



---

# **Storm Drainage Calculations** *Rolesville NC*

Frazier Farms Park Phase 1A / May 2023 / Revised August 2023 / 2020110039



# FRAZIER FARM PARK

PHASE 1A

ROLESVILLE, NORTH CAROLINA

STORM DRAINAGE CALCULATIONS

**PROJECT NUMBER:** 2020110039  
**CERTIFIED BY:** ERIC DOMONELL, PE

**DATE:** MAY 2023  
**REVISION 1:** AUGUST 2023



MCADAMS  
621 HILLSBOROUGH STREET  
SUITE 500  
RALEIGH, NORTH CAROLINA 27603  
NC Lic. # C-0293

**TOWN OF ROLESVILLE**  
**FRAZIER FARM PARK**  
SIA NARRATIVE

**GENERAL DESCRIPTION**

Located on Louisburg Road between Zebulon Road and Pulley Town Road in Rolesville, North Carolina, the approximately 8-acre project area is located within a portion of a +/- 116.56-acre parcel, which is further described by State Parcel Identification Numbers (PIN) 1779076610.

The site is located within the limits of the Town of Rolesville (the Town) and is therefore under the jurisdiction of the Town. Per the Town's mapping, the site is currently zoned PNR, Parks and Natural Resources. The portion of the parcels in which the site is located is bound to the north by an agricultural land class parcel, the west by Louisburg Rd with a residential development across the street, the south by a forestry land class parcel, and to the east by another agricultural land class parcel. The receiving stream for the proposed site is Perry Creek (NC stream index number 27-57-2, NC stream classification: Class WS-II;HQW;NSW), which belongs to the Neuse River Basin. The site is currently vacant farmland.

At this time, the Town of Rolesville is seeking to develop a roadway to serve the future recreational facility on the property. Anticipated improvements include two driveways, the roadway, associated parking and utilities.

**DISCUSSION OF STORMWATER MANAGEMENT**

The project, for this phase of development, will add a maximum of 1.85 acres of impervious surface. This project will be a low-density development and stormwater run-off will be collected via swales adjacent to the road then dissipated at low points via riprap pads.

Development on this site will be required to meet the stormwater management requirements enforced by the State. The construction of permanent stormwater control measures (SCMs) are not anticipated due to the low-impact nature of this development.

**DISCUSSION OF EROSION CONTROL**

It is our understanding that land-disturbing activities will be governed by NCDEQ. Development on this tract will be designed to incorporate appropriate erosion and sediment controls onsite, which are anticipated to consist largely of silt fence and silt fence outlets. The silt fence outlets will be installed in low spots and as the engineer instructs throughout the project, in accordance with the details and project specification manual, to prevent silt fence failure. Where stockpiles exist, an additional row of silt fence will be provided. One sediment trap will be required. There are no proposed experimental erosion control devices or methods proposed in this design.



United States  
Department of  
Agriculture

NRCS

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Wake County, North Carolina



# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

---

|  |    |
|--|----|
| <b>Preface</b> .....   | 2  |
| <b>How Soil Surveys Are Made</b> .....   | 5  |
| <b>Soil Map</b> .....  | 8  |
| Soil Map.....  | 9  |
| Legend.....  | 10 |
| Map Unit Legend.....   | 11 |
| Map Unit Descriptions.....   | 11 |
| Wake County, North Carolina.....   | 14 |
| AaA—Altavista fine sandy loam, 0 to 4 percent slopes, rarely flooded.....          | 14 |
| AuA—Augusta fine sandy loam, 0 to 2 percent slopes, rarely flooded.....            | 15 |
| ChA—Chewacla and Wehadkee soils, 0 to 2 percent slopes,<br>frequently flooded..... | 16 |
| HeB—Helena sandy loam, 2 to 6 percent slopes.....                                  | 17 |
| RgB—Rawlings-Rion complex, 2 to 6 percent slopes.....                              | 18 |
| RgC—Rawlings-Rion complex, 6 to 10 percent slopes.....                             | 20 |
| RgD—Rawlings-Rion complex, 10 to 15 percent slopes.....                            | 22 |
| VaB—Vance sandy loam, 2 to 6 percent slopes.....                                   | 23 |
| W—Water.....   | 24 |
| WeB—Wedowee sandy loam, 2 to 6 percent slopes.....                                 | 25 |
| WeC—Wedowee sandy loam, 6 to 10 percent slopes.....                                | 26 |
| WfB—Wedowee-Saw complex, 2 to 6 percent slopes.....                                | 27 |
| <b>References</b> .....  | 29 |

# How Soil Surveys Are Made

---

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil



## Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map




Map Scale: 1:16,700 if printed on A landscape (11" x 8.5") sheet.



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

### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil 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.

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 23, Sep 12, 2022

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 |
|------------------------------------|--|----------------|----------------|
| AaA                                | Altavista fine sandy loam, 0 to 4 percent slopes, rarely flooded       | 44.2           | 3.8%           |
| AuA                                | Augusta fine sandy loam, 0 to 2 percent slopes, rarely flooded         | 11.2           | 1.0%           |
| ChA                                | Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded | 183.4          | 15.8%          |
| HeB                                | Helena sandy loam, 2 to 6 percent slopes                               | 84.5           | 7.3%           |
| RgB                                | Rawlings-Rion complex, 2 to 6 percent slopes                           | 110.4          | 9.5%           |
| RgC                                | Rawlings-Rion complex, 6 to 10 percent slopes                          | 152.8          | 13.1%          |
| RgD                                | Rawlings-Rion complex, 10 to 15 percent slopes                         | 74.1           | 6.4%           |
| VaB                                | Vance sandy loam, 2 to 6 percent slopes                                | 10.7           | 0.9%           |
| W                                  | Water  | 37.0           | 3.2%           |
| WeB                                | Wedowee sandy loam, 2 to 6 percent slopes                              | 268.2          | 23.1%          |
| WeC                                | Wedowee sandy loam, 6 to 10 percent slopes                             | 33.3           | 2.9%           |
| WfB                                | Wedowee-Saw complex, 2 to 6 percent slopes                             | 153.1          | 13.2%          |
| <b>Totals for Area of Interest</b> |  | <b>1,163.0</b> | <b>100.0%</b>  |

## Map Unit Descriptions

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

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

## Custom Soil Resource Report

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

## Custom Soil Resource Report

of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.



## Wake County, North Carolina

### AaA—Altavista fine sandy loam, 0 to 4 percent slopes, rarely flooded

#### Map Unit Setting

*National map unit symbol:* 2xh95  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Altavista, rarely flooded, and similar soils:* 95 percent  
*Minor components:* 2 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Altavista, Rarely Flooded

##### Setting

*Landform:* Stream terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Old loamy alluvium derived from igneous and metamorphic rock

##### Typical profile

*Ap - 0 to 8 inches:* fine sandy loam  
*E - 8 to 12 inches:* fine sandy loam  
*BE - 12 to 15 inches:* sandy clay loam  
*Bt - 15 to 35 inches:* clay loam  
*BC - 35 to 42 inches:* sandy loam  
*C - 42 to 80 inches:* coarse sandy loam

##### Properties and qualities

*Slope:* 0 to 4 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)  
*Depth to water table:* About 18 to 30 inches  
*Frequency of flooding:* Rare  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* C  
*Ecological site:* F136XY660NC - High-bottomland forest, moist  
*Hydric soil rating:* No

**Minor Components**

**Roanoke, occasionally flooded, undrained**

*Percent of map unit:* 2 percent  
*Landform:* Stream terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

**AuA—Augusta fine sandy loam, 0 to 2 percent slopes, rarely flooded**

**Map Unit Setting**

*National map unit symbol:* 2spph  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* Prime farmland if drained

**Map Unit Composition**

*Augusta, rarely flooded, and similar soils:* 95 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Augusta, Rarely Flooded**

**Setting**

*Landform:* Stream terraces  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Riser, tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Old loamy alluvium derived from igneous and metamorphic rock

**Typical profile**

*A - 0 to 12 inches:* fine sandy loam  
*Btg - 12 to 50 inches:* sandy clay loam  
*Cg - 50 to 80 inches:* loamy sand

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.20 to 1.98 in/hr)  
*Depth to water table:* About 12 to 24 inches  
*Frequency of flooding:* Rare  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* C/D  
*Ecological site:* F136XY650NC - Bottomland forest, wet  
*Hydric soil rating:* No

**ChA—Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded**

**Map Unit Setting**

*National map unit symbol:* 2qwpj  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

**Map Unit Composition**

*Chewacla, frequently flooded, and similar soils:* 50 percent  
*Wehadkee, frequently flooded, and similar soils:* 45 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Chewacla, Frequently Flooded**

**Setting**

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Loamy alluvium derived from igneous and metamorphic rock

**Typical profile**

*A - 0 to 4 inches:* loam  
*Bw1 - 4 to 26 inches:* silty clay loam  
*Bw2 - 26 to 38 inches:* loam  
*Bw3 - 38 to 60 inches:* clay loam  
*C - 60 to 80 inches:* loam

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)  
*Depth to water table:* About 6 to 24 inches  
*Frequency of flooding:* NoneFrequent  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 10.1 inches)

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* B/D  
*Ecological site:* F136XY610GA - Flood plain forest, wet  
*Hydric soil rating:* No

### Description of Wehadkee, Frequently Flooded

#### Setting

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Loamy alluvium derived from igneous and metamorphic rock

#### Typical profile

*A - 0 to 7 inches:* silt loam  
*Bg - 7 to 49 inches:* clay loam  
*Cg - 49 to 80 inches:* clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.20 to 1.98 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* NoneFrequent  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 11.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6w  
*Hydrologic Soil Group:* B/D  
*Ecological site:* F136XY600NC - Flood plain swamp forest, hydric soils  
*Hydric soil rating:* Yes

### HeB—Helena sandy loam, 2 to 6 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2qqgq  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Helena and similar soils: 92 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Helena**

**Setting**

*Landform: Interfluves*

*Landform position (two-dimensional): Summit, shoulder*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Convex*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from granite and gneiss*

**Typical profile**

*Ap - 0 to 12 inches: sandy loam*

*BE - 12 to 19 inches: sandy clay loam*

*Bt1 - 19 to 39 inches: clay*

*Bt2 - 39 to 43 inches: clay loam*

*BCg - 43 to 46 inches: clay loam*

*C - 46 to 80 inches: sandy loam*

**Properties and qualities**

*Slope: 2 to 6 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Moderately well drained*

*Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)*

*Depth to water table: About 18 to 30 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)*

**Interpretive groups**

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 2e*

*Hydrologic Soil Group: D*

*Ecological site: F136XY810SC - Acidic upland forest, seasonally wet*

*Hydric soil rating: No*

**RgB—Rawlings-Rion complex, 2 to 6 percent slopes**

**Map Unit Setting**

*National map unit symbol: 2xhb9*

*Elevation: 70 to 560 feet*

*Mean annual precipitation: 39 to 47 inches*

*Mean annual air temperature: 55 to 63 degrees F*

*Frost-free period: 200 to 250 days*

*Farmland classification: Farmland of statewide importance*

### Map Unit Composition

*Rawlings and similar soils: 55 percent*

*Rion and similar soils: 35 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Rawlings

#### Setting

*Landform: Interfluves*

*Landform position (two-dimensional): Summit, shoulder*

*Landform position (three-dimensional): Interfluve*

*Down-slope shape: Convex*

*Across-slope shape: Convex*

*Parent material: Residuum weathered from granite*

#### Typical profile

*Ap - 0 to 8 inches: sandy loam*

*Bt - 8 to 20 inches: sandy clay loam*

*C - 20 to 40 inches: gravelly sandy loam*

*R - 40 to 80 inches: bedrock*

#### Properties and qualities

*Slope: 2 to 6 percent*

*Depth to restrictive feature: 20 to 40 inches to lithic bedrock*

*Drainage class: Well drained*

*Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: Low (about 4.7 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 2e*

*Hydrologic Soil Group: C*

*Ecological site: F136XY830NC - Acidic upland forest, dry-moist*

*Hydric soil rating: No*

### Description of Rion

#### Setting

*Landform: Interfluves*

*Landform position (two-dimensional): Summit, shoulder*

*Landform position (three-dimensional): Interfluve*

*Down-slope shape: Convex*

*Across-slope shape: Convex*

*Parent material: Saprolite derived from granite and gneiss*

#### Typical profile

*Ap - 0 to 8 inches: sandy loam*

*Bt1 - 8 to 17 inches: sandy clay loam*

*Bt2 - 17 to 38 inches: sandy loam*

*C - 38 to 80 inches: sandy loam*

#### Properties and qualities

*Slope: 2 to 6 percent*

## Custom Soil Resource Report

*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 7.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* B  
*Ecological site:* F136XY820GA - Acidic upland forest, moist  
*Hydric soil rating:* No

## RgC—Rawlings-Rion complex, 6 to 10 percent slopes

### Map Unit Setting

*National map unit symbol:* 2xhbb  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Rawlings and similar soils:* 55 percent  
*Rion and similar soils:* 35 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Rawlings

#### Setting

*Landform:* Interfluves  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from granite

#### Typical profile

*Ap - 0 to 8 inches:* sandy loam  
*Bt - 8 to 20 inches:* sandy clay loam  
*C - 20 to 40 inches:* gravelly sandy loam  
*R - 40 to 80 inches:* bedrock

#### Properties and qualities

*Slope:* 6 to 10 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Drainage class:* Well drained

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 4.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* C

*Ecological site:* F136XY830NC - Acidic upland forest, dry-moist

*Hydric soil rating:* No

### Description of Rion

#### Setting

*Landform:* Interfluves

*Landform position (two-dimensional):* Shoulder, backslope

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Saprolite derived from granite and gneiss

#### Typical profile

*Ap - 0 to 8 inches:* sandy loam

*Bt1 - 8 to 17 inches:* sandy clay loam

*Bt2 - 17 to 38 inches:* sandy loam

*C - 38 to 80 inches:* sandy loam

#### Properties and qualities

*Slope:* 6 to 10 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Moderate (about 7.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* B

*Ecological site:* F136XY820GA - Acidic upland forest, moist

*Hydric soil rating:* No



## **RgD—Rawlings-Rion complex, 10 to 15 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2xhb8

*Elevation:* 70 to 560 feet

*Mean annual precipitation:* 39 to 47 inches

*Mean annual air temperature:* 55 to 63 degrees F

*Frost-free period:* 200 to 250 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Rawlings and similar soils:* 55 percent

*Rion and similar soils:* 35 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Rawlings**

#### **Setting**

*Landform:* Interfluves

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from granite

#### **Typical profile**

*Ap - 0 to 8 inches:* sandy loam

*Bt - 8 to 20 inches:* sandy clay loam

*C - 20 to 40 inches:* gravelly sandy loam

*R - 40 to 80 inches:* bedrock

#### **Properties and qualities**

*Slope:* 10 to 15 percent

*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 4.7 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* C

*Ecological site:* F136XY830NC - Acidic upland forest, dry-moist

*Hydric soil rating:* No

**Description of Rion**

**Setting**

*Landform:* Interfluves  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Saprolite derived from granite and gneiss

**Typical profile**

*Ap - 0 to 8 inches:* sandy loam  
*Bt1 - 8 to 17 inches:* sandy clay loam  
*Bt2 - 17 to 38 inches:* sandy loam  
*C - 38 to 80 inches:* sandy loam

**Properties and qualities**

*Slope:* 10 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 7.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Ecological site:* F136XY820GA - Acidic upland forest, moist  
*Hydric soil rating:* No

**VaB—Vance sandy loam, 2 to 6 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2qqj  
*Elevation:* 70 to 560 feet  
*Mean annual precipitation:* 39 to 47 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Vance and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Vance

### Setting

*Landform:* Interfluves  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Saprolite residuum weathered from granite and gneiss

### Typical profile

*Ap - 0 to 5 inches:* sandy loam  
*Bt1 - 5 to 23 inches:* clay  
*Bt2 - 23 to 29 inches:* clay loam  
*C - 29 to 80 inches:* loam

### Properties and qualities

*Slope:* 2 to 6 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* High (about 9.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
*Hydrologic Soil Group:* D  
*Ecological site:* F136XY820GA - Acidic upland forest, moist  
*Hydric soil rating:* No

## W—Water

### Map Unit Setting

*National map unit symbol:* 2qqjv  
*Elevation:* 70 to 450 feet  
*Mean annual precipitation:* 39 to 51 inches  
*Mean annual air temperature:* 55 to 63 degrees F  
*Frost-free period:* 200 to 250 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Water:* 100 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Water

#### Interpretive groups

*Land capability classification (irrigated):* None specified

## Custom Soil Resource Report

*Land capability classification (nonirrigated): 8*  
*Hydric soil rating: No*

### **WeB—Wedowee sandy loam, 2 to 6 percent slopes**

#### **Map Unit Setting**

*National map unit symbol: 2xn40*  
*Elevation: 70 to 560 feet*  
*Mean annual precipitation: 39 to 47 inches*  
*Mean annual air temperature: 55 to 63 degrees F*  
*Frost-free period: 200 to 250 days*  
*Farmland classification: All areas are prime farmland*

#### **Map Unit Composition**

*Wedowee and similar soils: 94 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Wedowee**

##### **Setting**

*Landform: Interfluves*  
*Landform position (two-dimensional): Summit, shoulder*  
*Landform position (three-dimensional): Interfluve*  
*Down-slope shape: Convex*  
*Across-slope shape: Convex*  
*Parent material: Saprolite residuum weathered from granite and gneiss and/or  
saprolite residuum weathered from schist*

##### **Typical profile**

*Ap - 0 to 4 inches: sandy loam*  
*E - 4 to 7 inches: sandy loam*  
*BC - 23 to 35 inches: clay loam*  
*C - 35 to 80 inches: sandy clay loam*

##### **Properties and qualities**

*Slope: 2 to 6 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Drainage class: Well drained*  
*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high  
(0.57 to 1.98 in/hr)*  
*Depth to water table: More than 80 inches*  
*Frequency of flooding: None*  
*Frequency of ponding: None*  
*Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)*

##### **Interpretive groups**

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 2e*  
*Hydrologic Soil Group: B*  
*Ecological site: F136XY820GA - Acidic upland forest, moist*  
*Hydric soil rating: No*

## **WeC—Wedowee sandy loam, 6 to 10 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2xn41

*Elevation:* 70 to 560 feet

*Mean annual precipitation:* 39 to 47 inches

*Mean annual air temperature:* 55 to 63 degrees F

*Frost-free period:* 200 to 250 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Wedowee and similar soils:* 94 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Wedowee**

#### **Setting**

*Landform:* Interfluves

*Landform position (two-dimensional):* Shoulder, backslope

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Saprolite residuum weathered from granite and gneiss and/or  
saprolite residuum weathered from schist

#### **Typical profile**

*Ap - 0 to 4 inches:* sandy loam

*E - 4 to 7 inches:* sandy loam

*BC - 23 to 35 inches:* clay loam

*C - 35 to 80 inches:* sandy clay loam

#### **Properties and qualities**

*Slope:* 6 to 10 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* B

*Ecological site:* F136XY820GA - Acidic upland forest, moist

*Hydric soil rating:* No

## WfB—Wedowee-Saw complex, 2 to 6 percent slopes

### Map Unit Setting

*National map unit symbol:* 2xn42

*Elevation:* 70 to 560 feet

*Mean annual precipitation:* 39 to 47 inches

*Mean annual air temperature:* 55 to 63 degrees F

*Frost-free period:* 200 to 250 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Wedowee and similar soils:* 60 percent

*Saw and similar soils:* 35 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Wedowee

#### Setting

*Landform:* Interfluves

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Saprolite residuum weathered from granite and gneiss and/or  
saprolite residuum weathered from schist

#### Typical profile

*Ap - 0 to 4 inches:* sandy loam

*E - 4 to 7 inches:* sandy loam

*BC - 23 to 35 inches:* clay loam

*C - 35 to 80 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 2 to 6 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Moderate (about 6.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* B

*Ecological site:* F136XY820GA - Acidic upland forest, moist

*Hydric soil rating:* No

## Custom Soil Resource Report

### Description of Saw

#### Setting

*Landform:* Interfluves

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from granite and gneiss

#### Typical profile

*Ap - 0 to 8 inches:* sandy loam

*Bt - 8 to 20 inches:* clay

*BC - 20 to 26 inches:* sandy clay loam

*C - 26 to 29 inches:* sandy loam

*R - 29 to 80 inches:* bedrock

#### Properties and qualities

*Slope:* 2 to 6 percent

*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to low (0.00 to 0.01 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* C

*Ecological site:* F136XY830NC - Acidic upland forest, dry-moist

*Hydric soil rating:* No

# References

---

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_054262](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262)
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053577](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577)
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053580](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580)
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2\\_053374](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374)
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>



## Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)



**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Wake Forest, North Carolina, USA\***  
**Latitude: 35.9388°, Longitude: -78.4234°**  
**Elevation: m/ft\*\***  
 \* source: ESRI Maps  
 \*\* source: USGS



**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   | 4.84<br>(4.44-5.30)                 | 5.62<br>(5.15-6.13)    | 6.40<br>(5.86-6.97)    | 7.19<br>(6.58-7.85)    | 7.99<br>(7.27-8.71)    | 8.64<br>(7.82-9.41)    | 9.20<br>(8.29-10.0)    | 9.72<br>(8.70-10.6)    | 10.3<br>(9.13-11.2)    | 10.8<br>(9.52-11.8)    |
| 10-min  | 3.86<br>(3.55-4.23)                 | 4.49<br>(4.12-4.91)    | 5.12<br>(4.69-5.58)    | 5.75<br>(5.26-6.27)    | 6.37<br>(5.80-6.94)    | 6.88<br>(6.23-7.49)    | 7.31<br>(6.59-7.97)    | 7.70<br>(6.90-8.41)    | 8.14<br>(7.22-8.89)    | 8.51<br>(7.49-9.31)    |
| 15-min  | 3.22<br>(2.95-3.53)                 | 3.76<br>(3.45-4.11)    | 4.32<br>(3.96-4.71)    | 4.85<br>(4.44-5.29)    | 5.38<br>(4.90-5.86)    | 5.80<br>(5.26-6.33)    | 6.16<br>(5.56-6.72)    | 6.48<br>(5.80-7.07)    | 6.82<br>(6.06-7.46)    | 7.12<br>(6.27-7.79)    |
| 30-min  | 2.21<br>(2.02-2.42)                 | 2.60<br>(2.38-2.84)    | 3.07<br>(2.81-3.34)    | 3.51<br>(3.21-3.83)    | 3.98<br>(3.63-4.34)    | 4.37<br>(3.96-4.76)    | 4.72<br>(4.25-5.14)    | 5.04<br>(4.52-5.50)    | 5.43<br>(4.82-5.93)    | 5.76<br>(5.08-6.31)    |
| 60-min  | 1.38<br>(1.26-1.51)                 | 1.63<br>(1.50-1.78)    | 1.97<br>(1.80-2.14)    | 2.29<br>(2.09-2.50)    | 2.65<br>(2.42-2.89)    | 2.96<br>(2.69-3.23)    | 3.25<br>(2.93-3.54)    | 3.54<br>(3.17-3.86)    | 3.90<br>(3.46-4.26)    | 4.21<br>(3.71-4.61)    |
| 2-hr  | 0.806<br>(0.733-0.889)              | 0.958<br>(0.874-1.05)  | 1.17<br>(1.06-1.28)    | 1.37<br>(1.25-1.51)    | 1.62<br>(1.46-1.77)    | 1.84<br>(1.65-2.00)    | 2.04<br>(1.82-2.23)    | 2.26<br>(2.00-2.47)    | 2.54<br>(2.23-2.77)    | 2.79<br>(2.43-3.05)    |
| 3-hr  | 0.569<br>(0.517-0.631)              | 0.677<br>(0.618-0.747) | 0.827<br>(0.753-0.913) | 0.982<br>(0.890-1.08)  | 1.17<br>(1.05-1.28)    | 1.34<br>(1.20-1.47)    | 1.50<br>(1.33-1.65)    | 1.68<br>(1.48-1.84)    | 1.91<br>(1.67-2.09)    | 2.13<br>(1.83-2.34)    |
| 6-hr  | 0.342<br>(0.312-0.379)              | 0.407<br>(0.372-0.449) | 0.498<br>(0.454-0.548) | 0.592<br>(0.538-0.650) | 0.707<br>(0.638-0.774) | 0.812<br>(0.728-0.888) | 0.917<br>(0.815-1.00)  | 1.03<br>(0.905-1.12)   | 1.18<br>(1.02-1.29)    | 1.32<br>(1.13-1.44)    |
| 12-hr   | 0.201<br>(0.183-0.221)              | 0.239<br>(0.219-0.262) | 0.293<br>(0.269-0.322) | 0.350<br>(0.319-0.384) | 0.421<br>(0.382-0.460) | 0.487<br>(0.438-0.530) | 0.554<br>(0.493-0.602) | 0.626<br>(0.550-0.680) | 0.725<br>(0.628-0.788) | 0.818<br>(0.697-0.890) |
| 24-hr   | 0.119<br>(0.111-0.128)              | 0.144<br>(0.134-0.155) | 0.181<br>(0.168-0.195) | 0.211<br>(0.195-0.227) | 0.251<br>(0.232-0.270) | 0.284<br>(0.261-0.305) | 0.317<br>(0.291-0.342) | 0.352<br>(0.322-0.380) | 0.401<br>(0.364-0.433) | 0.440<br>(0.398-0.476) |
| 2-day   | 0.069<br>(0.064-0.074)              | 0.083<br>(0.078-0.090) | 0.104<br>(0.097-0.112) | 0.120<br>(0.112-0.129) | 0.142<br>(0.132-0.153) | 0.160<br>(0.148-0.172) | 0.179<br>(0.164-0.192) | 0.198<br>(0.181-0.213) | 0.224<br>(0.204-0.242) | 0.245<br>(0.222-0.266) |
| 3-day   | 0.049<br>(0.046-0.052)              | 0.059<br>(0.055-0.063) | 0.073<br>(0.068-0.078) | 0.084<br>(0.078-0.090) | 0.100<br>(0.092-0.107) | 0.112<br>(0.103-0.120) | 0.125<br>(0.115-0.134) | 0.138<br>(0.126-0.148) | 0.156<br>(0.142-0.168) | 0.171<br>(0.154-0.184) |
| 4-day   | 0.039<br>(0.036-0.041)              | 0.046<br>(0.043-0.050) | 0.058<br>(0.054-0.061) | 0.066<br>(0.062-0.071) | 0.078<br>(0.073-0.084) | 0.088<br>(0.081-0.094) | 0.098<br>(0.090-0.105) | 0.108<br>(0.099-0.116) | 0.122<br>(0.111-0.131) | 0.133<br>(0.121-0.143) |
| 7-day   | 0.026<br>(0.024-0.027)              | 0.031<br>(0.029-0.033) | 0.037<br>(0.035-0.040) | 0.043<br>(0.040-0.046) | 0.050<br>(0.047-0.054) | 0.056<br>(0.052-0.060) | 0.062<br>(0.058-0.067) | 0.069<br>(0.063-0.074) | 0.077<br>(0.071-0.083) | 0.084<br>(0.077-0.091) |
| 10-day  | 0.020<br>(0.019-0.022)              | 0.024<br>(0.023-0.026) | 0.029<br>(0.028-0.031) | 0.033<br>(0.031-0.035) | 0.039<br>(0.036-0.041) | 0.043<br>(0.040-0.046) | 0.047<br>(0.044-0.050) | 0.051<br>(0.048-0.055) | 0.057<br>(0.053-0.062) | 0.062<br>(0.057-0.067) |
| 20-day  | 0.014<br>(0.013-0.015)              | 0.016<br>(0.015-0.017) | 0.019<br>(0.018-0.020) | 0.022<br>(0.020-0.023) | 0.025<br>(0.023-0.026) | 0.027<br>(0.026-0.029) | 0.030<br>(0.028-0.032) | 0.033<br>(0.030-0.035) | 0.036<br>(0.033-0.039) | 0.039<br>(0.036-0.042) |
| 30-day  | 0.011<br>(0.011-0.012)              | 0.013<br>(0.013-0.014) | 0.016<br>(0.015-0.017) | 0.017<br>(0.016-0.018) | 0.020<br>(0.018-0.021) | 0.021<br>(0.020-0.023) | 0.023<br>(0.022-0.025) | 0.025<br>(0.023-0.027) | 0.027<br>(0.025-0.029) | 0.029<br>(0.027-0.031) |
| 45-day  | 0.010<br>(0.009-0.010)              | 0.011<br>(0.011-0.012) | 0.013<br>(0.012-0.014) | 0.014<br>(0.014-0.015) | 0.016<br>(0.015-0.017) | 0.017<br>(0.016-0.018) | 0.018<br>(0.017-0.020) | 0.020<br>(0.019-0.021) | 0.021<br>(0.020-0.023) | 0.023<br>(0.021-0.024) |
| 60-day  | 0.009<br>(0.008-0.009)              | 0.010<br>(0.010-0.011) | 0.012<br>(0.011-0.012) | 0.013<br>(0.012-0.013) | 0.014<br>(0.013-0.015) | 0.015<br>(0.014-0.016) | 0.016<br>(0.015-0.017) | 0.017<br>(0.016-0.018) | 0.018<br>(0.017-0.019) | 0.019<br>(0.018-0.020) |

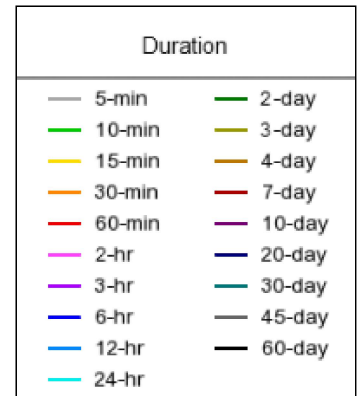
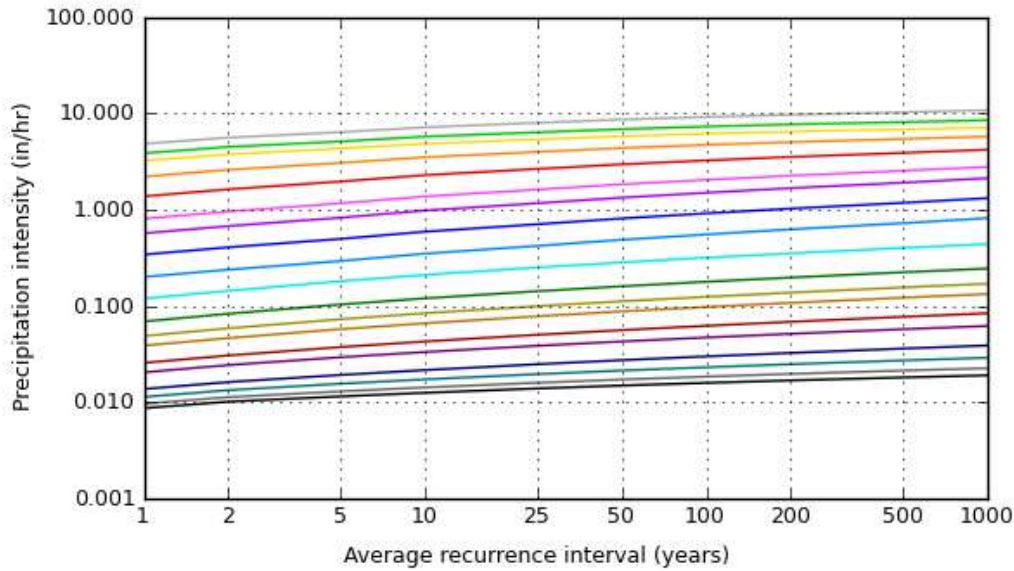
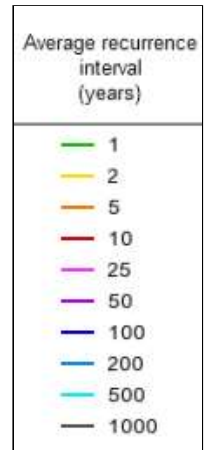
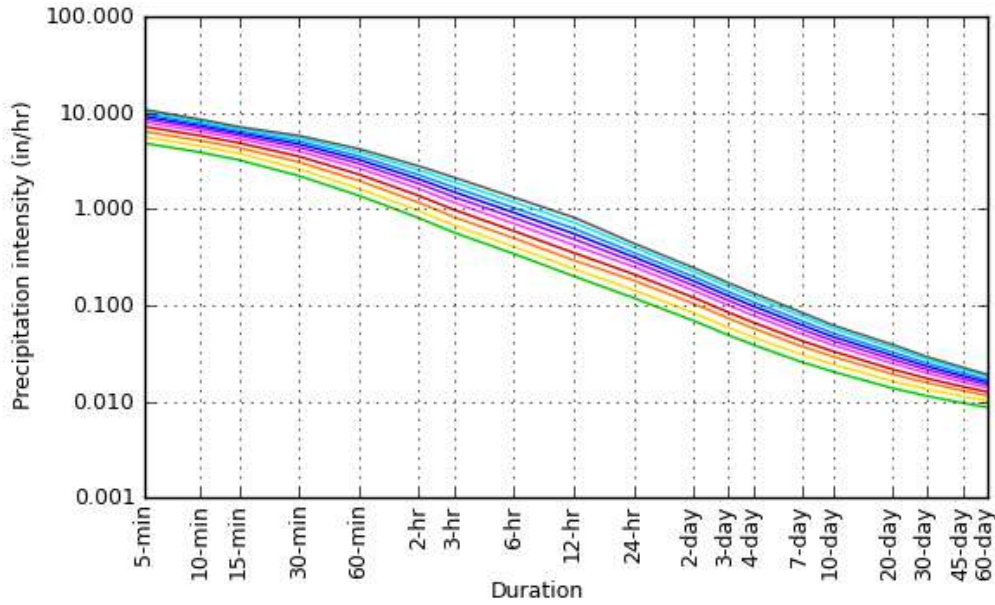
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration 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.

[Back to Top](#)

**PF graphical**

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

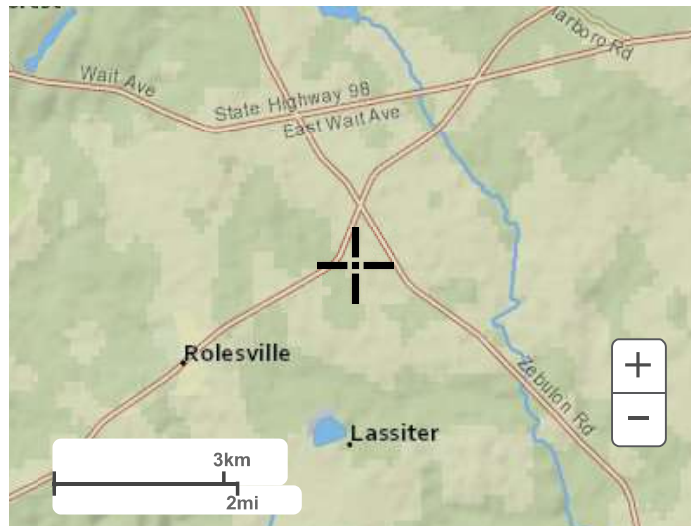
Latitude: 35.9388°, Longitude: -78.4234°



[Back to Top](#)

**Maps & aeriels**

**Small scale terrain**



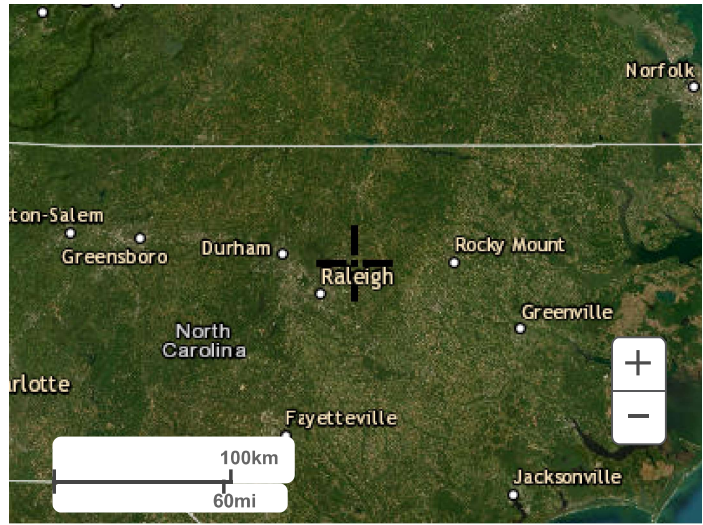
Large scale terrain



Large scale map



Large scale aerial



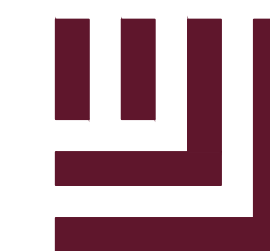
[Back to Top](#)

Could not retrieve elevation data due to Cross-Origin permissions.

---

[US Department of Commerce](#)  
[National Oceanic and Atmospheric Administration](#)  
[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

[Disclaimer](#)



**McADAMS**

The John R. McAdams Company, Inc.  
2905 Meridian Parkway  
Durham, NC 27713

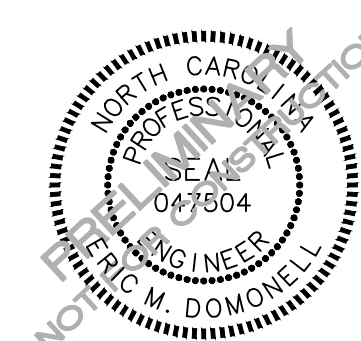
phone 919. 361. 5000  
fax 919. 361. 2269  
license number: C-0293

www.mcadamsco.com

**CLIENT**

NAME: TOWN OF ROLESVILLE  
ADDRESS: 502 SOUTHTOWN CIRCLE  
ADDRESS: ROLESVILLE NC 27571  
PHONE: 919.554.6582

**FRAZIER FARM PARK  
CONSTRUCTION DRAWINGS  
PHASE 1A  
11624 LOUISBURG ROAD  
ROLESVILLE, NORTH CAROLINA**



**REVISIONS**

NO. DATE

**PLAN INFORMATION**

PROJECT NO. 202011039  
FILENAME 2020110039-PH1- PREDA  
CHECKED BY EMD  
DRAWN BY SME  
SCALE 1"=120'  
DATE 03.22.2023

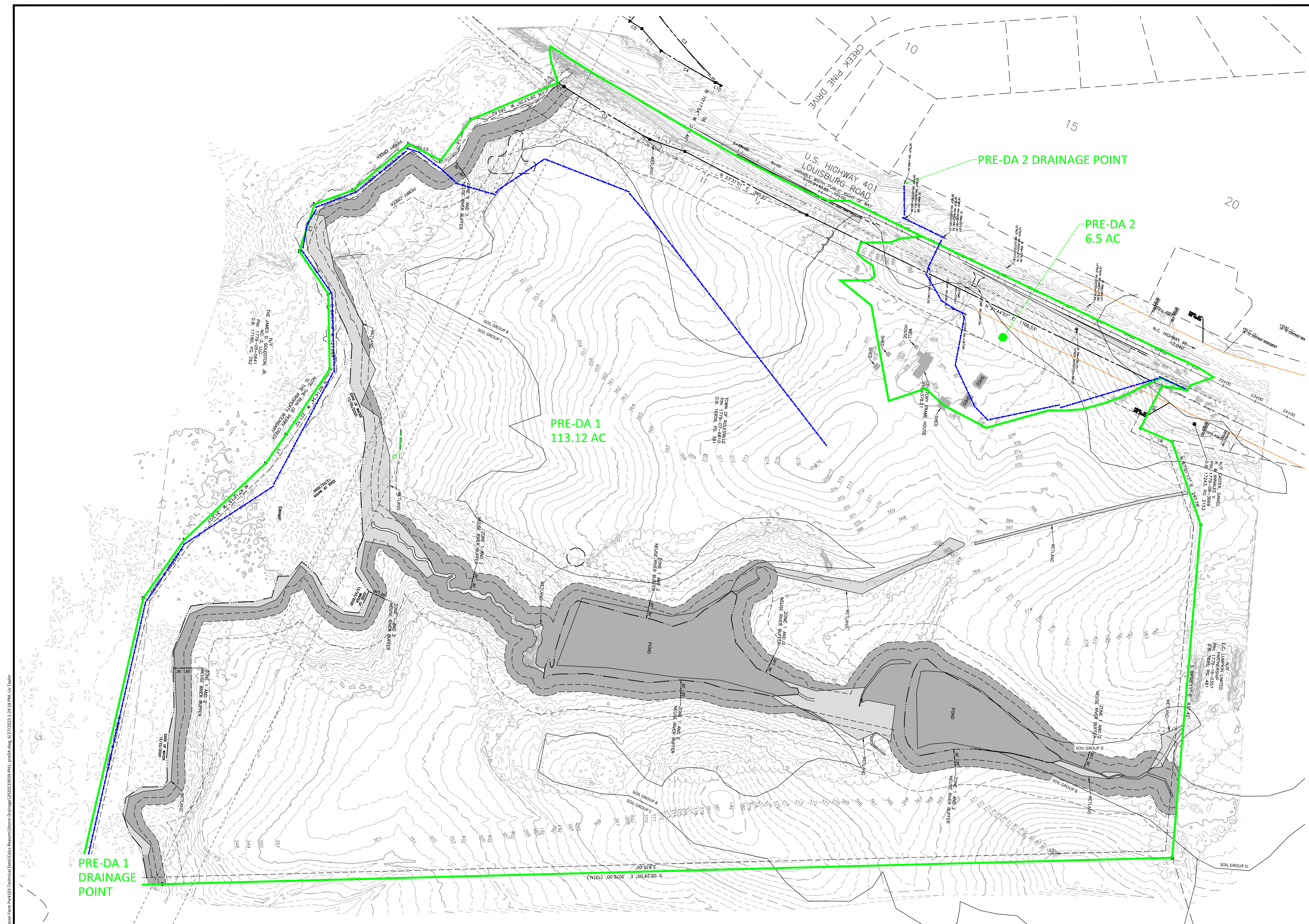
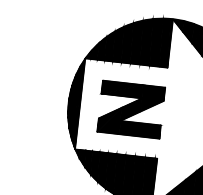
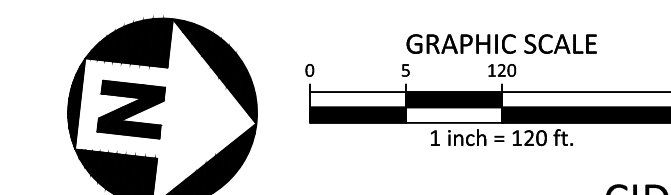
**SHEET**

**PRE DRAINAGE MAP**

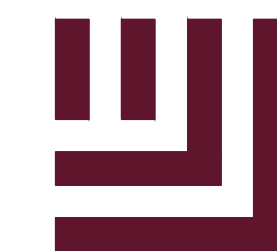
CID-23-5

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT TOWN OF ROLESVILLE ENGINEERING DESIGN AND CONSTRUCTION STANDARDS



M:\Projects\WOL\2020110039 Frazier Farm PH1\03-Technical Data\Cadd\Storm Drainage\2020110039-PH1- preDA.dwg, 6/27/2023 1:24:18 PM, LV Taylor



**McADAMS**

The John R. McAdams Company, Inc.  
2905 Meridian Parkway  
Durham, NC 27713

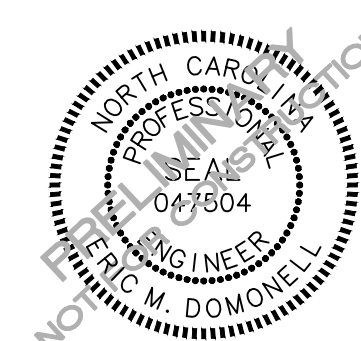
phone 919. 361. 5000  
fax 919. 361. 2269  
license number: C-0293

www.mcadamsco.com

**CLIENT**

NAME: TOWN OF ROLESVILLE  
ADDRESS: 502 SOUTHTOWN CIRCLE  
ADDRESS: ROLESVILLE NC 27571  
PHONE: 919.554.6582

**FRAZIER FARM PARK  
CONSTRUCTION DRAWINGS  
PHASE 1A  
11624 LOUISBURG ROAD  
ROLESVILLE, NORTH CAROLINA**



**REVISIONS**

NO. DATE

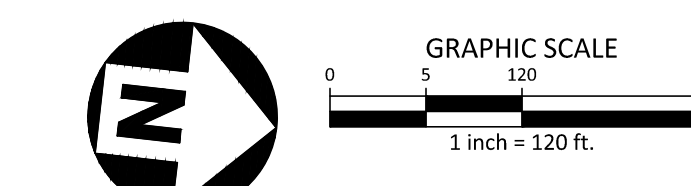
**PLAN INFORMATION**

PROJECT NO. 202011039  
FILENAME 2020110039-PH1- POSTDA  
CHECKED BY EMD  
DRAWN BY SME  
SCALE 1"=120'  
DATE 03.22.2023

**SHEET**

**POST DRAINAGE AREA**

CID-23-5



ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT TOWN OF ROLESVILLE ENGINEERING DESIGN AND CONSTRUCTION STANDARDS

PIN: 1779-26-3965  
OWNER: PULLEY, MICHAEL HUGH & WILLIAM SCOTT  
D.B. 17362, PG. 2427

PIN: 1779-19-0337  
OWNER: E.C. LUMPKIN LIMITED PARTNERSHIP  
D.B. 7695, PG. 481

PIN: 1779-08-3669  
OWNER: CASTERO, DANIEL R. & ANNALIE V.  
D.B. 17246, PG. 2133

TOWN OF ROLESVILLE  
PIN: 1779-04-4615  
D.B. 7526, PG. 781

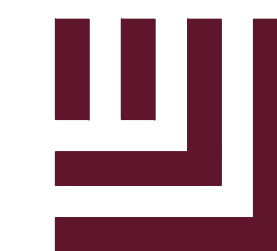
POST-DA 1  
113.64 AC

POST-DA 2  
5.98 AC

POST-DA 2 DRAINAGE POINT

POST-DA 1 DRAINAGE POINT

M:\Projects\WOL\2020110039 Frazier Farm Park\03-Technical Data\Cases-Reports\Storm Drainage\2020110039-PH1- postDA.dwg, 6/27/2023 11:26:36 AM, Lu Taylor



**McADAMS**

The John R. McAdams Company, Inc.  
2905 Meridian Parkway  
Durham, NC 27713

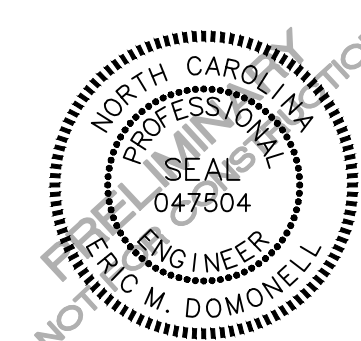
phone 919.361.5000  
fax 919.361.2269  
license number: C-0293

www.mcadamsco.com

**CLIENT**

NAME: TOWN OF ROLESVILLE  
ADDRESS: 502 SOUTHTOWN CIRCLE  
ADDRESS: ROLESVILLE NC 27571  
PHONE: 919.554.6582

**FRAZIER FARM PARK  
CONSTRUCTION DRAWINGS  
PHASE 1A  
11624 LOUISBURG ROAD  
ROLESVILLE, NORTH CAROLINA**



**REVISIONS**

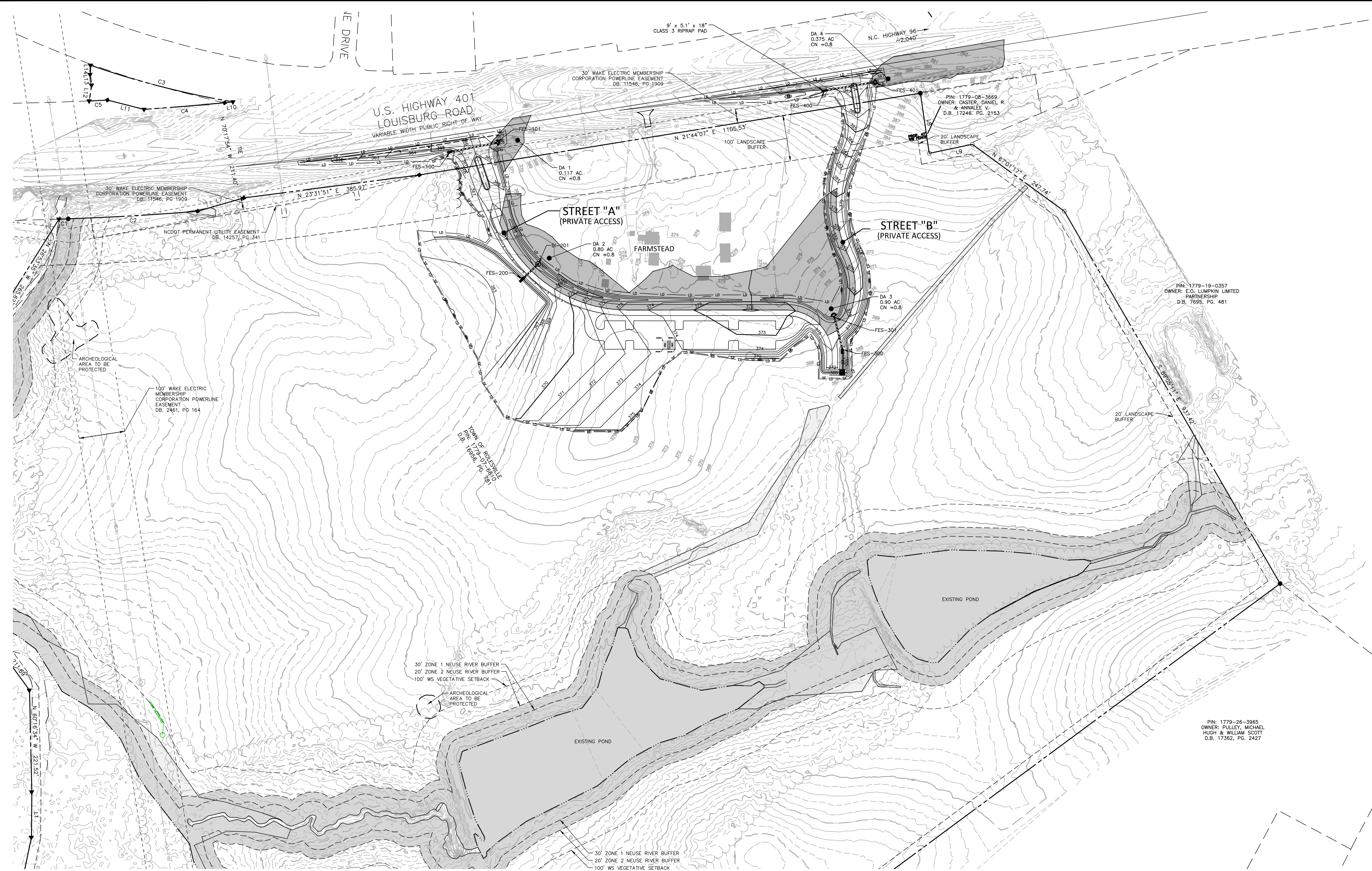
NO. DATE

**PLAN INFORMATION**

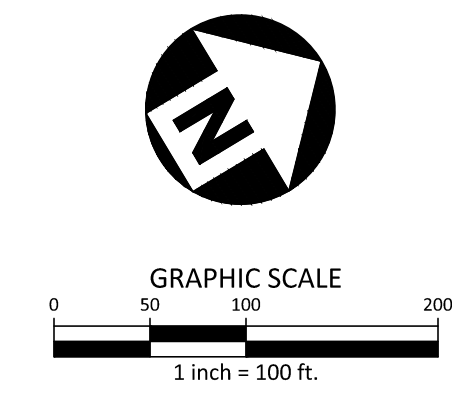
PROJECT NO. 202011039  
FILENAME 2020110039-PH1-DA  
CHECKED BY EMD  
DRAWN BY SME  
SCALE 1"=100'  
DATE 03.22.2023

**SHEET**

**INLET DRAINAGE AREAS**



ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT TOWN OF ROLESVILLE ENGINEERING DESIGN AND CONSTRUCTION STANDARDS

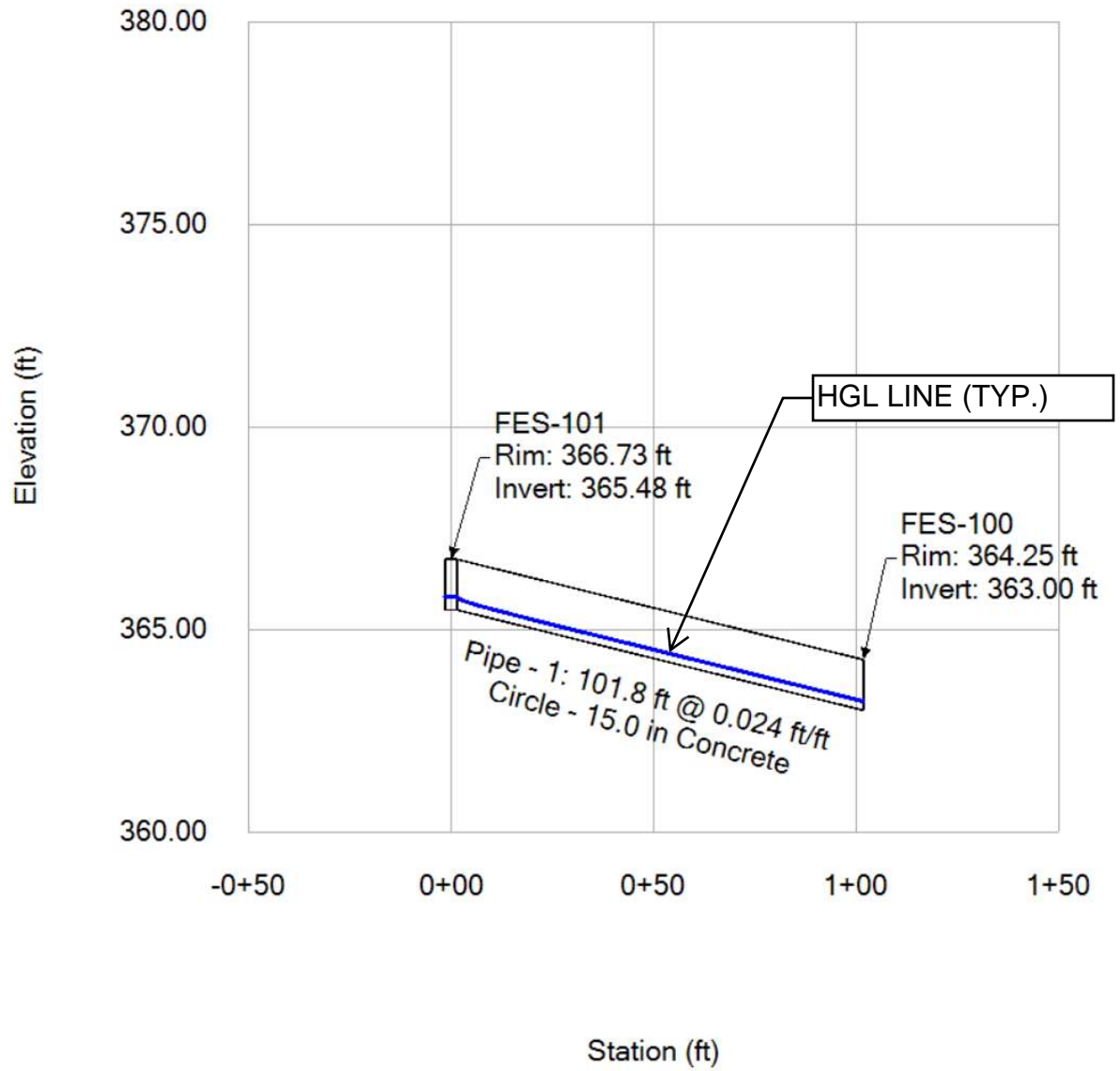


CID-23-5

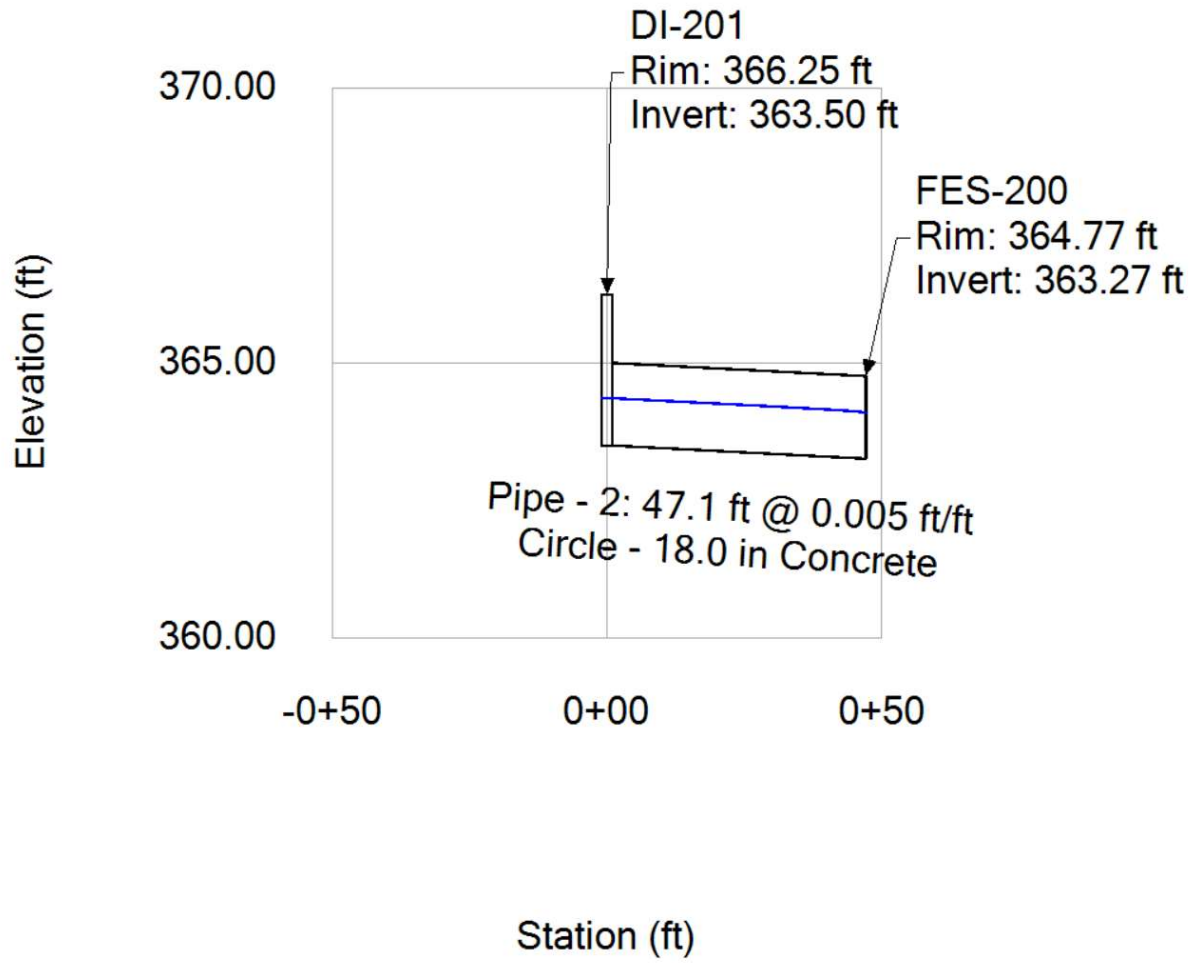
PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

M:\Projects\WOL\2020110039 Frazier Farm PH1\03-Technical Data\Cadd\Reports\Storm Drainage\2020110039-PH1-DA.dwg, 6/27/2023 3:25:54 PM, LUY TAYLOR

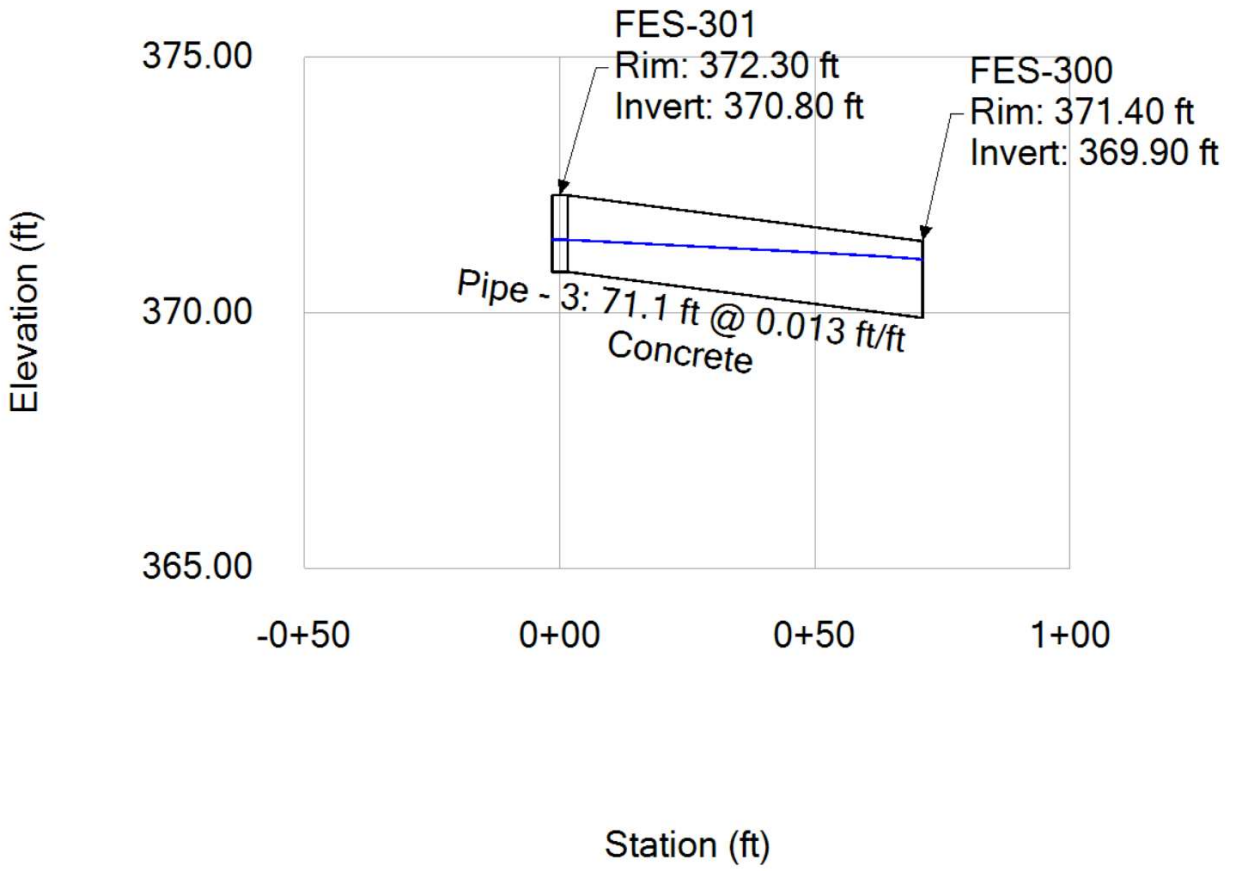




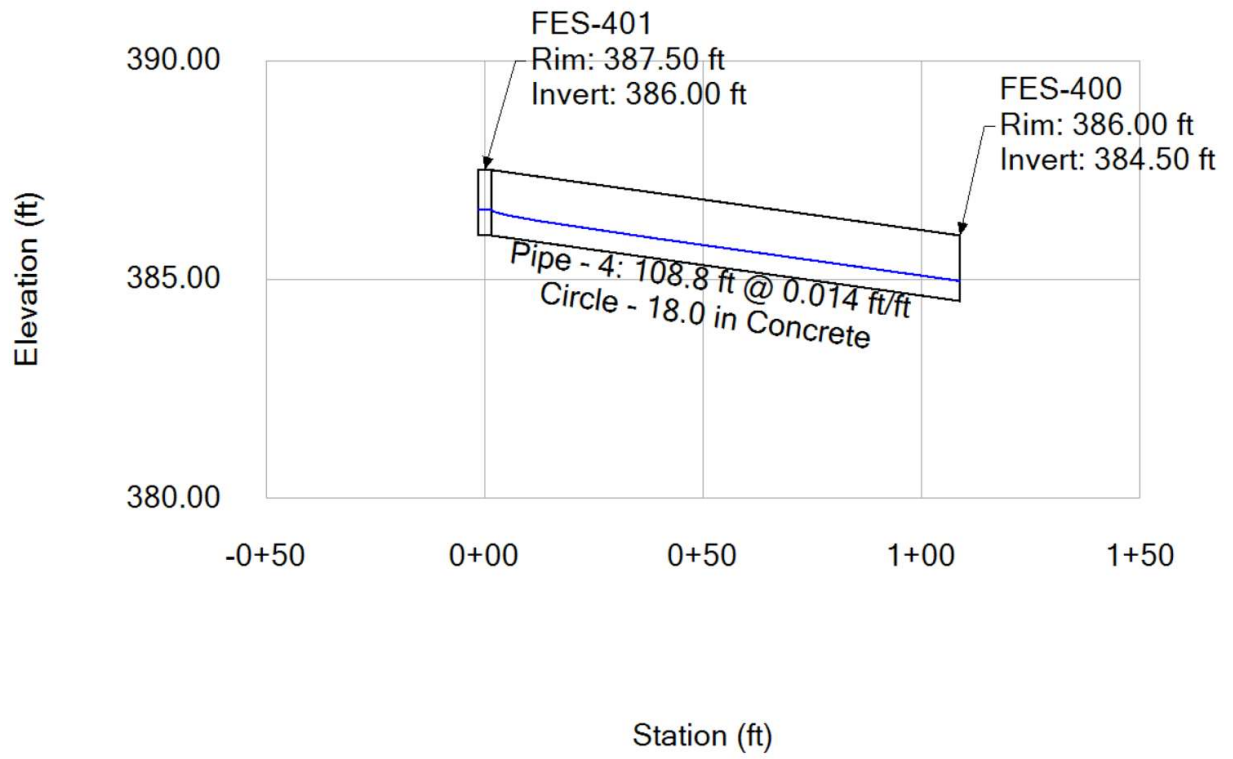
NOTE: FOR  
SURFACE  
PROFILES  
SEE SHEETS  
C3.00s



NOTE: FOR  
SURFACE  
PROFILES  
SEE SHEETS  
C3.00s



NOTE: FOR  
SURFACE  
PROFILES  
SEE SHEETS  
C3.00s



NOTE: FOR  
SURFACE  
PROFILES  
SEE SHEETS  
C3.00s

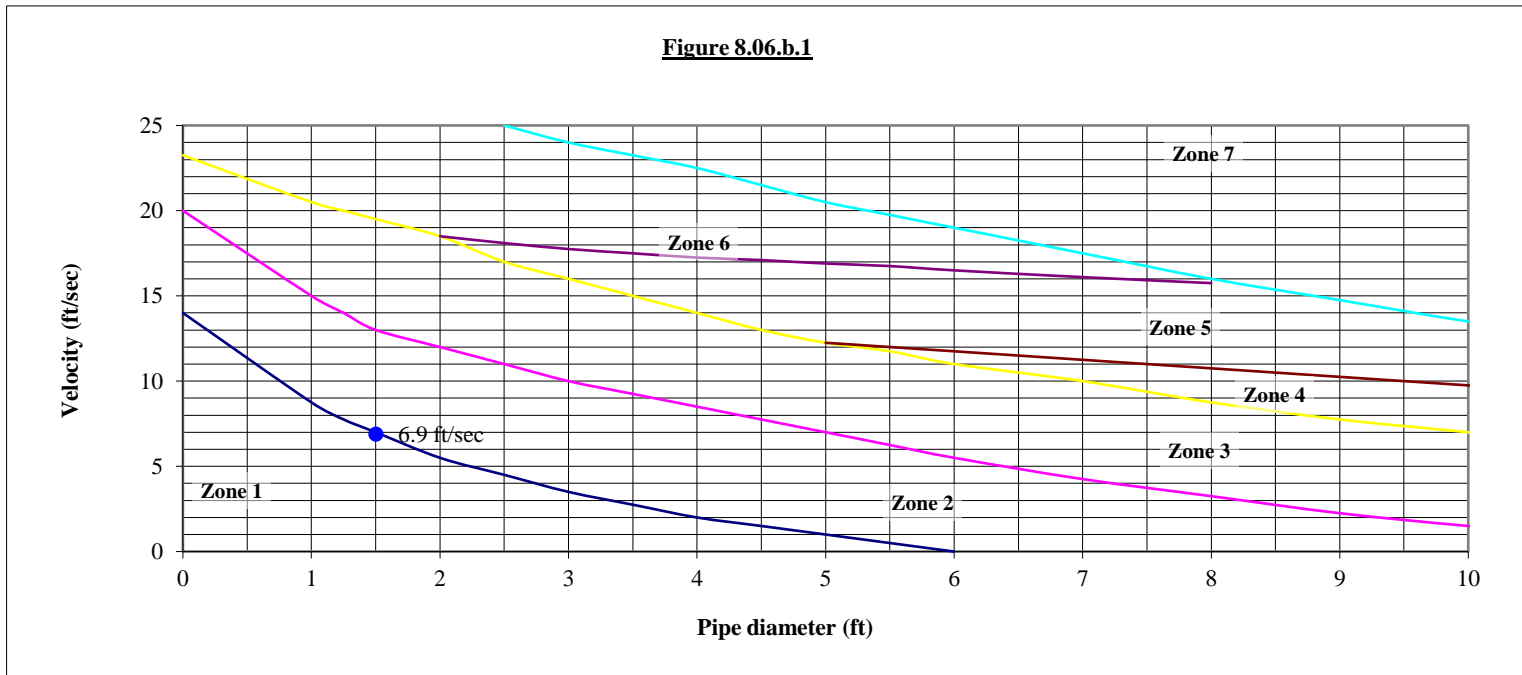


## DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: Frazier Farms  
 Project Number: 2020110039  
 Outlet Number: 18-IN Worst Case

Date: 4/3/2023  
 Calculated By: OGT

Outlet flowrate = 5.38 cfs  
 Pipe diameter = 18 inches  
 Number of pipes = 1  
 Pipe separation = 0 feet  
 Outlet Velocity = 6.9 ft/sec



Zone from graph above = 2

Outlet pipe diameter = 18 in.  
 Outlet flowrate = 5.4 cfs  
 Outlet velocity = 6.9 ft/sec  
 Material = Class B

Length = 9.0 ft.  
 Width = 5.1 ft.  
 Stone diameter = 6 in.  
 Thickness = 18 in.

| Zone | Material               | Diameter | Thickness | Length    | Width    |
|------|------------------------|----------|-----------|-----------|----------|
| 1    | Class A                | 3        | 12        | 4 x D(o)  | 3 x D(o) |
| 2    | Class B                | 6        | 18        | 6 x D(o)  | 3 x D(o) |
| 3    | Class I                | 13       | 24        | 8 x D(o)  | 3 x D(o) |
| 4    | Class I                | 13       | 24        | 8 x D(o)  | 3 x D(o) |
| 5    | Class II               | 23       | 36        | 10 x D(o) | 3 x D(o) |
| 6    | Class II               | 23       | 36        | 10 x D(o) | 3 x D(o) |
| 7    | Special study required |          |           |           |          |

1. Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
2. Outlet velocity based on full-flow velocity