From: Billy Gleaves
Sent: Tuesday, February 20, 2024 8:36 AM
To: Vogtle PEmails
Subject: FW: Presentation & Tuesday Meeting
Attachments: NRC - Duke Energy Belews Creek Kickoff 02-21-2024 Final.pdf

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Sent: Monday, February 19, 2024 2:53 PM
To: Billy Gleaves <Bill.Gleaves@nrc.gov>
Subject: [External_Sender] Presentation & Tuesday Meeting

Billy –

Attached is our presentation for Wednesday.

Let's touch base tomorrow with a short meeting. I'm pretty open, with the exception of 9:00-10:00am. You can send me an invite for what time works best for you.

Lee Grzeck
Licensing Manager
New Nuclear Generation
(910) 616-1958 cell
(980) 373-1530 work

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DUKE
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Belews Creek Early Site Permit Pre-Application Meeting

New Nuclear Generation

FEB. 21, 2024

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Section I Agenda – Belews Creek Project Kick-Off

- NRC opens the meeting
- Safety: Lee Grzeck, licensing manager, New Nuclear Generation, Duke Energy
- Team introductions
- Opening remarks: Rounette Nader, vice president, New Nuclear Generation, Duke Energy
- Belews Creek Project Kick-Off: Grzeck
  - Duke Energy Overview
  - Nuclear Empowers Us Today, Tomorrow and for the Future
  - Mapping the Future in the Carolinas
  - Early Site Permit (ESP) Application – Belews Creek Site
  - The Road to Advanced Nuclear Generation
  - Stakeholder Engagement Is Important to Us

Section II Agenda – Subsurface Exploration and Characterization

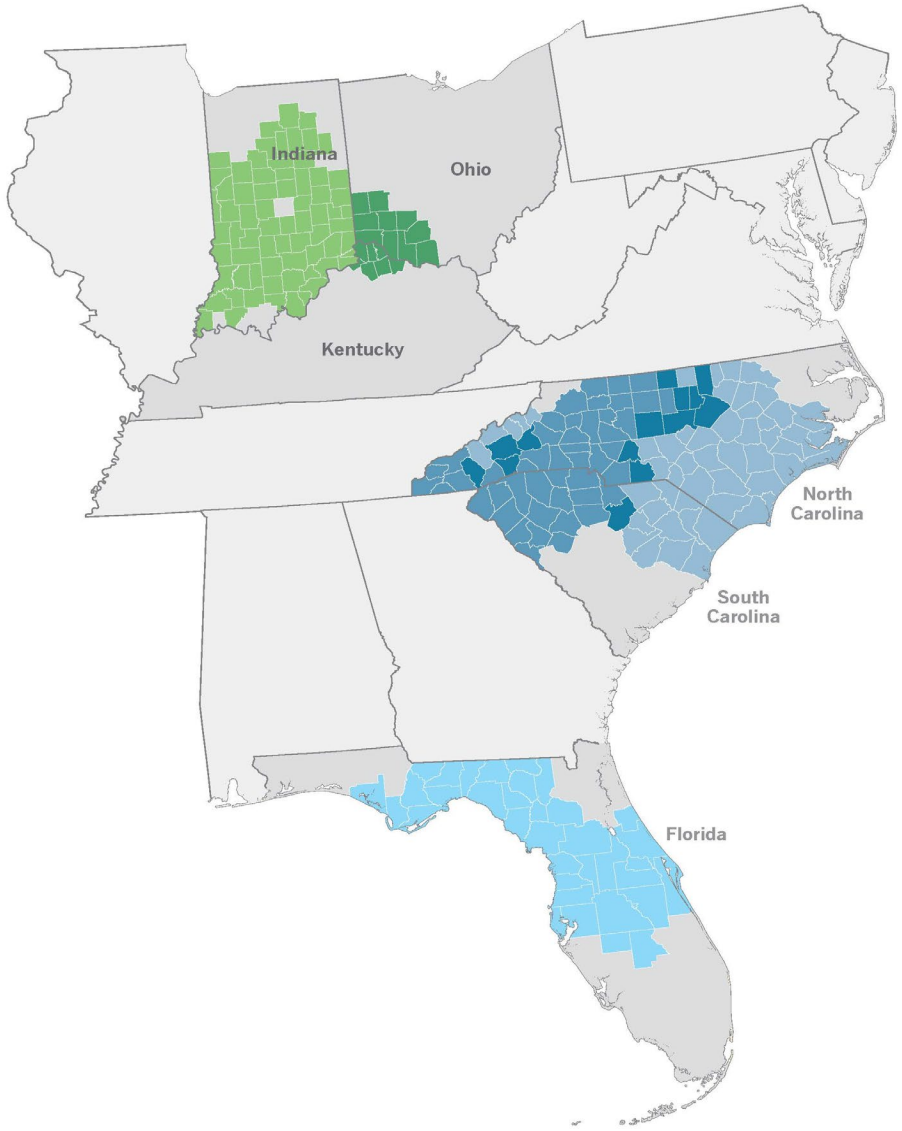
- Subsurface Exploration and Characterization: Jeff Smith, chief technical lead, WSP
  - Overview
  - Site Location
  - Geology
  - Geology and Hydrology
  - Seismology
  - Site Investigation
    - ✓ Existing Information
    - ✓ Proposed In Situ (Field) Testing
    - ✓ Proposed Laboratory Testing
  - Boring and Well Layout Plan
  - Summary
- Closing Remarks

SECTION I – BELEWS CREEK PROJECT KICK-OFF

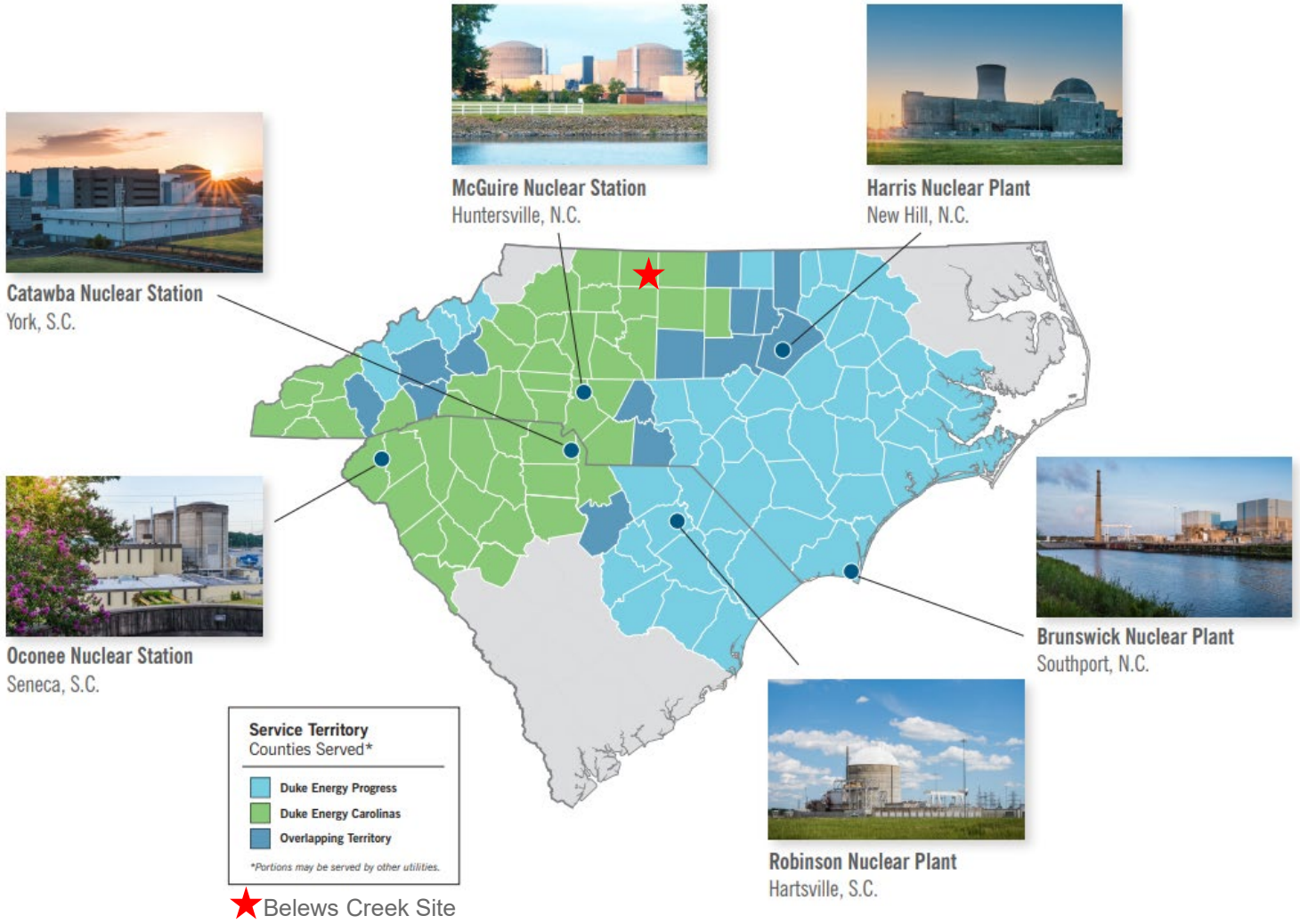
Lee Grzeck, licensing manager, New Nuclear Generation, Duke Energy

Duke Energy Overview

- Electric customers: 8.2 million
  - North Carolina, South Carolina, Florida, Indiana, Ohio, Kentucky
- Total generating capacity: 50,000 megawatts
- Clean energy transformation
  - 2030: 50% reduction in carbon emissions from electric generation
  - 2050: Net-zero carbon emissions from electric generation
- Natural gas customers: 1.6 million
  - North Carolina, South Carolina, Ohio, Kentucky, Tennessee



Nuclear Empowers Us Today, Tomorrow and for the Future

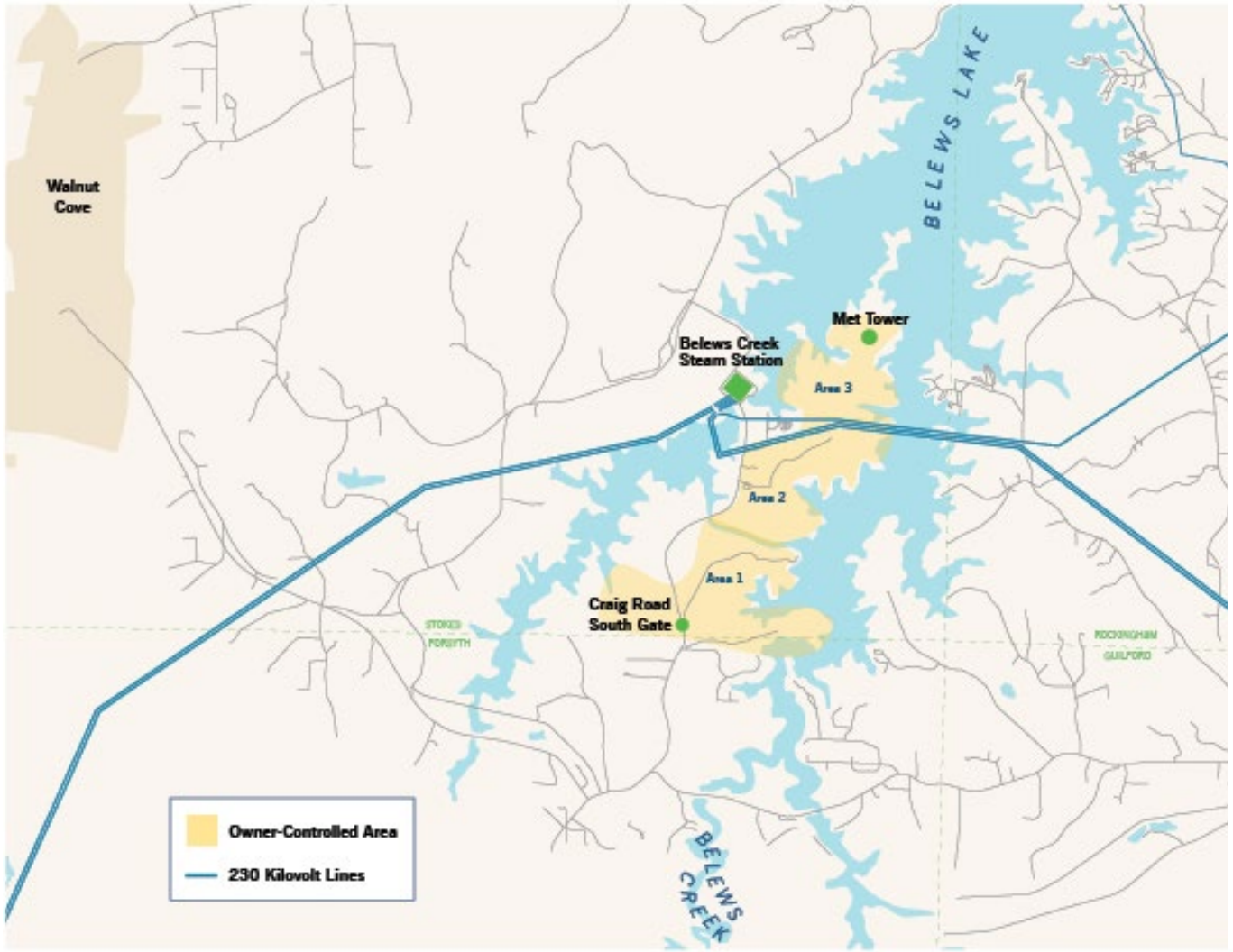


Mapping the Future in the Carolinas

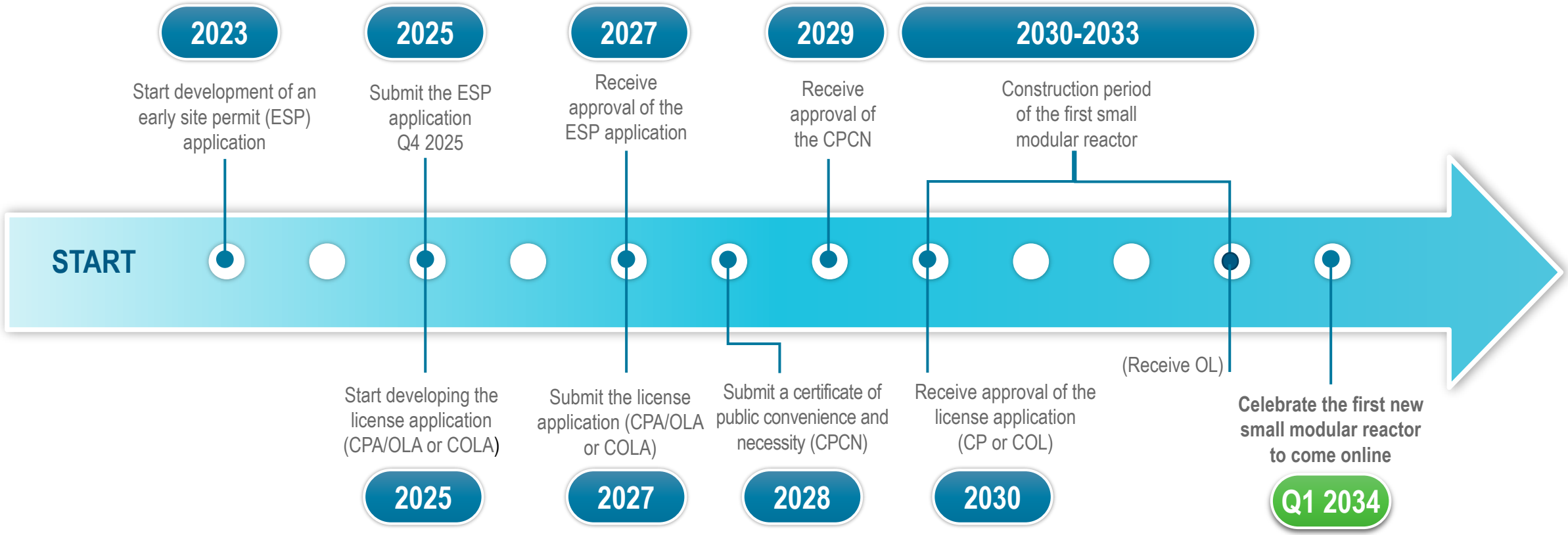
- **2022 North Carolina Utilities Commission Carbon Plan order authorized near-term activities**
  - Site selection, early site permit (ESP) application development and technology assessment
- **2023 Carolinas Resource Plan (Supplemented)**
  - Complete early site permit application and technology assessment
  - Start construction permit application or combined operating license application for first site mid-2025
  - Start ESP application for a second site in 2025
  - Add 600 megawatts (MW) of advanced nuclear to our system by 2035
  - By 2050: More than 11,000 MW of new nuclear is needed

Early Site Permit (ESP) Application – Belews Creek Site

- Technology-neutral
- Multiple units
- Water availability
- Transmission access
- Transportation
- Geology / Seismology
- Population centers



The Road to Advanced Nuclear Generation



Construction permit application (CPA) and construction permit (CP)
Operating license application (OLA) and operating license (OL)
Combined license application (COLA) and combined license (COL)

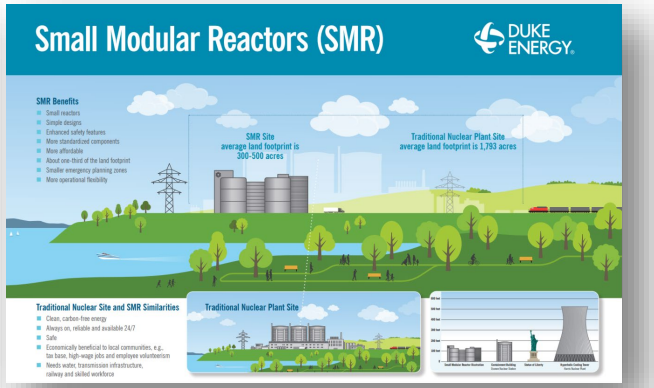
Stakeholder Engagement Is Important to Us

Strategies

- Listen and learn before making decisions, adjust plans based on stakeholder feedback
- Understand stakeholder concerns, needs and preferences
- Use multimedia tools to educate, inform and communicate proactively, early and often
- Demonstrate transparency and welcome diverse perspectives

Outreach

- Hosting in-person and virtual meetings, site tours and community and Environmental Justice discussions
- Providing government, civic and community presentations – and attending community events
- Using traditional and social media, postcards, fact sheets, graphics, maps, advertisements and web content, such as duke-energy.com/stokes
- Contributing to the vitality of the community through Duke Energy Foundation grants and sponsorships of local events
- Leveraging employees as company ambassadors



SECTION II – SUBSURFACE EXPLORATION AND CHARACTERIZATION

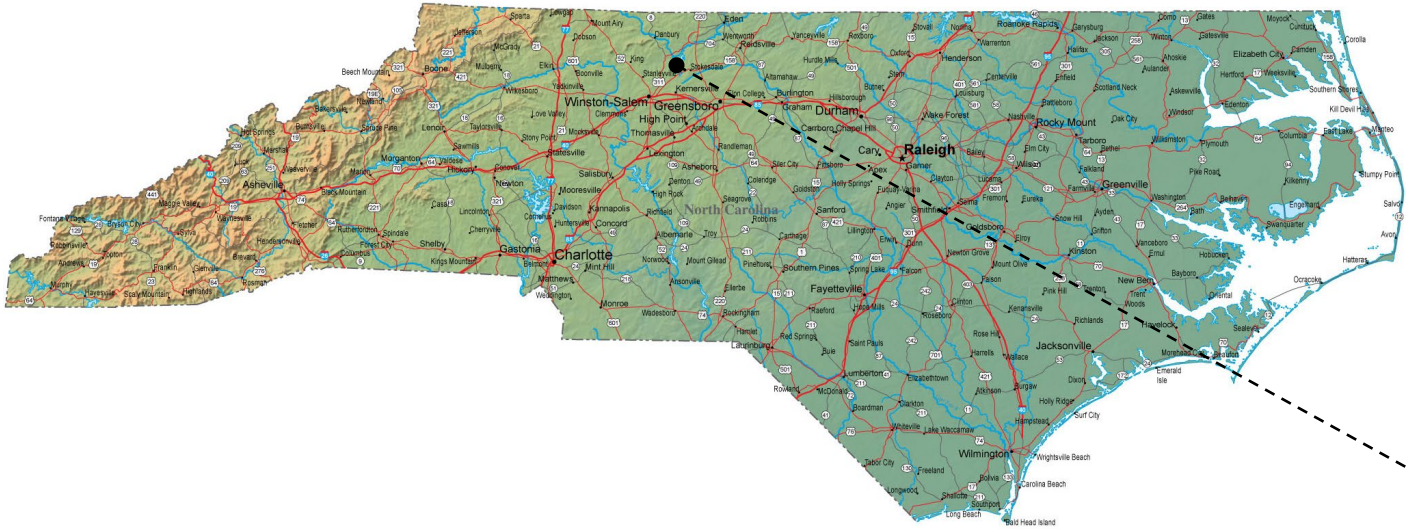
Jeff Smith, chief technical lead, WSP

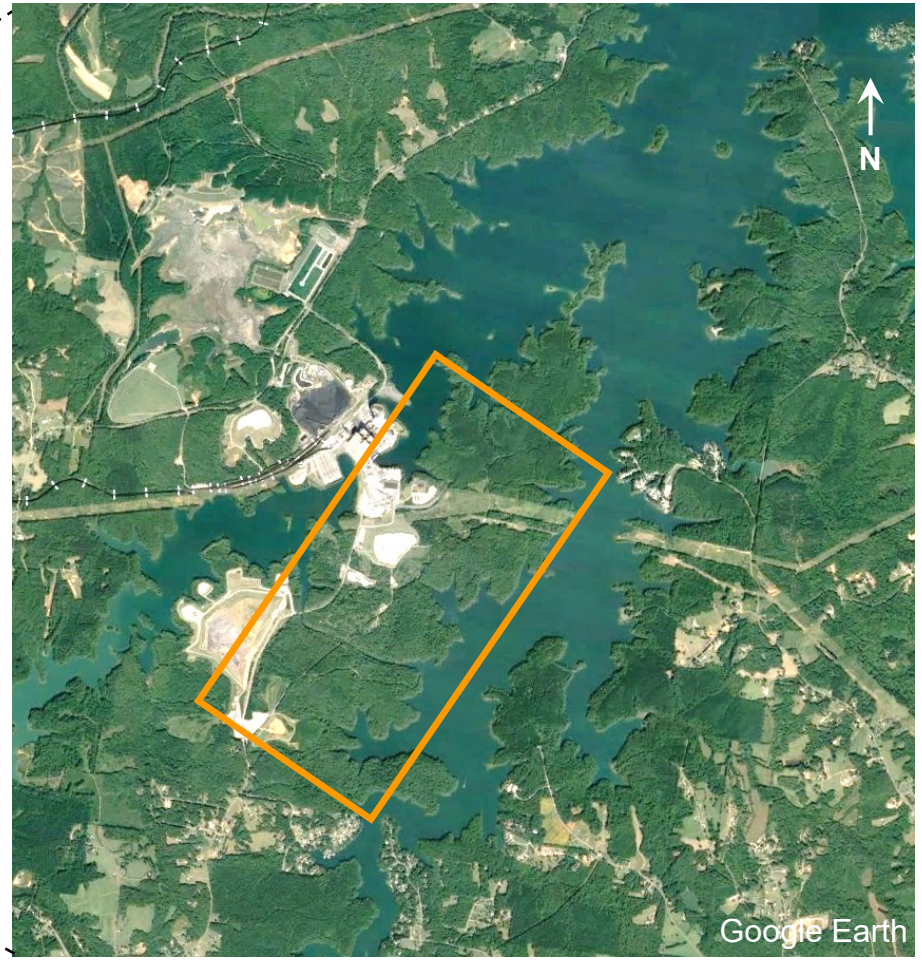
Overview

- Form an expert team to execute Duke Energy's early site permit application at the Belews Creek Site
  - Sargent and Lundy: Plant licensing and design expertise
  - WSP: Site characterization expertise and site knowledge
  - Specialty contractors: Testing validation and expertise
- Collect subsurface information needed for the senior seismic hazard analysis committee (SSHAC) level two (L2) effort and early site permit application for small modular reactors (SMR)
  - Determine the field (in situ) and laboratory geotechnical and geological properties of soil and rock
  - Determine the groundwater and hydrologic flow properties
- Report the results of the subsurface exploration and testing

Site Location

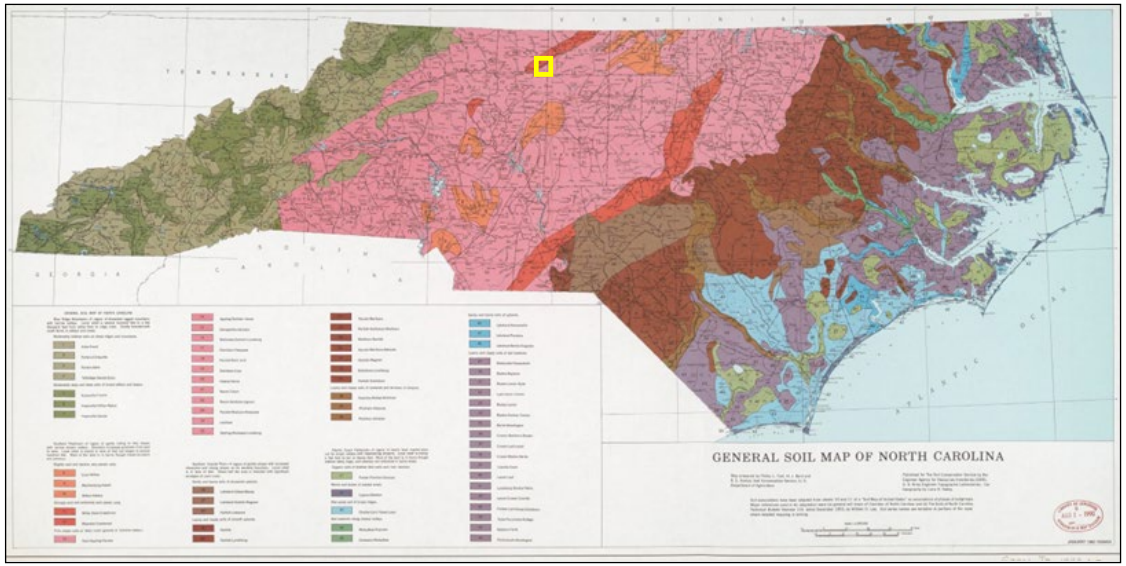
- Located near-north of Belews Creek, North Carolina, at the site of an existing coal-fired power plant at the southern end of Belews Lake



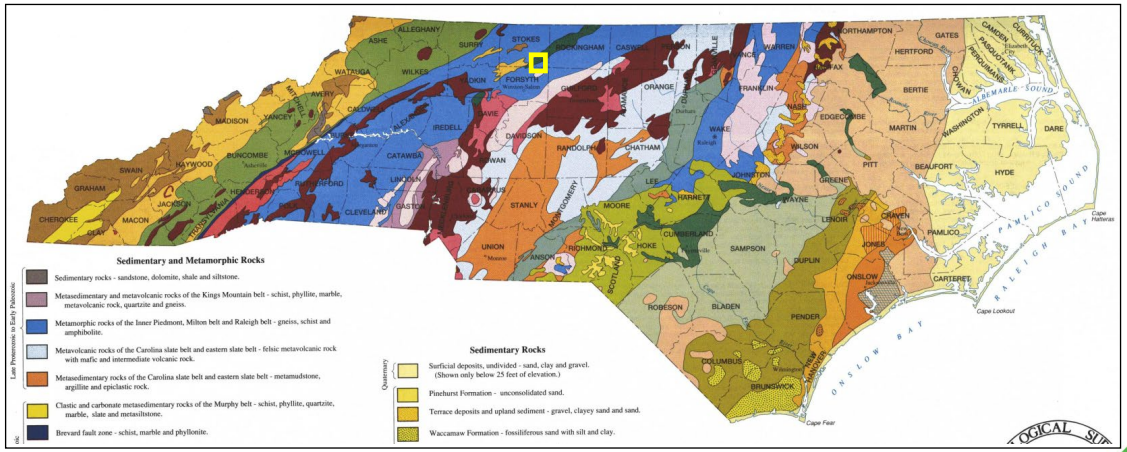


Geology

- **Soil map**: Residual soils consist of sand, silt and some clay. Cecil-Appling-Pacolet soil series derived from igneous and metamorphic rocks
(Soil Conservation Service (SCS), 1990)



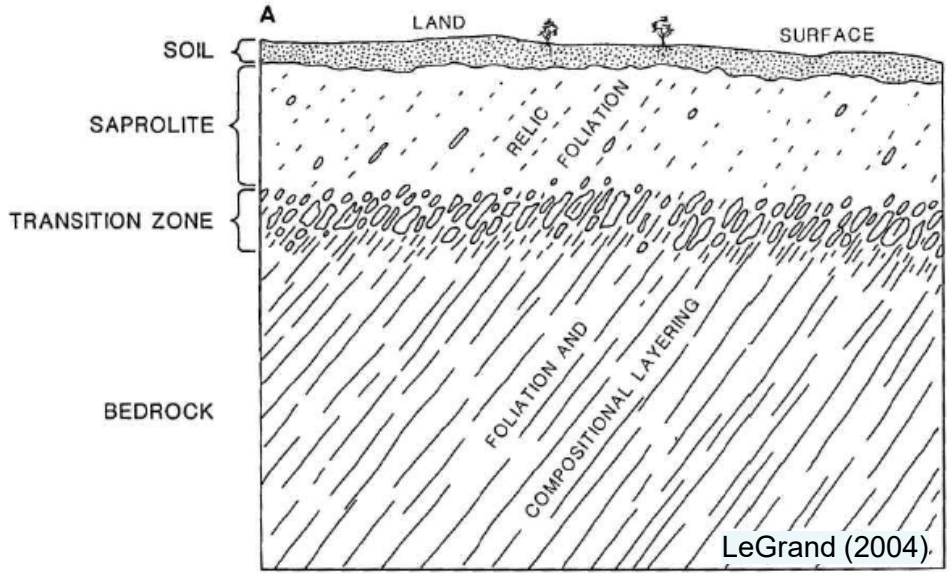
- **Geologic map**: Rock consists of inner Piedmont Cambrian Gneiss and Schist (North Carolina Geological Survey (NCGS), 1996)



Geology and Hydrology

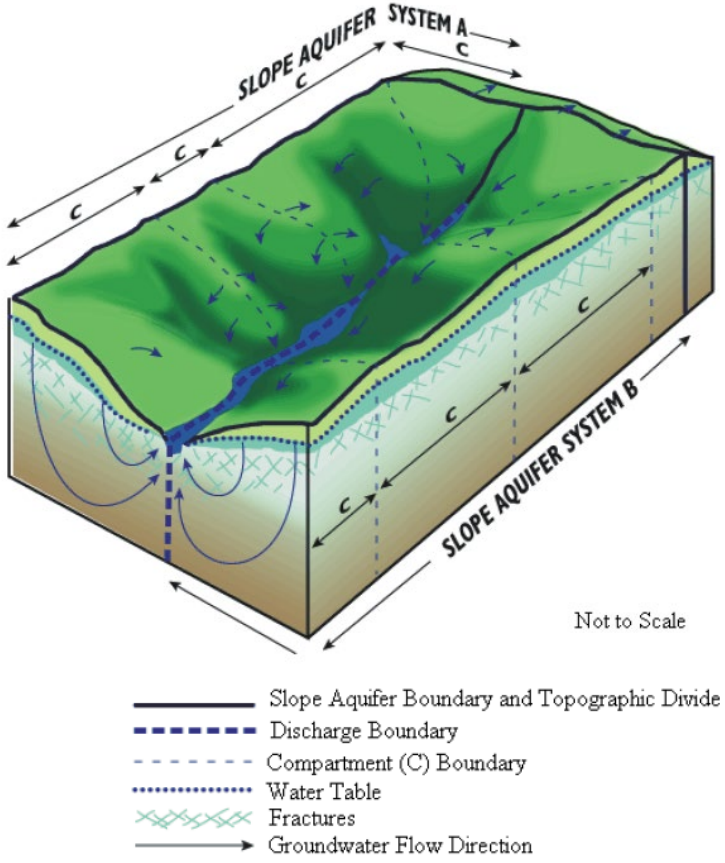
Piedmont Geology and Hydrogeologic Framework

Residual Soil, Saprolite and Foliated Bedrock System

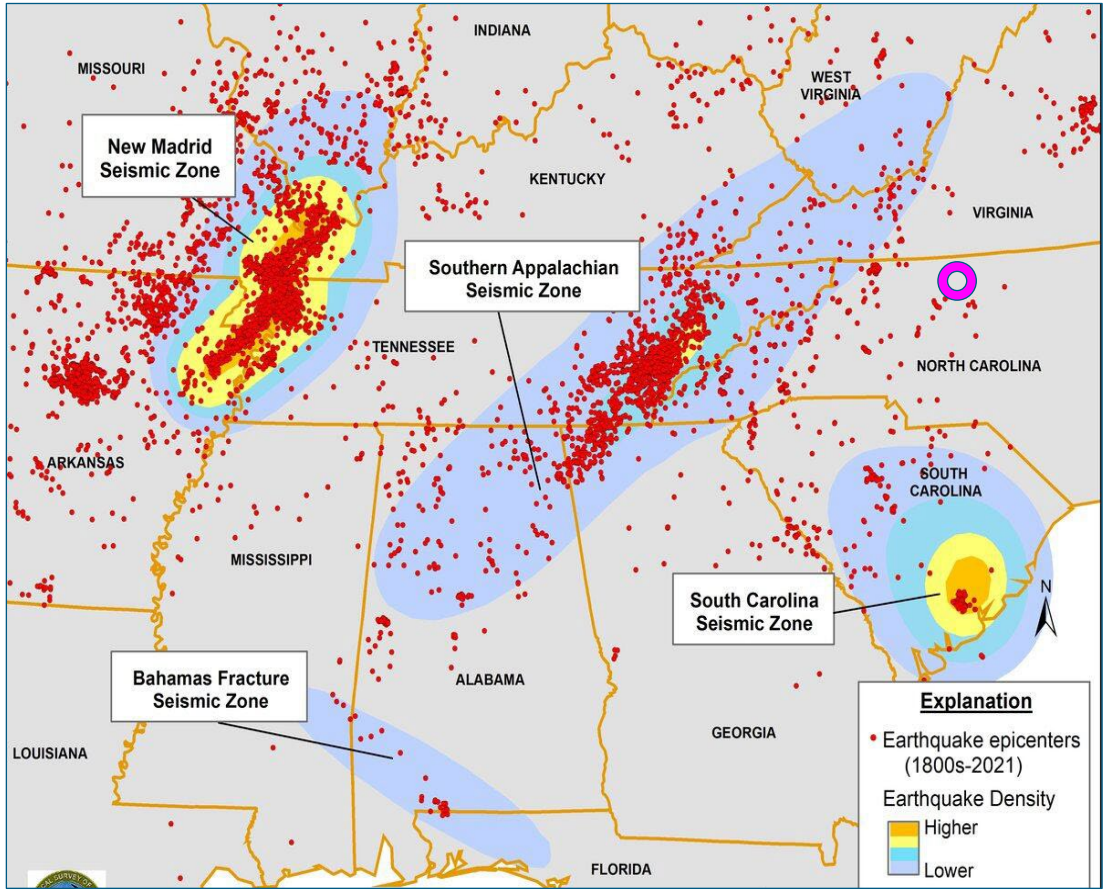


Soil overlying Saprolite underlain by partially weathered rock (transition zone) above foliated schist and gneiss to depth

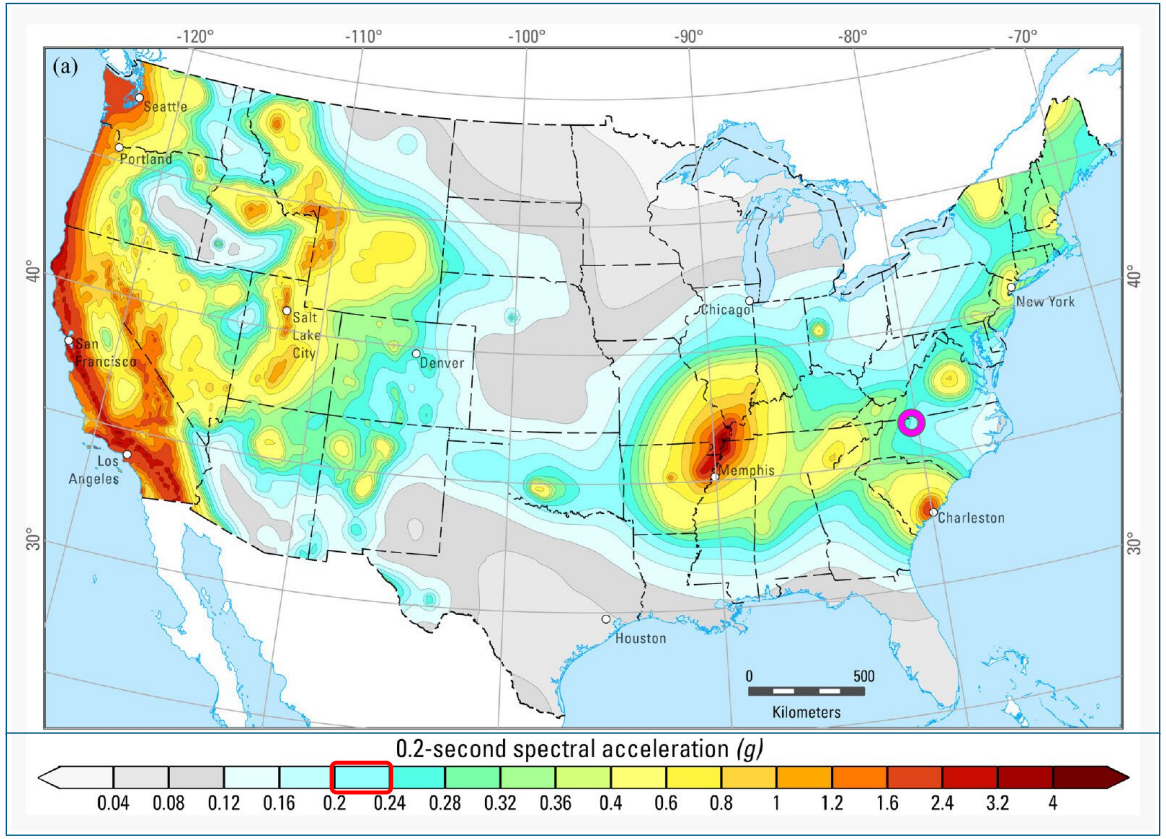
Slope-Aquifer System Common in the Piedmont Physiographic Province



Seismology



Geological Survey of Alabama (2023)



Petersen, U.S. Geological Survey (USGS), Earthquake Engineering Research Institute (EERI) (2024)

Site Investigation: Existing Information

- Soil, partially weathered rock, rock and water table depths
- Data collected by others used to inform of subsurface conditions prior to the planned exploration and testing

CRW/CR Series (28 borings)	Total Depth (ft)	Soil Thickness (ft)	PWR Thickness (ft)	Rock (bedrock) Depth (ft)	Water Table Depth (ft)
minimum	8.0	7.0	2.0	10.9	16.2
maximum	95.0	78.9	17.0	78.9	62.2
average	54.1	37.7	9.6	43.0	33.3

FGD/BC Series (20 borings)	Total Depth (ft)	Soil Thickness (ft)	PWR Thickness (ft)	Rock (bedrock) Depth (ft)	Water Table Depth (ft)
minimum	32.8	3.3	2.1	15.3	21.5
maximum	102.0	80.0	50.5	61.0	87.5
average	59.4	40.9	13.6	43.0	38.2

Site Investigation: Existing Information

- Partially weathered rock and intact rock (Duke Energy)
- Core collected by others used to inform of subsurface conditions prior to the planned exploration and testing

BC-85

FGD Landfill

NQ Core

Augen Gneiss: Medium-to-fine grained

Rock depth: 3.4 to 41.8 feet

3.4 to 10.8 ft.

24.4 to 33.6 ft.

33.6 to 41.8 ft.

Site Investigation – Proposed In Situ (Field) Testing

Geotechnical and Geological

- Standard penetration tests
- Intact sampling
- Bulk sampling
- Rock coring (recovery, rock quality designation (RQD), rock mass parameters)
- Borehole geophysical testing
  - P-S suspension logging
  - Downhole seismic velocity logging
  - Natural gamma
  - Long and short normal resistivity
  - Single-point resistance
  - Spontaneous potential
  - Three-arm caliper
  - Optical or acoustical televiewer
  - Deviation survey

Geotechnical and Geological (continued)

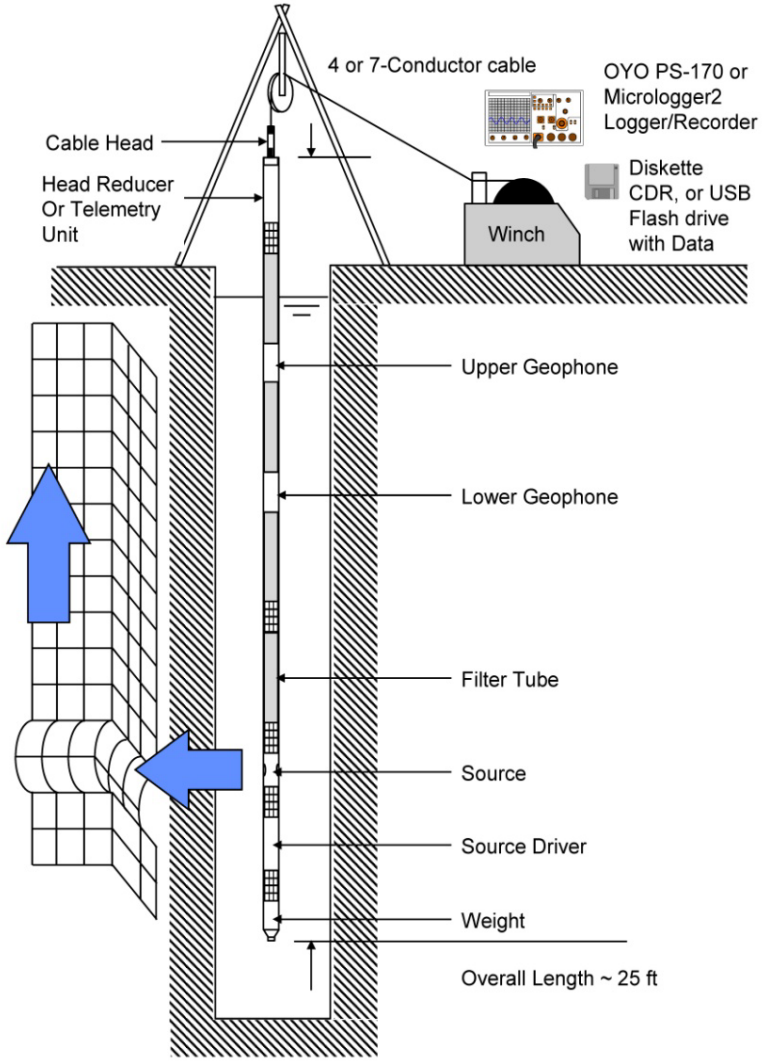
- Surface geophysical testing
  - Spectral analysis of surface waves (SASW) testing
  - Field electrical resistivity testing

Hydrological

- Monitoring, sentinel, pumping wells
- Slug testing (hydraulic conductivity)
- Packer testing
- Pumping tests

Site Investigation – Proposed Field Testing

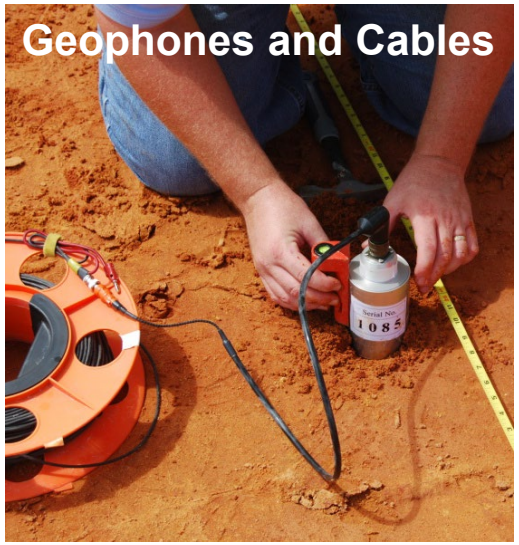
P-S Suspension Logging

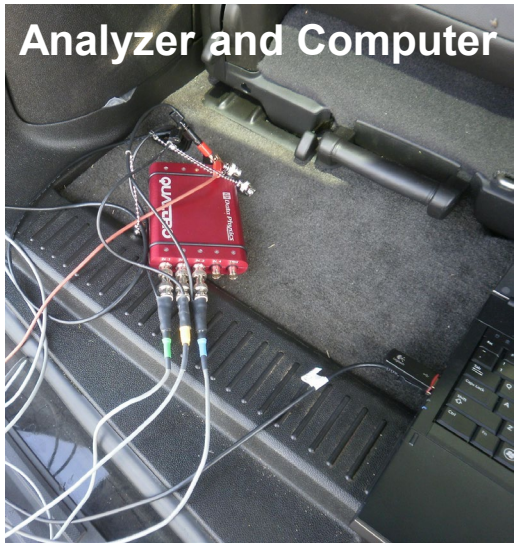


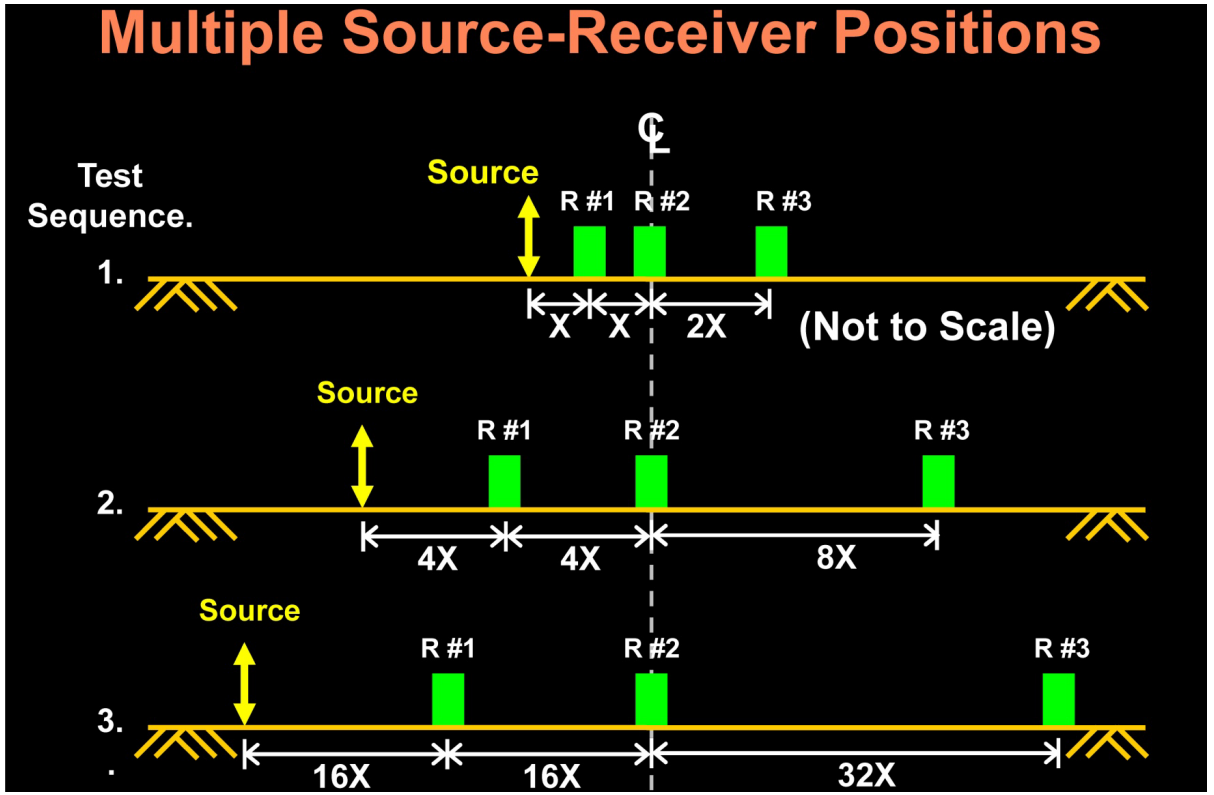
Downhole Seismic Velocity Logging

Site Investigation – Proposed Field Testing

Spectral analysis of surface waves (SASW)

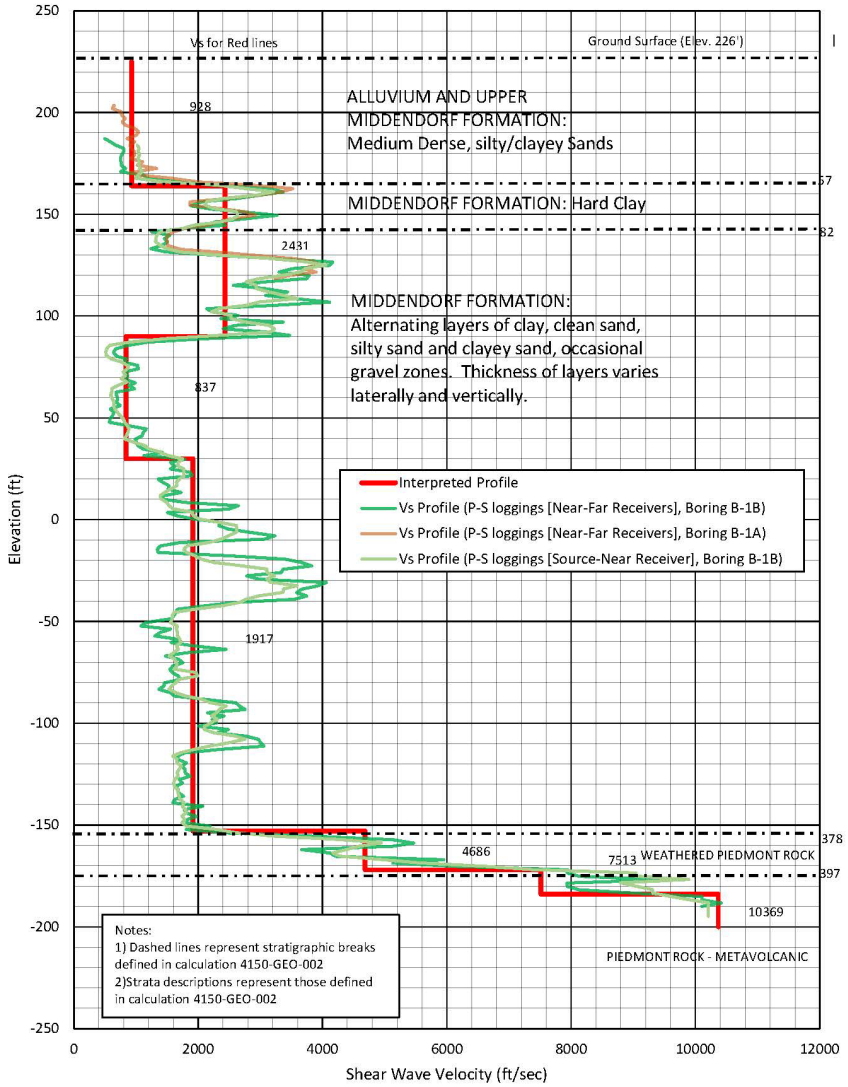




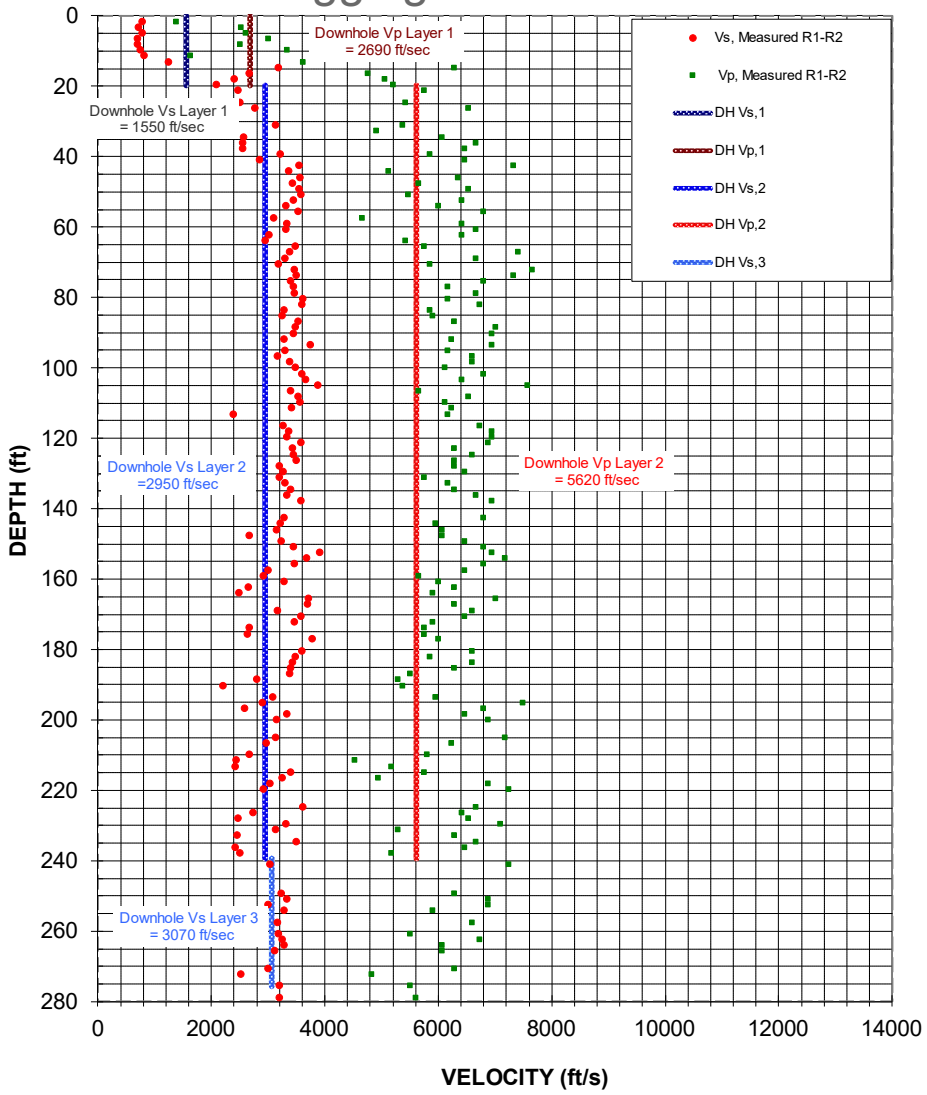


Site Investigation – Proposed Field Testing

P-S Logging versus SASW



P-S Logging versus Downhole



Site Investigation: Proposed Laboratory Testing (Soil)

- Water content
- Unit weight
- Soil classification
- Atterberg limits
- Grain size analysis
- Triaxial compression (unconsolidated undrained (UU), consolidated undrained (CU))
- Unconfined compressive strength
- Consolidation
- Swell or collapse potential
- Resonant column torsional shear
- Moisture-density relationship
- Organic content
- Specific gravity
- Thermal conductivity
- pH
- Sulfate content
- Chloride content
- Partition coefficient Kd

Site Investigation: Proposed Laboratory Testing (Rock)

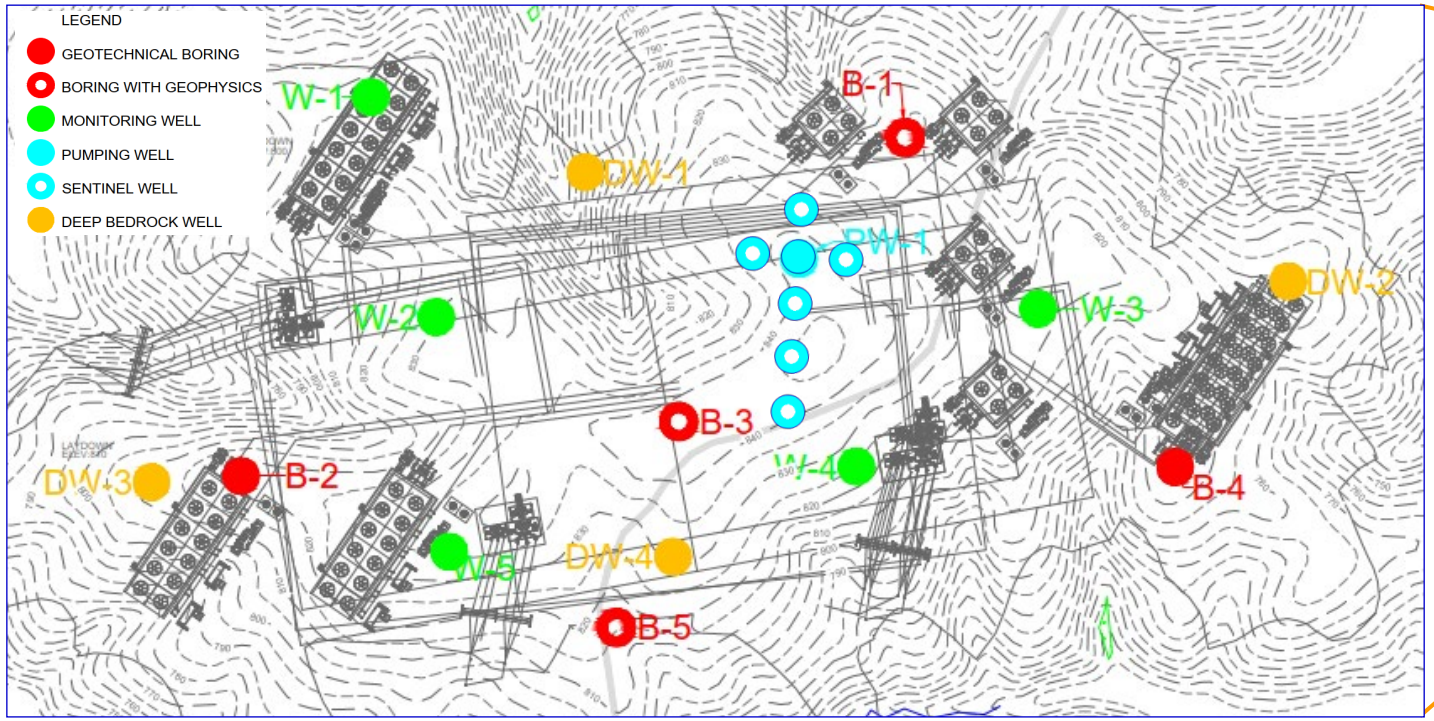
- Water content
- Unit weight
- Resonant column torsional shear (RCTS)
- Unconfined free-free resonant column (URC)
- Point load strength index
- Undrained triaxial compression
- Unconfined compression
- Modulus of elasticity
- Direct shear strength
- pH
- Partition coefficient Kd

Site Investigation: Specialty Subcontractors

- GRL Engineers: Lakewood, Colorado (standard penetration test (SPT) energy testing)
- GEOVision: Corona, California (borehole and surface geophysical testing)
- University of Texas: Austin, Texas (SASW, RCTS, and URC testing)
- GeoTesting Express: Acton, Massachusetts (laboratory testing of rock)

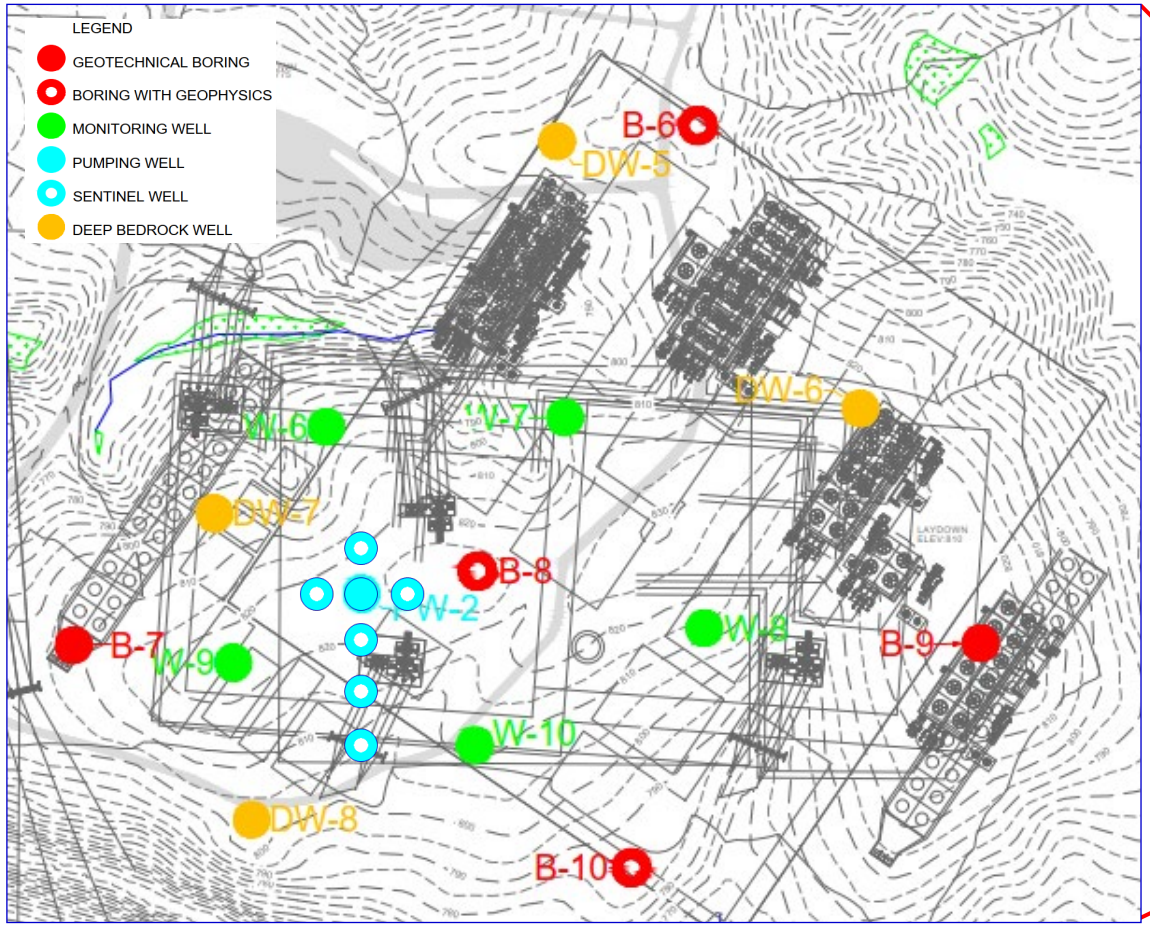
Boring and Well Layout Plan – North Area

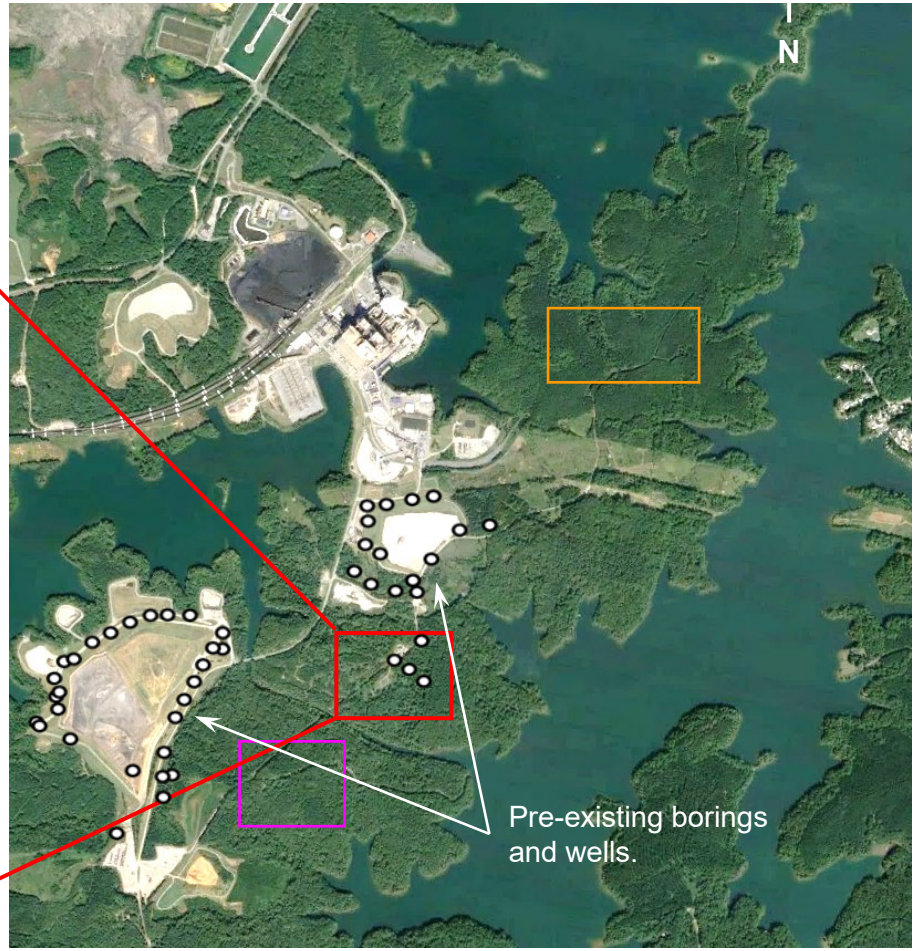
North Area



Boring and Well Layout Plan – Middle Area

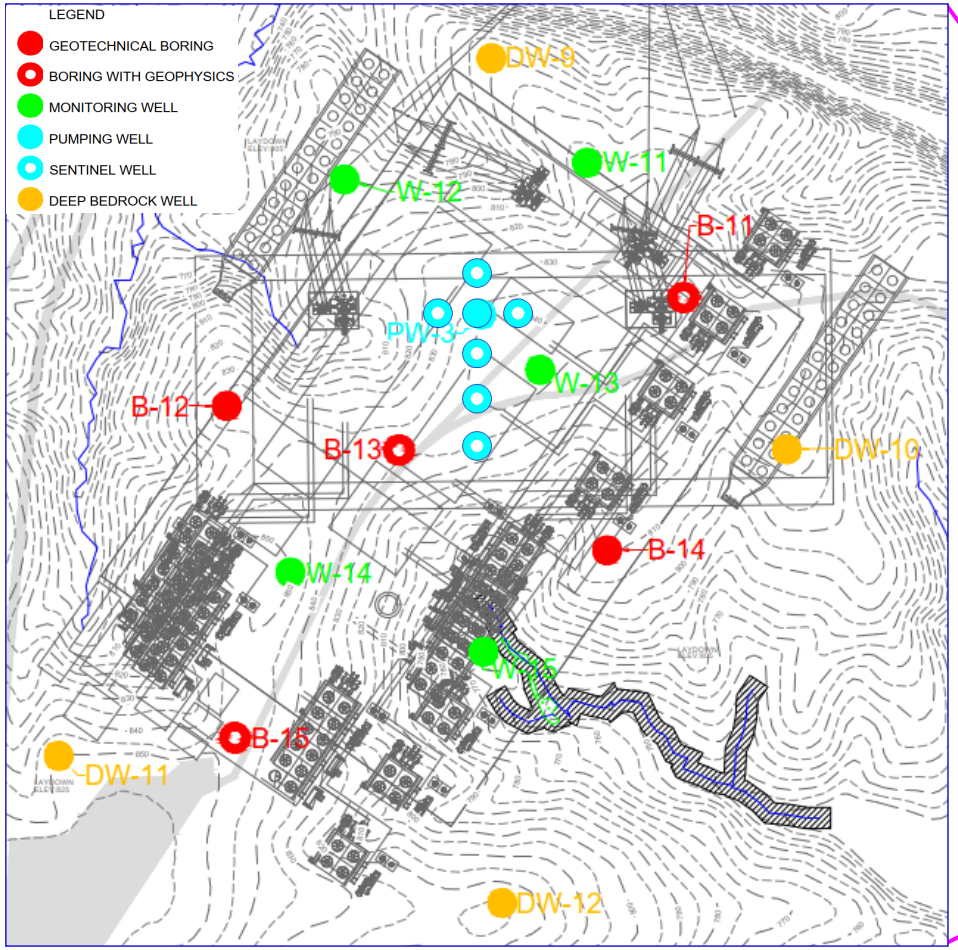
Middle Area

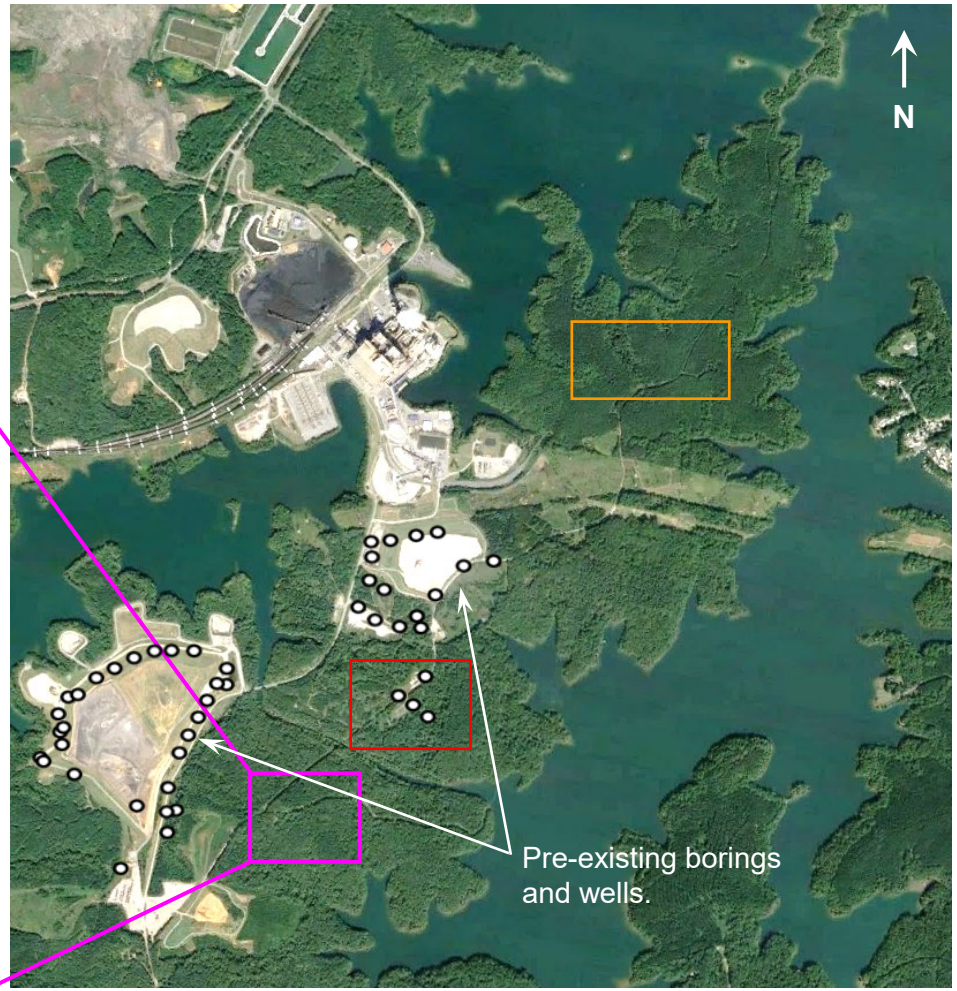




Boring and Well Layout Plan – South Area

South Area





Summary

- Perform a site investigation to define site-specific geotechnical, geologic and hydrogeologic characteristics of the subsurface
- Complete a combination of geotechnical borings and wells within each of the north, middle and south areas
- Complete 15 geotechnical borings with nine for geophysical testing, 27 groundwater monitoring wells, 18 sentinel wells and three pumping wells
- Use laboratory and field testing information for evaluations, analyses and calculations to support the early site permit application

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