

STUDY PLAN:
HABITAT ASSESSMENTS AND SURVEYS
FOR RARE PLANTS ALONG THE
MOUNTAIN VALLEY PIPELINE SOUTHGATE PROJECT IN
NORTH CAROLINA

17 July 2018

Submitted To:

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1.0 Introduction

1.1 Project Description

Mountain Valley Pipeline, LLC (“Mountain Valley”) is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project (“Project”). The Project is in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina (Appendix A; Figure 1). Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline, known as the H-650 pipeline, to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern U.S. Subject to receipt of the required permits and regulatory approvals, Mountain Valley anticipates construction of the Project to commence in spring of 2020.

The proposed Project will interconnect with and receive gas from the existing Mountain Valley Pipeline near Chatham, Virginia, and the East Tennessee Natural Gas, LLC., mainline near Eden, North Carolina, and will deliver gas to connections with customers’ existing facilities in Eden and Graham, North Carolina. The Project is a stand-alone project from the Mountain Valley Pipeline and has an expected in-service date of late 2020. In addition to the H-650 pipeline, Mountain Valley proposes to construct and operate two new compressor stations at milepost (MP) 0 in Pittsylvania County, Virginia, and near MP 26 in Rockingham County, North Carolina, and four interconnects near MPs 0, 28, 30, and 72. Meter stations and other ancillary facilities required for the safe and reliable operation of the pipeline are also included.

To the extent practicable, Mountain Valley routed the new pipeline parallel to existing corridors. As currently proposed, the pipeline is parallel to existing utility corridors, trails, and roads for approximately 47 percent (34 miles) of the proposed alignment. The Project limits-of-disturbance (LOD) include a 100-foot-wide right-of-way (ROW), consisting of 50-foot temporary and 50-foot permanent easements. Where feasible, the ROW will be reduced in width to 75 feet (22.9 m) at resource crossings.

Access roads are 25 feet wide for permanent or temporary use. To facilitate the construction and maintenance of the pipeline, 196 access roads are currently proposed for construction or improvement. Of the 196 access roads, 68 will be in Virginia (± 23.2 mi) and 128 will be in North Carolina (± 28.3 mi). Additional temporary workspaces, laydown and contractor yards are also anticipated.

1.2 Agency Coordination

The Federal Endangered Species Act of 1973 (ESA) [16 U.S.C. 1531 et seq.] provides for the listing, conservation, and recovery of endangered and threatened



species of plants and wildlife. Under the ESA, the U.S. Fish and Wildlife Service (USFWS) is mandated to monitor and protect listed species. Many states enacted similar laws.

The USFWS (Raleigh Field Office) indicated two federally protected plant species may occur within the proposed Project area and requested completion of field surveys to determine presence or probable absence of each species. These species include small whorled pogonia (*Isotria medeoloides*), and smooth coneflower (*Echinacea laevigata*).

On behalf of Mountain Valley, Environmental Solutions & Innovations, Inc. (ESI) proposes to complete surveys to determine whether the above mentioned plant species or their preferred habitats occur within the Project area. Through submittal of this document, ESI and Mountain Valley request concurrence with the Study Plan’s methods and site-specific authorization from USFWS (Raleigh Field Office) to conduct the proposed survey activities.

This Study Plan presents all current potential aspects of the Project; however, changes to the alignment and number and location of facilities and access roads may occur. Any additions to the Project will be handled consistently with the level of effort described in this Study Plan. Should a final route be determined prior to the completion of surveys, no surveys will be completed on the eliminated alignment, facilities, and/or access roads.

2.0 Survey Methods

In general, field surveys for rare plants are conducted using a meander search technique within predetermined areas along the Project route (Goff et al. 1982). During this type of survey, more time and effort is spent in areas exhibiting the most suitable habitat thus increasing the likelihood of locating rare species. If target species are found, population boundaries are recorded using a GPS Unit with submeter accuracy. Representative photographs are taken. Surveys are completed during the optimum search windows for rare plant target species identified in Table 1. Due to the short timeline of the Project, ESI proposes commencing surveys for small-whorled pogonia immediately such that field work is completed within the survey window. Further, ESI proposes conducting surveys for the smooth coneflower during the summer of 2018.

Table 1. Anticipated MVP Southgate rare plant species surveys.

Common Name	Listing Status ¹	Habitat	Survey Window	Total Survey Acreage ⁴
Small whorled pogonia	FE (NC)	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect	May 5 – July 25 ²	271.2



Common Name	Listing Status ¹	Habitat	Survey Window	Total Survey Acreage ⁴
Smooth coneflower	FE (NC)	Open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way; associated with neutral to alkaline soils high in calcium and magnesium	June 15 – October 31	88.3

¹ FE - federally endangered

² Federally listed small whorled pogonia species optimal survey period for counties south of Caroline County, as designated by the USFWS Virginia Ecological Field Services Office (USFWS 2012)

³ Federally listed smooth coneflower optimal survey period as designated by the USFWS Virginia Ecological Field Services Office (USFWS 2012).

⁴ Survey areas determined by detailed GIS analysis of forest cover based on aerial imagery; soils; slopes; and slope aspects.

Mr. Lawrence Brewer and Mr. Fred Huber will conduct plant surveys for ESI. Both Mr. Brewer and Mr. Huber are USFWS Certified Plant Surveyors for smooth coneflower, small whorled pogonia in many states. North Carolina does not maintain a list of certified plant surveys for these species. Mr. Brewer is an experienced and trained plant taxonomist and has completed a wide variety of plant and natural community surveys over the last 25 years. Mr. Huber has 26 years' experience working with the U.S. Forest Service (USFS) as Forest Botanist where he monitored a multitude of federally listed plant species including the two federally listed species of interest associated with the Project area. Resumes for each of the Certified Plant Surveyors are included as Appendix B. ESI respectfully requests authorization for Mr. Brewer and Mr. Huber to conduct surveys for this Project given their extensive experience as professional botanists.

2.1 Small Whorled Pogonia (*Isotria medeoloides*)

The small whorled pogonia is a member of the orchid family and is characterized by a single gray-green stem 10 to 14 inches (25.4 to 35.6 cm) tall and a whorl of five to six leaves at the top of the stem. The leaves are gray-green, oblong, and can reach 1 to 3.5 inches (2.5 to 8.9 cm) in length. A single or a pair of green-yellow flowers appears in May or June. The small whorled pogonia is found in mature, hardwood stands comprising beech (*Fagus* spp.), birch (*Betula* spp.), maple (*Acer* spp.), oak (*Quercus* spp.), and hickory (*Carya* spp.) species with an open understory. The small whorled pogonia prefers acid soils under a thick layer of dead leaves, often on slopes adjacent small streams. Although widely distributed across 17 eastern states, the small whorled pogonia is rare with populations typically containing less than 20 plants. It was listed as federally endangered in 1982, but was reclassified to threatened in 1994. No published critical habitat exists for the small whorled pogonia.

Coordination with the USFWS Raleigh Field Office indicates this species may be located along portions of the Project in Rockingham and Alamance counties, North Carolina. A detailed GIS desktop analysis was performed along the Project area using aerial imagery and soils information to identify potential habitat, which is defined as forested areas with north to east-facing slopes 0-30 percent and soil pH ranging 3.5 to

5.5. Approximately 271 acres of potentially suitable habitat were identified for small whorled pogonia during the GIS desktop analysis (Appendix A, Figure 2). Surveys in suitable habitat for small whorled pogonia are conducted between May 5 and July 25.

2.2 Smooth Coneflower (*Echinacea laevigata*)

Smooth coneflower is a perennial herb in the Aster family (Asteraceae) that grows up to 4.9 feet (1.5 m) tall from a vertical root stock. The large elliptical to broadly lanceolate basal leaves may reach 7.8 inches (19.8 cm) in length and 2.9 inches (7.4 cm) in width and taper into long petioles toward the base. They are smooth to slightly rough in texture. The stems are smooth, with few leaves. The mid-stem leaves are smaller than the basal leaves and have shorter petioles. Flower heads are usually solitary. The rays of the flowers (petal-like structures) are light pink to purplish in color, usually drooping, and 1.9 to 3.1 inches (4.8 to 7.9 cm) long. Flowering occurs from late May through mid-July and fruits develop from late June to September. The fruiting structures often persist through the fall.

The species is typically found in well drained areas of open woods, cedar barrens, roadsides, clear cuts, dry limestone bluffs, and power line ROWs containing neutral to alkaline soils rich in calcium and magnesium. Smooth coneflower was listed as federally endangered on 8 October 1992. Currently 24 populations of the species are known only from Virginia, North Carolina, South Carolina, and Georgia (USFWS 1995). This species is not currently known in the Project area.

The USFWS Raleigh Field Office requested completion of surveys for smooth coneflower along the route in North Carolina. Discussion with the Service and the North Carolina Wildlife Resources Commission (NCWRC) suggested limiting survey areas by soil types associated with known populations in the state of North Carolina.

Surveys for smooth coneflower are completed on soil types associated with known populations of this species. Soil type associations were determined from observations found in www.inaturalist.org, a joint initiative of the California Academy of Sciences and the National Geographic Society that records research grade species identification and location data from field biologists. Soil types identified that correspond with soils found within the project area of investigation (AOI) include Chewacla and Wehadkee (ChA), Iredell (IrB), Wehadkee silt loam (41A), Cecil sandy loam (CaB), Helena sandy loam (HeB), and Vance sandy loam (VaC). These soil types were overlain within the Project AOI to determine focused survey areas (Appendix A, Figure 3). Approximately 88.3 acres of suitable habitat were identified using soil associations and photo-aerial review. Surveys for smooth coneflower are conducted June 15 to October 31 when the species is either flowering or fruiting.

3.0 Timeline and Reporting

Field surveys for rare plants within the Project area are scheduled to begin July 20, 2018 and continue until the late summer/early fall months. A single report following completion of field surveys will be submitted to the USFWS and NCWRC. ESI will compile synthesized documentation of the field investigations, life history information, coordination efforts, and photographs and maps into a written survey report detailing the habitat assessment and field survey methods, findings, and recommendations. The report will contain all pertinent Project data including (as attachments) notes, field forms, plant list(s), photographs, and mapping. The deliverable will include pertinent correspondence, contact narratives, action plan, or resource inquiries with any regulatory agency.

4.0 Request for Agency Concurrence

4.1 Request to Proceed

We are requesting concurrence from the USFWS and NCWRC that the methods and proposed personnel described herein are consistent with each agency's standards.

4.2 Period for Which Survey Results are Valid

Consistent with the USFWS guidelines for plant surveys, we seek confirmation that results of the survey remains valid for a period of two years upon completion of the project.

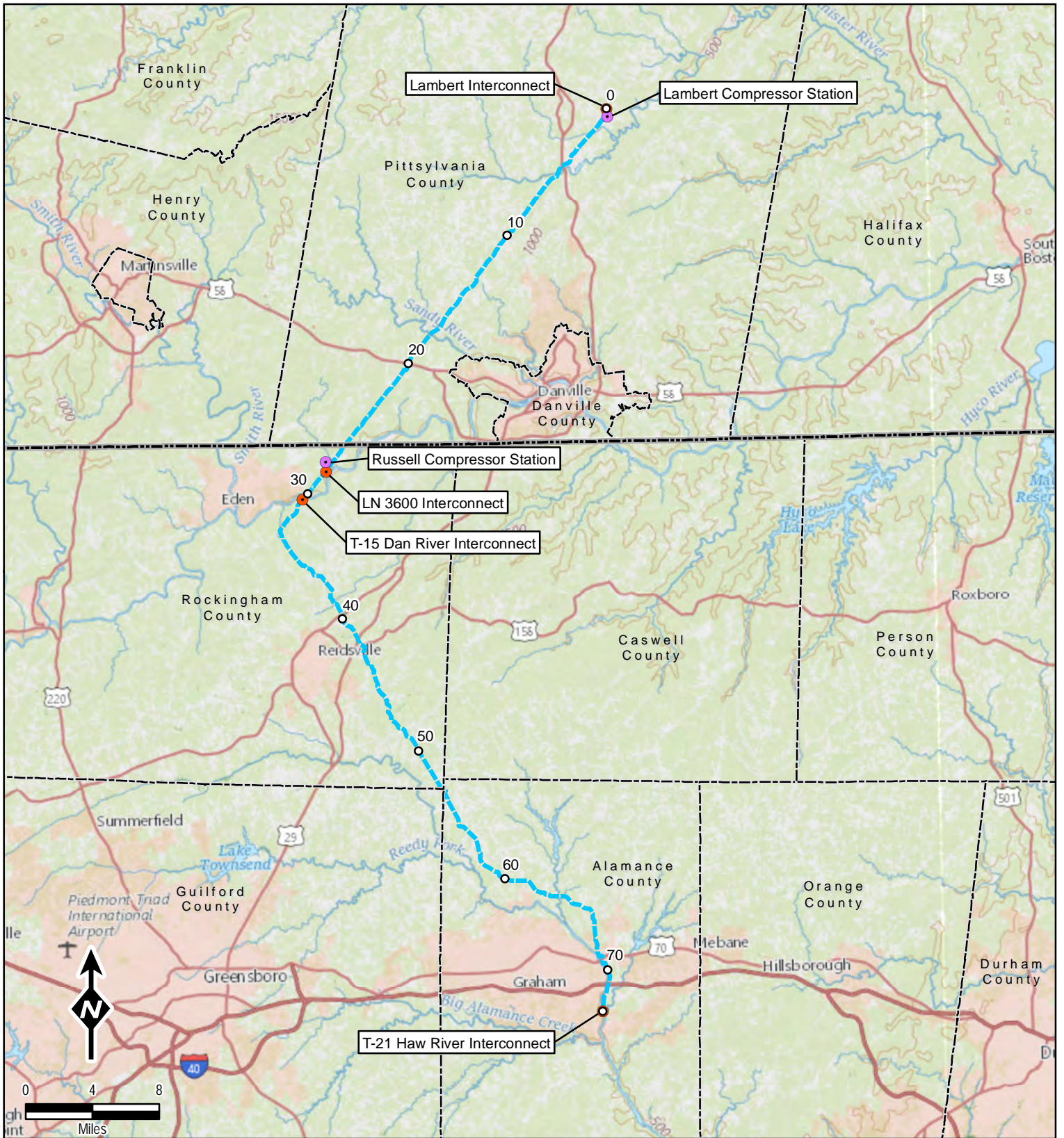
5.0 Literature Cited

Goff, F. G., A. Dawson, and J. Rochow. 1982. Site examination for threatened and endangered plant species *Environmental Management* 6:307-316.

USFWS. 1995. Smooth Coneflower (*Echinacea laevigata*) recovery plan. U.S. Department of Interior, Fish and Wildlife Service, Southeast Region, Atlanta, Georgia. 37 pp.

USFWS. 2012. Optimal survey timeframes for Virginia's federally listed and candidate plant species. U.S. Department of Interior, Fish and Wildlife Service.

**APPENDIX A
FIGURES**



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Legend

- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Meter Station
- County Boundary
- State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley
PIPELINE, LLC

Project Overview
Map

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

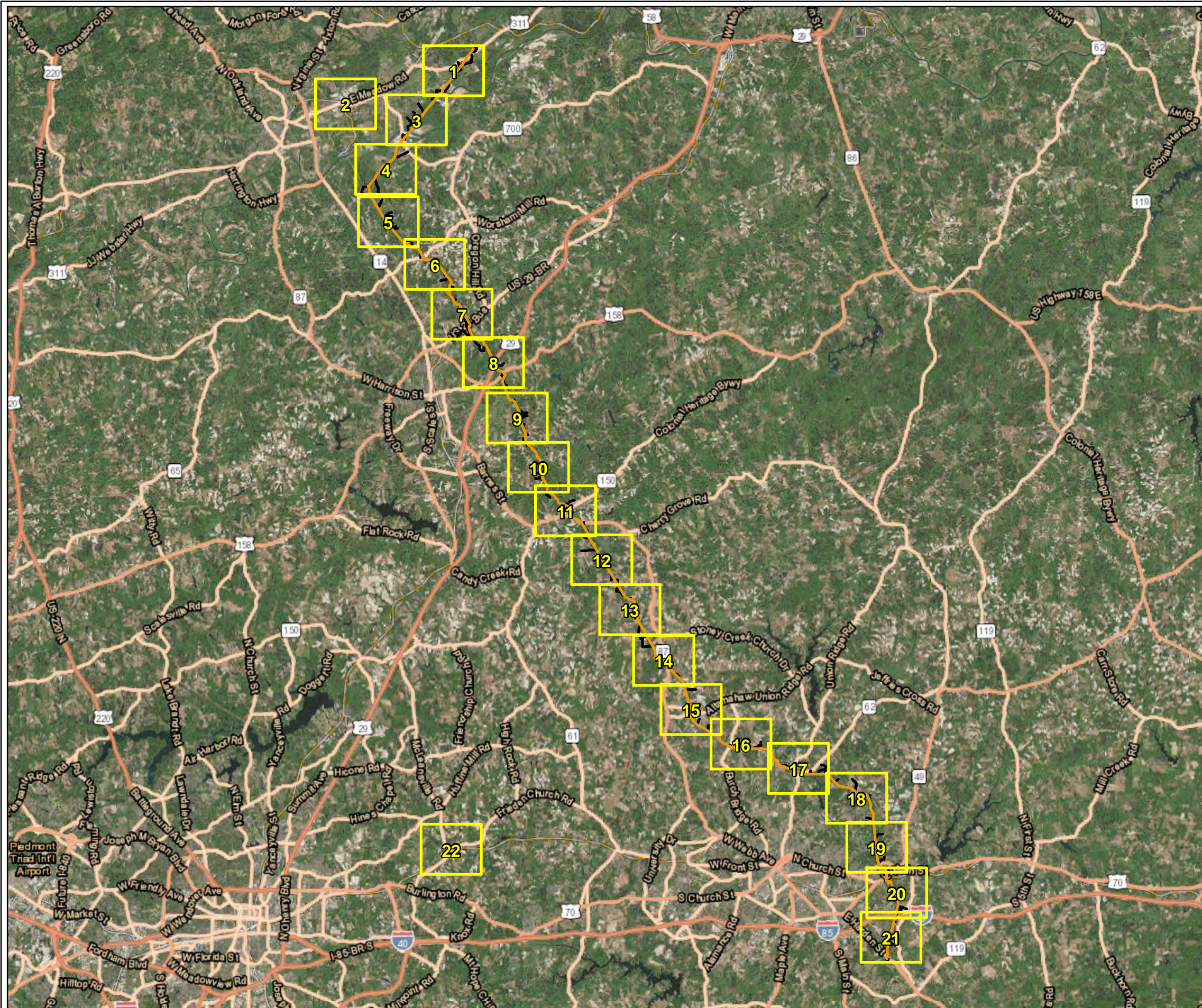
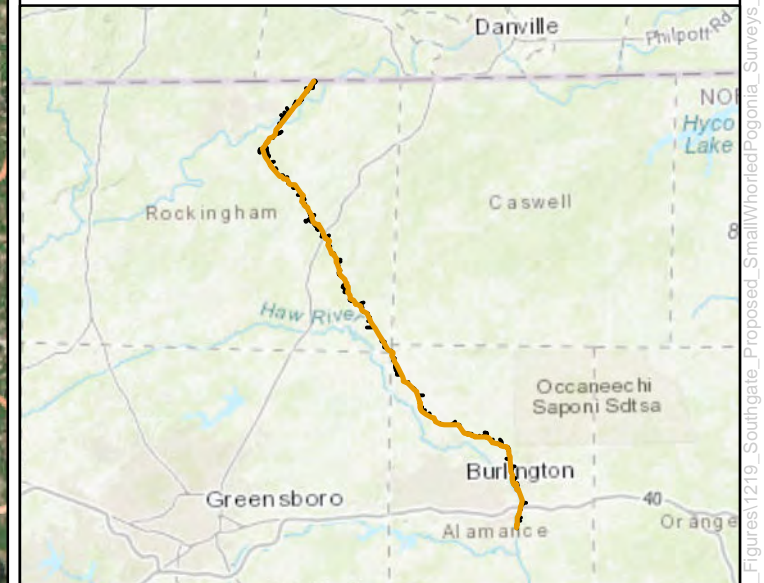


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

Key Map

- Project Alignment
- Access Road



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ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

Project No. 1219

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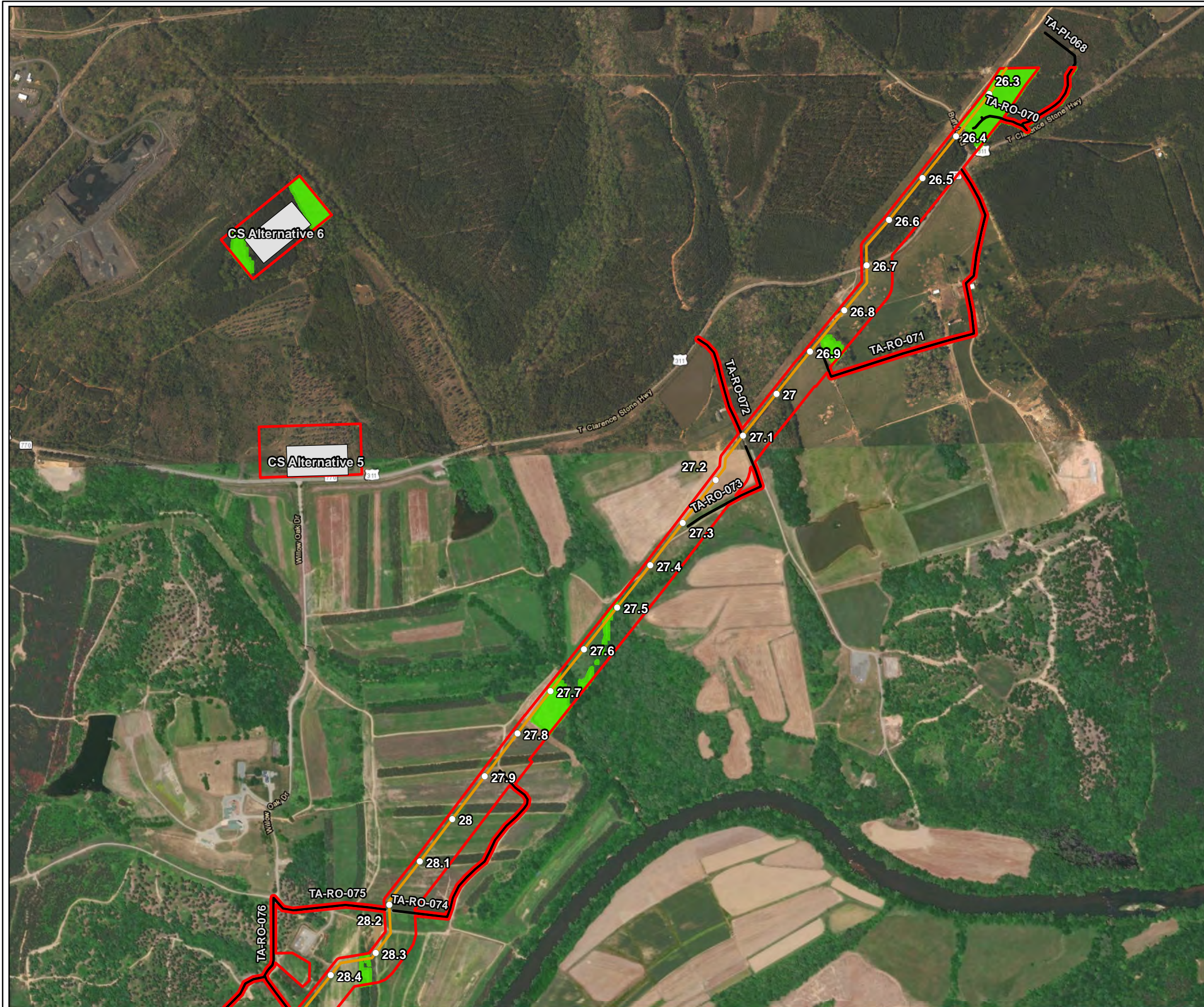
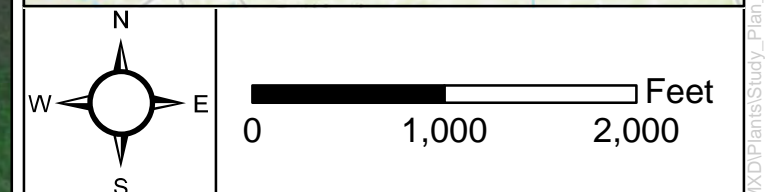
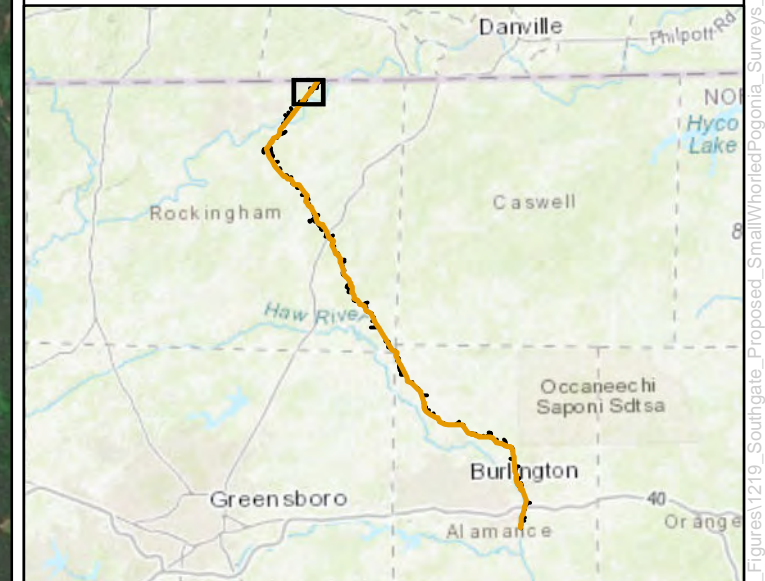


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

- Milepost
- Project Alignment
- Access Road
- Facility Site
- Area of Investigation (AOI)
- Small Whorled Pogonia Survey Area



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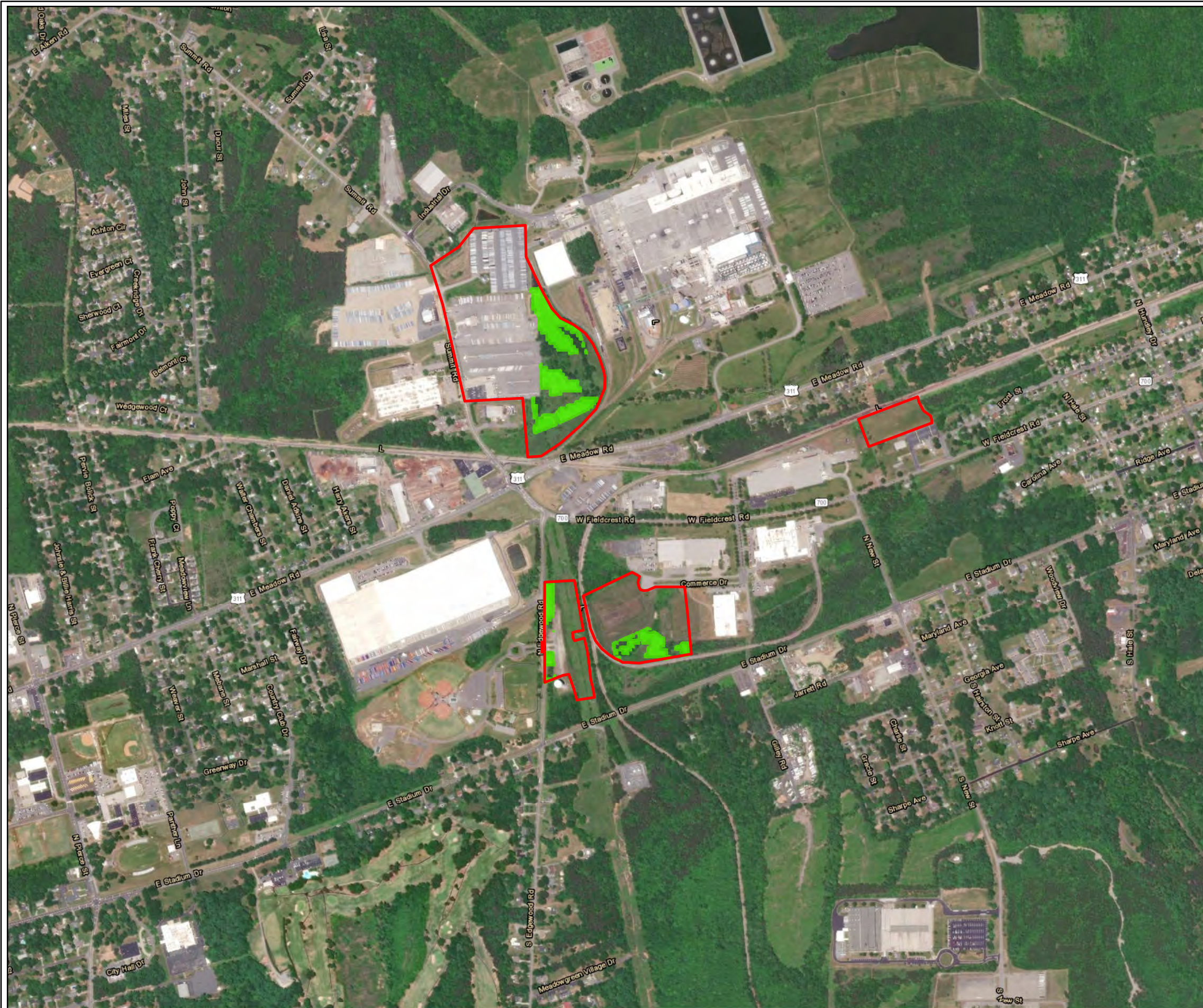
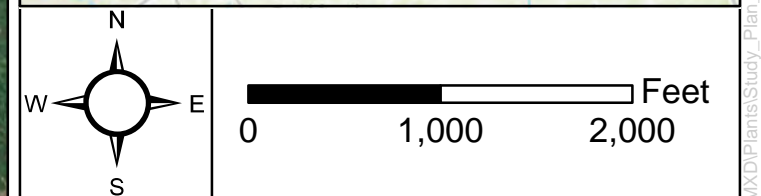
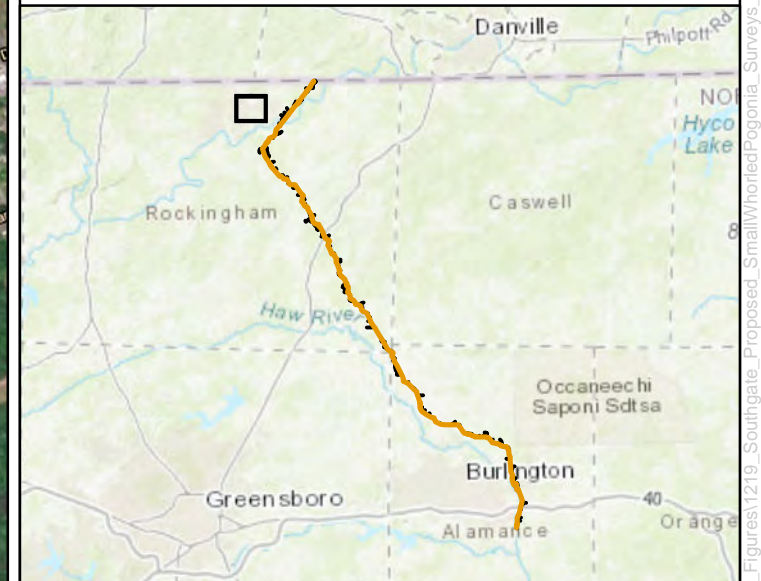


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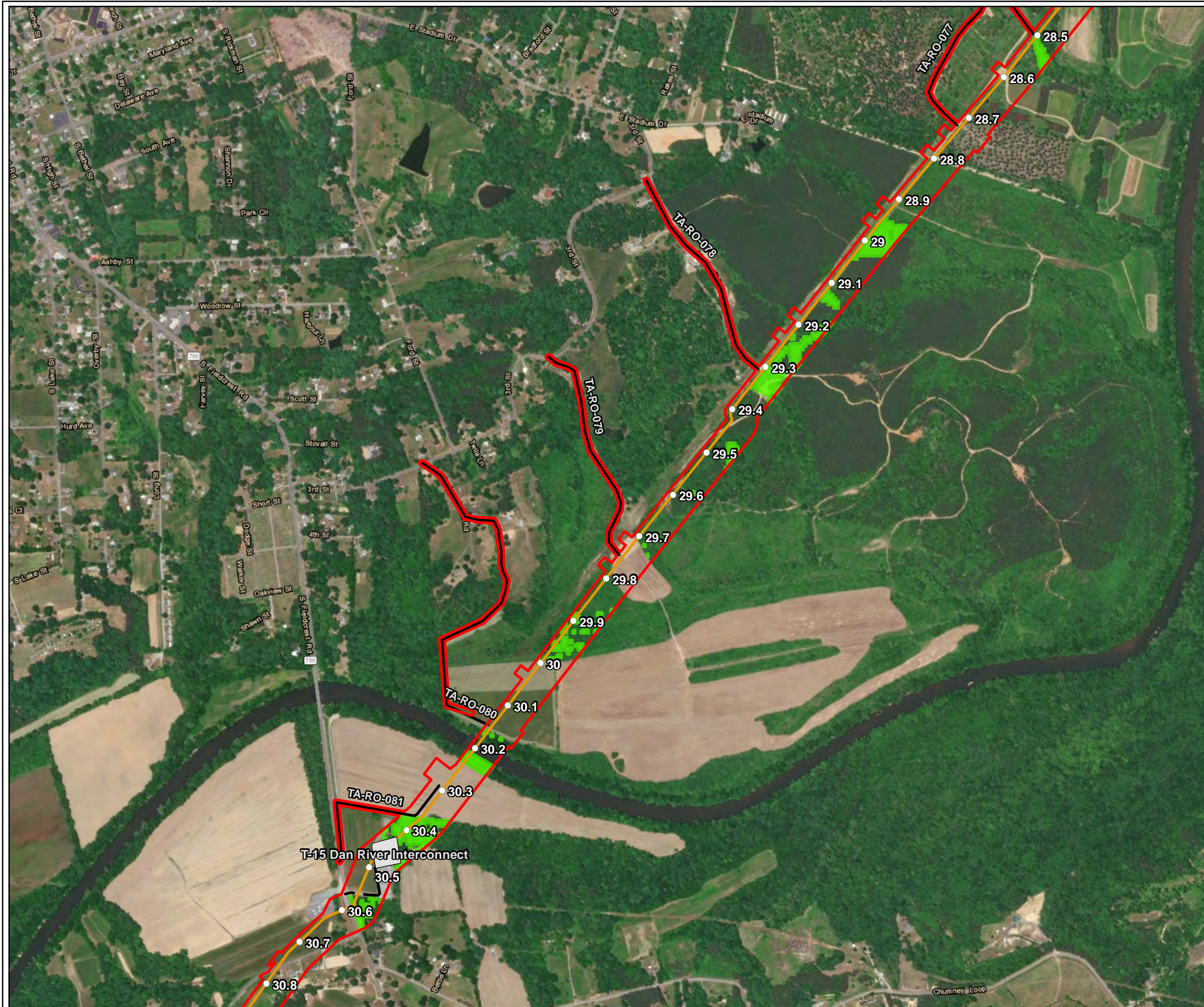
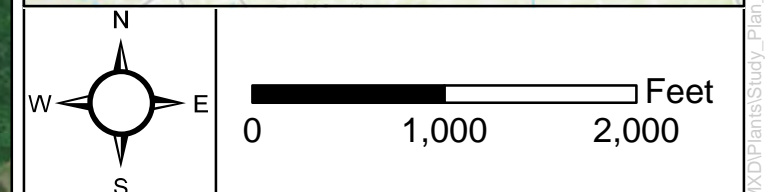
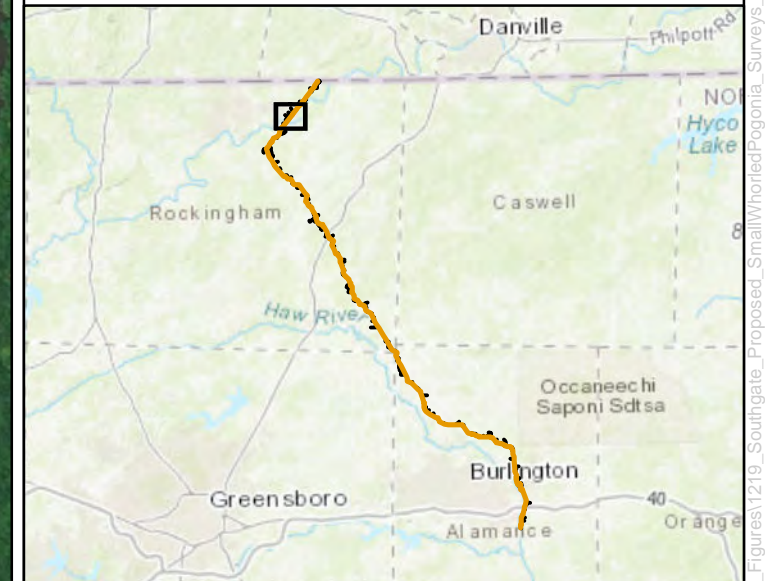


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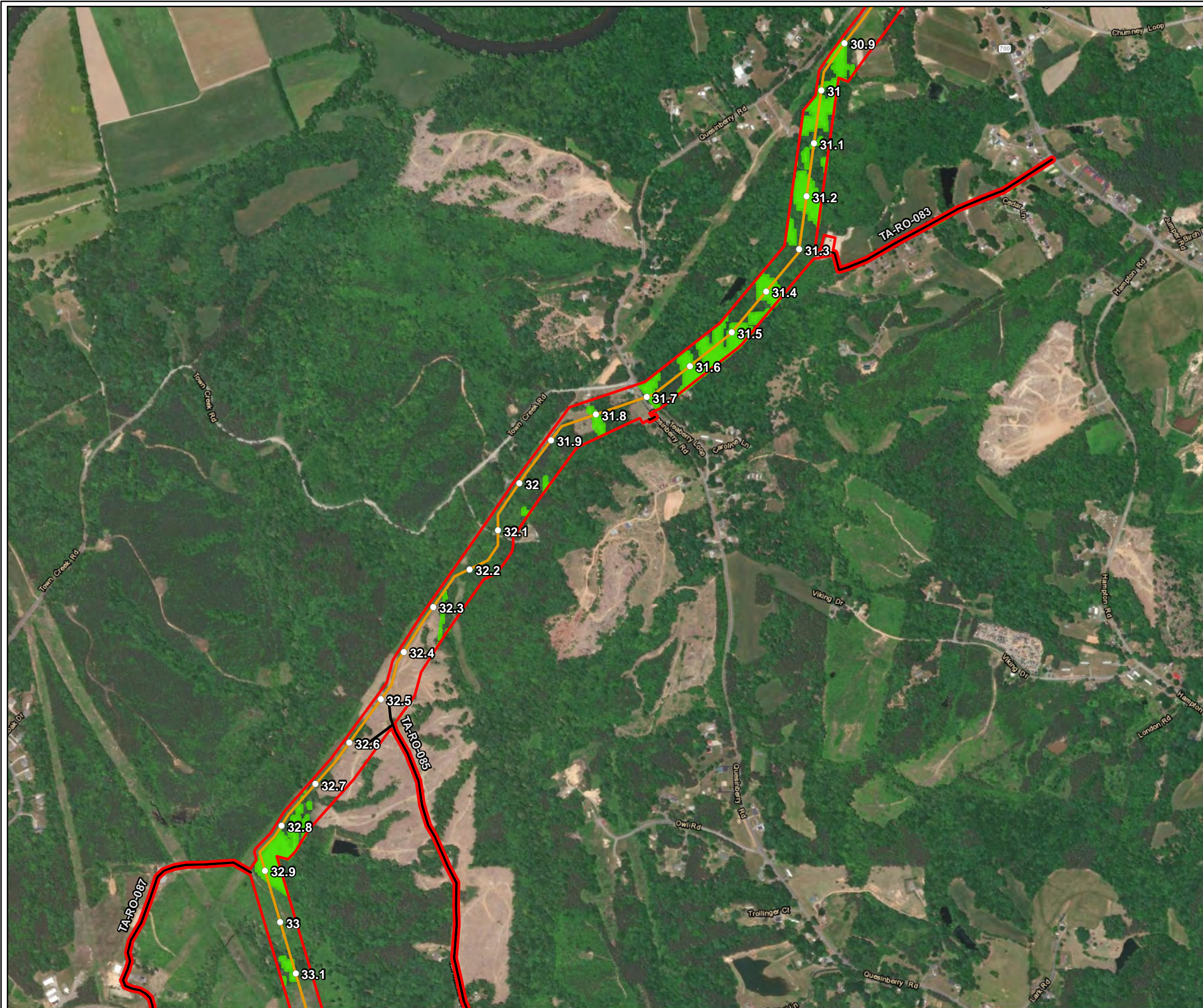
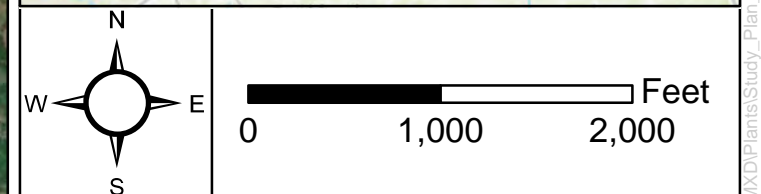
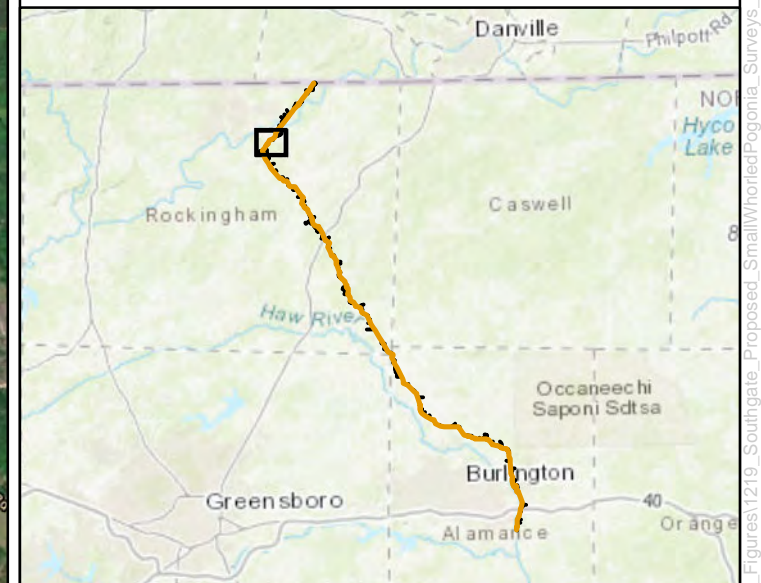


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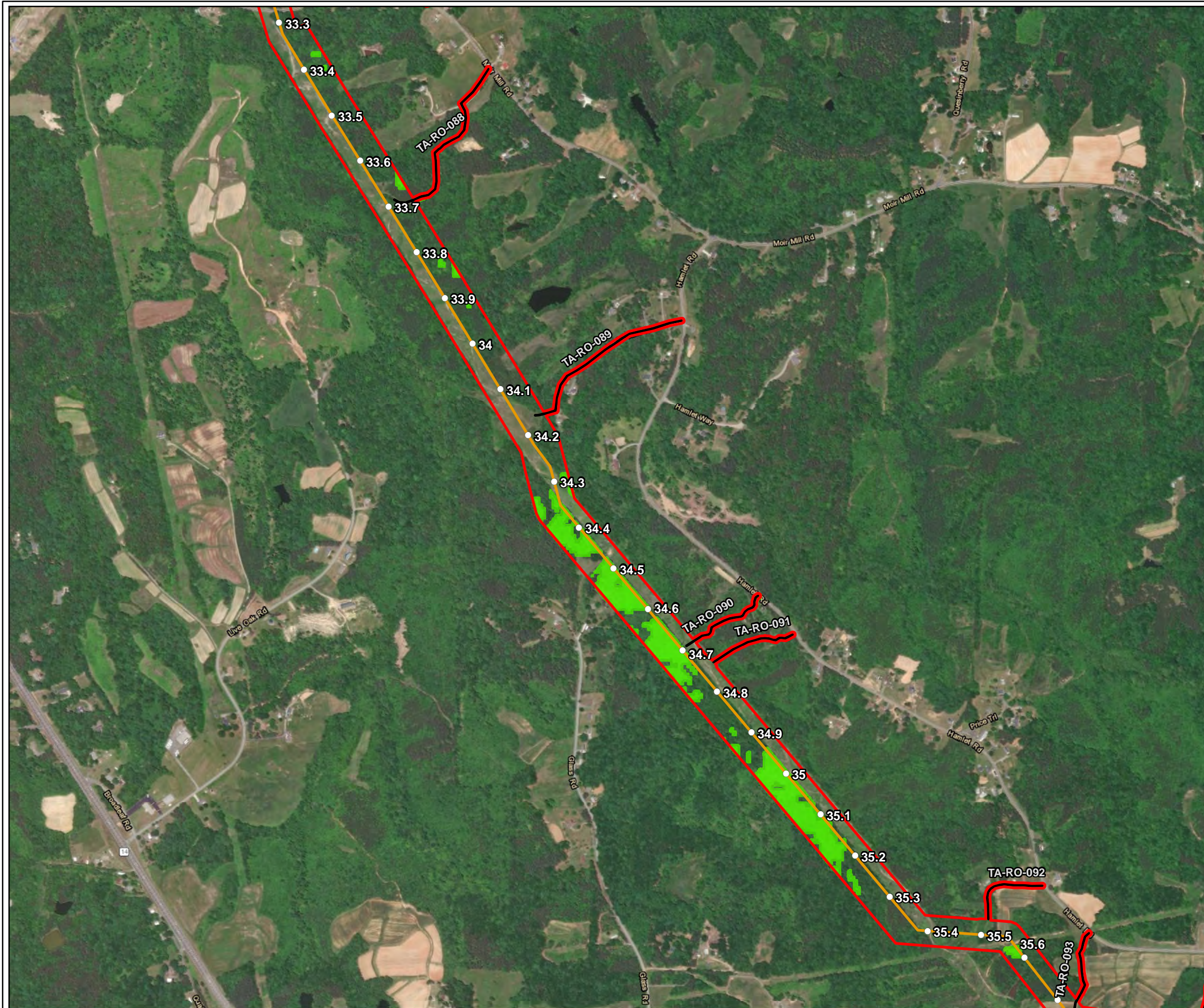
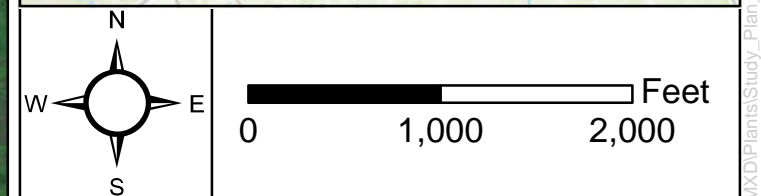
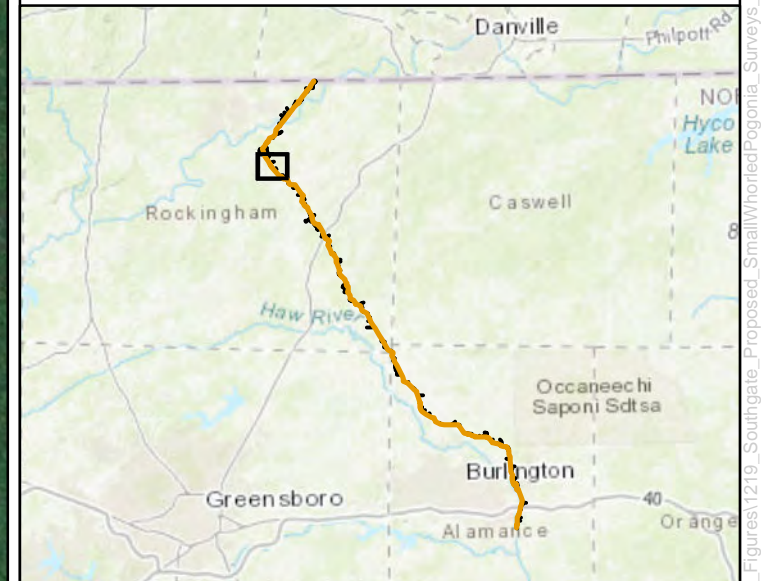


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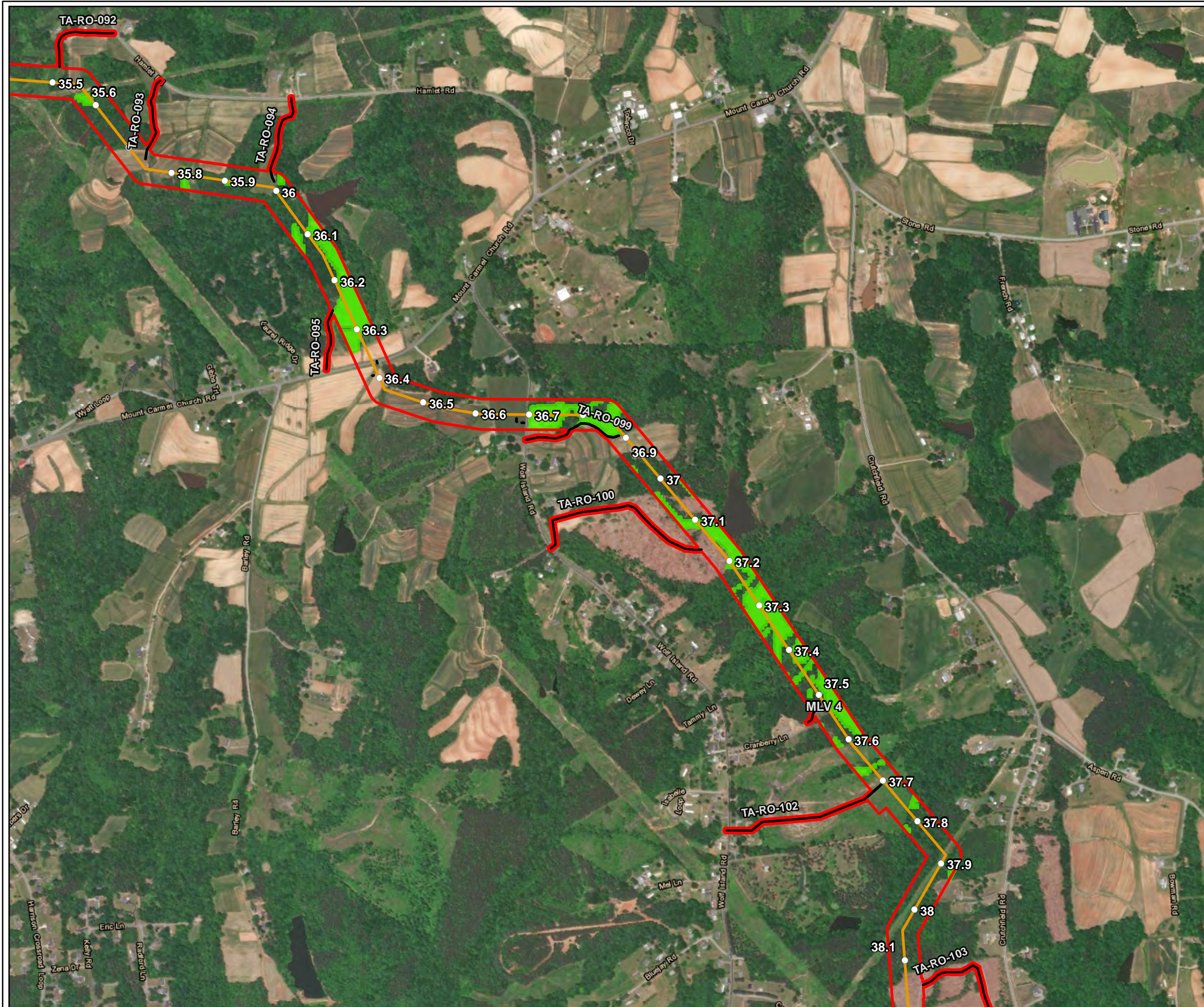
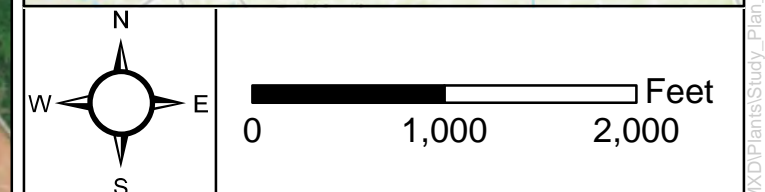
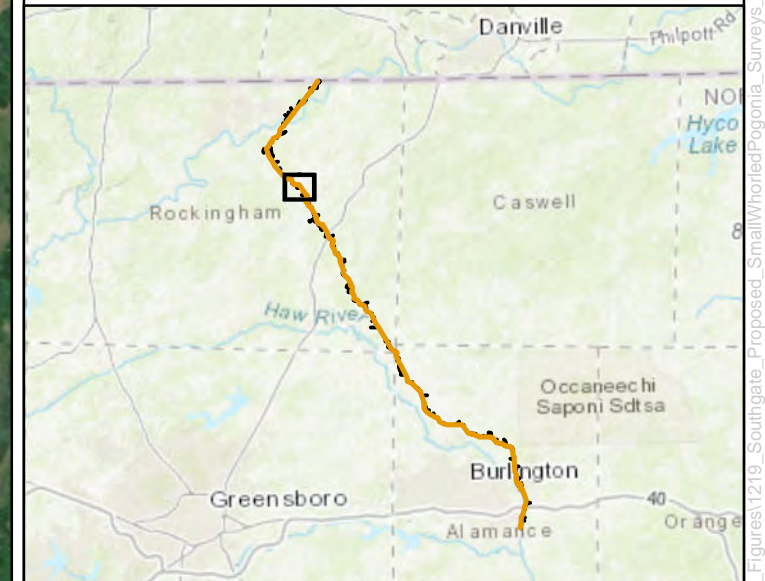


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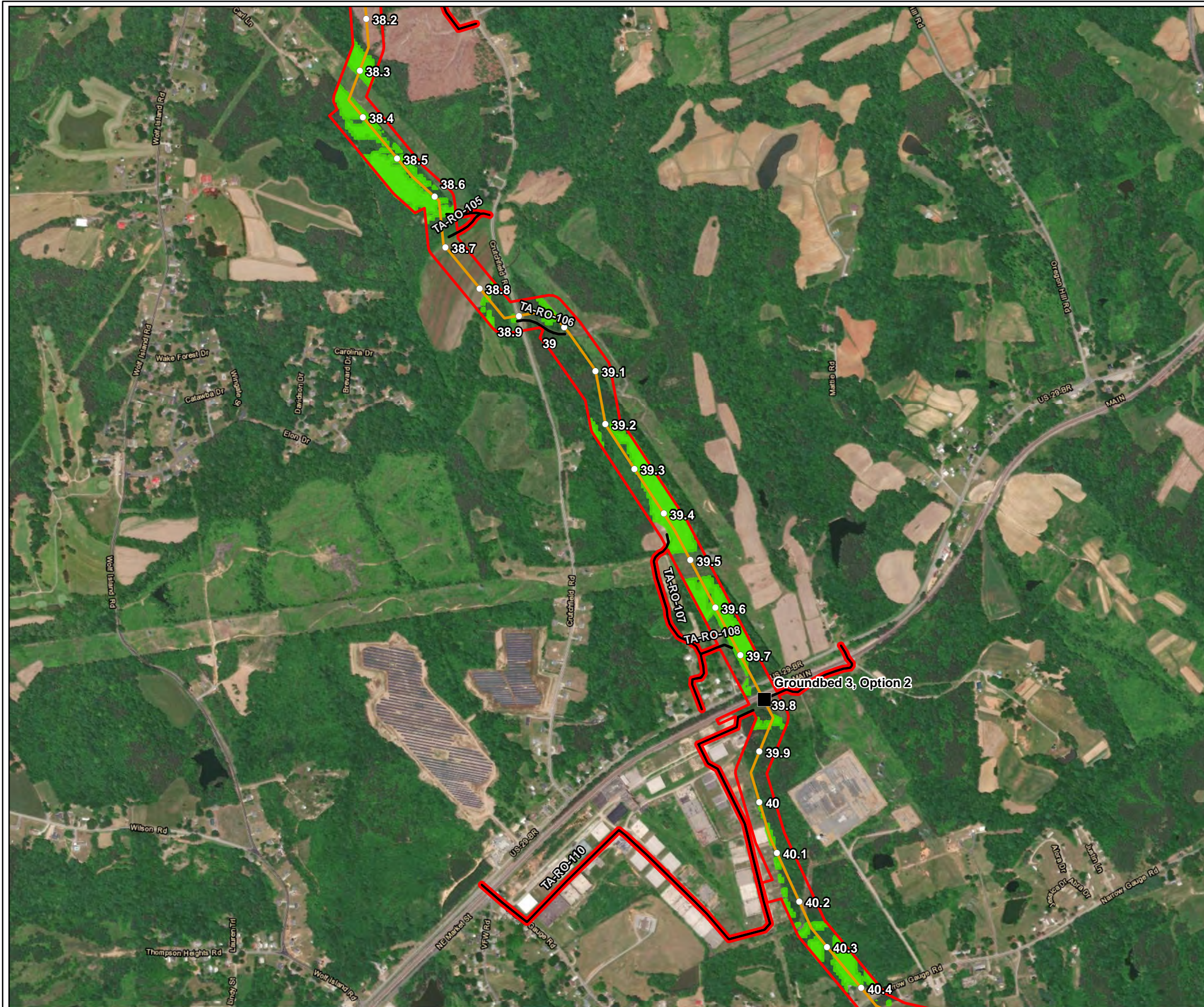
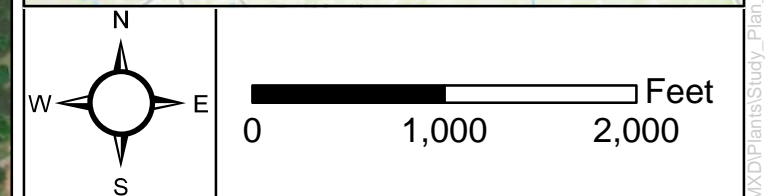
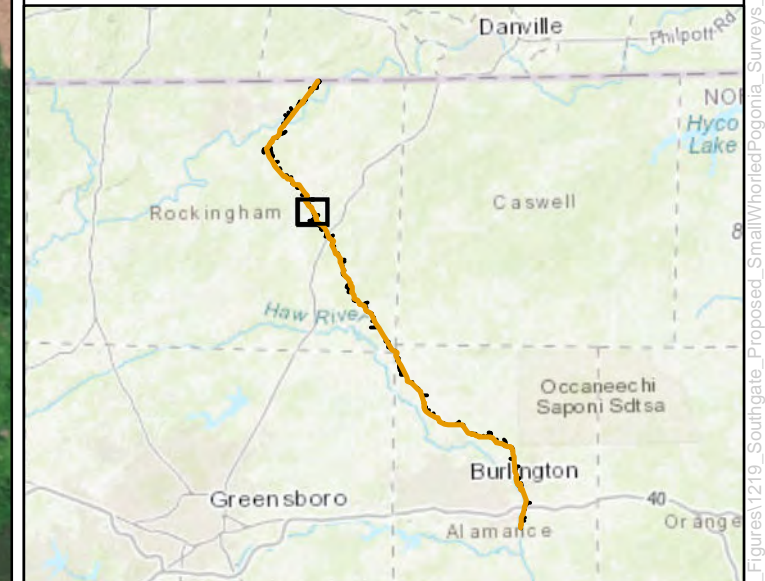


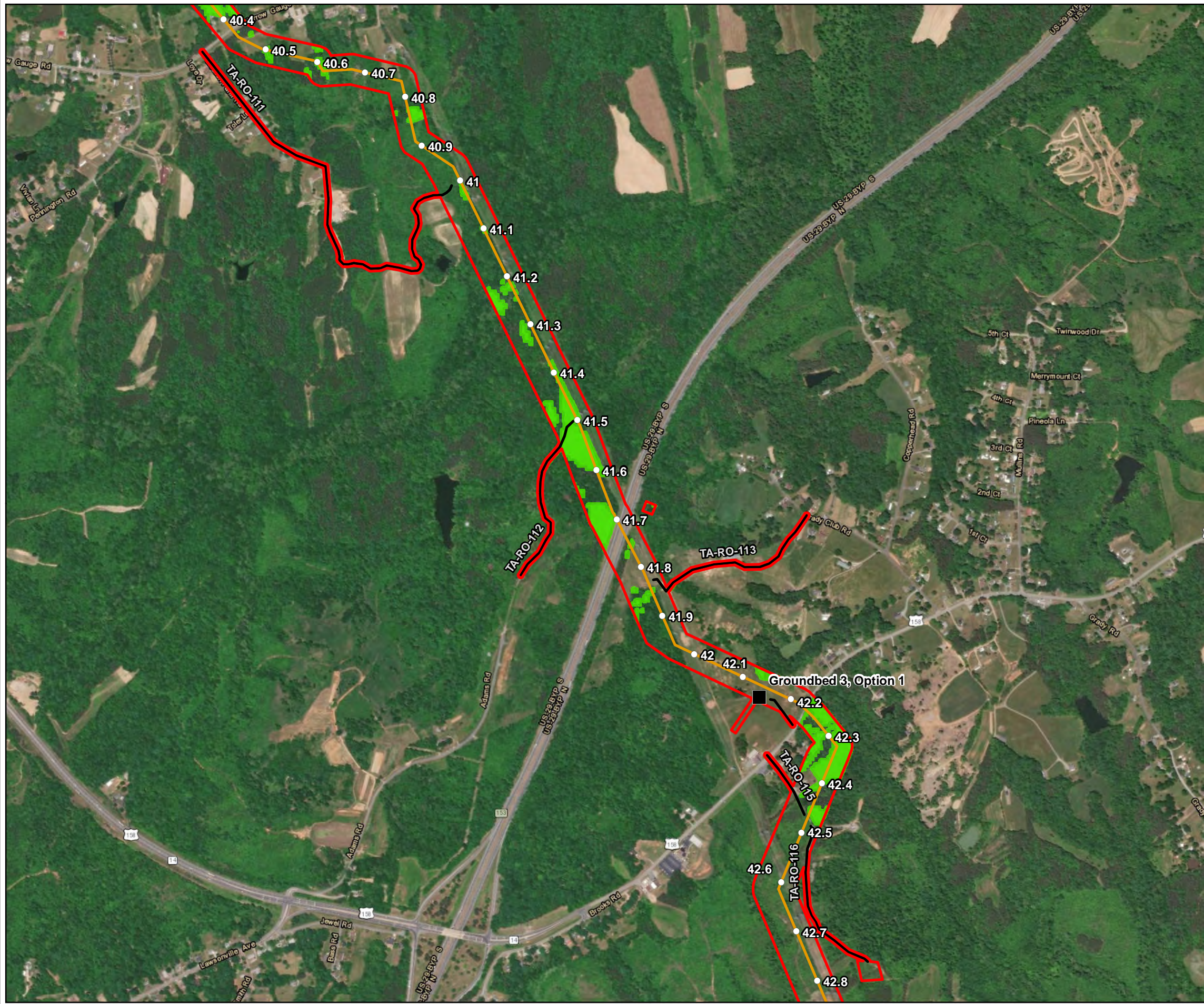
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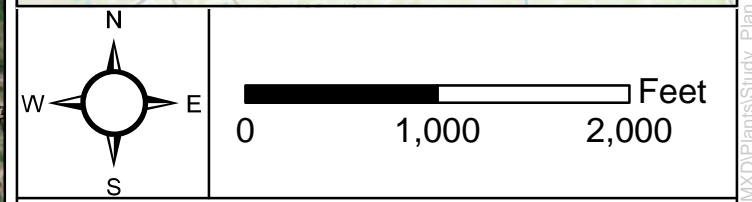
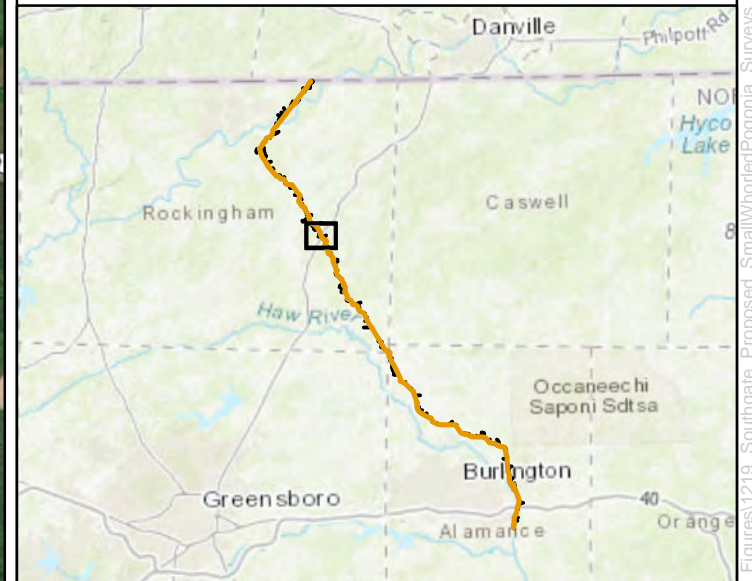


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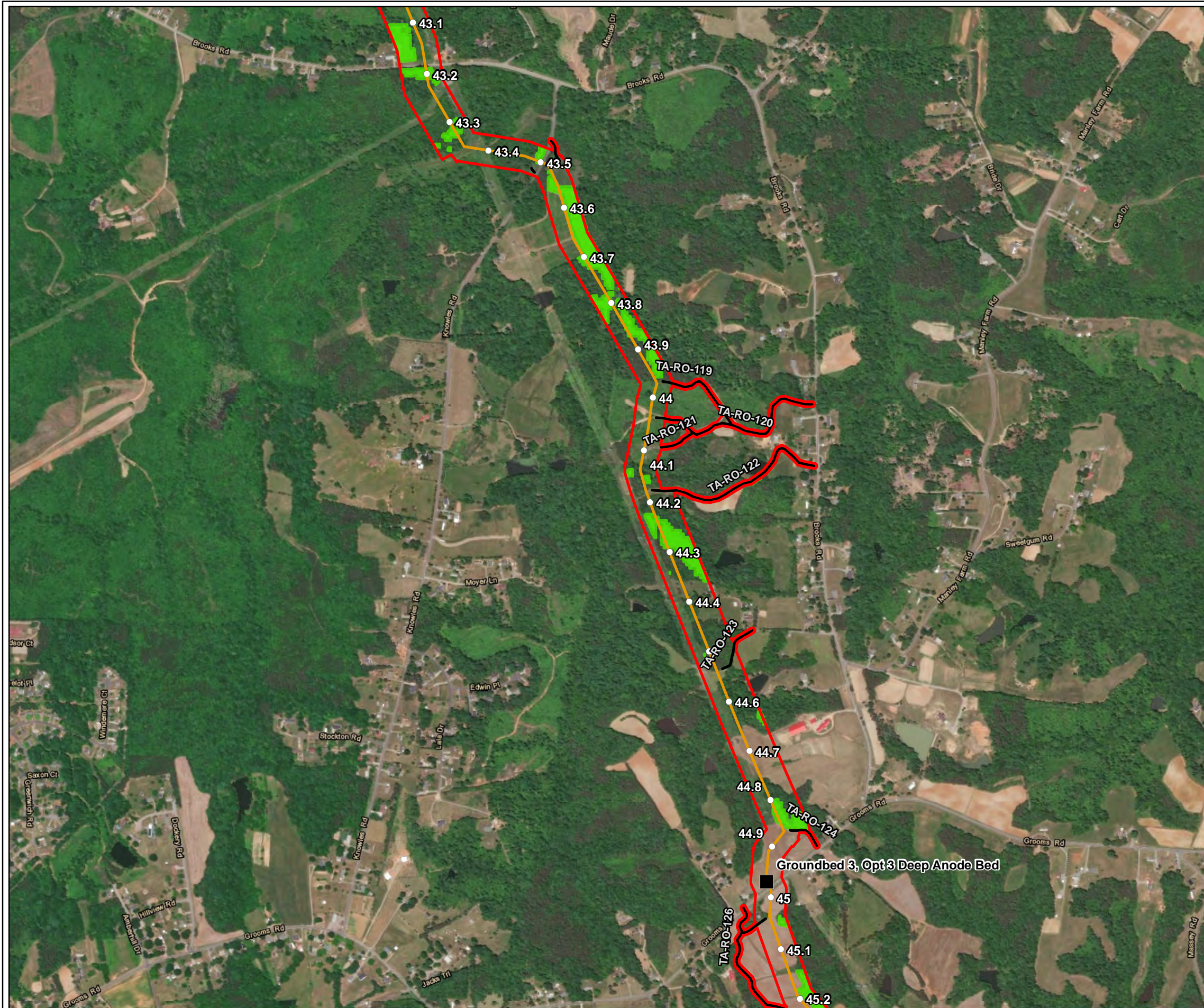
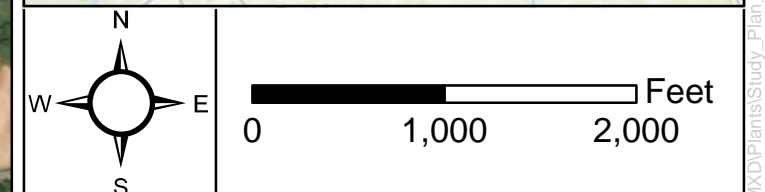
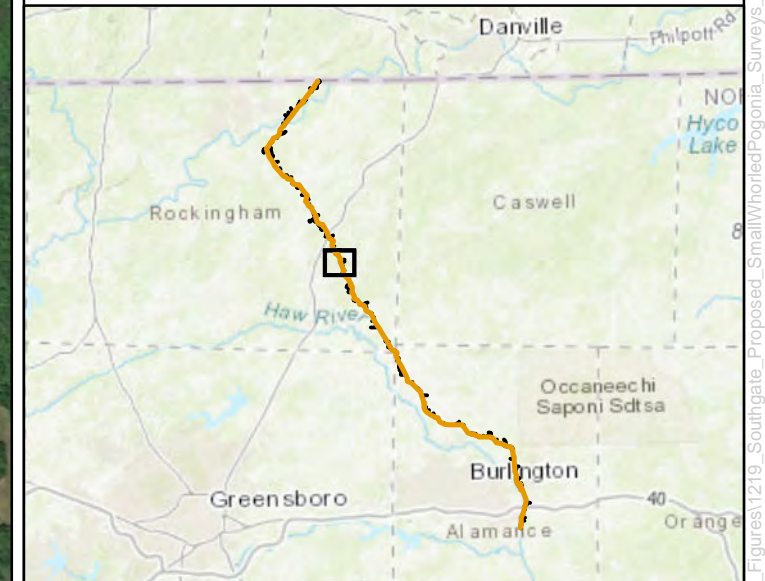


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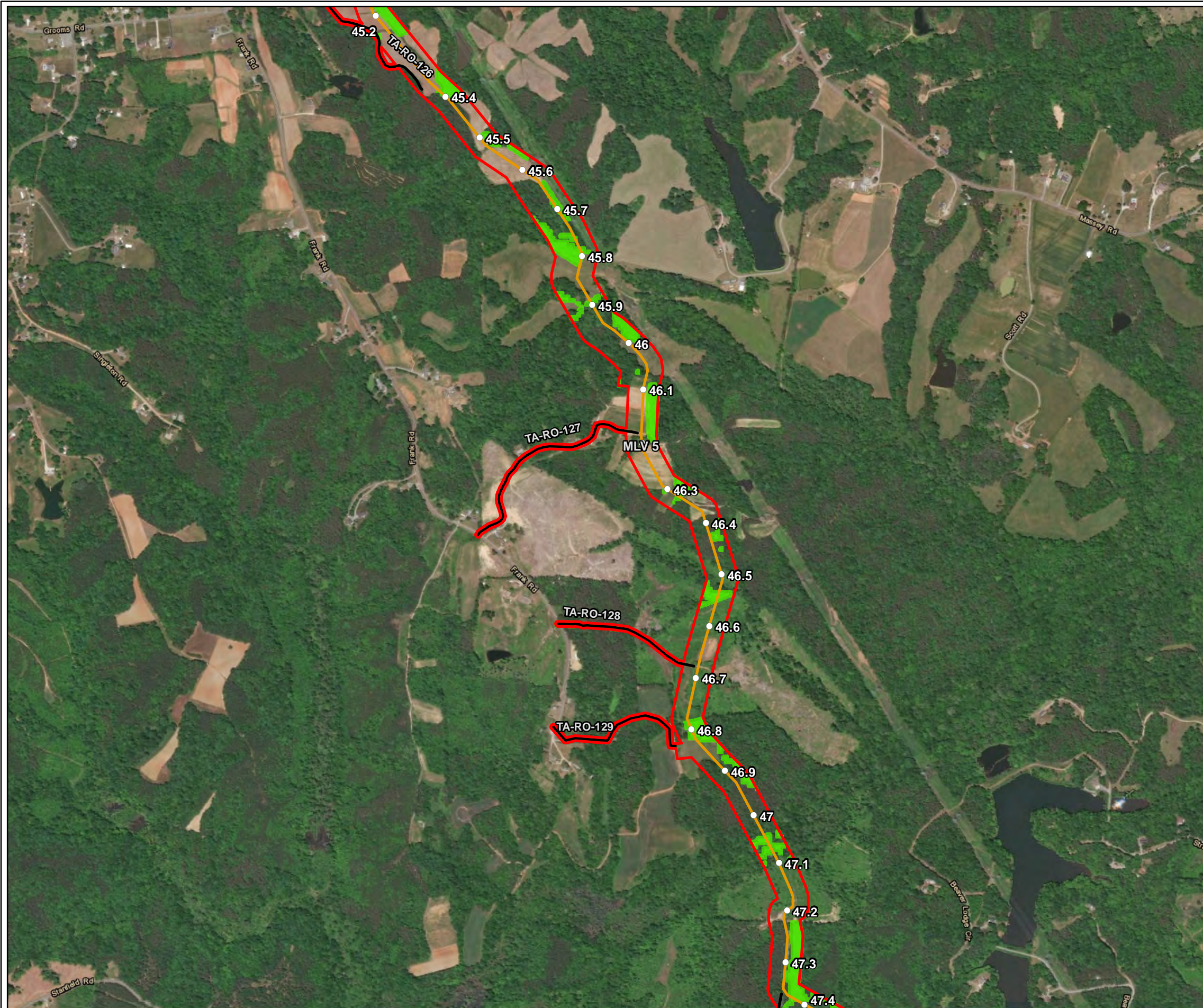
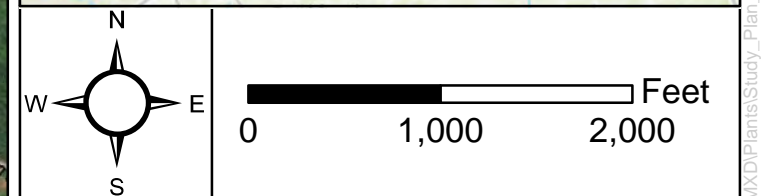
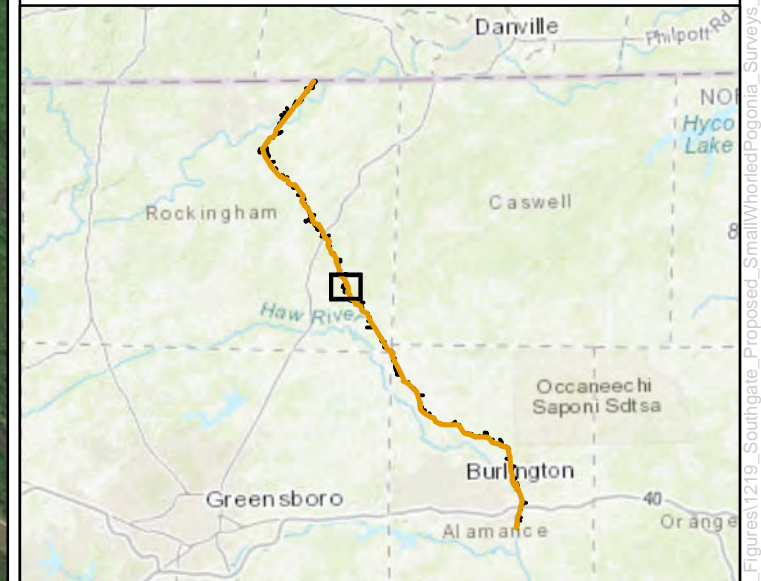


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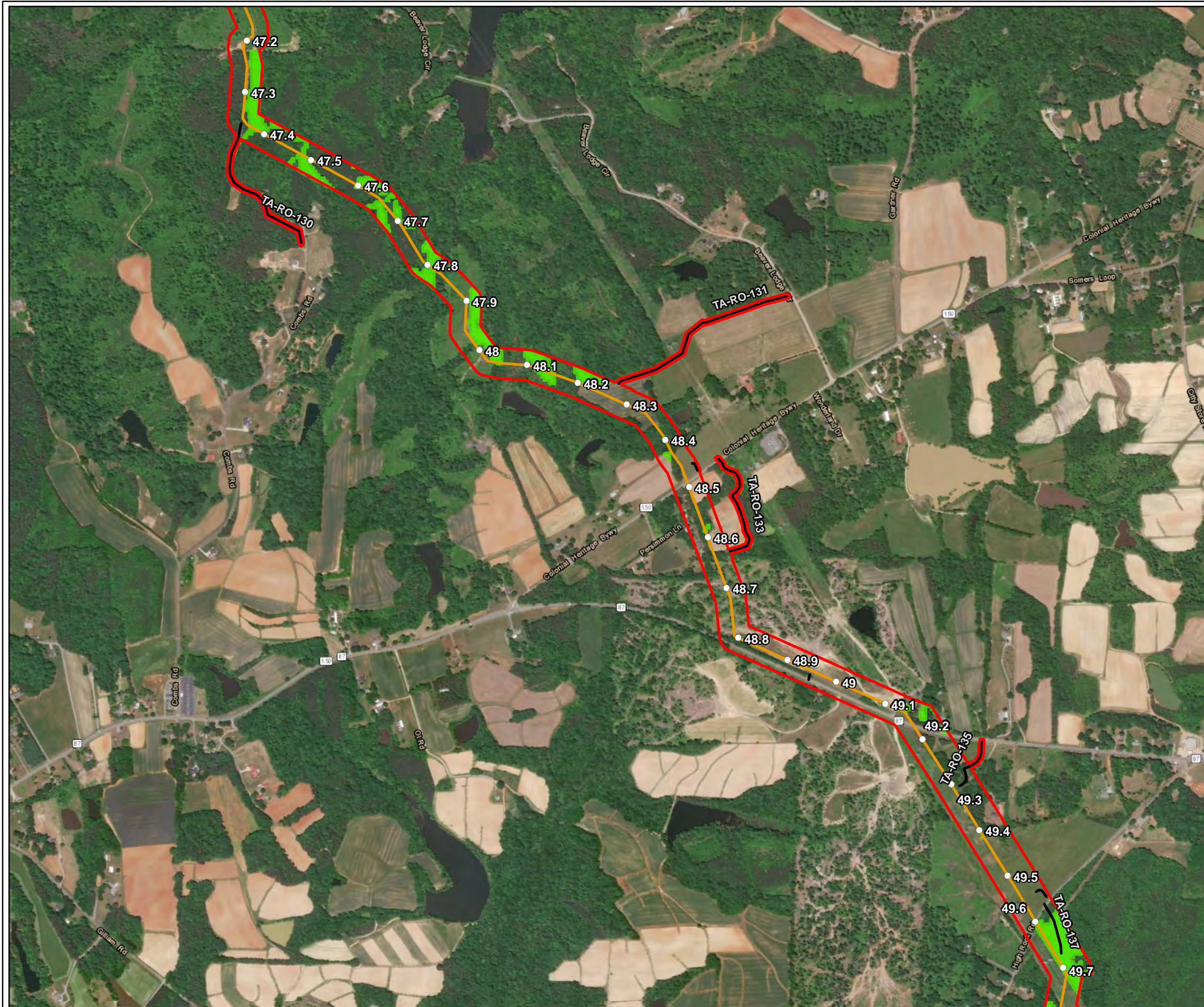
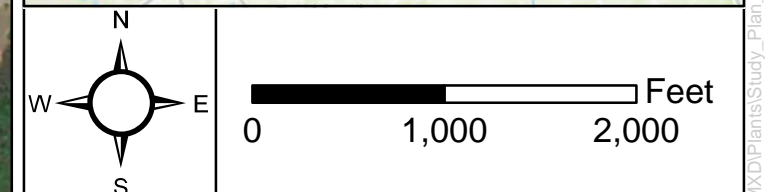
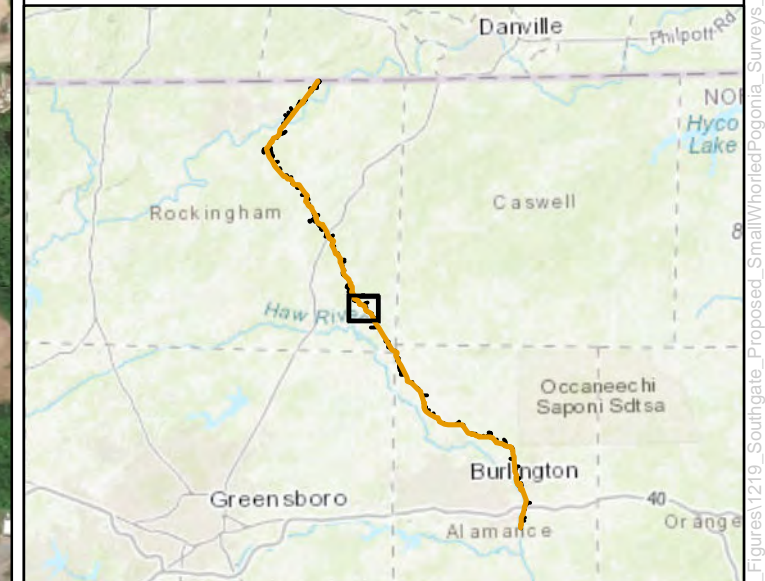


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- Area of Investigation (AOI)
- Small Whorled Pogonia Survey Area



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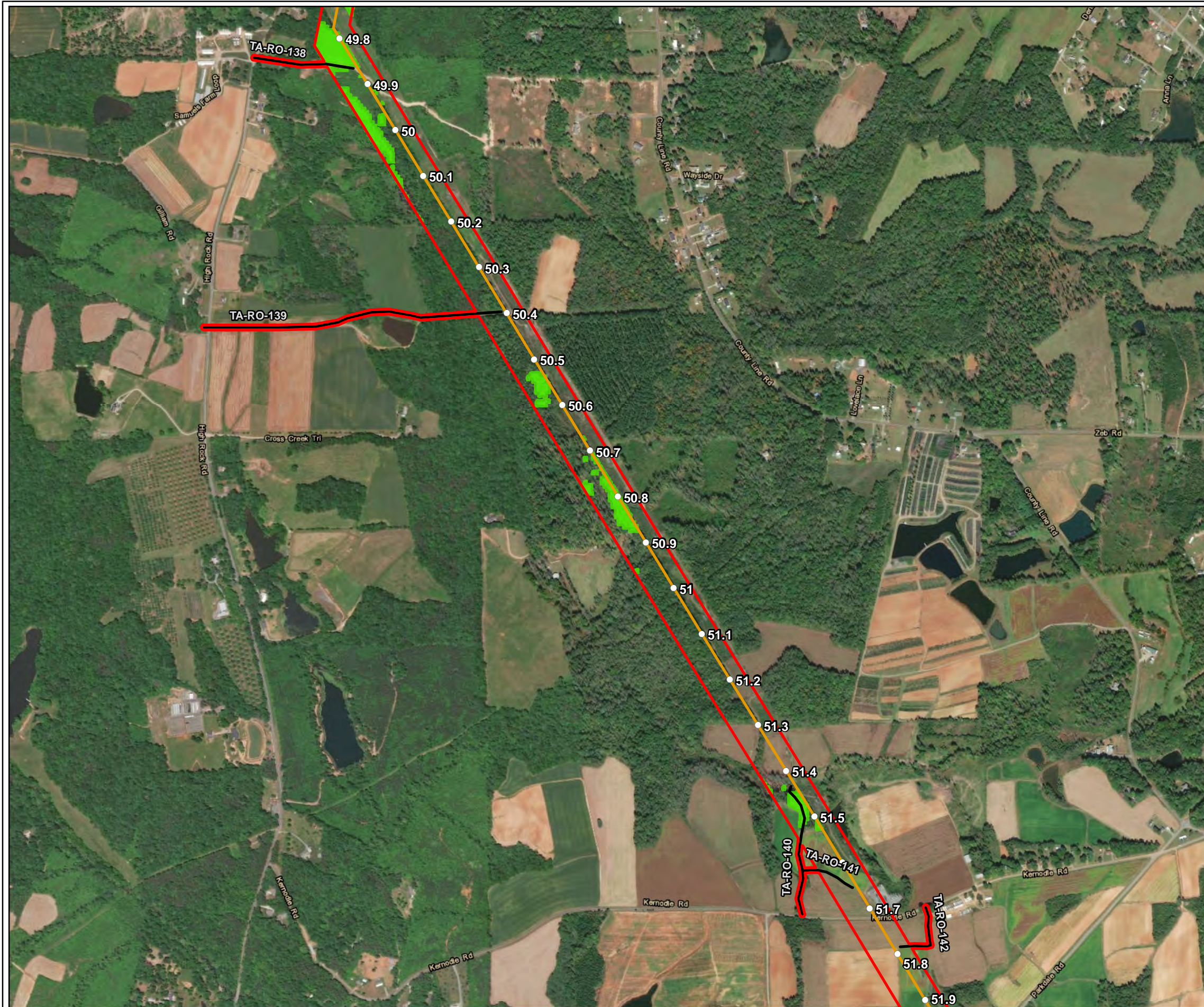
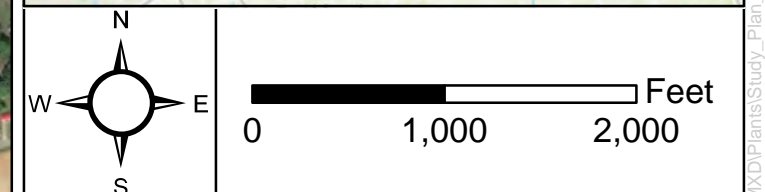
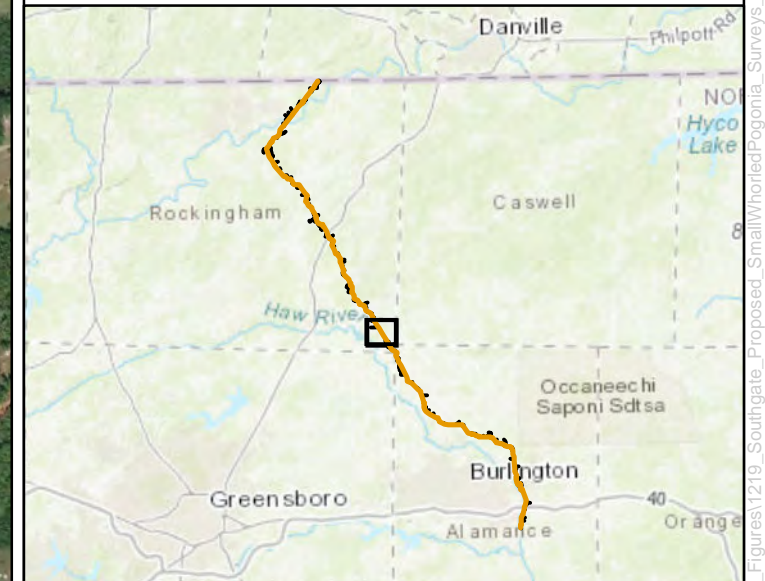


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

- Milepost
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Small Whorled Pogonia Survey Area



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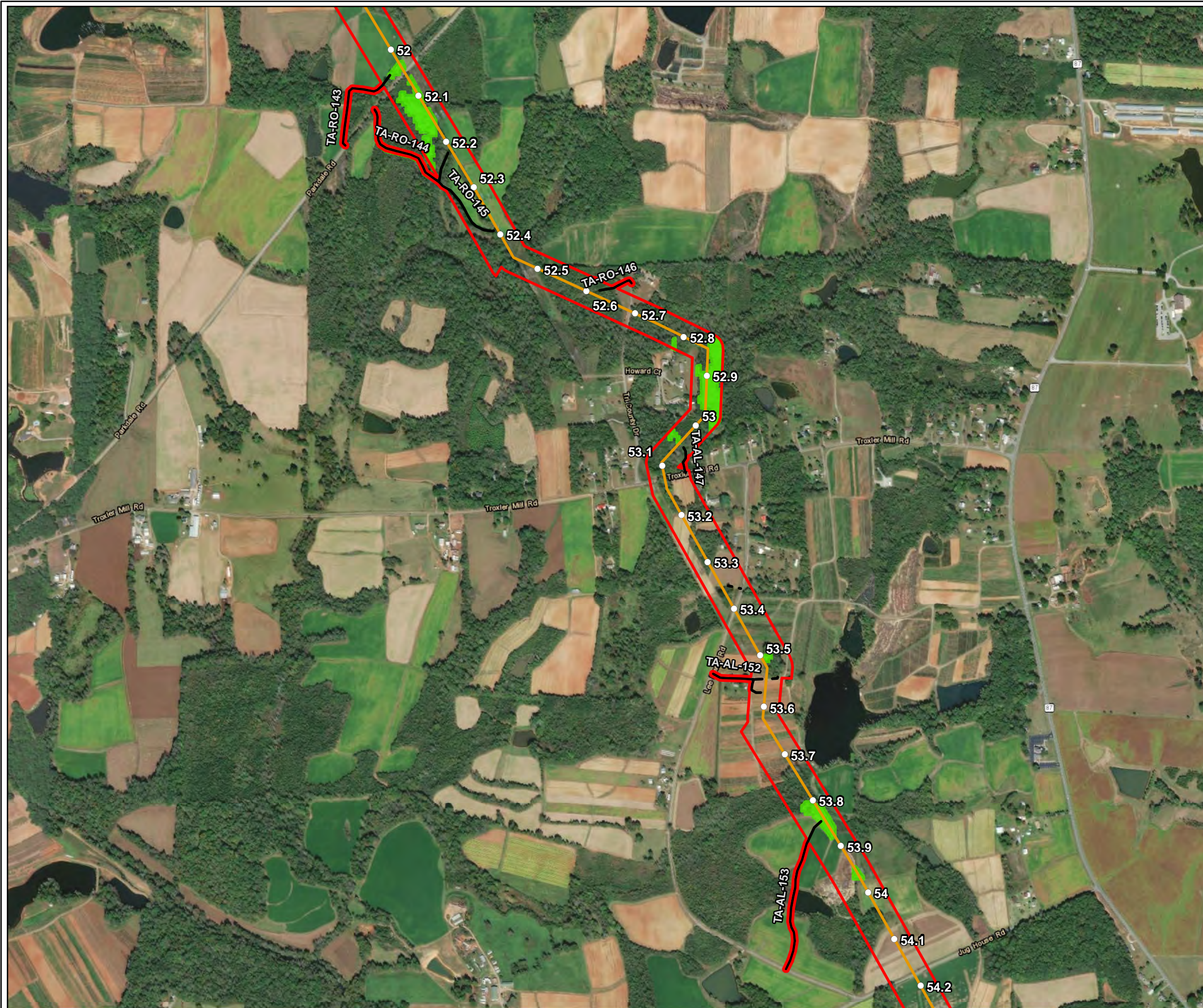
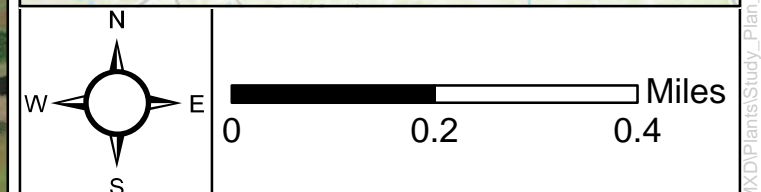
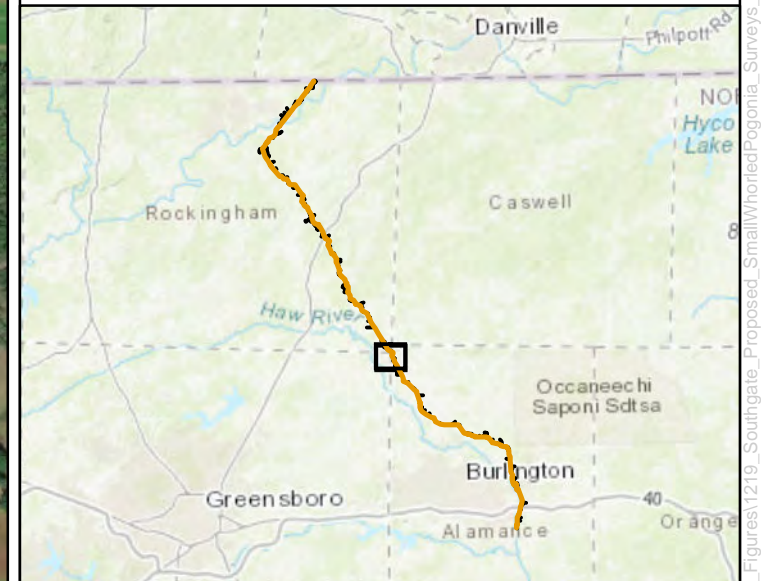


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

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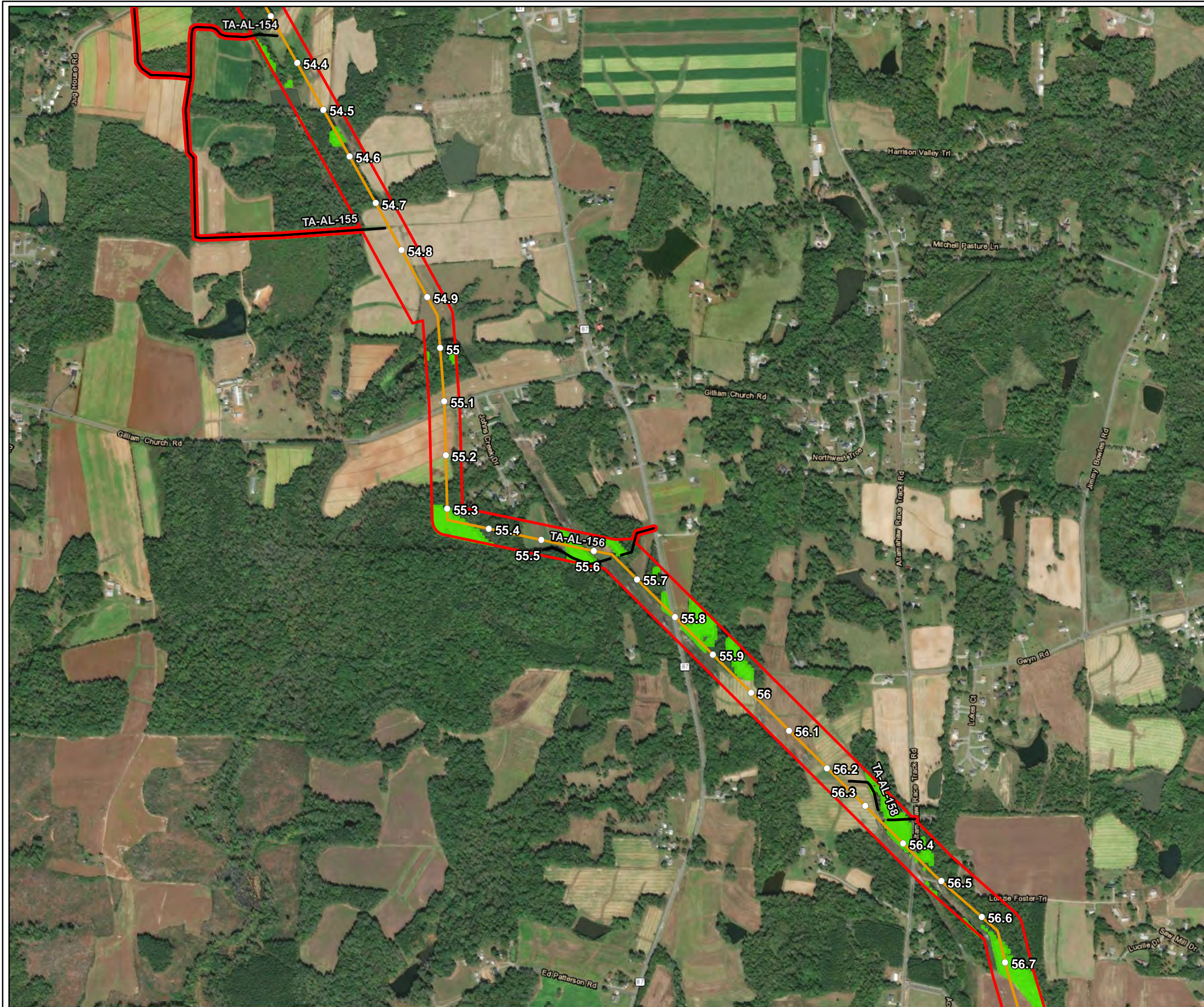
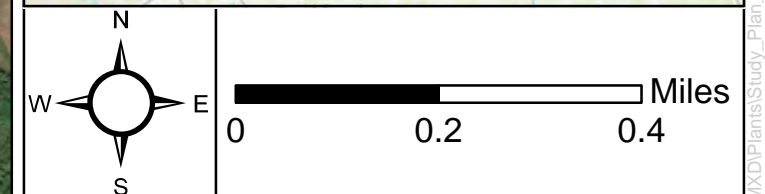
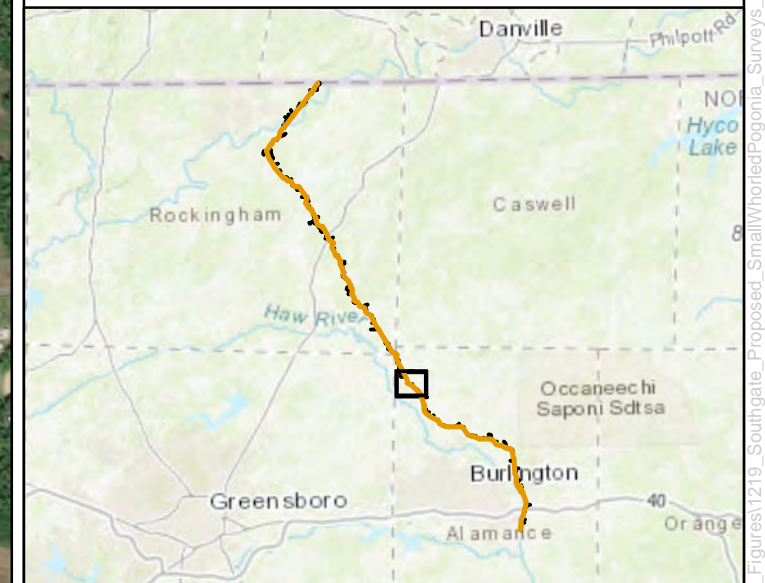


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- Milepost
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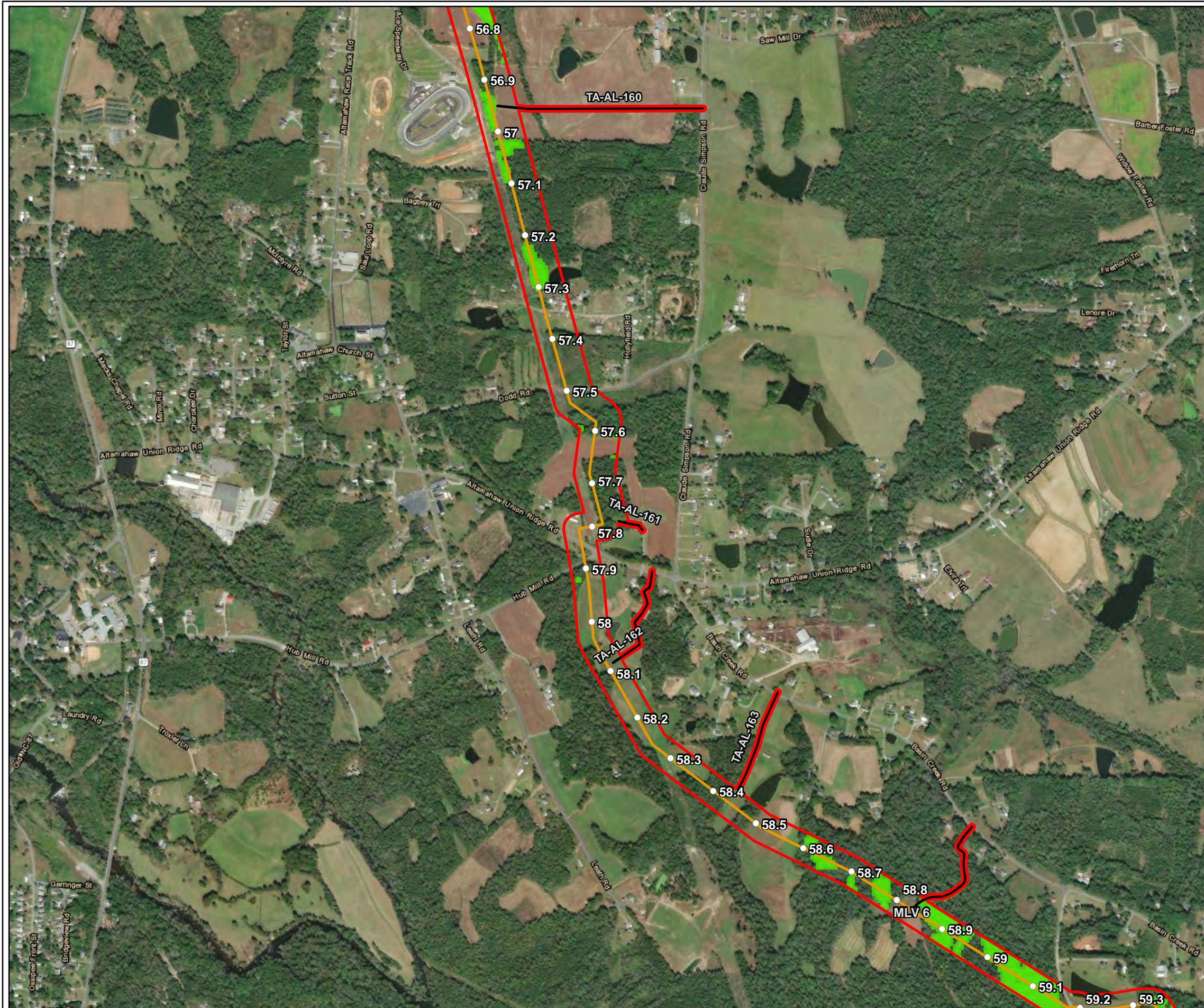
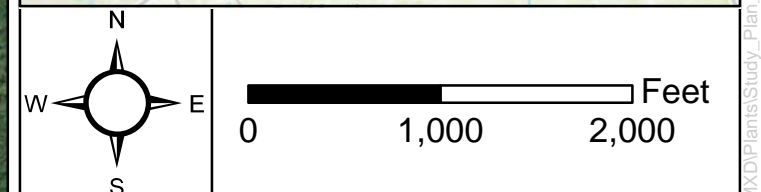
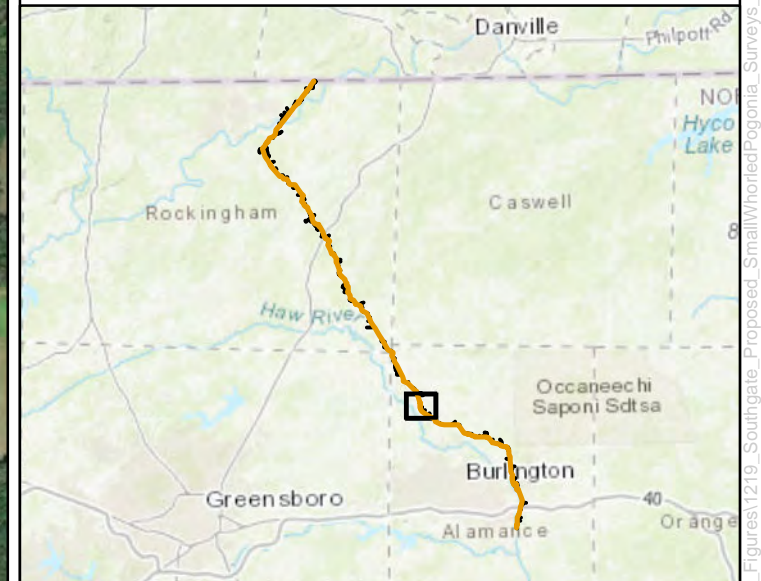


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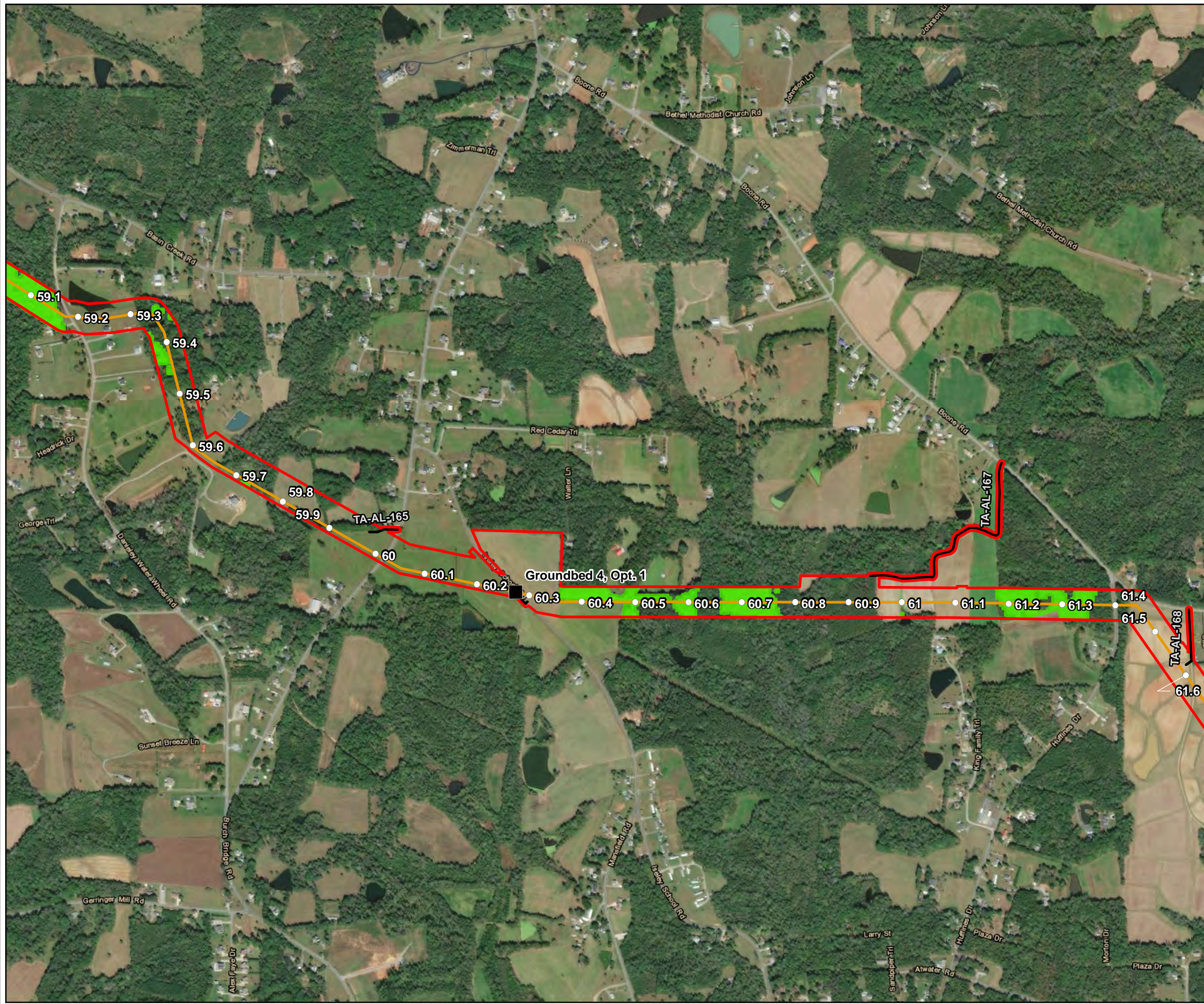
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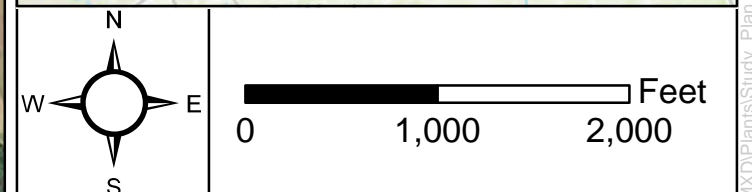
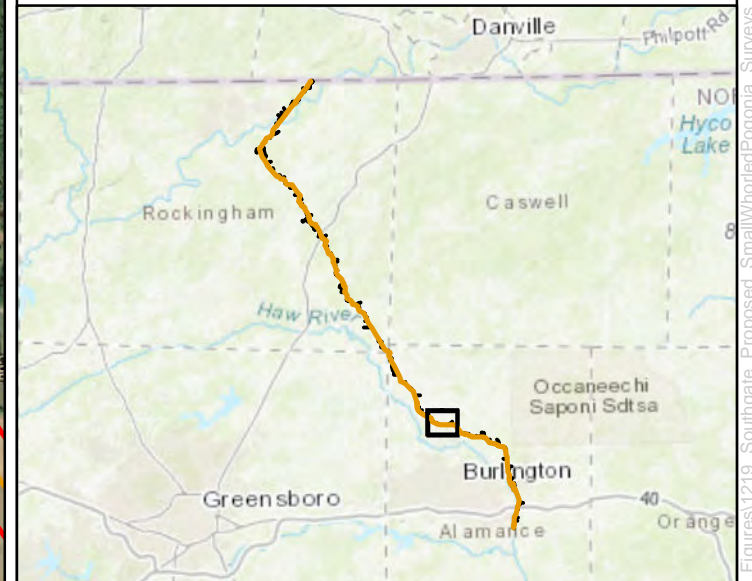
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Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.



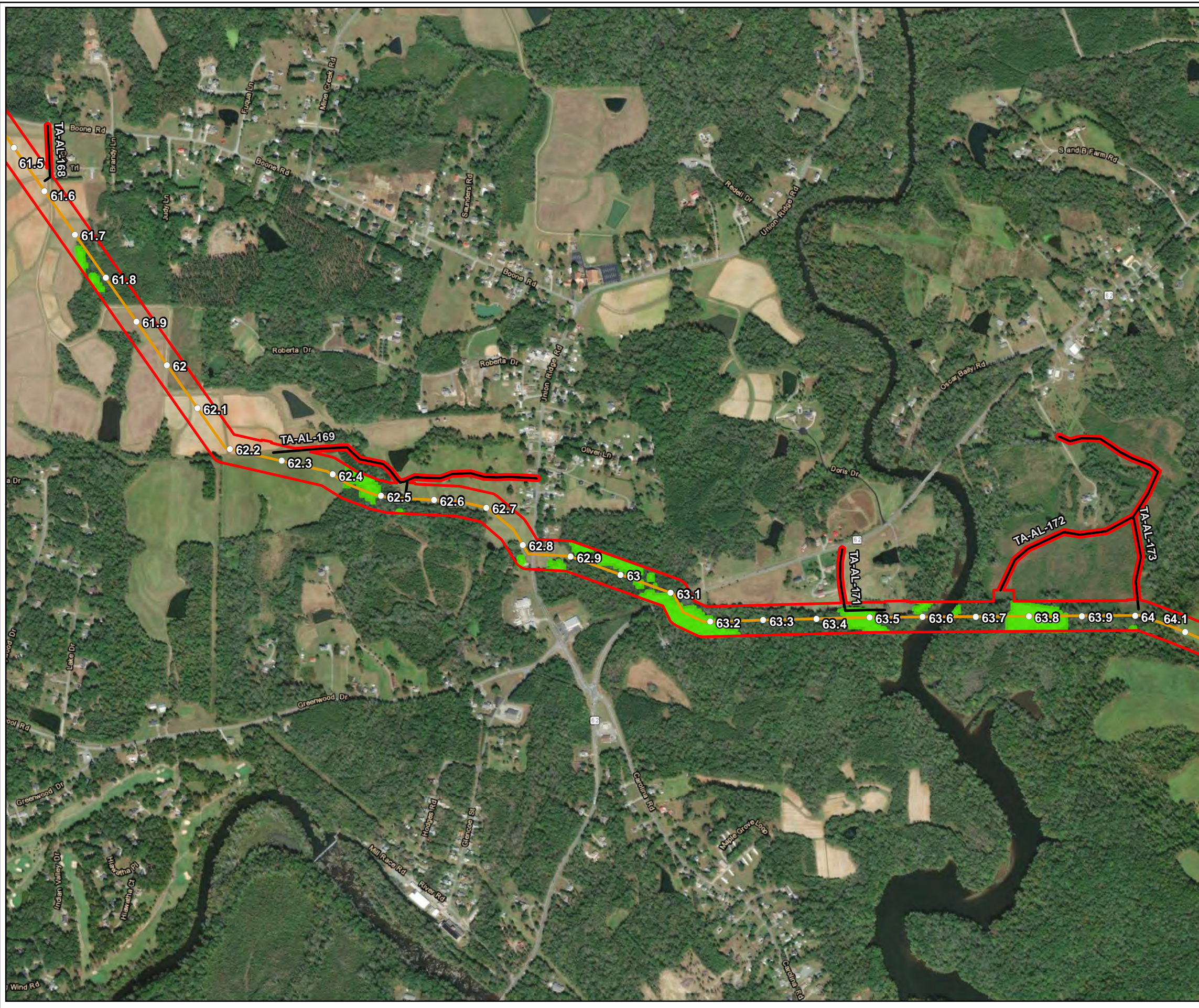
- Milepost
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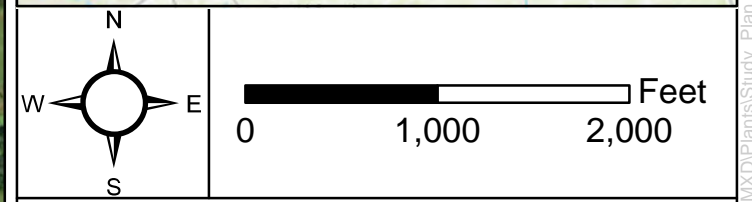
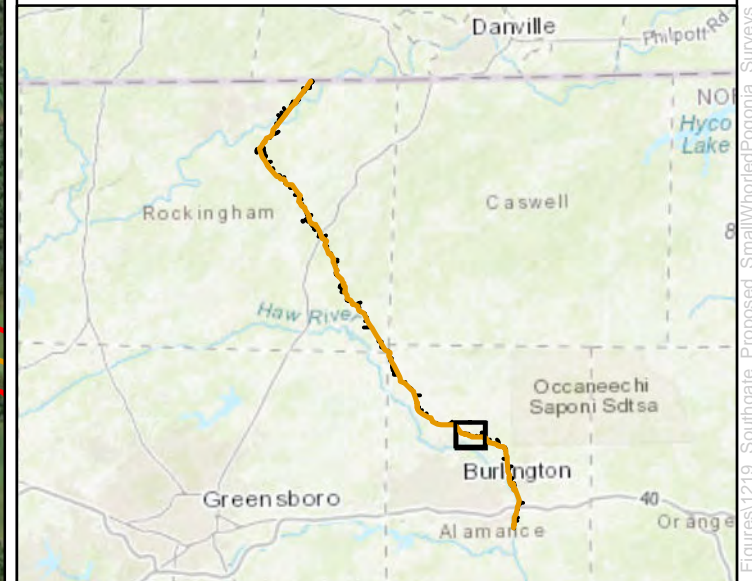
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Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.



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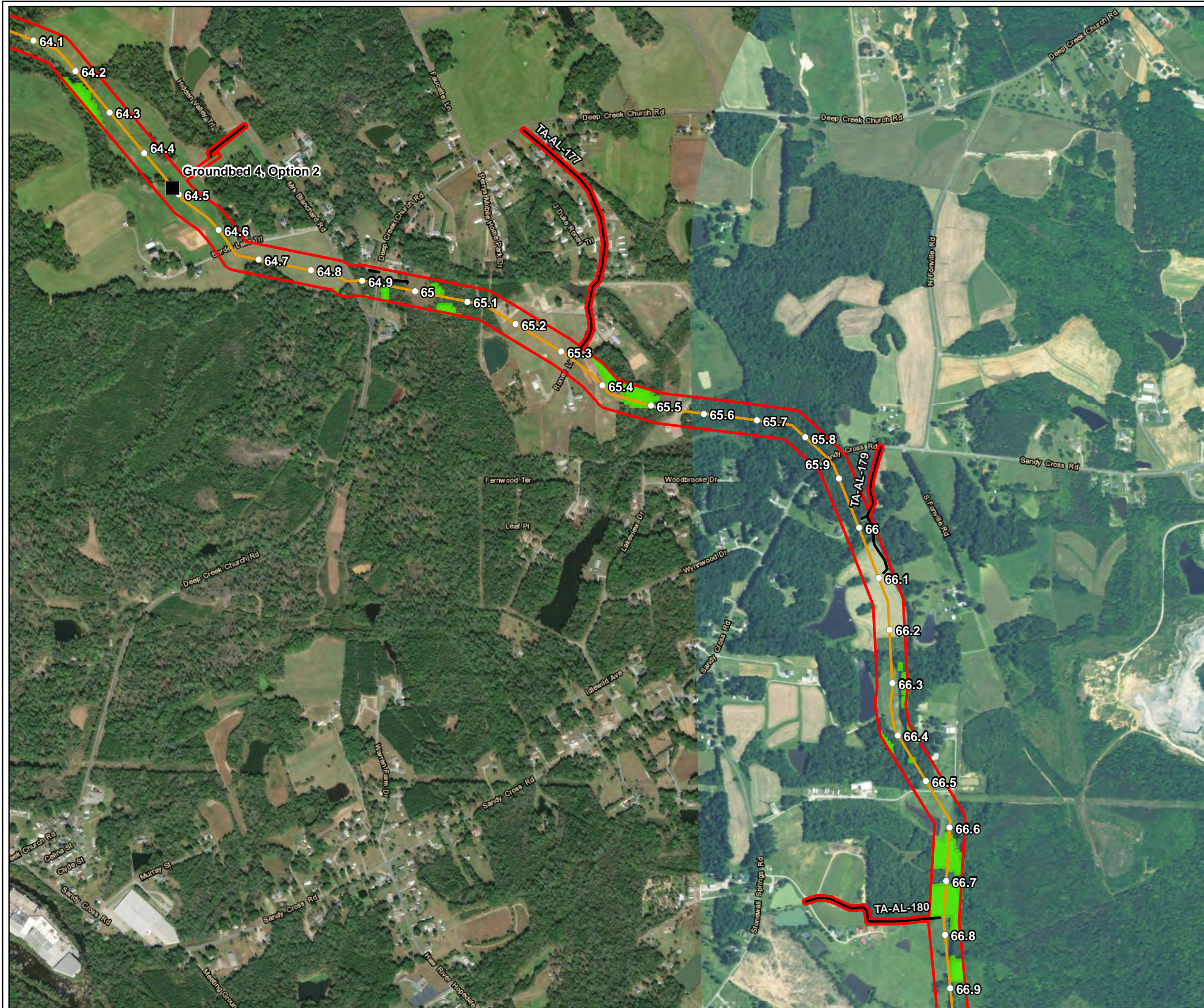
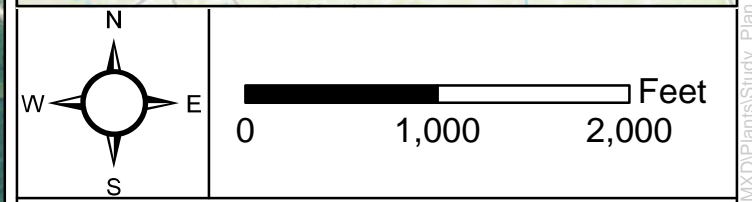
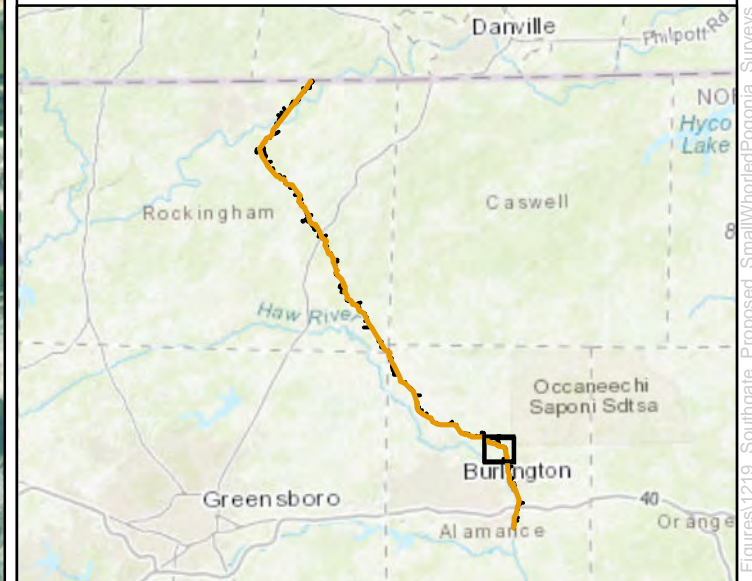


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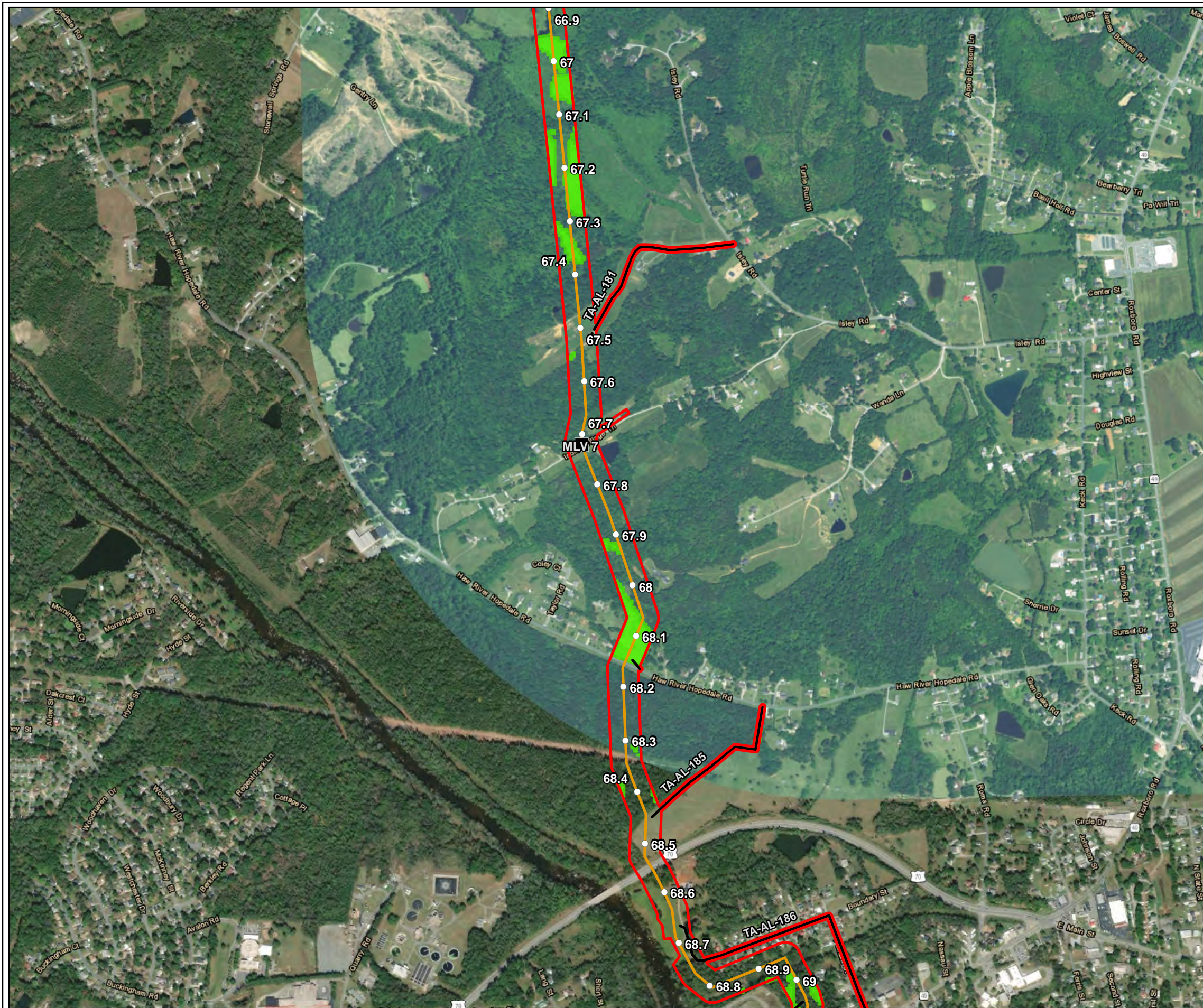
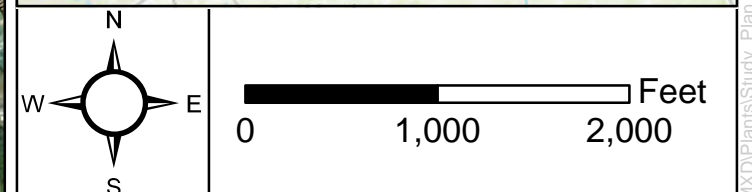
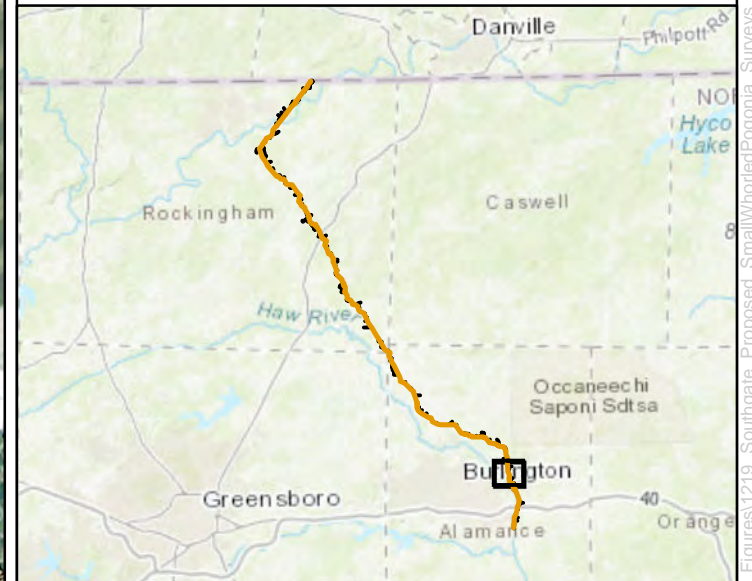


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

- Milepost
- Ground Bed
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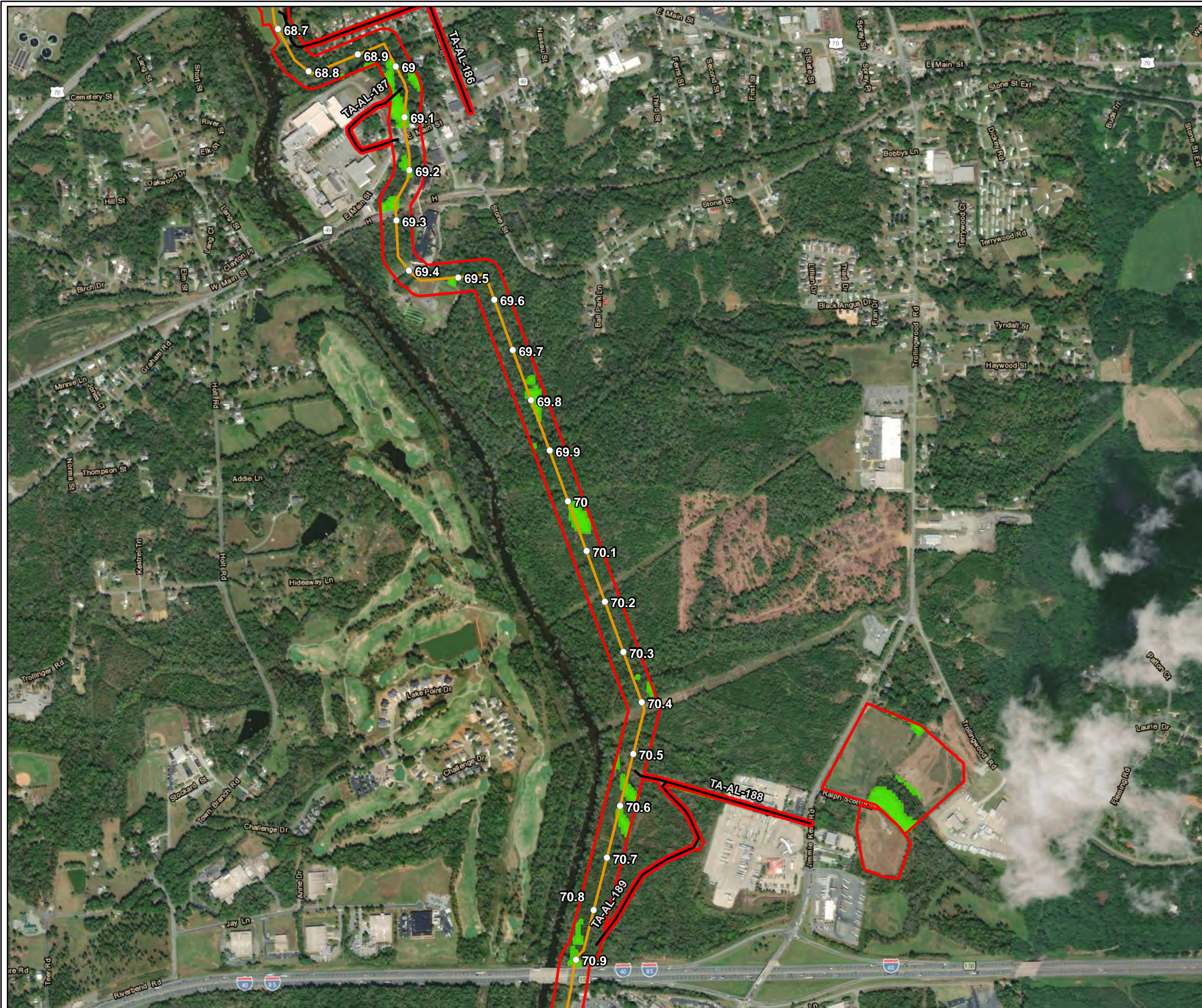
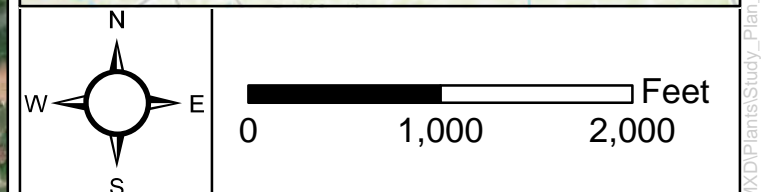
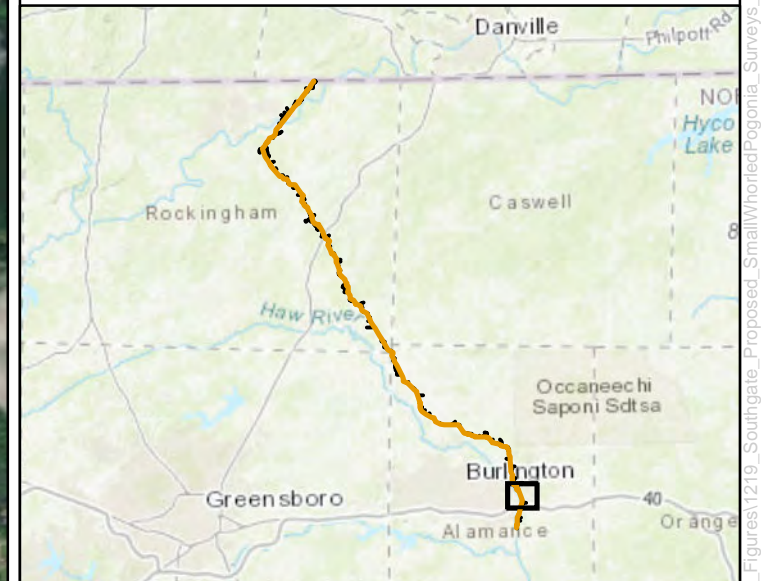


Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

- Milepost
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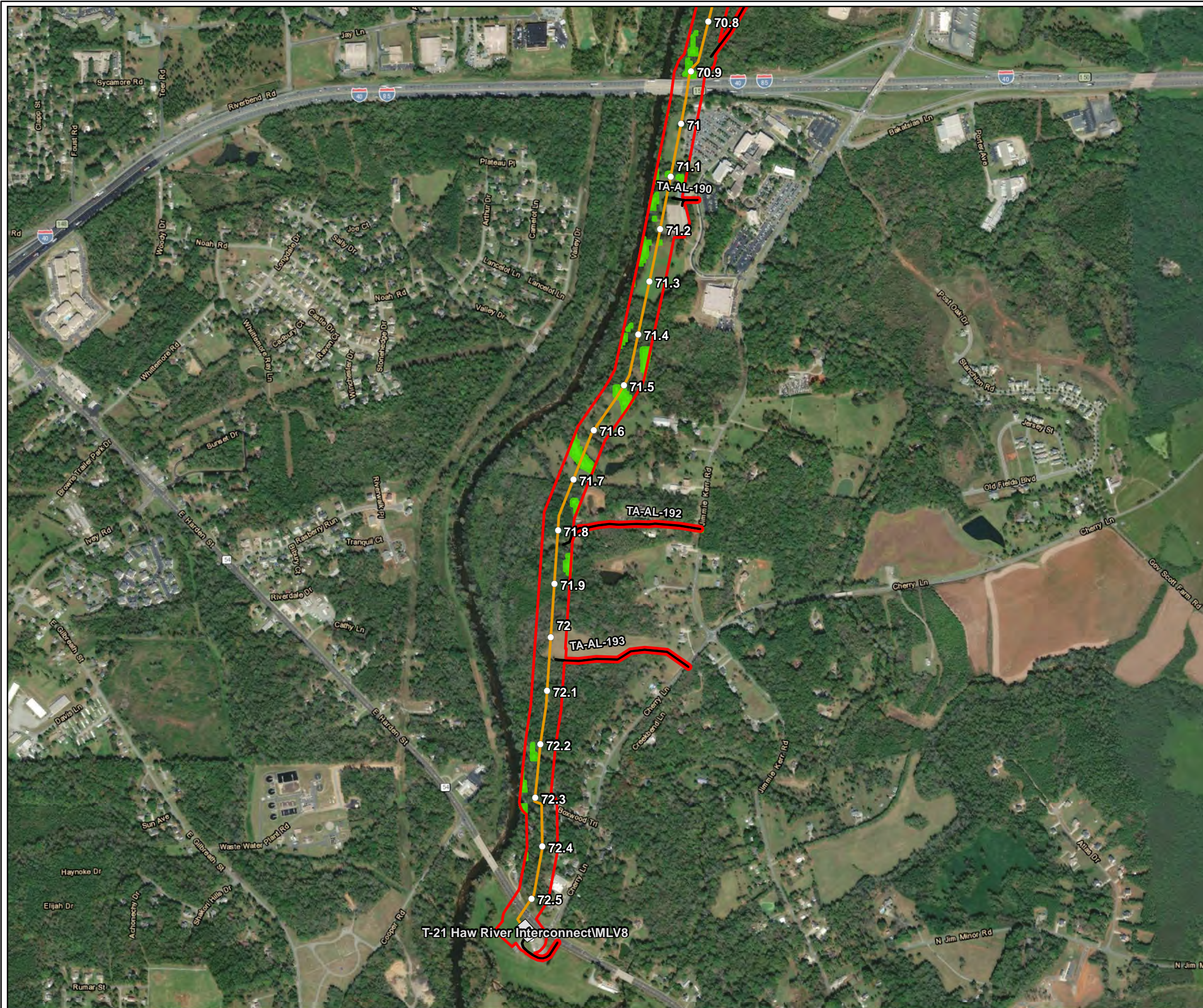
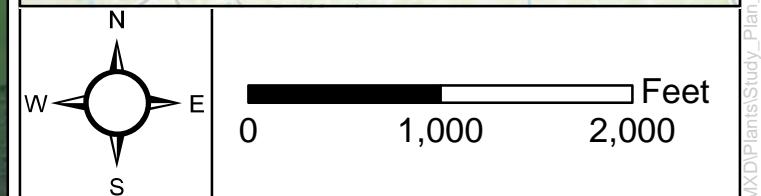
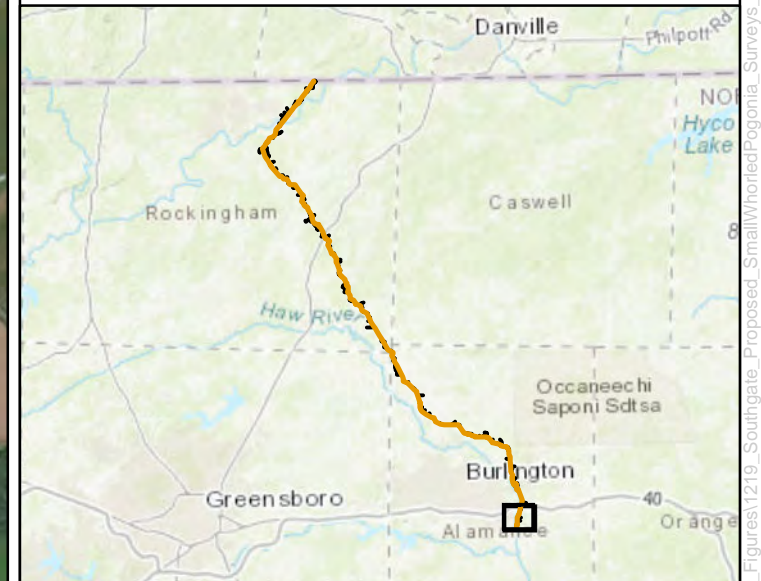


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- Milepost
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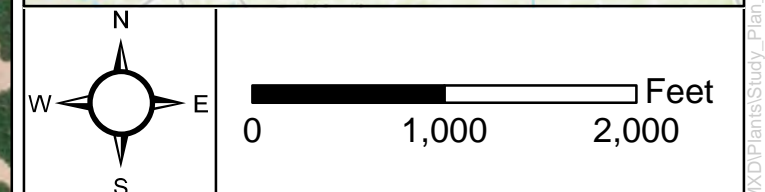
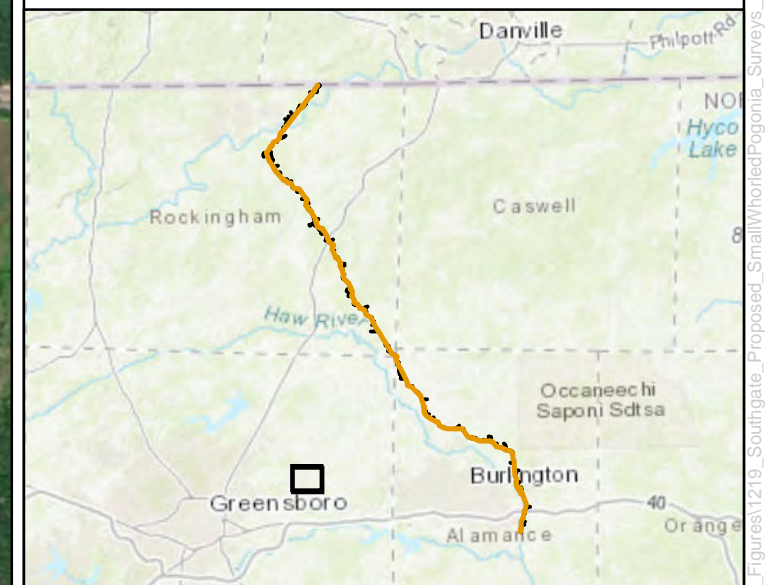
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Figure 2. Proposed small whorled pogonia survey areas along MVP Southgate Project in Rockingham, Guilford and Alamance counties, North Carolina.

- Area of Investigation (AOI)
- Small Whorled Pogonia Survey Area



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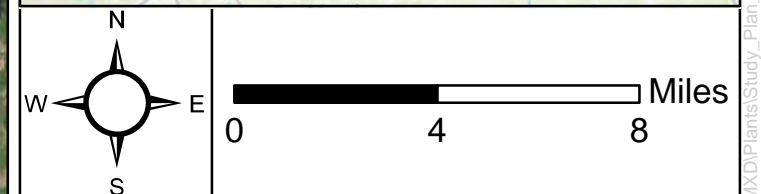
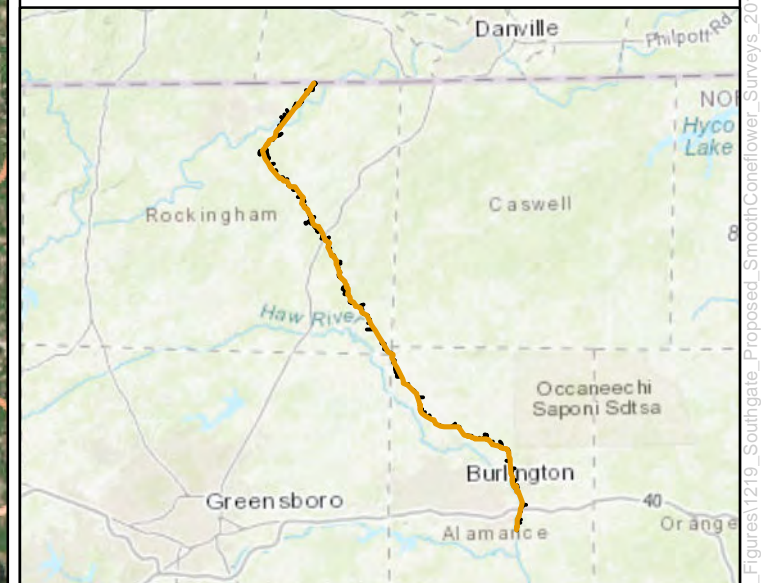
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

Key Map

- Project Alignment
- - - Access Road

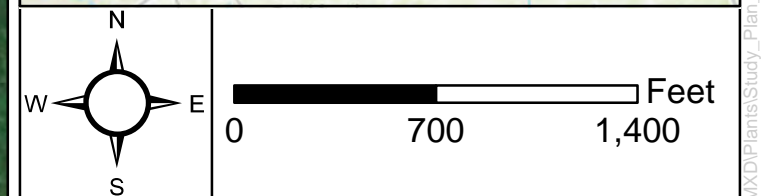
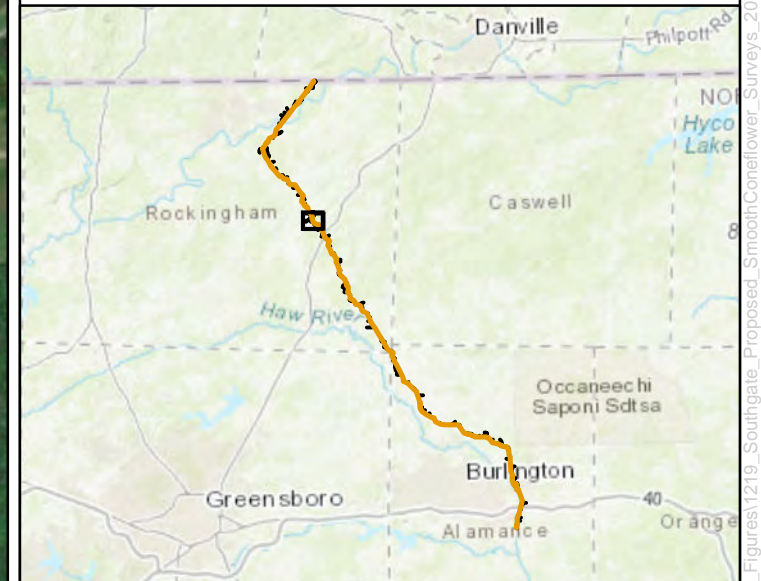


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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

- Milepost
- Ground Bed
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



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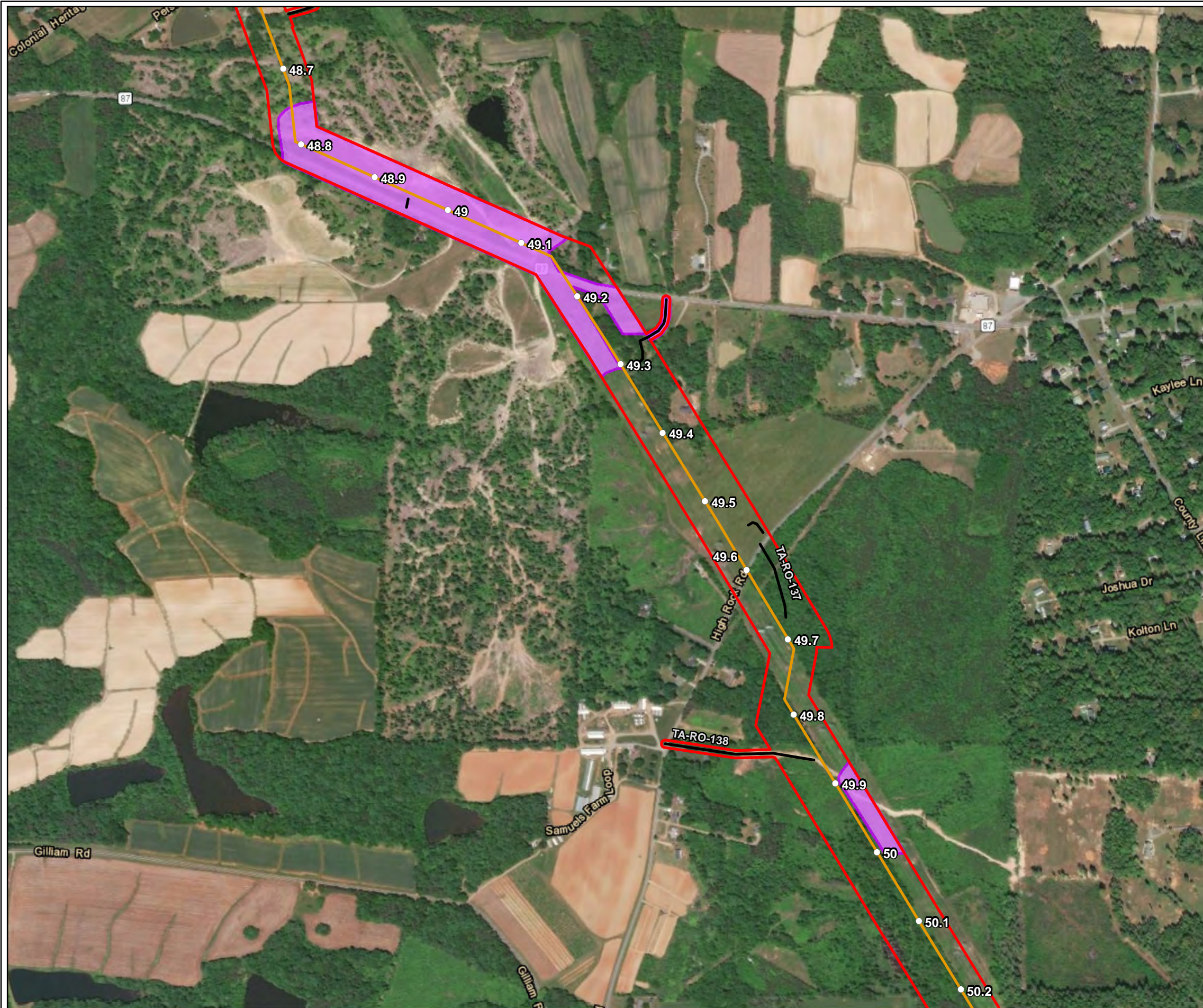
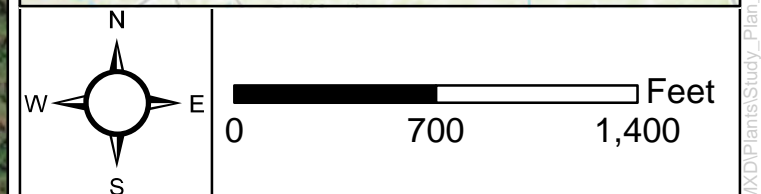
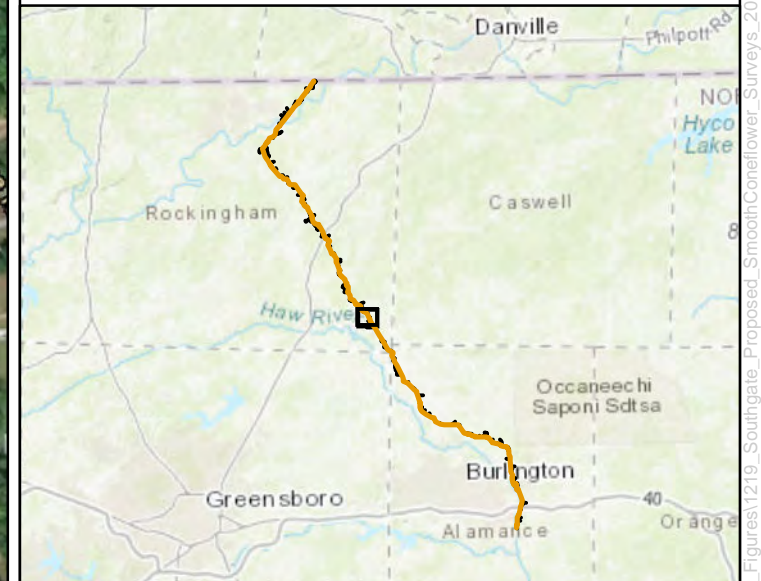


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

- Milepost
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



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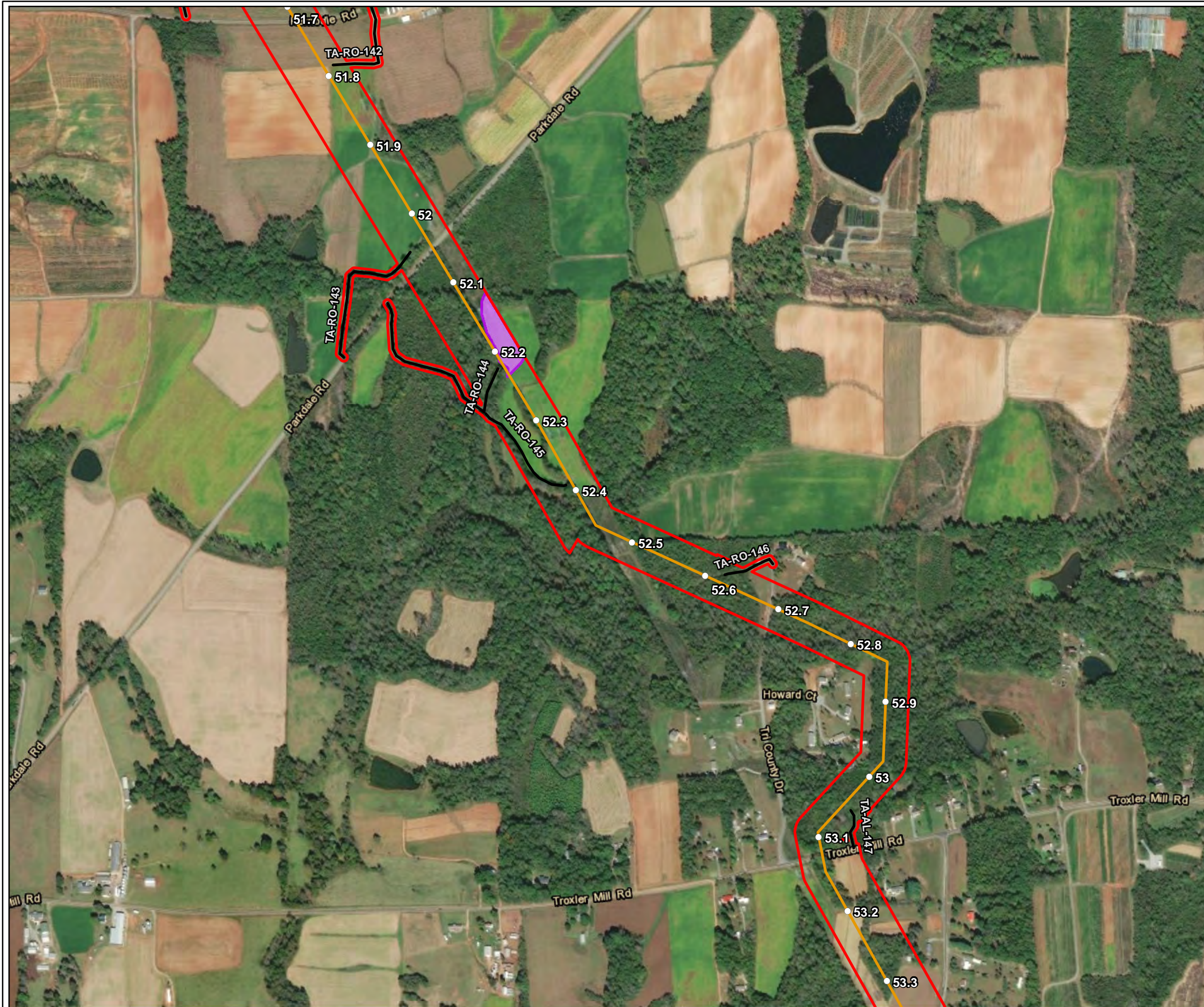
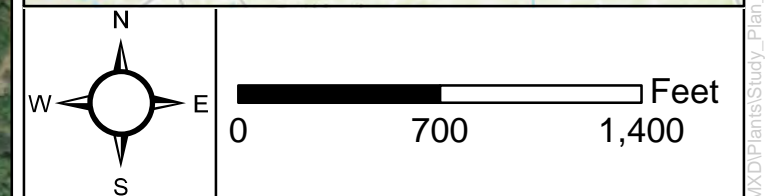
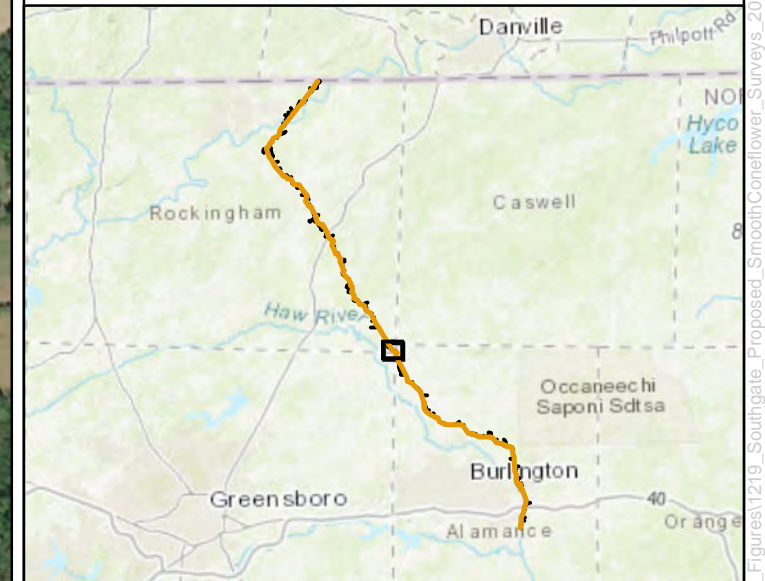


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

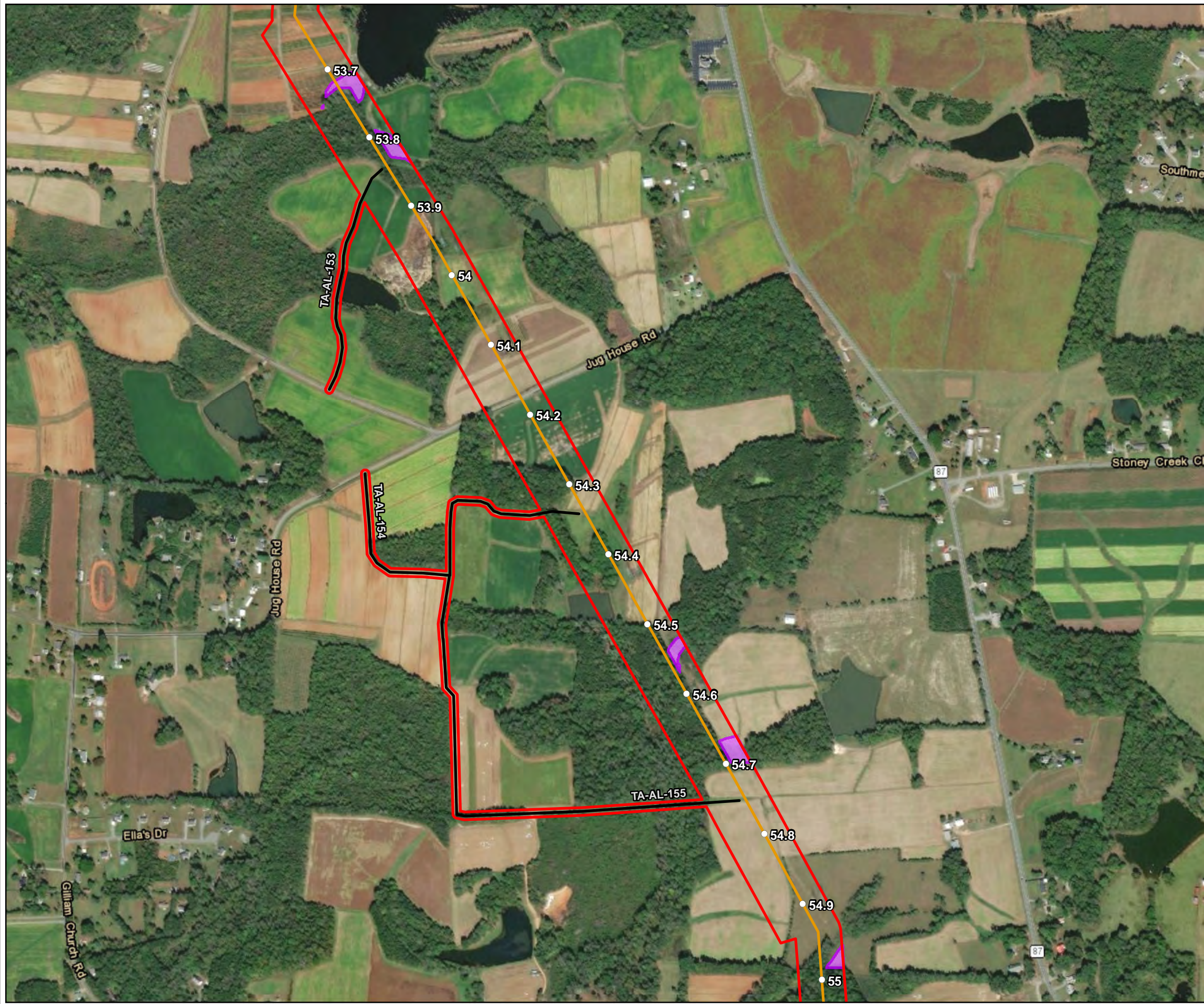
- Milepost
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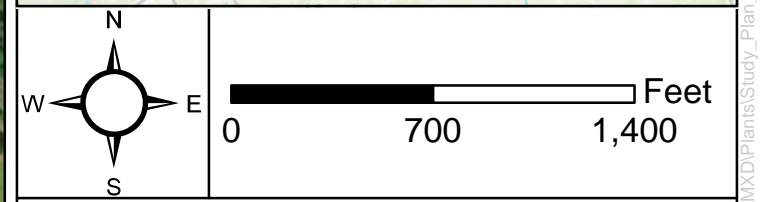
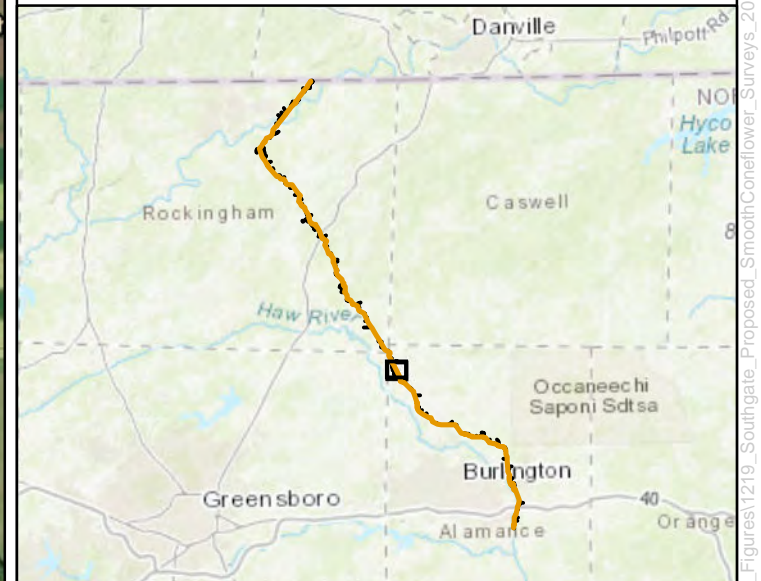
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.



- Milepost
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



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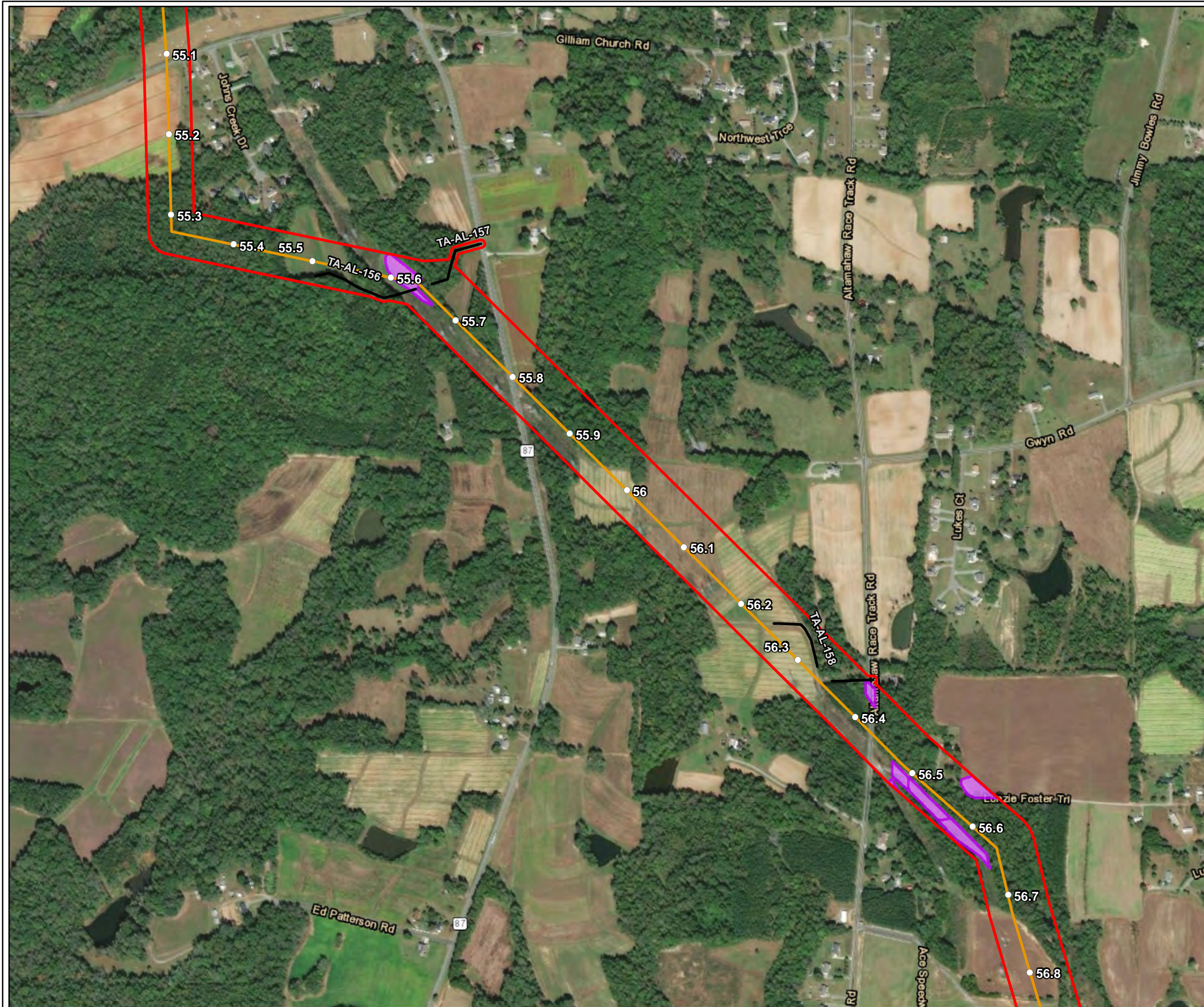
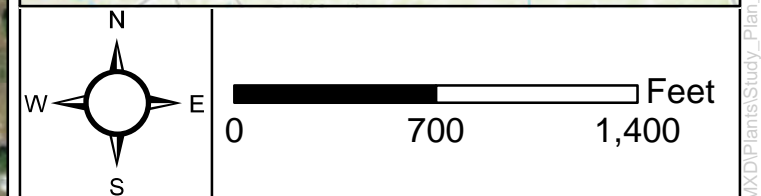
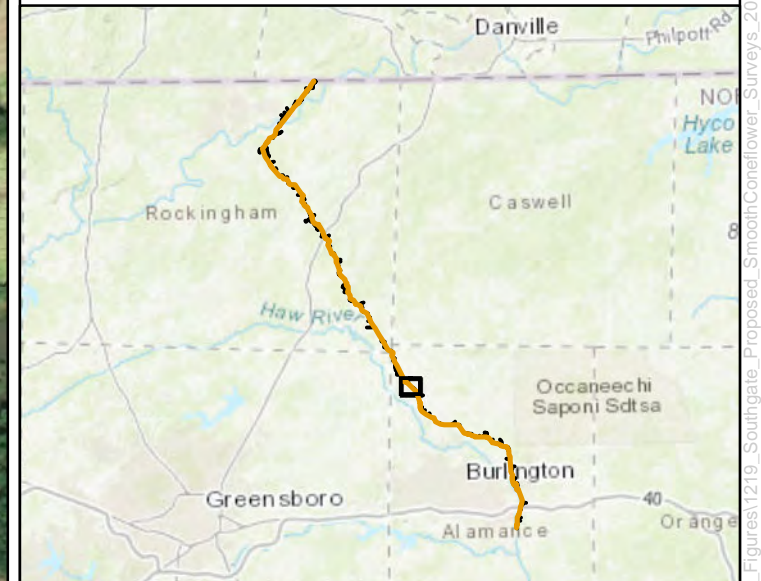


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

- Milepost
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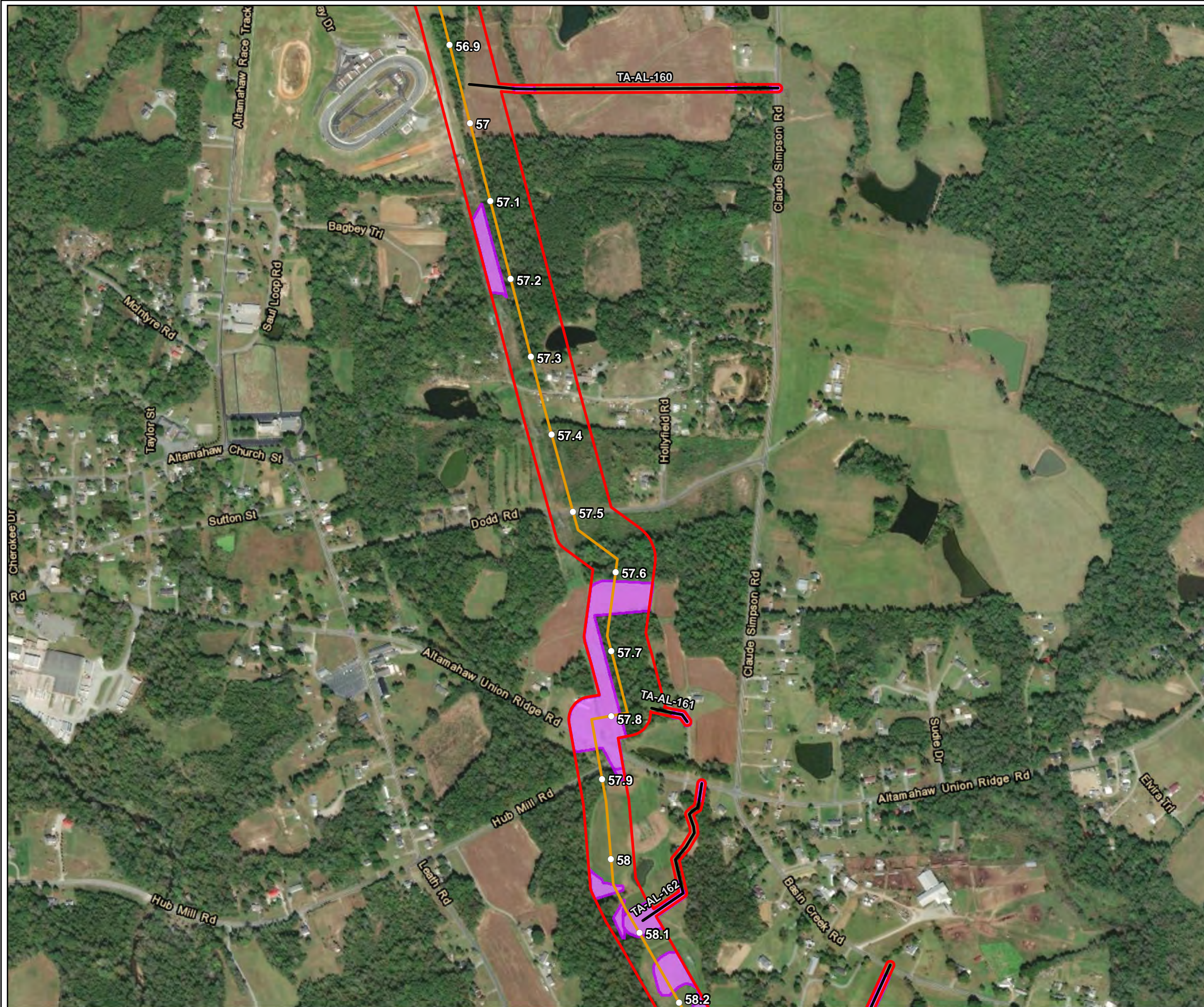
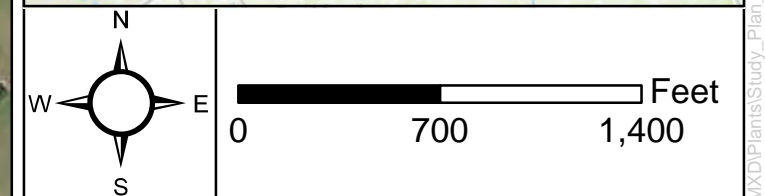
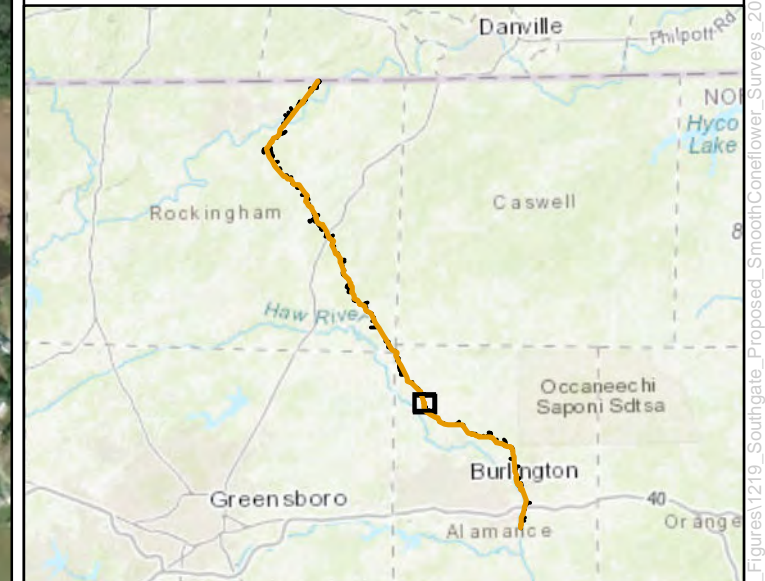


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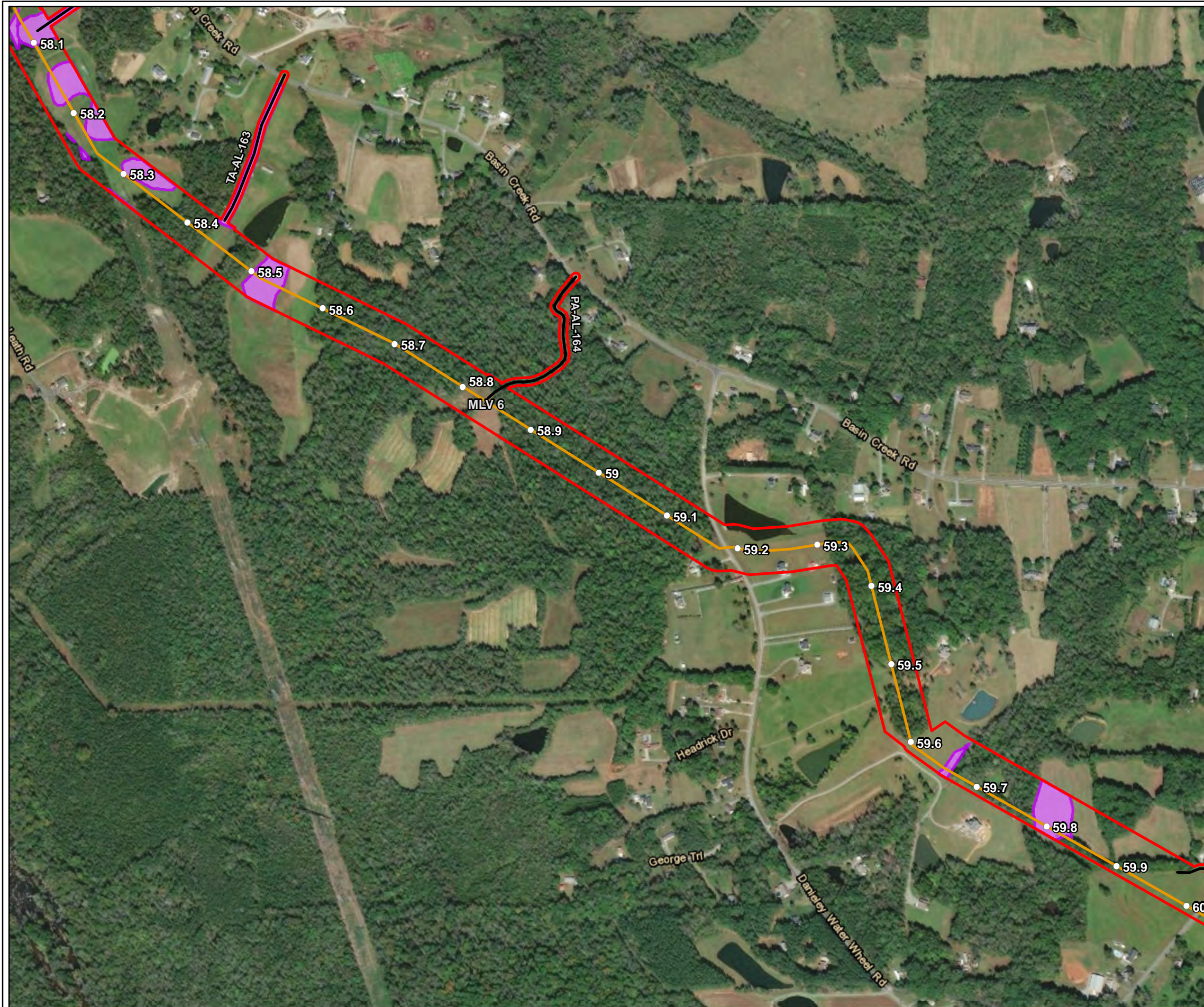
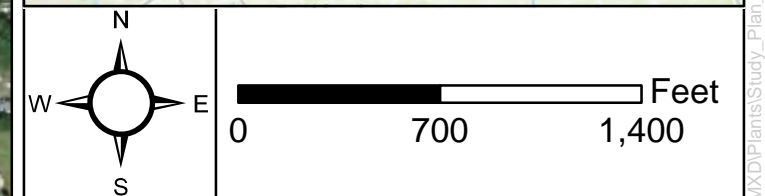
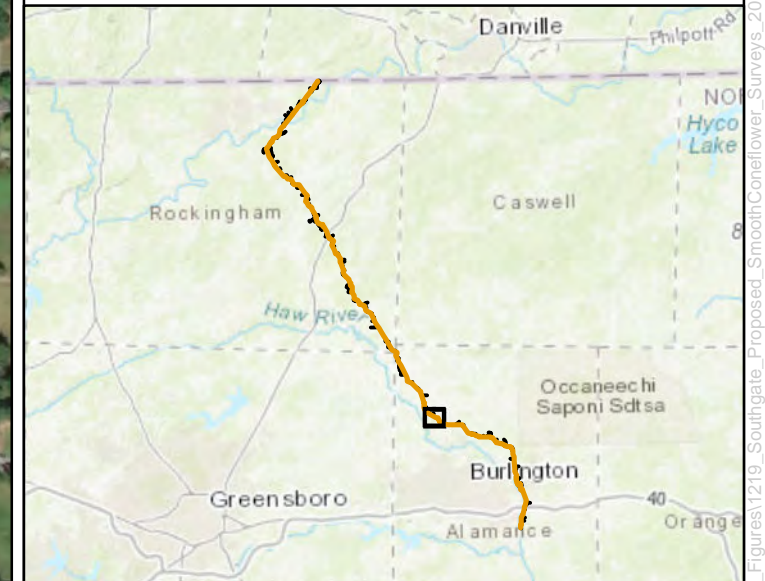


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

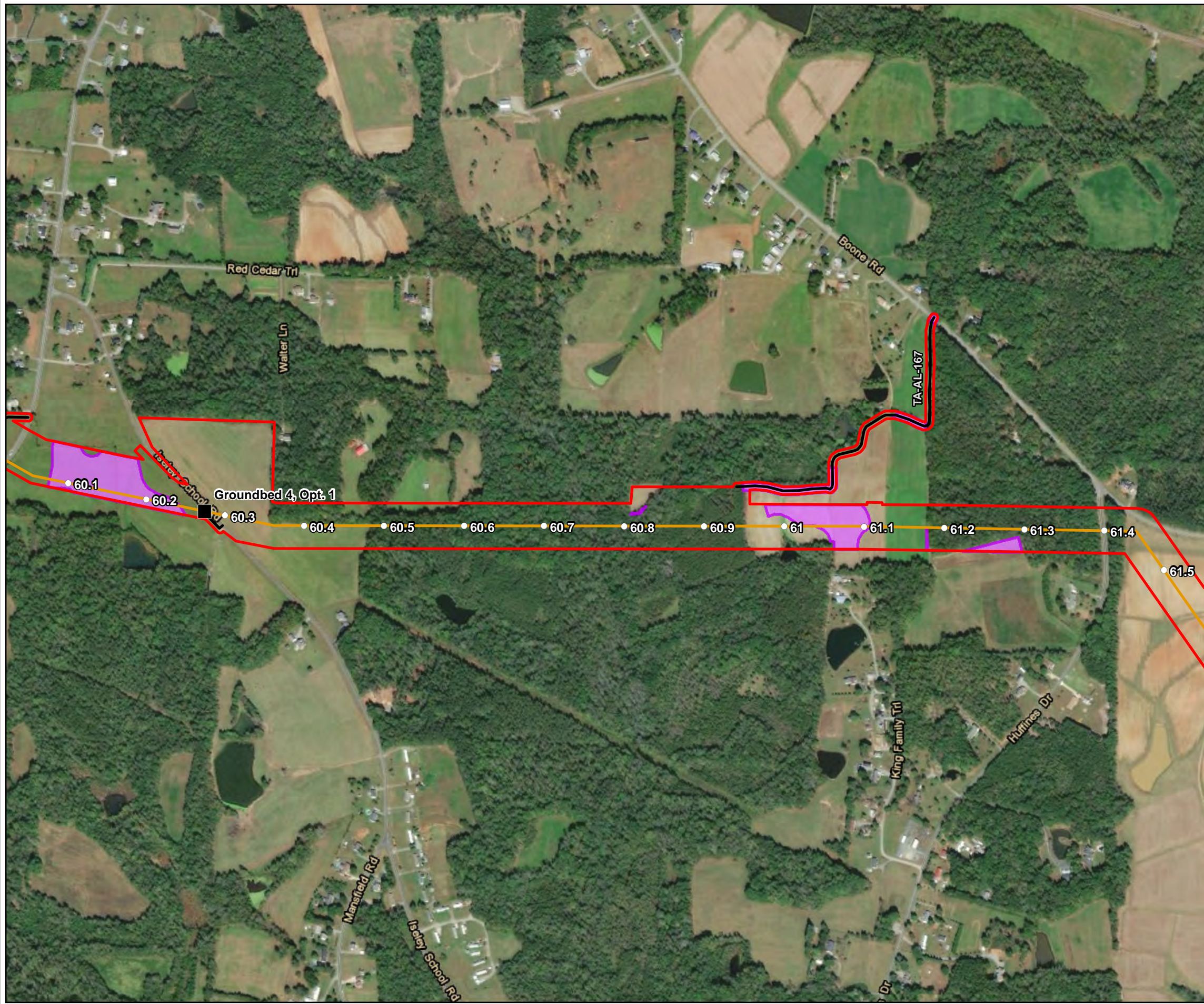
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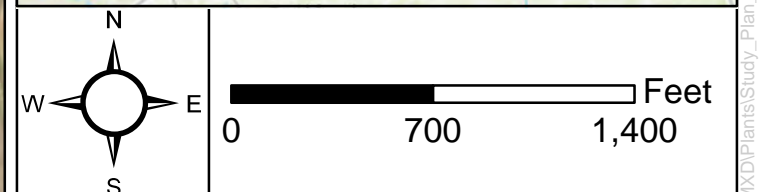
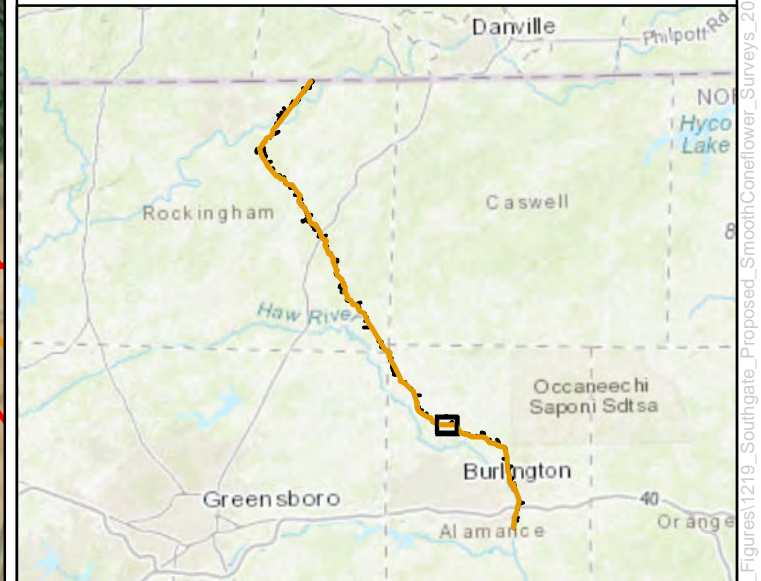
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.



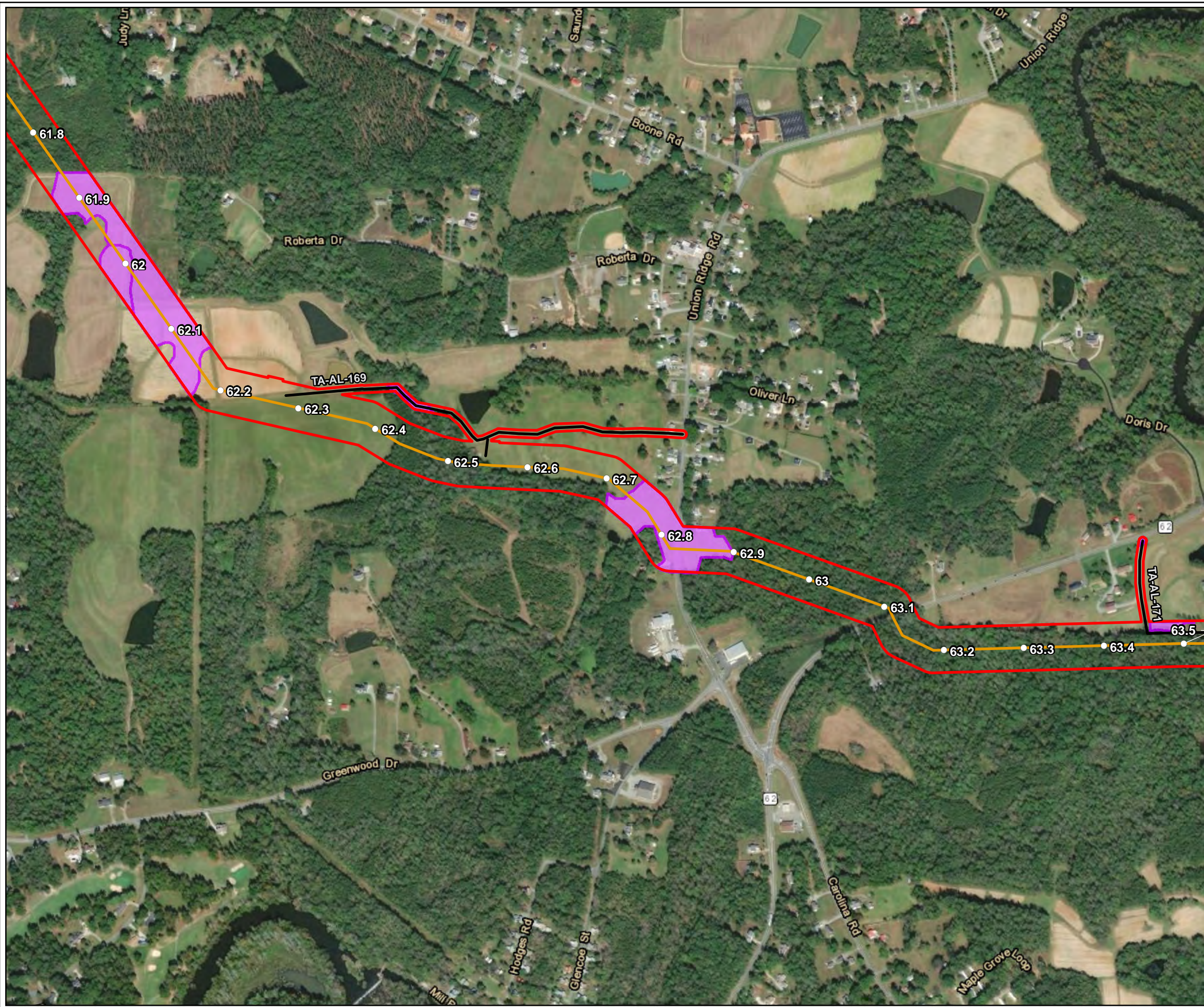
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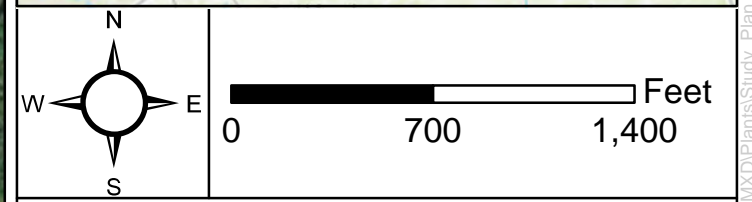
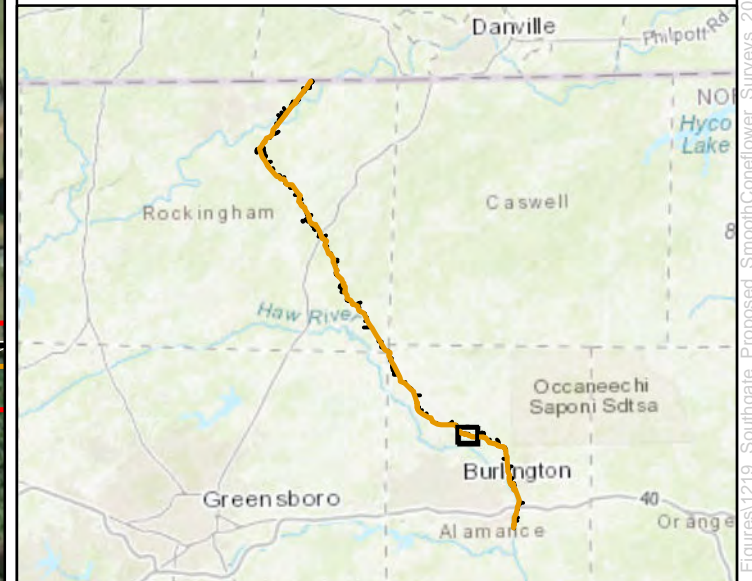
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.



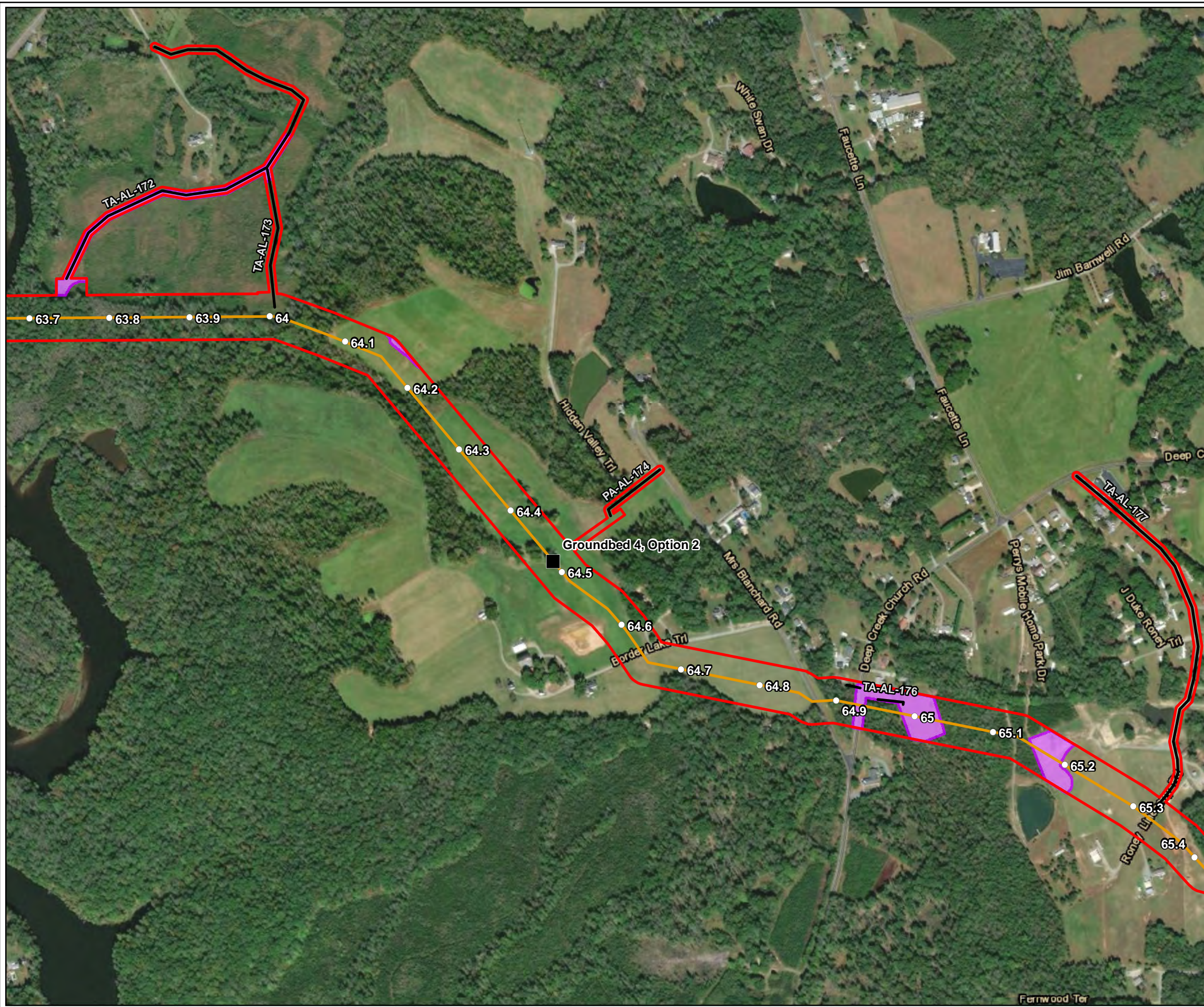
- Milepost
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



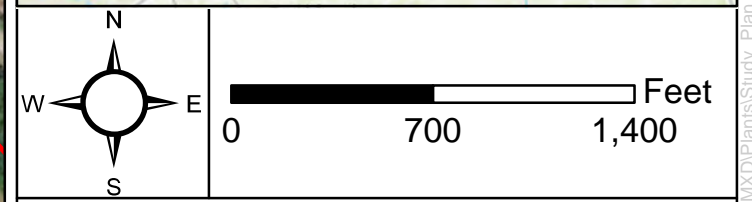
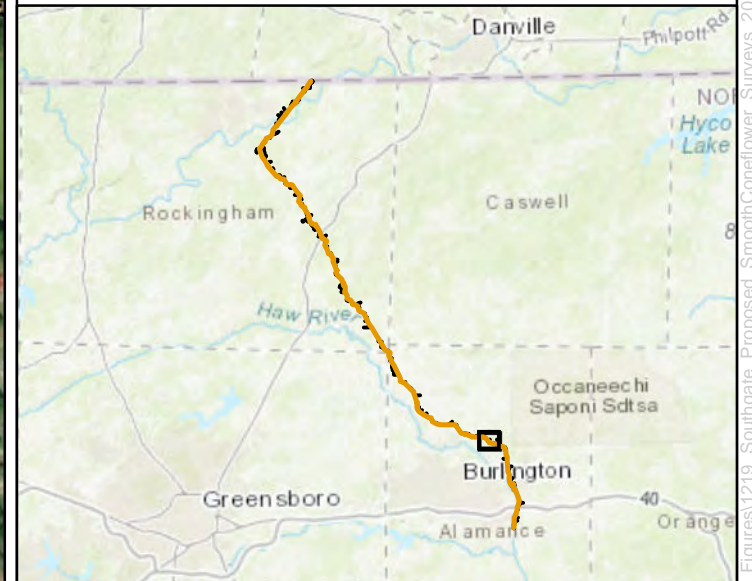
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.



- Milepost
- Ground Bed
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



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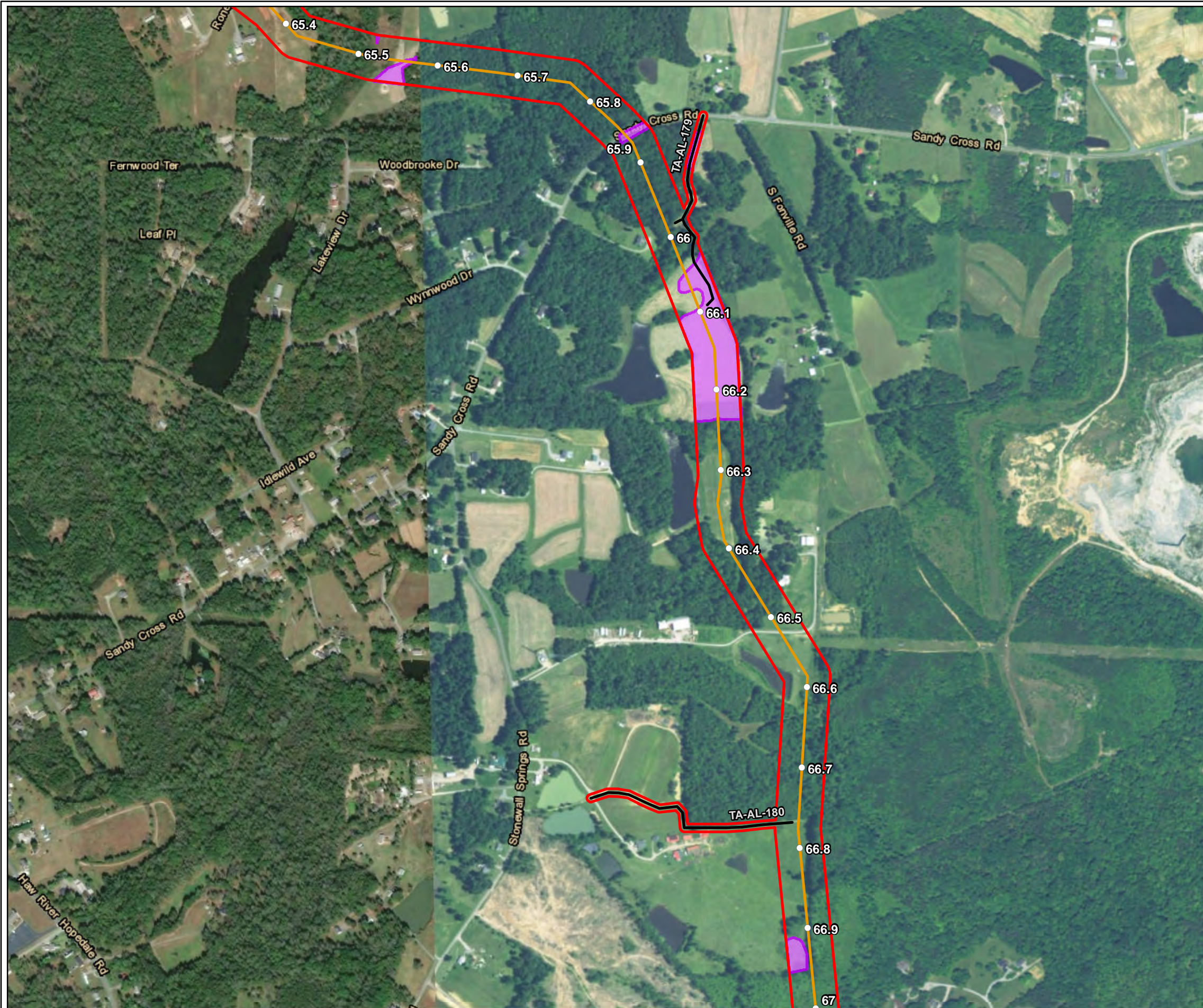
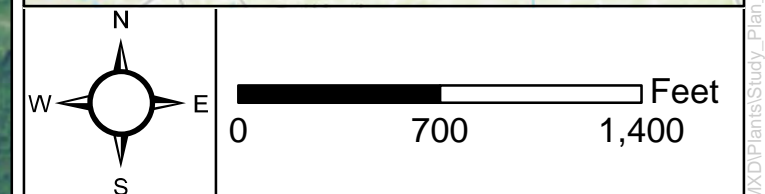
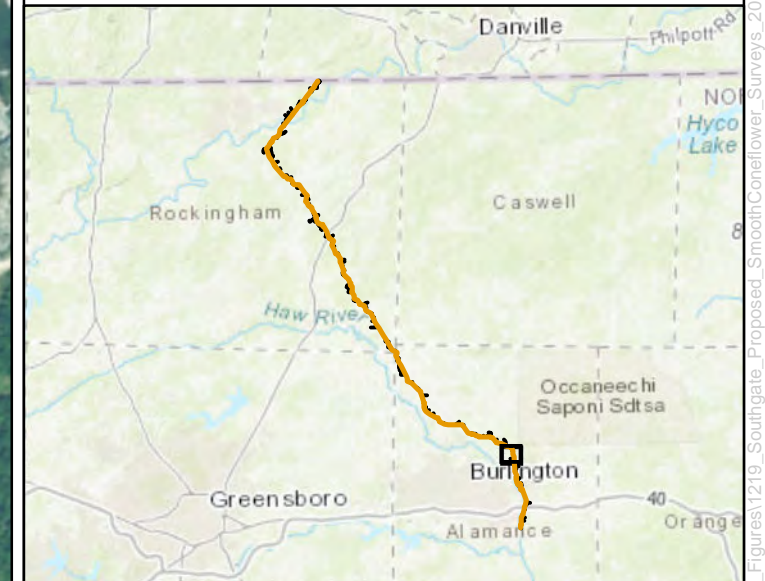


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

- Milepost
- Project Alignment
- Access Road
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



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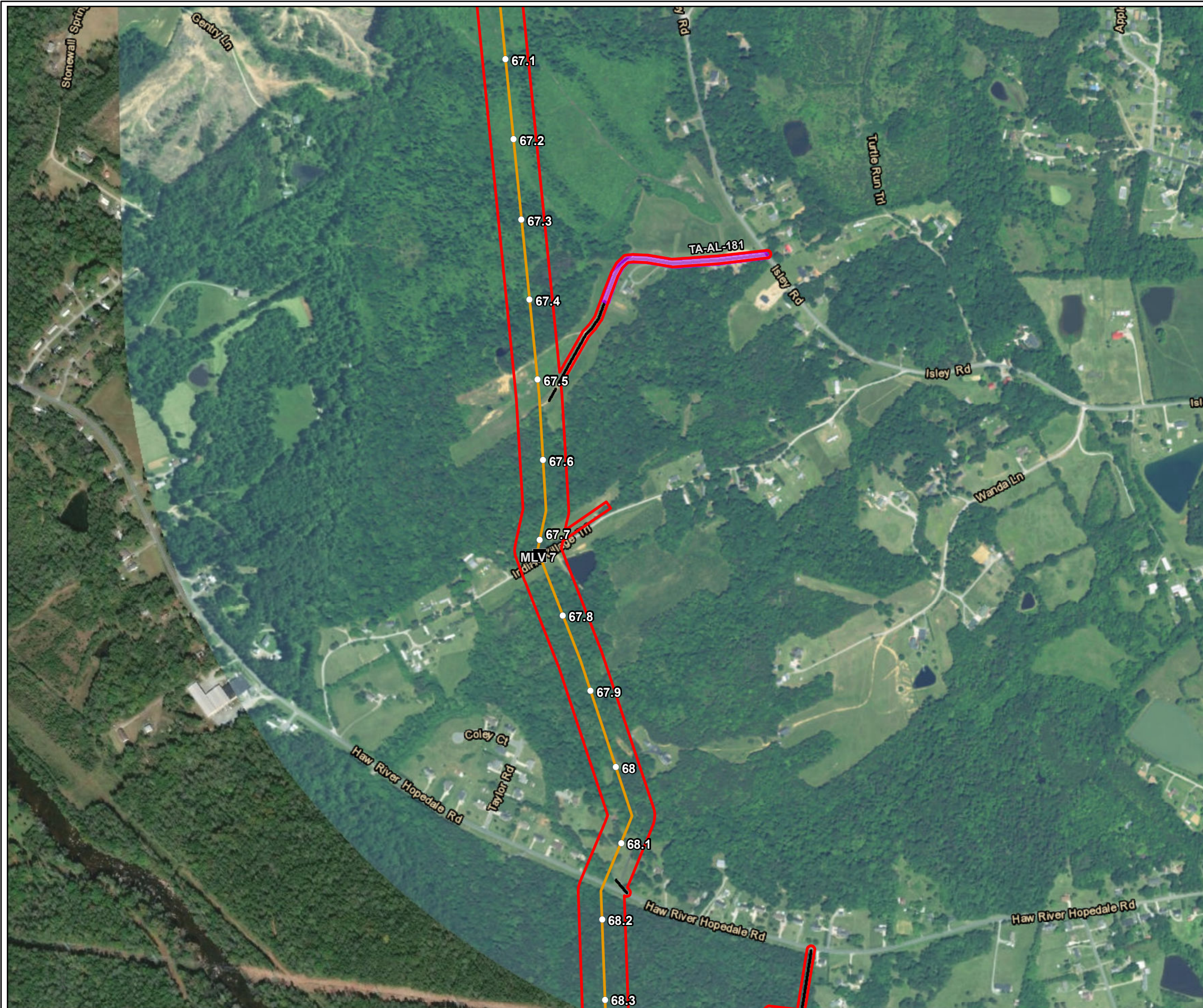
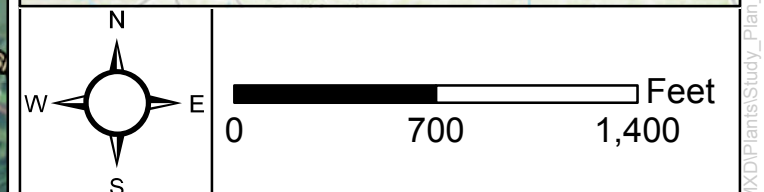
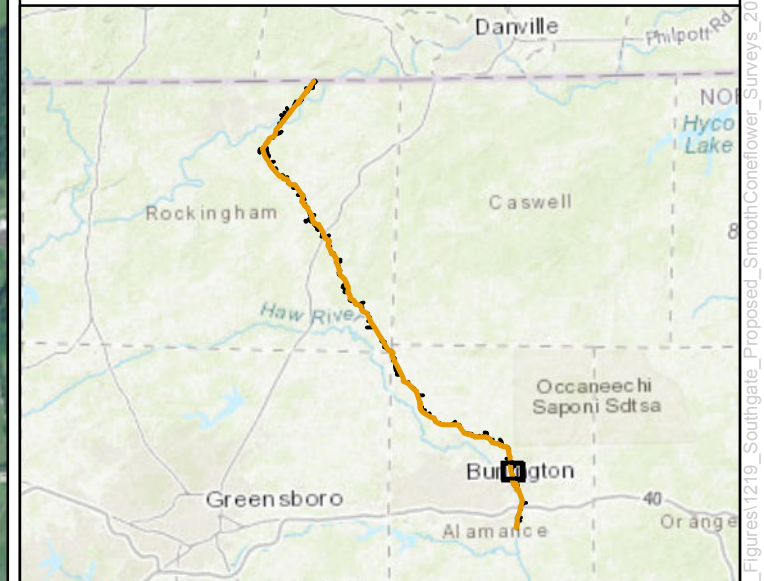


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

- Milepost
- Ground Bed
- Project Alignment
- Access Road
- Facility Site
- Area of Investigation (AOI)
- Smooth Coneflower Survey Area



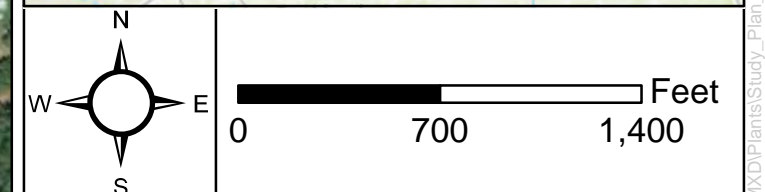
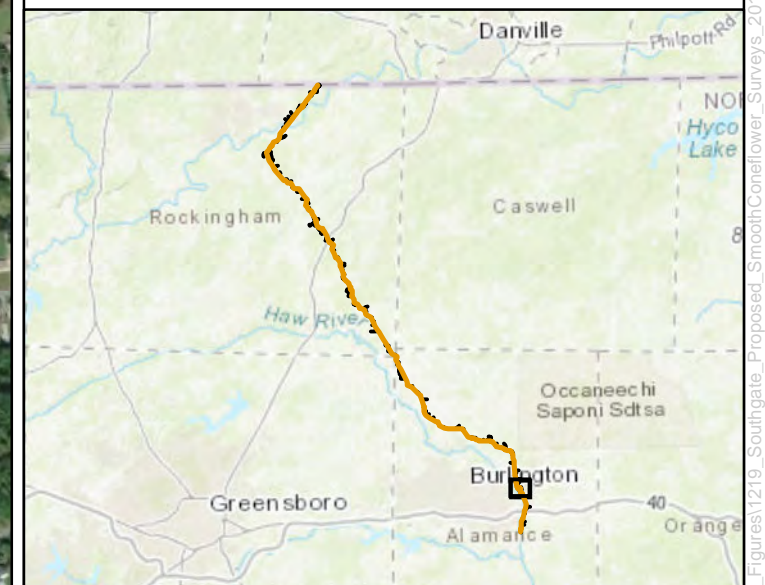
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

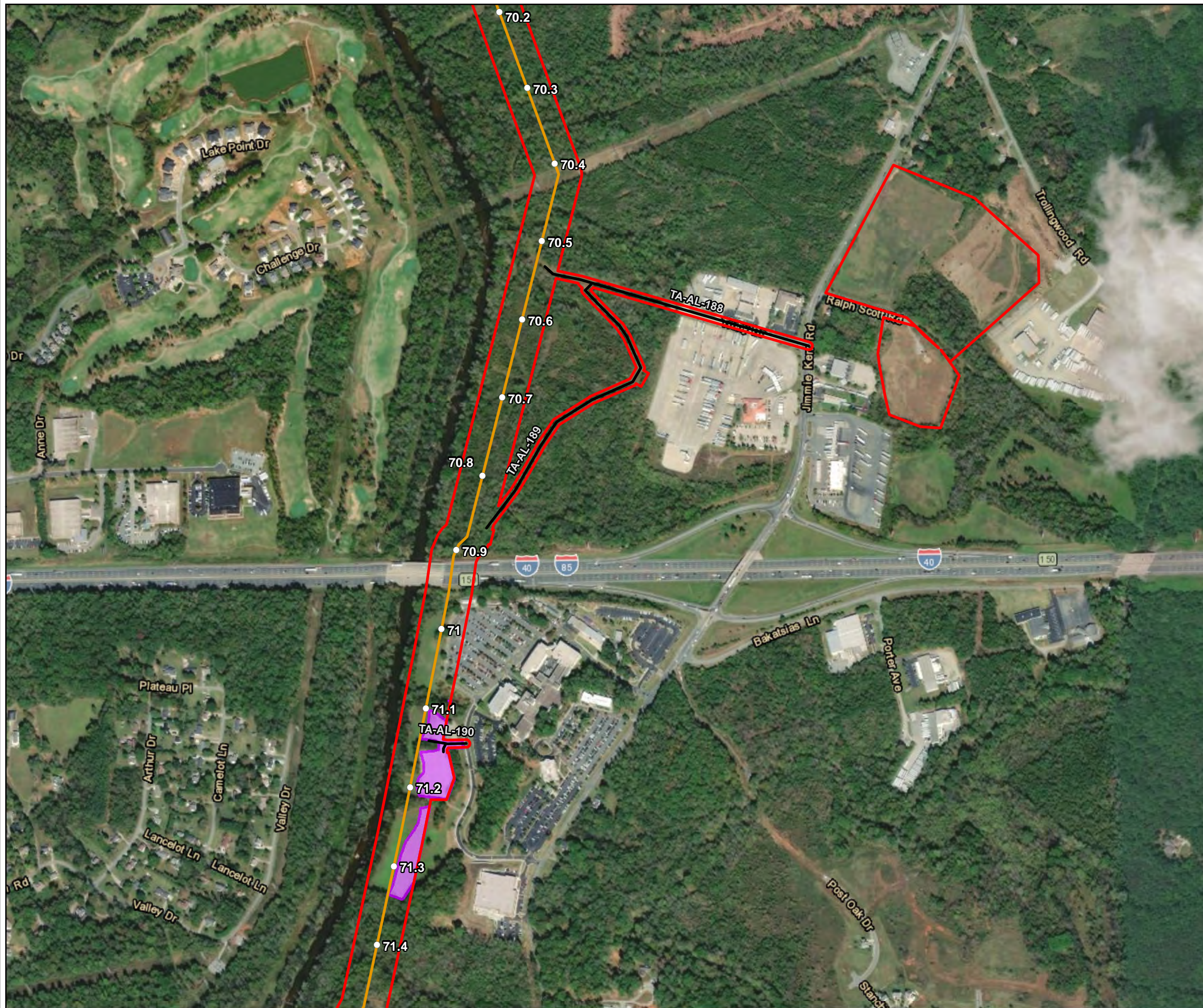
- Milepost
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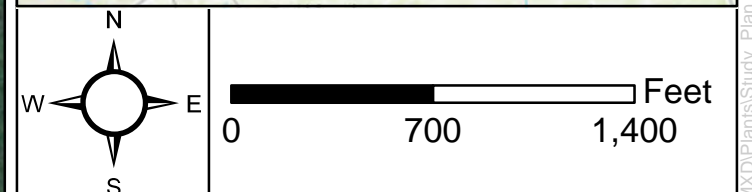
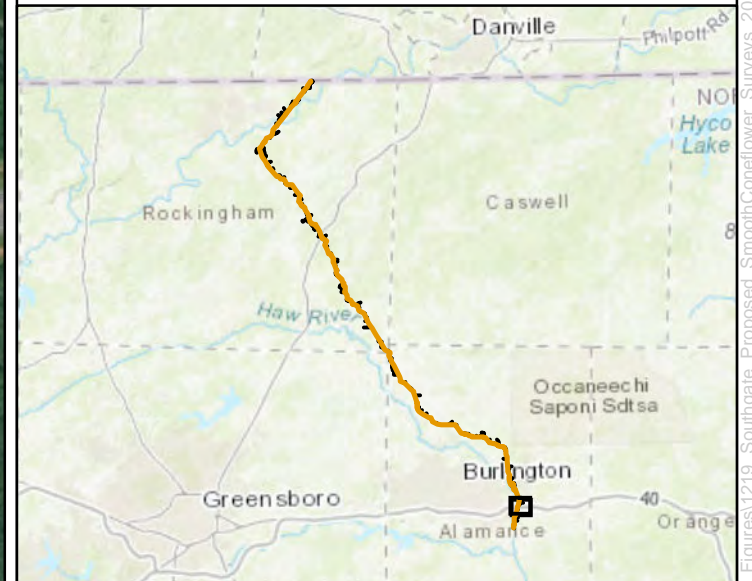
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Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.



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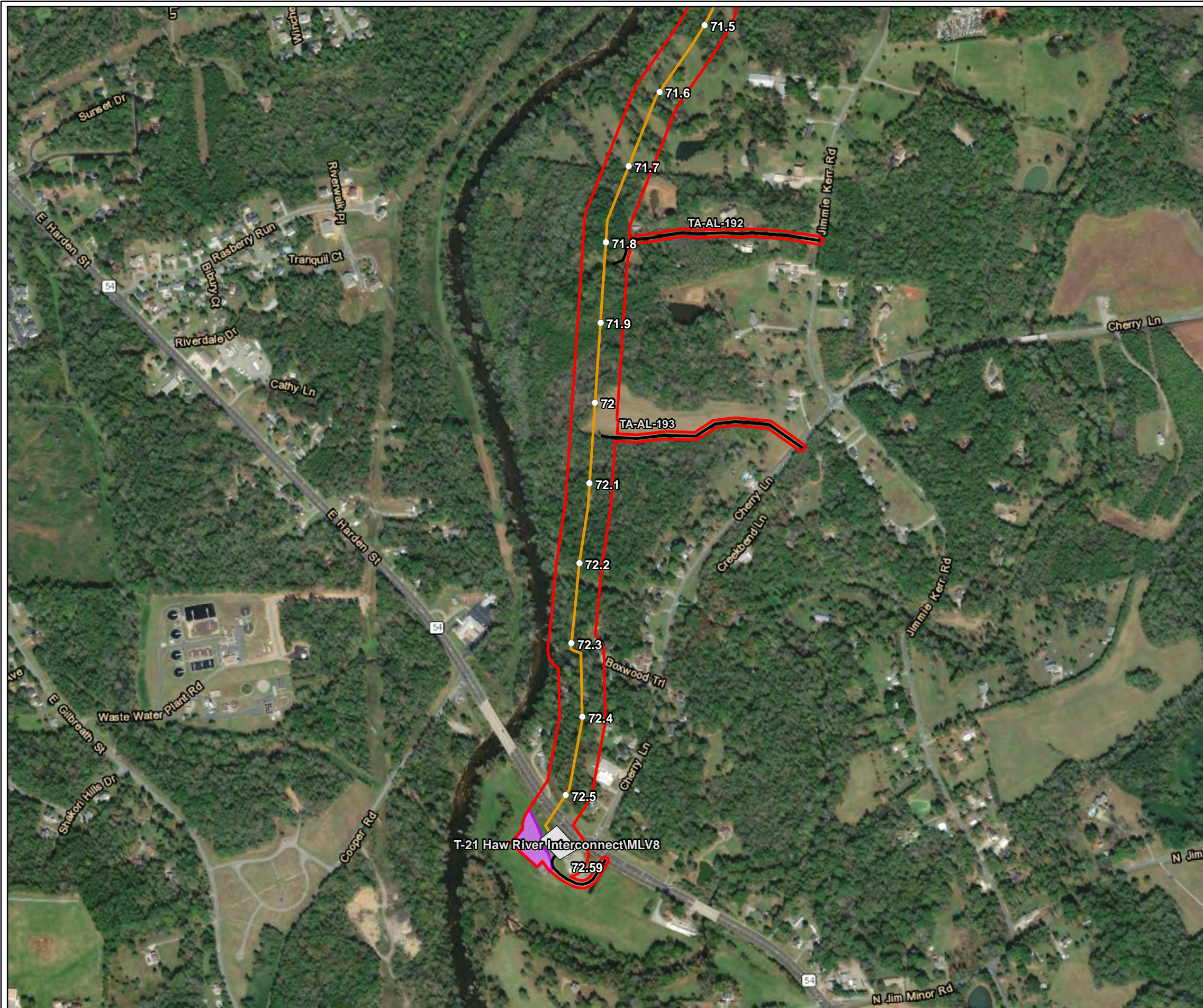
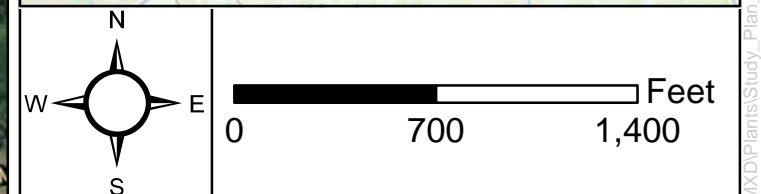
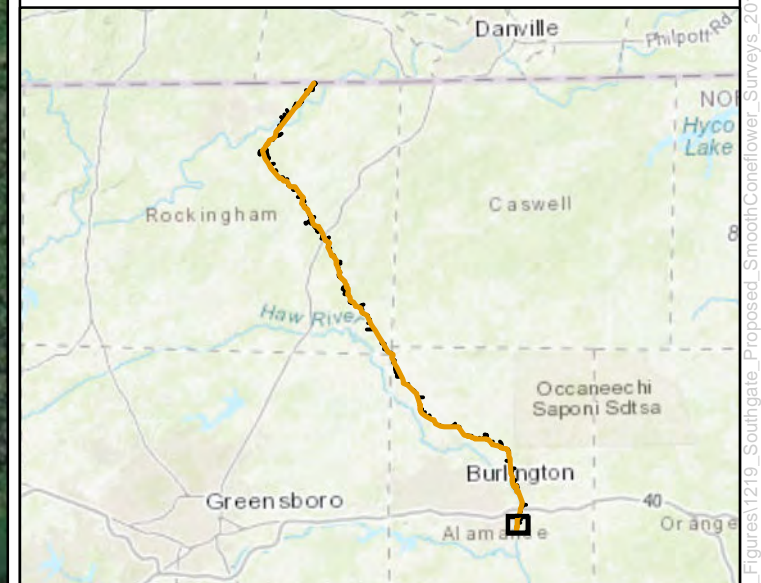


Figure 3. Proposed smooth coneflower survey areas along MVP Southgate Project in Rockingham and Alamance counties, North Carolina.

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**APPENDIX B
QUALIFIED SURVEYORS**





Lawrence G. Brewer

Plant Taxonomist

4525 Este Avenue

Cincinnati, OH 45232

513-451-1777

Environmental Solutions & Innovations, Inc.

Real Science, Real Solutions

EDUCATION

M.A., Biology, Western Michigan University, 1982

B.A., Biology, Hope College, 1975

PROFESSIONAL CERTIFICATIONS

U.S Army Corps of Engineers Wetland Training Course, Ann Arbor, MI, 1996

Gopher Tortoise Training Course, Hattiesburg, MS, 1997

Geographic Positioning System (GPS) Field Training, Cincinnati, OH, 1998

Pesticide Training, Florence, KY, 2004

Ohio Department of Transportation – Ecological Training, 2011

USFWS QUALIFIED PLANT SURVEYOR:

Northeast bulrush (PA)
Small whorled pogonia (PA, VA, OH)

Smooth coneflower (VA)

Running buffalo clover, Eastern prairie fringed orchid (OH)

Virginia spiraea (VA)

PROFESSIONAL AFFILIATIONS

Ecological Society of America

Ohio Academy of Sciences

Torrey Botanical Club

Southern Appalachian Botanical Society

Society for Ecological Restoration

Lucy Braun Association

Natural Areas Association

The Nature Conservancy

QUALIFICATIONS AND EXPERIENCE

Larry Brewer is an experienced and trained Plant Taxonomist. He has conducted a wide variety of plant and natural community surveys over the last 35 years. His experience includes rare plant surveys on public and private lands throughout the Midwest and eastern United States to address National Environmental Policy Act and Endangered Species Act concerns in environmental reports and permit applications. Mr. Brewer routinely conducts field surveys for federal and state listed threatened and endangered plants; plant community assessments; vegetation mapping; and habitat characterization. He writes technical sections of documents, prepares taxonomic plant lists, and conducts impact analyses for multidisciplinary environmental documents for federal and state agencies including Federal Energy Regulatory Commission (FERC), Departments of Transportation (DOT), Federal Aviation Administration (FAA), U. S. Army Corps of Engineers (ACOE), U. S. Fish and Wildlife Service (USFWS), and Department of Defense (DoD).

Mr. Brewer is experienced with wetland determination, delineation, habitat restoration, and preparation of detailed mitigation plans. He was the plant ecologist and wetland scientist for a project involving restoration and creation of 400 acres of wetlands for Indianapolis Airport Authority in Indiana. Mr. Brewer worked nine field seasons for the Michigan Natural Features Inventory where he did ecological assessments in 30 different plant community types. For a 3-year study, he completed quantitative sampling of over 80 wetlands around the Great Lakes region. While at Western Michigan University, Mr. Brewer mapped the presettlement vegetation of 10 counties in southwestern Michigan.

Over the last six years, Mr. Brewer has been Senior Plant Ecologist for the Center of Applied Ecology at the Northern Kentucky University and permanent employee at ESI, Inc.

PROJECTS

AT&T Fiber Optic Line

North Carolina

Project Botanist

Survey for federally threatened *Virginia spiraea* and other plants of concern along AT&T's proposed 30.4-mile fiber optic line in Buncombe and Madison counties.

American Electric Power, Bland Area Improvements

Virginia

Project Botanist

Rare plant surveys along 138 kV Transmission Line Rebuild Project crossing Jefferson National Forest in Bland County. Surveys included federally endangered northeastern bulrush, smooth coneflower, and small whorled pogonia.



MVP, Mountain Valley Pipeline

Virginia and West Virginia

Project Botanist

Rare plant surveys along 300-mile natural gas pipeline crossing seventeen counties. Surveys include federally endangered species: northeastern bulrush, running buffalo clover, shale barren rock cress, small whorled pogonia, smooth coneflower, and Virginia spiraea. Surveys also focused on state listed species and species of concern.

Dominion Transmission, Jetersville to Ponton 115 kV Transmission Line

Virginia

Project Botanist

Presence and absence surveys for smooth coneflower along 8-mile corridor and multiple access roads in Amelia County.

Appalachian Power Company, Wythe Area Improvements

Virginia

Project Botanist

Presence and absence surveys for smooth coneflower and Virginia spiraea along 15-mile transmission line in Wythe County.

Appalachian Transmission Company, Inc., Cloverdale-Lexington 500 kV transmission Line

Virginia

Project Botanist

Habitat Assessments and surveys for smooth coneflower and shale barren rock cress in Botetourt and Rockbridge counties.

Appalachian Power Company, Richland's-Whitewood 138 kV Transmission Line

Virginia

Project Botanist

Presence/absence surveys for federally listed Virginia spiraea along 10-mile line in Buchanan and Tazewell counties.

American Electric Power Fleming to Jenkins Rebuild to Ferrus

Virginia

Project Botanist

Habitat assessments for small whorled pogonia and surveys for Virginia spiraea in Letcher County, Kentucky and Dickenson County, Virginia.

American Electric Power, Sunscape and Matt Funk Transmission Lines

Virginia

Project Botanist

Smooth coneflower and piratebush surveys along two transmission line corridors and associated access roads in Roanoke County, Virginia.

Dominion Transmission, 138 kV Hybrid Energy/Clinch River Transmission Line

Virginia

Project Botanist

Surveys for federally threatened small whorled pogonia and one state-listed plant celadine poppy (*Stylophorum diphyllum*) along 9-mile transmission line corridor in Wise and Russell counties.

American Electric Power, Penhook-Westlake 138 kV Line

Virginia

Project Botanist

Habitat survey for federally endangered smooth coneflower along 14-mile transmission line corridor in Franklin County.

American Electric Power, Penhook-Westlake 138 kV Line

Virginia

Project Botanist

Habitat survey for federally endangered smooth coneflower along 14-mile transmission line corridor in Franklin County.



Environmental Solutions & Innovations, Inc.

Real Science, Real Solutions

Fred Huber

Botanist

4525 Este Avenue

Cincinnati, OH 45232

513-451-1777



EDUCATION

M.S., Botany, North Carolina State University, 1976

B.A., Biology, Gettysburg

CERTIFICATIONS

Wild Plant Management

Permit, Pennsylvania Department of Conservation and Natural Resources

QUALIFICATIONS AND EXPERIENCE

Mr. Huber is an experienced botanist and completes field surveys and monitoring for rare plant species. Much of his work is completed in North Carolina, Pennsylvania, Tennessee, West Virginia, and Virginia. A recent retiree of the U.S. Forest Service (USFS), Mr. Huber's experience encompasses 26 years of experience as Forest Botanist on the 1.8-million acre George Washington and Jefferson National Forests in Virginia and West Virginia where he monitored multiple federally listed plant species including: Virginia roundleaf birch (*Betula uber*), shale barren rockcress (*Boechnera serotina*), rock gnome lichen (*Cetradonia linearis*), smooth purple coneflower (*Echinacea laevigata*), Virginia sneezeweed (*Helenium virginicum*), swamp pink (*Helonias bullata*), small whorled pogonia (*Isotria medeloides*), northeastern bulrush (*Scirpus ancistrochaetus*), and Virginia meadowsweet (*Spiraea virginiana*).

Mr. Huber's extensive history in botany includes preparation of Biological Evaluations (BE) evaluating effects of proposed projects on rare plant species in support of National Environmental Policy Act (NEPA) documentation. His experience also includes reviewing Environmental Impact Statements (EIS); providing input to the forest planning process; and developing plant management strategies, including treatment for non-native plant infestations.

PROJECTS

USDA Forest Service, National Forests in North Carolina

North Carolina

Botanist

Duties included conducting field surveys for federally and state listed plant species, as well as Regional Forester's Sensitive Species, in areas of Forest Service activity such as timber sales, road construction, and recreation developments. Provided botanical input for the first Forest Plan for the National Forests in North Carolina. Organized the first symposium to address the management of grassy balds.

USDA Forest Service, George Washington and Jefferson National Forests

Virginia, West Virginia, and Kentucky

Forest Botanist

Duties included conducting field surveys for federally and state listed plant species, as well as Regional Forester's Sensitive Species, in areas of Forest Service activity such as timber sales, road construction, recreation developments, and prescribed burns. Field surveys and monitoring were also conducted in support of endangered and threatened species recovery. Surveys were often in conjunction with cooperators such as the West Virginia Division of Natural Resources, the Virginia Natural Heritage Program, the Massey Herbarium at Virginia Tech, and the U.S. Fish and Wildlife Service. Averaged approximately 60 days a year in the field.



Served as forest coordinator for non-native invasive plant species management. Completed field surveys for non-native plant infestations; implemented treatments for those infestations; advised district offices on treatments; and coordinated with state, federal, and non-governmental organizations.

In addition, prepared BEs for plants on the federal threatened and endangered list and on the Regional Forester's Sensitive Species list. BEs were prepared as part of the NEPA process for evaluating the effects of proposed projects on rare species.

University of North Carolina, Chapel Hill

North Carolina

Research Associate

Field research in Great Smoky Mountains National Park for Dr. Peter White. Established and inventoried the vegetation in long-term monitoring plots in old growth forest.

Western Carolina University

North Carolina

Research Associate

Summarized research completed in the Great Smoky Mountains National Park for Dr. John McCrone in support of the establishment of the Great Smoky Mountains Biosphere Reserve.

USDA Forest Service, National Forest in North Carolina

North Carolina

Botanist

Field inventory and monitoring, including for mountain golden heather (*Hudsonia montana*), and swamp pink (*Helonias bullata*), and providing botanical input to the Forest Planning process. Organized first symposium on management of grass bald habitats in the southern Appalachia.

North Carolina Natural Heritage Program

North Carolina

Botanist

First botanist on staff. Acquired data on endangered, threatened, and state rare plant species and significant plant communities for entry into the Natural Heritage database. This included visiting herbaria throughout the state, reviewing scientific field reports, and conducting field inventories. Also reviewed environmental impact statements, organized a team of plant ecologists to establish a plant community classification system for the new program, and helped identify significant natural areas for protection.

North Carolina State University

North Carolina

Master's degree in Botany included research with the federally listed bunched arrowhead (*Sagittaria fasciculata*).