 ft, Outlet Elevation (invert): 381.50 ft

Culvert Length: 255.94 ft, Culvert Slope: 0.0955

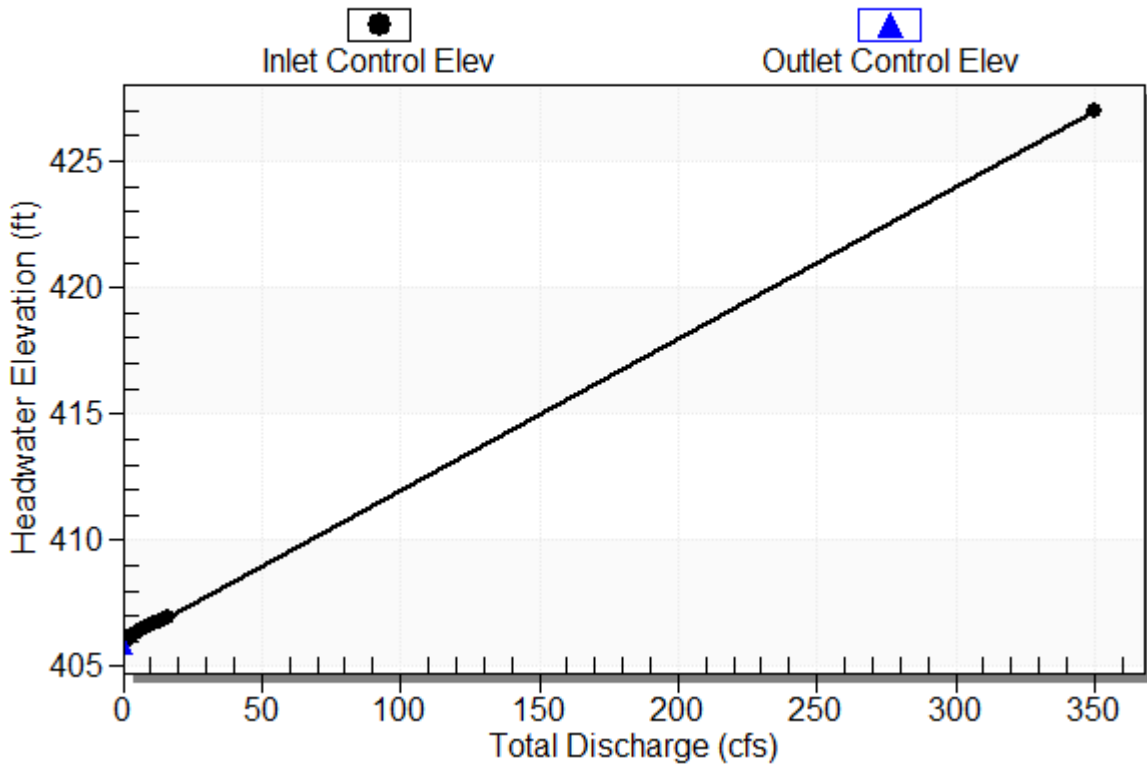
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Culvert Performance Curve Plot: Lt. Sta. 692+80

### Performance Curve

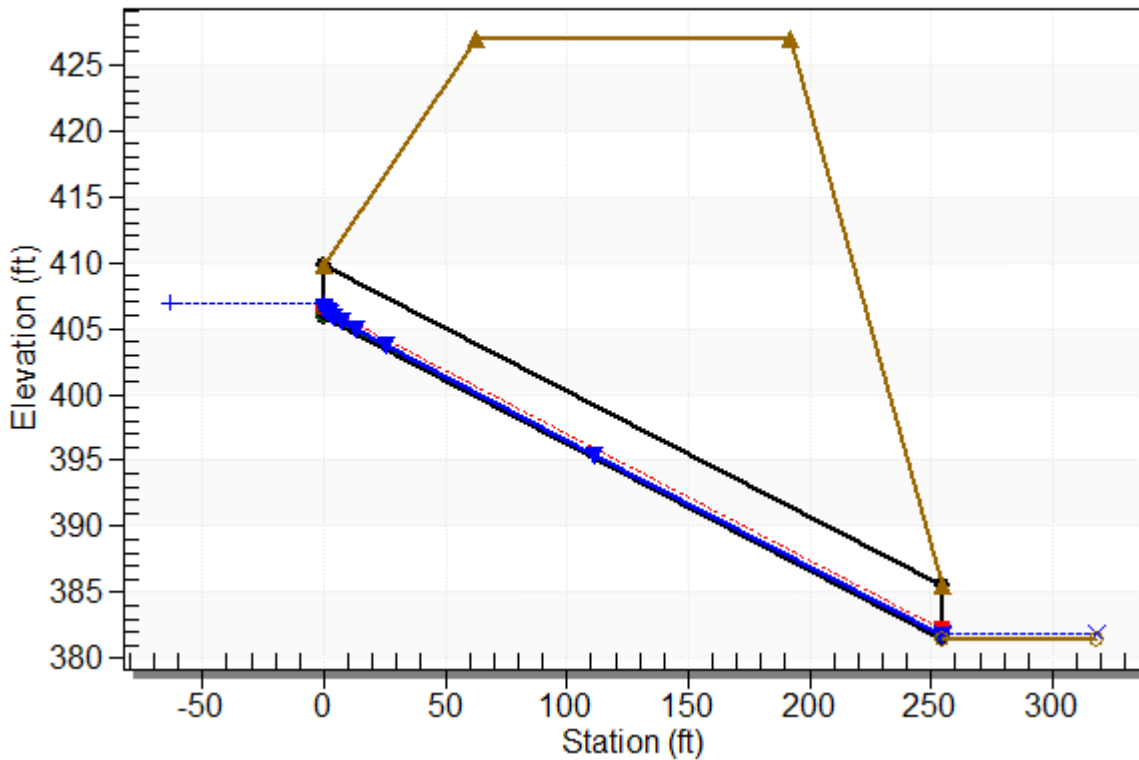
Culvert: Lt. Sta. 692+80



## Water Surface Profile Plot for Culvert: Lt. Sta. 692+80

### Crossing - Crossing 41, Design Discharge - 14.7 cfs

Culvert - Lt. Sta. 692+80, Culvert Discharge - 14.7 cfs



### Site Data - Lt. Sta. 692+80

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 405.82 ft

Outlet Station: 254.78 ft

Outlet Elevation: 381.50 ft

Number of Barrels: 1

### Culvert Data Summary - Lt. Sta. 692+80

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 41)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	381.50	0.00	0.00	0.00	0.00
1.65	381.59	0.09	2.11	0.59	1.23
3.29	381.64	0.14	2.74	0.89	1.31
4.94	381.68	0.18	3.19	1.13	1.36
6.59	381.71	0.21	3.55	1.34	1.40
8.23	381.74	0.24	3.85	1.53	1.43
9.88	381.77	0.27	4.11	1.70	1.45
11.53	381.80	0.30	4.34	1.86	1.47
13.18	381.82	0.32	4.55	2.01	1.49
14.67	381.84	0.34	4.73	2.14	1.50
16.47	381.87	0.37	4.92	2.29	1.52

### **Tailwater Channel Data - Crossing 41**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 8.00 ft

Side Slope (H:V): 3.00 (1:1)

Channel Slope: 0.1000

Channel Manning's n: 0.0450

Channel Invert Elevation: 381.50 ft

### **Roadway Data for Crossing: Crossing 41**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 427.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

**LOCATION:** Rt. Sta. 745+45  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 99.75 acres

**RUNOFF COEFFICIENT, C=**

**Topography:** Rolling (2% - 10%)

Acres		C-Value	Description
25.87	-	0.90	Pavements & Roofs
24.04	-	0.15	Woodland & Forest
24.13	-	0.70	Industrial Areas, Light
25.71	-	0.25	Grass Shoulders
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.50

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0050
Travel time, (hr)	1.023

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	3019	0
Course slope, (ft/ft)	0.0310	0.003
Velocity, (fps)	2.84077	1.11342
Travel time, (hr)	0.295	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.318 hr I (50 Yr)= 2.82  
 79.1 min I (100 Yr)= 3.03  
 Design Q (50 Yr)= 169.61 cfs  
 Maximum Q (100 Yr)= 190.31 cfs

Run 1: 5' X 5' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	360.12	355.00	350.26	5.00	1.02	YES
100	360.60	355.00	350.26	5.00	1.12	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 169.61 cfs

Maximum Flow: 190.31 cfs

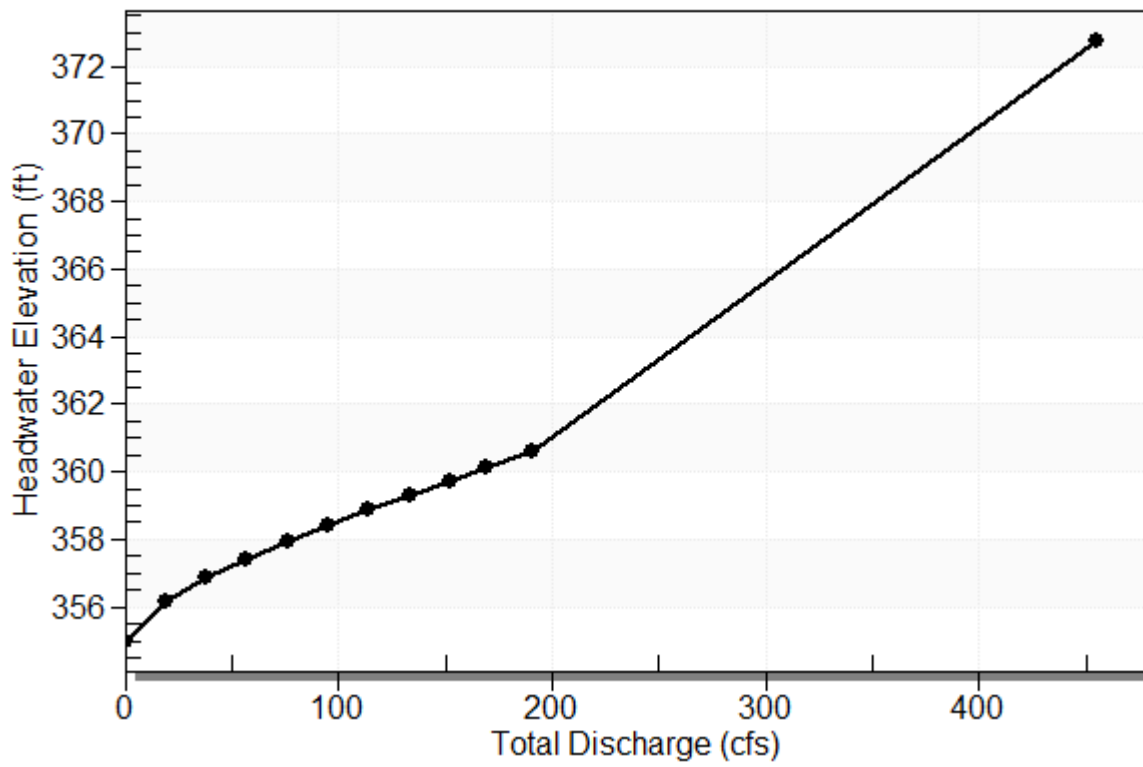
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 45**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 745+45 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
355.00	0.00	0.00	0.00	1
356.16	19.03	19.03	0.00	1
356.84	38.06	38.06	0.00	1
357.41	57.09	57.09	0.00	1
357.94	76.12	76.12	0.00	1
358.42	95.16	95.16	0.00	1
358.87	114.19	114.19	0.00	1
359.30	133.22	133.22	0.00	1
359.73	152.25	152.25	0.00	1
360.12	169.61	169.61	0.00	1
360.60	190.31	190.31	0.00	1
371.00	455.35	455.35	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 45

## Total Rating Curve

Crossing: Crossing 45





**Table 2 - Culvert Summary Table: Rt. Sta. 745+45**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	355.00	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
19.03	19.03	356.16	1.159	0.0*	1-S2n	0.442	0.766	0.442	0.884	8.607	3.659
38.06	38.06	356.84	1.839	0.0*	1-S2n	0.682	1.216	0.682	1.325	11.154	4.540
57.09	57.09	357.41	2.410	0.0*	1-S2n	0.915	1.594	0.943	1.672	12.102	5.116
76.12	76.12	357.94	2.938	0.0*	1-S2n	1.105	1.931	1.105	1.967	13.777	5.555
95.16	95.16	358.42	3.420	0.0*	1-S2n	1.295	2.241	1.333	2.227	14.273	5.912
114.19	114.19	358.87	3.870	0.0*	1-S2n	1.472	2.530	1.520	2.462	15.020	6.216
133.22	133.22	359.30	4.300	0.0*	1-S2n	1.641	2.804	1.701	2.677	15.666	6.481
152.25	152.25	359.73	4.726	0.0*	1-S2n	1.811	3.065	1.882	2.877	16.180	6.717
169.61	169.61	360.12	5.119	0.165	5-S2n	1.956	3.294	2.041	3.048	16.620	6.913
190.31	190.31	360.60	5.604	0.845	5-S2n	2.128	3.557	2.232	3.241	17.051	7.126

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 355.00 ft, Outlet Elevation (invert): 350.26 ft

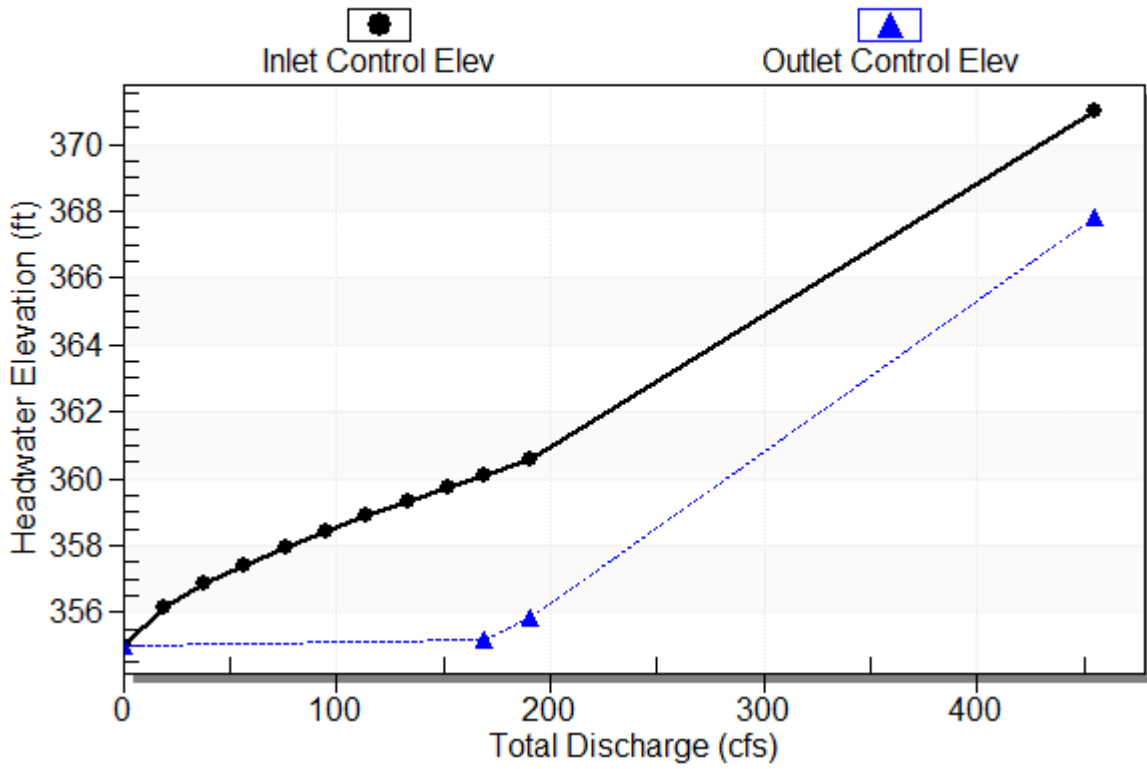
Culvert Length: 275.59 ft, Culvert Slope: 0.0172

\*\*\*\*\*

# Culvert Performance Curve Plot: Rt. Sta. 745+45

## Performance Curve

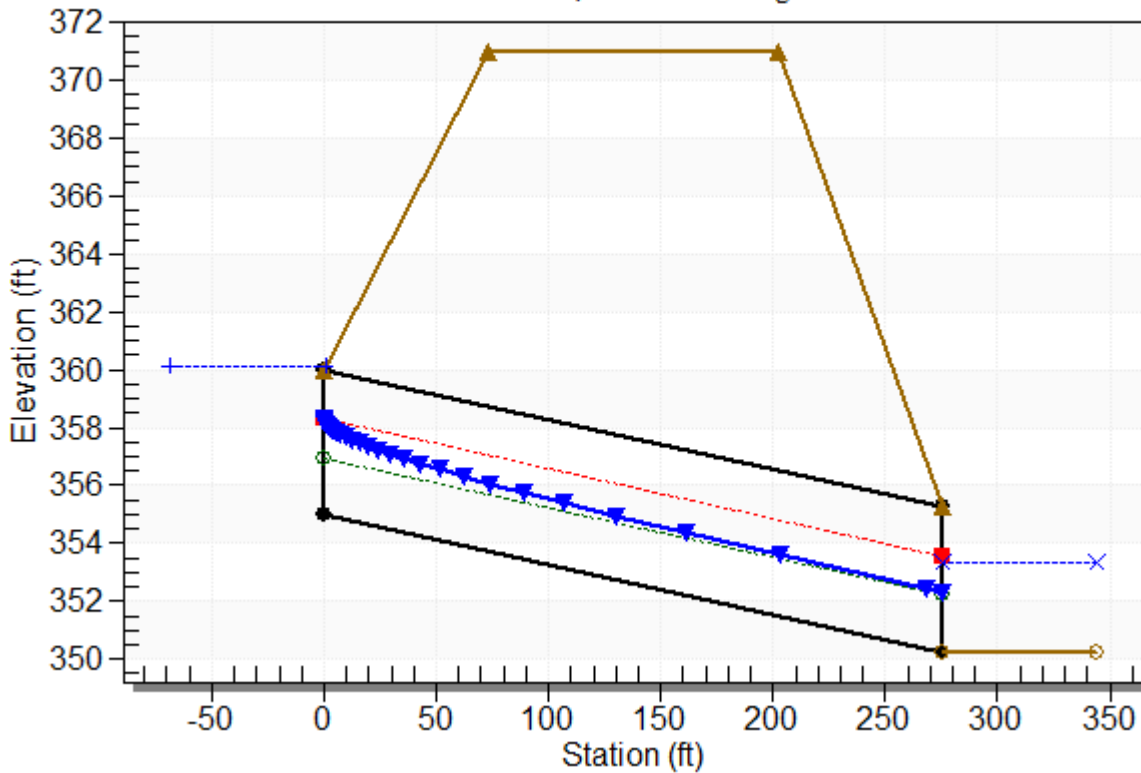
Culvert: Rt. Sta. 745+45



## Water Surface Profile Plot for Culvert: Rt. Sta. 745+45

Crossing - Crossing 45, Design Discharge - 169.6 cfs

Culvert - Rt. Sta. 745+45, Culvert Discharge - 169.6 cfs



### Site Data - Rt. Sta. 745+45

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 355.00 ft

Outlet Station: 275.55 ft

Outlet Elevation: 350.26 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 745+45

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 45)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	350.26	0.00	0.00	0.00	0.00
19.03	351.14	0.88	3.66	1.10	0.74
38.06	351.59	1.33	4.54	1.65	0.76
57.09	351.93	1.67	5.12	2.09	0.78
76.12	352.23	1.97	5.55	2.45	0.79
95.16	352.49	2.23	5.91	2.78	0.80
114.19	352.72	2.46	6.22	3.07	0.81
133.22	352.94	2.68	6.48	3.34	0.81
152.25	353.14	2.88	6.72	3.59	0.82
169.61	353.31	3.05	6.91	3.80	0.82
190.31	353.50	3.24	7.13	4.04	0.82

### **Tailwater Channel Data - Crossing 45**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 5.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0200

Channel Manning's n: 0.0450

Channel Invert Elevation: 350.26 ft

### **Roadway Data for Crossing: Crossing 45**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 371.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft



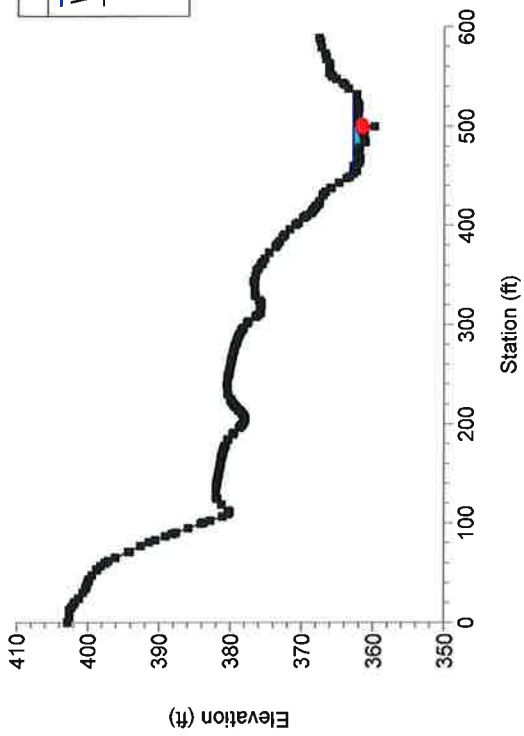
*HEC-RAS Output  
Station 745+45*



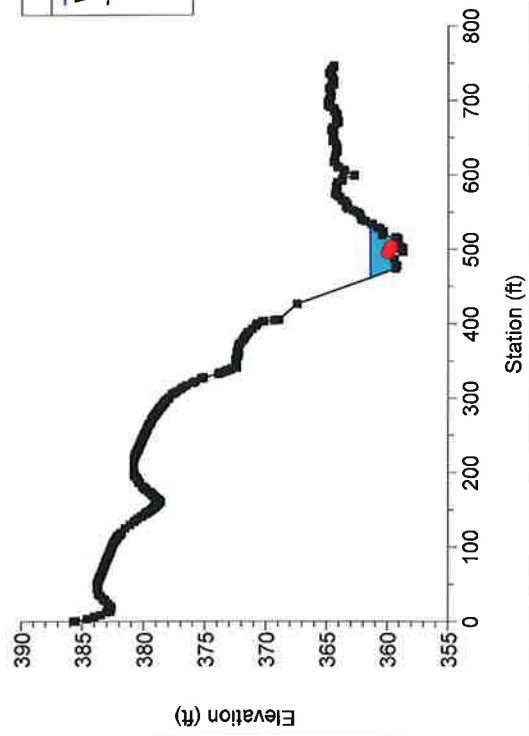
HEC-RAS Plan: Plan 01 River: Ditch #51 & #52 Reach: Ditch #51 & #52

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #51 & #52	987	50 yr	169.61	359.80	362.81	362.81	383.18	0.028345	7.81	72.08	82.44	0.94
Ditch #51 & #52	987	100 yr	190.31	359.80	362.85	362.85	383.25	0.031133	8.30	75.90	82.93	0.99
Ditch #51 & #52	937	50 yr	169.61	358.80	361.49	361.38	381.87	0.018742	6.55	84.02	61.85	0.83
Ditch #51 & #52	937	100 yr	190.31	358.80	361.68		382.02	0.015444	6.33	76.30	64.92	0.78
Ditch #51 & #52	887	50 yr	169.61	358.70	361.03		381.21	0.008264	4.85	91.72	67.92	0.58
Ditch #51 & #52	887	100 yr	190.31	358.70	361.40		381.54	0.005323	4.32	118.01	73.27	0.48
Ditch #51 & #52	837	50 yr	169.61	357.00	360.88		360.98	0.002483	3.19	124.26	82.81	0.34
Ditch #51 & #52	837	100 yr	190.31	357.00	361.31		361.38	0.001652	2.86	160.57	86.71	0.28
Ditch #51 & #52	787	50 yr	169.61	356.30	360.78		360.89	0.001466	2.87	121.60	82.07	0.28
Ditch #51 & #52	787	100 yr	190.31	356.30	361.24		361.32	0.001045	2.63	160.60	90.12	0.24
Ditch #51 & #52	737	50 yr	169.61	355.40	360.74		360.82	0.000993	2.77	156.58	92.87	0.24
Ditch #51 & #52	737	100 yr	190.31	355.40	361.20		361.27	0.000736	2.56	201.44	98.02	0.21
Ditch #51 & #52	687	50 yr	169.61	354.20	360.77		360.79	0.000116	1.21	348.84	151.42	0.09
Ditch #51 & #52	687	100 yr	190.31	354.20	361.23		361.24	0.000100	1.18	421.48	173.90	0.08
Ditch #51 & #52	637	50 yr	169.61	354.60	360.82	357.40	360.78	0.002322	3.10	80.38	54.25	0.26
Ditch #51 & #52	637	100 yr	190.31	354.60	361.10	357.59	361.22	0.001814	2.94	109.18	65.34	0.23
Ditch #51 & #52	575		Culvert									
Ditch #51 & #52	350	50 yr	169.61	349.40	352.13		352.64	0.013265	5.74	29.57	14.80	0.71
Ditch #51 & #52	350	100 yr	190.31	349.40	352.25		352.82	0.014170	6.07	31.35	14.86	0.74
Ditch #51 & #52	300	50 yr	169.61	348.50	351.89	351.11	352.09	0.008413	5.12	42.55	46.63	0.61
Ditch #51 & #52	300	100 yr	190.31	348.50	351.78	351.28	352.23	0.009038	5.45	47.03	50.68	0.64
Ditch #51 & #52	250	50 yr	169.61	347.40	351.07	351.07	351.57	0.012528	6.54	63.82	74.23	0.68
Ditch #51 & #52	250	100 yr	190.31	347.40	351.17	351.17	351.88	0.012970	6.80	71.01	75.72	0.69
Ditch #51 & #52	200	50 yr	169.61	346.20	349.38	349.38	350.01	0.014114	6.81	45.77	52.83	0.76
Ditch #51 & #52	200	100 yr	190.31	346.20	349.49	349.49	350.15	0.014441	7.10	51.81	55.32	0.78
Ditch #51 & #52	150	50 yr	169.61	345.50	348.53	348.44	349.08	0.013324	6.50	48.03	48.12	0.75
Ditch #51 & #52	150	100 yr	190.31	345.50	348.65	348.55	349.22	0.013496	6.76	53.85	50.87	0.76
Ditch #51 & #52	100	50 yr	169.61	344.90	348.23		348.51	0.007383	5.08	73.65	61.19	0.57
Ditch #51 & #52	100	100 yr	190.31	344.90	348.34		348.64	0.007558	5.30	80.95	63.78	0.58
Ditch #51 & #52	50	50 yr	169.61	344.90	347.74		348.09	0.009584	5.80	75.39	69.01	0.64
Ditch #51 & #52	50	100 yr	190.31	344.90	347.84		348.21	0.009997	6.07	82.29	71.51	0.66
Ditch #51 & #52	0	50 yr	169.61	344.00	346.97	346.97	347.46	0.016347	6.99	67.90	80.69	0.76
Ditch #51 & #52	0	100 yr	190.31	344.00	347.08	347.08	347.57	0.016199	7.15	77.26	86.64	0.76

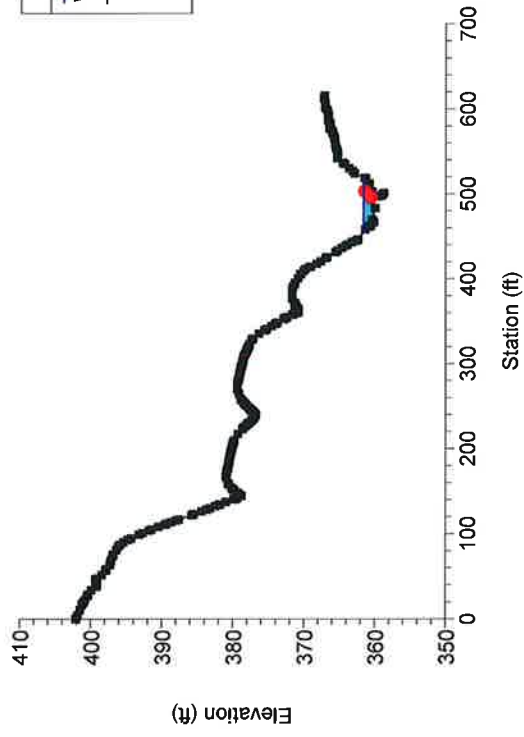
Ditch #51 & #52 Plan: Plan 01 9/1/2015  
987



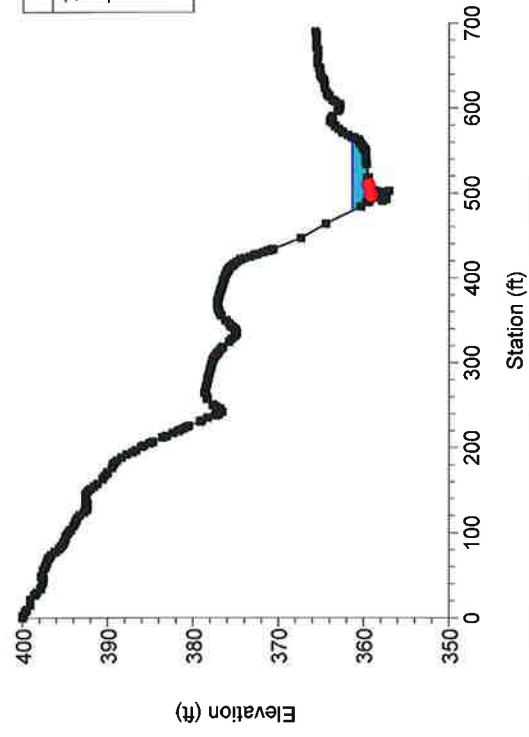
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887



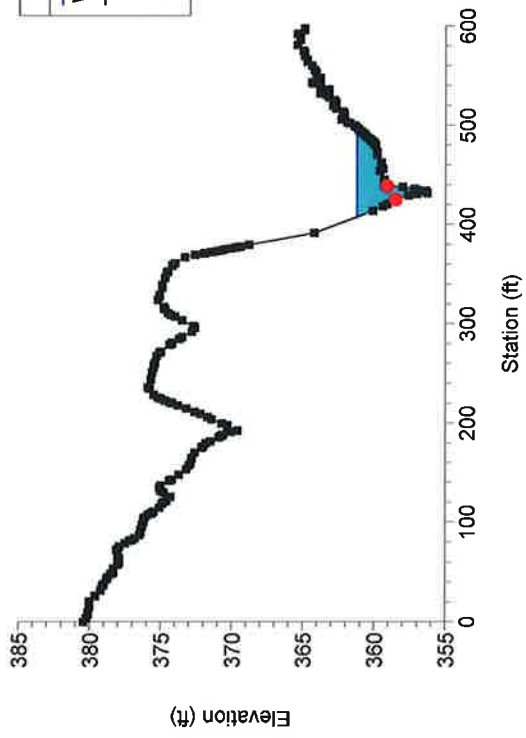
Ditch #51 & #52 Plan: Plan 01 9/1/2015  
937



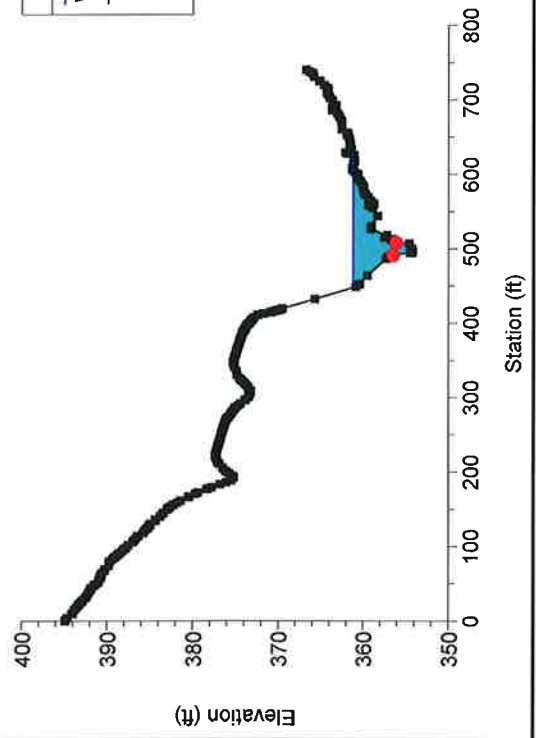
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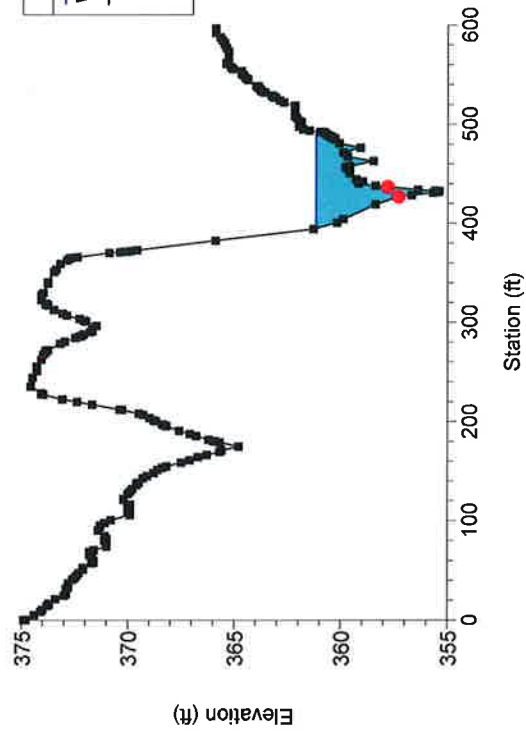
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787



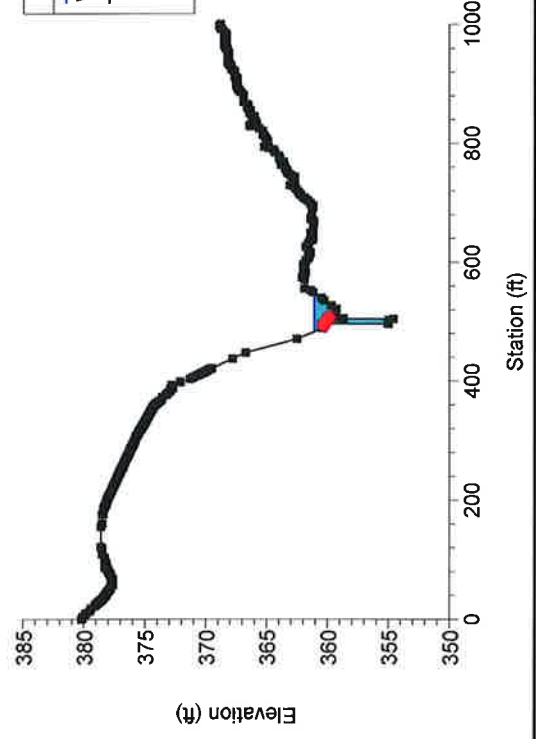
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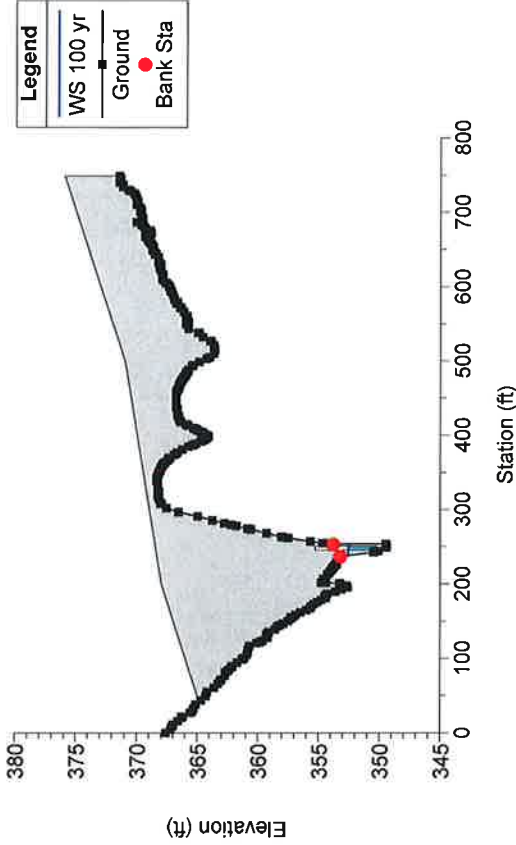
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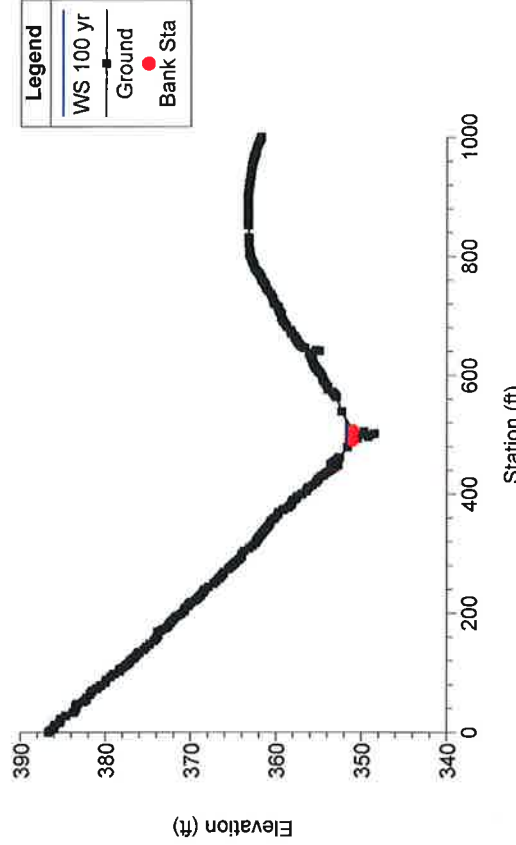
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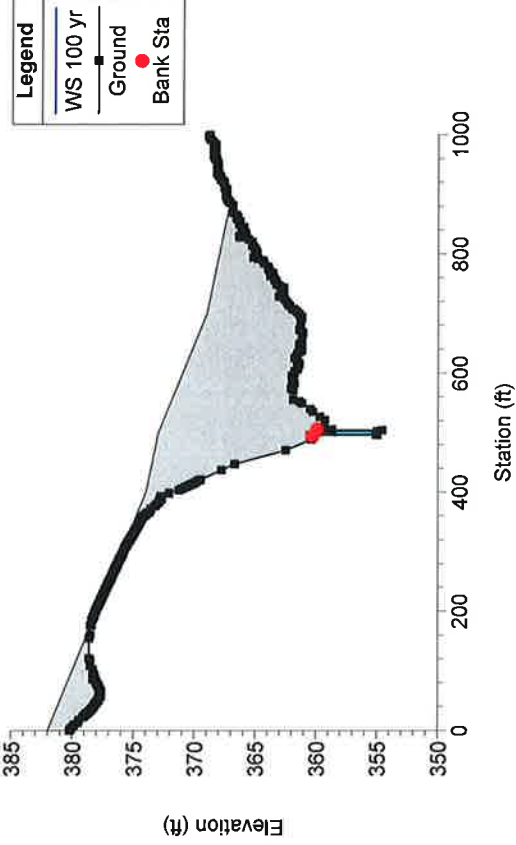
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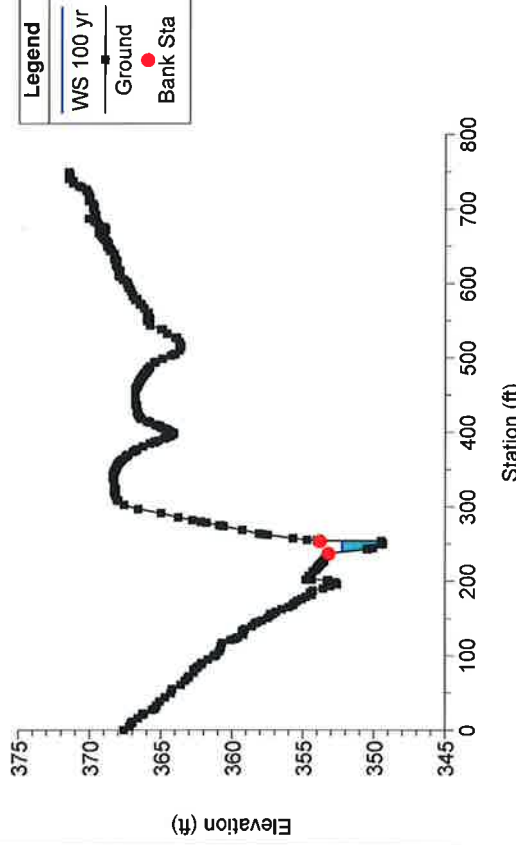
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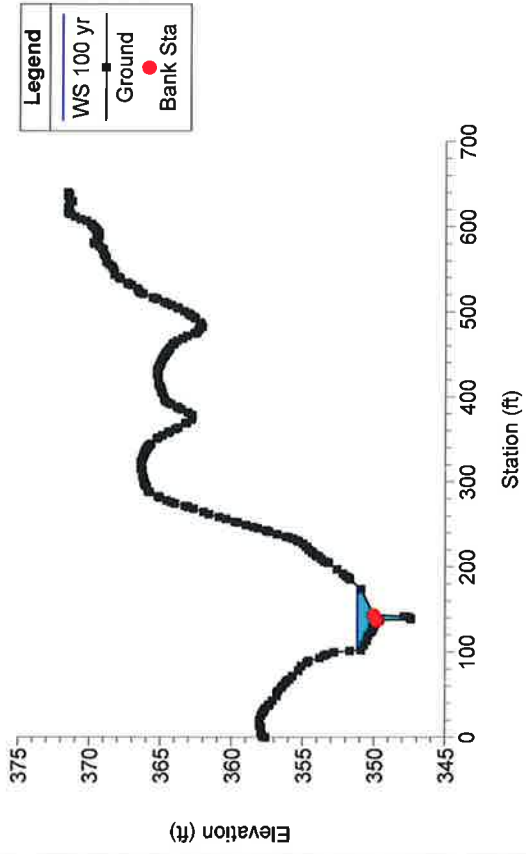
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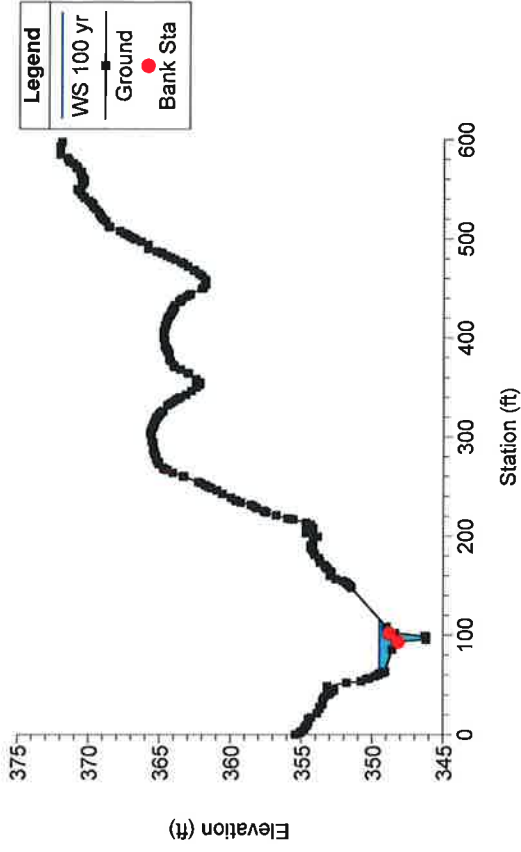
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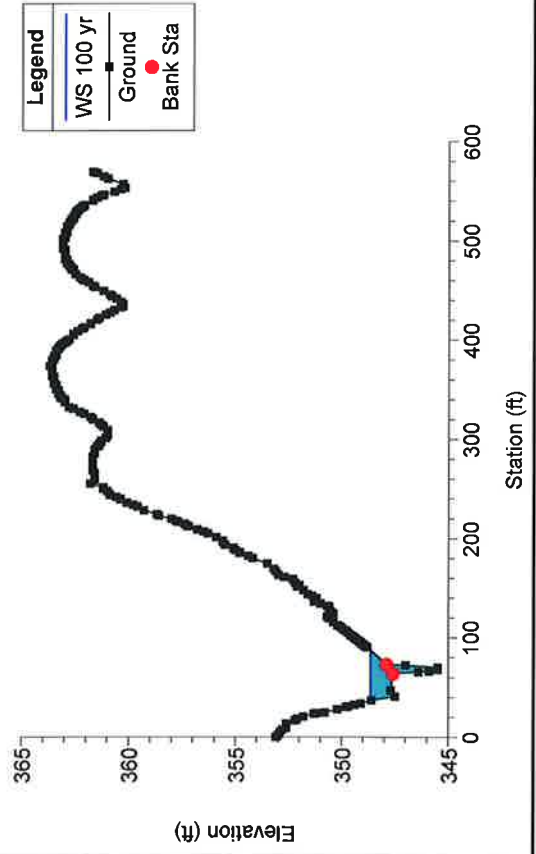
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250



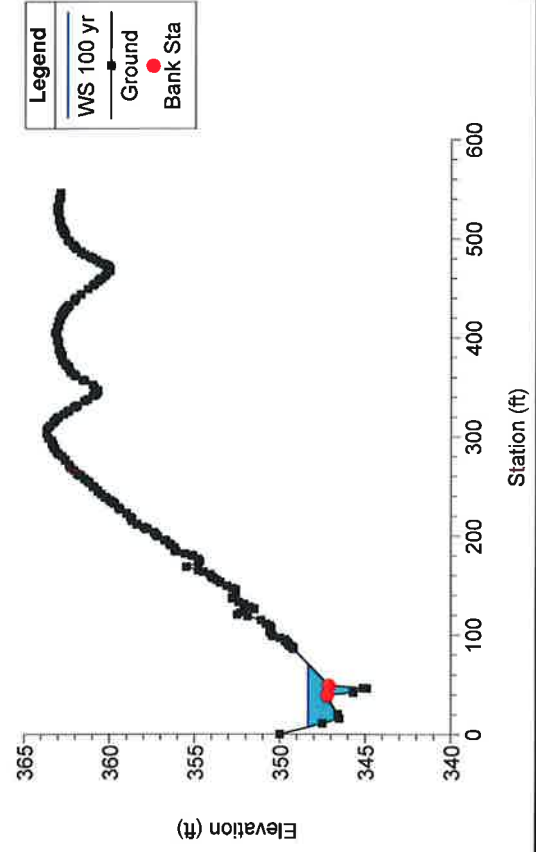
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200



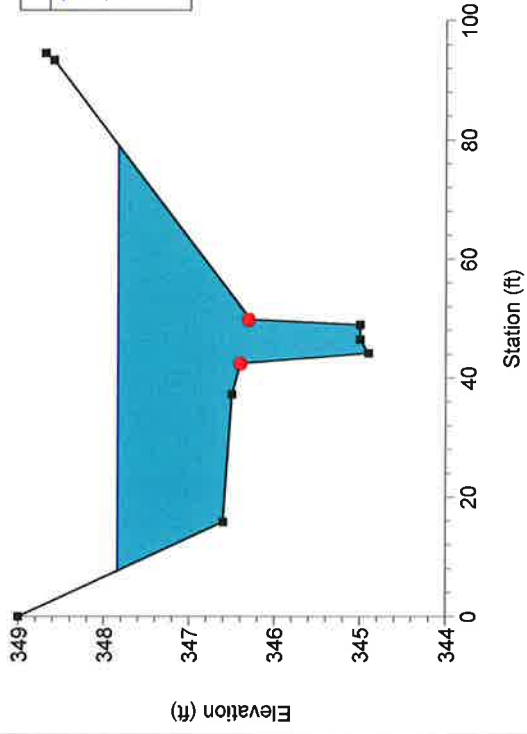
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150



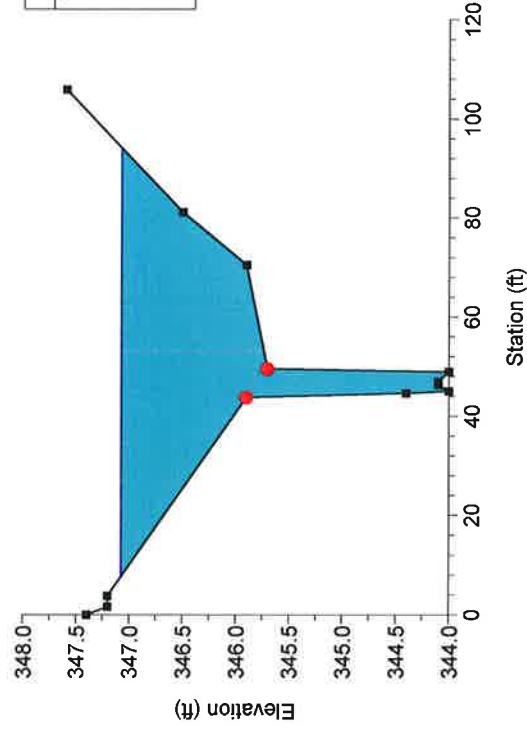
Ditch #51 & #52 Plan: Plan 01 9/1/2015  
100



Ditch #51 & #52 Plan: Plan 01 9/1/2015  
50



Ditch #51 & #52 Plan: Plan 01 9/1/2015  
0



**Location:** Rt. Sta. 754+85  
**HY8 File Name:** .INP  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

Drainage Area (acres) = 399.54

Curve Number, CN =

Hydraulic Soil Group: A

Acres		CN	Description
10.00	-	83.00	IA (Paved-Open Ditches)
273.50	-	30.00	Woods (Good)
16.04	-	89.00	Commercial and Business
0.00	-	61.00	Residential (1/4 Acre)
100.00	-	54.00	Residential (1/2 Acre)
0.00	-	51.00	Residential (1 Acre)
0.00	-	39.00	Pature, Grassland, Or Range (Good)
0.00	-	30.00	Woods (Good)

Weighted CN-value = 39.7

Time of Concentration,  $t_c$  = 0.853 hrs.

<u>Sheet Flow</u>	
Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0400
Travel time, (hr)	0.445

<u>Shallow Concentrated Flow</u>		
Segment	Unpaved	Paved
Surface (unpaved)	16.1345	20.3282
Length, (ft)	3692.90	0.00
Course slope, (ft/ft)	0.0244	0.0000
Velocity, (fps)	2.5188	0.0643
Travel time, (hr)	0.407	0.000

<u>Channel Flow</u>	
Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

24 Hour Rainfall, P -

SCDHEC Rainfall for: Lexington, SC

Design Storm	(in)
2 year	3.60
10 year	5.30
25 year	6.40
50 year	7.30
100 year	8.30

Maximum Retention, S: Intial Abstraction,  $I_a$  =

$$S = (1000/CN) - 10 = 15.19 \text{ in}$$

$$I_a = 0.2(S) = 3.04 \text{ in}$$

**Location:** Rt. Sta. 754+85  
**HY8 File Name:** .INP  
**Continued**

Runoff, Q =

$$Q = (P-0.2S)^2 / (P+0.8S)$$

Design Storm	P	S	=	Q	
2	3.60	15.19	=	0.0	in
10	5.30	15.19	=	0.3	in
25	6.40	15.19	=	0.6	in
50	7.30	15.19	=	0.9	in
100	8.30	15.19	=	1.4	in

Unit Peak Discharge, q<sub>u</sub>  
 Rainfall Distribution Type II

Design Storm	P	I <sub>a</sub>	I <sub>a</sub> / p (max 0.50)	q <sub>u</sub>	
2	3.60	3.04	0.50	1.0	csm/in
10	5.30	3.04	0.50	1.0	csm/in
25	6.40	3.04	0.47	193.1	csm/in
50	7.30	3.04	0.42	240.8	csm/in
100	8.30	3.04	0.37	277.6	csm/in

Pond Factor, F<sub>p</sub> =

7.27 acres = 1.8%                      F<sub>p</sub> = 0.8

Peak Discharge, q<sub>p</sub> =

$$q_p = q_u A_m Q F_p$$

Design Storm	q <sub>u</sub> (csm/in)	A <sub>m</sub> (mi <sub>2</sub> )	Q (in)	F <sub>p</sub>	q <sub>p</sub> (cfs)	
2	1.0	0.62	0.0	0.820	0.0	cfs
10	1.0	0.62	0.3	0.820	0.2	cfs
25	193.1	0.62	0.6	0.820	60.3	cfs
50	240.8	0.62	0.9	0.820	115.1	cfs
100	277.6	0.62	1.4	0.820	192.4	cfs

Run 1: 8' X 8' Box Culvert						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	345.42	342.58	341.18	8.00	0.36	YES
100	346.58	342.58	341.18	8.00	0.50	



# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 115.1 cfs

Maximum Flow: 192.4 cfs

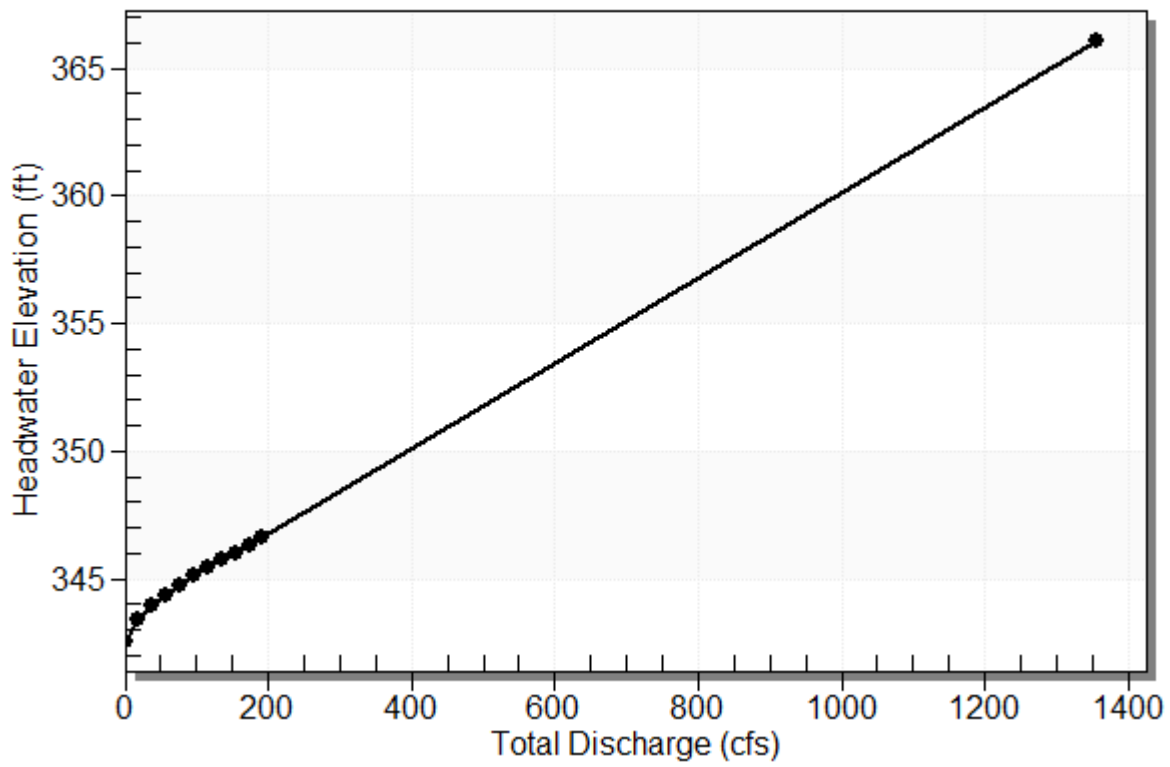
**Table 1 - Summary of Culvert Flows at Crossing: Crossing 44**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 754+85 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
342.58	0.00	0.00	0.00	1
343.44	19.24	19.24	0.00	1
343.95	38.48	38.48	0.00	1
344.37	57.72	57.72	0.00	1
344.75	76.96	76.96	0.00	1
345.10	96.20	96.20	0.00	1
345.42	115.10	115.10	0.00	1
345.73	134.68	134.68	0.00	1
346.03	153.92	153.92	0.00	1
346.31	173.16	173.16	0.00	1
346.58	192.40	192.40	0.00	1
365.00	1356.52	1356.52	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 44

## Total Rating Curve

Crossing: Crossing 44



**Table 2 - Culvert Summary Table: Rt. Sta. 754+85**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	342.58	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
19.24	19.24	343.44	0.862	0.0*	1-JS1t	0.326	0.564	0.945	0.945	2.545	4.118
38.48	38.48	343.95	1.368	0.017	1-JS1t	0.651	0.896	1.407	1.407	3.418	5.058
57.72	57.72	344.37	1.792	0.387	1-JS1t	0.859	1.174	1.765	1.765	4.087	5.671
76.96	76.96	344.75	2.171	0.707	1-JS1t	1.032	1.422	2.067	2.067	4.653	6.135
96.20	96.20	345.10	2.519	0.993	1-JS1t	1.205	1.650	2.332	2.332	5.156	6.514
115.10	115.10	345.42	2.839	1.254	1-JS1t	1.374	1.859	2.566	2.566	5.607	6.831
134.68	134.68	345.73	3.153	1.507	1-JS1t	1.532	2.065	2.787	2.787	6.040	7.119
153.92	153.92	346.03	3.447	1.745	1-JS1t	1.671	2.257	2.988	2.988	6.438	7.370
173.16	173.16	346.31	3.728	1.974	1-JS1t	1.811	2.441	3.176	3.176	6.815	7.598
192.40	192.40	346.58	3.999	2.197	1-S2n	1.950	2.619	2.020	3.352	11.906	7.806

\* Full Flow Headwater elevation is below inlet invert.

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 342.58 ft, Outlet Elevation (invert): 341.18 ft

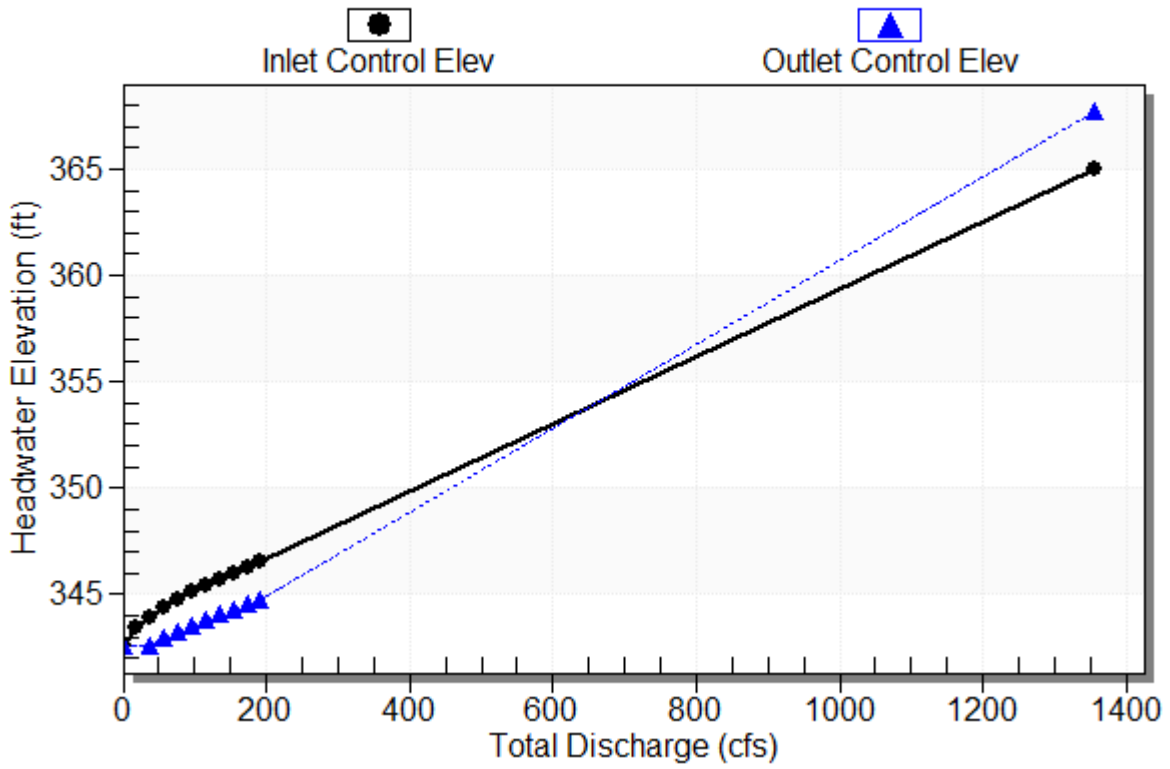
Culvert Length: 206.72 ft, Culvert Slope: 0.0068

\*\*\*\*\*

# Culvert Performance Curve Plot: Rt. Sta. 754+85

## Performance Curve

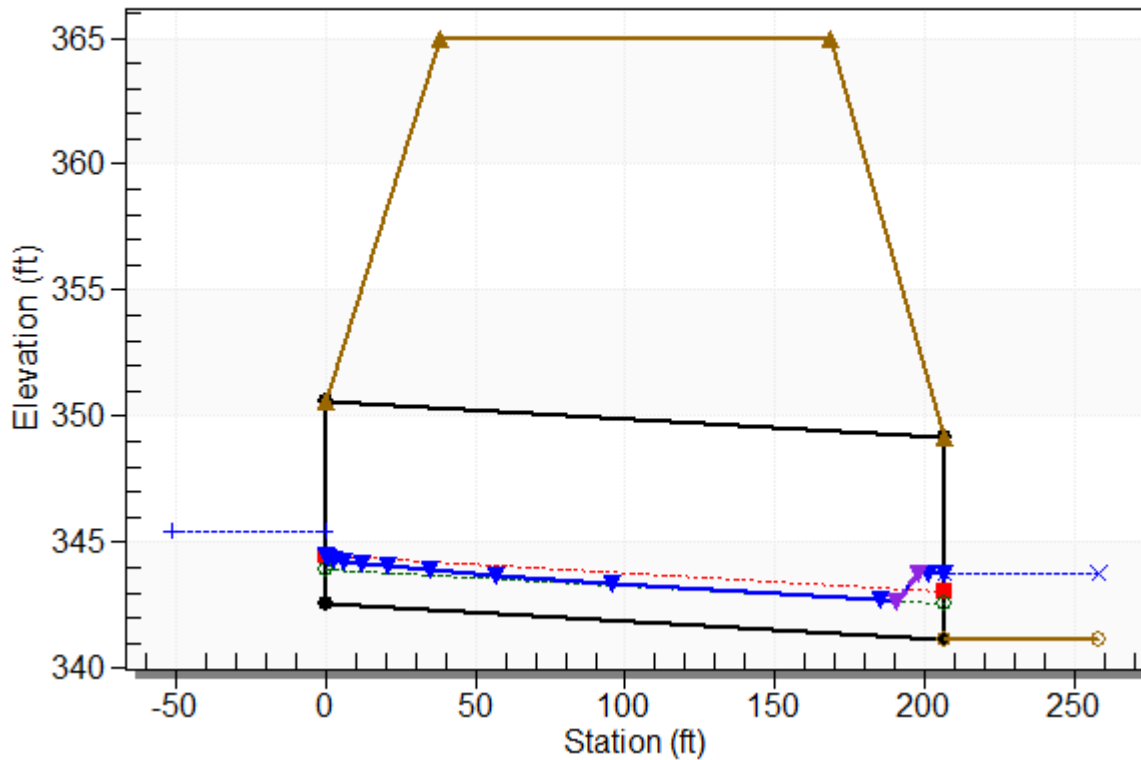
Culvert: Rt. Sta. 754+85



## Water Surface Profile Plot for Culvert: Rt. Sta. 754+85

Crossing - Crossing 44, Design Discharge - 115.1 cfs

Culvert - Rt. Sta. 754+85, Culvert Discharge - 115.1 cfs



### Site Data - Rt. Sta. 754+85

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 342.58 ft

Outlet Station: 206.72 ft

Outlet Elevation: 341.18 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 754+85

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 8.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 44)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	341.18	0.00	0.00	0.00	0.00
19.24	342.12	0.94	4.12	1.47	0.81
38.48	342.59	1.41	5.06	2.20	0.84
57.72	342.95	1.77	5.67	2.75	0.86
76.96	343.25	2.07	6.14	3.23	0.87
96.20	343.51	2.33	6.51	3.64	0.88
115.10	343.75	2.57	6.83	4.00	0.89
134.68	343.97	2.79	7.12	4.35	0.89
153.92	344.17	2.99	7.37	4.66	0.90
173.16	344.36	3.18	7.60	4.95	0.90
192.40	344.53	3.35	7.81	5.23	0.91

### **Tailwater Channel Data - Crossing 44**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0250

Channel Manning's n: 0.0450

Channel Invert Elevation: 341.18 ft

### **Roadway Data for Crossing: Crossing 44**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 365.00 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

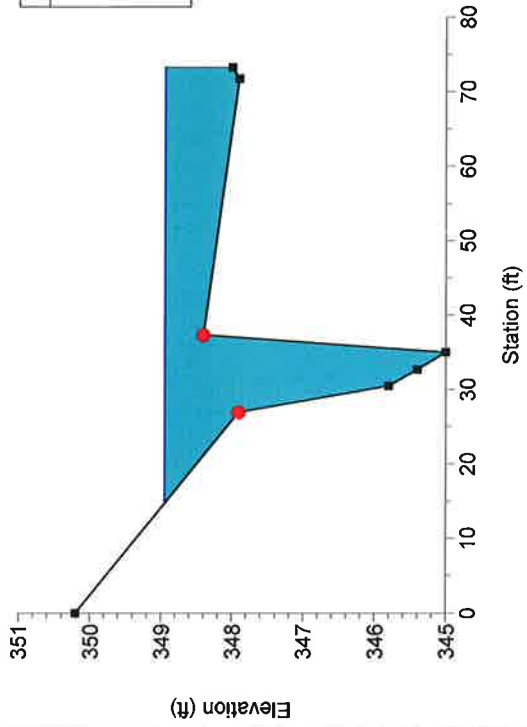


*HEC-RAS Output  
Station 755+00*

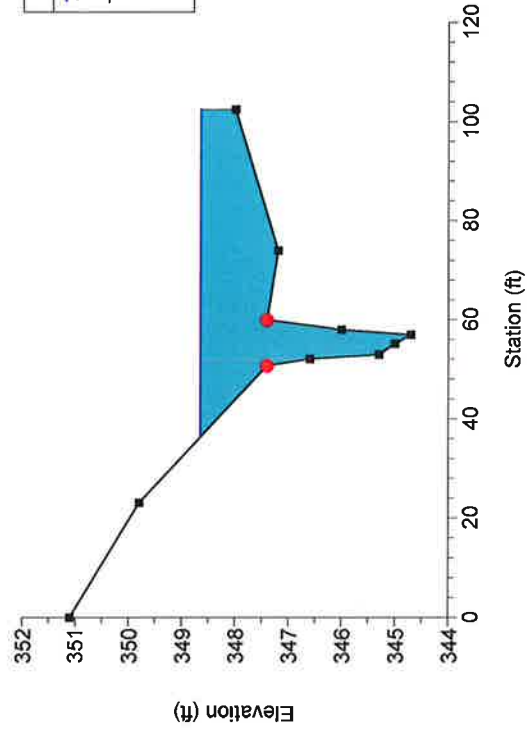
HEC-RAS Plan: Plan 01 River: Ditch #54 & #53 Reach: Ditch #54 & #53

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Ditch #54 & #53	1009	50 yr	115.10	345.00	348.44	347.67	348.76	0.007833	4.68	35.77	52.62	0.55
Ditch #54 & #53	1009	100 yr	192.40	345.00	348.95	348.65	349.37	0.008576	5.62	64.37	58.65	0.60
Ditch #54 & #53	959	50 yr	115.10	344.70	348.13		348.38	0.006516	4.40	51.62	60.23	0.51
Ditch #54 & #53	959	100 yr	192.40	344.70	348.66		348.95	0.006701	5.11	84.91	68.28	0.53
Ditch #54 & #53	909	50 yr	115.10	344.50	347.84	347.37	348.08	0.005643	4.37	63.38	80.77	0.47
Ditch #54 & #53	909	100 yr	192.40	344.50	348.43		348.64	0.004930	4.66	116.86	94.10	0.45
Ditch #54 & #53	859	50 yr	115.10	344.60	347.23	347.23	347.62	0.015727	5.97	46.89	63.95	0.74
Ditch #54 & #53	859	100 yr	192.40	344.60	348.22		348.37	0.005120	4.45	122.76	87.70	0.45
Ditch #54 & #53	809	50 yr	115.10	343.90	346.83		347.03	0.005656	4.20	66.57	80.06	0.49
Ditch #54 & #53	809	100 yr	192.40	343.90	348.16		348.22	0.001376	2.83	225.83	149.77	0.26
Ditch #54 & #53	759	50 yr	115.10	343.20	346.69		346.78	0.003505	3.34	105.90	97.86	0.38
Ditch #54 & #53	759	100 yr	192.40	343.20	348.13		348.16	0.000933	2.31	297.08	175.75	0.20
Ditch #54 & #53	709	50 yr	115.10	343.60	346.52		346.61	0.003139	3.37	107.02	90.82	0.38
Ditch #54 & #53	709	100 yr	192.40	343.60	348.09		348.12	0.000742	2.27	280.61	121.69	0.20
Ditch #54 & #53	659	50 yr	115.10	342.20	346.51		346.55	0.000448	1.60	105.60	64.65	0.15
Ditch #54 & #53	659	100 yr	192.40	342.20	348.07		348.10	0.000265	1.57	255.76	119.23	0.12
Ditch #54 & #53	609	50 yr	115.10	342.60	345.10	345.10	346.35	0.046960	8.99	12.81	5.16	1.00
Ditch #54 & #53	609	100 yr	192.40	342.60	346.12	346.12	347.88	0.053254	10.65	18.07	5.18	1.00
Ditch #54 & #53	567		Culvert									
Ditch #54 & #53	400	50 yr	115.10	341.20	344.13	344.13	345.58	0.058391	9.69	11.88	4.12	1.01
Ditch #54 & #53	400	100 yr	192.40	341.20	345.31	345.31	347.35	0.068490	11.45	16.81	4.17	1.01
Ditch #54 & #53	350	50 yr	115.10	340.30	343.23	342.65	343.57	0.007766	4.86	38.10	45.25	0.56
Ditch #54 & #53	350	100 yr	192.40	340.30	343.63	343.43	344.16	0.010849	6.37	58.77	57.59	0.67
Ditch #54 & #53	300	50 yr	115.10	340.20	342.86	342.66	343.15	0.008416	4.88	57.06	85.80	0.58
Ditch #54 & #53	300	100 yr	192.40	340.20	343.32		343.62	0.008271	5.49	103.76	115.90	0.59
Ditch #54 & #53	250	50 yr	115.10	340.00	342.63		342.78	0.005174	3.81	78.36	94.63	0.48
Ditch #54 & #53	250	100 yr	192.40	340.00	343.11		343.27	0.004738	4.22	127.35	104.94	0.47
Ditch #54 & #53	200	50 yr	115.10	339.80	342.38		342.52	0.005108	3.75	81.88	88.29	0.47
Ditch #54 & #53	200	100 yr	192.40	339.80	342.87		343.03	0.005088	4.33	131.47	113.67	0.48
Ditch #54 & #53	150	50 yr	115.10	339.60	342.04		342.22	0.006753	4.23	68.98	76.35	0.53
Ditch #54 & #53	150	100 yr	192.40	339.60	342.56		342.75	0.006023	4.68	110.31	83.31	0.52
Ditch #54 & #53	100	50 yr	115.10	339.10	341.73		341.92	0.005488	3.86	59.63	67.09	0.49
Ditch #54 & #53	100	100 yr	192.40	339.10	342.25		342.46	0.005311	4.45	95.47	72.84	0.50
Ditch #54 & #53	50	50 yr	115.10	338.50	341.52		341.67	0.004157	3.52	64.68	64.03	0.43
Ditch #54 & #53	50	100 yr	192.40	338.50	342.01		342.21	0.004529	4.24	97.66	69.37	0.47
Ditch #54 & #53	0	50 yr	115.10	338.10	340.83	340.83	341.29	0.014568	5.70	34.48	55.89	0.77
Ditch #54 & #53	0	100 yr	192.40	338.10	341.25	341.25	341.80	0.015101	6.70	58.63	61.20	0.81

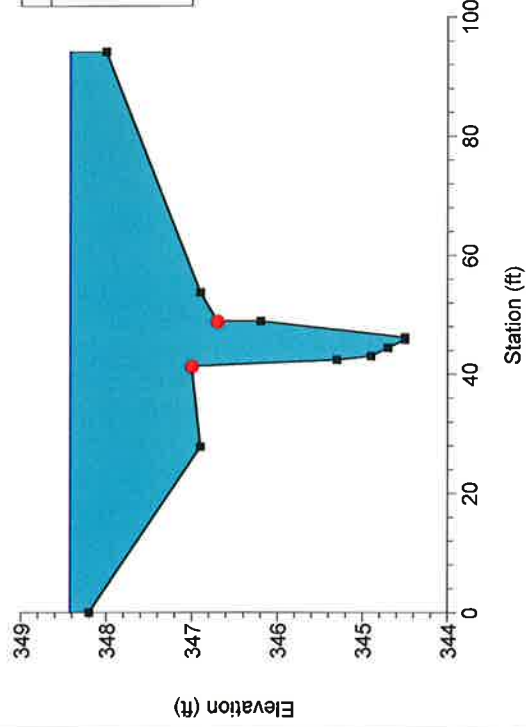
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1009



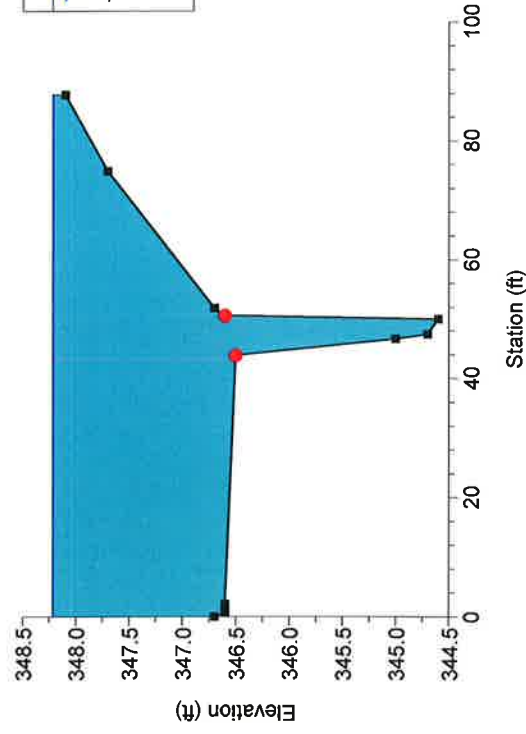
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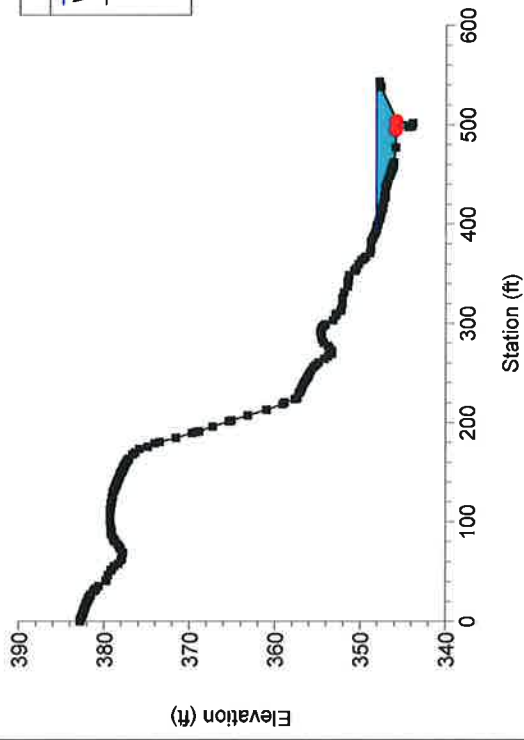
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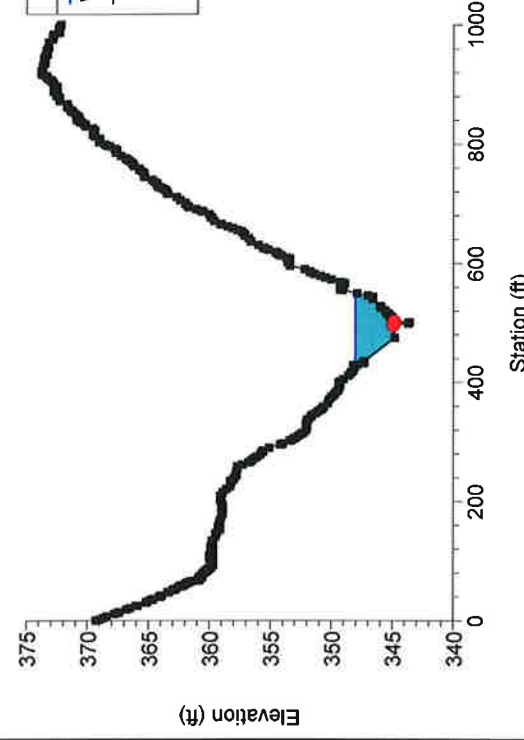
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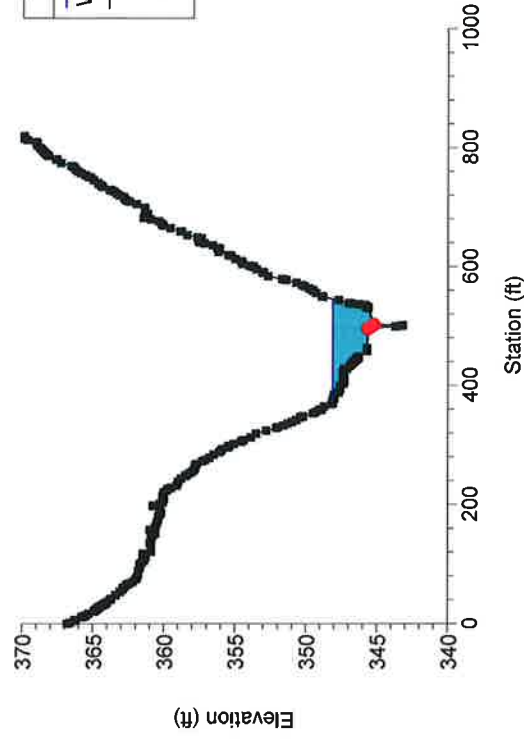
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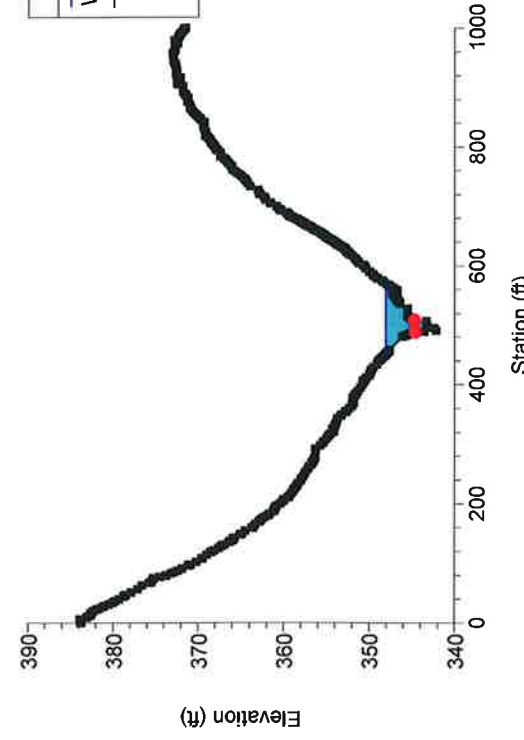
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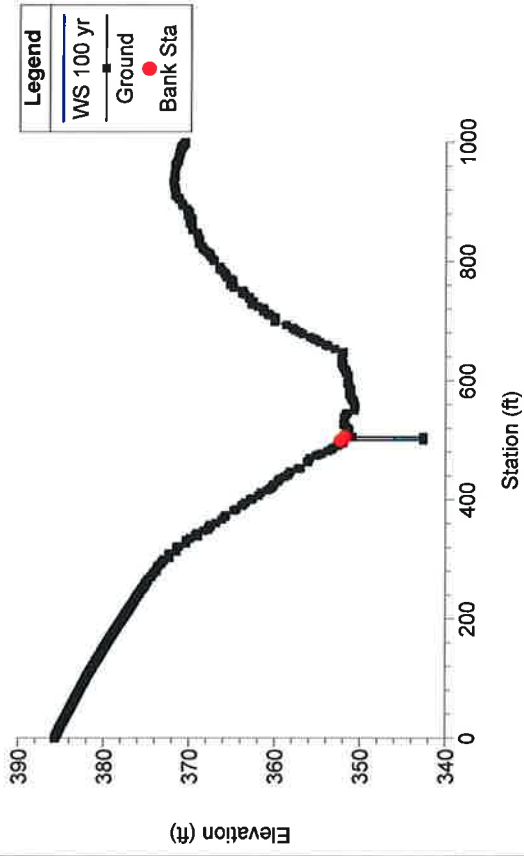
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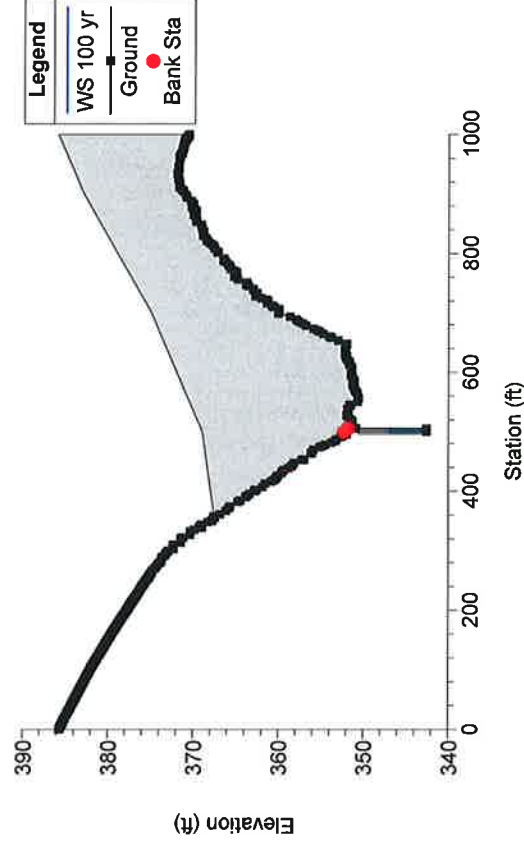
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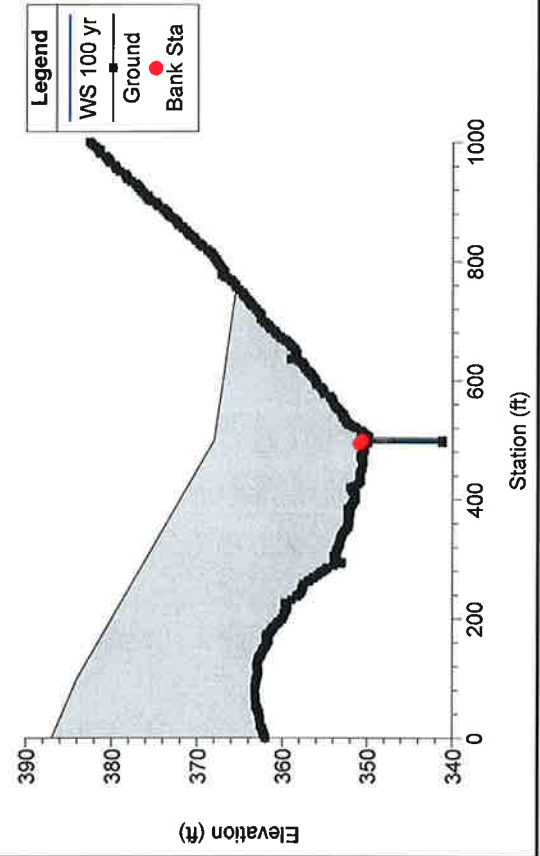
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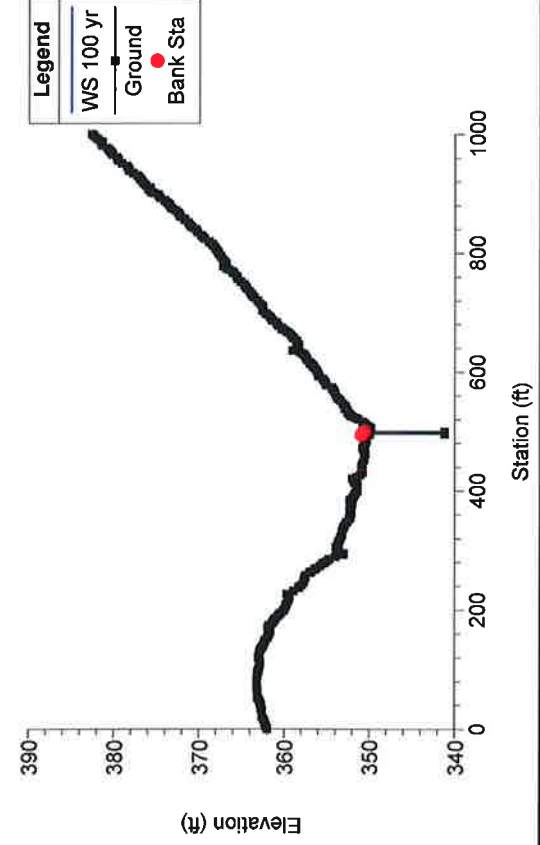
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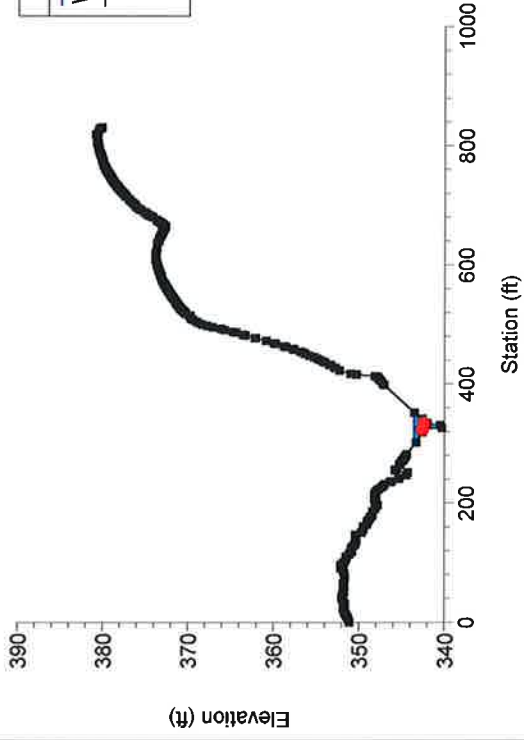
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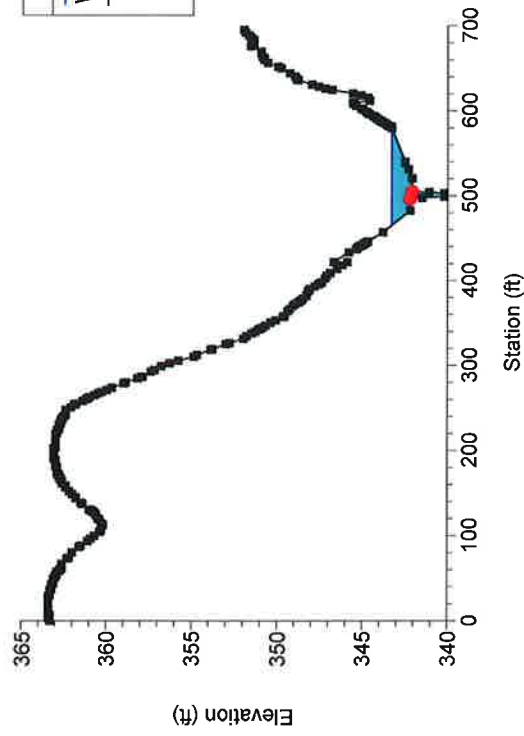
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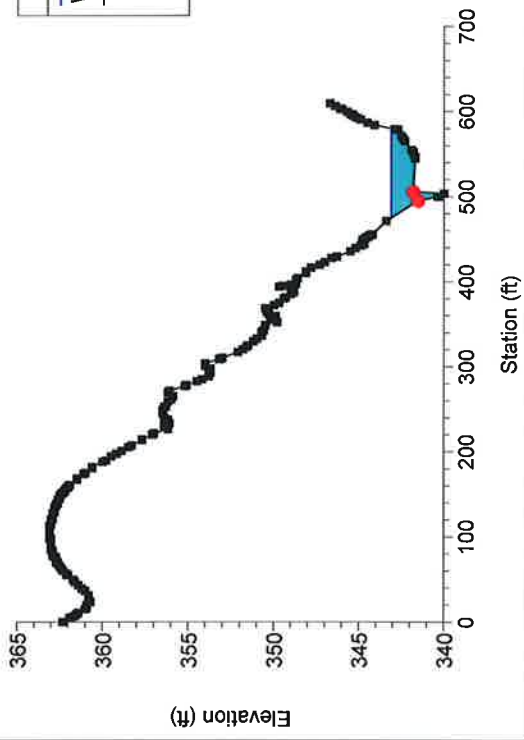
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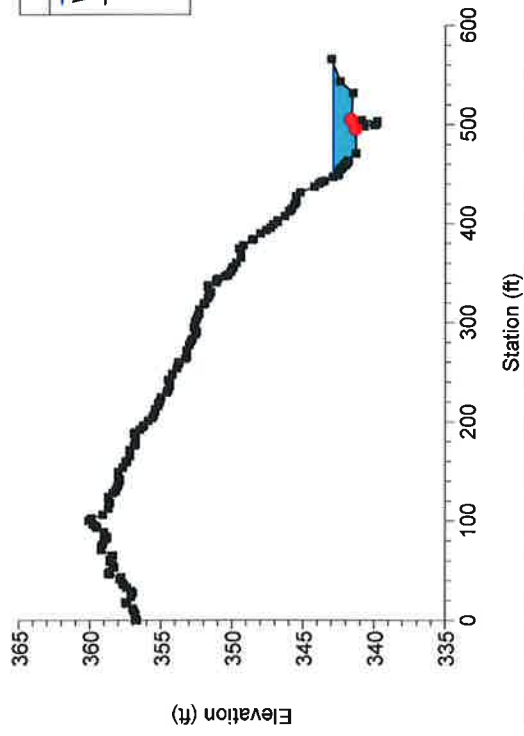
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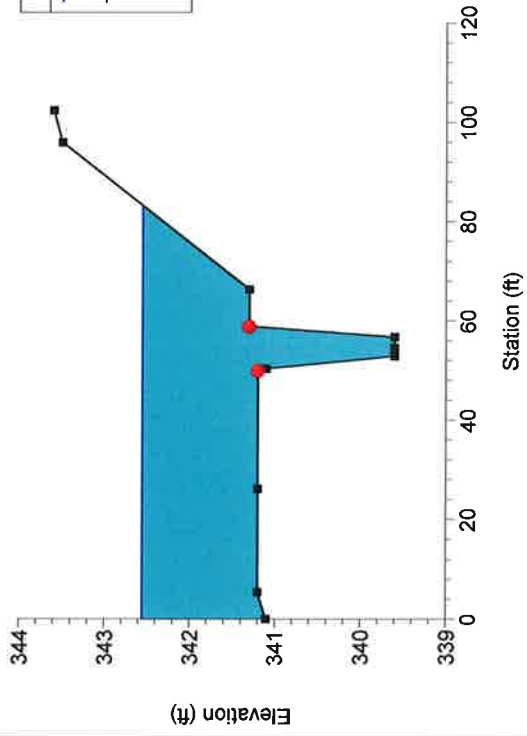


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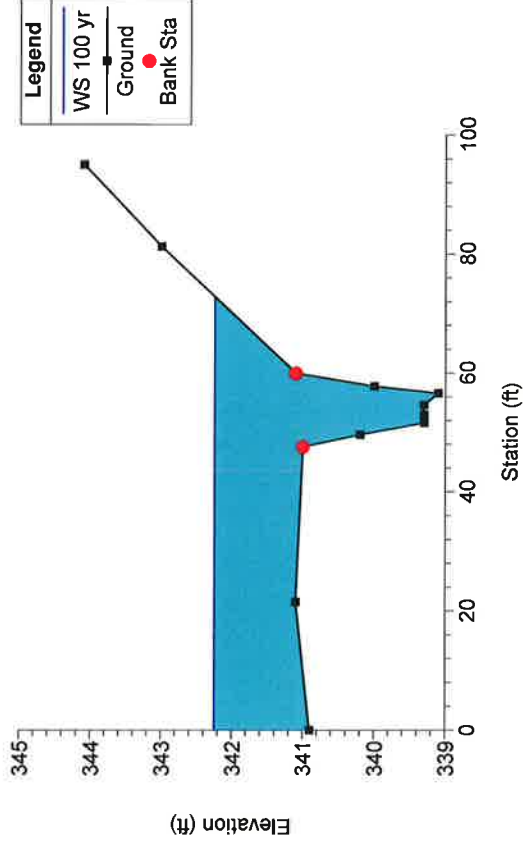




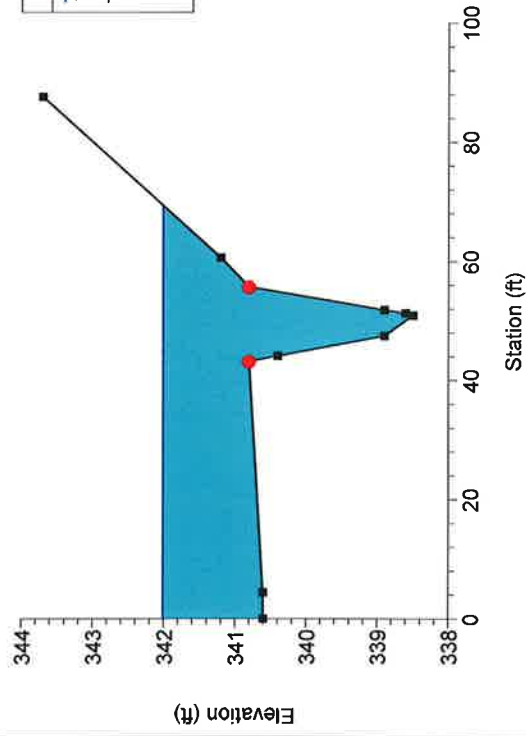
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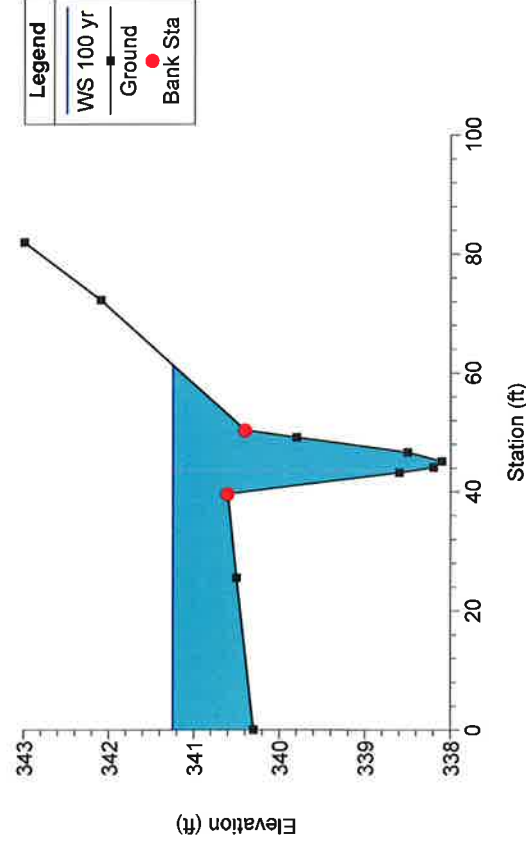
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100



Ditch #54 & #53 Plan: Plan 01 9/1/2015  
50



Ditch #54 & #53 Plan: Plan 01 9/1/2015  
0



**LOCATION:** Rt. Sta. 781+65  
**HY8 File Name:**  
**City/County:** Lexington, SC  
**Type of Road:** Interstate

**DRAINAGE AREA:** 38.53 acres

**RUNOFF COEFFICIENT, C=**

**Topography:** Rolling (2% - 10%)

Acres	-	C-Value	Description
1.40	-	0.90	Pavements & Roofs
4.34	-	0.15	Woodland & Forest
30.39	-	0.30	Meadows & Pasture Land
2.40	-	0.45	Unpaved Road, Sandy Soils
0.00	-	0.00	
0.00	-	0.00	

Weighted C-Value: 0.31

**TIME OF CONCENTRATION:**

**Sheet Flow**

Segment	1
Roughness coeff., n	0.8
Length, (< 100) (ft)	100.0
2yr/24hr rainfall (in)	3.60
Land slope, (ft/ft)	0.0030
Travel time, (hr)	1.255

**Shallow Concentrated Flow**

Segment	Unpaved	Paved
Segment	2	
Surface	16.1345	20.3282
Length, (ft)	2874.3	0
Course slope, (ft/ft)	0.0317	0.003
Velocity, (fps)	2.87085	1.11342
Travel time, (hr)	0.278	0

**Channel Flow**

Segment	
Roughness coeff., n	0.012
Flow length, (ft)	0
Channel slope, (ft/ft)	0.0001
X-sect. area, (sq ft)	0.00
Wet. perimeter, (ft)	0.00
Hydraulic radius, (ft)	1.00
Travel time, (hr)	0.000

Time of Concentration = 1.533 hr I (50 Yr)= 2.52  
 92.0 min I (100 Yr)= 2.71  
 Design Q (50 Yr)= 36.57 cfs  
 Maximum Q (100 Yr)= 41.02 cfs

Run 1: 36" RC Pipe						
YEAR	H <sub>w</sub>	IN	OUT	RISE	H <sub>w</sub> /D	<1.2
50	422.72	419.86	411.91	3.00	0.95	YES
100	422.96	419.86	411.91	3.00	1.03	

# HY-8 Culvert Analysis Report

## Crossing Discharge Data

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

Minimum Flow: 0 cfs

Design Flow: 36.57 cfs

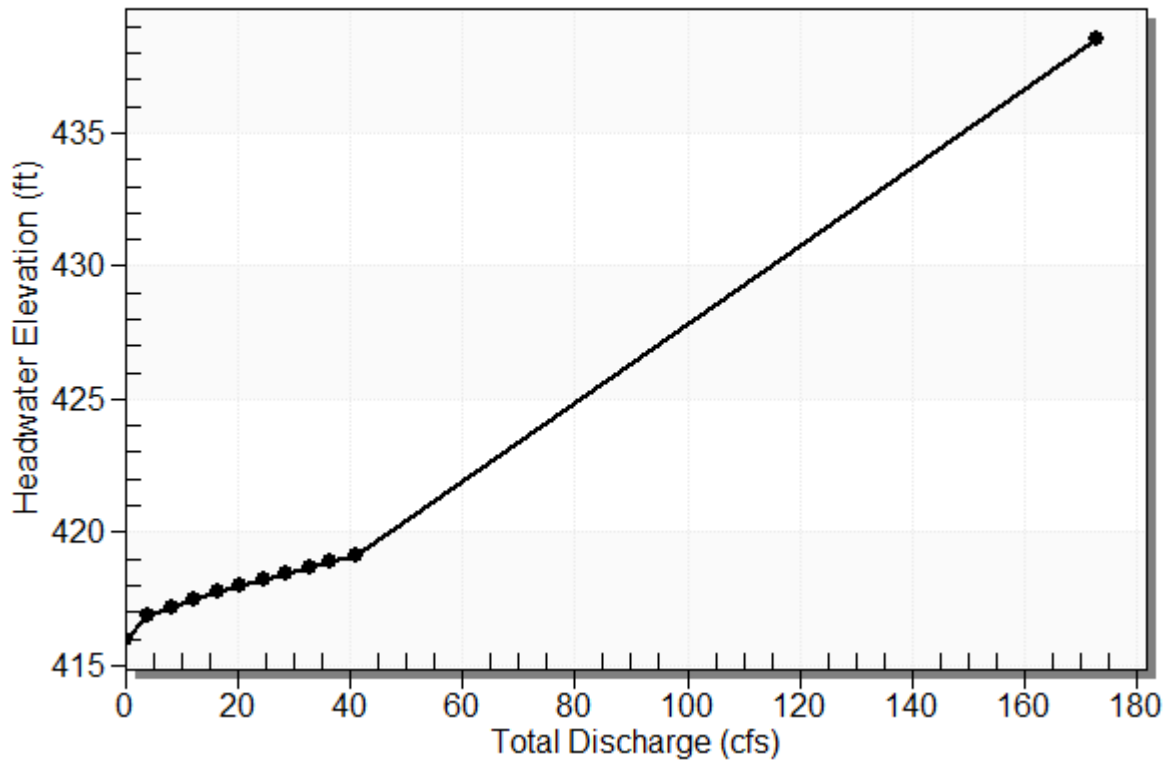
Maximum Flow: 41.02 cfs

**Table 1 - Summary of Culvert Flows at Crossing: Crossing 43 downstream**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 781+65 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
416.00	0.00	0.00	0.00	1
416.83	4.10	4.10	0.00	1
417.20	8.20	8.20	0.00	1
417.49	12.31	12.31	0.00	1
417.78	16.41	16.41	0.00	1
418.03	20.51	20.51	0.00	1
418.26	24.61	24.61	0.00	1
418.47	28.71	28.71	0.00	1
418.67	32.82	32.82	0.00	1
418.86	36.57	36.57	0.00	1
419.10	41.02	41.02	0.00	1
438.00	172.84	172.84	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 43 downstream

Total Rating Curve  
Crossing: Crossing 43 downstream



**Table 2 - Culvert Summary Table: Rt. Sta. 781+65**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	416.00	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
4.10	4.10	416.83	0.831	0.0*	1-S2n	0.347	0.628	0.347	0.225	8.689	8.185
8.20	8.20	417.20	1.199	0.0*	1-S2n	0.506	0.899	0.524	0.340	9.837	10.314
12.31	12.31	417.49	1.491	0.0*	1-S2n	0.618	1.110	0.656	0.432	10.665	11.725
16.41	16.41	417.78	1.777	0.0*	1-S2n	0.715	1.292	0.715	0.510	12.589	12.810
20.51	20.51	418.03	2.028	0.0*	1-S2n	0.812	1.454	0.844	0.580	12.612	13.695
24.61	24.61	418.26	2.255	0.0*	1-S2n	0.887	1.597	0.929	0.644	13.161	14.449
28.71	28.71	418.47	2.467	0.0*	1-S2n	0.960	1.730	1.010	0.703	13.688	15.109
32.82	32.82	418.67	2.673	0.0*	1-S2n	1.033	1.856	1.089	0.758	14.163	15.695
36.57	36.57	418.86	2.863	0.0*	1-S2n	1.098	1.962	1.156	0.805	14.538	16.184
41.02	41.02	419.10	3.095	0.0*	5-S2n	1.165	2.084	1.233	0.859	14.961	16.712

\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 416.00 ft, Outlet Elevation (invert): 411.91 ft

Culvert Length: 131.47 ft, Culvert Slope: 0.0311

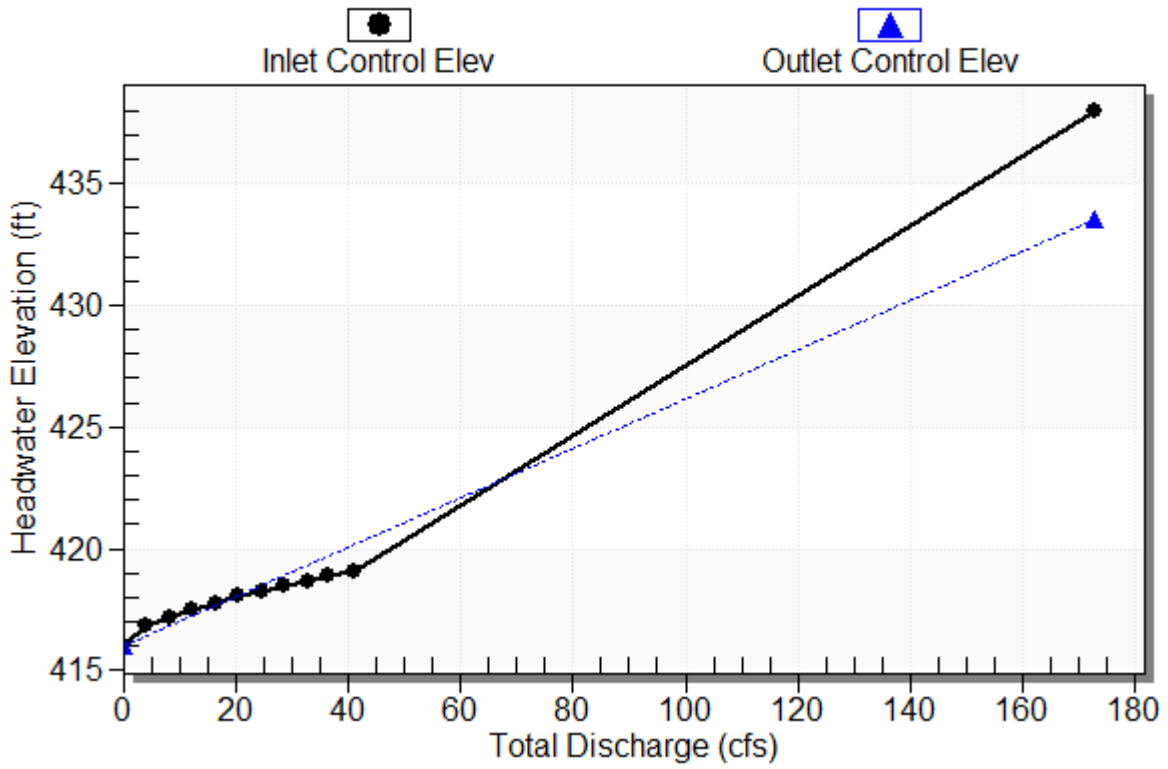
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# Culvert Performance Curve Plot: Rt. Sta. 781+65

## Performance Curve

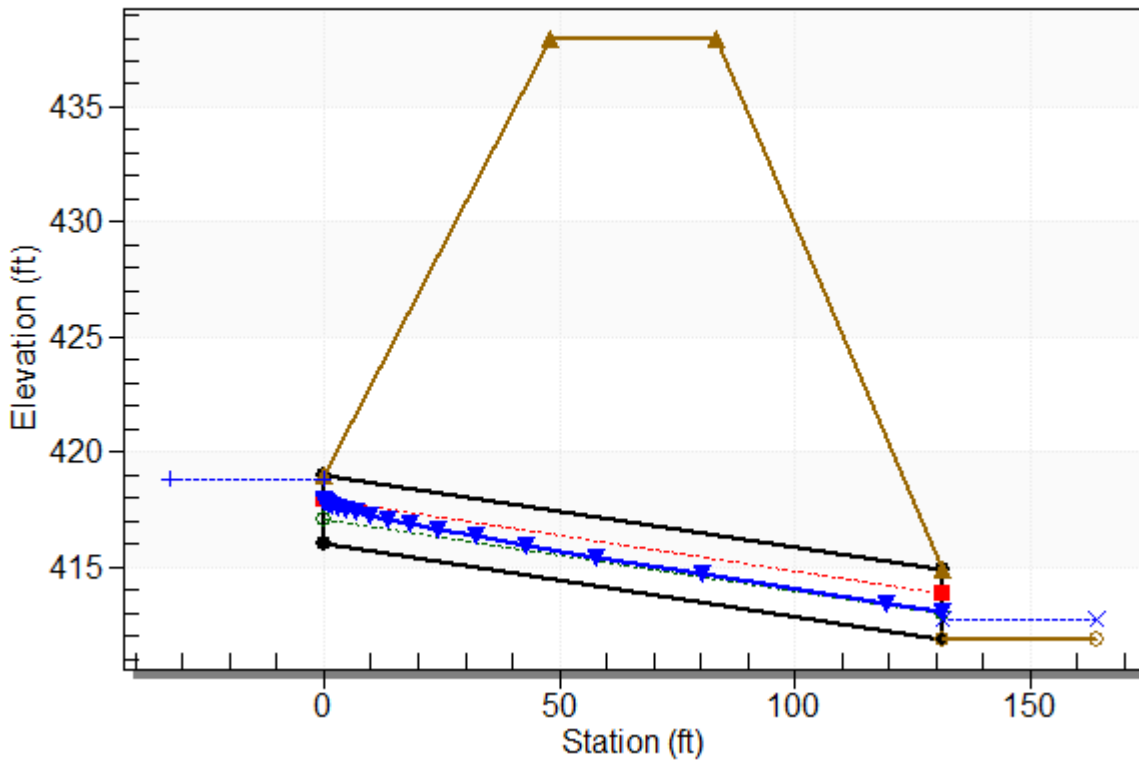
Culvert: Rt. Sta. 781+65



## Water Surface Profile Plot for Culvert: Rt. Sta. 781+65

Crossing - Crossing 43 downstream, Design Discharge - 36.6 cfs

Culvert - Rt. Sta. 781+65, Culvert Discharge - 36.6 cfs



### Site Data - Rt. Sta. 781+65

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 416.00 ft

Outlet Station: 131.41 ft

Outlet Elevation: 411.91 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 781+65

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 43 downstream)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	411.91	0.00	0.00	0.00	0.00
4.10	412.14	0.23	8.19	0.56	3.19
8.20	412.25	0.34	10.31	0.85	3.34
12.31	412.34	0.43	11.72	1.08	3.41
16.41	412.42	0.51	12.81	1.27	3.47
20.51	412.49	0.58	13.69	1.45	3.51
24.61	412.55	0.64	14.45	1.61	3.54
28.71	412.61	0.70	15.11	1.75	3.56
32.82	412.67	0.76	15.70	1.89	3.59
36.57	412.72	0.81	16.18	2.01	3.61
41.02	412.77	0.86	16.71	2.14	3.62

### **Tailwater Channel Data - Crossing 43 downstream**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 1.00 (1:1)

Channel Slope: 0.0400

Channel Manning's n: 0.0120

Channel Invert Elevation: 411.91 ft

### **Roadway Data for Crossing: Crossing 43 downstream**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 438.00 ft

Roadway Surface: Paved

Roadway Top Width: 35.00 ft

## **Crossing Discharge Data**

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

Minimum Flow: 0 cfs

Design Flow: 36.57 cfs

Maximum Flow: 41.02 cfs

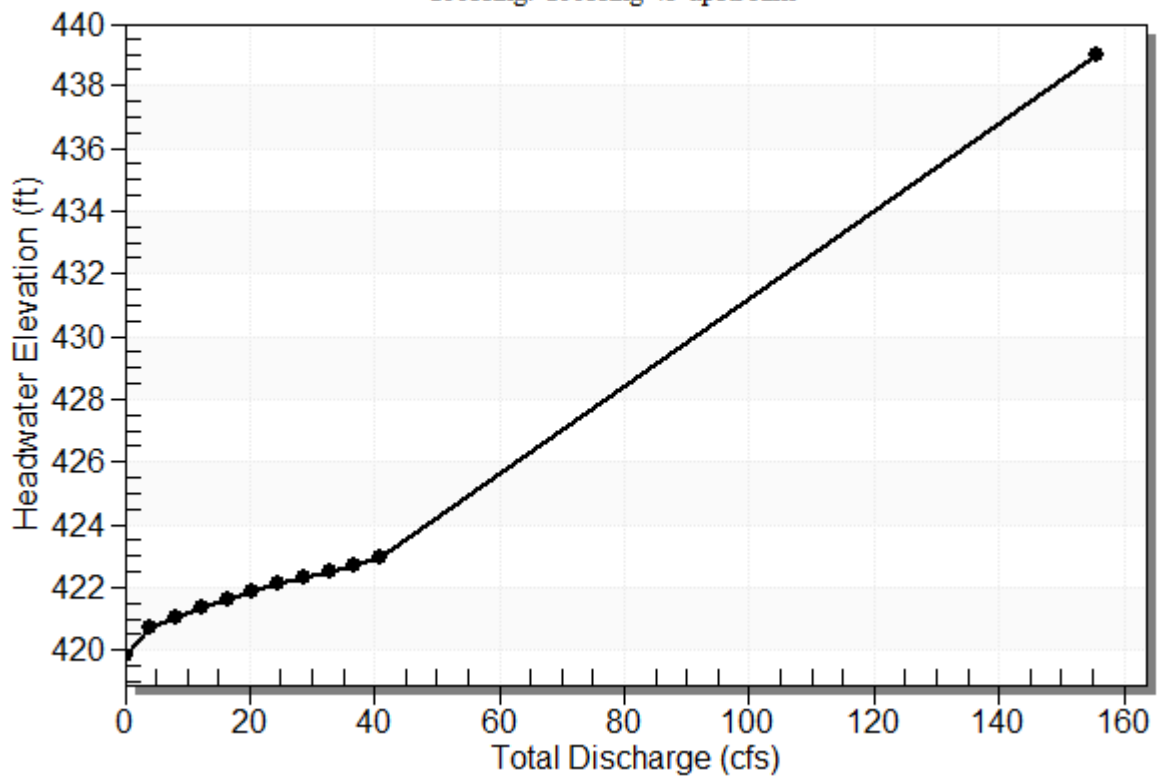
**Table 4 - Summary of Culvert Flows at Crossing: Crossing 43 upstream**

Headwater Elevation (ft)	Total Discharge (cfs)	Rt. Sta. 781+65 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
419.86	0.00	0.00	0.00	1
420.69	4.10	4.10	0.00	1
421.06	8.20	8.20	0.00	1
421.35	12.31	12.31	0.00	1
421.64	16.41	16.41	0.00	1
421.89	20.51	20.51	0.00	1
422.11	24.61	24.61	0.00	1
422.33	28.71	28.71	0.00	1
422.53	32.82	32.82	0.00	1
422.72	36.57	36.57	0.00	1
422.96	41.02	41.02	0.00	1
438.00	155.72	155.72	0.00	Overtopping

# Rating Curve Plot for Crossing: Crossing 43 upstream

## Total Rating Curve

Crossing: Crossing 43 upstream



**Table 5 - Culvert Summary Table: Rt. Sta. 781+65**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	419.86	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
4.10	4.10	420.69	0.831	0.0*	1-S2n	0.347	0.628	0.347	0.823	8.690	0.000
8.20	8.20	421.06	1.199	0.0*	1-S2n	0.506	0.899	0.524	1.198	9.849	0.000
12.31	12.31	421.35	1.491	0.0*	1-S2n	0.618	1.110	0.656	1.491	10.655	0.000
16.41	16.41	421.64	1.777	0.0*	1-S2n	0.715	1.292	0.715	1.772	12.591	0.000
20.51	20.51	421.89	2.028	0.0*	1-S2n	0.812	1.454	0.846	2.032	12.577	0.000
24.61	24.61	422.11	2.255	0.0*	1-S2n	0.886	1.597	0.932	2.240	13.097	0.000
28.71	28.71	422.33	2.467	0.0*	1-S2n	0.960	1.730	1.014	2.240	13.614	0.000
32.82	32.82	422.53	2.673	0.0*	1-S2n	1.033	1.856	1.093	2.240	14.087	0.000
36.57	36.57	422.72	2.863	0.0*	1-S2n	1.098	1.962	1.160	2.240	14.478	0.000
41.02	41.02	422.96	3.095	0.0*	5-S2n	1.165	2.084	1.242	2.240	14.827	0.000



\* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 419.86 ft, Outlet Elevation (invert): 416.00 ft

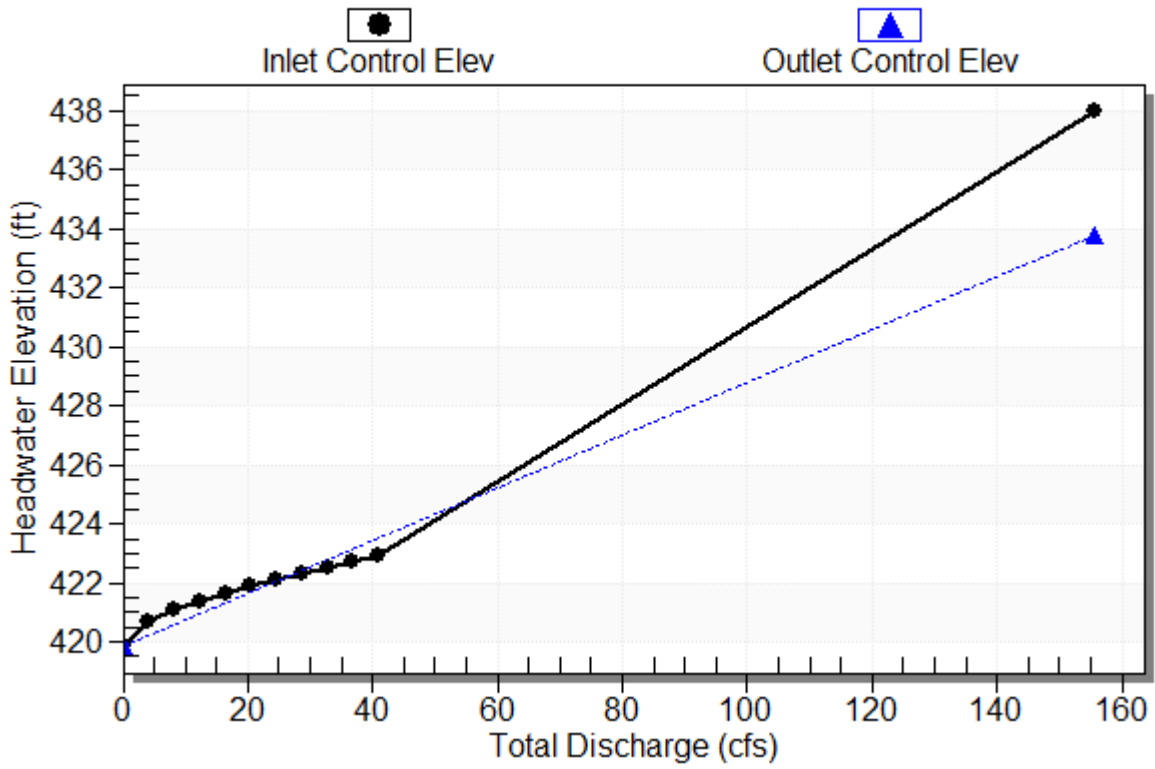
Culvert Length: 124.03 ft, Culvert Slope: 0.0311

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# Culvert Performance Curve Plot: Rt. Sta. 781+65

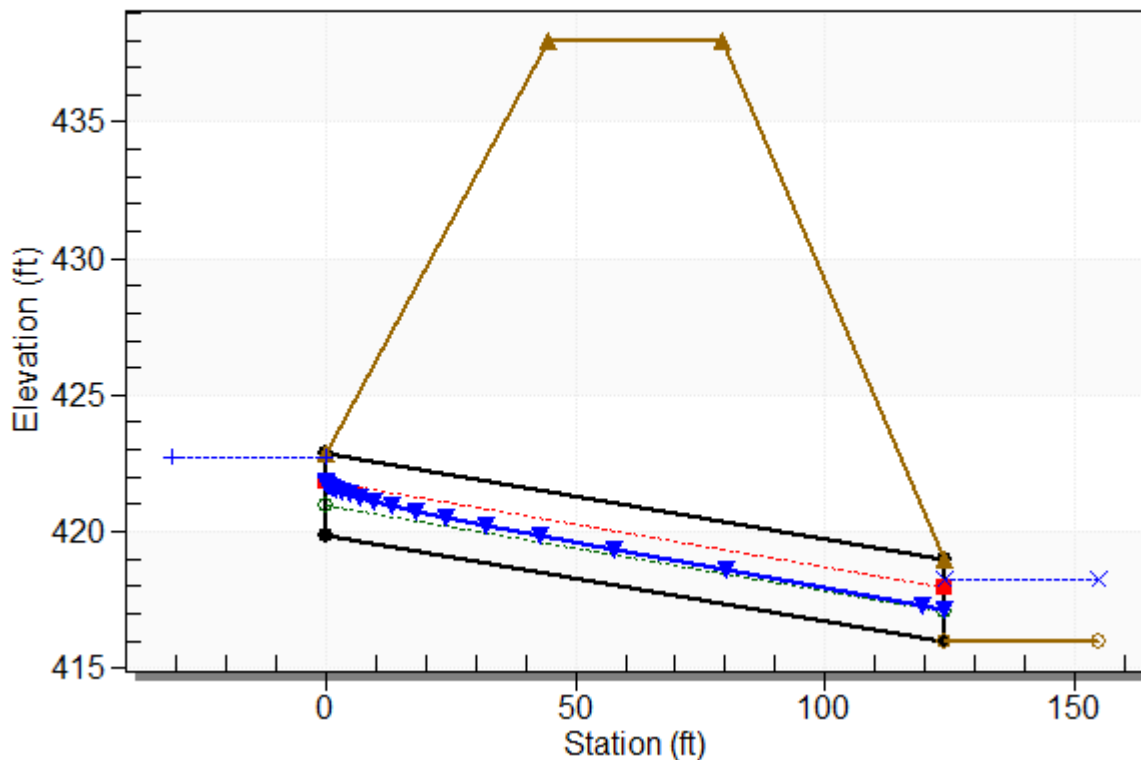
## Performance Curve

Culvert: Rt. Sta. 781+65



## Water Surface Profile Plot for Culvert: Rt. Sta. 781+65

Crossing - Crossing 43 upstream, Design Discharge - 36.6 cfs  
Culvert - Rt. Sta. 781+65, Culvert Discharge - 36.6 cfs



### Site Data - Rt. Sta. 781+65

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 419.86 ft

Outlet Station: 123.97 ft

Outlet Elevation: 416.00 ft

Number of Barrels: 1

### Culvert Data Summary - Rt. Sta. 781+65

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

**Table 6 - Downstream Channel Rating Curve (Crossing: Crossing 43 upstream)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
0.00	416.00	-7069797073369245200 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 .00	0.00
2.43	416.63	-7069797073369245200 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 .00	0.00
4.86	416.91	-7069797073369245200 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 .00	0.00





**Tailwater Channel Data - Crossing 43 upstream**

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 416.00 ft

**Roadway Data for Crossing: Crossing 43 upstream**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 438.00 ft

Roadway Surface: Paved

Roadway Top Width: 35.00 ft



## 4.3 Cross-line Drainage System Analysis

Existing cross-line drainage systems on the project were analyzed for the 50-year and 100-year design storms. GEOPAK Drainage was used to analyze the existing systems. The GEOPAK Drainage output and HGL Profiles are provided in this section.

I-20 Improvement Project Design-Build Preparation On-Call  
 Closed Drainage System Analysis  
 Outfall No.1 Lt. Sta. 546+72 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB1-02	5	8.31	8.95	0.80	1.16	0.00	0.00	0.80	0.30
ECB1-01	63.4	25.15	3.29	0.53	14.42	0.00	0.00	0.53	0.30

## Outfall No.2 Lt. Sta. 564+13 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB2-02	5	6.17	8.95	0.45	1.53	0.00	0.00	0.45	0.30
ECB2-01	87.9	9.10	2.60	0.43	8.13	0.00	0.00	0.43	0.30

## Outfall No.3 Lt. Sta. 788+22 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB3-02	5	7.84	8.95	0.40	2.19	0.00	0.00	0.40	0.30
ECB3-01	76.3	11.46	2.89	0.29	13.68	0.00	0.00	0.29	0.30

## Outfall No.4 Lt. Sta. 420+92 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB4-02	10	7.99	7.80	0.80	1.28	0.00	0.00	0.80	0.30
ECB4-01	65.2	25.01	3.23	0.40	19.37	0.00	0.00	0.40	0.30

## Outfall No.5 Lt. Sta. 449+97 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB5-03	10	20.74	7.80	0.45	5.91	0.00	0.00	0.45	0.30
ECB5-02	5	4.87	8.95	0.80	0.68	0.00	0.00	0.80	0.30
ECB5-01	78	21.75	2.84	0.42	18.21	0.00	0.00	0.42	0.30

## Outfall No.6 Lt. Sta. 239+53 (I-20)

## AREA DATA

Area - ID	Tc Used	Discharge	Intensity	Composite C Value	Composite Area	Total Subarea C Value	Total Subarea	Remainder C Value	Remainder Area
ECB6-02	5	2.15	8.95	0.30	0.80	0.00	0.00	0.30	0.30
ECB6-01	38.2	1.82	4.52	0.36	1.12	0.00	0.00	0.36	0.30

I-20 Improvement Project Design-Build Preperation On-Call  
 Closed Drainage System Analysis  
 Outfall No.1 Lt. Sta. 546+72 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP1-02	ECB1-02	OP1-01	Circular	Concrete	1.00	2.00	128.74	2.35	28.17	40.44	1.29	13.14	419.85	419.72	416.82	416.15	417.85	414.82	9.22	12.71	1.87	1.33
EP1-01	ECB1-01	ECB1-02	Circular	Concrete	1.00	2.00	81.75	2.52	25.15	41.85	1.17	13.18	421.92	423.79	419.86	419.10	419.92	417.86	8.01	12.26	2.00	1.24

Outfall No.2 Lt. Sta. 564+13 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP2-02	ECB2-02	OP2-01	Circular	Concrete	1.00	3.00	99.43	0.24	10.87	38.19	1.14	4.39	392.54	390.69	392.30	390.35	389.54	389.30	4.38	4.97	1.15	1.05
EP2-01	ECB2-01	ECB2-02	Circular	Concrete	1.00	3.00	83.09	0.64	9.10	62.08	0.80	5.98	393.07	391.35	392.54	390.35	390.07	389.54	3.17	5.92	1.28	0.81

Outfall No.3 Lt. Sta. 788+22 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP3-02	ECB3-02	OP3-01	Circular	Concrete	1.00	3.00	114.19	14.19	13.97	292.76	0.46	20.22	436.57	434.78	420.37	417.84	433.57	417.37	5.24	19.97	1.21	0.47
EP3-01	ECB3-01	ECB3-02	Circular	Concrete	1.00	3.00	89.56	1.36	11.46	90.72	0.75	8.33	437.84	436.32	436.62	434.38	434.84	433.62	3.29	8.11	1.48	0.76

Outfall No.4 Lt. Sta. 420+92 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP4-02	ECB4-02	OP4-01	Circular	Concrete	1.00	2.00	83.68	1.26	28.27	29.53	1.70	9.93	384.34	384.36	383.29	383.00	382.34	381.29	9.00	9.88	2.00	1.71
EP4-01	ECB4-01	ECB4-02	Circular	Concrete	1.00	2.00	70.82	0.78	25.01	23.23	2.00	8.17	385.00	386.84	384.45	384.36	383.00	382.45	7.96	8.09	2.00	1.91

Outfall No.5 Lt. Sta. 449+97 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP5-03	ECB5-03	OP5-01	Circular	Concrete	1.00	2.50	60.73	3.36	30.78	87.61	1.07	15.43	400.58	399.98	398.54	397.24	398.08	396.04	7.69	13.19	1.90	1.20
EP5-02	ECB5-02	ECB5-03	Circular	Concrete	1.00	2.00	107.14	1.70	23.27	34.36	1.27	11.07	402.00	401.76	400.18	399.48	400.00	398.18	7.94	10.76	1.76	1.30
EP5-01	ECB5-01	ECB5-02	Circular	Concrete	1.00	2.00	73.94	2.35	21.75	40.44	1.09	12.39	403.95	405.18	402.21	401.37	401.95	400.21	6.92	11.49	2.00	1.16

Outfall No.6 Lt. Sta. 239+53 (I-20)

LINK DATA

Link - ID	US Node	DS Node	Shape	Material	# Barrels	Rise	Actual Length	Slope	Q (cfs)	Capacity	Uniform Depth	Uniform	US Soffit	US HGL	DS Soffit	DS HGL	US Invert	DS Invert	Actual Vel US	Actual Vel DS	Actual Depth US	Actual Depth DS
EP6-02	ECB6-02	OP6-01	Circular	Concrete	1.00	1.50	76.16	2.13	2.90	17.85	0.42	7.06	297.88	297.05	296.26	295.19	296.38	294.76	3.82	7.01	0.67	0.43
EP6-01	ECB6-01	ECB6-02	Circular	Concrete	1.00	1.50	72.24	2.24	1.82	18.33	0.33	6.29	299.40	298.59	297.78	296.61	297.90	296.28	2.28	6.26	0.69	0.33

I-20 Improvement Project Design-Build Preparation On-Call  
 Closed Drainage System Analysis  
 Outfall No.1 Lt. Sta. 546+72 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP1-02	24" R.C. PIPE	Pipe	Concrete	Circular	ECB1-02	OP1-01	128.74	2.35	2.00	7141114	417.85	414.82
EP1-01	24" R.C. PIPE	Pipe	Concrete	Circular	ECB1-01	ECB1-02	81.75	2.52	2.00	7141114	419.92	417.86

## Outfall No.2 Lt. Sta. 564+13 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP2-02	36" R.C. PIPE	Pipe	Concrete	Circular	ECB2-02	OP2-01	99.43	0.24	3.00	7141116	389.54	389.30
EP2-01	36" R.C. PIPE	Pipe	Concrete	Circular	ECB2-01	ECB2-02	83.09	0.64	3.00	7141116	390.07	389.54

## Outfall No.3 Lt. Sta. 788+22 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP3-02	36" R.C. PIPE	Pipe	Concrete	Circular	ECB3-02	OP3-01	114.19	14.19	3.00	7141116	433.57	417.37
EP3-01	36" R.C. PIPE	Pipe	Concrete	Circular	ECB3-01	ECB3-02	89.56	1.36	3.00	7141116	434.84	433.62

## Outfall No.4 Lt. Sta. 420+92 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP4-02	24" R.C. PIPE	Pipe	Concrete	Circular	ECB4-02	OP4-01	83.68	1.26	2.00	7141114	382.34	381.29
EP4-01	24" R.C. PIPE	Pipe	Concrete	Circular	ECB4-01	ECB4-02	70.82	0.78	2.00	7141114	383.00	382.45

## Outfall No.5 Lt. Sta. 449+97 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP5-03	30" R.C. PIPE	Pipe	Concrete	Circular	ECB5-03	OP5-01	60.73	3.36	2.50	7141115	398.08	396.04
EP5-02	24" R.C. PIPE	Pipe	Concrete	Circular	ECB5-02	ECB5-03	107.14	1.70	2.00	7141114	400.00	398.18
EP5-01	24" R.C. PIPE	Pipe	Concrete	Circular	ECB5-01	ECB5-02	73.94	2.35	2.00	7141114	401.95	400.21

## Outfall No.6 Lt. Sta. 239+53 (I-20)

## LINK DATA for ROAD DESIGN

Link - ID	Link-Type	Type	Material	Shape	US Node	DS Node	Actual Length	Slope	Rise	Pay Item	US Invert	DS Invert
EP6-02	18" R.C. PIPE	Pipe	Concrete	Circular	ECB6-02	OP6-01	76.16	2.13	1.50	7141113	296.38	294.76
EP6-01	18" R.C. PIPE	Pipe	Concrete	Circular	ECB6-01	ECB6-02	72.24	2.24	1.50	7141113	297.90	296.28

I-20 Improvement Project Design-Build Preparation On-Call  
 Closed Drainage System Analysis  
 Outfall No.1 Lt. Sta. 546+72 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP1-01	Existing	Outlet	OP	I20EXEBEP	46+71.82 R	-82.60	416.82	416.82	2.00	0.00	0.00	63.67	0.00	15.58	0.55	0.00
ECB1-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	46+30.05 R	-9.68	422.40	422.40	4.55	0.04	63.50	63.50	28.17	15.58	0.55	3.29
ECB1-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	46+04.96 R	38.13	423.07	423.07	3.15	0.00	63.40	63.40	25.15	14.42	0.53	3.29

Outfall No.2 Lt. Sta. 564+13 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP2-01	Existing	Outlet	OP	I20EXEBEP	64+12.66 R	-111.78	392.30	392.30	3.00	0.00	0.00	88.51	0.00	9.66	0.43	0.00
ECB2-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	64+10.07 R	-12.39	392.94	392.94	3.40	0.01	88.13	88.13	10.87	9.66	0.43	2.60
ECB2-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	64+07.90 R	40.67	393.55	393.55	3.48	0.00	87.90	87.90	9.10	8.13	0.43	2.60

Outfall No.3 Lt. Sta. 788+22 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP3-01	Existing	Outlet	OP	I20EXEBEP	88+22.33 R	-70.71	419.37	419.37	2.00	0.00	0.00	76.57	0.00	15.87	0.31	0.00
ECB3-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	88+16.20 R	-0.98	437.52	437.52	3.95	0.02	76.48	76.48	13.97	15.87	0.31	2.88
ECB3-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	88+13.48 R	43.99	438.61	438.61	3.77	0.00	76.30	76.30	11.46	13.68	0.29	2.89

Outfall No.4 Lt. Sta. 420+92 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP4-01	Existing	Outlet	OP	I20EXEBEP	20+92.22 R	63.24	383.29	383.29	2.00	0.00	0.00	65.49	0.00	20.65	0.43	0.00
ECB4-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	21+47.12 R	0.08	384.59	384.59	2.25	0.19	65.35	65.35	28.27	20.65	0.43	3.22
ECB4-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	21+84.56 R	-30.04	385.52	385.52	2.52	0.00	65.20	65.20	25.01	19.37	0.40	3.23

Outfall No.5 Lt. Sta. 449+97 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP5-01	Existing	Outlet	OP	I20EXEBEP	49+97.45 R	116.08	398.54	398.54	2.50	0.00	0.00	78.33	0.00	24.80	0.44	0.00
ECB5-03	Existing	Other	C.B. TYPE 9	I20EXEBEP	50+27.59 R	63.36	400.33	400.33	2.25	0.01	78.26	78.26	30.78	24.80	0.44	2.84
ECB5-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	50+81.44 R	0.74	404.74	404.74	4.74	0.05	78.10	78.10	23.27	18.89	0.43	2.84
ECB5-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	51+15.59 R	-34.84	406.11	406.11	4.16	0.00	78.00	78.00	21.75	18.21	0.42	2.84

Outfall No.6 Lt. Sta. 239+53 (I-20)

NODE DATA

Node - ID	Description	Node Type	Node Library Item Name	Node Reference PGL	Station	Offset	Reference Elevation	Node Elevation	Node Depth	Junction Loss	Tc Used	Cumulative Tc	Cumulative Discharge	Cumulative Area	Cumulative C Value	Cumulative Intensity
OP6-01	Existing	Outlet	OP	I20EXEBEP	39+53.29 R	-35.93	296.26	296.26	1.50	0.00	0.00	38.57	0.00	1.92	0.34	0.00
ECB6-02	Existing	Other	C.B. TYPE 9	I20EXEBEP	39+14.96 R	-0.66	298.72	298.72	2.44	0.02	38.39	38.39	2.90	1.92	0.34	4.51
ECB6-01	Existing	Other	C.B. TYPE 9	I20EXEBEP	38+81.01 R	32.57	302.12	302.12	4.22	0.00	38.20	38.20	1.82	1.12	0.36	4.52

I-20 Improvement Project Design-Build Preparation On-Call  
Closed Drainage System Analysis  
Outfall No.1 Lt. Sta. 546+72 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP1-01	OP	I20EXEBEP	546+71.82 R 4	-82.60	416.82	2.00	None
ECB1-02	C.B. TYPE 9	I20EXEBEP	546+30.05 R 4	-9.68	422.40	4.55	7191205
ECB1-01	C.B. TYPE 9	I20EXEBEP	546+04.96 R 4	38.13	423.07	3.15	7191205

Outfall No.2 Lt. Sta. 564+13 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP2-01	OP	I20EXEBEP	564+12.66 R 4	-111.78	392.30	3.00	None
ECB2-02	C.B. TYPE 9	I20EXEBEP	564+10.07 R 4	-12.39	392.94	3.40	7191205
ECB2-01	C.B. TYPE 9	I20EXEBEP	564+07.90 R 4	40.67	393.55	3.48	7191205

Outfall No.3 Lt. Sta. 788+22 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP3-01	OP	I20EXEBEP	788+22.33 R 4	-70.71	419.37	2.00	None
ECB3-02	C.B. TYPE 9	I20EXEBEP	788+16.20 R 4	-0.98	437.52	3.95	7191205
ECB3-01	C.B. TYPE 9	I20EXEBEP	788+13.48 R 4	43.99	438.61	3.77	7191205

Outfall No.4 Lt. Sta. 420+92 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP4-01	OP	I20EXEBEP	420+92.22 R 3	63.24	383.29	2.00	None
ECB4-02	C.B. TYPE 9	I20EXEBEP	421+47.12 R 3	0.08	384.59	2.25	7191205
ECB4-01	C.B. TYPE 9	I20EXEBEP	421+84.56 R 3	-30.04	385.52	2.52	7191205

Outfall No.5 Lt. Sta. 449+97 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP5-01	OP	I20EXEBEP	449+97.45 R 3	116.08	398.54	2.50	None
ECB5-03	C.B. TYPE 9	I20EXEBEP	450+27.59 R 3	63.36	400.33	2.25	7191205
ECB5-02	C.B. TYPE 9	I20EXEBEP	450+81.44 R 3	0.74	404.74	4.74	7191205
ECB5-01	C.B. TYPE 9	I20EXEBEP	451+15.59 R 3	-34.84	406.11	4.16	7191205

Outfall No.6 Lt. Sta. 239+53 (I-20)

NODE DATA for ROAD DESIGN

Node - ID	Node Library Item Name	Reference PGL	Station	Offset	Node Elevation	Node Depth	Pay Item
OP6-01	OP	I20EXEBEP	239+53.29 R 2	-35.93	296.26	1.50	None
ECB6-02	C.B. TYPE 9	I20EXEBEP	239+14.96 R 2	-0.66	298.72	2.44	7191205
ECB6-01	C.B. TYPE 9	I20EXEBEP	238+81.01 R 2	32.57	302.12	4.22	7191205

# 5 Appendix

## 5.1 Culvert Inventory Forms & Culvert Assessment Forms



## Begin Project to U.S. Route 1 Interchange

# Culvert Inventory Form

Pipe Label: I-20-3A

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20	Ginny	BMP	EMP
<b>Inlet</b>		<b>Outlet</b>				229+15	229+15
Latitude	Longitude	Latitude	Longitude				
34.00406	81.16578	34.00482	81.16626				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream
	Skewed		Median		Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	36"	264'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-3A

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				229+15	229+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Section of pipe under I-20. Video pipe inspection revealed joint separations at 9' and 265' from the box along Ginny Lane. Minor sediment build up at pipe inlet. Some cracking and infiltration also identified in video pipe inspection.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-3A

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20	Ginny	BMP	EMP
<b>Inlet</b>		<b>Outlet</b>				229+15	229+15
Latitude	Longitude	Latitude	Longitude				
34.00406	81.16578	34.00482	81.16626				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream
	Skewed		Median		Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	36"	42'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-3A

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				229+15	229+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Section of pipe under Ginny Lane. Video pipe inspection revealed joint offset in the pipe at 38' from the outlet. Separation occurs near a box on the shoulder between I-20 and Ginny Lane. Pipe outlet appears relatively new with a precast headwall and wingwalls. Rip-rap downstream has been washed out.

**Recommendation:** Line pipe. Place additional rip-rap at pipe outfall downstream of concrete apron.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20 4EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20	Ginny	BMP	EMP
Inlet		Outlet				239+15	239+15
Latitude	Longitude	Latitude	Longitude				
34.00309	81.16888	34.00288	81.16889				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			Purpose:		
Orientation:	Transverse	Inlet Position:		Outlet Position:		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder	X	Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
Material:		# Barrels:	1	Area:		Length:	Shape:
CAP				Diameter	18"	78'	Circle
CMP				Width			Ellipse
RCP	X			Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
Materials:		Area:		Notes:			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
Pipe End Type:		Inlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin	X	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
Pipe End Type:		Outlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete	X		
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None	X	Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20 4EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				239+15	239+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Pipe inlet is existing median catch basin. No apparent defects from video pipe inspection. Some mower damage at pipe end.

**Recommendation:** Retain pipe. Cut off any reinforcing steel protruding from pipe end.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20 4WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20	Ginny	BMP	EMP
Inlet		Outlet				239+15	239+15
Latitude	Longitude	Latitude	Longitude				
34.00329	81.16887	34.00309	81.16888				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			Purpose:		
Orientation:	Transverse	Inlet Position:		Outlet Position:		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	Median	X	Other	
<b><u>BARREL</u></b>							
Material:		# Barrels:	1	Area:		Length:	Shape:
CAP				Diameter	18"	60'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
Materials:		Area:		Notes:			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
Pipe End Type:		Inlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
Pipe End Type:		Outlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			



# Culvert Assessment Form

Pipe Label: I-20-4WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				239+15	239+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	X
Cracked		Sediment	X	Piping			

**Comments:** Pipe runs between existing catch basins from the westbound shoulder to the median. Video pipe inspection indicates substantial debris accumulation in the pipe and root penetration. Video pipe inspection abandoned after 6 feet due to partial blockage of pipe.

**Recommendation:** Clean existing pipe. Inspect pipe prior to use in proposed project.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-5

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				248+65	248+65
Latitude	Longitude	Latitude	Longitude				
34.00146	81.17114	34.00181	81.17195				
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
CAP			Diameter	270'	Circle		
CMP			Width	4'	Ellipse		
RCP	X		Height	4'	Box		X
HDPE						Other	
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall	X	Concrete	X		
Flared		Wing Wall	X	Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None		Other			
				None			
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall	X	Concrete	X		
Flared		Wing Wall	X	Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None		Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-5

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				248+65	248+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour	X	Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	X
Cracked		Sediment	X	Piping			

**Comments:** No apparent structural issues. Heavy vegetation and sediment downstream. There is a scour hole starting around the upstream wingwalls.

**Recommendation:** Clean outfall ditch approximately 100 feet. Fix scour around wingwalls on upstream end and add rip-rap protection around the headwalls and wingwalls.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-6

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/10/2015	Pipe	I-20	Ginny	BMP	EMP	
<b>Inlet</b>		<b>Outlet</b>				250+15	250+15	
Latitude	Longitude	Latitude	Longitude					
34.00110	81.17155	34.00164	81.17215					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	240'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin		None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin		None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-6

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				250+15	250+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed a joint offset at 21' from downstream pipe end. Joint offset is near Ginny Lane. No other structural issues identified. Heavy vegetation at pipe outfall.

**Recommendation:** Line downstream section of pipe from catch basin on the shoulder of Ginny Lane to the outfall. Retain remainder of pipe. Clean outfall ditch approximately 50 feet and place rip-rap.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-7

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				258+00	258+00
Latitude	Longitude	Latitude	Longitude				
33.99990	81.17299	33.99986	81.17362				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream X	
	Skewed X	Median		Median		Other	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	30"	210	Circle X
CMP				Width			Ellipse
RCP	X			Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete	X		
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None	X	Other			
				None			
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None	X	Other			
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-7

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				258+00	258+00		
<b><u>INLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion X
Scour		Scour		Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping	X		
<p><b><u>Comments:</u></b> Video pipe inspection shows no major joint separations or cracks, however, significant infiltration along the entire length of pipe from the median to the WB side of I-20, with standing water at downstream end of pipe. Sediment build-up at pipe end and in outfall ditch.</p>							
<p><b><u>Recommendation:</u></b> Line pipe. Clean outfall ditch approximately 100 feet and add rip-rap outlet protection.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-7

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				256+98	256+98	
Latitude	Longitude	Latitude	Longitude					
33.99990	81.17299	33.99986	81.17362					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X	
	Skewed	X	Median	Median		Other		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	30"	210	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete	X			
	Flared	Wing Wall		Asphalt				
	Flat	X	Rip Rap	Stone				
	Catch Basin	None	X	Other				
				None				
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	X	Rip Rap	Stone				
	Catch Basin	None	X	Other				
				None	X			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-7

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				256+98	256+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping	X		

**Comments:** Video pipe inspection shows no major joint separations or cracks, however, significant infiltration along the entire length of pipe from the median to the WB side of I-20, with standing water at downstream end of pipe. Sediment build-up at pipe end and in outfall ditch.

**Recommendation:** Line pipe. Clean outfall ditch approximately 100 feet and add rip-rap outlet protection.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-8

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/10/2015	Culvert	I-20		BMP	EMP	
Inlet		Outlet				265+60	265+60	
Latitude	Longitude	Latitude	Longitude					
33.99775	81.17477	33.99816	81.17501					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		Purpose:				
Orientation:	Transverse	Inlet Position:		Outlet Position:		Constructed Ditch		
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X	
	Skewed	X	Median	Median		Other		
<b><u>BARREL</u></b>								
Material:	# Barrels:	1	Area:	Length:	Shape:			
CAP			Diameter	166'	Circle			
CMP			Width	12'	Ellipse			
RCP	X		Height	12'	Box		X	
HDPE						Other		
Masonry								
Mixed/Other								
<b><u>LINER</u></b>								
Materials:	Area:		Notes:					
CMP	Diameter							
Concrete	Width							
Fiberglass	Height							
Plastic								
Other								
<b><u>INLET</u></b>								
Pipe End Type:	Inlet End Treatment Type:		Apron:					
Beveled	Head Wall		X	Concrete				X
Flared	Wing Wall		X	Asphalt				
Flat	X	Rip Rap		Stone				
Catch Basin	None			Other				
				None				
<b><u>OUTLET</u></b>								
Pipe End Type:	Outlet End Treatment Type:		Apron:					
Beveled	Head Wall		X	Concrete				X
Flared	Wing Wall		X	Asphalt				
Flat	X	Rip Rap		Stone				
Catch Basin	None			Other				
				None				
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-8

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				265+60	265+60		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues with culvert. Severe erosion/failure of concrete ditch on inlet end of culvert. Slope drain outlets in middle of fill slope causing additional erosion on the upstream end. Scour holes forming around end of wingwalls.



**Recommendation:** Retain culvert. Add piping to carry slope drain to the bottom of the slope. Fill scour holes around wingwalls and add rip-rap protection around headwalls and wingwalls, both ends of culvert. Remove failed concrete ditch sections upstream of culvert and grade trapezoidal ditch section. Line ditch with rip-rap.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-8

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				265+80	265+80
Latitude	Longitude	Latitude	Longitude				
33.99775	81.17477	33.99816	81.17501				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	166'	Circle	
	CMP			Width	12'	Ellipse	
	RCP	X		Height	12'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-8

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				265+75	265+75		

### INLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

### OUTLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

### BARREL

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues with culvert. Severe erosion/failure of concrete ditch on inlet end of culvert. Slope drain outlets in middle of fill slope causing additional erosion on the upstream end. Scour holes forming around end of wingwalls.



**Recommendation:** Retain culvert. Add piping to carry slope drain to the bottom of the slope. Fill scour holes around wingwalls and add rip-rap protection around headwalls and wingwalls, both ends of culvert. Remove failed concrete ditch sections upstream of culvert and grade trapezoidal ditch section. Line ditch with rip-rap.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-9

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				271+07	271+07	
Latitude	Longitude	Latitude	Longitude					
33.99668	81.17627	33.99669	81.17528					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder		X	Shoulder	X	Natural Stream	
	Skewed	X	Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	260'	Circle	
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	X	Rip Rap	X	Stone			
	Catch Basin	None		Other				
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				X
	Flared	Wing Wall		Asphalt				
	Flat	X	Rip Rap	Stone				
	Catch Basin	None		X	Other			
				None				X
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-9

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				271+07	271+07		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Pipe outfall under water. Video pipe inspection not completed. Heavy vegetation at outfall.

**Recommendation:** Clean pipe and inspect prior to use in proposed project. Clean outfall ditch approximately 100 feet. Add rip-rap outlet protection.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-10

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				275+80	275+80
Latitude	Longitude	Latitude	Longitude				
33.99575	81.17725	33.99559	81.17630				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	290'	Circle	
	CMP			Width	4'	Ellipse	
	RCP	X		Height	4'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			



# Culvert Assessment Form

Pipe Label: I-20-10

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				275+80	275+80		

**INLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues with culvert. Outfall is stable with little vegetation or sediment deposition both upstream and downstream.

**Recommendation:** Retain culvert.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-11EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				292+15	292+15
Latitude	Longitude	Latitude	Longitude				
33.99242	81.18145	33.99559	81.17630				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	24"	180'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-11EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				292+15	292+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed significant joint offsets in pipe > 1" at multiple locations along the pipe. Pipe runs from catch basin in the EB shoulder to a catch basin in the median.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-11WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				292+15	292+15
Latitude	Longitude	Latitude	Longitude				
33.99559	81.17630	33.99325	81.18142				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	24"	180'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	X	Stone		
Catch Basin		None		Other			
				None		X	
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-11WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				292+15	292+15		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour	X	Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed several separated and offset joints along the pipe allowing infiltration and sediment into the pipe. Separations are greater than 1". Pipe inspection started from median catch basin. Joint offsets and separations occur beginning 91 feet from start of survey. Problem areas occur outside of the roadway footprint along the existing fill slope. Scour around pipe at downstream end and in outfall ditch. Last segment of pipe separated and fallen in scour hole.

**Recommendation:** Placement of a precast headwall with rip-rap slope protection as well as additional rip-rap protection of outfall ditch.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-12

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/10/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				297+20	297+20	
Latitude	Longitude	Latitude	Longitude					
33.99207	81.18287	33.99250	81.18308					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	168'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-12

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/10/2015	
				297+20	297+20		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	X
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection not performed due to blockage of pipe from built up sediment. Heavy vegetation in outfall ditch. The outfall ditch parallels I-20 within R/W.

**Recommendation:** Clean pipe and outfall ditch approximately 500 feet.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-13EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				306+00	306+00
Latitude	Longitude	Latitude	Longitude				
33.99106	81.18511	33.99121	81.18521				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream	
	Skewed		Median		Median	X	Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	65	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			



# Culvert Assessment Form

Pipe Label: I-20-13EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				306+00	306+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no major defects in the pipe. EB pipe runs between a catch basin in the roadside ditch to the median.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-13WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				306+00	306+00
Latitude	Longitude	Latitude	Longitude				
33.99121	81.18521	33.99141	81.18534				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	90'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin		None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-13WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				306+00	306+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed several joint separations along pipe. Joint separations occur within the median and along the outside roadway shoulder and fill slopes. No apparent issues under the existing pavement.

**Recommendation:** Line WB side of pipe from median catch basin to outfall. Clean outfall ditch to R/W.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-14EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				310+00	310+00
Latitude	Longitude	Latitude	Longitude				
33.99049	81.18624	33.99068	81.18637				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream	
	Skewed		Median		Median	X	Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	65'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		X	Other		
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-14EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				310+00	310+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	X
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection reveals no apparent issues with pipe. Some mower damage at the inlet.

**Recommendation:** Remove all exposed reinforcing steel from pipe inlet to avoid further damage from mowing operations. Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-14WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				310+00	310+00
Latitude	Longitude	Latitude	Longitude				
33.99068	81.18637	33.99091	81.18652				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	90'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin		None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-14WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				310+00	310+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Crack apparent at 64' from the median catch basin, no other structural issues identified in video pipe inspection. Crack is approximately under the edge of the paved shoulder. Vegetation and minor sedimentation at outfall ditch.

**Recommendation:** Line pipe from median to outfall. Clean outfall ditch and add rip-rap outlet protection.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-15EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				314+98	314+98	
Latitude	Longitude	Latitude	Longitude					
33.98986	81.18764	33.99001	81.18780					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other	X	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	90'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-15EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				314+98	314+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping	X		

**Comments:** Video pipe inspection shows infiltration into the pipe at 27 feet from the median. No other structural issues identified in video pipe inspection. Pipe inlet shows large amount of leaves and debris.

**Recommendation:** Clean pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-15WB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				315+50	315+50	
Latitude	Longitude	Latitude	Longitude					
33.99001	81.18780	33.99030	81.18810					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	148'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin		None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-15WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				315+50	315+50		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping	X		

**Comments:** Video pipe inspection shows infiltration into the pipe at 80 and 104 feet from the median. No other structural issues identified in video pipe inspection. Some debris(rubble) present at the outfall. Pipe outfall parallels a driveway along Baskins Hill Road.

**Recommendation:** Clean pipe and pipe outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-16EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				324+65	324+65
Latitude	Longitude	Latitude	Longitude				
33.98813	81.18999	33.98824	81.19017				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	68'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-16EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				324+65	324+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping	X		

**Comments:** Video pipe inspection shows major joint separation at 62 feet from median catch basin. Joint separation located outside of roadway in fill section. No other structural issues identified.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-16WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				324+65	324+65
Latitude	Longitude	Latitude	Longitude				
33.98824	81.18999	33.98840	81.19041				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	90'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-16WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				324+65	324+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed joint separation and root growth in the joint at 85 feet from median catch basin. Separation and root located near roadside ditch location outside of the roadway pavement. Pipe is tied to a drainage system that conveys runoff through a subdivision off of Baskin Hills Road.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-17

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				340+46	340+46	
Latitude	Longitude	Latitude	Longitude					
33.98424	81.19206	33.98443	81.19271					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch		
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream	
	Skewed		Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	210'	Circle		
	CMP			Width	8'	Ellipse		
	RCP	X		Height	8'	Box		
	HDPE					Other		
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin	None			Other			
					None			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin	None			Other			
					None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-17

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				340+46	340+46		
<b><u>INLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour	X	Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour	X	Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			
<p><b><u>Comments:</u></b> No apparent structural issues found. Concrete ditches at culvert inlet experience erosion/failure. Some scour around wingwalls on both ends. Approximately 1.5 ft drop from apron to stream at outfall.</p>							
<p><b><u>Recommendation:</u></b> Retain culvert. Remove failed concrete ditches. Construction trapezoidal, rip-rap lined ditches in place of concrete ditches. Repair scour holes around wingwalls and add rip-rap protection.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-18A

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				353+20	353+20
Latitude	Longitude	Latitude	Longitude				
33.98090	81.19408	33.98103	81.19379				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	24"	100'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete	X	
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-18A

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				353+20	353+20		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No issues indicated in video pipe inspection. Pipe collects runoff from US 1 Interchange from paved ditch.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-18EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				353+18	353+18
Latitude	Longitude	Latitude	Longitude				
33.98072	81.19366	33.98103	81.19379				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	36"	122'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete	X	
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-18EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				353+18	353+18		

### INLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

### OUTLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

### BARREL

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed a hole present at 87 feet from the median catch basin. Hole is located under the existing EB paved shoulder. Infiltration also identified at 105'. No other structural issues were observed. A paved ditch carries runoff to the inlet.



**Recommendation:** Line pipe.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-18WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				353+18	353+18
Latitude	Longitude	Latitude	Longitude				
33.98103	81.19379	33.98146	81.19395				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	36"	160'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete	X	
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-18WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				353+18	353+18		
<b><u>INLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			
<p><b><u>Comments:</u></b> Video pipe inspection revealed a hole present at 145 feet from the median catch basin. Review of aerial photography indicate the hole may be from guardrail post along U.S. Rte 1 Ramp. Joint separation &gt;1" also observed at 155' from median catch basin.</p>							
<p><b><u>Recommendation:</u></b> Replace pipe from US 1 Ramp to outfall.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-19EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				358+98	358+98
Latitude	Longitude	Latitude	Longitude				
33.97954	81.19443	33.97954	81.19414				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X	Natural Stream
	Skewed	X	Median	X	Median		Other
							X
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	85'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete		X	
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin			None	X	Other		
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			



# Culvert Assessment Form

Pipe Label: I-20-19EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				358+98	358+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed a joint offset at 80 feet from the median catch basin. Offset located outside of roadway pavement. Mower damage to pipe end. Heavy vegetation and sediment in outfall ditch (concrete).

**Recommendation:** Retain pipe. Remove exposed reinforcing steel from pipe end. Clean outfall ditch.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

## U.S. Route 1 Interchange to S.C. Route 6 Interchange

# Culvert Inventory Form

Pipe Label: I-20-20WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				373+00	373+00
Latitude	Longitude	Latitude	Longitude				
33.97581	81.19602	33.97589	81.19628				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	82'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt	X		
	Flat	Rip Rap		Stone			
		None	X	Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-20WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				373+00	373+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Infiltration noted at 45 feet from median catch basin. Infiltration located within outside WB lane. No issues at the pipe outfall.

**Recommendation:** Line existing pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-20WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				373+40	373+40
Latitude	Longitude	Latitude	Longitude				
33.97581	81.19602	33.97589	81.19628				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	82'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt	X	
	Flat	X	Rip Rap		Stone		
			None	X	Other		
					None		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-20WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				373+40	373+40		
<b><u>INLET</u></b>							
Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			
<p><b><u>Comments:</u></b> Infiltration noted at 45 feet from median catch basin. Infiltration located within outside WB lane. No issues at the pipe outfall.</p>							
<p><b><u>Recommendation:</u></b> Line existing pipe.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-21

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				374+90	374+90
Latitude	Longitude	Latitude	Longitude				
33.97524	81.19561	33.97551	81.19651				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream
	Skewed		Median		Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	288'	Circle	
	CMP			Width	6'	Ellipse	
	RCP	X		Height	6'	Box	
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
		None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap	X	Stone			
		None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-23EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				401+05	401+05	
Latitude	Longitude	Latitude	Longitude					
33.96895	81.19990	33.96912	81.18340					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other	X	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	82'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
		None		Other				
				None				
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
		None		Other				
				None				
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-23EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				401+05	401+05		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-23WB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				401+05	401+05	
Latitude	Longitude	Latitude	Longitude					
33.96912	81.18340	33.96927	81.18354					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	82'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>	<b>Notes:</b>					
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>	<b>Apron:</b>					
	Beveled	Head Wall	Concrete					
	Flared	Wing Wall	Asphalt					
	Flat	Rip Rap	Stone					
	Catch Basin	X None	X Other					
			None	X				
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>	<b>Apron:</b>					
	Beveled	X Head Wall	Concrete	X				
	Flared	Wing Wall	Asphalt					
	Flat	Rip Rap	Stone					
		None	X Other					
			None					
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-23WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				401+05	401+05		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. The end section of pipe is damaged with large pieces of pipe hanging from reinforcing steel. Damage appears to be from mowing operations.

**Recommendation:** Retain existing pipe. Replace 8' pipe on downstream end.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-24

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				412+60	412+60
Latitude	Longitude	Latitude	Longitude				
33.96753	81.20319	33.96811	81.20348				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X
	Longitudinal		Shoulder	X	Shoulder	Natural Stream	
	Skewed		Median		Median	Other	X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	224'	Circle	
	CMP			Width	4'	Ellipse	
	RCP	X		Height	4'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>	<b>Notes:</b>				
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>	<b>Apron:</b>				
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
		None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>	<b>Apron:</b>				
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
		None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-24

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				412+60	412+60		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues. Culvert headwalls and wingwalls in good shape. Some vegetation downstream of culvert.

**Recommendations:** Clean outfall ditch to R/W line.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-26EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				439+80	439+80	
Latitude	Longitude	Latitude	Longitude					
33.96753	81.20319	33.96811	81.20348					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other	X	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	18"	74'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
			None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-26EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				439+80	439+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	X
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection revealed a hole at 2' from median catch basin with exposed reinforcing steel. Large section of concrete missing from pipe wall. Debris blocking pipe at 38' from median catch basin.

**Recommendation:** Clean existing pipe and repair/replace section of broken pipe in the median.

<u>Inspector Signature:</u>				<u>Inspector Name (Printed):</u>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-26WB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				439+80	439+80	
Latitude	Longitude	Latitude	Longitude					
33.96811	81.20348	33.96511	81.21171					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	18"	88'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
			None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-26WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				439+80	439+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection revealed a hole at 6' from median catch basin. Pipe end is damaged/broken. Damage appears to be from mowing operations. No other structural issues identified.

**Recommendations:** Replace broken pipe within the median.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-27

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				444+80	444+80	
Latitude	Longitude	Latitude	Longitude					
33.96424	81.21307	33.96461	81.21325					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	30"	144'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	None	X	Other				
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap	X	Stone				
		None	X	Other				
				None	X			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-27

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				444+80	444+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection not completed, pipe not accessible. Dense vegetation on the downstream end.

**Recommendation:** Clean outfall to R/W. Clean existing pipe and inspect prior to acceptance.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-28EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				450+80	450+80	
Latitude	Longitude	Latitude	Longitude					
33.96358	81.21501	33.96378	81.21498					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed	X	Median		Median	Other		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	74'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-28EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				450+80	450+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-28WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				450+80	450+80
Latitude	Longitude	Latitude	Longitude				
33.96378	81.21498	33.96424	81.21491				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	24"	168'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin			None	X	Other		
				None		X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-28WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				450+80	450+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Some debris and vegetation at the outfall. Minor erosion.

**Recommendation:** Clean outfall approximately 50 feet. Add rip-rap to pipe outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-29EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				461+00	461+00	
Latitude	Longitude	Latitude	Longitude					
33.96254	81.21807	33.96275	81.21804					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream		
	Skewed	X	Median		Median	X	Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	74'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	X	Rip Rap	Stone				
	Catch Basin	None		X	Other			
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	X	None	X	Other			
				None	X			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-29EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				461+00	461+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Pipe inlet partially blocked by sediment build-up.

**Recommendation:** Clean existing pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-29WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				461+00	461+00
Latitude	Longitude	Latitude	Longitude				
33.96275	81.21804	33.96299	81.21799				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	24"	88'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin			None	X	Other		
				None		X	
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-29WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				461+00	461+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Minor erosion at the pipe outfall.

**Recommendation:** Retain pipe and place rip-rap outfall protection.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-30EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				472+40	472+40	
Latitude	Longitude	Latitude	Longitude					
34.06387	81.22151	33.96155	81.22158					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other	X	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	30"	68'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-30EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				472+40	472+40		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour	X	Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Dense vegetation and scour around the pipe inlet.

**Recommendation:** Remove vegetation from pipe inlet. Repair scoured areas and add rip-rap for pipe end treatment.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-30WB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				472+40	472+40	
Latitude	Longitude	Latitude	Longitude					
33.96155	81.22158	33.96194	81.22172					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)				<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	30"	150'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	None	X	Other				
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap	X	Stone				
	Catch Basin	None		Other				
				None	X			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-30WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				472+40	472+40		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	50% Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Some debris encountered on downstream end of the pipe. No structural issues identified. Pipe outlet is silted up blocking approximately 50% of pipe. Some erosion downstream.

**Recommendation:** Clean existing pipe and outfall to R/W. Add rip-rap outlet protection.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-31EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				494+75	494+75	
Latitude	Longitude	Latitude	Longitude					
33.95900	81.22829	33.95923	81.22841					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)				<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream		
	Skewed		Median		Median	Other	X	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	90'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				



# Culvert Assessment Form

Pipe Label: I-20-31EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				494+75	494+75		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated	X		X
Scour		Scour		Scour			

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrosion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Several separated joints identified by video pipe inspection at 20', 22.5', and 80' from median catch basin.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-31WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		BMP	EMP
Inlet			Outlet			494+75	494+75
Latitude	Longitude	Latitude	Longitude				
33.95923	81.22841	33.95950	81.22854				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			Purpose:		
Orientation:	Transverse	X	Inlet Position:		Outlet Position:		Constructed Ditch
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median		X	Median	Other
<b><u>BARREL</u></b>							
Material:		# Barrels:	1	Area:		Length:	Shape:
CAP				Diameter	24"	100'	Circle
CMP				Width			Ellipse
RCP	X			Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
Materials:		Area:		Notes:			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
Pipe End Type:		Inlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin	X	None		X	Other		
				None	X		
<b><u>OUTLET</u></b>							
Pipe End Type:		Outlet End Treatment Type:		Apron:			
Beveled		Head Wall		Concrete	X		
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None		X	Other		
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-31WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				494+75	494+75		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated			
Scour		Scour		Scour			

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No Structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

## S.C. Route 6 Interchange to End Project

# Culvert Inventory Form

Pipe Label: I-20-32

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				508+20	508+20
Latitude	Longitude	Latitude	Longitude				
33.95766	81.23243	33.95808	81.23264				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X
	Longitudinal		Shoulder	X	Shoulder	Erosion	Natural Stream
	Skewed		Median		Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	137'	Circle	
	CMP			Width	4'	Ellipse	
	RCP	X		Height	4'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		Rip Rap placed around the headwall and wingwalls.	
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap	X	Stone			
	Catch Basin	None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		Rip Rap placed around the headwall and wingwalls.	
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap	X	Stone			
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-32

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				508+20	508+20		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comment:** Video pipe inspection not provided. Small crack on wingwall on outlet end of culvert. Cracking is minor and outside of roadway. Vegetation is minor and scour around culvert is protected with rip-rap on downstream end. Heavy vegetation and scour around inlet side.

**Recommendation:** Retain culvert. Grout cracking on downstream wingwall. Remove vegetation and fill scour holes around wingwalls, protect with rip-rap.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-33

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				527+77	527+77
Latitude	Longitude	Latitude	Longitude				
33.95766	81.23243	33.95808	81.23264				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream
	Skewed		Median		Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	30"	176'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-33

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				527+77	527+77		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X
Separated		Separated		Separated		Blocked	X
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X
Separated		Separated		Separated		Blocked	X
Scour		Scour		Scour	X	Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No video inspection information provided. Pipe outlet is surrounded with heavy vegetation and downed trees. Erosion and scour upstream and downstream of pipe.

**Recommendation:** Clean outfall ditch approximately 100 feet downstream of pipe. Clean existing pipe and inspect. Place rip-rap outlet protection and pipe end treatment on both inlet and outlet.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-34 on WB from offsite

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				546+25	546+25
Latitude	Longitude	Latitude	Longitude				
33.95305	81.24334	33.95282	81.24327				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream X	
	Skewed	Median		Median		Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	86'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-34 on WB from offsite

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				546+25	546+25		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-35EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				546+25	546+25	
Latitude	Longitude	Latitude	Longitude					
33.95260	81.24320	33.95226	81.24309					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)				<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream	
	Skewed		Median	X	Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	24"	120'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin		None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-35EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				546+25	546+25		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No issues found. Sedimentation and vegetation downstream.

**Recommendation:** Clean outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-35WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				546+25	546+25
Latitude	Longitude	Latitude	Longitude				
33.95282	81.24327	33.95260	81.24320				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder	X	Shoulder	Natural Stream	
	Skewed		Median		Median	X	Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	78'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
					None		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-35WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				546+25	546+25		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-36EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				556+12	556+12
Latitude	Longitude	Latitude	Longitude				
33.95113	81.24591	33.95079	81.24586				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other <input checked="" type="checkbox"/>
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	124'	Circle <input checked="" type="checkbox"/>
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap	X	Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-36EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				556+12	556+12		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Outfall is full of sediment.

**Recommendation:** Clean outfall ditch to R/W line. Reseed shoulders and fill slopes to minimize sediment loading to ditch. Add riprap outlet protection at pipe outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-37

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				564+10	564+10	
Latitude	Longitude	Latitude	Longitude					
33.95013	81.24826	33.94971	81.24795					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream	
	Skewed		Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	36"	180'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
	Catch Basin	X	None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin		None	X	Other			
					None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-37

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				564+10	564+10		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection not completed due to debris in pipe. Heavy vegetation at pipe outlet, with sediment blocking about 40% of pipe.

**Recommendation:** Clean pipe and inspect. Clean outfall ditch to R/W.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-38

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				576+67	576+67	
Latitude	Longitude	Latitude	Longitude					
33.94791	81.25123	33.94822	81.25194					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	X	
	Longitudinal		Shoulder	X	Shoulder	X	Natural Stream	
	Skewed	X	Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	36"	248'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>	<b>Notes:</b>					
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>	<b>Apron:</b>					
	Beveled	Head Wall	Concrete					
	Flared	Wing Wall	Asphalt					
	Flat	Rip Rap	Stone					
		None	X	Other				
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>	<b>Apron:</b>					
	Beveled	Head Wall	Concrete					
	Flared	Wing Wall	Asphalt					
	Flat	Rip Rap	Stone					
		None	X	Other				
				None	X			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-38

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				576+67	576+67		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	X
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection not completed due to debris in pipe. Some minor damage to upstream end of pipe, appears to be from mowing operations.

**Recommendation:** Clean pipe and outfall ditch.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-39WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/11/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				583+39	583+39
Latitude	Longitude	Latitude	Longitude				
33.94791	81.25123	33.94822	81.25194				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	172'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin			None	X	Other		
				None		X	
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-39WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/11/2015	
				583+39	583+39		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Hole located at 105' from median catch basin. Hole is located in the middle of the outside westbound lane. No other structural issues found.

**Recommendation:** Line pipe. Clean outfall ditch approximately 50 feet.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-40

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				598+75	598+75	
Latitude	Longitude	Latitude	Longitude					
33.94459	81.25742	33.94490	81.25793					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X	
	Skewed	X	Median	Median		Other		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	30"	192'	Circle	X
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
	CMP		Diameter					
	Concrete		Width					
	Fiberglass		Height					
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat	X	Rip Rap		Stone			
			None	X	Other			
					None	X		
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	X	Head Wall		Concrete			
	Flared		Wing Wall		Asphalt			
	Flat		Rip Rap		Stone			
			None	X	Other			
					None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-40

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				598+75	598+75		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	X Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** No video pipe inspection completed. Pipe inlet/outlet blocked by sediment and vegetation.

**Recommendation:** Clean pipe and outfall ditch within R/W. Clear heavy vegetation from inlet.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-41EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				619+05	619+05
Latitude	Longitude	Latitude	Longitude				
33.94171	81.26332	33.94138	81.26339				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	18"	124'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete	X	
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
	Catch Basin		None	X	Other		
					None		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-41EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				619+05	619+05		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection showed a chip in the pipe at 38' from the median catch basin and deformation of the pipe at 61'. A joint offset was also identified at 103'. The joint offset is located within the roadway fill slope. The chip is located under the inside EB lane and the deformation is located under the outside EB lane.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-42WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		BMP	EMP
<b>Inlet</b>		<b>Outlet</b>				623+15	623+15
Latitude	Longitude	Latitude	Longitude				
33.94111	81.26443	33.94124	81.26477				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder	X	Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	124'	Circle
CMP				Width			Ellipse
RCP	X			Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin	X	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete	X		
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None	X	Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-42WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				623+15	623+15		

**INLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues identified in video pipe inspection.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-43

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				627+50	629+00
Latitude	Longitude	Latitude	Longitude				
33.94021	81.26610	33.94026	81.26551				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder	X	Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	188'	Circle
CMP				Width			Ellipse
RCP	X			Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin	X	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete	X		
Flared		Wing Wall		Asphalt			
Flat	X	Rip Rap		Stone			
Catch Basin		None	X	Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-43

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				627+50	629+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

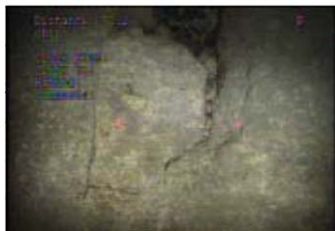
**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked	X	Sediment		Piping			

**Comments:** A chip was identified in the video pipe inspection at 71' from the median catch basin, or under the inside EB lane. Recommend lining pipe.



**Recommendation:** Line pipe.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-44

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				624+15	624+15
Latitude	Longitude	Latitude	Longitude				
33.94107	81.26511	33.94026	81.26551				
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	218'	Circle	
	CMP			Width	5'	Ellipse	
	RCP	X		Height	5'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
		None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	Rip Rap		Stone			
		None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-44

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				624+15	624+15		

## INLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

## OUTLET

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour	X	Corrsion	

## BARREL

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues found. Scour hole downstream of concrete apron. Bank armoring present downstream of culvert.

**Recommendation:** Retain culvert.

<u>Inspector Signature:</u>		<u>Inspector Name (Printed):</u>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-45EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				645+65	645+65
Latitude	Longitude	Latitude	Longitude				
33.93773	81.27068	33.93749	81.27061				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	30"	90'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin			None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-45EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				645+65	645+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe. Remove trees and heavy vegetation from pipe outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-45WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				645+65	645+65
Latitude	Longitude	Latitude	Longitude				
33.93804	81.27077	33.93773	81.27068				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	30"	120'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-45WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				645+65	645+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-46EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				653+25	653+25
Latitude	Longitude	Latitude	Longitude				
33.93659	81.27279	33.93630	81.27271				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)				<b>Purpose:</b>	
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	110'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		X	Head Wall	Concrete		X	
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		None		X	Other		
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-46EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				653+25	653+25		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-46WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				653+25	653+25
Latitude	Longitude	Latitude	Longitude				
33.93685	81.27286	33.93659	81.27279				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	100'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-46WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				653+25	653+25		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-47EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				659+52	659+52	
Latitude	Longitude	Latitude	Longitude					
33.93565	81.27451	33.93527	81.27438					
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder		Shoulder		X Natural Stream		
	Skewed	X	Median	X	Median	Other X		
<b><u>BARREL</u></b>								
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
CAP				Diameter	18"	144'	Circle X	
CMP				Width			Ellipse	
RCP		X		Height			Box	
HDPE							Other	
Masonry								
Mixed/Other								
<b><u>LINER</u></b>								
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>				
CMP		Diameter						
Concrete		Width						
Fiberglass		Height						
Plastic								
Other								
<b><u>INLET</u></b>								
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
Beveled		Head Wall		Concrete				
Flared		Wing Wall		Asphalt				
Flat		Rip Rap		Stone				
Catch Basin		X	None	X	Other			
				None	X			
<b><u>OUTLET</u></b>								
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
Beveled		Head Wall		Concrete				X
Flared		Wing Wall		Asphalt				
Flat		X	Rip Rap	Stone				
Catch Basin		None		X	Other			
				None				
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-47EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				659+52	659+52		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Pipe outlets to asphalt ditch that drains to the 5'x5' culvert at 667+00. Asphalt ditch has experienced undercutting and has failed immediately downstream of pipe outfall. Asphalt ditch flows into 30" pipe under adjacent frontage road.

**Recommendation:** Retain pipe. Reconstruct asphalt ditch downstream of pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-48

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				667+03	667+03
Latitude	Longitude	Latitude	Longitude				
33.93450	81.27656	33.93424	81.27631				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	18"	124'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
			None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap		Stone		
			None	X	Other		
					None	X	
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-48

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				667+03	667+03		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** *Small cracks along pipe near median.*

**Recommendation:** *Line pipe.*

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-49

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				667+20	667+20
Latitude	Longitude	Latitude	Longitude				
33.93468	81.27688	33.93427	81.27631				
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
CAP			Diameter	218'	Circle		
CMP			Width	5'	Ellipse		
RCP	X		Height	5'	Box		
HDPE					Other		
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall	X	Concrete	X		
Flared		Wing Wall	X	Asphalt			
Flat		Rip Rap		Stone			
		None		Other			
				None			
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall	X	Concrete	X		
Flared		Wing Wall	X	Asphalt			
Flat		Rip Rap		Stone			
		None		Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-49

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				667+20	667+20		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No apparent structural issues from field investigation.

**Recommendation:** Retain culvert.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-50EB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				688+50	688+50	
Latitude	Longitude	Latitude	Longitude					
33.93118	81.28242	33.93097	81.28208					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder		Shoulder		X Natural Stream		
	Skewed	X	Median	X	Median	Other X		
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	128'	Circle X	
	CMP			Width			Ellipse	
	RCP	X		Height			Box	
	HDPE						Other	
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	X	None	X	Other			
				None	X			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		Concrete				X
	Flared	Wing Wall		Asphalt				
	Flat	Rip Rap		Stone				
	Catch Basin	None		X	Other			
				None				
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-50EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				688+50	688+50		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Joint separation located 116' from median catch basin in fill slope.

**Recommendation:** Repair/replace last 12' of pipe at outfall.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-51

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				692+80	692+80	
Latitude	Longitude	Latitude	Longitude					
33.93468	81.27688	33.93427	81.27631					
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X	
	Longitudinal	Shoulder		X	Shoulder	X	Natural Stream	
	Skewed	X	Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	258'	Circle		
	CMP			Width	4'	Ellipse		
	RCP	X		Height	4'	Box		
	HDPE					Other		
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
		None			Other			
					None			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
		None			Other			
					None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-51

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				692+80	692+80		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion X
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No video pipe inspection provided. No apparent structural issues form field investigation. Culvert outlet has a significant drop from concrete apron to channel bottom (3-4 feet). Culvert outfalls immediatly to a 72" RCP under a dirt frontage road. Channel was dry at the time of field investigation.

**Recommendation:** Line outfall channel with riprap downstream of the culvert and upstream of the 72" RCP. Retain culvert.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-52

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				696+05	696+05
Latitude	Longitude	Latitude	Longitude				
33.93002	81.28447	33.92996	81.28395				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	160'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None			
				X			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin		None	X	Other		
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-52

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				696+05	696+05		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-53EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				713+00	713+00
Latitude	Longitude	Latitude	Longitude				
33.92740	81.28910	33.92707	81.28921				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	128'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin		None		X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-53EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				713+00	713+00		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-54WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				719+60	719+60
Latitude	Longitude	Latitude	Longitude				
33.92639	81.29089	33.92659	81.29115				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
	CAP			Diameter	18"	128'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>		
	CMP		Diameter				
	Concrete		Width				
	Fiberglass		Height				
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-54WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				719+60	719+60		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection revealed major cracking in pipe from 83' to 88' from the median catch basin as well as a hole at 75' from the median catch basin. Pipe carries runoff from median to a downstream drainage system.

**Recommendation:** Line pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-55EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				722+85	722+85
Latitude	Longitude	Latitude	Longitude				
33.92588	81.29129	33.92590	81.29178				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	110'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-55EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				722+85	722+85		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection revealed minor cracking in pipe at 40' from pipe end.

**Recommendation:** Recommend pipe lining.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-55WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				722+85	722+85
Latitude	Longitude	Latitude	Longitude				
33.92590	81.29178	33.92610	81.29207				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		X	Shoulder	Natural Stream	
	Skewed	X	Median		Median	X	Other
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	30"	110'	Circle
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-55WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				722+85	722+85		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** No structural issues found. Pipe is part of closed drainage system in interchange.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-56EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				729+40	729+40
Latitude	Longitude	Latitude	Longitude				
33.92498	81.29365	33.92467	81.29343				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other <input checked="" type="checkbox"/>
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	132'	Circle <input checked="" type="checkbox"/>
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat		Rip Rap		Stone		
	Catch Basin	X	None	X	Other		
					None	X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled		Head Wall		Concrete		
	Flared		Wing Wall		Asphalt		
	Flat	X	Rip Rap	X	Stone		
	Catch Basin		None		Other		
					None	X	
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-56EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				729+40	729+40		

**INLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Pipe blocked/full of debris, no video pipe inspection completed.

**Recommendation:** Clean existing pipe and inspect prior to acceptance.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-57WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				741+05	741+05
Latitude	Longitude	Latitude	Longitude				
33.92357	81.29711	33.92374	81.29739				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder	X	Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	106'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete	X		
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		X	Other		
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-57WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				741+05	741+05		
<b><u>INLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked	X	Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment		Joint Separation		Blocked	
Cracked	X	Sediment		Piping			
<p><b><u>Comments:</u></b> Pipe is cracked at 92' from median catch basin. Crack located outside of roadway pavement. Mower damage to pipe end. Repair/replace 16'.</p>							
<p><b><u>Recommendation:</u></b> Replace approximately 16' from pipe end. Retain remainder.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			



# Culvert Inventory Form

Pipe Label: I-20-58

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				745+45	745+45	
Latitude	Longitude	Latitude	Longitude					
33.92344	81.29829	33.92274	81.29865					
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>			
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder		X	Shoulder	X	Natural Stream	
	Skewed	X	Median		Median		Other	
<b><u>BARREL</u></b>								
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>		
	CAP			Diameter	275'	Circle		
	CMP			Width	5'	Ellipse		
	RCP	X		Height	5'	Box		
	HDPE					Other		
	Masonry							
	Mixed/Other							
<b><u>LINER</u></b>								
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>				
	CMP	Diameter						
	Concrete	Width						
	Fiberglass	Height						
	Plastic							
	Other							
<b><u>INLET</u></b>								
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin	None			Other			
					None			
<b><u>OUTLET</u></b>								
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
	Beveled	Head Wall		X	Concrete			X
	Flared	Wing Wall		X	Asphalt			
	Flat	X	Rip Rap		Stone			
	Catch Basin	None			Other			
					None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-58

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				745+45	745+45		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour	X	Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour	X	Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection not provided. Minor scour at the upstream end of the culvert. Large scour hole downstream of culvert apron. No apparent structural issues from field investigation.

**Recommendation:** Retain culvert. Provide rip-rap outlet protection downstream of concrete apron.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-59EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				747+98	747+98
Latitude	Longitude	Latitude	Longitude				
33.92287	81.29923	33.92256	81.29918				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	110'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	X	Wing Wall	Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None		X	Other		
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-59EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				747+98	747+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour	X	Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed a major joint separation at 100 feet from the median catch basin. Joint separation appears to be the last joint of the pipe at the outfall.

**Recommendation:** Replace 8'-12' of pipe at outfall and provide outlet and pipe end protection to address scour around the pipe end. Retain remainder of pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-60EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				751+98	751+98
Latitude	Longitude	Latitude	Longitude				
33.92247	81.30046	33.92218	81.30049				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	106'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete		X	
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		X	Other		
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-60EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				751+98	751+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-61

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Culvert	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				754+85	754+85
Latitude	Longitude	Latitude	Longitude				
33.92241	81.30155	33.92195	81.30115				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder	X	Shoulder	X	Natural Stream	X
	Skewed	X	Median	Median		Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	206'	Circle	
	CMP			Width	8'	Ellipse	
	RCP	X		Height	8'	Box	X
	HDPE					Other	
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>		Riprap around wingwalls and headwall.	
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap	X	Stone		
	Catch Basin	None		Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>		Riprap around wingwalls and headwall.	
	Beveled	Head Wall	X	Concrete	X		
	Flared	Wing Wall	X	Asphalt			
	Flat	X	Rip Rap		Stone		
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-611-20-61

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				754+85	754+85		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection not provided. No apparent structural issues.

**Recommendation:** Some debris/downed trees present at the end of the culvert. Clean outfall ditch approximately 50 feet.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-62EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				759+45	759+45
Latitude	Longitude	Latitude	Longitude				
33.92173	81.30276	33.92150	81.30238				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	18"	140'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None		X	
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete		X	
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	Stone			
Catch Basin		None		X	Other		
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-62EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				759+45	759+45		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	X
Cracked	X	Sediment		Piping			

**Comments:** Video pipe inspection revealed cracks and debris in pipe.

**Recommendation:** Clean existing pipe and line.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-63WB

District	Work County	Date	Type	Route #	Aux	Mile Point		
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>	
<b>Inlet</b>		<b>Outlet</b>				763+98	763+98	
Latitude	Longitude	Latitude	Longitude					
33.92129	81.30415	33.92174	81.30381					
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)		<b>Purpose:</b>				
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch		
	Longitudinal	Shoulder		Shoulder		X Natural Stream		
	Skewed	X	Median	X	Median	Other X		
<b><u>BARREL</u></b>								
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>	
CAP				Diameter	18"	194'	Circle X	
CMP				Width			Ellipse	
RCP		X		Height			Box	
HDPE							Other	
Masonry								
Mixed/Other								
<b><u>LINER</u></b>								
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>				
CMP		Diameter						
Concrete		Width						
Fiberglass		Height						
Plastic								
Other								
<b><u>INLET</u></b>								
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>				
Beveled		Head Wall		Concrete				
Flared		Wing Wall		Asphalt				
Flat		Rip Rap		Stone				
Catch Basin		X	None	Other				
				None				
<b><u>OUTLET</u></b>								
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>				
Beveled		Head Wall		Concrete				X
Flared		Wing Wall		Asphalt				
Flat		X	Rip Rap	Stone				
Catch Basin			None	X	Other			
				None				
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>				
1				1				
2				2				

# Culvert Assessment Form

Pipe Label: I-20-63WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				763+98	763+98		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation	X	Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed joint offset in pipe located outside of the roadway pavement area at 160' from median catch basin. Joint offset appears minor and is located approximately 25' off of the edge of the paved shoulder. Pipe outfalls to concrete ditch.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-64

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				776+44	776+44
Latitude	Longitude	Latitude	Longitude				
33.92005	81.30799	33.91976	81.30797				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	103'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete		X	
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin	None		X	Other		
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-64

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				776+44	776+44		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues. Pipe outlets to concrete ditch in stable condition.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-65EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				780+65	780+65
Latitude	Longitude	Latitude	Longitude				
33.91954	81.30959	33.91924	81.30933				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	36"	132'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	X	Stone		
Catch Basin		None		Other			
				None			
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-65EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				780+65	780+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues. Grouted rip-rap along outfall ditch to R/W. Paved asphalt ditch downstream of R/W.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



# Culvert Inventory Form

Pipe Label: I-20-65WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				780+65	780+65
Latitude	Longitude	Latitude	Longitude				
33.91954	81.30959	33.91954	81.30959				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	
	Longitudinal	Shoulder		Shoulder		X Natural Stream	
	Skewed	X	Median	X	Median	Other X	
<b><u>BARREL</u></b>							
<b>Material:</b>		<b># Barrels:</b>	1	<b>Area:</b>		<b>Length:</b>	<b>Shape:</b>
CAP				Diameter	36"	132'	Circle X
CMP				Width			Ellipse
RCP		X		Height			Box
HDPE							Other
Masonry							
Mixed/Other							
<b><u>LINER</u></b>							
<b>Materials:</b>		<b>Area:</b>		<b>Notes:</b>			
CMP		Diameter					
Concrete		Width					
Fiberglass		Height					
Plastic							
Other							
<b><u>INLET</u></b>							
<b>Pipe End Type:</b>		<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		X	Rip Rap	X	Stone		
Catch Basin		None		Other			
				None	X		
<b><u>OUTLET</u></b>							
<b>Pipe End Type:</b>		<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
Beveled		Head Wall		Concrete			
Flared		Wing Wall		Asphalt			
Flat		Rip Rap		Stone			
Catch Basin		X	None	X	Other		
				None	X		
<b>Inspector Signature:</b>				<b>Inspector Name (Printed):</b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-65WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				780+65	780+65		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues.

**Recommendation:** Retain pipe.

<b>Inspector Signature:</b>		<b>Inspector Name (Printed):</b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-66EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				788+16	788+16
Latitude	Longitude	Latitude	Longitude				
33.91889	81.31147	33.91860	81.31144				
Fill Height > 15' (check if yes)	X	Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other <input checked="" type="checkbox"/>
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	112'	Circle <input checked="" type="checkbox"/>
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None		Other			
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-66EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				788+16	788+16		
<b><u>INLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>OUTLET</u></b>							
<b>Headwall</b>		<b>Apron</b>		<b>End Section</b>			
Cracked		Cracked		Cracked		Vegetation	X Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	
<b><u>BARREL</u></b>							
Corrosion		Alignment	X	Joint Separation		Blocked	
Cracked		Sediment		Piping			
<p><b><u>Comments:</u></b> Video pipe inspection revealed deformation of the pipe at 58 feet from the median catch basin and root infiltration in the joint at 91 feet. No other structural issues. Deformation is located under outside EB lane.</p>							
<p><b><u>Recommendation:</u></b> Clean pipe and line from median to outlet. Clean outfall ditch approximately 100 feet.</p>							
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Inventory Form

Pipe Label: I-20-66WB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/12/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				788+16	788+16
Latitude	Longitude	Latitude	Longitude				
33.91918	81.31184	33.91889	81.31147				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	X	<b>Inlet Position:</b>		<b>Outlet Position:</b>	Constructed Ditch	
	Longitudinal		Shoulder		Shoulder	X	Natural Stream
	Skewed		Median	X	Median		Other X
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	24"	90'	Circle X
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	None	X	Other			
				None	X		
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-66WB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/12/2015	
				788+16	788+16		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	

# Culvert Inventory Form

Pipe Label: I-20-67EB

District	Work County	Date	Type	Route #	Aux	Mile Point	
1	Lexington	8/13/2015	Pipe	I-20		<b>BMP</b>	<b>EMP</b>
<b>Inlet</b>		<b>Outlet</b>				794+45	794+45
Latitude	Longitude	Latitude	Longitude				
33.91820	81.31349	33.91798	81.31314				
Fill Height > 15' (check if yes)		Pipe Accepted w/remediation (check if yes)			<b>Purpose:</b>		
<b>Orientation:</b>	Transverse	<b>Inlet Position:</b>		<b>Outlet Position:</b>		Constructed Ditch	X
	Longitudinal	Shoulder		Shoulder		Natural Stream	
	Skewed	X	Median	X	Median	Other	
<b><u>BARREL</u></b>							
	<b>Material:</b>	<b># Barrels:</b>	1	<b>Area:</b>	<b>Length:</b>	<b>Shape:</b>	
	CAP			Diameter	18"	128'	Circle
	CMP			Width			Ellipse
	RCP	X		Height			Box
	HDPE						Other
	Masonry						
	Mixed/Other						
<b><u>LINER</u></b>							
	<b>Materials:</b>	<b>Area:</b>		<b>Notes:</b>			
	CMP	Diameter					
	Concrete	Width					
	Fiberglass	Height					
	Plastic						
	Other						
<b><u>INLET</u></b>							
	<b>Pipe End Type:</b>	<b>Inlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete			
	Flared	Wing Wall		Asphalt			
	Flat	Rip Rap		Stone			
	Catch Basin	X	None	Other			
				None			
<b><u>OUTLET</u></b>							
	<b>Pipe End Type:</b>	<b>Outlet End Treatment Type:</b>		<b>Apron:</b>			
	Beveled	Head Wall		Concrete		X	
	Flared	Wing Wall		Asphalt			
	Flat	X	Rip Rap	Stone			
	Catch Basin		None	X	Other		
				None			
<b><u>Inspector Signature:</u></b>				<b><u>Inspector Name (Printed):</u></b>			
1				1			
2				2			

# Culvert Assessment Form

Pipe Label: I-20-67EB

Work County	Type	Route	Aux	Mile Point		Date	Asset #
Lexington		I-20		BMP	EMP	8/13/2015	
				794+45	794+45		

**INLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked		Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**OUTLET**

Headwall		Apron		End Section			
Cracked		Cracked		Cracked	X	Vegetation	Alignment
Separated		Separated		Separated		Blocked	Erosion
Scour		Scour		Scour		Corrsion	

**BARREL**

Corrosion		Alignment		Joint Separation		Blocked	
Cracked		Sediment		Piping			

**Comments:** Video pipe inspection revealed no structural issues. Pipe outfalls to concrete ditch. Minor damage to pipe end from mowing operations.

**Recommendation:** Retain pipe.

<b><u>Inspector Signature:</u></b>		<b><u>Inspector Name (Printed):</u></b>	
1		1	
2		2	



## 5.2 I-20 Video Inspection Report