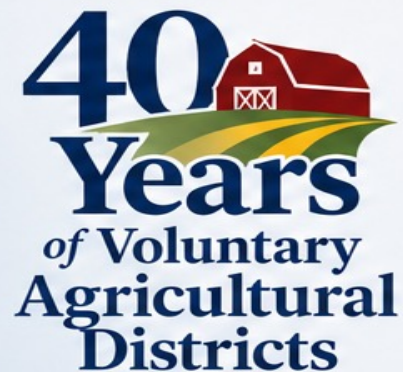




★
*North Carolina Department of
Agriculture and Consumer Services*

UTILIZING NCDOT GIS DATA

- **LeiLani Paugh, Director, Program Delivery Support Team, NC DOT**
- **Connor Badgett, Senior GIS Analyst, NC DOT**

**N★C
FOREVER
FARMS**





NORTH CAROLINA
Department of Transportation

Utilizing NCDOT GIS Data

Presenters: LeiLani Paugh, Connor Badgett

July 22, 2026

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

ATLAS Background

LeiLani Paugh



NCDOT Project ATLAS Background

Advancing Transportation through Linkages, Automation, and Screening

- Project ATLAS began in 2018 with the goal of streamlining NCDOT project development using GIS tools, applications, and data
 - Objectives
 - Regional evaluation using GIS
 - Early screening
 - Inform scope, schedule and budget
 - Automated reporting
 - One-stop-shop for vetted project data
- Available to those with an NCID
 - An individual can register for an NCID and request access by emailing ATLAS@ncdot.gov
 - If you'd like access, see us after the presentation
- Currently have ~10 NCDOT staff and consultants supporting ATLAS

The image shows a screenshot of the NCID login interface. At the top, there is a logo with the text "NCID" in a large, stylized font, with a smaller "NCID" below it and a yellow padlock icon to the right. Below the logo are two input fields: "Username" and "Password". Underneath these fields is a blue button labeled "NCID Login". Below the button is a link that says "Trouble Signing In?". At the bottom left of the interface is a link "Need Help?" and at the bottom right is a link "Register!".

[Privacy and Other Policies](#)

[Contact Us](#)



WARNING: This is a government computer system, which may be accessed and used only for authorized business by authorized personnel. Unauthorized access or use of this computer system may subject violators to criminal, civil and/or administrative action.



NCC742

ATLAS Data



Wetlands &
Streams



Protected
Species



Historic
Resources



Traffic



Community
Studies



Bike & Ped



Right of Way



Utilities



ATLAS Sources

ATLAS incorporates federal, state, and local data including:

USGS

USFWS

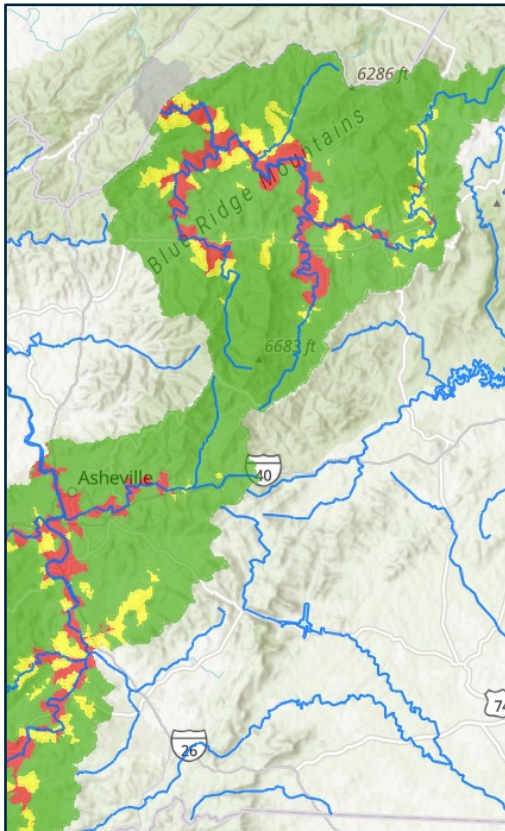
NOAA

NC SHPO

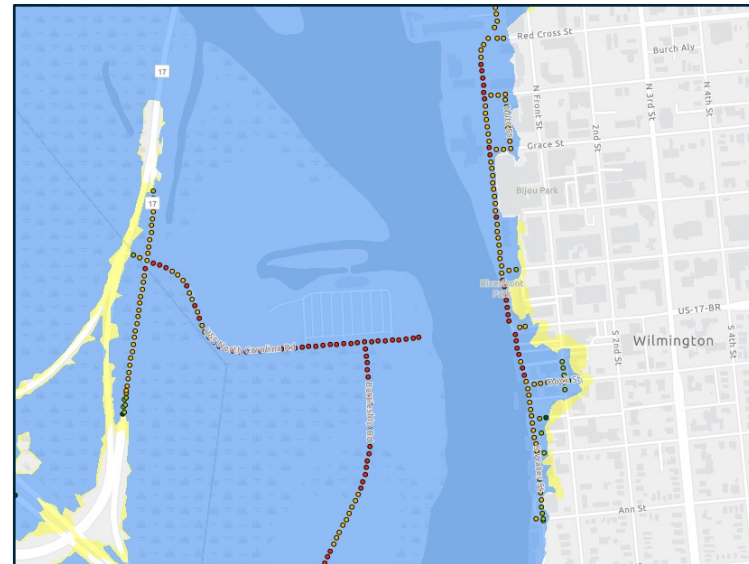
NC DEQ

NC WRC

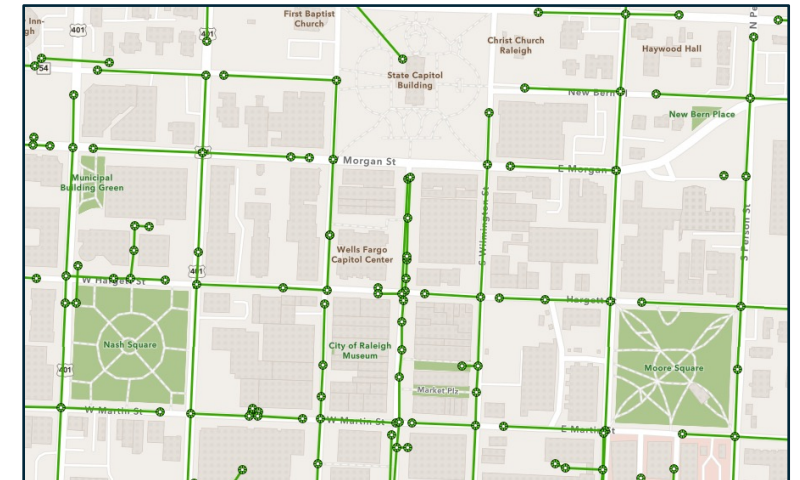
Municipal and County governments



Sources: USGS; NCDOT



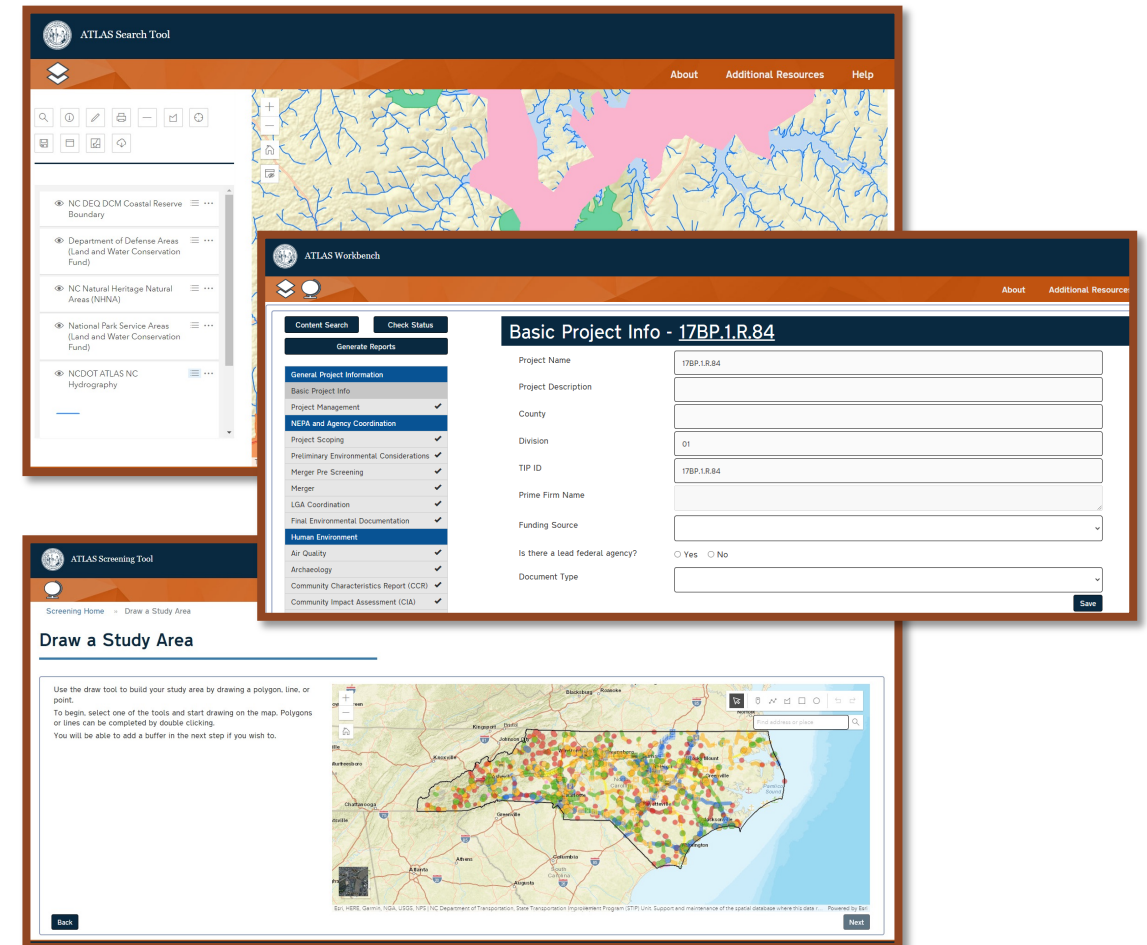
Sources: FEMA; NCDOT



Source: City of Raleigh

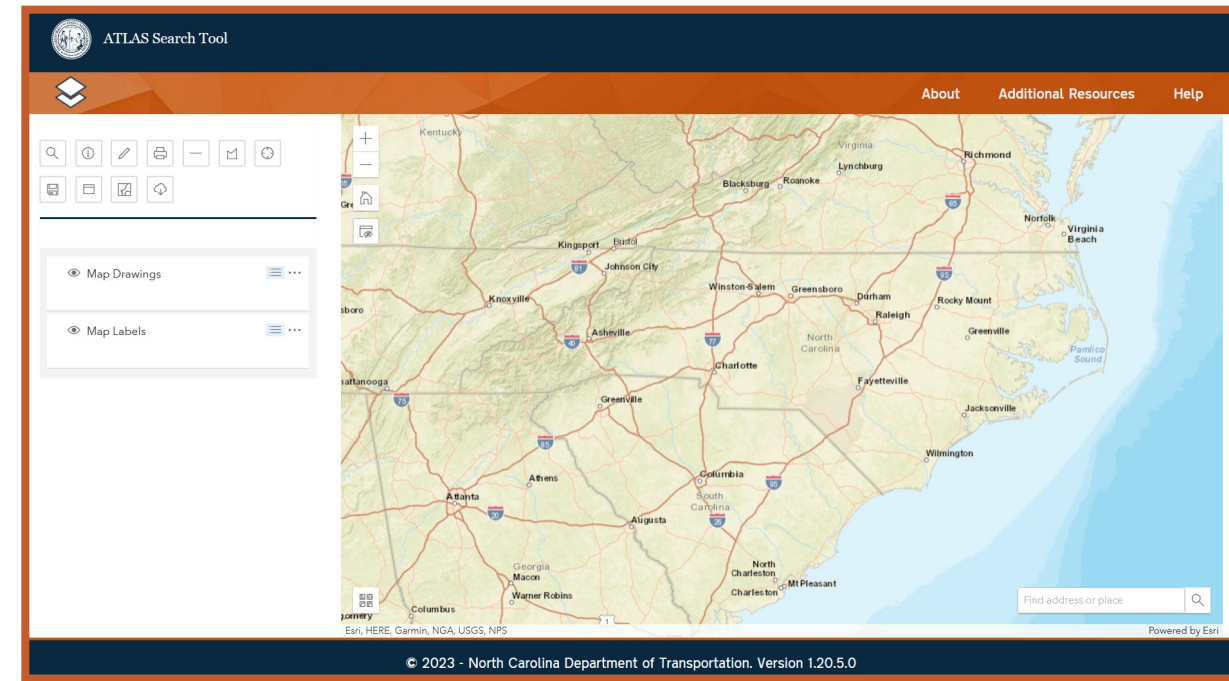
ATLAS Tools

- ATLAS Tools
 - Search Tool: Used to search and download data related to project development
 - Screening Tool: Used to identify key features in a study area, customize screenings to fit a subject matter, and provide summary reports
 - Workbench: Used to manage and upload project data and deliverables, and establish data governance



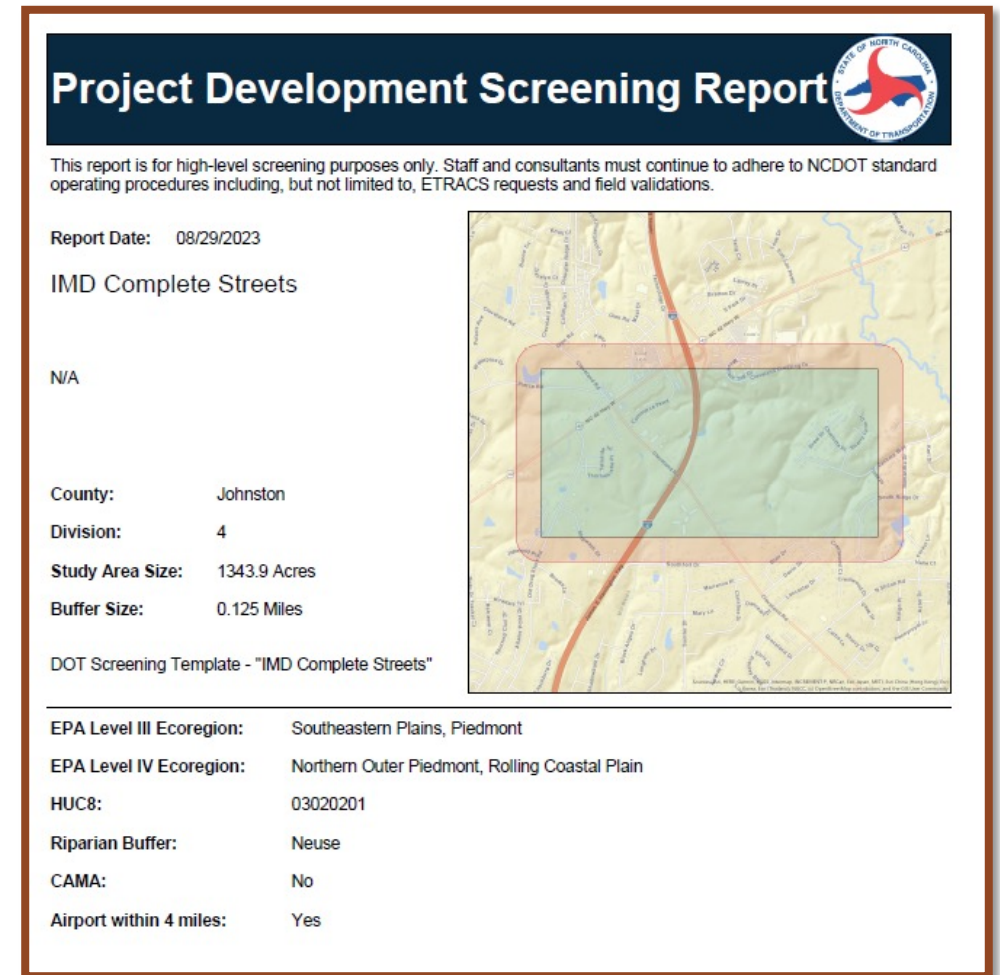
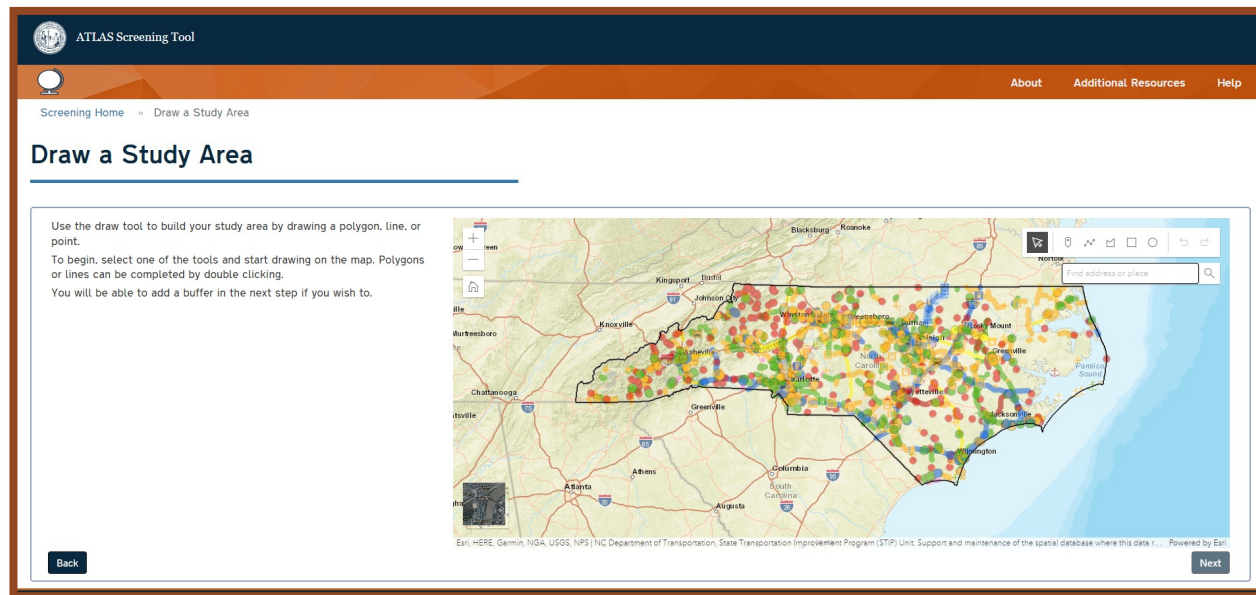
ATLAS Search Tool Overview

- ATLAS Search Tool has 3 primary functions:
 1. Find GIS data from multiple sources in one place
 - Currently contains about 750 GIS layers
 2. View data on map
 3. Download multiple data sources at once in a variety of formats
- Useful when preparing for scoping, completing a technical report, or compiling an environmental document
- For any data needs, the Search tool eliminates the need to look through various webpages and source agencies



ATLAS Screening Tool Overview

- Screen GIS layers for overlaps with DOT study areas
- Generate reports with number of features and important attributes
- Helps projects comply with public outreach, avoidance of resources, mitigation for impacts, etc.
- Download multiple data sources at once in a variety of formats



What are ATLAS Templates?

- Templates are preloaded layer lists developed by NCDOT disciplines.
- Users can create and save their own templates
- Templates can be used for early project screening or for developing PDN deliverables
- For example, the Initial Issues Identification Template can be used to identify early project issues, including VAD parcels

Project Development Screening Report

This report is for high-level screening purposes only. Staff and consultants must continue to adhere to NCDOT standard operating procedures including, but not limited to, ETRACS requests and field validations.

Report Date: 07/09/2026

Initial Issues Identification Template

This screening template was designed to identify key layers needed to scope projects.

County: Wake
Division: 5
Study Area Size: 3898.4 Acres
Buffer Size: 50 Feet

DOT Screening Template - "Initial Issues Identification Template"

ATLAS Screening Tool

Screening Home Draw a Study Area Select a Screening Template Apply a Buffer Select Layers to Screen

About Additional Resources Help

Select Layers to Screen

Use the check boxes to add layers to your project screening. Click the layer name to preview the layer on the map, view layer information, or set sub-report fields for specific layers.

Layer Information Set Field

VAD

- ☐ Human Environment
- ☐ Special Districts
- ☒ NC Statewide Voluntary Agricultural Districts VAD Parcels Parcel
- ☐ NC Voluntary Agriculture District (VAD) Program Presence
- ☐ Natural Environment

BackNext

Special Districts	Feature Count	Total Coverage	Nearest Feature
NC Statewide Voluntary Agricultural Districts VAD Parcels	9	299.8 ac	21.7 ft
2705638193	1	37.1 ac	
2705645192	1	41.0 ac	
2705728838	1	9.9 ac	
2705752319	1	17.7 ac	
2705755433	1	0.4 ac	
2705759569	1	21.5 ac	
2705921498	1	11.8 ac	
2705934448	1	94.6 ac	
2715330080	1	65.8 ac	
Transportation	Feature Count	Total Coverage	Nearest Feature
NCDOT Railroads	8	20516.4 ft	3586.9 ft

VAD GIS Data and ATLAS

- NCDOT screens projects early to identify necessary coordination or actions that need to be taken
- ATLAS helps to identify overlaps with VAD parcels, grab owner information, and visualize where VAD parcels are
- NCDOT and other agencies have legal obligations to VAD parcels

Project Development Screening Report

This report is for high-level screening purposes only. Staff and consultants must continue to adhere to NCDOT standard operating procedures including, but not limited to, ETRACS requests and field validations.

Report Date: 06/26/2026

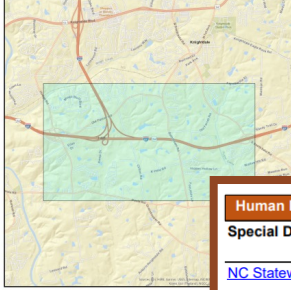
VAD Screening

N/A

County: Wake
Division: 5
Study Area Size: 4392.4 Acres
Buffer Size: N/A

User Customized Screening

EPA Level III Ecoregion: Piedmont
EPA Level IV Ecoregion: Northern Outer Piedmont
HUCs: 03020201
Riparian Buffer: Neuse
CAMA: No
Airport within 4 miles: Yes



Human Environment

Special Districts	Feature Count	Total Coverage	Nearest Feature
NC Statewide Voluntary Agricultural Districts VAD Parcels	4	133.1 ac	339.3 ft
1743945183	1	69.7 ac	
1753037979	1	14.7 ac	
1753039017	1	18.4 ac	
1753137174	1	30.4 ac	

ATLAS Search Tool

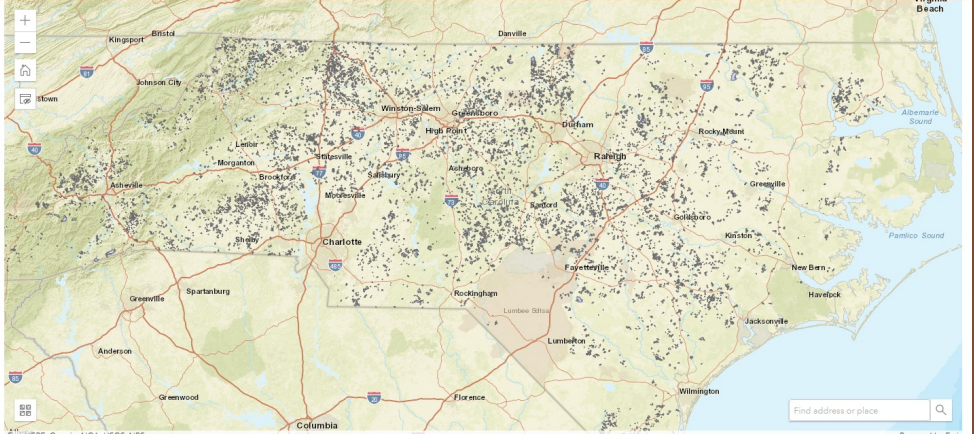
About Additional Resources Help

Find address or place

NC Statewide Voluntary Agricultural Districts VAD Parcels

Map Drawings

Map Labels

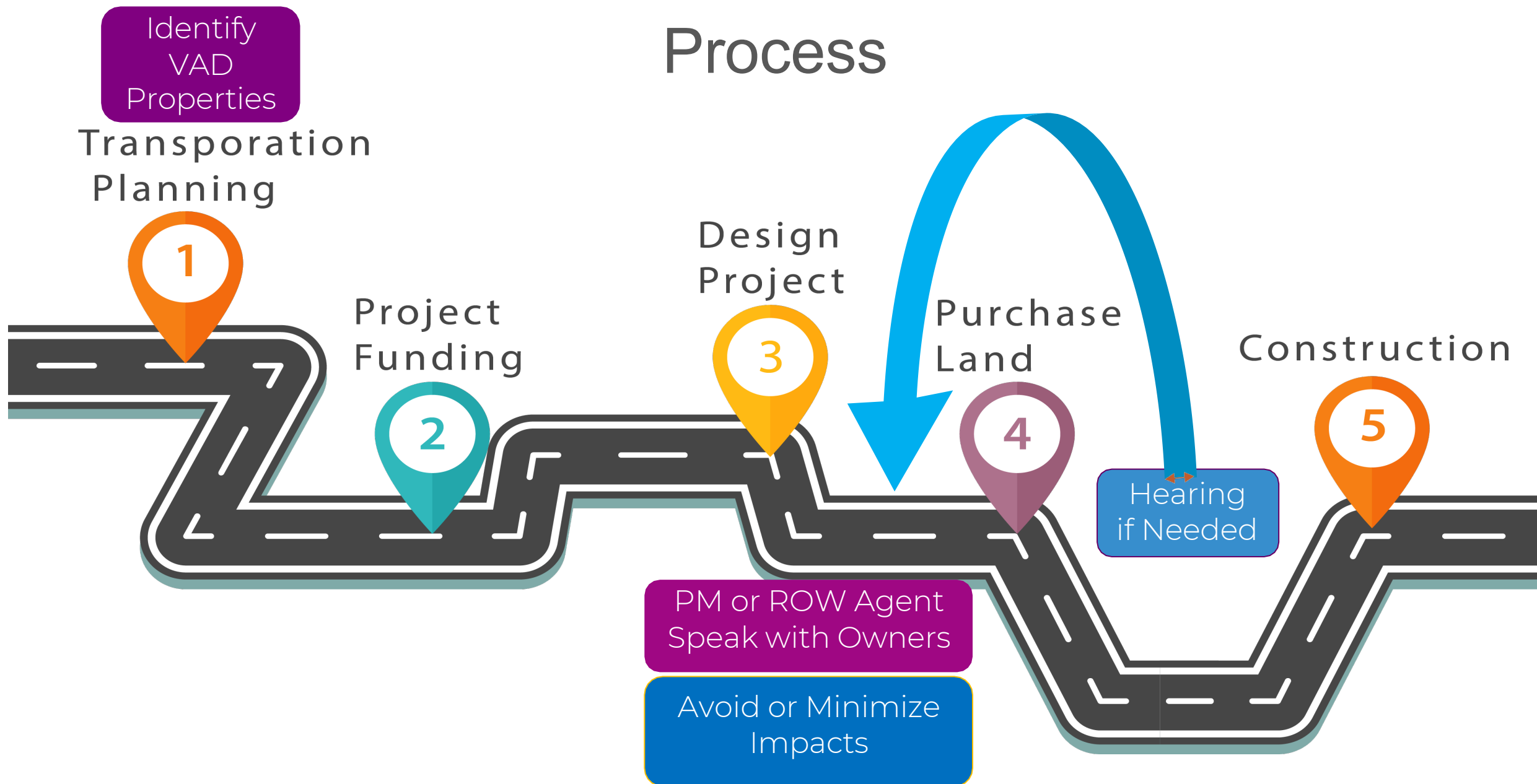


Hearing Requirement

Pursuant to G.S. 106-7 40:

No state or local public agency or governmental unit may formally initiate any action to condemn any interest in qualifying farmland within a VAD or EVAD until such agency or unit has requested the Advisory Board to hold a public hearing on the proposed condemnation

Process

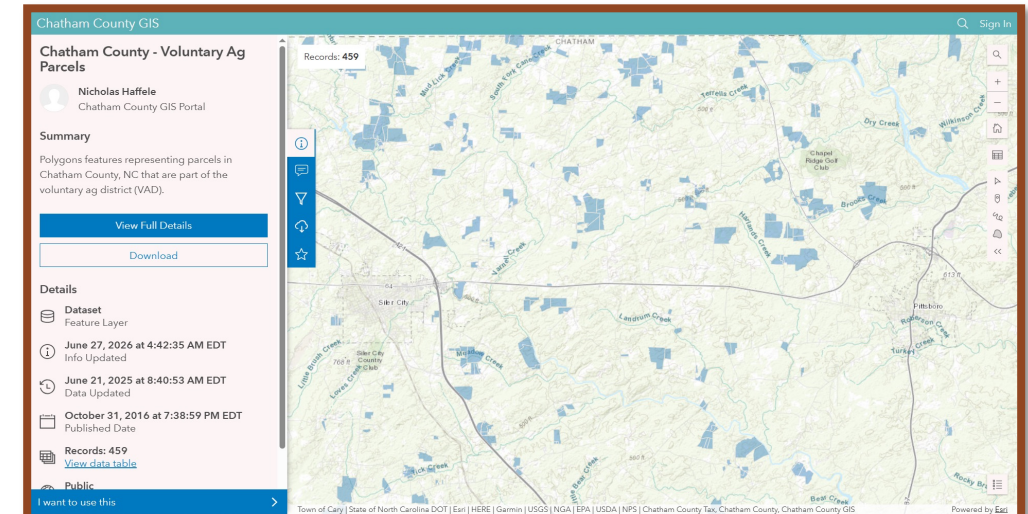
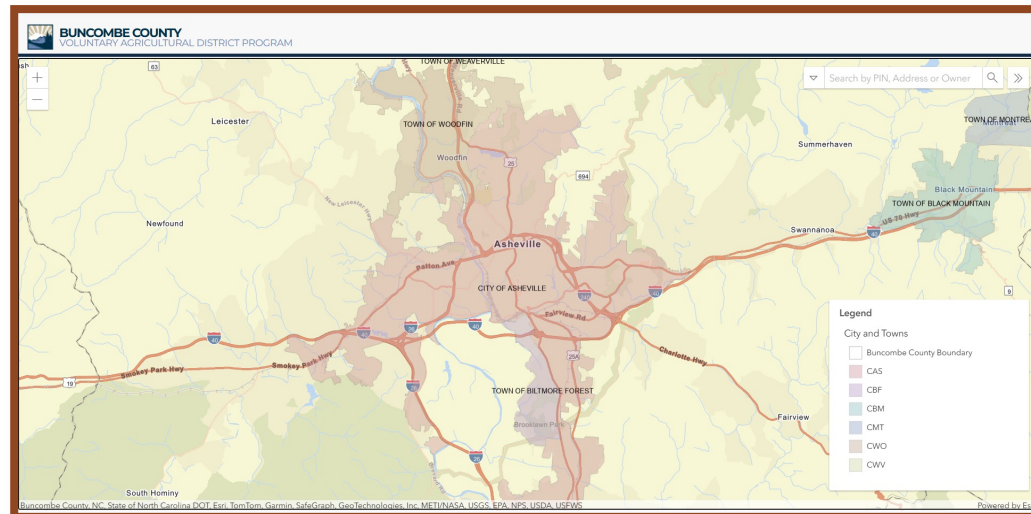
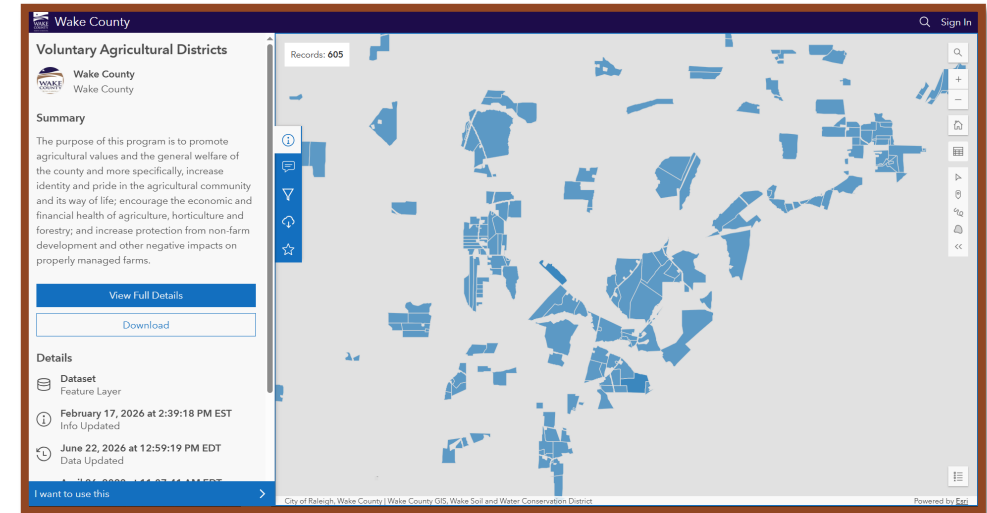


Updating VAD GIS Data in North Carolina

Connor Badgett

County VAD Layers

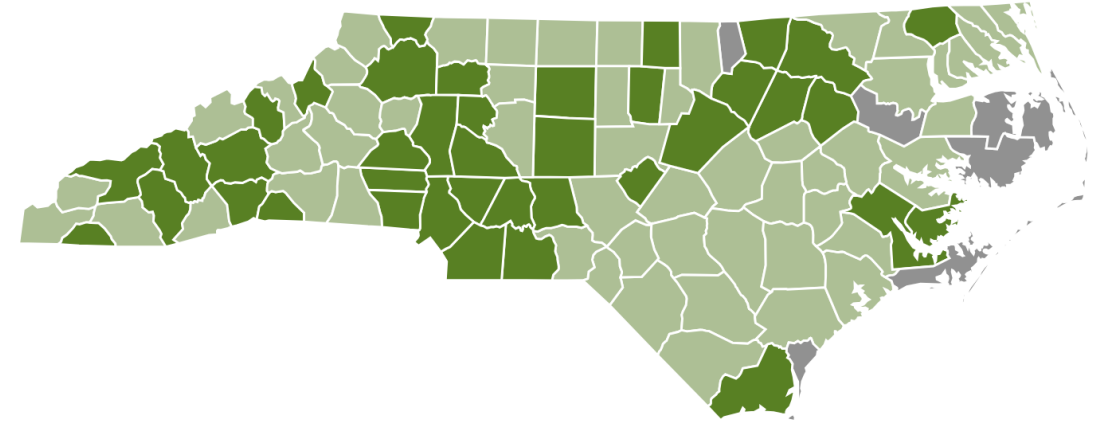
- Counties maintain their own GIS datasets
- NCDOT previously had ~70 individual county VAD layers in ATLAS of the (now) 93 counties in the VAD program



Statewide VAD Layer

- Statewide VAD layer was updated from a voluntary survey sent to participating counties
 - Differed from the individual county VAD layers in update cycle, attributes, symbology, etc.
- Other agencies or individuals that benefit from an updated statewide VAD layer:
 - NCDOT
 - Municipal governments
 - Public utility authorities
 - Users performing property research
 - Must be alerted if a property inquiry is within ½ mile of a VAD parcel
- NCDOT saw a need to help update the Statewide VAD layer

North Carolina Voluntary Agricultural Districts by County



Counties with VAD Programs: 93

VAD Counties with Enhanced VAD Programs: 39

Farms Enrolled in the VAD Program Statewide: 11,210

Acres of Farmland and Working Forests Enrolled in the VAD Program Statewide: 832,209.3

Farms Enrolled in the Enhanced VAD Program Statewide: 933

Acres of Farmland and Working Forests Enrolled in the Enhanced VAD Program Statewide: 56,756.09

Total Farms Enrolled in the VAD and EVAD Program Statewide: 12,143

Total Acres of Farmland and Working Forests Enrolled in the VAD and EVAD Program Statewide: 888,965.41

Updating the Statewide Layer

- Performed outreach and documented how counties supply their VAD data

Chatham County GIS



Chatham County - Voluntary Ag Parcels

Nicholas Haffele

Chatham County GIS Portal

View Map

Download

More

Summary

Polygons features representing parcels in Chatham County, NC that are part of the voluntary ag district (VAD).

Polygons features representing parcels in Chatham County, NC that are part of the voluntary ag district (VAD).

Details

Dataset

Feature Layer

June 27, 2026 at 4:42:35 AM EDT

Info Updated

June 21, 2025 at 8:40:53 AM EDT

Data Updated

October 31, 2016 at 7:38:59 PM EDT

Published Date

Contact Us

Cumberland County ITS-Geospatial Services Division
GIS Manager: Dr. Ehsan Momeni
117 Dick St Room 18
Fayetteville, NC 28301
PHONE: 910-678-7712

COPYRIGHT CCGIS

ATLAS VAD Data Sources

Data Source

County

Anson

Update type

County has no Available V...

Feature Layer Name

Service URL

Data Contact Name

Data Contact Email

Update type

No value

Update Automatically through Feature Service

County has no Available VAD Data

County has no VAD Program

Request Data from POC and Manually Update

Download from Website and Manually Update

Download CSV and Manually Update

17

Updating the Statewide Layer (cont.)

- Once we found each layer, we also had to document what each attribute is called
- This is necessary to put all data into a common format

Parcel	Owner	Owner2	Address	City			
pin	owner		address1	address2			
PARCEL_ID	NAME		ADDR	CITY			
NAD83_PIN	OWNER_NAME	OWNER_NA_1	OWNER_ADDR				ACRE
PIN	Name1	Name2	Address1	City	State	ZipCode	LegalLandUnits
NCPIN	OWNER1	OWNER2	ADDR_1	CITY	STATE	ZIP	ASSESSED_ACRES
PIN	NAME	ATTN	NAMEFILE_A	CITY	STATE	ZIPCD	ACREAGE
PIN	NAME		ADDR	CITY		ZIPCD	ACRES
PIN	Name						Acres
Tax_PIN1	Name		Location				ACREAGE
PIN							ACRES
PIN	CURR_NAME1	CURR_NAME2	CURR_ADDR1	CURR_CITY	CURR_STATE	CURR_ZIPCO	VAL_AC

ATLAS VAD Attribute Mapping			
County	Input Attribute	Target Attribute	Default Value
Ashe	GPIN	Parcel	
Ashe	OWNER_NAME	Owner	
Ashe		Owner2	
Ashe		Address	
Ashe		City	
Ashe		State	NC
Ashe		ZIP	
Ashe	TOTAL_ACRES	Acres	
Ashe		CoName	Ashe

Updating the Statewide Layer (cont.)

- Created a script using the data tables we filled out previously
- Allows for manual updates from downloaded GIS data, tables, or from county contacts
- Checks if the layer's name is what is expected
- Logs errors with updates for inaccessible layers, field mismatches, changed URLs, etc.

```
def compare_layer_names(expected_name: str, actual_name: str) -> Tuple[bool, str]:
    expected = (expected_name or "").strip()
    actual = (actual_name or "").strip()

    if not expected and not actual:
        return True, "Both expected and actual layer names are blank."

    if not expected:
        return False, f"Expected layer name is blank in hosted table, but REST layer name is '{actual}'."

    if not actual:
        return False, f"REST layer name is blank, but hosted table expects '{expected}'."

    if expected == actual:
        return True, f"Layer name matches: '{expected}'."

    return False, f"Layer name mismatch: expected '{expected}', actual '{actual}'."
```

```
def log_error(county, source_url, stage, reason, extra=None):
    global ERROR_LOG_PATH
    if not ERROR_LOG_PATH:
        init_error_report(LOG_FOLDER)

    ts = datetime.datetime.now().strftime("%H:%M:%S")
    lines = [
        "-" * 80,
        f"[{ts}] COUNTY: {county or '(unknown)'}",
        f"STAGE: {stage}",
        f"SOURCE: {source_url or '(none)'}",
        f"REASON: {reason}",
    ]
    if extra is not None and str(extra).strip() != "":
        lines.append("DETAILS:")
        lines.append(str(extra))

    with open(ERROR_LOG_PATH, "a", encoding="utf-8") as f:
        f.write("\n".join(lines) + "\n")

    ensure_dir(LOG_FOLDER)
    print(LOG_FOLDER)
```

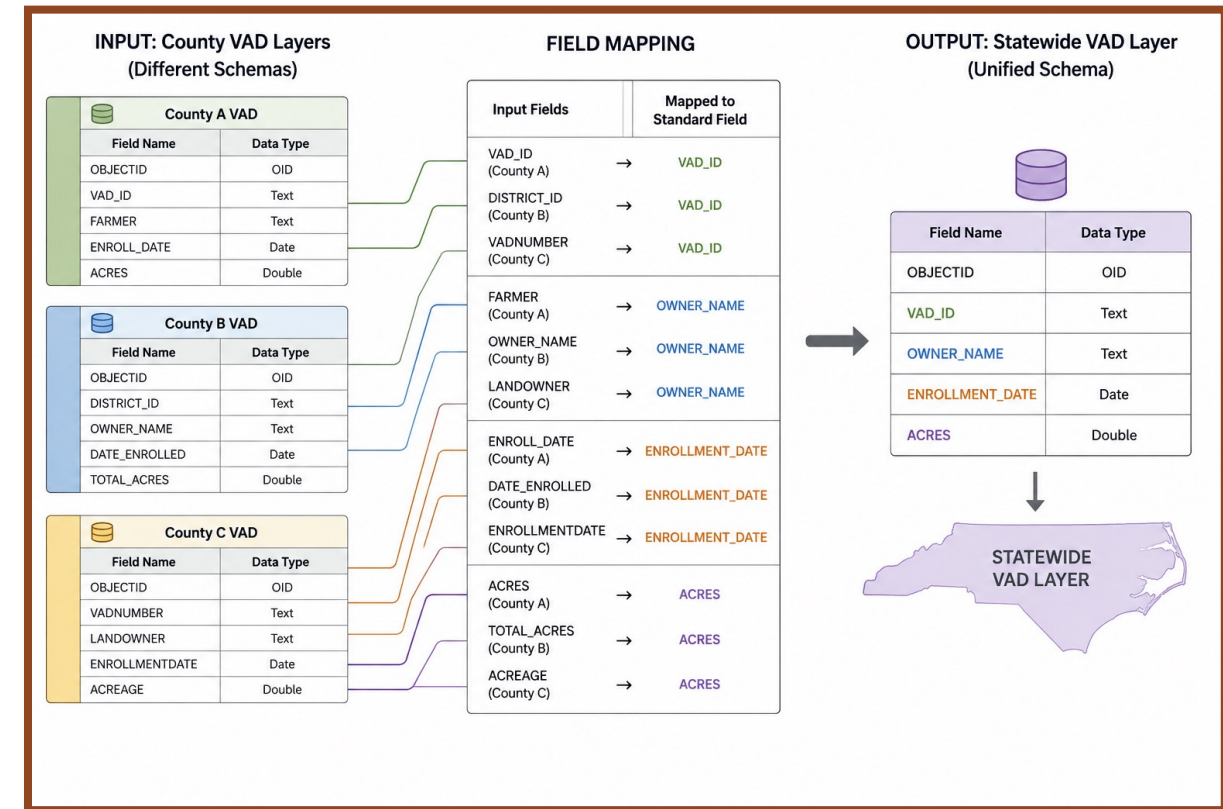
```
# --- Hosted control tables (DIRECT URLS) ---
DATA_SOURCES_TABLE_URL = "https://services6.arcgis.com/3Sj1fiIDvQtFfbvg/arcgis/rest/services/ATLAS%20Data%20Sources/FeatureServer/0"
ATTRIBUTE_MAPPING_TABLE_URL = "https://services6.arcgis.com/3Sj1fiIDvQtFfbvg/arcgis/rest/services/ATLAS%20Attribute%20Mapping/FeatureServer/0"

# --- Destination feature layer ---
DEST_LAYER_URL = "https://services6.arcgis.com/3Sj1fiIDvQtFfbvg/arcgis/rest/services/NCDOT%20ATLAS%20Statewide%20VAD%20Parcels/FeatureServer/0"
DEST_COUNTY_FIELD = "CoName"
DEST_STATE_FIELD = "State"
DEST_ACRES_FIELD = "Acres"
DEST_SOURCE_URL_FIELD = "Source_URL"

# --- Processing log table (append only) ---
SUMMARY_TABLE_URL = "https://services6.arcgis.com/3Sj1fiIDvQtFfbvg/arcgis/rest/services/ATLAS%20VAD%20Log/FeatureServer/0"
```

Updating the Statewide Layer (cont.)

- Combines data via field mapping into one statewide GIS layer
- Automated the process to update the statewide VAD layer on a regular basis, representing all 93 counties in the VAD program
- This will be available from the NCDA&CS GIS portal in the near future



Tracking and Review



North Carolina Department of Agriculture & Consumer Services

Voluntary Agricultural Districts Data Management Tool

Update Method

- All -

Last Run Result

- All -

Counties

Map

Processing Log

Alamance

Alexander

Alleghany

Anson

Ashe

Avery

Beaufort

Bertie

Bladen

Brunswick

Buncombe

Burke

Cabarrus

97 VAD Districts in Statewide Layer

ATLAS VAD Processing Log

ATLAS VAD Processing Log

Run Date	County	Status
----------	--------	--------

ATLAS VAD Attribute Mapping

County	Input Attribute	Target Attribute
Ashe	GPIN	
Ashe	OWNER_NAME	
Ashe		
Ashe		
Ashe		City
Ashe		State
Ashe		ZIP
Ashe	TOTAL_ACRES	Acres
Ashe		CoName
Ashe		Ashe

Last update: a few seconds ago



SUCCESS	64%
DATA NEVER UPDATED	32%
FAILED - Failure - Source URL Not Valid	3%
FAILED - COUNTY_FAIL	1%



SUCCESS	64%
DATA NEVER UPDATED	32%
FAILED - Failure - Source URL Not Valid	3%
FAILED - COUNTY_FAIL	1%

NCDACS - VAD Data Sources: Ashe

ATLAS VAD Data Sources

Data Source

County

Ashe

Update type

Update Automatically through Feature Service

Feature Layer Name

Farmland Preservation Properties

countygov.com/arcgis/rest/services/Web_Map_201...

Last Successful Run

6/25/2026

09:54:07 AM

Update

Next Steps

- Turn the layer and application over to NCDA&CS to maintain the statewide VAD layer
 - Will become available for anyone to use in their GIS software
- Use the updated statewide VAD layer in ATLAS

Layer Maintenance Process

ATLAS Layer Maintenance Tracking Tool

Layers

Q Search Layer or Layer Id

Layer Name

Assigned To

Next Maint. ...

Last...

M. ...

Maint. M...

ATLAS Tribal Coordination	Phoenix Spivey	7/9/26	7/9/25	Update	Jul
ATLAS USFWS Species Consultation Range (part 1)	Katie Talavera	4/23/26	10/23/25	Update	Aug
ATLAS USFWS Species Consultation Range (part 2)	Katie Talavera	4/23/26	10/23/25	Update	Aug
Bat Bridge Inspections	Katie Talavera	10/31/26	10/31/25	Verify	Aug
Bat Bridges Habitat Probability	Katie Talavera	5/31/26	5/31/21	Verify	Apr
Bat Culvert Inspections	Connor Badgett	12/1/26	12/1/25	Update	Dec
Blue Ridge Forever Appalachian Trail Centerline	Aidan O'Brien	2/7/27	2/7/25	Verify	Feb
Bunched Arrowhead Potential Habitat	Katie Talavera	11/7/25	11/7/20	Verify	Sep
Bureau of Land Management					
Bureau of Land Management					
Bureau of Land Management					

11905 - ATLAS Tribal Coordination

MAINTENANCE ACTIVITY NOTES/RECORD

visualization of the spreadsheet in this doc:
<https://connect.ncdot.gov/resources/Environmental/EAU/CR/Archaeology/Documents/NCDOT%20Protocol%20for%20Archaeology%20Updates.pdf>

ATLAS Layer Request Tracking Tool

Q Search

Newest to Oldest

1022 - NCDEQ ESC Local Program Jurisdictions

Overall Status: Completed

Data Status: On AGOL-Permanent Metadata Status: Meets Minimum

Request Date: 6/29/26 Update Date: 6/30/26

1021 - Petroleum Contaminated Soil Remediation Permits

Overall Status: Completed

Data Status: On AGOL-Permanent Metadata Status: Meets DIT Standard

Request Date: 6/29/26 Update Date: 6/30/26

1020 - Freight Route Plans Layer

Overall Status: Completed

Data Status: Metadata Status: Meets Minimum

Request Date: 6/3/26 Update Date: 7/7/26

1019 - NOAA Restricted Areas

Overall Status: Completed

Data Status: On AGOL-Permanent Metadata Status: Meets Minimum

Request Date: 5/27/26 Update Date: 5/27/26

1018 - American Community Survey (ACS)

Overall Status: Requested

Data Status: Metadata Status: Meets Minimum

Request Date: 5/22/26 Update Date: 5/22/26

1017 - Encroachment Data

Overall Status: Removed

Data Status: Metadata Status: Meets Minimum

Request Date: 2/19/26 Update Date: 2/25/26

1016 - as built initiative

Overall Status: Removed

Data Status: Metadata Status: Meets Minimum

Request Date: 2/19/26 Update Date: 3/4/26

1015 - Huc8 and River Basin columns

Overall Status: Completed

Data Status: Metadata Status: Meets Minimum

Request Date: 4/29/26 Update Date: 6/25/26

1014 - Ozone 2015 standard

Overall Status: Removed

Data Status: Metadata Status: Meets Minimum

Request Date: 10/20/25 Update Date: 12/18/25

1013 - School Studies Layer

Overall Status: Removed

Data Status: Metadata Status: Meets Minimum

Request Date: 8/6/25 Update Date: 10/15/25

1012 - Evacuation Routes

Overall Status: Completed

Data Status: Metadata Status: Meets Minimum

Request Date: 8/6/25 Update Date: 10/15/25

ATLAS Layer Issues Tracker Tool

Q Search

National Park Service Park Boundaries

National Park Service Park Boundaries

Layer ID*

11566

ATLAS Layer Name*

National Park Service Park Boundaries

Broke Layer Location Service*

https://services1.arcgis.com/Bc8EJBxQRMchle/ArcGIS/rest/services/NPSParkBoundaries/FeatureServer/0

Issue Information

Issue Status

Outstanding

Assigned To

Natalie Oleson

Date Added

7/7/2026

Date Resolved

MM/DD/YYYY

Issue Analysis

7/7, MP: Service is no longer available on the server.

Response Action Status

7/7, MP: Can this layer be replaced with the agol hosted "Administrative Boundaries of National Park System Units" owned by "Eari, US, Federal, Data - https://data.usgs.gov/datacatalog/arcgis/rest/services/NPSParkBoundaries/FeatureServer/0?_lang=en" This was hosted by "NCDOT, RTSC" and has a north arrow (source: https://www.ncdot.gov/). It is a shapefile.

Use Cases

Layer Name	Use Case
Federal Lands	Use this layer to identify NPS parks. Use this in conjunction with the "National Park Service Park Boundaries" layer, which includes many of the same sites but has different information.
National Park Service Park Boundaries	Use this layer to identify NPS parks. Use this in conjunction with the "Federal Lands" layer, which includes many of the same sites but has different information.
USDA National Forests	Use this layer to identify property that may be protected as National Forests. This should be used in conjunction with the "NC USFS Owned Land" layer and "Forest Service Basic Ownership" layer, which have some different sites and attributes.
Forest Service Basic Ownership	Use this layer to identify property that may be protected as National Forests. This should be used in conjunction with the "NC USFS Owned Land" layer and "USDA National Forests" layer, which have some different sites and attributes.
NC USFS Owned Land	Use this layer to identify property that may be protected as National Forests. This should be used in conjunction with the "USDA National Forests" layer and "Forest Service Basic Ownership" layer, which have some different sites and attributes.
USA Parks (Esri)	Use this layer during Stage 1 and scoping to view potential parks. Not as comprehensive as the "Federal Lands" layer, but with slightly different boundaries for each site. Use both layers in conjunction for most conservative coverage.

Live ATLAS Demo with VAD Data

Connor Badgett

ATLAS Map: Combining the Functionality of Search and Screening in One Tool

ATLAS is Moving to the Cloud

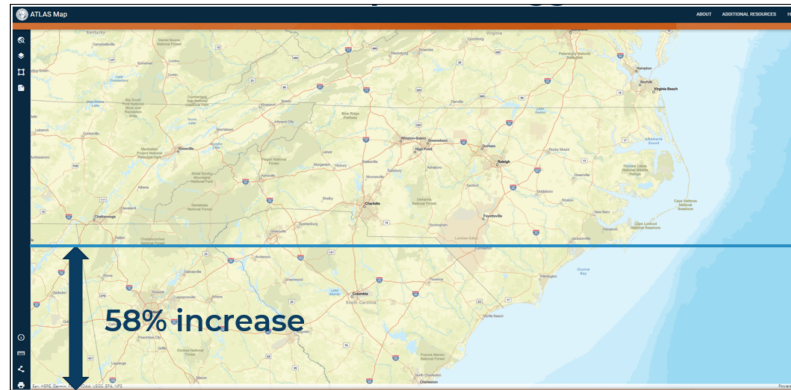
- First state-owned application to move to the cloud environment
- Server capacity expands on demand



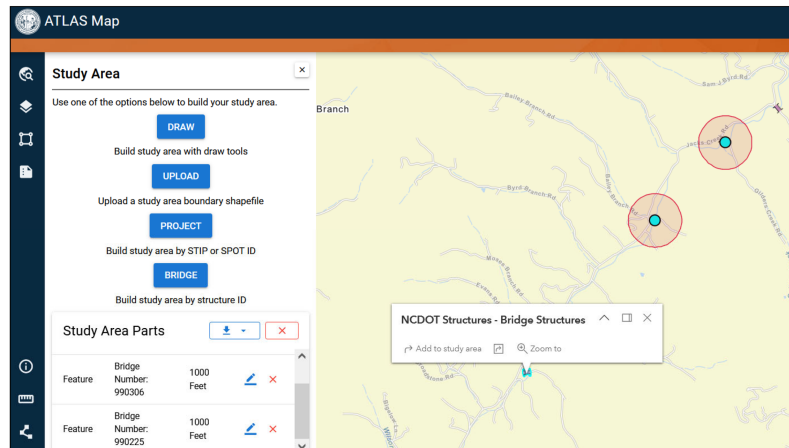
Benefits to the user

- Faster layer load times
- Larger study areas
- Screen more layers
- Experience fewer errors

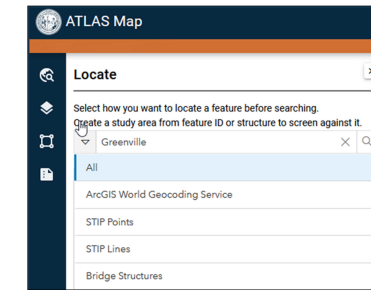
More Dedicated Space to the Map



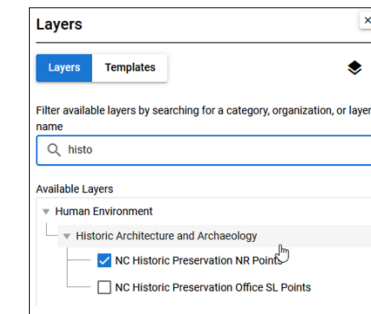
Screen Multiple Study Areas Simultaneously



Search Options Expanded



More Intuitive Layer Search



Additional Enhancements

- Print report-quality maps
- Expand access to additional user groups

ATLAS Test User

- Google “NCDOT ATLAS”
- Click on Search and/or Screening Link
- Sign in with NCID
 - NCVaduser
 - Rainbowyear2026@2
- Play with it over the next week!

Contact Us

Project ATLAS

ATLAS@ncdot.gov

LeiLani Paugh

lypaugh@ncdot.gov

Connor Badgett

ext-chbadgett@ncdot.gov

A

T

L

A

S

Questions
And
Discussion

 <https://connect.ncdot.gov/resources/Environmental/EAU/Project-Atlas/>

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Thank you!

