

*Stormwater Impact Analysis*

**Scooter's Rolesville  
306 South Main St.**

Rolesville, North Carolina  
KHA Project ID No. 016485000

Prepared for:  
S&S Java Enterprises  
Submitted: February 2024

STORMWATER IMPACT ANALYSIS

SCOOTER'S ROLESVILLE  
306 SOUTH MAIN STREET  
ROLESVILLE, NORTH CAROLINA 27571

PREPARED FOR:

S&S JAVA ENTERPRISES  
13 LAFOY DRIVE  
CLAYTON, NORTH CAROLINA 27527

PREPARED BY:

KIMLEY-HORN AND ASSOCIATES, INC.  
421 FAYETTEVILLE STREET, SUITE 600  
RALEIGH, NORTH CAROLINA 27601  
NC CERT. OF AUTH: F-0102

SUBMITTED: FEBRUARY 2024



KHA #016485000

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## OVERVIEW

This report contains the approach and results of a stormwater impact analysis conducted for the proposed Scooter's Rolesville project. The project site consists of the parcel located at 306 South Main Street in Rolesville, North Carolina. The parcel is currently vacant. The stormwater study area encompasses approximately 0.70 acres.

From the NRCS Soil Survey, the near surface soils are classified as 100% Urban Land. Ground cover was assumed to be in good condition for both the pre- and post-development calculations.

The property is not within a defined floodplain area and is not identified under a special flood hazard per FEMA FIRM presented within Appendix A. Per the USGS Quadrangle Map (Appendix B) there is not a "blue line" stream present. There are no streams and wetlands onsite.

### Proposed Development

This project proposes the development of a coffee shop and associated infrastructure. The proposed development increases the existing impervious coverage in the study area from 0.00 acres to 0.43 acres. Due to the increase in impervious area, detention and water quality treatment are required.

### Stormwater Analysis

Stormwater management measures shall be designed in accordance with the Town of Rolesville, Wake County, and NCDEQ Stormwater Guidelines. Per the Town of Rolesville stormwater quantity requirements, the post-development stormwater runoff rate leaving the site shall not exceed pre-development conditions for the local 1-year, 24-hour storm events.

Per the Town of Rolesville stormwater quality requirements, all development projects required to manage storm water shall provide permanent on-site BMPs to lower the nitrogen export amounts. The code further states the measures shall control and treat runoff from the first inch of rain with a runoff volume drawdown time between 48 and 120 hours.

### Water Quantity

A single point of analysis (POA-1) encompasses the impacted site area. The flow rate at the point of analysis was evaluated using the SCS Method. The calculations for POA-1 indicate that the post-development peak runoff rates will exceed pre-development rates for the 1-year 24-hour storm event, therefore detention is required. The time of concentration was assumed to be 5 minutes for the pre-development condition due to the small site area. Post-development areas were assumed to have a time of concentration of 5 minutes. See below for flow summary to POA-1.

Pre-Development 1 year flow- 1.27 cfs      Post Development 1 year flow- 1.20 cfs

Pre-Development 10 year flow- 3.20 cfs      Post Development 10 year flow- 3.78 cfs

Pre-Development 25 year flow – 4.10 cfs      Post Development 25 year flow- 4.61 cfs

Pre-Development 100-year flow- 5.59 cfs      Post Development 100 year flow- 5.91 cfs

### Water Quality

The one (1) proposed wet detention basin will be used as a water quality BMP, treating the 1-inch storm. The proposed BMP is in accordance with the NCDEQ Design Manual. Refer to Appendix E for stormwater quality calculations.

### Conclusion

The calculations indicate that the proposed development will comply with local and state stormwater requirements. To meet Town of Rolesville stormwater quantity requirements, this site will incorporate one wet pond for detention. The proposed wet pond will also be utilized as a water quality BMP. Water quality regulation measures are required based on the increase in impervious area to the proposed development.

# **APPENDIX A**



PROJECT SITE

### FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://FRIS.NC.GOV/FRIS](https://fris.nc.gov/fris)  
[HTTPS://MSCS.FEMA.GOV](https://MSCS.FEMA.GOV)

- SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) Zone X, A99
  - With BFE or Depth Zone AE, AO, AH, VE, AR
  - Regulatory Floodway
  - 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile Zone X
  - Future Conditions 1% Annual Chance Flood Hazard Zone X
  - Area with Reduced Flood Risk due to Levee See Notes Zone X
- OTHER AREAS OF FLOOD HAZARD**
  - Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
  - Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
  - Coastal Transect
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
  - Limit of Study
  - Jurisdiction Boundary
- GENERAL STRUCTURES**
- OTHER FEATURES**

### NOTES TO USERS

For information and questions about this map, available products associated with the FIRM including historic versions of the FIRMA, flow order products or the National Flood Insurance Program in general, please call the FEMA Map Information Exchange at 1-877-FEMA-MAP (1-877-368-2627) or visit the FEMA Map Service Center website at <https://www.fema.gov>. An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at <https://fris.nc.gov/fris> or contact the FEMA Map Service Center.

Communities desiring land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Map Service Center of the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-358-0623.

Flood Insurance Study (FIS) means an examination, evaluation, and determination of flood hazards, corresponding water surface elevations, flood hazard risk zones, and other flood data in a community issued by the North Carolina Floodplain Mapping Program (NCFMP). The Flood Insurance Study (FIS) is composed of the following products used together: the Digital Flood Hazard Database, the Water Surface Elevation Features, the digitally derived unsegmented Flood Insurance Rate Map and the Flood Insurance Survey Report. A Flood Insurance Survey is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. This report contains detailed flood elevation data, data tables and FIRM indices. When a Flood Study is completed for the NCFMP, the digital information, reports and maps are assembled into an FIS. Information shown on the FIS is provided in digital format by the NCFMP. Base map information shown on this FIS was provided in digital format by the NCFMP. The source of this information can be determined from the metadata available in the Digital Flood Database and the Technical Support Data Notebook (TSND).

**ACCREDITED LEVEE NOTES TO USERS:** If an accredited levee note appears on this panel (check with your local community to obtain more information, such as the estimated level of protection provided which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residential areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <https://www.fema.gov/national-flood-insurance-program>.

**PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS:** If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.13 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicate the levee system does not comply with Section 65.13 requirements, FEMA will remove the flood hazard area contribution to the risk in the related documentation of the levee system. To mitigate flood risk in residential areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <https://www.fema.gov/national-flood-insurance-program>.

**LIMIT OF MODERATE WAVE ACTION NOTES TO USERS:** For some coastal flooding zones the AE Zone category has been divided by a Limit of Moderate Wave Action (LIMWA). The LIMWA represents the approximate landward limit of the 1-foot limiting wave. The effects of wave heights between the VE Zone and the LIMWA (or between the LIMWA and the LOMA) for areas where VE zones are not identified, will be similar to, but less severe than those in the VE Zone.

### SCALE

Map Projection: North Carolina State Plane Projection Feet (Zone 3200)  
 Datum: NAD 1983 (Horizontal), NAD 1983 (Vertical)

1 inch = 500 feet 1:6,000

### PANEL LOCATOR

### NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM

### NATIONAL FLOOD INSURANCE PROGRAM

### FLOOD INSURANCE RATE MAP

## NORTH CAROLINA

PANEL 1758

Panel Contains:

COMMUNITY	CID	PANEL SUFFIX
ROLESVILLE, TOWN OF	370468	1758 K
WAKE COUNTY	370556	1758 K

**FEMA** National Flood Insurance Program

VERSION NUMBER 2.3.3.2  
 MAP NUMBER 3720175800K  
 MAP REVISED July 19, 2022

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long-term agreement for floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map flood hazard areas of the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.





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[HTTPS://FRIS.NC.GOV/FRIS](https://fris.nc.gov/fris)  
[HTTPS://MSC.FEMA.GOV](https://MSC.FEMA.GOV)

- SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) Zone AE, AD, AH, VE, AR
  - With BFE or Depth Zone AE, AD, AH, VE, AR
  - Regulatory Floodway
  - 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile Zone X
  - Future Conditions 1% Annual Chance Flood Hazard Zone X
  - Area with Reduced Flood Risk due to Levee See Notes Zone X
- OTHER AREAS OF FLOOD HAZARD**
  - Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
  - Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
  - Coastal Transect
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
  - Limit of Study
  - Jurisdiction Boundary
- OTHER FEATURES**

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To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-639-8620.

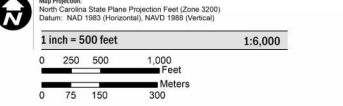
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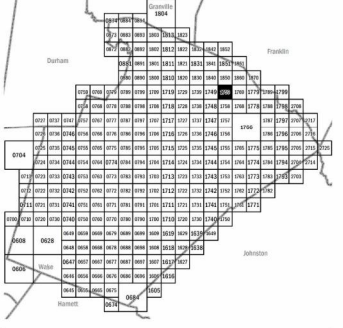
**PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS:** If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided which may exceed the 1-percent-annual-chance level and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.15 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicates the levee system does not comply with Section 65.15 requirements, FEMA will remove the flood hazard and the information for this area is related to the determination of the levee system. To mitigate flood risk in residential risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA website at <https://www.fema.gov>.

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**SCALE**



**PANEL LOCATOR**



**FEMA**  
**National Flood Insurance Program**

**NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM**  
**NATIONAL FLOOD INSURANCE PROGRAM**  
**FLOOD INSURANCE RATE MAP**  
**NORTH CAROLINA**

PANEL 1759

Panel Contains:

COMMUNITY	CID	PANEL SUFFIX
ROLETSVILLE TOWN OF	370468	1759 K
WAKE COUNTY	370588	1759 K
WAKE FOREST, TOWN OF	370244	1759 K

VERSION NUMBER  
**2.3.3.2**  
 MAP NUMBER  
**3720175900K**  
 MAP REVISED  
**July 19, 2022**

# **APPENDIX B**



# **APPENDIX C**



1 Mile  
5000 Feet

Scale 1:15840  
(Joins sheet 21)

0 1000 2000 3000 4000 5000



PROJECT SITE

(Joins sheet 31)

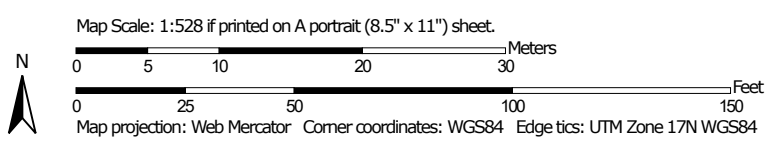
(Joins sheet 23)

LwB2 WmB2 Me ApC2 ApB2 Cm Me WkE Wo WkE

Soil Map—Wake County, North Carolina



Soil Map may not be valid at this scale.




## MAP LEGEND




















### Area of Interest (AOI)







Area of Interest (AOI)

### Soils


-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points

### Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


### Water Features

-  Streams and Canals

### Transportation

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

### Background

-  Aerial Photography

## MAP INFORMATION

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

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Wake County, North Carolina  
 Survey Area Data: Version 25, Oct 2, 2023

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

Date(s) aerial images were photographed: Apr 24, 2022—May 9, 2022

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.

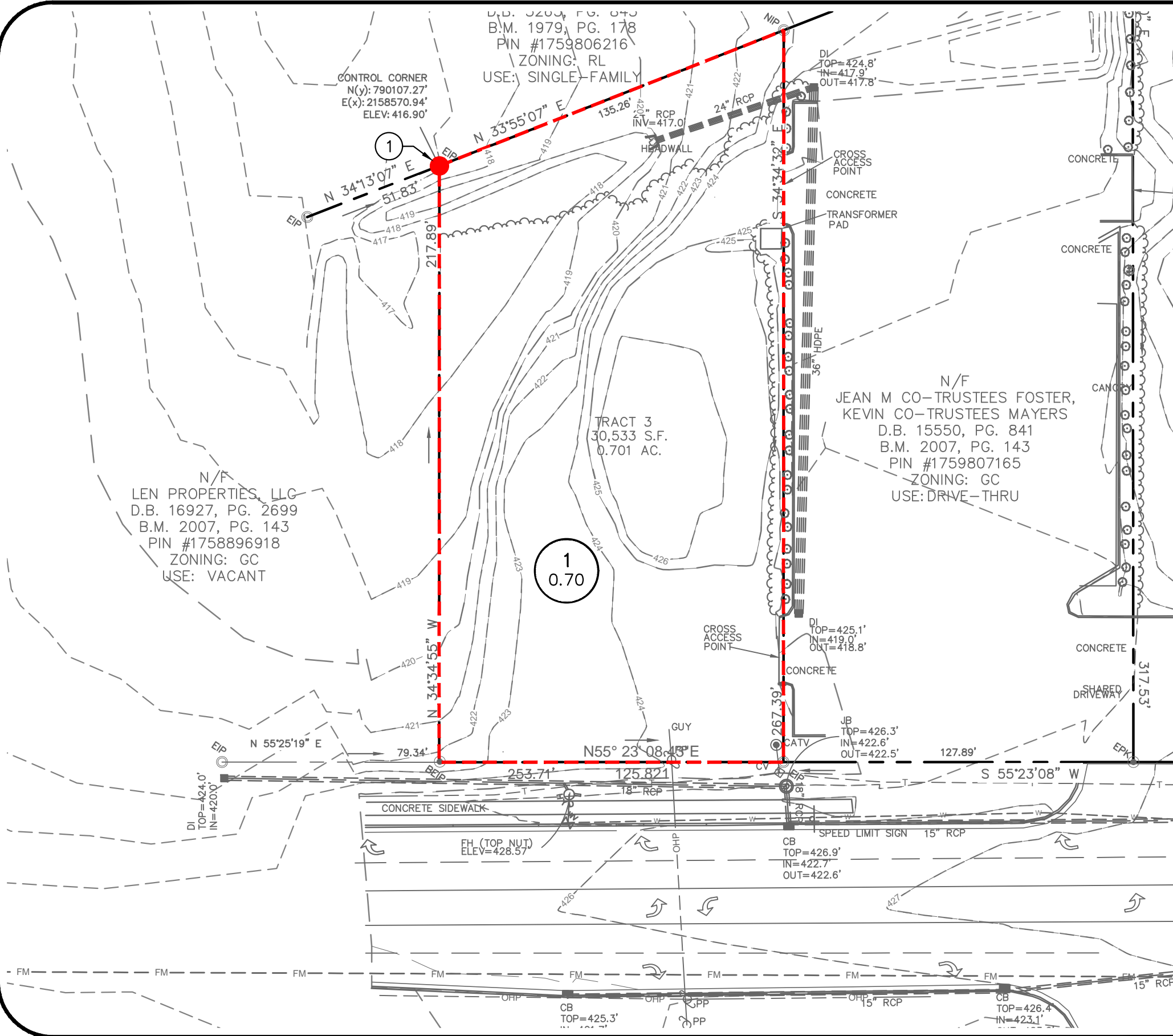
## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ur	Urban land	0.7	100.0%
<b>Totals for Area of Interest</b>		<b>0.7</b>	<b>100.0%</b>



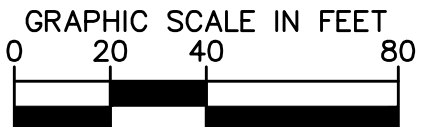
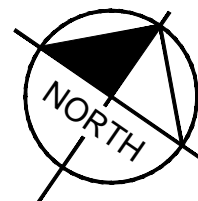
# **APPENDIX D**

# SCOOTERS ROLESVILLE



DRAINAGE AREA TABLE					
DRAINAGE AREA	PERVIOUS (AC)	IMPERVIOUS (AC)	TOTAL (AC)	T <sub>c</sub> (MIN)	OUTFALL NOTES
1	0.70	0.00	0.70	5.0	-
TOTAL	0.70	0.00	0.70		

**NOTES**  
 1. ASSUMED MINIMUM TIME OF CONCENTRATION = 5 MINUTES



## LEGEND

- - - - - DRAINAGE AREA OUTLINE
- - - - - PROPERTY LINE
- 3 POINT OF ANALYSIS
- X  
AC SUBAREA ID  
SUBAREA SIZE

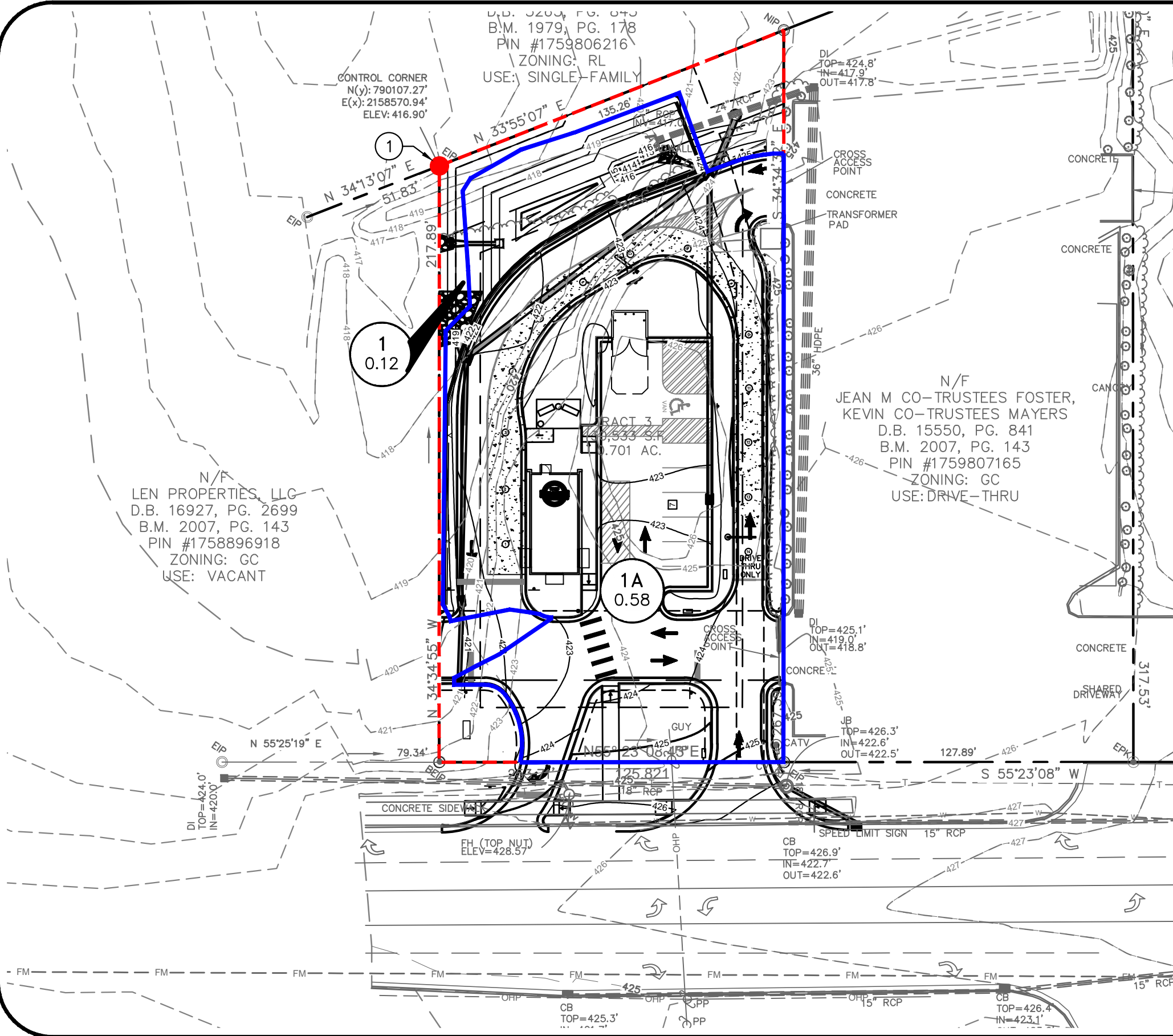
## PRE-DEVELOPMENT DRAINAGE AREA MAP

KHA PROJECT NO: 016485000  
 DATE: 02/26/2024



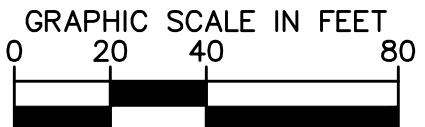
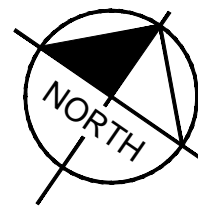
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 421 FAYETTEVILLE STREET, SUITE 600, RALEIGH, NC 27601  
 PHONE: 919-677-2000 FAX: 919-677-2050  
 WWW.KIMLEY-HORN.COM

# SCOOTERS ROLESVILLE



DRAINAGE AREA TABLE					
DRAINAGE AREA	PERVIOUS (AC)	IMPERVIOUS (AC)	TOTAL (AC)	T <sub>c</sub> (MIN)	OUTFALL NOTES
1	0.10	0.02	0.12	5.0	-
1A	0.17	0.41	0.58	5.0	
TOTAL	0.27	0.43	0.70		

**NOTES**  
 1. ASSUMED MINIMUM TIME OF CONCENTRATION = 5 MINUTES



## LEGEND

- - - - - DRAINAGE AREA OUTLINE
- DRAINAGE AREA OUTLINE
- - - - - PROPERTY LINE
- 3 POINT OF ANALYSIS
- X  
AC SUBAREA ID  
SUBAREA SIZE

## POST-DEVELOPMENT DRAINAGE AREA MAP

KHA PROJECT NO: 016485000  
 DATE: 02/26/2024



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 421 FAYETTEVILLE STREET, SUITE 600, RALEIGH, NC 27601  
 PHONE: 919-677-2000 FAX: 919-677-2050  
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# **APPENDIX E**

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)
PRE-POA 1 DA	1-year 24-hour	1	0.070	11.950	1.27
PRE-POA 1 DA	10 Year	10	0.176	11.900	3.20
PRE-POA 1 DA	25 Year	25	0.226	11.900	4.10
PRE-POA 1 DA	100 Year	100	0.310	11.900	5.59
POST-POA 1 BYPASS DA	1-year 24-hour	1	0.013	11.950	0.24
POST-POA 1 BYPASS DA	10 Year	10	0.032	11.900	0.58
POST-POA 1 BYPASS DA	25 Year	25	0.041	11.900	0.74
POST-POA 1 BYPASS DA	100 Year	100	0.056	11.900	0.99
POST-POA 1 DA	1-year 24-hour	1	0.102	11.900	1.83
POST-POA 1 DA	10 Year	10	0.205	11.900	3.53
POST-POA 1 DA	25 Year	25	0.250	11.900	4.27
POST-POA 1 DA	100 Year	100	0.325	11.900	5.47

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)
PRE- POA 1	1-year 24-hour	1	0.070	11.950	1.27
PRE- POA 1	10 Year	10	0.176	11.900	3.20
PRE- POA 1	25 Year	25	0.226	11.900	4.10
PRE- POA 1	100 Year	100	0.310	11.900	5.59
POST-POA 1	1-year 24-hour	1	0.078	12.050	1.20
POST-POA 1	10 Year	10	0.199	11.950	3.78
POST-POA 1	25 Year	25	0.253	11.950	4.61
POST-POA 1	100 Year	100	0.342	11.950	5.91

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
WET POND (IN)	1-year 24-hour	1	0.102	11.900	1.83	(N/A)	(N/A)
WET POND (OUT)	1-year 24-hour	1	0.064	12.050	1.05	418.16	0.048
WET POND (IN)	10 Year	10	0.205	11.900	3.53	(N/A)	(N/A)
WET POND (OUT)	10 Year	10	0.166	11.950	3.22	418.36	0.057

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
WET POND (IN)	25 Year	25	0.250	11.900	4.27	(N/A)	(N/A)
WET POND (OUT)	25 Year	25	0.212	11.950	3.90	418.41	0.060
WET POND (IN)	100 Year	100	0.325	11.900	5.47	(N/A)	(N/A)
WET POND (OUT)	100 Year	100	0.287	11.950	4.96	418.51	0.064



Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

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Time-Depth Curve: 10 Year

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Label	10 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

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CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.4
5.500	0.4	0.4	0.4	0.4	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.5	0.5	0.5	0.5
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.6	0.6	0.6	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.7
8.500	0.7	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.8	0.9	0.9	0.9
10.000	0.9	0.9	1.0	1.0	1.0
10.500	1.0	1.1	1.1	1.1	1.1
11.000	1.2	1.2	1.3	1.3	1.4
11.500	1.4	1.5	1.8	2.2	2.9
12.000	3.3	3.4	3.5	3.6	3.7
12.500	3.7	3.7	3.8	3.8	3.9
13.000	3.9	3.9	3.9	4.0	4.0
13.500	4.0	4.1	4.1	4.1	4.1
14.000	4.1	4.2	4.2	4.2	4.2
14.500	4.2	4.2	4.3	4.3	4.3
15.000	4.3	4.3	4.3	4.3	4.4
15.500	4.4	4.4	4.4	4.4	4.4
16.000	4.4	4.4	4.5	4.5	4.5
16.500	4.5	4.5	4.5	4.5	4.5
17.000	4.5	4.6	4.6	4.6	4.6

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.500	4.6	4.6	4.6	4.6	4.6
18.000	4.6	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.7	4.7	4.7
19.000	4.7	4.7	4.7	4.7	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.8	4.8	4.8
20.500	4.8	4.8	4.8	4.8	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	4.9	4.9
22.000	4.9	4.9	4.9	4.9	4.9
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.0	5.0
24.000	5.0	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

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Time-Depth Curve: 100 Year	
Label	100 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

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CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.3	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.4	0.4	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.5
5.500	0.5	0.6	0.6	0.6	0.6
6.000	0.6	0.6	0.6	0.6	0.7
6.500	0.7	0.7	0.7	0.7	0.7
7.000	0.7	0.8	0.8	0.8	0.8
7.500	0.8	0.8	0.9	0.9	0.9
8.000	0.9	0.9	0.9	1.0	1.0
8.500	1.0	1.0	1.0	1.1	1.1
9.000	1.1	1.1	1.2	1.2	1.2
9.500	1.2	1.3	1.3	1.3	1.3
10.000	1.4	1.4	1.4	1.5	1.5
10.500	1.5	1.6	1.6	1.7	1.7
11.000	1.8	1.8	1.9	2.0	2.1
11.500	2.1	2.3	2.7	3.3	4.3
12.000	5.0	5.2	5.3	5.4	5.5
12.500	5.6	5.6	5.7	5.7	5.8
13.000	5.8	5.9	5.9	6.0	6.0
13.500	6.0	6.1	6.1	6.1	6.2
14.000	6.2	6.2	6.3	6.3	6.3
14.500	6.3	6.4	6.4	6.4	6.4
15.000	6.5	6.5	6.5	6.5	6.5
15.500	6.6	6.6	6.6	6.6	6.6
16.000	6.7	6.7	6.7	6.7	6.7
16.500	6.7	6.8	6.8	6.8	6.8
17.000	6.8	6.8	6.8	6.9	6.9

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.500	6.9	6.9	6.9	6.9	6.9
18.000	7.0	7.0	7.0	7.0	7.0
18.500	7.0	7.0	7.1	7.1	7.1
19.000	7.1	7.1	7.1	7.1	7.1
19.500	7.1	7.2	7.2	7.2	7.2
20.000	7.2	7.2	7.2	7.2	7.2
20.500	7.2	7.3	7.3	7.3	7.3
21.000	7.3	7.3	7.3	7.3	7.3
21.500	7.3	7.3	7.4	7.4	7.4
22.000	7.4	7.4	7.4	7.4	7.4
22.500	7.4	7.4	7.4	7.5	7.5
23.000	7.5	7.5	7.5	7.5	7.5
23.500	7.5	7.5	7.5	7.5	7.6
24.000	7.6	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time-Depth Curve: 1-year 24- Hour	
Label	1-year 24- Hour
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.2
4.500	0.2	0.2	0.2	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.3	0.3	0.3	0.3	0.3
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.4	0.4	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.5	0.6	0.6
10.500	0.6	0.6	0.6	0.6	0.7
11.000	0.7	0.7	0.7	0.7	0.8
11.500	0.8	0.9	1.0	1.2	1.6
12.000	1.9	2.0	2.0	2.0	2.1
12.500	2.1	2.1	2.1	2.2	2.2
13.000	2.2	2.2	2.2	2.3	2.3
13.500	2.3	2.3	2.3	2.3	2.3
14.000	2.3	2.4	2.4	2.4	2.4
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.4	2.5	2.5	2.5
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5
16.500	2.5	2.6	2.6	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.500	2.6	2.6	2.6	2.6	2.6
18.000	2.6	2.6	2.6	2.6	2.7
18.500	2.7	2.7	2.7	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.8	2.8
21.000	2.8	2.8	2.8	2.8	2.8
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.9	2.9	2.9
24.000	2.9	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

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Time-Depth Curve: 25 Year	
Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

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CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.2	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.3	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.4	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.5	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.6	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.7	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.7	0.8	0.8
8.500	0.8	0.8	0.8	0.8	0.9
9.000	0.9	0.9	0.9	0.9	1.0
9.500	1.0	1.0	1.0	1.0	1.1
10.000	1.1	1.1	1.1	1.2	1.2
10.500	1.2	1.3	1.3	1.3	1.4
11.000	1.4	1.5	1.5	1.6	1.6
11.500	1.7	1.8	2.1	2.6	3.4
12.000	4.0	4.1	4.2	4.3	4.4
12.500	4.4	4.5	4.5	4.6	4.6
13.000	4.6	4.7	4.7	4.7	4.8
13.500	4.8	4.8	4.8	4.9	4.9
14.000	4.9	4.9	5.0	5.0	5.0
14.500	5.0	5.0	5.1	5.1	5.1
15.000	5.1	5.1	5.2	5.2	5.2
15.500	5.2	5.2	5.2	5.3	5.3
16.000	5.3	5.3	5.3	5.3	5.3
16.500	5.3	5.4	5.4	5.4	5.4
17.000	5.4	5.4	5.4	5.4	5.5

Subsection: Time-Depth Curve  
 Label: Rolesville  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

CUMULATIVE RAINFALL (in)  
 Output Time Increment = 0.100 hours  
 Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.500	5.5	5.5	5.5	5.5	5.5
18.000	5.5	5.5	5.5	5.6	5.6
18.500	5.6	5.6	5.6	5.6	5.6
19.000	5.6	5.6	5.6	5.7	5.7
19.500	5.7	5.7	5.7	5.7	5.7
20.000	5.7	5.7	5.7	5.7	5.7
20.500	5.8	5.8	5.8	5.8	5.8
21.000	5.8	5.8	5.8	5.8	5.8
21.500	5.8	5.8	5.8	5.8	5.9
22.000	5.9	5.9	5.9	5.9	5.9
22.500	5.9	5.9	5.9	5.9	5.9
23.000	5.9	5.9	5.9	6.0	6.0
23.500	6.0	6.0	6.0	6.0	6.0
24.000	6.0	(N/A)	(N/A)	(N/A)	(N/A)



Subsection: Time of Concentration Calculations  
Label: POST-POA 1 BYPASS DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

Time of Concentration Results

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Segment #1: User Defined Tc

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Time of Concentration	0.083 hours
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Time of Concentration (Composite)

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Time of Concentration (Composite)	0.083 hours
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Subsection: Time of Concentration Calculations  
Label: POST-POA 1 BYPASS DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

==== User Defined

Tc = Value entered by user  
Where: Tc= Time of concentration, hours

Subsection: Time of Concentration Calculations  
Label: POST-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

Time of Concentration Results

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Segment #1: User Defined Tc

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Time of Concentration	0.083 hours
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Time of Concentration (Composite)

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Time of Concentration (Composite)	0.083 hours
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Subsection: Time of Concentration Calculations  
Label: POST-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

==== User Defined

Tc = Value entered by user  
Where: Tc= Time of concentration, hours

Subsection: Time of Concentration Calculations  
Label: PRE-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

Time of Concentration Results

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Segment #1: User Defined Tc

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Time of Concentration	0.083 hours
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Time of Concentration (Composite)

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Time of Concentration (Composite)	0.083 hours
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Subsection: Time of Concentration Calculations  
Label: PRE-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

==== User Defined

Tc = Value entered by user  
Where: Tc= Time of concentration, hours

Subsection: Runoff CN-Area  
 Label: POST-POA 1 BYPASS DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft <sup>2</sup> )	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	871.200	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil D	80.000	4,356.000	0.0	0.0	80.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	5,227.200	(N/A)	(N/A)	83.000

Subsection: Runoff CN-Area  
 Label: POST-POA 1 DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft <sup>2</sup> )	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	17,859.600	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil D	80.000	7,405.200	0.0	0.0	80.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	25,264.800	(N/A)	(N/A)	92.724



Subsection: Runoff CN-Area  
 Label: PRE-POA 1 DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft <sup>2</sup> )	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil D	80.000	27,486.360	0.0	0.0	80.000
Woods - grass combination - poor - Soil D	86.000	3,005.640	0.0	0.0	86.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	30,492.000	(N/A)	(N/A)	80.591

Subsection: Unit Hydrograph Summary  
 Label: POST-POA 1 BYPASS DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Storm Event	1-year 24- Hour
Return Event	1 years
Duration	24.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	5,227.200 ft <sup>2</sup>

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	0.25 ft <sup>3</sup> /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	0.24 ft <sup>3</sup> /s

<b>Drainage Area</b>	
SCS CN (Composite)	83.000
Area (User Defined)	5,227.200 ft <sup>2</sup>
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	0.013 ac-ft

<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	0.013 ac-ft

<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.63 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: POST-POA 1 BYPASS DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

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SCS Unit Hydrograph Parameters

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Unit peak time, $T_p$	0.056 hours
Unit receding limb, $T_r$	0.222 hours
Total unit time, $T_b$	0.278 hours

---

Subsection: Unit Hydrograph Summary  
 Label: POST-POA 1 DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Storm Event	1-year 24- Hour
Return Event	1 years
Duration	24.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	25,264.800 ft <sup>2</sup>

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	1.88 ft <sup>3</sup> /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.900 hours
Flow (Peak Interpolated Output)	1.83 ft <sup>3</sup> /s

<b>Drainage Area</b>	
SCS CN (Composite)	93.000
Area (User Defined)	25,264.800 ft <sup>2</sup>
Maximum Retention (Pervious)	0.8 in
Maximum Retention (Pervious, 20 percent)	0.2 in

<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	0.102 ac-ft

<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	0.102 ac-ft

<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: POST-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

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SCS Unit Hydrograph Parameters	
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

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Subsection: Unit Hydrograph Summary  
 Label: PRE-POA 1 DA  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Storm Event	1-year 24- Hour
Return Event	1 years
Duration	24.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	30,492.000 ft <sup>2</sup>

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	1.32 ft <sup>3</sup> /s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	11.950 hours
Flow (Peak Interpolated Output)	1.27 ft <sup>3</sup> /s

<b>Drainage Area</b>	
SCS CN (Composite)	81.000
Area (User Defined)	30,492.000 ft <sup>2</sup>
Maximum Retention (Pervious)	2.3 in
Maximum Retention (Pervious, 20 percent)	0.5 in

<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.2 in
Runoff Volume (Pervious)	0.070 ac-ft

<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	0.070 ac-ft

<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.52 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: PRE-POA 1 DA  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	0.056 hours
Unit receding limb, $T_r$	0.222 hours
Total unit time, $T_b$	0.278 hours

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Subsection: Time vs. Elevation  
 Label: WET POND (OUT)  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Elevation (ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	417.00	417.00	417.00	417.00	417.00
0.250	417.00	417.00	417.00	417.00	417.00
0.500	417.00	417.00	417.00	417.00	417.00
0.750	417.00	417.00	417.00	417.00	417.00
1.000	417.00	417.00	417.00	417.00	417.00
1.250	417.00	417.00	417.00	417.00	417.00
1.500	417.00	417.00	417.00	417.00	417.00
1.750	417.00	417.00	417.00	417.00	417.00
2.000	417.00	417.00	417.00	417.00	417.00
2.250	417.00	417.00	417.00	417.00	417.00
2.500	417.00	417.00	417.00	417.00	417.00
2.750	417.00	417.00	417.00	417.00	417.00
3.000	417.00	417.00	417.00	417.00	417.00
3.250	417.00	417.00	417.00	417.00	417.00
3.500	417.00	417.00	417.00	417.00	417.00
3.750	417.00	417.00	417.00	417.00	417.00
4.000	417.00	417.00	417.00	417.00	417.00
4.250	417.00	417.00	417.00	417.00	417.00
4.500	417.00	417.00	417.00	417.00	417.00
4.750	417.00	417.00	417.00	417.00	417.00
5.000	417.00	417.00	417.00	417.00	417.00
5.250	417.00	417.00	417.00	417.00	417.00
5.500	417.00	417.00	417.00	417.01	417.01
5.750	417.01	417.01	417.01	417.01	417.01
6.000	417.01	417.01	417.01	417.01	417.01
6.250	417.01	417.01	417.01	417.01	417.01
6.500	417.02	417.02	417.02	417.02	417.02
6.750	417.02	417.02	417.02	417.02	417.02
7.000	417.02	417.03	417.03	417.03	417.03
7.250	417.03	417.03	417.03	417.03	417.03
7.500	417.04	417.04	417.04	417.04	417.04
7.750	417.04	417.04	417.04	417.05	417.05
8.000	417.05	417.05	417.05	417.05	417.06
8.250	417.06	417.06	417.06	417.06	417.06
8.500	417.07	417.07	417.07	417.07	417.07
8.750	417.08	417.08	417.08	417.08	417.09
9.000	417.09	417.09	417.09	417.10	417.10
9.250	417.10	417.11	417.11	417.11	417.11
9.500	417.12	417.12	417.12	417.12	417.13
9.750	417.13	417.13	417.14	417.14	417.14
10.000	417.15	417.15	417.16	417.16	417.16
10.250	417.17	417.17	417.18	417.18	417.19



Subsection: Time vs. Elevation  
 Label: WET POND (OUT)  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Elevation (ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.500	417.19	417.20	417.20	417.21	417.21
10.750	417.22	417.23	417.23	417.24	417.25
11.000	417.26	417.26	417.27	417.28	417.29
11.250	417.30	417.31	417.32	417.34	417.35
11.500	417.36	417.38	417.40	417.44	417.49
11.750	417.55	417.64	417.75	417.91	418.05
12.000	418.13	418.16	418.13	418.09	418.06
12.250	418.04	418.02	418.01	418.00	417.99
12.500	417.98	417.98	417.97	417.97	417.97
12.750	417.97	417.97	417.96	417.96	417.96
13.000	417.96	417.96	417.96	417.96	417.96
13.250	417.96	417.96	417.96	417.96	417.96
13.500	417.96	417.96	417.95	417.95	417.95
13.750	417.95	417.95	417.95	417.95	417.95
14.000	417.95	417.95	417.95	417.95	417.95
14.250	417.95	417.95	417.95	417.95	417.95
14.500	417.95	417.95	417.95	417.95	417.95
14.750	417.95	417.95	417.95	417.95	417.95
15.000	417.95	417.95	417.95	417.95	417.95
15.250	417.95	417.95	417.95	417.95	417.95
15.500	417.95	417.95	417.95	417.95	417.95
15.750	417.95	417.95	417.95	417.95	417.95
16.000	417.95	417.95	417.95	417.95	417.95
16.250	417.95	417.95	417.95	417.95	417.95
16.500	417.95	417.95	417.95	417.95	417.95
16.750	417.95	417.95	417.95	417.95	417.95
17.000	417.95	417.95	417.95	417.95	417.95
17.250	417.95	417.95	417.95	417.95	417.95
17.500	417.95	417.95	417.95	417.95	417.95
17.750	417.95	417.95	417.95	417.95	417.94
18.000	417.94	417.94	417.94	417.94	417.94
18.250	417.94	417.94	417.94	417.94	417.94
18.500	417.94	417.94	417.94	417.94	417.94
18.750	417.94	417.94	417.94	417.94	417.94
19.000	417.94	417.94	417.94	417.94	417.94
19.250	417.94	417.94	417.94	417.94	417.94
19.500	417.94	417.94	417.94	417.94	417.94
19.750	417.94	417.94	417.94	417.94	417.94
20.000	417.94	417.94	417.94	417.94	417.94
20.250	417.94	417.94	417.94	417.94	417.94
20.500	417.94	417.94	417.94	417.94	417.94
20.750	417.94	417.94	417.94	417.94	417.94

Subsection: Time vs. Elevation  
 Label: WET POND (OUT)  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Elevation (ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
21.000	417.94	417.94	417.94	417.94	417.94
21.250	417.94	417.94	417.94	417.94	417.94
21.500	417.94	417.94	417.94	417.94	417.94
21.750	417.94	417.94	417.94	417.94	417.94
22.000	417.94	417.94	417.94	417.94	417.94
22.250	417.94	417.94	417.94	417.94	417.94
22.500	417.94	417.94	417.94	417.94	417.94
22.750	417.94	417.94	417.94	417.94	417.94
23.000	417.94	417.94	417.94	417.94	417.94
23.250	417.94	417.94	417.94	417.94	417.94
23.500	417.94	417.94	417.94	417.94	417.94
23.750	417.94	417.94	417.94	417.94	417.94
24.000	417.94	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Volume  
 Label: WET POND  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	0.000	0.000	0.000	0.001	0.001
6.500	0.001	0.001	0.001	0.001	0.001
6.750	0.001	0.001	0.001	0.001	0.001
7.000	0.001	0.001	0.001	0.001	0.001
7.250	0.001	0.001	0.001	0.001	0.001
7.500	0.001	0.001	0.001	0.001	0.002
7.750	0.002	0.002	0.002	0.002	0.002
8.000	0.002	0.002	0.002	0.002	0.002
8.250	0.002	0.002	0.002	0.002	0.002
8.500	0.002	0.003	0.003	0.003	0.003
8.750	0.003	0.003	0.003	0.003	0.003
9.000	0.003	0.003	0.004	0.004	0.004
9.250	0.004	0.004	0.004	0.004	0.004
9.500	0.004	0.004	0.005	0.005	0.005
9.750	0.005	0.005	0.005	0.005	0.005
10.000	0.006	0.006	0.006	0.006	0.006
10.250	0.006	0.006	0.007	0.007	0.007

Subsection: Time vs. Volume  
 Label: WET POND  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.500	0.007	0.007	0.008	0.008	0.008
10.750	0.008	0.009	0.009	0.009	0.009
11.000	0.010	0.010	0.010	0.011	0.011
11.250	0.011	0.012	0.012	0.013	0.013
11.500	0.014	0.014	0.015	0.017	0.019
11.750	0.021	0.025	0.030	0.036	0.043
12.000	0.046	0.048	0.047	0.045	0.043
12.250	0.042	0.041	0.041	0.040	0.040
12.500	0.040	0.040	0.039	0.039	0.039
12.750	0.039	0.039	0.039	0.039	0.039
13.000	0.039	0.039	0.039	0.039	0.039
13.250	0.039	0.039	0.039	0.039	0.039
13.500	0.039	0.039	0.039	0.039	0.039
13.750	0.039	0.038	0.038	0.038	0.038
14.000	0.038	0.038	0.038	0.038	0.038
14.250	0.038	0.038	0.038	0.038	0.038
14.500	0.038	0.038	0.038	0.038	0.038
14.750	0.038	0.038	0.038	0.038	0.038
15.000	0.038	0.038	0.038	0.038	0.038
15.250	0.038	0.038	0.038	0.038	0.038
15.500	0.038	0.038	0.038	0.038	0.038
15.750	0.038	0.038	0.038	0.038	0.038
16.000	0.038	0.038	0.038	0.038	0.038
16.250	0.038	0.038	0.038	0.038	0.038
16.500	0.038	0.038	0.038	0.038	0.038
16.750	0.038	0.038	0.038	0.038	0.038
17.000	0.038	0.038	0.038	0.038	0.038
17.250	0.038	0.038	0.038	0.038	0.038
17.500	0.038	0.038	0.038	0.038	0.038
17.750	0.038	0.038	0.038	0.038	0.038
18.000	0.038	0.038	0.038	0.038	0.038
18.250	0.038	0.038	0.038	0.038	0.038
18.500	0.038	0.038	0.038	0.038	0.038
18.750	0.038	0.038	0.038	0.038	0.038
19.000	0.038	0.038	0.038	0.038	0.038
19.250	0.038	0.038	0.038	0.038	0.038
19.500	0.038	0.038	0.038	0.038	0.038
19.750	0.038	0.038	0.038	0.038	0.038
20.000	0.038	0.038	0.038	0.038	0.038
20.250	0.038	0.038	0.038	0.038	0.038
20.500	0.038	0.038	0.038	0.038	0.038
20.750	0.038	0.038	0.038	0.038	0.038

Subsection: Time vs. Volume  
 Label: WET POND  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours  
 Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
21.000	0.038	0.038	0.038	0.038	0.038
21.250	0.038	0.038	0.038	0.038	0.038
21.500	0.038	0.038	0.038	0.038	0.038
21.750	0.038	0.038	0.038	0.038	0.038
22.000	0.038	0.038	0.038	0.038	0.038
22.250	0.038	0.038	0.038	0.038	0.038
22.500	0.038	0.038	0.038	0.038	0.038
22.750	0.038	0.038	0.038	0.038	0.038
23.000	0.038	0.038	0.038	0.038	0.038
23.250	0.038	0.038	0.038	0.038	0.038
23.500	0.038	0.038	0.038	0.038	0.038
23.750	0.038	0.038	0.038	0.038	0.038
24.000	0.038	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Elevation-Area Volume Curve  
 Label: WET POND  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Elevation (ft)	Planimeter (ft <sup>2</sup> )	Area (ft <sup>2</sup> )	A1+A2+sqr (A1*A2) (ft <sup>2</sup> )	Volume (ac-ft)	Volume (Total) (ac-ft)
417.00	0.0	1,602.000	0.000	0.000	0.000
418.00	0.0	1,937.000	5,300.554	0.041	0.041
419.00	0.0	2,296.000	6,341.875	0.049	0.089

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Requested Pond Water Surface Elevations	
Minimum (Headwater)	417.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	419.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Orifice - 2	Forward	Culvert - 1	417.94	419.00
Inlet Box	Riser - 1	Forward	Culvert - 1	418.19	419.00
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	417.09	419.00
Culvert-Circular	Culvert - 1	Forward	TW	417.09	419.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

<b>Structure ID: Culvert - 1</b>	
<b>Structure Type: Culvert-Circular</b>	
Number of Barrels	1
Diameter	15.0 in
Length	17.00 ft
Length (Computed Barrel)	17.00 ft
Slope (Computed)	0.005 ft/ft
<b>Outlet Control Data</b>	
Manning's n	0.013
Ke	0.200
Kb	0.023
Kr	0.000
Convergence Tolerance	0.00 ft
<b>Inlet Control Data</b>	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.093
T2 ratio (HW/D)	1.195
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.

Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	418.46 ft	T1 Flow	4.80 ft <sup>3</sup> /s
T2 Elevation	418.58 ft	T2 Flow	5.49 ft <sup>3</sup> /s



Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

---

**Structure ID: Riser - 1**  
**Structure Type: Inlet Box**

---

Number of Openings	1
Elevation	418.19 ft
Orifice Area	6.0 ft <sup>2</sup>
Orifice Coefficient	0.600
Weir Length	10.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

---



---

**Structure ID: Orifice - 1**  
**Structure Type: Orifice-Circular**

---

Number of Openings	1
Elevation	417.09 ft
Orifice Diameter	0.5 in
Orifice Coefficient	0.600

---



---

**Structure ID: Orifice - 2**  
**Structure Type: Orifice-Area**

---

Number of Openings	1
Elevation	417.94 ft
Orifice Area	0.5 ft <sup>2</sup>
Top Elevation	418.19 ft
Datum Elevation	417.94 ft
Orifice Coefficient	0.600

---



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**Structure ID: TW**  
**Structure Type: TW Setup, DS Channel**

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Tailwater Type	Free Outfall
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**Convergence Tolerances**

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Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

---

Subsection: Outlet Input Data  
Label: Composite Outlet Structure - 1  
Scenario: 1-year 24-hour

Return Event: 1 years  
Storm Event: 1-year 24- Hour

---

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s

---

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	417.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	419.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Orifice - 2	Forward	Culvert - 1	417.94	419.00
Inlet Box	Riser - 1	Forward	Culvert - 1	418.19	419.00
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	417.09	419.00
Culvert-Circular	Culvert - 1	Forward	TW	417.09	419.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

<b>Structure ID: Culvert - 1</b>	
<b>Structure Type: Culvert-Circular</b>	
Number of Barrels	1
Diameter	15.0 in
Length	17.00 ft
Length (Computed Barrel)	17.00 ft
Slope (Computed)	0.005 ft/ft
<b>Outlet Control Data</b>	
Manning's n	0.013
Ke	0.200
Kb	0.023
Kr	0.000
Convergence Tolerance	0.00 ft
<b>Inlet Control Data</b>	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.093
T2 ratio (HW/D)	1.195
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.  
 Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	418.46 ft	T1 Flow	4.80 ft <sup>3</sup> /s
T2 Elevation	418.58 ft	T2 Flow	5.49 ft <sup>3</sup> /s

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

---

**Structure ID: Riser - 1**  
**Structure Type: Inlet Box**

---

Number of Openings	1
Elevation	418.19 ft
Orifice Area	6.0 ft <sup>2</sup>
Orifice Coefficient	0.600
Weir Length	10.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

---



---

**Structure ID: Orifice - 1**  
**Structure Type: Orifice-Circular**

---

Number of Openings	1
Elevation	417.09 ft
Orifice Diameter	0.5 in
Orifice Coefficient	0.600

---



---

**Structure ID: Orifice - 2**  
**Structure Type: Orifice-Area**

---

Number of Openings	1
Elevation	417.94 ft
Orifice Area	0.5 ft <sup>2</sup>
Top Elevation	418.19 ft
Datum Elevation	417.94 ft
Orifice Coefficient	0.600

---



---

**Structure ID: TW**  
**Structure Type: TW Setup, DS Channel**

---

Tailwater Type	Free Outfall
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---



---

**Convergence Tolerances**

---

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

---

Subsection: Outlet Input Data  
Label: Composite Outlet Structure - 1  
Scenario: 10 Year

Return Event: 10 years  
Storm Event: 10 Year

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	417.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	419.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Orifice - 2	Forward	Culvert - 1	417.94	419.00
Inlet Box	Riser - 1	Forward	Culvert - 1	418.19	419.00
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	417.09	419.00
Culvert-Circular	Culvert - 1	Forward	TW	417.09	419.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

<b>Structure ID: Culvert - 1</b>	
<b>Structure Type: Culvert-Circular</b>	
Number of Barrels	1
Diameter	15.0 in
Length	17.00 ft
Length (Computed Barrel)	17.00 ft
Slope (Computed)	0.005 ft/ft
<b>Outlet Control Data</b>	
Manning's n	0.013
Ke	0.200
Kb	0.023
Kr	0.000
Convergence Tolerance	0.00 ft
<b>Inlet Control Data</b>	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.093
T2 ratio (HW/D)	1.195
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.  
 Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	418.46 ft	T1 Flow	4.80 ft <sup>3</sup> /s
T2 Elevation	418.58 ft	T2 Flow	5.49 ft <sup>3</sup> /s



Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

---

**Structure ID: Riser - 1**  
**Structure Type: Inlet Box**

---

Number of Openings	1
Elevation	418.19 ft
Orifice Area	6.0 ft <sup>2</sup>
Orifice Coefficient	0.600
Weir Length	10.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

---



---

**Structure ID: Orifice - 1**  
**Structure Type: Orifice-Circular**

---

Number of Openings	1
Elevation	417.09 ft
Orifice Diameter	0.5 in
Orifice Coefficient	0.600

---



---

**Structure ID: Orifice - 2**  
**Structure Type: Orifice-Area**

---

Number of Openings	1
Elevation	417.94 ft
Orifice Area	0.5 ft <sup>2</sup>
Top Elevation	418.19 ft
Datum Elevation	417.94 ft
Orifice Coefficient	0.600

---



---

**Structure ID: TW**  
**Structure Type: TW Setup, DS Channel**

---

Tailwater Type	Free Outfall
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---



---

**Convergence Tolerances**

---

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

---

Subsection: Outlet Input Data  
Label: Composite Outlet Structure - 1  
Scenario: 25 Year

Return Event: 25 years  
Storm Event: 25 Year

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	417.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	419.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Area	Orifice - 2	Forward	Culvert - 1	417.94	419.00
Inlet Box	Riser - 1	Forward	Culvert - 1	418.19	419.00
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	417.09	419.00
Culvert-Circular	Culvert - 1	Forward	TW	417.09	419.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

<b>Structure ID: Culvert - 1</b>	
<b>Structure Type: Culvert-Circular</b>	
Number of Barrels	1
Diameter	15.0 in
Length	17.00 ft
Length (Computed Barrel)	17.00 ft
Slope (Computed)	0.005 ft/ft
<b>Outlet Control Data</b>	
Manning's n	0.013
Ke	0.200
Kb	0.023
Kr	0.000
Convergence Tolerance	0.00 ft
<b>Inlet Control Data</b>	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.093
T2 ratio (HW/D)	1.195
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.  
 Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	418.46 ft	T1 Flow	4.80 ft <sup>3</sup> /s
T2 Elevation	418.58 ft	T2 Flow	5.49 ft <sup>3</sup> /s

Subsection: Outlet Input Data  
 Label: Composite Outlet Structure - 1  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

---

**Structure ID: Riser - 1**  
**Structure Type: Inlet Box**

---

Number of Openings	1
Elevation	418.19 ft
Orifice Area	6.0 ft <sup>2</sup>
Orifice Coefficient	0.600
Weir Length	10.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

---



---

**Structure ID: Orifice - 1**  
**Structure Type: Orifice-Circular**

---

Number of Openings	1
Elevation	417.09 ft
Orifice Diameter	0.5 in
Orifice Coefficient	0.600

---



---

**Structure ID: Orifice - 2**  
**Structure Type: Orifice-Area**

---

Number of Openings	1
Elevation	417.94 ft
Orifice Area	0.5 ft <sup>2</sup>
Top Elevation	418.19 ft
Datum Elevation	417.94 ft
Orifice Coefficient	0.600

---



---

**Structure ID: TW**  
**Structure Type: TW Setup, DS Channel**

---

Tailwater Type	Free Outfall
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---



---

**Convergence Tolerances**

---

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

---

Subsection: Outlet Input Data  
Label: Composite Outlet Structure - 1  
Scenario: 100 Year

Return Event: 100 years  
Storm Event: 100 Year

---

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s

---

Subsection: Elevation-Volume-Flow Table (Pond)  
 Label: WET POND  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Infiltration	
Infiltration Method (Computed)	No Infiltration

---

Initial Conditions	
Elevation (Water Surface, Initial)	417.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft <sup>3</sup> /s
Flow (Initial Infiltration)	0.00 ft <sup>3</sup> /s
Flow (Initial, Total)	0.00 ft <sup>3</sup> /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft <sup>3</sup> /s)	Storage (ac-ft)	Area (ft <sup>2</sup> )	Infiltration (ft <sup>3</sup> /s)	Flow (Total) (ft <sup>3</sup> /s)	2S/t + O (ft <sup>3</sup> /s)
417.00	0.00	0.000	1,602.000	0.00	0.00	0.00
417.09	0.00	0.003	1,630.849	0.00	0.00	1.62
417.50	0.00	0.019	1,765.527	0.00	0.00	9.35
417.94	0.01	0.038	1,916.004	0.00	0.01	18.35
418.00	0.29	0.041	1,937.000	0.00	0.29	19.93
418.19	1.21	0.049	2,002.863	0.00	1.21	25.00
418.50	4.93	0.064	2,112.687	0.00	4.93	35.81
419.00	7.06	0.089	2,296.000	0.00	7.06	50.18

Subsection: Elevation-Volume-Flow Table (Pond)  
 Label: WET POND  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	417.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft <sup>3</sup> /s
Flow (Initial Infiltration)	0.00 ft <sup>3</sup> /s
Flow (Initial, Total)	0.00 ft <sup>3</sup> /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft <sup>3</sup> /s)	Storage (ac-ft)	Area (ft <sup>2</sup> )	Infiltration (ft <sup>3</sup> /s)	Flow (Total) (ft <sup>3</sup> /s)	2S/t + O (ft <sup>3</sup> /s)
417.00	0.00	0.000	1,602.000	0.00	0.00	0.00
417.09	0.00	0.003	1,630.849	0.00	0.00	1.62
417.50	0.00	0.019	1,765.527	0.00	0.00	9.35
417.94	0.01	0.038	1,916.004	0.00	0.01	18.35
418.00	0.29	0.041	1,937.000	0.00	0.29	19.93
418.19	1.21	0.049	2,002.863	0.00	1.21	25.00
418.50	4.93	0.064	2,112.687	0.00	4.93	35.81
419.00	7.06	0.089	2,296.000	0.00	7.06	50.18



Subsection: Elevation-Volume-Flow Table (Pond)  
 Label: WET POND  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	417.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft <sup>3</sup> /s
Flow (Initial Infiltration)	0.00 ft <sup>3</sup> /s
Flow (Initial, Total)	0.00 ft <sup>3</sup> /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft <sup>3</sup> /s)	Storage (ac-ft)	Area (ft <sup>2</sup> )	Infiltration (ft <sup>3</sup> /s)	Flow (Total) (ft <sup>3</sup> /s)	2S/t + O (ft <sup>3</sup> /s)
417.00	0.00	0.000	1,602.000	0.00	0.00	0.00
417.09	0.00	0.003	1,630.849	0.00	0.00	1.62
417.50	0.00	0.019	1,765.527	0.00	0.00	9.35
417.94	0.01	0.038	1,916.004	0.00	0.01	18.35
418.00	0.29	0.041	1,937.000	0.00	0.29	19.93
418.19	1.21	0.049	2,002.863	0.00	1.21	25.00
418.50	4.93	0.064	2,112.687	0.00	4.93	35.81
419.00	7.06	0.089	2,296.000	0.00	7.06	50.18

Subsection: Elevation-Volume-Flow Table (Pond)  
 Label: WET POND  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	417.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft <sup>3</sup> /s
Flow (Initial Infiltration)	0.00 ft <sup>3</sup> /s
Flow (Initial, Total)	0.00 ft <sup>3</sup> /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft <sup>3</sup> /s)	Storage (ac-ft)	Area (ft <sup>2</sup> )	Infiltration (ft <sup>3</sup> /s)	Flow (Total) (ft <sup>3</sup> /s)	2S/t + O (ft <sup>3</sup> /s)
417.00	0.00	0.000	1,602.000	0.00	0.00	0.00
417.09	0.00	0.003	1,630.849	0.00	0.00	1.62
417.50	0.00	0.019	1,765.527	0.00	0.00	9.35
417.94	0.01	0.038	1,916.004	0.00	0.01	18.35
418.00	0.29	0.041	1,937.000	0.00	0.29	19.93
418.19	1.21	0.049	2,002.863	0.00	1.21	25.00
418.50	4.93	0.064	2,112.687	0.00	4.93	35.81
419.00	7.06	0.089	2,296.000	0.00	7.06	50.18

Subsection: Pond Inflow Summary  
 Label: WET POND (IN)  
 Scenario: 1-year 24-hour

Return Event: 1 years  
 Storm Event: 1-year 24- Hour

Summary for Hydrograph Addition at 'WET POND'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	POST-POA 1 DA

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft <sup>3</sup> /s)
Flow (From)	POST-POA 1 DA	0.102	11.900	1.83
Flow (In)	WET POND	0.102	11.900	1.83

Subsection: Pond Inflow Summary  
 Label: WET POND (IN)  
 Scenario: 10 Year

Return Event: 10 years  
 Storm Event: 10 Year

Summary for Hydrograph Addition at 'WET POND'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	POST-POA 1 DA

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft <sup>3</sup> /s)
Flow (From)	POST-POA 1 DA	0.205	11.900	3.53
Flow (In)	WET POND	0.205	11.900	3.53

Subsection: Pond Inflow Summary  
 Label: WET POND (IN)  
 Scenario: 25 Year

Return Event: 25 years  
 Storm Event: 25 Year

Summary for Hydrograph Addition at 'WET POND'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	POST-POA 1 DA

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft <sup>3</sup> /s)
Flow (From)	POST-POA 1 DA	0.250	11.900	4.27
Flow (In)	WET POND	0.250	11.900	4.27

Subsection: Pond Inflow Summary  
 Label: WET POND (IN)  
 Scenario: 100 Year

Return Event: 100 years  
 Storm Event: 100 Year

Summary for Hydrograph Addition at 'WET POND'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	POST-POA 1 DA

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft <sup>3</sup> /s)
Flow (From)	POST-POA 1 DA	0.325	11.900	5.47
Flow (In)	WET POND	0.325	11.900	5.47

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WET POND (OUT) (Time vs. Elevation, 1 years (1-year 24-hour))...26, 27, 28

WET POND (Time vs. Volume, 1 years (1-year 24-hour))...29, 30, 31



## Water Quality Calculations

### Wet Detention Pond

**Project Information**

Project Name: Scooters Rolesville  
 KHA Project #: 016485000  
 Designed by: MDB Date: 2/28/2024  
 Revised by: MDB Date: 2/29/2024  
 Checked by: COB Date: 2/29/2024

**Design Resource:**

NCDENR - Stormwater Best Management Practices (Revision 4-18-17)

**Site Information**

County:	<u>Wake</u>	
Region:	<u>Mtn. &amp; Piedmont</u>	
Sub Area Location:	<u>Drainage Area to Pond</u>	
Drainage Area (DA) =	<u>0.58</u>	Acres
Impervious Area (IA) with FS =	<u>0.41</u>	Acres
Percent Impervious (I) =	<u>70.69</u>	%

actual

**Main Pool Average Depth (d<sub>av</sub>):**

d<sub>av</sub> Option 1 (when shelf is not submerged) = 0.92 ft  
 d<sub>av</sub> Option 2 (when shelf is submerged) = 3.55 ft

Option 1
$d_{av} = V_{perm\_pool} / A_{perm\_pool}$
Option 2
$D_{avg} = \frac{V_{PP} - V_{shelf}}{A_{bottom\ of\ shelf}}$
Where: $D_{avg}$ = Average depth in feet $V_{pp}$ = Total volume of permanent pool (feet <sup>3</sup> ) $V_{shelf}$ = Volume over the shelf only (feet <sup>3</sup> ) $0.5 * Depth_{max\ over\ shelf} * Perimeter_{perm\ pool} * Width_{submerged\ portion\ of\ shelf}$ $A_{bottom\ of\ shelf}$ = Area of permanent pool (feet <sup>2</sup> )

**Required Surface Area (85% TSS):**

SA/DA for d<sub>av</sub> = 3.5 and 70% Impervious = 2.28  
 SA/DA for d<sub>av</sub> = 3.5 and 80% Impervious = 2.64  
 Surface Area to DA Ratio (SA/DA) = 2.30  
 Req'd Main Pool Surface Area at Perm. Pool = 581 sf  
 Req'd Total Pond Surface Area at Perm. Pool = Range from 668 sf to 697 sf

[\(Taken from Chapter C-3 of NCDEQ Stormwater BMP Manual\)](#)

Average depth rounded down to nearest 0.5'  
 Average depth rounded down to nearest 0.5'

**\*\*\*\*THIS IS ONLY THE MAIN POOL SURFACE AREA\*\*\*\***  
 This includes minimum 20% forbay surface area

**Required Storage Volume (Water Quality):**

Design Storm = 1.0 inch  
 Determine Rv Value = 0.05 + .009 (I) = 0.69 in/in  
 Design Storm Storage Volume = 1,445 cf  
 Storage Volume Required = 1,445 cf

**Summary of Proposed BMP**

Bottom of Pond Elevation = 414.00 ft  
 Sediment Cleanout Elevation = 415.00 ft  
 Permanent Pool Elevation = 417.09 ft  
 Temporary Pool Elevation = 417.94 ft  
 Top of Berm Elevation = 419.00 ft  
 Main Pool Surface Area at Permanent Pool = 1,102 sf  
 Forebay Volume (FV1) = 562 cf  
 Permanent Pool Volume (PPV) = 1,015 cf  
 Temporary Pool Volume (TPV) = 1,482 cf  
 Total Storage Volume (TSV) = 3,713 cf  
 Total Pond Volume (PV) = 5,299 cf

(Required Surface Area = 581 sf )  
 (55.3% of Main Pool Volume)  
 (Main Pool Only)  
 (Required Volume = 1445 cf )

**Proposed Water Quality Volumes**

**Water Quality Volume -**

**Wet Detention Pond**

Water Quality Volume Required =	<b>1,445</b>
Water Quality Volume Provided =	<b>1,482</b>

<b>POND</b>					
Elevation	Contour Area	Incremental Volume	Accumulated Volume, S	Stage, Z	
	sf ft	cu ft	cu ft	ft	
414.00	10	0	0	0.00	(Bottom of Pond)
414.50	93	26	26	0.50	
415.00	210	76	102	1.00	
416.00	485	348	449	2.00	(Bottom of Shelf)
417.09	1,602	1,137	1,586	3.09	(Permanent Pool Elevation)
417.09	1,602	0	0	3.09	(Top of Shelf)
417.94	1,884	1,482	1,482	3.94	(Temporary Pool Elevation)
418.00	1,937	115	1,596	4.00	
419.00	2,296	2,117	3,713	5.00	(Top of Berm)

<b>MAIN POOL</b>				
Elevation	Contour Area	Incremental Volume	Accumulated Volume, S	Stage, Z
	sf ft	cu ft	cu ft	ft
414.00	10	0	0	0.00
414.50	53	16	16	0.50
415.00	116	42	58	1.00
416.00	286	201	259	2.00
417.09	1,102	756	1,015	3.09
417.09	1,102	0	1,015	3.09

<b>FOREBAY</b>				
Elevation	Contour Area	Incremental Volume	Accumulated Volume, S	Stage, Z
	sq ft	cu ft	cu ft	ft
414.50	40	0	0	0.00
415.00	94	34	34	0.50
416.00	200	147	181	1.50
417.09	500	381	562	2.59
417.09	500	0	562	2.59

**Wet Detention Basin  
INCREMENTAL DRAWDOWN METHOD**

Wet Detention Pond

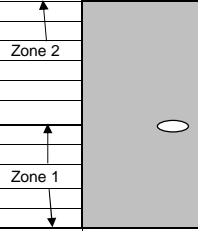
**Project Information**

Project Name:	Scooters Rolesville		
KHA Project #:	016485000		
Designed by:	MDB	Date:	2/28/2024
Revised by:	MDB	Date:	2/29/2024
Checked by:	COB	Date:	2/29/2024

**Design Resource:** NCDENR - Stormwater BMP Manual (June 2009)

**Water Quality Orifice**

Incremental Determination of Water Quality Volume Drawdown Time



$$Q_2 = C_D * A * (2gH_0)^{1/2}$$

$$Q_1 = 0$$

Orifice Diameter (D) =	0.50 in
Cd =	0.6
Area =	0.00136 sf
Ei =	417.09
Orifice Inv.	417.09
Zone 1 Range =	417.09 to 417.1108333
Zone 2 Range =	417.1108333 to 417.94

**Incremental Drawdown Method**

	Countour	Contour Area	Incremental Volume	Stage, Z	Zone	Q	Drawdown Time
	417.09	1,602.00	0	0.00	1	0.0000	--
	417.14	1,620	81	0.05	2	0.0011	1,197
	417.19	1,639	81	0.10	2	0.0018	735
(Orifice Centroid Elevation)	417.111	1,610	-129	0.02	1	0.0000	--
	417.24	1,657	82	0.15	2	0.0024	582
	417.29	1,676	294	0.20	2	0.0028	1,765
	417.34	1,694	84	0.25	2	0.0031	447
	417.39	1,712	85	0.30	2	0.0035	409
	417.44	1,731	86	0.35	2	0.0038	381
	417.49	1,749	87	0.40	2	0.0040	359
	417.54	1,768	88	0.45	2	0.0043	341
	418.00	1,937.00	852	0.91	NOT IN RANGE	0.0000	--
	418.05	1,981	98	0.96	NOT IN RANGE	0.0000	--
	418.10	2,025	100	1.01	NOT IN RANGE	0.0000	--
	418.15	2,070	102	1.06	NOT IN RANGE	0.0000	--
	418.20	2,114	105	1.11	NOT IN RANGE	0.0000	--
	418.25	2,158	107	1.16	NOT IN RANGE	0.0000	--
	418.30	2,202	109	1.21	NOT IN RANGE	0.0000	--
	417.94	1,884.00	-735	0.85	2	0.0060	-2,050
	<b>Total (402)</b>	--	<b>1,578</b>	--	--	--	<b>4,165</b>

(Minimum Required Treatment Volume Elev.) Drawdown Time = Incremental Volume / Q / 60sec/min

**Summary**

<b>Total Volume =</b>	<b>1,578 cf</b>
<b>Total Time =</b>	<b>4,165 min</b>
<b>Total Time =</b>	<b>2.89 days*</b>
<b>Max Q =</b>	<b>0.006 cfs</b>

\*Drawdown time calculated based on minimum required treatment volume and corresponding elevation

**RIP-RAP CALCULATIONS**

**Project Information**

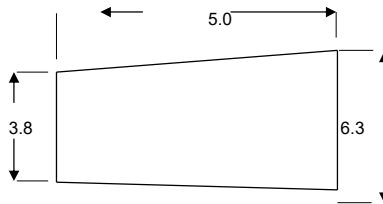
Project Name: Scooters Rolesville  
 KHA Project #: 16485000  
 Designed by: JAA Date: 2/28/2024  
 Revised by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Checked by: COB Date: 2/28/2024

**FES-1**

Storm System Outlet Into Pond

Pipe Diameter	d=	15 in	
Number of Pipes	#=	1 total	
Pipe Slope	s=	0.50 %	
Manning's number	n=	0.013	
Flow	Q=	4.58 cfs	Assumes Full Flow
Velocity	V=	3.73 ft/s	Velocity of flow entering rip rap apron

Dissipator Dimensions *	Zone =	1
	Stone Filling Class =	A
	D <sub>0</sub> =	1.25 ft
	Entry Width ( 3 X D <sub>0</sub> ) =	3.8 ft
	Length ( 4 X D <sub>0</sub> ) =	5.0 ft
	Width (La + D <sub>0</sub> ) =	6.3 ft
	Min. Thickness =	12 inches
	Min. Stone Diameter=	3 inches



\* All units are in feet  
 \*\* Dissipator pad designed for full flow of pipe

**RIP-RAP CALCULATIONS**

**Project Information**

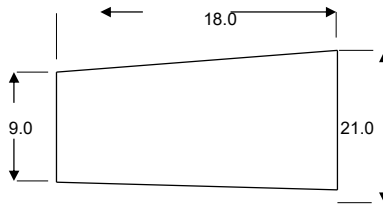
Project Name: Scooters Rolesville  
 KHA Project #: 16485000  
 Designed by: MDB Date: 2/29/2024  
 Revised by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Checked by: COB Date: 2/29/2024

**FES-2**

Outfall From Splitter Box

Pipe Diameter d= 36 in  
 Number of Pipes #= 1 total  
 Pipe Slope s= 0.50 %  
 Manning's number n= 0.013  
 Flow Q= 47.29 cfs Assumes Full Flow  
 Velocity V= 6.69 ft/s Velocity of flow entering rip rap apron

Dissipator Dimensions \*  
 Zone = 2  
 Stone Filling Class = B  
 D<sub>0</sub> = 3.00 ft  
 Entry Width ( 3 X D<sub>0</sub> ) = 9.0 ft  
 Length ( 6 X D<sub>0</sub> ) = 18.0 ft  
 Width (La + D<sub>0</sub>) = 21.0 ft  
 Min. Thickness = 22 inches  
 Min. Stone Diameter= 6 inches



\* All units are in feet  
 \*\* Dissipator pad designed for full flow of pipe

**RIP-RAP CALCULATIONS**

**Project Information**

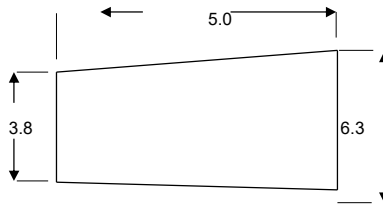
Project Name: Scooters Rolesville  
 KHA Project #: 16485000  
 Designed by: MDB Date: 2/29/2024  
 Revised by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Checked by: COB Date: 2/29/2024

**FES-3**

Outfall From Riser

Pipe Diameter	d=	15 in	
Number of Pipes	#=	1 total	
Pipe Slope	s=	0.50 %	
Manning's number	n=	0.013	
Flow	Q=	4.58 cfs	Assumes Full Flow
Velocity	V=	3.73 ft/s	Velocity of flow entering rip rap apron

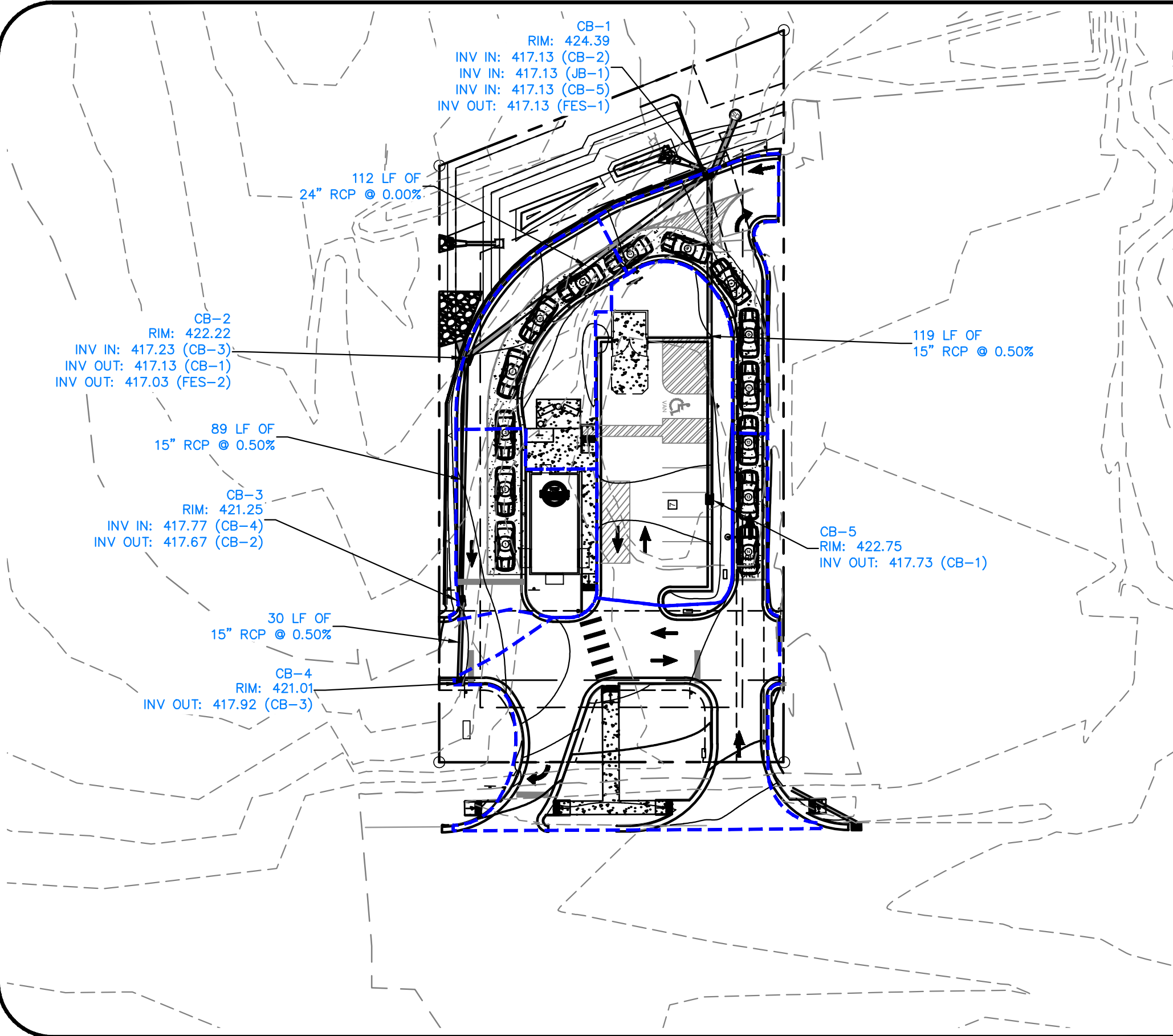
Dissipator Dimensions *	Zone =	1
	Stone Filling Class =	A
	D <sub>0</sub> =	1.25 ft
	Entry Width ( 3 X D <sub>0</sub> ) =	3.8 ft
	Length ( 4 X D <sub>0</sub> ) =	5.0 ft
	Width (La + D <sub>0</sub> ) =	6.3 ft
	Min. Thickness =	12 inches
	Min. Stone Diameter=	3 inches



\* All units are in feet  
 \*\* Dissipator pad designed for full flow of pipe

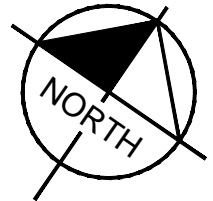
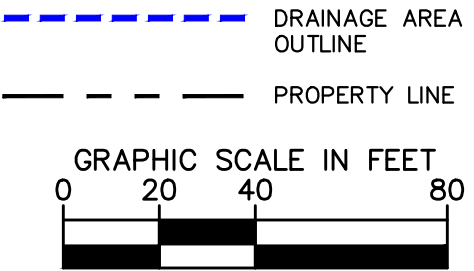
# **APPENDIX F**

# SCOOTERS ROLESVILLE



INLET DRAINAGE AREA	
INLET ID	AREA (AC)
CB-1	0.064
CB-2	0.081
CB-3	0.071
CB-4	0.205
CB-5	0.134

## LEGEND



## INLET DRAINAGE AREA MAP

KHA PROJECT NO: 016485000  
 DATE: 12/19/2023

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 421 FAYETTEVILLE STREET, SUITE 600, RALEIGH, NC 27601  
 PHONE: 919-677-2000 FAX: 919-677-2050  
 WWW.KIMLEY-HORN.COM



## 2-YEAR

FlexTable: Catch Basin Table

Label	Inlet	Inlet Location	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Inlet C	Inlet Drainage Area (acres)	External CA (acres)	Local CA (acres)	Local Intensity (in/h)	Local Flow Time (min)	Bypassed Rational Flow (cfs)	Flow (Captured) (cfs)	Flow (Total Out) (cfs)	Capture Efficiency (Calculated) (%)	Spread / Top Width (ft)	Hydraulic Grade Line (In) (ft)	Clogging Factor (%)
CB-1	NCDOT-combination inlet	On Grade	424.39	417.13	0.95	0.064	0.000	0.061	5.620	5.0	0.04	0.31	1.75	89.0	3.6	417.71	50.0
CB-2	NCDOT-combination inlet	In Sag	422.23	417.13	0.75	0.081	0.000	0.061	5.620	5.0	0.00	0.34	1.30	100.0	3.4	417.81	50.0
CB-3	NCDOT-combination inlet	In Sag	421.25	417.67	0.00	0.071	0.000	0.000	5.620	5.0	0.00	0.00	0.98	100.0	0.0	418.06	50.0
CB-4	NCDOT-combination inlet	In Sag	421.01	417.92	0.85	0.205	0.000	0.174	5.620	5.0	0.00	0.99	0.99	100.0	6.6	418.31	50.0
CB-5	NCDOT-combination inlet	In Sag	422.75	417.73	0.75	0.134	0.000	0.101	5.620	5.0	0.00	0.57	0.57	100.0	4.7	418.03	50.0

# 10-YEAR

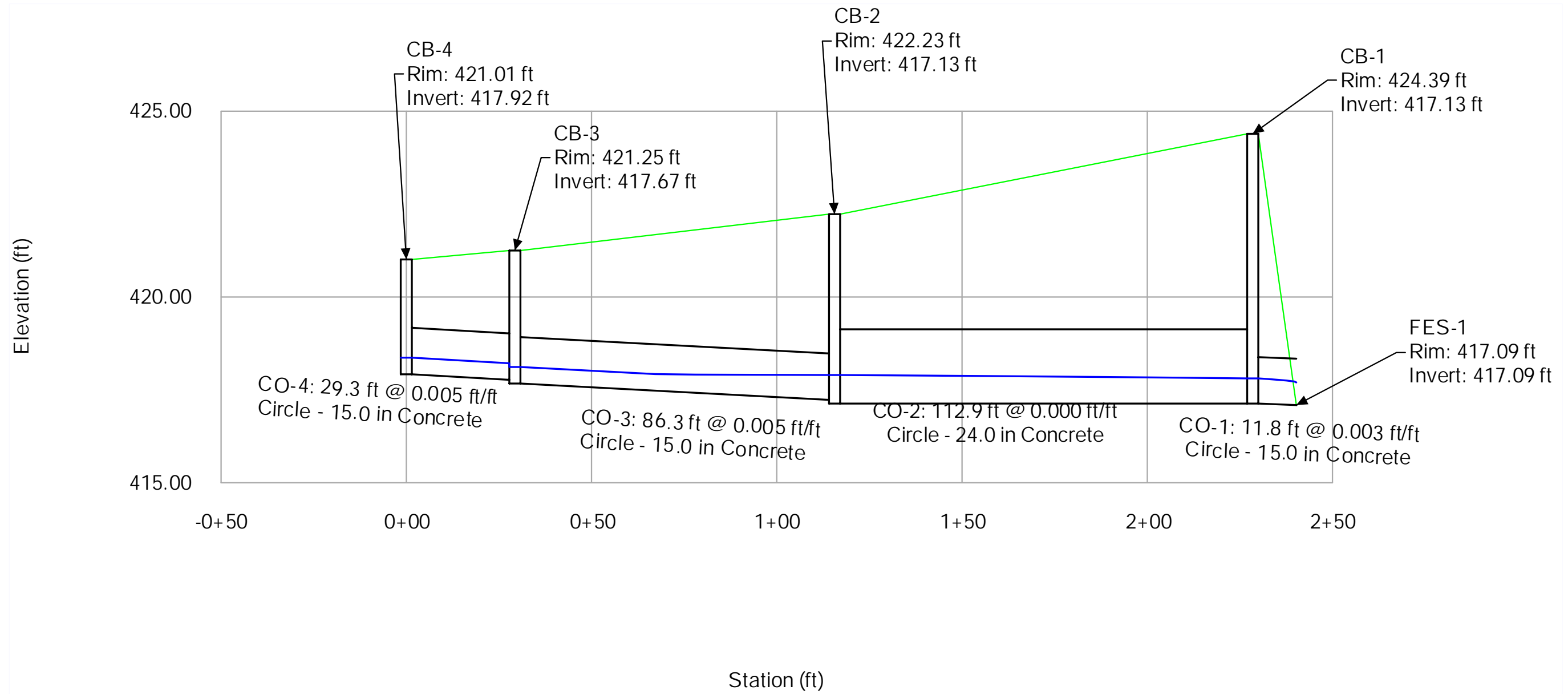
FlexTable: Conduit Table

Label	Start Node	Stop Node	Upstream Inlet C	Upstream Inlet Area (acres)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Flow (cfs)	System Intensity (in/h)	Invert (Start) (ft)	Invert (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Material
CO-1	CB-1	FES-1	0.95	0.064	3.23	3.77	2.34	5.993	417.13	417.09	417.81	417.70	11.8	0.003	15.0	0.013	Concrete
CO-2	CB-2	CB-1	0.75	0.081	0.53	0.23	1.66	7.017	417.13	417.13	417.90	417.81	112.9	0.000	24.0	0.013	Concrete
CO-3	CB-3	CB-2	0.00	0.071	3.20	4.61	1.26	7.146	417.67	417.23	418.12	417.90	86.3	0.005	15.0	0.013	Concrete
CO-4	CB-4	CB-3	0.85	0.205	3.21	4.62	1.26	7.190	417.92	417.77	418.37	418.21	29.3	0.005	15.0	0.013	Concrete
CO-5	CB-5	CB-1	0.75	0.134	2.74	4.60	0.73	7.190	417.73	417.13	418.07	417.81	118.5	0.005	15.0	0.013	Concrete

# 10-YEAR

## Profile Report

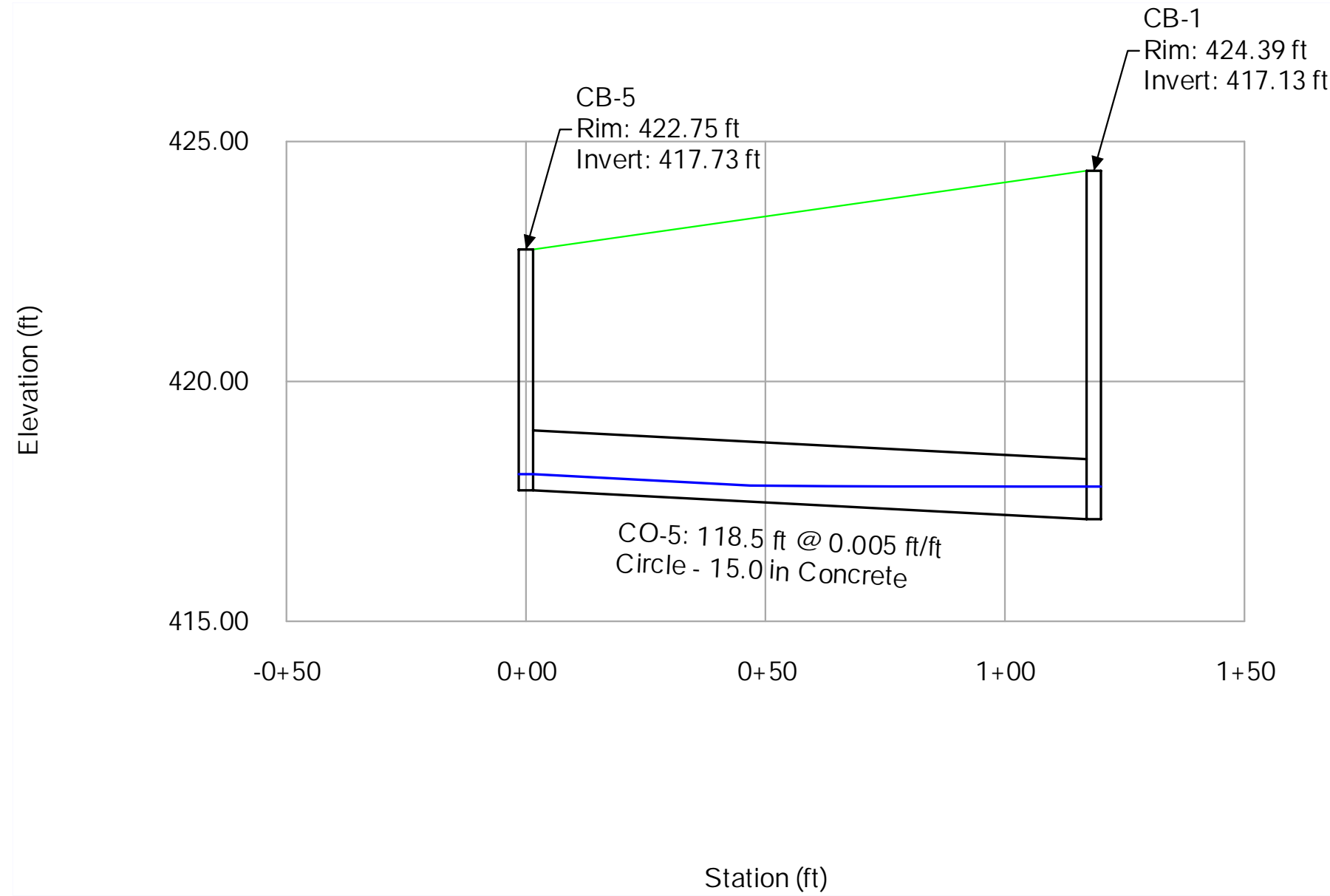
Engineering Profile - CB-4 to FES-1 (2023-12-18 Scooters Rolesville.stsw)



# 10-YEAR

## Profile Report

### Engineering Profile - CB-5 to CB-1 (2023-12-18 Scooters Rolesville.stsw)



# **APPENDIX G**



**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps & aerials](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	<b>4.84</b> (4.43-5.29)	<b>5.62</b> (5.15-6.13)	<b>6.40</b> (5.87-6.98)	<b>7.19</b> (6.58-7.85)	<b>7.98</b> (7.27-8.70)	<b>8.62</b> (7.81-9.38)	<b>9.18</b> (8.27-10.0)	<b>9.67</b> (8.66-10.6)	<b>10.2</b> (9.08-11.2)	<b>10.7</b> (9.44-11.7)
10-min	<b>3.86</b> (3.54-4.22)	<b>4.49</b> (4.12-4.91)	<b>5.12</b> (4.70-5.59)	<b>5.75</b> (5.26-6.27)	<b>6.36</b> (5.80-6.94)	<b>6.86</b> (6.22-7.48)	<b>7.29</b> (6.57-7.94)	<b>7.67</b> (6.87-8.36)	<b>8.09</b> (7.19-8.83)	<b>8.44</b> (7.44-9.24)
15-min	<b>3.22</b> (2.95-3.52)	<b>3.77</b> (3.45-4.11)	<b>4.32</b> (3.96-4.72)	<b>4.85</b> (4.44-5.29)	<b>5.38</b> (4.90-5.86)	<b>5.79</b> (5.25-6.31)	<b>6.14</b> (5.54-6.69)	<b>6.45</b> (5.78-7.04)	<b>6.78</b> (6.03-7.41)	<b>7.06</b> (6.22-7.73)
30-min	<b>2.21</b> (2.02-2.41)	<b>2.60</b> (2.38-2.84)	<b>3.07</b> (2.81-3.35)	<b>3.51</b> (3.21-3.83)	<b>3.98</b> (3.63-4.34)	<b>4.36</b> (3.95-4.75)	<b>4.70</b> (4.24-5.12)	<b>5.02</b> (4.50-5.48)	<b>5.40</b> (4.80-5.90)	<b>5.72</b> (5.04-6.26)
60-min	<b>1.38</b> (1.26-1.50)	<b>1.63</b> (1.50-1.78)	<b>1.97</b> (1.80-2.15)	<b>2.29</b> (2.09-2.50)	<b>2.65</b> (2.41-2.89)	<b>2.95</b> (2.68-3.22)	<b>3.24</b> (2.92-3.53)	<b>3.52</b> (3.15-3.84)	<b>3.87</b> (3.44-4.23)	<b>4.18</b> (3.68-4.57)
2-hr	<b>0.805</b> (0.732-0.887)	<b>0.957</b> (0.874-1.05)	<b>1.17</b> (1.06-1.28)	<b>1.37</b> (1.24-1.50)	<b>1.61</b> (1.46-1.76)	<b>1.83</b> (1.64-2.00)	<b>2.03</b> (1.81-2.22)	<b>2.24</b> (1.98-2.45)	<b>2.51</b> (2.20-2.74)	<b>2.75</b> (2.40-3.02)
3-hr	<b>0.568</b> (0.516-0.629)	<b>0.676</b> (0.617-0.746)	<b>0.827</b> (0.753-0.913)	<b>0.979</b> (0.888-1.08)	<b>1.16</b> (1.05-1.28)	<b>1.33</b> (1.19-1.46)	<b>1.49</b> (1.32-1.64)	<b>1.66</b> (1.47-1.82)	<b>1.89</b> (1.65-2.07)	<b>2.10</b> (1.81-2.31)
6-hr	<b>0.341</b> (0.311-0.377)	<b>0.406</b> (0.372-0.448)	<b>0.498</b> (0.454-0.548)	<b>0.590</b> (0.537-0.648)	<b>0.704</b> (0.636-0.771)	<b>0.808</b> (0.725-0.883)	<b>0.911</b> (0.810-0.995)	<b>1.02</b> (0.898-1.11)	<b>1.17</b> (1.02-1.27)	<b>1.30</b> (1.12-1.42)
12-hr	<b>0.200</b> (0.183-0.220)	<b>0.238</b> (0.219-0.261)	<b>0.293</b> (0.268-0.321)	<b>0.349</b> (0.319-0.383)	<b>0.420</b> (0.380-0.458)	<b>0.485</b> (0.436-0.527)	<b>0.550</b> (0.489-0.598)	<b>0.621</b> (0.546-0.674)	<b>0.718</b> (0.622-0.779)	<b>0.808</b> (0.689-0.878)
24-hr	<b>0.119</b> (0.110-0.128)	<b>0.143</b> (0.134-0.155)	<b>0.180</b> (0.168-0.194)	<b>0.210</b> (0.195-0.226)	<b>0.250</b> (0.231-0.269)	<b>0.282</b> (0.260-0.303)	<b>0.314</b> (0.289-0.339)	<b>0.349</b> (0.319-0.376)	<b>0.396</b> (0.360-0.427)	<b>0.433</b> (0.393-0.468)
2-day	<b>0.069</b> (0.064-0.074)	<b>0.083</b> (0.077-0.089)	<b>0.103</b> (0.096-0.111)	<b>0.119</b> (0.111-0.129)	<b>0.141</b> (0.131-0.152)	<b>0.159</b> (0.147-0.171)	<b>0.177</b> (0.163-0.191)	<b>0.195</b> (0.179-0.211)	<b>0.221</b> (0.201-0.239)	<b>0.241</b> (0.219-0.261)
3-day	<b>0.048</b> (0.045-0.052)	<b>0.058</b> (0.054-0.062)	<b>0.072</b> (0.067-0.078)	<b>0.084</b> (0.078-0.090)	<b>0.099</b> (0.092-0.106)	<b>0.111</b> (0.103-0.119)	<b>0.123</b> (0.114-0.132)	<b>0.136</b> (0.125-0.146)	<b>0.154</b> (0.140-0.166)	<b>0.168</b> (0.152-0.181)
4-day	<b>0.038</b> (0.036-0.041)	<b>0.046</b> (0.043-0.049)	<b>0.057</b> (0.053-0.061)	<b>0.066</b> (0.061-0.070)	<b>0.077</b> (0.072-0.083)	<b>0.087</b> (0.080-0.093)	<b>0.097</b> (0.089-0.103)	<b>0.107</b> (0.098-0.114)	<b>0.120</b> (0.110-0.129)	<b>0.131</b> (0.119-0.141)
7-day	<b>0.025</b> (0.024-0.027)	<b>0.030</b> (0.028-0.032)	<b>0.037</b> (0.034-0.039)	<b>0.042</b> (0.039-0.045)	<b>0.050</b> (0.046-0.053)	<b>0.055</b> (0.051-0.059)	<b>0.061</b> (0.057-0.066)	<b>0.068</b> (0.062-0.072)	<b>0.076</b> (0.070-0.082)	<b>0.083</b> (0.076-0.089)
10-day	<b>0.020</b> (0.019-0.021)	<b>0.024</b> (0.022-0.025)	<b>0.029</b> (0.027-0.031)	<b>0.033</b> (0.031-0.035)	<b>0.038</b> (0.035-0.041)	<b>0.042</b> (0.039-0.045)	<b>0.046</b> (0.043-0.050)	<b>0.051</b> (0.047-0.054)	<b>0.056</b> (0.052-0.061)	<b>0.061</b> (0.056-0.066)
20-day	<b>0.013</b> (0.012-0.014)	<b>0.016</b> (0.015-0.017)	<b>0.019</b> (0.018-0.020)	<b>0.021</b> (0.020-0.022)	<b>0.024</b> (0.023-0.026)	<b>0.027</b> (0.025-0.029)	<b>0.029</b> (0.027-0.031)	<b>0.032</b> (0.030-0.034)	<b>0.035</b> (0.033-0.038)	<b>0.038</b> (0.035-0.041)
30-day	<b>0.011</b> (0.010-0.012)	<b>0.013</b> (0.012-0.014)	<b>0.015</b> (0.014-0.016)	<b>0.017</b> (0.016-0.018)	<b>0.019</b> (0.018-0.020)	<b>0.021</b> (0.019-0.022)	<b>0.023</b> (0.021-0.024)	<b>0.024</b> (0.023-0.026)	<b>0.027</b> (0.025-0.028)	<b>0.028</b> (0.026-0.030)
45-day	<b>0.009</b> (0.009-0.010)	<b>0.011</b> (0.010-0.011)	<b>0.012</b> (0.012-0.013)	<b>0.014</b> (0.013-0.015)	<b>0.015</b> (0.015-0.016)	<b>0.017</b> (0.016-0.018)	<b>0.018</b> (0.017-0.019)	<b>0.019</b> (0.018-0.020)	<b>0.021</b> (0.019-0.022)	<b>0.022</b> (0.020-0.023)
60-day	<b>0.008</b> (0.008-0.009)	<b>0.010</b> (0.009-0.010)	<b>0.011</b> (0.010-0.012)	<b>0.012</b> (0.011-0.013)	<b>0.013</b> (0.013-0.014)	<b>0.014</b> (0.014-0.015)	<b>0.015</b> (0.014-0.016)	<b>0.016</b> (0.015-0.017)	<b>0.018</b> (0.016-0.019)	<b>0.018</b> (0.017-0.020)

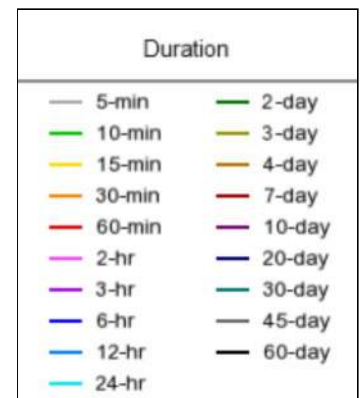
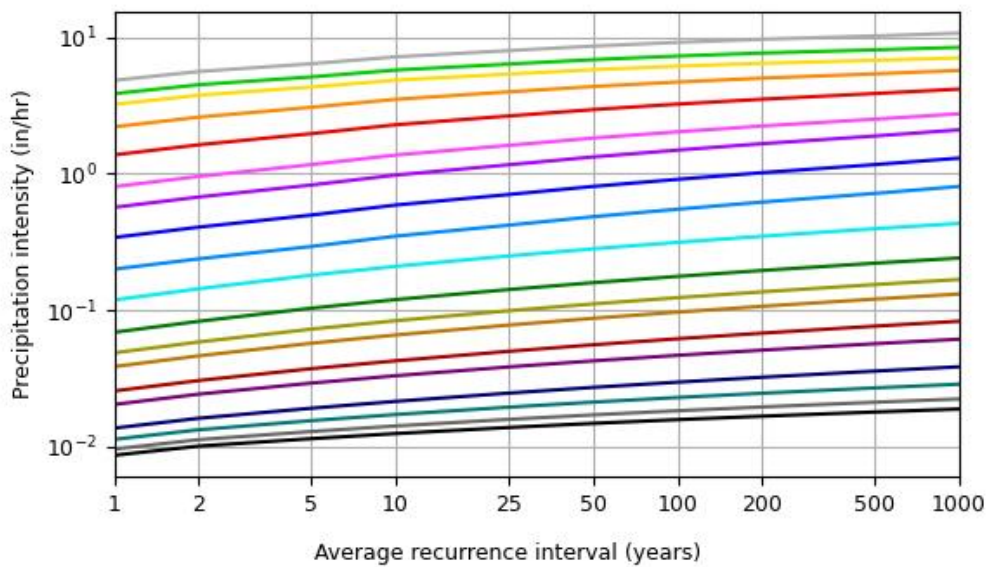
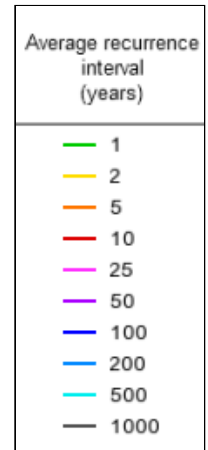
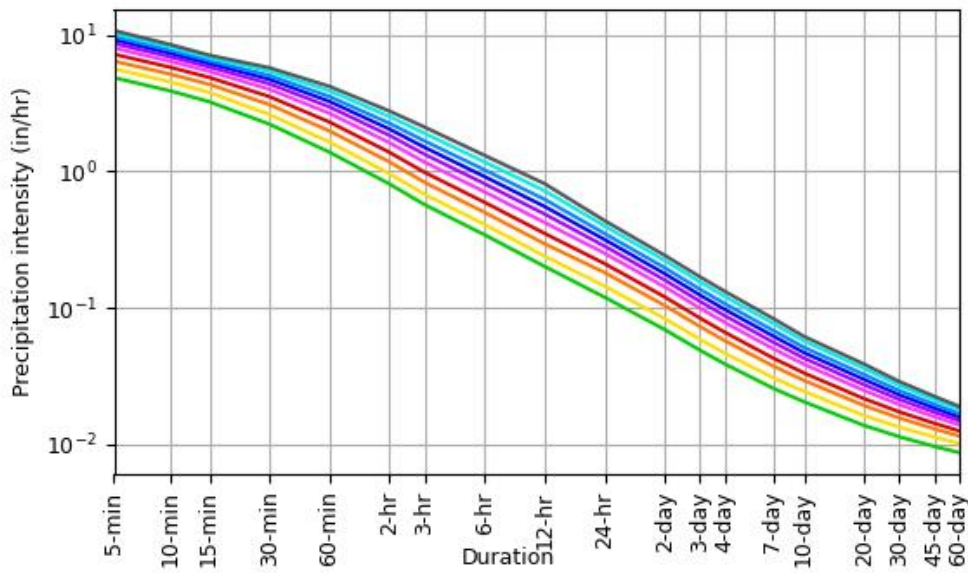
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**

PDS-based intensity-duration-frequency (IDF) curves

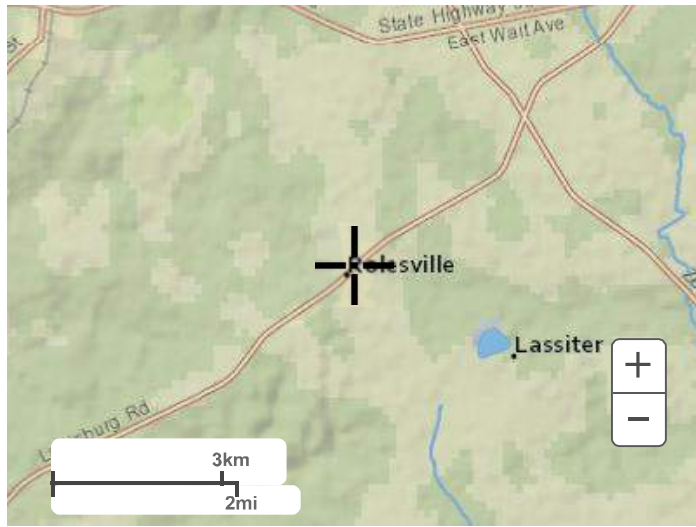
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**Maps & aerials**

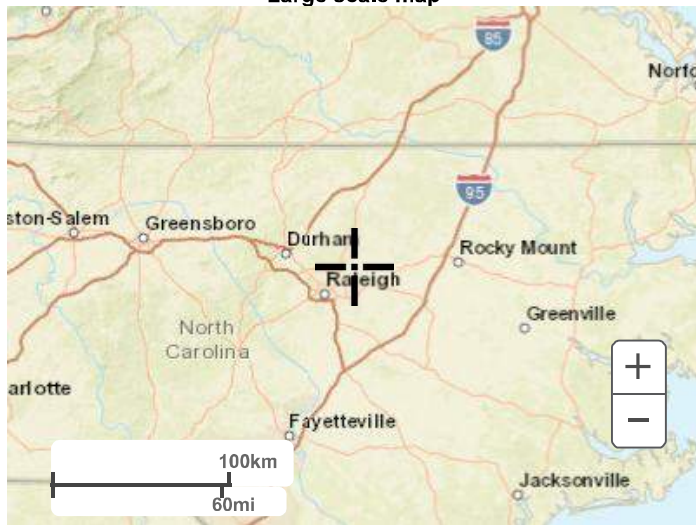
**Small scale terrain**



Large scale terrain

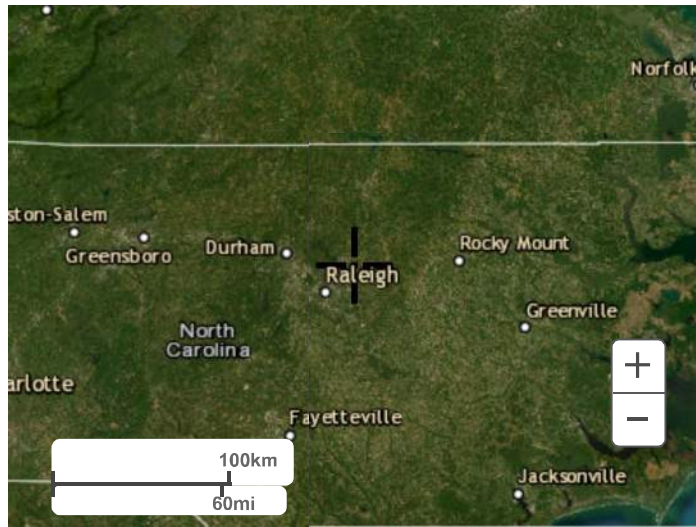


Large scale map



Large scale aerial





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**POINT PRECIPITATION FREQUENCY ESTIMATES**

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NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps & aerials](#)

**PF tabular**

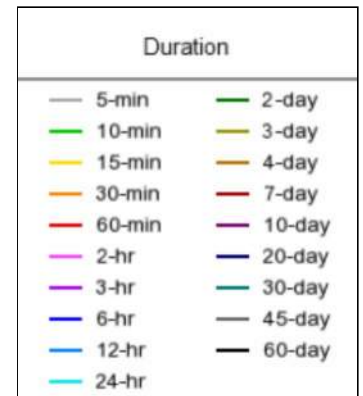
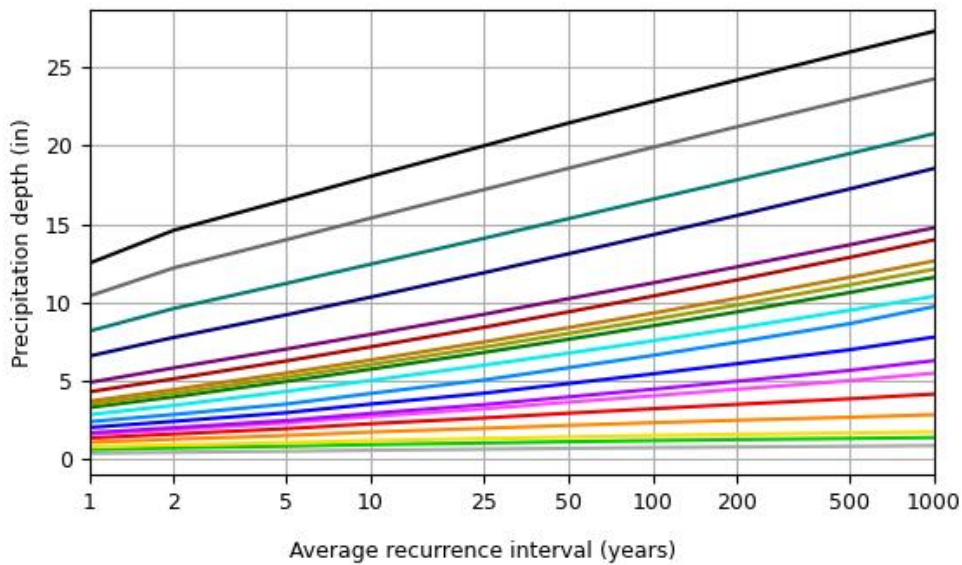
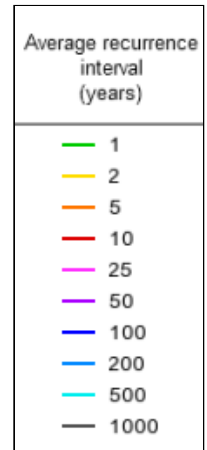
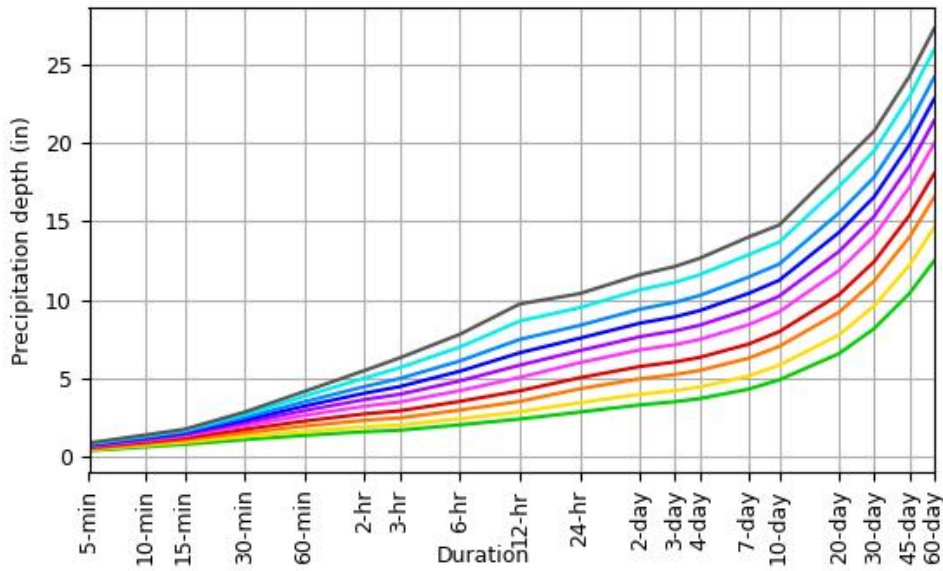
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	<b>0.403</b> (0.369-0.441)	<b>0.468</b> (0.429-0.511)	<b>0.533</b> (0.489-0.582)	<b>0.599</b> (0.548-0.654)	<b>0.665</b> (0.606-0.725)	<b>0.718</b> (0.651-0.782)	<b>0.765</b> (0.689-0.833)	<b>0.806</b> (0.722-0.880)	<b>0.852</b> (0.757-0.931)	<b>0.893</b> (0.787-0.978)
10-min	<b>0.644</b> (0.590-0.704)	<b>0.749</b> (0.687-0.818)	<b>0.854</b> (0.783-0.932)	<b>0.959</b> (0.877-1.04)	<b>1.06</b> (0.966-1.16)	<b>1.14</b> (1.04-1.25)	<b>1.22</b> (1.10-1.32)	<b>1.28</b> (1.14-1.39)	<b>1.35</b> (1.20-1.47)	<b>1.41</b> (1.24-1.54)
15-min	<b>0.805</b> (0.738-0.880)	<b>0.942</b> (0.863-1.03)	<b>1.08</b> (0.990-1.18)	<b>1.21</b> (1.11-1.32)	<b>1.34</b> (1.22-1.46)	<b>1.45</b> (1.31-1.58)	<b>1.54</b> (1.38-1.67)	<b>1.61</b> (1.44-1.76)	<b>1.70</b> (1.51-1.85)	<b>1.77</b> (1.56-1.93)
30-min	<b>1.10</b> (1.01-1.21)	<b>1.30</b> (1.19-1.42)	<b>1.54</b> (1.41-1.68)	<b>1.76</b> (1.61-1.92)	<b>1.99</b> (1.81-2.17)	<b>2.18</b> (1.98-2.38)	<b>2.35</b> (2.12-2.56)	<b>2.51</b> (2.25-2.74)	<b>2.70</b> (2.40-2.95)	<b>2.86</b> (2.52-3.13)
60-min	<b>1.38</b> (1.26-1.50)	<b>1.63</b> (1.50-1.78)	<b>1.97</b> (1.80-2.15)	<b>2.29</b> (2.09-2.50)	<b>2.65</b> (2.41-2.89)	<b>2.95</b> (2.68-3.22)	<b>3.24</b> (2.92-3.53)	<b>3.52</b> (3.15-3.84)	<b>3.87</b> (3.44-4.23)	<b>4.18</b> (3.68-4.57)
2-hr	<b>1.61</b> (1.46-1.78)	<b>1.91</b> (1.75-2.10)	<b>2.34</b> (2.13-2.56)	<b>2.74</b> (2.49-3.01)	<b>3.23</b> (2.91-3.53)	<b>3.65</b> (3.28-3.99)	<b>4.06</b> (3.62-4.44)	<b>4.48</b> (3.97-4.90)	<b>5.03</b> (4.41-5.49)	<b>5.51</b> (4.79-6.04)
3-hr	<b>1.71</b> (1.55-1.89)	<b>2.03</b> (1.85-2.24)	<b>2.48</b> (2.26-2.74)	<b>2.94</b> (2.67-3.24)	<b>3.50</b> (3.15-3.84)	<b>3.99</b> (3.57-4.38)	<b>4.48</b> (3.98-4.91)	<b>4.99</b> (4.40-5.47)	<b>5.68</b> (4.95-6.22)	<b>6.31</b> (5.44-6.93)
6-hr	<b>2.05</b> (1.87-2.26)	<b>2.44</b> (2.23-2.68)	<b>2.99</b> (2.72-3.28)	<b>3.54</b> (3.22-3.88)	<b>4.22</b> (3.81-4.62)	<b>4.84</b> (4.34-5.29)	<b>5.46</b> (4.86-5.96)	<b>6.11</b> (5.38-6.66)	<b>6.99</b> (6.08-7.62)	<b>7.81</b> (6.70-8.53)
12-hr	<b>2.41</b> (2.21-2.66)	<b>2.87</b> (2.64-3.15)	<b>3.54</b> (3.24-3.88)	<b>4.21</b> (3.84-4.62)	<b>5.06</b> (4.59-5.53)	<b>5.84</b> (5.25-6.36)	<b>6.63</b> (5.90-7.21)	<b>7.48</b> (6.58-8.12)	<b>8.65</b> (7.49-9.40)	<b>9.74</b> (8.31-10.6)
24-hr	<b>2.86</b> (2.66-3.08)	<b>3.45</b> (3.22-3.72)	<b>4.34</b> (4.04-4.68)	<b>5.04</b> (4.68-5.43)	<b>6.00</b> (5.56-6.46)	<b>6.77</b> (6.24-7.28)	<b>7.56</b> (6.95-8.14)	<b>8.38</b> (7.67-9.02)	<b>9.50</b> (8.66-10.3)	<b>10.4</b> (9.43-11.2)
2-day	<b>3.32</b> (3.09-3.57)	<b>3.99</b> (3.72-4.30)	<b>4.98</b> (4.64-5.36)	<b>5.76</b> (5.35-6.20)	<b>6.81</b> (6.31-7.34)	<b>7.65</b> (7.07-8.24)	<b>8.52</b> (7.84-9.17)	<b>9.41</b> (8.62-10.1)	<b>10.6</b> (9.69-11.5)	<b>11.6</b> (10.5-12.6)
3-day	<b>3.52</b> (3.28-3.77)	<b>4.23</b> (3.95-4.53)	<b>5.24</b> (4.89-5.62)	<b>6.05</b> (5.63-6.48)	<b>7.15</b> (6.63-7.67)	<b>8.02</b> (7.42-8.60)	<b>8.92</b> (8.22-9.57)	<b>9.84</b> (9.04-10.6)	<b>11.1</b> (10.1-12.0)	<b>12.1</b> (11.0-13.1)
4-day	<b>3.72</b> (3.48-3.98)	<b>4.46</b> (4.17-4.77)	<b>5.51</b> (5.15-5.89)	<b>6.34</b> (5.91-6.77)	<b>7.48</b> (6.95-8.00)	<b>8.39</b> (7.77-8.97)	<b>9.32</b> (8.60-9.98)	<b>10.3</b> (9.45-11.0)	<b>11.6</b> (10.6-12.5)	<b>12.7</b> (11.5-13.6)
7-day	<b>4.31</b> (4.04-4.60)	<b>5.15</b> (4.82-5.50)	<b>6.28</b> (5.88-6.70)	<b>7.18</b> (6.71-7.66)	<b>8.41</b> (7.84-8.98)	<b>9.40</b> (8.72-10.0)	<b>10.4</b> (9.63-11.1)	<b>11.4</b> (10.6-12.3)	<b>12.9</b> (11.8-13.8)	<b>14.0</b> (12.8-15.0)
10-day	<b>4.91</b> (4.60-5.24)	<b>5.84</b> (5.48-6.23)	<b>7.04</b> (6.59-7.50)	<b>7.97</b> (7.46-8.49)	<b>9.24</b> (8.62-9.84)	<b>10.2</b> (9.53-10.9)	<b>11.2</b> (10.4-12.0)	<b>12.3</b> (11.4-13.1)	<b>13.7</b> (12.6-14.6)	<b>14.8</b> (13.6-15.8)
20-day	<b>6.59</b> (6.20-7.01)	<b>7.78</b> (7.32-8.28)	<b>9.21</b> (8.66-9.80)	<b>10.3</b> (9.71-11.0)	<b>11.9</b> (11.1-12.6)	<b>13.1</b> (12.2-13.9)	<b>14.3</b> (13.3-15.2)	<b>15.5</b> (14.4-16.6)	<b>17.2</b> (15.9-18.4)	<b>18.5</b> (17.1-19.9)
30-day	<b>8.18</b> (7.72-8.68)	<b>9.62</b> (9.08-10.2)	<b>11.2</b> (10.6-11.9)	<b>12.4</b> (11.7-13.2)	<b>14.1</b> (13.2-15.0)	<b>15.3</b> (14.4-16.3)	<b>16.6</b> (15.5-17.6)	<b>17.8</b> (16.6-19.0)	<b>19.5</b> (18.1-20.8)	<b>20.8</b> (19.2-22.2)
45-day	<b>10.4</b> (9.89-11.0)	<b>12.2</b> (11.6-12.9)	<b>14.0</b> (13.3-14.8)	<b>15.4</b> (14.6-16.2)	<b>17.2</b> (16.2-18.1)	<b>18.5</b> (17.5-19.6)	<b>19.9</b> (18.7-21.0)	<b>21.2</b> (19.9-22.4)	<b>22.9</b> (21.4-24.3)	<b>24.2</b> (22.6-25.7)
60-day	<b>12.5</b> (11.9-13.1)	<b>14.6</b> (13.9-15.3)	<b>16.5</b> (15.7-17.4)	<b>18.0</b> (17.1-19.0)	<b>20.0</b> (18.9-21.0)	<b>21.4</b> (20.3-22.5)	<b>22.8</b> (21.5-24.0)	<b>24.2</b> (22.8-25.5)	<b>25.9</b> (24.4-27.4)	<b>27.3</b> (25.6-28.9)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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**PF graphical**

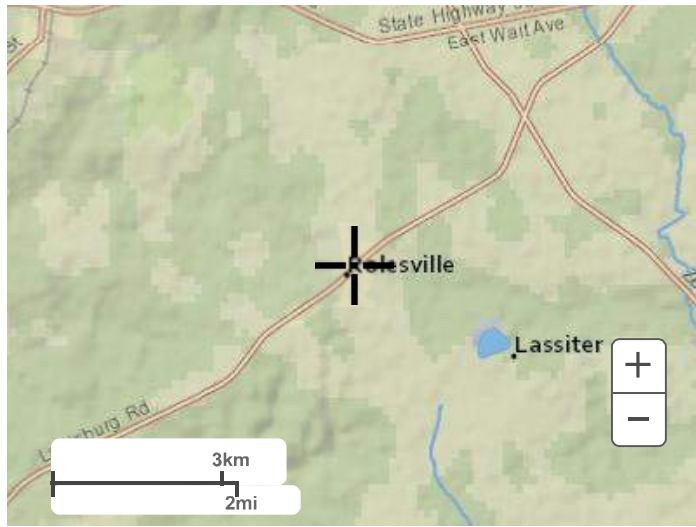
PDS-based depth-duration-frequency (DDF) curves  
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**Maps & aerials**

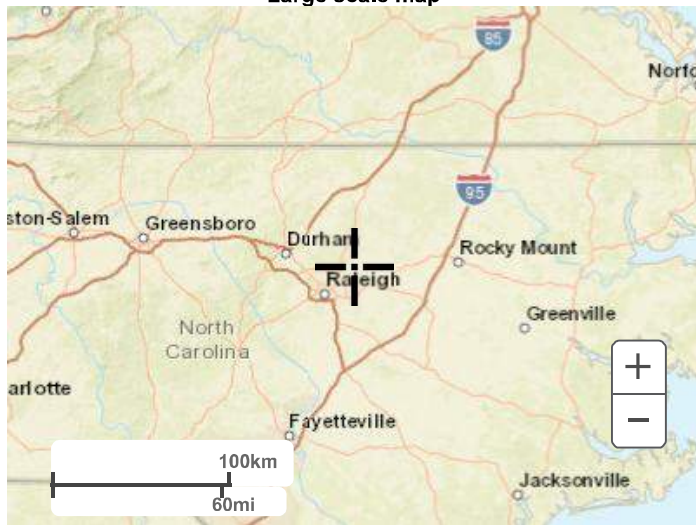
**Small scale terrain**



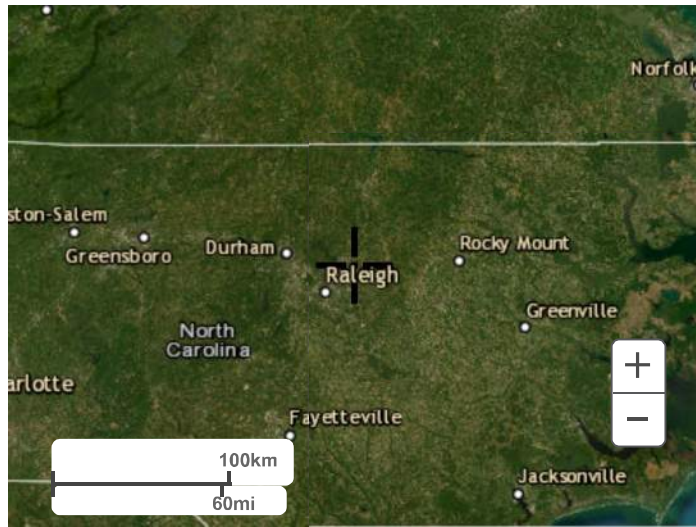
Large scale terrain



Large scale map



Large scale aerial



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