

# GEOTECHNICAL ENGINEERING UNIT

NCDOT Technical Services Division



**The Geotechnical Engineering Unit provides scoping, planning, design, technical expertise and management services related to soil, rock, slopes and foundations for roadway and structure projects.**

During the prescoping and document stage, unit staff and their consultant partners identify and map areas of contamination, unsuitable soils, unstable slopes and high groundwater to inform planning.

During planning and preconstruction, the unit collects subsurface data and provides construction recommendations for roads, pavement subgrades, bridge and culvert foundations, retaining walls, sound barriers and special ditches

for final plans. This work helps guide right of way limits and acquisition. Other recommendations provided prior to project let are assessments of vibration impacts, infiltration rates of soil for basins, acidic rock, ponds, dam assessment, contaminated soil and groundwater and how to mitigate and manage them.

During construction, unit staff review blasting plans, foundations, retaining walls and other submittals and advise on unexpected issues as they arise.

## Contact

Turn to Geotechnical Engineering staff early on for project screening and preconstruction design and through the construction process for expertise, connections to appropriate consultants and assistance.

**Visit the unit's Connect site for contact information and resources.**

[connect.ncdot.gov/resources/geological/pages](https://connect.ncdot.gov/resources/geological/pages)



## Services

- Consultant prequalification
- Contaminant identification and mitigation support
- Encroachment reviews
- Foundation item testing
- Full-depth pavement reclamation investigations
- Geotechnical review of project areas
- Ground subsidence and sink hole repair plans
- Grouting voids and raising slabs
- Infiltration basin studies
- Plan reviews
- Pond surveys and dam investigations
- Retaining wall recommendations and repair plans for failing walls
- Settlement monitoring
- Slope/reinforced slope recommendations
- Stakeholder engagement
- Subgrade and pavement distress improvement recommendations
- Subsurface investigations and construction recommendations
- Vibration impact assessment and mitigation recommendations



# PROJECT EXAMPLES



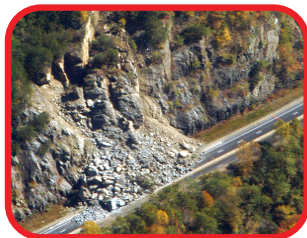
## BLOWING ROCK BYPASS

The Geotechnical Engineering Unit supported Division 11 in designing and constructing the Blowing Rock Bypass, U.S. 321. Decades before, the unit conducted geologic mapping to identify the best corridor. During design and construction of the project, Geotechnical staff designed more than 30 retaining walls, recommended slope steepness and assisted with solutions to mitigate rock and embankment slides, such as temporary rock wall fencing to mitigate risks to traffic during blasting. Unit staff also engaged extensively with local officials, in collaboration with the Environmental Analysis Unit, to ensure the project proceeded successfully and without damage to homes and structures.



## GREENVILLE 10TH STREET EXTENSION

Geotechnical Engineering Unit staff supported Division 2 with a project to extend 10th Street in Greenville. In the planning and scoping phase, they identified sites of potential contamination from dry cleaning businesses, gas stations and other businesses and recommended appropriate subgrade for the project. Unit staff conducted site assessments to identify the location and types of soil and groundwater contamination and underground storage tanks and made right of way acquisition recommendations. They managed mitigation of contaminants, including tank and contaminant removal, including securing a consultant design for cleaning contaminated groundwater so it was suitable for sewage treatment or groundwater runoff.



## INTERSTATE 40 LANDSLIDE

The Geotechnical Unit supports divisions managing major land and rock slides, such as the major slide in 2009 that closed Interstate 40 for six months at milepost 2.5 near the Tennessee border. Unit staff designed the repair, adjusting it over time as the project proceeded. They advised on the design of the slope above the road, including the location of nearly 600 anchors required to stabilize it, and recommended testing instrumentation to monitor movement. Their work spanned the entire project, offering recommendations and helping to develop the emergency contract to repair the slide.

