

# Lidar Phases

- Phase 1- Collected by USGS and NCFMP with Hurricane Sandy funds 2014
- Phase 2- collected by NCFMP and NCDOT in conjunction with USGS - 2014
- Phase 3- collected by NCFMP and NCDOT with assistance from the General Assembly-2015
- Phase 4- collected by NCFMP and NCDOT-2016-17
- Phase 5- collected by NCFMP and NCDOT -2017

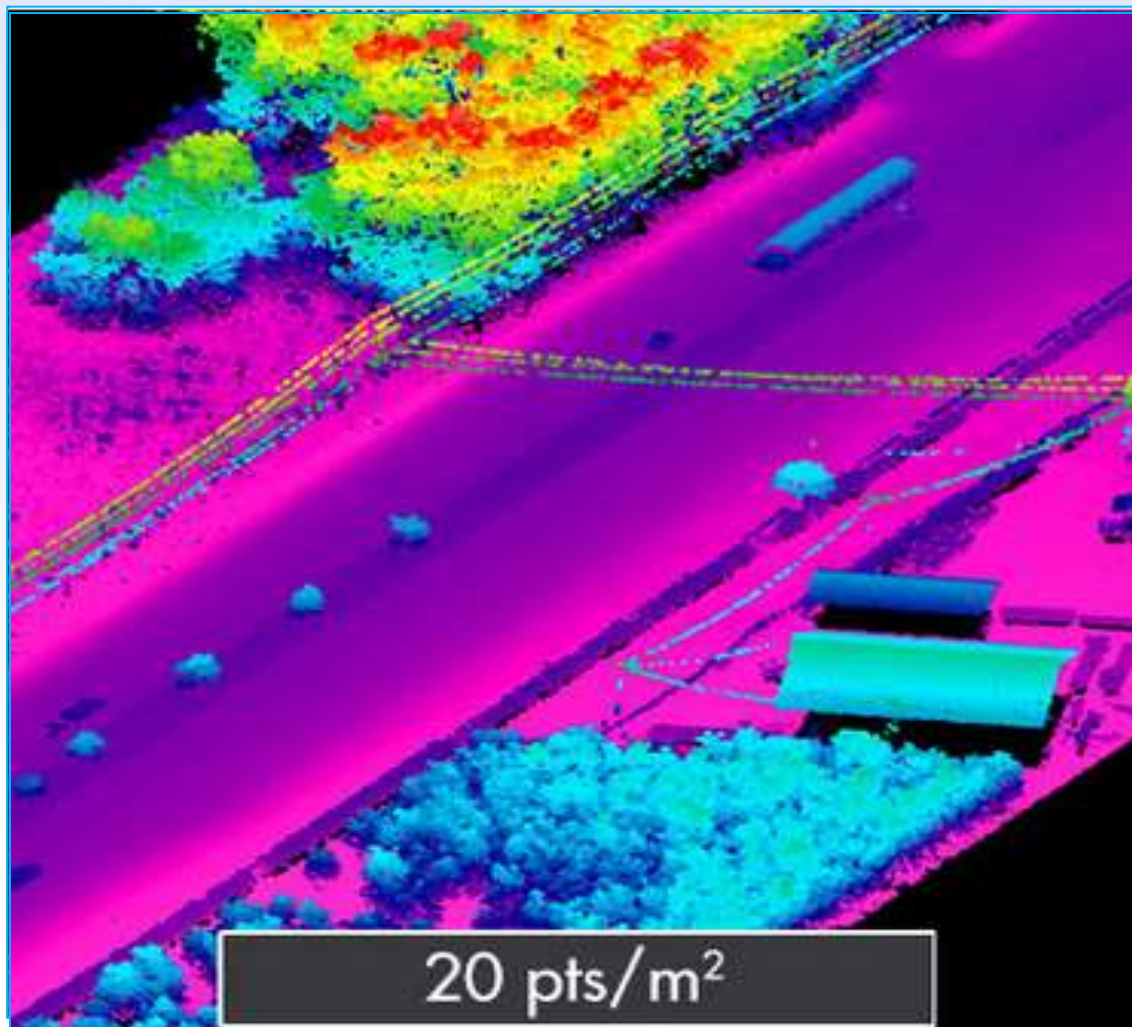
- Phase 1, 2, and 3
  - 2 points per square meter/linear sensor
- Phase 4 and 5
  - 8 points per square meter/Geiger sensor



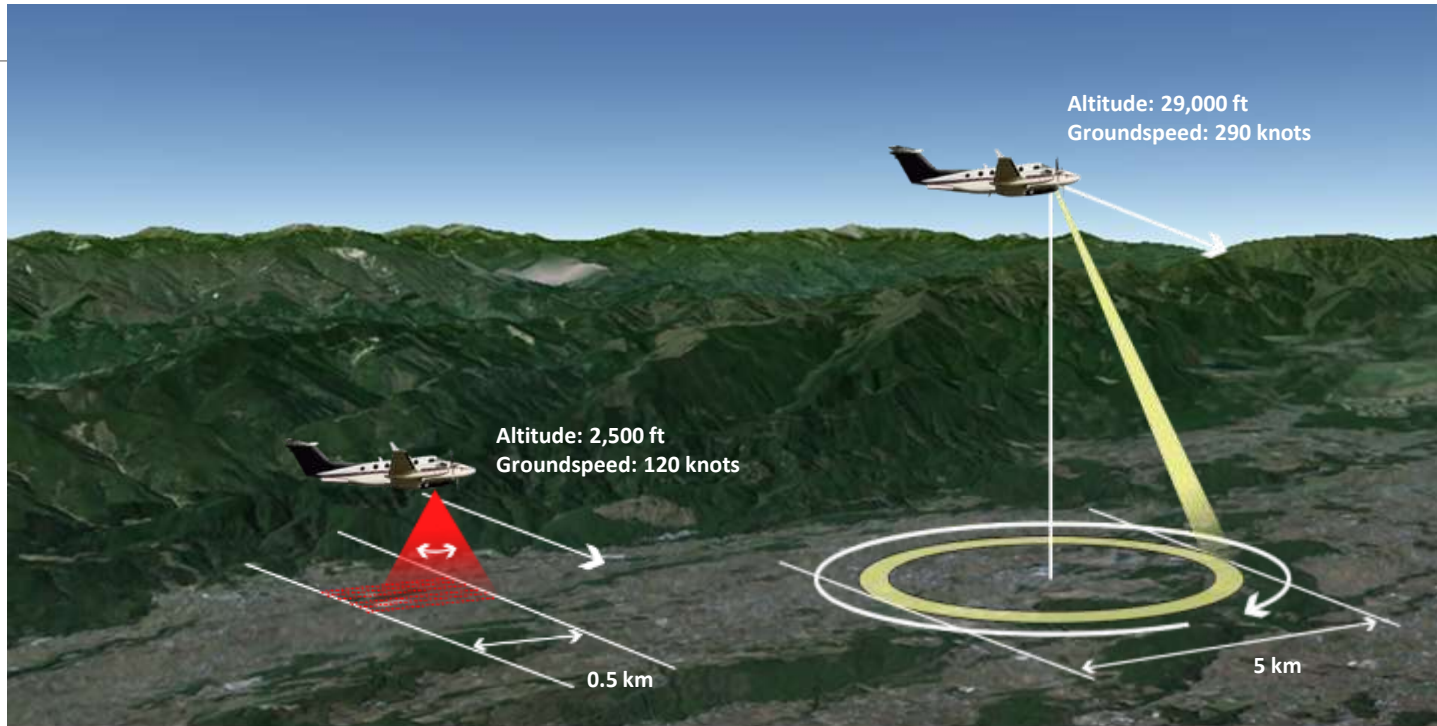
# 2016 Data Collection

## Geiger Mode Sensor

- Pilot test area in Mecklenburg County.
  - 20 points per square meter with nominal post spacing of 0.7 meters.
  - 8 ppm deliverable at same or reduced cost.
  - Data collected will support a 9.25 cm (3.36 inches) RMSEz.



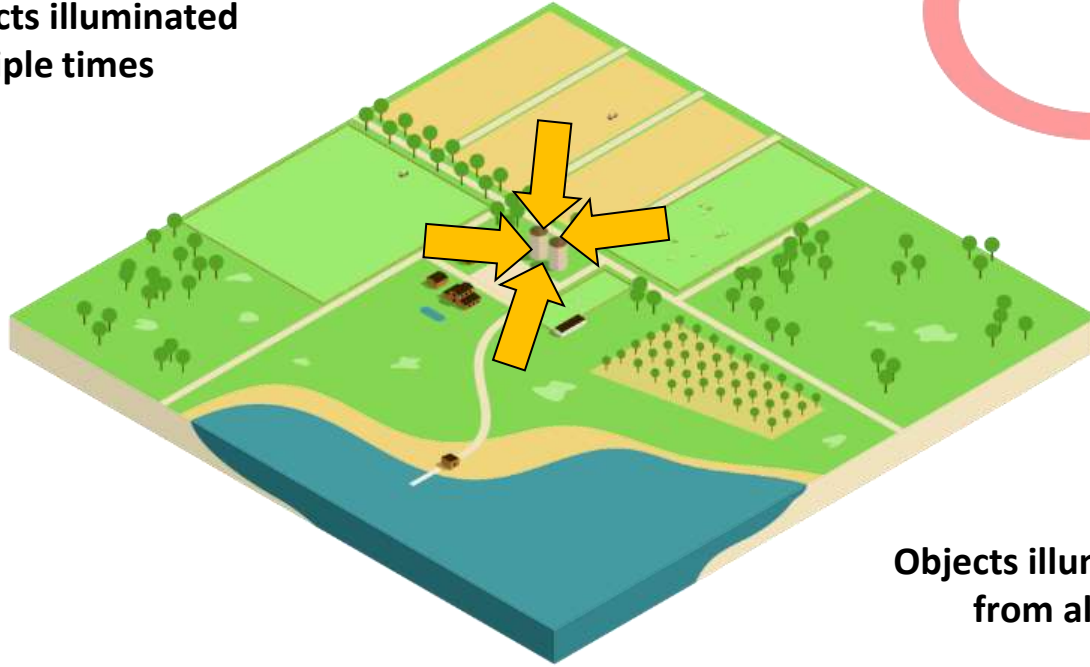
# Linear Vs. Geiger



**Geiger mode collects a far larger swath than linear mode LiDAR**

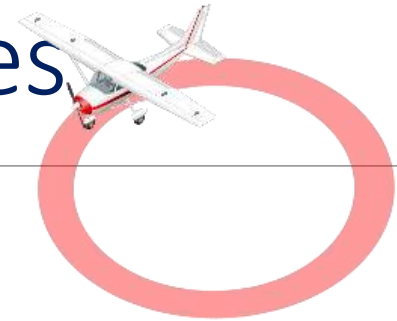
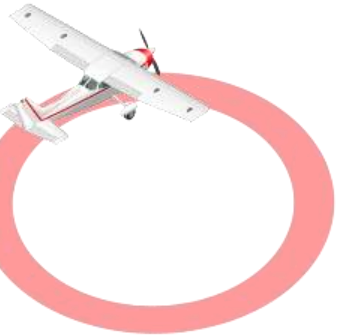
# Geiger Collection Angles

Objects illuminated  
multiple times

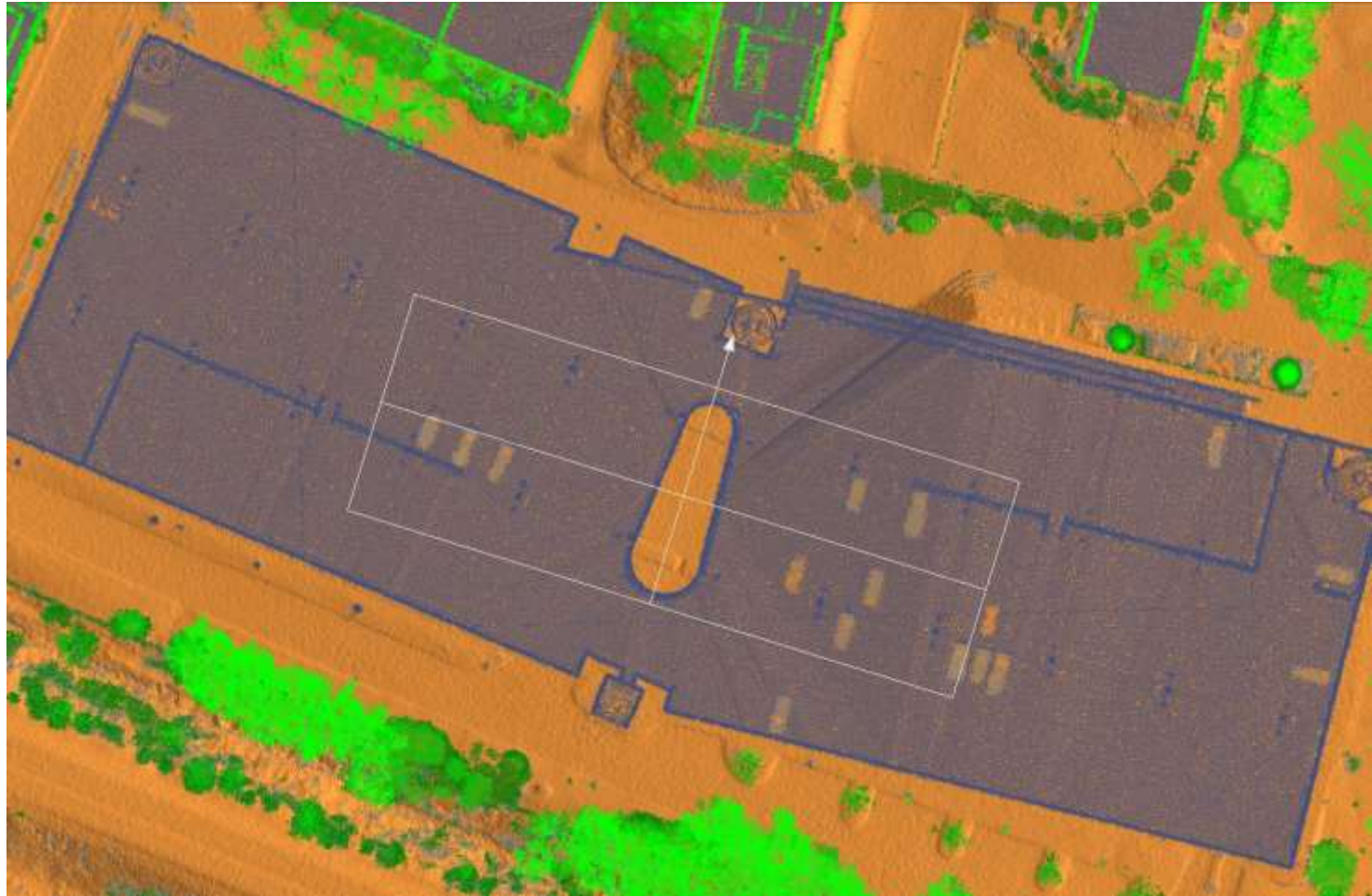


Objects illuminated  
from all angles

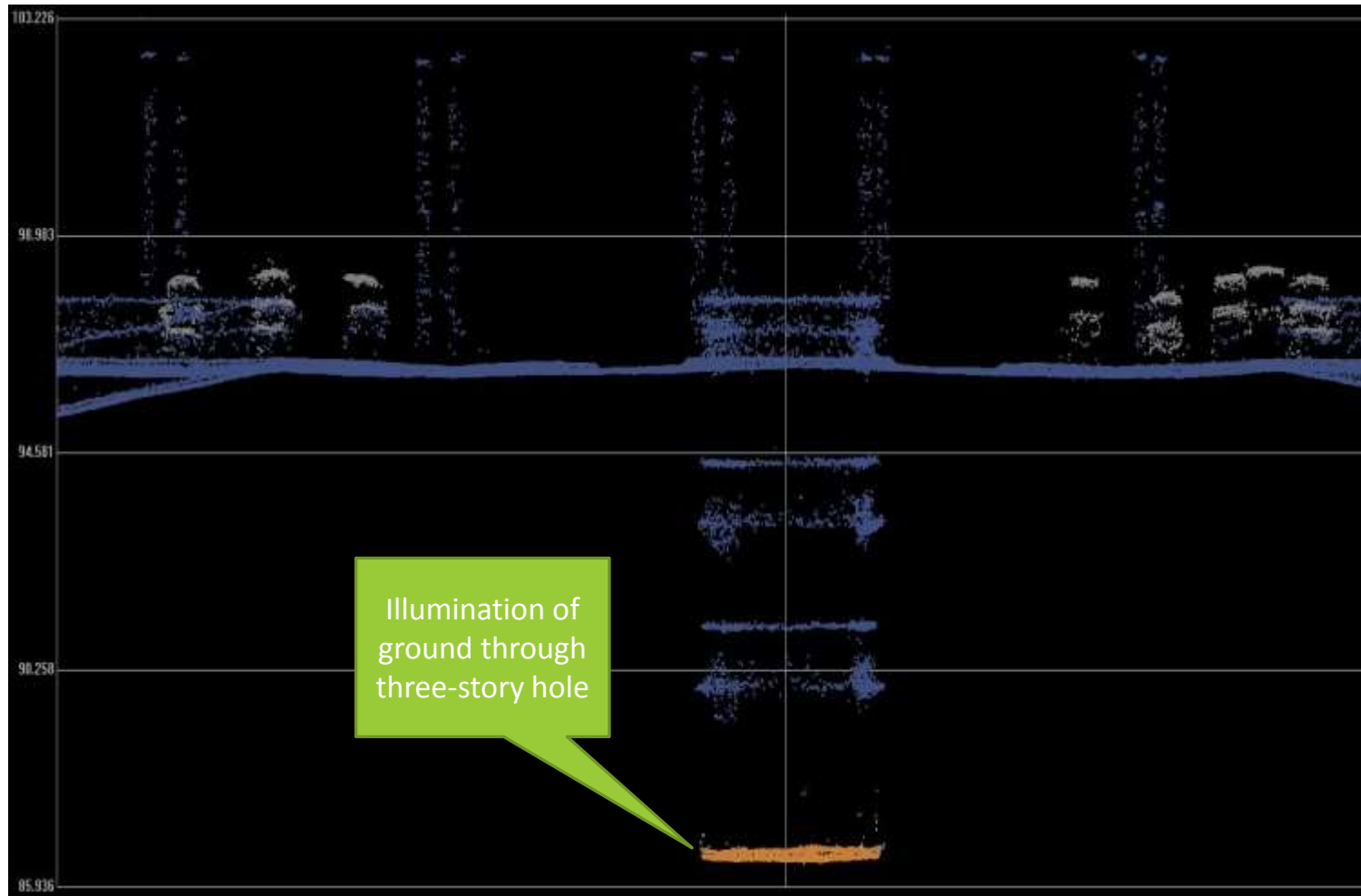
Improved foliage penetration and reduced shadowing



Geiger 30 ppsm-  
Ground  
illumination



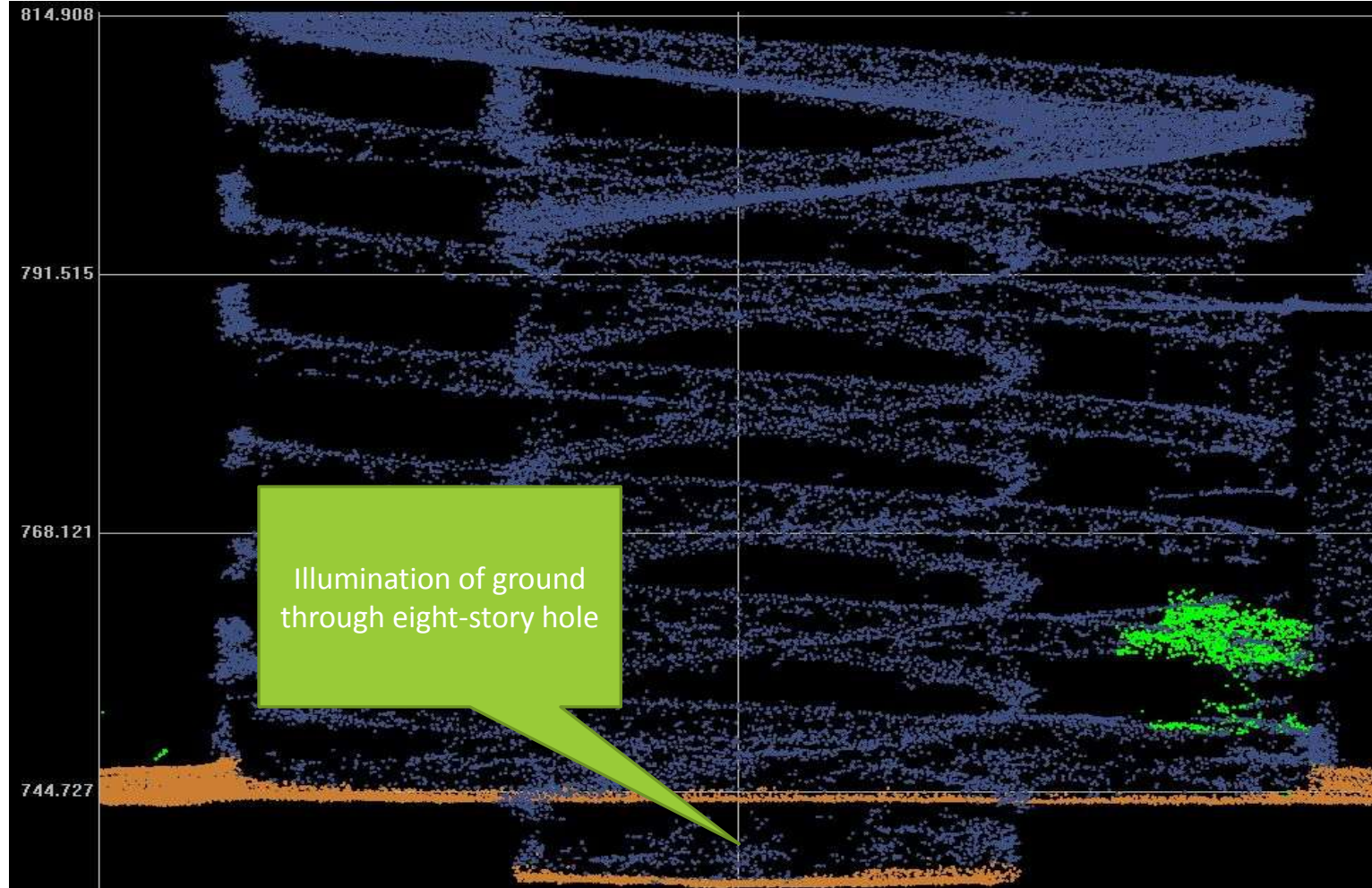
Ground within  
vertical  
obstruction



Geiger 30  
ppsm –  
Ground  
illumination



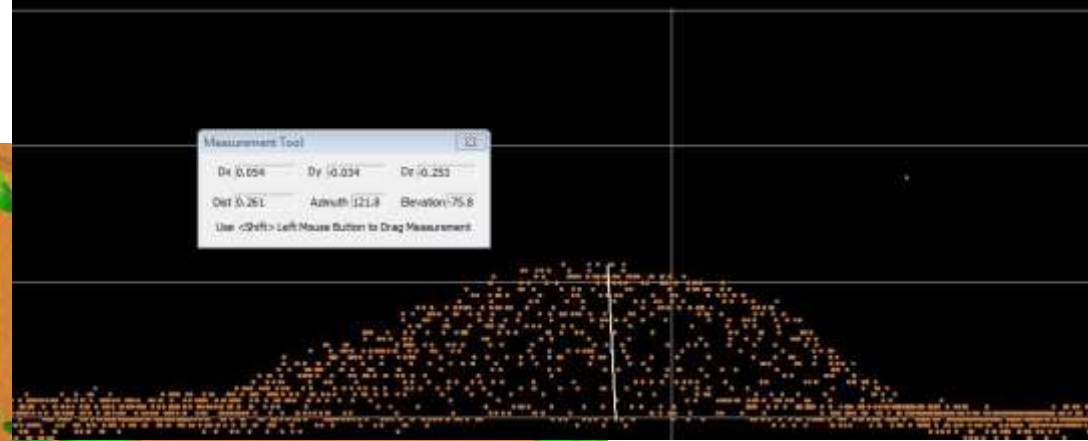
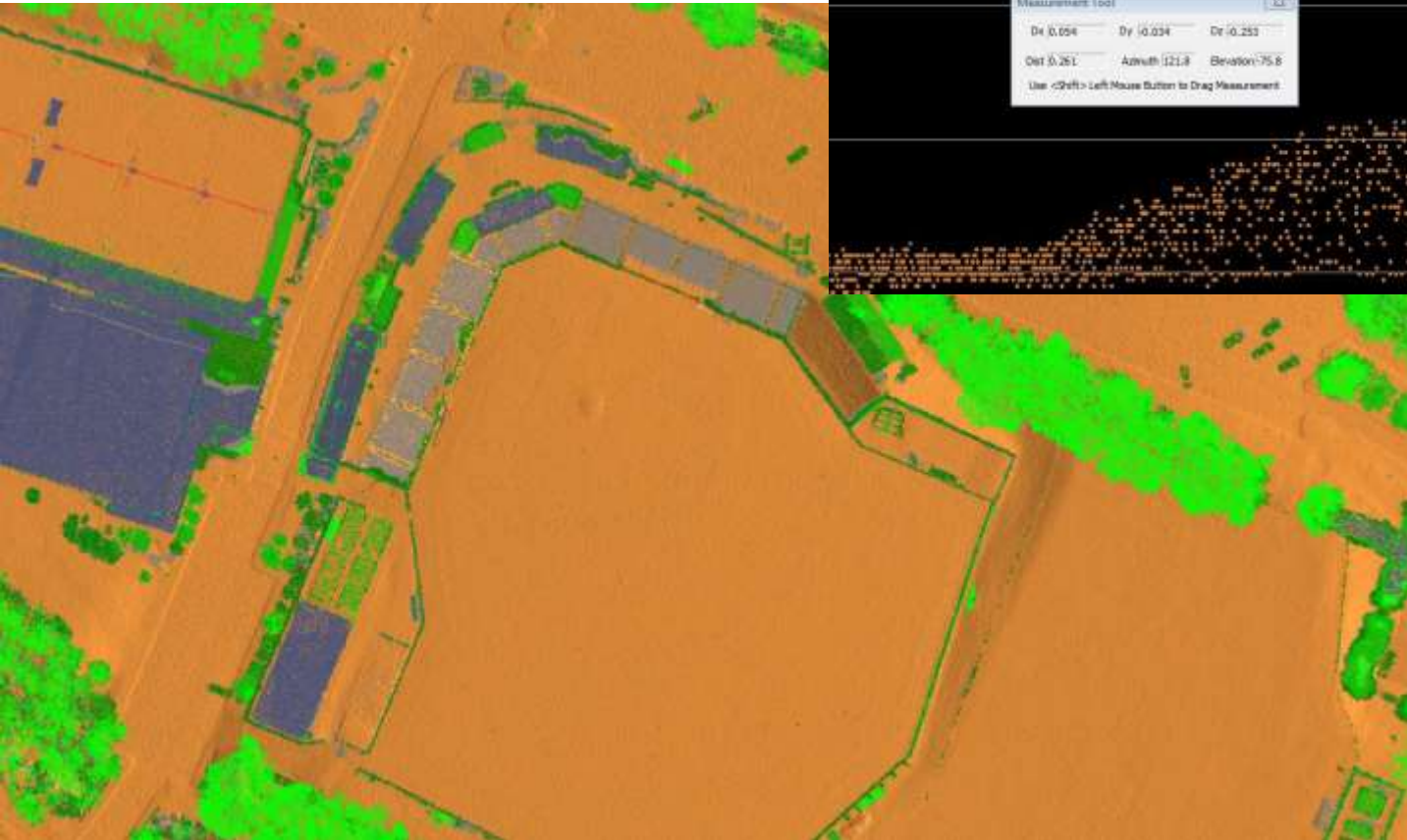
Ground  
within vertical  
obstruction





**Geiger Mode  
LIDAR  
Samples**





# Clip and Ship



WELCOME TO NORTH CAROLINA'S SPATIAL DATA DOWNLOAD

Login below with your NCID

A North Carolina ID (NCID) is required.

Don't have a NCID? Sign up here.

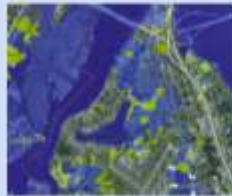
NCID USER NAME:

hsmorgan

PASSWORD:

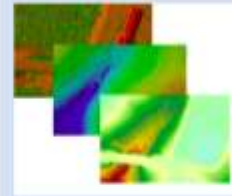
\*\*\*\*\*

LOGIN



## Hazards

Information provided with Floodplain Mapping.



## Base Data

- Quality Level 2 LIDAR
- Legacy LIDAR
- Digital Elevation Models



## Built Environment

Data on structures and other built environments.



NC Floodplain Mapping Program  
4305 Reedy Creek Drive  
Raleigh, NC 27607

Phone: (919) 715-5711  
Fax: (919) 715-6408  
Email: [rmclipsandship@ncdps.gov](mailto:rmclipsandship@ncdps.gov)

Mailing Address  
4218 Mail Service Center  
Raleigh, NC 27699-4218

# Clip and Ship

## Please Select Data Type for Download

Click one of the blue boxes to view and download data. Then draw or select an area of interest on the map.

### Hazards

#### FLOOD ZONES

Download the 100 year flood zones and associated layers such as cross sections, benchmarks, political areas, counties.

### Base Data

#### QL2 LIDAR

2 points per meter dataset from 2014 to the present covering 60 counties.

#### ELEVATION

Digital Elevation Model (DEM) data for both Legacy and QL2 source data.

#### LEGACY LIDAR

Bare Earth points (ascii comma delimited)

### Built Environment

#### SCHOOLS

Build points for Schools Campus points for school polygon for campus

#### BUILDING INFORMATION

Building footprints Building points



NC Floodplain Mapping Program  
4100 Sandy Creek Drive  
Raleigh, NC 27607

Phone: (919) 725-5711  
Fax: (919) 715-0408  
Email: [ncflood@ncflood.com](mailto:ncflood@ncflood.com)

Mailing Address  
4210 Mail Service Center  
Raleigh, NC 27699-6218

# Clip and Ship

The screenshot displays the 'SPATIAL Data Download' website interface. At the top, there is a navigation bar with links for ADMIN, DATA DOWNLOAD, LARGE DATA REQUEST, MY ACCOUNT, and LOGOUT. The main heading is 'QL2 LIDAR DATA DOWNLOAD', accompanied by a 'SELECT DATA TO DOWNLOAD' button and a 'Pick A County' dropdown menu. Below this is a map of North Carolina with various counties highlighted in different colors: pink for Granville, Raleigh, and Fayetteville; green for Johnston, Wake, and Wayne; and orange for other counties. A legend on the left side of the map, titled 'QL2 LIDAR', shows 'Phase 1 - 2014 USGS' in orange and 'Phase 2 - 2014 NC' in green. The bottom of the page features contact information for the NC Floodplain Mapping Program, including the address (4105 Beady Creek Drive, Raleigh, NC 27607), phone number ((919) 715-5711), fax number ((919) 715-0408), and mailing address (4218 Mail Service Center, Raleigh, NC 27699-4238).

# Clip and Ship

The screenshot displays the 'SPATIAL Data Download' web application. The browser address bar shows the URL <https://rmp.nc.gov/SDD/DataDownload.aspx#>. The page header includes navigation links for ADMIN, DATA DOWNLOAD, LARGE DATA REQUEST, MY ACCOUNT, and LOGOUT. The main content area is titled 'OL2 LIDAR DATA DOWNLOAD' and features a 'SELECT DATA TO DOWNLOAD' button and a 'Pick A County' dropdown menu. Below this is a map interface with controls for zooming, selecting a tile, county, drawing a box, and drawing an area. A search bar for location is also present. A 'No legend' popup is visible in the bottom left. The footer contains the SPATIAL Data Download logo and contact information for the NC Floodplain Mapping Program.

**SPATIAL Data Download**

ADMIN DATA DOWNLOAD LARGE DATA REQUEST MY ACCOUNT LOGOUT

OL2 LIDAR DATA DOWNLOAD

SELECT DATA TO DOWNLOAD Pick A County

SELECT 1 TILE COUNTY DRAW BOX DRAW AREA

Search for location

No legend

**SPATIAL Data Download**

NC Floodplain Mapping Program  
4105 Reedy Creek Drive  
Raleigh, NC 27607

Mailing Address  
4218 Mail Service Center  
Raleigh, NC 27699-4218

Phone: (919) 715-5711  
Fax: (919) 715-0408

# Clip and Ship

The screenshot shows a web browser window with the URL <https://rmp.nc.gov/SDC/DataDownload.aspx#>. The page features a blue header with the "SPATIAL Data Download" logo and navigation links for "LIDAR Download", "DOWNLOAD", "LARGE DATA REQUEST", "MY ACCOUNT", and "LOGOUT". A central modal window titled "LiDAR Download" contains the following content:

Click here for an explanation of the state LiDAR project for all years with specifications per phase. [View LIDAR Fact Sheet.](#)  
Select the classes of LiDAR you wish to include in your output .LAS file.

**ALL CLASSES**  
This dataset contains all classes including ground, roads, vegetation and water

**BARE EARTH**  
This dataset represents the earth's surface with all vegetation and human-made structures removed. The output .LAS file will contain classes 2 (Ground) and 13 (Roads).

**INDIVIDUAL CLASSES**

- Ground
- Strata/Vegetation
- Buildings
- Roads
- Bridges

**SUBMIT REQUEST**

- All selected datasets will be delivered as a single zip file.
- It may take up to 24 hours to generate your zip.
- You will receive an email when your zip file is ready for download.

At the bottom of the page, contact information is provided:

**SPATIAL Data Download**  
NC Topographic Mapping Program  
4305 Sandy Creek Drive  
Raleigh, NC 27607  
Phone: (919) 715-5711  
Fax: (919) 715-0408  
Mailing Address  
4238 Mail Service Center  
Raleigh, NC 27699-4218

# Clip and Ship

**Please Select Data Type for Download**

Click one of the blue boxes to view and download data. Then draw or select an area of interest on the map.

**WOULD YOU LIKE TO USE THE CURRENT AREA YOU HAVE SELECTED?**

**Hazards**

- FLOOD ZONES**  
Download the 100 year flood zones and associated layers such as cross sections, benchmarks, political areas, counties.

**Base Data**

- QL2 LIDAR**  
2 points per meter dataset from 2014 to the present covering 60 counties.
- ELEVATION**  
Digital Elevation Modal (DEM) data for both Legacy and QL2 source data.
- LEGACY LIDAR**  
Bare Earth points (ascii comma delimited)

**Built Environment**

- SCHOOLS**  
Build points for Schools Campus points for school polygon for campus
- BUILDING INFORMATION**  
Building footprints Building points

**Current Links**

Your jobs are processing. This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your zip file. **If you would like to extract more data from this same area, you may click the 'Select Data to Download' button and you will be prompted to reuse the same area.**

LIDAR Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

NC Floodplain Mapping Program  
4105 Sandy Creek Drive  
Raleigh, NC 27607

Phone: (919) 715-3711  
Fax: (919) 715-0408

Mailing Address  
4213 Mail Service Center  
Raleigh, NC 27699-4213



# Clip and Ship- Flood zone Data

The screenshot displays the 'SPATIAL Data Download' web application. The main interface features a map of North Carolina with flood zones highlighted in purple. A central dialog box titled 'Please Select Layers and Formats' is open, listing various data layers for selection. The layers include:

- BASE FLOOD ELEVATIONS (FT)
- BENCHMARKS
- COASTAL TRANSECT
- STRUCTURES
- CROSS SECTION
- STREAM CENTERLINE
- COASTAL BARRIER RESOURCE SYSTEMS
- POLITICAL AREAS
- FLOOD HAZARD LINES
- FLOOD HAZARD AREAS
- WATER AREAS
- COUNTIES

The 'Format' dropdown menu is set to 'Shapefile - SHP - .shp'. A green 'SUBMIT JOB' button is located at the bottom right of the dialog box. In the background, the map shows a coastal area with labels for 'Fayetteville' and 'Beaufort'. The top navigation bar includes links for 'DATA DOWNLOAD', 'LARGE DATA REQUEST', 'MY ACCOUNT', and 'LOGOUT'. A 'Current Jobs' notification box in the bottom left corner states: 'Your jobs are processing. This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your zip file. If you would like to extract more data from this same area, you may click the "Select Data to Download" button and you will be prompted to reuse the same area.' A footer section provides contact information for the NC Floodplain Mapping Program, including the address: 4305 Reedy Creek Drive, Raleigh, NC 27607, and phone/fax numbers: (919) 721-5711 and (919) 715-1408.

# Clip and Ship- DEMS

The screenshot shows the 'SPATIAL Data Download' website interface. The main heading is 'ELEVATION DATA DOWNLOAD'. A map is visible in the background with a grid overlay. A dialog box titled 'Multiple Counties Selected' is open in the center, containing the following text: 'You have selected data from multiple counties. Each selected county will be processed separately so that file sizes will be optimized for download. When your data is ready, you will receive an email for each county selected.' Below this text is a list of counties with checkboxes: SAMPSON, CUMBERLAND, BOBESON, and BLADEN. At the bottom of the dialog are 'CLOSE' and 'OK' buttons. In the bottom left corner, there is a 'Current Jobs' notification box with the text: 'Your jobs are processing. This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your .zip file. If you would like to extract more data from this same area, you may click the "Select Data to Download" button and you will be prompted to reuse the same area.' Below the notification is a button that says 'LIDAR Data Request may take up to 24 hours. click here to check the status of your request'. At the bottom of the page, there is contact information for the NC Floodplain Mapping Program, including the address (4218 Mail Service Center, Raleigh, NC 27699-4218), phone number (919) 733-5755, and fax number (919) 733-9406.

**Multiple Counties Selected**

You have selected data from multiple counties. Each selected county will be processed separately so that file sizes will be optimized for download. When your data is ready, you will receive an email for each county selected.

- SAMPSON
- CUMBERLAND
- BOBESON
- BLADEN

CLOSE OK

**Current Jobs**

Your jobs are processing.

This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your .zip file. If you would like to extract more data from this same area, you may click the "Select Data to Download" button and you will be prompted to reuse the same area.

LIDAR Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

Flood Zones... SUBMITTED View Metadata

**SPATIAL Data Download**

NC Floodplain Mapping Program  
4218 Mail Service Center  
Raleigh, NC 27699

Phone: (919) 733-5755  
Fax: (919) 733-9406

Mailing Address  
4218 Mail Service Center  
Raleigh, NC 27699-4218

# Clip and Ship- DEMs

The screenshot displays the 'SPATIAL Data Download' website interface. The main heading is 'ELEVATION DATA DOWNLOAD'. A central panel titled 'Elevation Download' provides instructions: 'Select one or more elevation datasets. You may choose any combination of datasets from both Legacy and QL2.' It features two columns of options: 'Legacy' (DEM10, DEM20, DEM50) and 'QL2' (DEM03, DEM05, DEM10, DEM20, DEM40, INTENSITY\_IMAGES). A 'SUBMIT JOB' button is located at the bottom right of this panel. A 'Current Jobs' notification box in the bottom left states 'Your jobs are processing.' and provides instructions on how to retrieve and re-select data. A footer section contains contact information for the NC Floodplain Mapping Program, including the address (4105 Randy Creek Drive, Raleigh, NC 27607), phone number (919) 715-5711, and fax number (919) 715-0408.

**SPATIAL Data Download**

## ELEVATION DATA DOWNLOAD

Select one or more elevation datasets.  
You may choose any combination of datasets from both Legacy and QL2.

### Legacy

All counties in North Carolina currently have legacy bare earth LIDAR from the initial statewide collection conducted from 2001-2005. This data was collected at a spacing of approximately 1 point per 3-4 square meters.

- DEM10
- DEM20
- DEM50

### QL2

This data is Quality Level 2 (QL2) and was collected at a spacing of approximately 2 points per square meter. All returns classified data is available.

- DEM03
- DEM05
- DEM10
- DEM20
- DEM40
- INTENSITY\_IMAGES

**SUBMIT JOB**

All selected datasets will be delivered as a single zip file.  
It may take up to 24 hours to generate your zip.  
You will receive an email when your zip file is ready for download.

**Current Jobs**  
Your jobs are processing.  
This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your zip file. If you would like to extract more data from this same area, you may click the 'Select Data to Download' button and you will be prompted to reuse the same area.

LIDAR Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

Flood Zones... **JOB COMPLETE** **DOWNLOAD** [View Metadata](#)

NC Floodplain Mapping Program  
4105 Randy Creek Drive  
Raleigh, NC 27607

Phone: (919) 715-5711  
Fax: (919) 715-0408

Mailing Address  
4218 Mjrd Service Center  
Raleigh, NC 27699-4319

# Clip and Ship- Schools

**SPATIAL Data Download**

**SCHOOLS DATA DOWNLOAD**

DATA DOWNLOAD | LARGE DATA REQUEST | MY ACCOUNT | LOGOUT

County: [Dropdown]

SEARCH for location

FILE Geodatabase - GDB - gis

**Submit JOB**

**Current Jobs**

Your jobs are processing.  
This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your .zip file. If you would like to extract more data from this same area, you may click the "Select Data to Download" button and you will be prompted to reuse the same area.

LIDAR Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

Flood Zones... **JOB COMPLETE** **DOWNLOAD** [View Metadata](#)

Elevation Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

**SPATIAL Data Download**

NC Floodplain Mapping Program  
4105 Steady Creek Drive  
Raleigh, NC 27607

Phone: (919) 715-5711  
Fax: (919) 715-5409

Mailing Address  
4215 Mail Service Center  
Raleigh, NC 27609-4218

# Clip and Ship- Legacy

The screenshot shows the 'Please Select Data Type for Download' page of the SPAT Data Download application. The page is titled 'Please Select Data Type for Download' and includes a sub-header: 'Click one of the blue boxes to view and download data. Then draw or select an area of interest on the map.' A prominent red banner asks: 'WOULD YOU LIKE TO USE THE CURRENT AREA YOU HAVE SELECTED?'. The main content area is divided into three columns: 'Hazards', 'Base Data', and 'Built Environment'. Under 'Hazards', there is a blue box for 'FLOOD ZONES' with a description: 'Download the 100 year flood zones and associated layers such as cross sections, benchmarks, political areas, counties.' Under 'Base Data', there are three options: 'QL2 LIDAR' (2 points per meter dataset from 2014 to the present covering 60 counties), 'ELEVATION' (Digital Elevation Model (DEM) data for both Legacy and QL2 source data), and 'LEGACY LIDAR' (Bare Earth points (ascii comma delimited)). Under 'Built Environment', there are two options: 'SCHOOLS' (Build points for Schools Campus points for school polygon for campus) and 'BUILDING INFORMATION' (Building footprints Building points). A 'Current Jobs' sidebar on the left shows a processing status for 'LIDAR Data Request' (may take up to 24 hours) and 'Flood Zones' (JOB COMPLETE) with a 'DOWNLOAD' button. The footer contains contact information for the NC Floodplain Mapping Program, including the address (4105 Reedy Creek Drive, Raleigh, NC 27607), phone (919) 715-5211, fax (919) 715-6408, and mailing address (4218 Mail Service Center, Raleigh, NC 27699-4218).

**Please Select Data Type for Download**

Click one of the blue boxes to view and download data. Then draw or select an area of interest on the map.

**WOULD YOU LIKE TO USE THE CURRENT AREA YOU HAVE SELECTED?**

**Hazards**

**FLOOD ZONES**  
Download the 100 year flood zones and associated layers such as cross sections, benchmarks, political areas, counties.

**Base Data**

**QL2 LIDAR**  
2 points per meter dataset from 2014 to the present covering 60 counties.

**ELEVATION**  
Digital Elevation Model (DEM) data for both Legacy and QL2 source data.

**LEGACY LIDAR**  
Bare Earth points (ascii comma delimited)

**Built Environment**

**SCHOOLS**  
Build points for Schools Campus points for school polygon for campus

**BUILDING INFORMATION**  
Building footprints Building points

**Current Jobs**

Your jobs are processing.  
This may take several minutes depending on the size of your area. When your job is complete, click the Download button to retrieve your .zip file. If you would like to extract more data from this same area, you may click the 'Select Data to Download' button and you will be prompted to reuse the same area.

LIDAR Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

Flood Zones... **JOB COMPLETE** **DOWNLOAD** [View Metadata](#)

Elevation Data Request may take up to 24 hours.  
[click here to check the status of your request](#)

**NC Floodplain Mapping Program**  
4105 Reedy Creek Drive  
Raleigh, NC 27607

**Mailing Address**  
4218 Mail Service Center  
Raleigh, NC 27699-4218

Phone: (919) 715-5211  
Fax: (919) 715-6408

# Clip and Ship- Legacy

The screenshot shows a web browser window displaying the FRIS North Carolina Flood Risk Information System. The browser's address bar shows the URL `fris.ncem.org/fris/Download.aspx?ST=NC`. The page header features the logo "FRIS | North Carolina Flood Risk Information System" and navigation buttons for "Home" and "Map".

Below the header is a "Data Search" section with a search icon and a dropdown menu for "County:" currently set to "Ashe, North Carolina". To the right of this section is a yellow instruction box that reads "Select a county from the list or click on the map." Below the search section is a "Statewide Datasets" list containing the following items:

- Terrain Data Grid
- DFIRM Panel Shapefile
- NCFMP Geodatabase Dictionary
- LIDAR Metadata

The bottom half of the page is dominated by a map of North Carolina showing county boundaries. The county of Ashe is highlighted in a bright orange color. The map also shows major highways, the Atlantic Ocean to the east, and the border with South Carolina to the south. Labels for "Virginia Beach" and "Columbia SOUTH CAROLINA" are visible on the map.

# Clip and Ship- Large Data Request

The screenshot displays the 'LARGE DATA REQUEST' form on the SPATIAL Data Download website. The form is divided into several sections:

- INSTRUCTIONS:** A list of four steps with checkboxes: 1. Enter your request information and click Submit Request. 2. You will receive an email with instructions on where to send a hard drive to NCRFP. 3. Once NCRFP receives your hard drive, your data request may require up to six business days for processing. 4. NCRFP will process your request and mail your hard drive to the shipping address you provide.
- SELECT ONE OR MORE CATEGORIES:** A dropdown menu.
- SELECTED AREA:** A text input field.
- DATA TYPE:** Radio buttons for 'Clip Shapefile' and 'Download Shapefile'. A note states: 'Select either shapefile or Download Shapefile. Click here for an explanation of the various data requests for all users with specific use cases: Data Request User Guide'.
- ALTERNATE DATA TYPE:** Radio buttons for 'Data Elevation' and 'Legacy Elevation'.
- GIS DATA:** Radio buttons for 'Road Shapefile', 'Roads', and 'Building Information'. A note states: 'Click on a specific category to see the associated data from the Data Download page'.
- DESCRIPTION / SPECIAL INSTRUCTIONS:** A large text area.
- Data Return Address:** Fields for 'STREET ADDRESS', 'CITY', 'STATE' (a dropdown menu currently showing 'North Carolina'), and 'ZIP'.
- Submit:** A green button labeled 'SUBMIT JOB'.

At the bottom of the page, there is a blue banner with a checkmark icon and the text: 'This is a beta version of the Spatial Data Download site.' Below this, there is a small link: 'View the beta version of the Spatial Data Download site.' and a 'Feedback' link.

# NOAA Data Access Viewer

<https://coast.noaa.gov/dataviewer/>



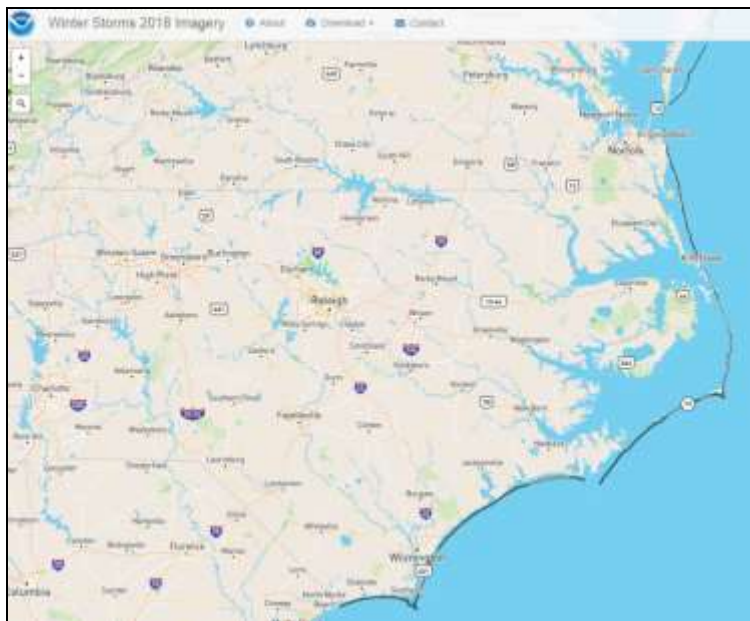


---

# NOAA Winter Storm Imagery

---

<https://storms.ngs.noaa.gov/storms/winter2018/index.html#10/38.8440/-75.0920>



# Questions

Gary Thompson, PLS  
NC Emergency Management  
Risk Management  
NC Geodetic Survey  
[Gary.thompson@ncdps.gov](mailto:Gary.thompson@ncdps.gov)  
919-948-7844

