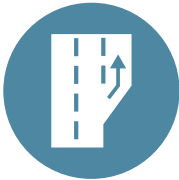


# GRAHAM

Greater Rural Access and Highways to Accelerate Mobility



BICYCLE & PEDESTRIAN



CLIMBING LANES



UPGRADES



ITS COMPONENTS



SAFETY

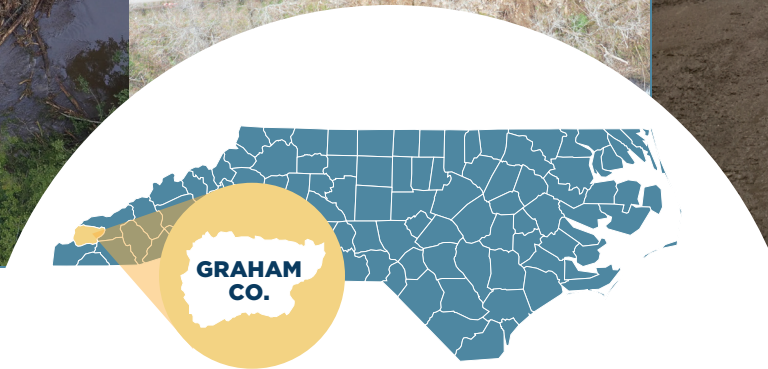


STATE OF GOOD REPAIR



WILDLIFE CROSSING

## Project Description



GRAHAM  
CO.

USDOT RAISE Investment Program  
GRANT APPLICATION  
FEBRUARY 2023



# I. Project Overview

**Greater Rural Access and Highways to Accelerate Mobility (GRAHAM, or the Project)** is the result of extensive collaboration between the North Carolina Department of Transportation (NCDOT), Federal Highway Administration (FHWA), Appalachian Regional Commission (ARC), Southwestern Commission, Appalachian Trail Conservancy, Graham and Cherokee County Commissioners and County Managers, and the Graham County Economic Development Director. The project will improve a 12-mile portion of Corridor K of the Appalachian Development Highway System (ADHS) in Graham County, North Carolina while increasing travel time reliability and reducing congestion through the implementation of Intelligent Transportation Systems (ITS) components in the region.

The Project will more safely and equitably serve all transportation users in a remote portion of rural western North Carolina by adding alternating climbing and passing lanes (2+1 design) along

NC 143 and NC 28 between Robbinsville and the Stecoah Valley; improving retaining walls, embankments, and drainage; constructing new sidewalks in Robbinsville along US 129 and NC 143 and a 0.6 mile multi-use path in the Stecoah Valley to improve multimodal access to services, businesses and educational opportunities; and realigning and improving Appalachian National Scenic Trail (ANST) access and safety, including a new land bridge to allow pedestrians and wildlife to safely cross NC 143. GRAHAM will modernize and bring the project roads into a state of good repair by constructing wider 10-foot shoulders including 8-foot paved shoulders, improved horizontal and vertical alignments, and widening travel lanes to meet NCDOT standards. The project also includes two Dynamic Message Signs (DMS), six Dynamic Trailblazers, and a new closed-circuit television camera (CCTV) at the intersection of US 129 and NC 143 in Robbinsville, with signal coordination at five intersections.

## Application Information

**Supplemental Materials are available online at:**

<https://connect.ncdot.gov/resources/RAISE2023-A0009C/Pages/default.aspx>

**Unique Entity Identifier Number:** XSN8A4TT1DY5

**Contact Name:** Gretchen Vetter

**E-mail:** [gavetter@ncdot.gov](mailto:gavetter@ncdot.gov)

**Telephone:** (919) 707-4740

**Project Type:** Capital Project



## 2. Project History

The ADHS is a 3,090-mile system of State, US, and Interstate routes established by Congress in 1965 and organized into lettered corridors to provide a safe, efficient transportation system, generate economic development in previously isolated areas, supplement the interstate system, and provide access to regional, national, and international markets to the Appalachian Region. Corridor K is part of the original ADHS authorized by Congress in 1965 and stretches from I-75 near Cleveland, TN to Corridor A (US 23) near Dillsboro, NC. This section of Corridor K, Project A-0009C, in North Carolina's State Transportation Improvement Program (STIP), is one of the last ADHS corridors to be completed; additional funding is critical to its completion.

The A-0009C portion of the Project has achieved several important milestones: the National Environmental Policy Act (NEPA) process was completed in March 2021, ROW was completed in July 2022, and Final Design was completed in August 2022. To increase the opportunity for regional and local contractors to potentially bid on the project, A-0009C has been split into four sections to lower the cost of each contract and proceed with construction based on available ADHS funding: CA (Let August 2022), CB (Let September 2022), CC (Let December 2022), and CD. Due to the high cost of the low bids for CA, CB, and CC, additional funding is needed to construct the CD portion of the project and complete improvements to this corridor of local, regional, and national significance.

## 3. Transportation Challenges

GRAHAM addresses several transportation challenges to improve safety, mobility, and quality of life for transportation disadvantaged rural residents in this remote and mountainous corner of the Appalachian region. These roads traverse sensitive natural habitats and provide access to the Nantahala National Forest, Cherokee National Forest, Joyce Kilmer Memorial Forest, ANST, and Eastern Band of Cherokee territory. The Project is critical to regional freight movements, commuter mobility, and tourism access; the US 129 portion of the Project is part of the Tail of the Dragon, an internationally famous destination for motorcycle and sports car enthusiasts with over 300 curves over 11 miles. Moreover, US 129, NC 143, and NC 28 serve as the primary roadway network in Graham County, and together form the only detour route in the region for the frequent closures of US 19/74 for landslides and other emergency events in the Nantahala Gorge. Notwithstanding the unique importance of the Project roads, they have met the end of their useful life and need modernization. GRAHAM roads are characterized by narrow travel lanes, steep grades, and sharp curves which limit line-of-sight and speeds, and inadequate or non-existent shoulders, leading to travel time reliability, regional resiliency, and safety challenges.

### Travel Time Reliability

Travel times on the Project roads can be unpredictable. They are located in mountainous terrain, with grades between three and eight percent and sharp curves that reduce sight distance. Speed limits on the project roads range from 25 miles per hour (mph) in tight curve sections to 55 mph in straighter sections. Lane widths are narrow and there are limited passing opportunities over substantial distances due to the prevalence of sharp curves and steep grades. By implementing a 2+1 design in strategic locations, the Project will improve mobility by allowing vehicles to pass trucks and slower vehicles safely and efficiently, while maintaining direction of travel and minimizing crossings into the opposing lane of traffic.

GRAHAM will result in a corridor-wide average speed benefit of seven miles per hour and improve travel time reliability in each direction (see traffic studies on [Supplemental Materials website](#)). GRAHAM substantially reduces travel time, with improvements of between 12-19 percent during the AM and PM peak periods. The largest improvement occurs between Cheoah and Stecoah, where the Project reduces travel time variability from 15 minutes to less than 8 minutes in the PM peak westbound direction. Travel time reliability will be further improved with the



introduction of ITS components, including CCTV and signal coordination in Robbinsville, which will reduce congestion and delay during detour events.

## Regional Resiliency

The *2020 North Carolina Climate Risk Assessment and Resilience Plan* found that climate change is likely to increase the intensity and frequency of severe weather events accompanied by heavy precipitation. This increases the risk of flooding and geotechnical failures such as landslides—particularly in areas with steep slopes, seeps or springs on cut slopes, and colluvial deposits—and can cause significant damage to infrastructure assets. Since 2019, US 19/74 in the Nantahala Gorge has been closed five times due to landslides. The project roads are the only detour for regional travelers, but with only a single lane in each direction and inadequate communications, the increased traffic volumes lead to congestion and travel delays. GRAHAM improves the resilience of the regional roadway network in two primary ways:

Firstly, the proposed DMS and Dynamic Trailblazers will provide real-time messages about road closures and emergencies for travelers along US 19/74. These ITS components will be placed strategically along the Project roads and US 19/74 to quickly and effectively communicate detour routes and emergency information. Currently, portable Variable Message Signs (VMS) are deployed from Sylva, approximately 40 miles away; the process of delivering and installing these units takes over three hours. The Project's DMS units by contrast can display emergency messages in less than five minutes from the time of notification. This improvement will reduce driver frustration, improve mobility and efficiency of freight traffic, and reduce congestion at or near the incident location. Moreover, the implementation of CCTV and signal coordination at the intersection of US 129 and NC 143 in Robbinsville will allow monitoring of traffic conditions in real time, and the implementation of timing plans to accommodate operations during periods of higher traffic volumes to reduce travel delay.

Secondly, the design of GRAHAM enhancements will improve the resilience of the Project roads.

The segment of NC 143 in the Stecoah Gap has previously experienced an embankment failure and landslide, and other sections of the Project roads are susceptible to slope failures, unstable embankments, and unstable retaining walls. The Project will construct shored mechanically stabilized earth (SMSE) walls, gravity walls, and mechanically stabilized earth (MSE) walls throughout the project corridor to flatten and reinforce project slopes without requiring large excavations and to shore up areas with colluvium deposits. Slopes will be vegetated, and drainage will be improved to minimize impacts to streams and further bolster the GRAHAM corridor from geotechnical failures.

## Safety

GRAHAM addresses several safety concerns for both motorized and non-motorized travelers. The steep grades, narrow lanes, sharp curves, lack of passing and climbing lanes, and inadequate shoulders characteristic of the Project roads creates unsafe travel condition and affects vehicle speed and vehicle control, particularly for large trucks. Between 2017 and 2022 there were 270 crashes on the Project roads, including 4 fatal crashes and 16 serious injury crashes. Moreover, emergency response is often hampered by slow response times related to the travel time variability described in the preceding section. Lastly, gaps in the existing bicycle and pedestrian network create barriers for non-motorized travelers to safely travel the Project roads. Where the ANST crosses NC 143 at-grade, pedestrians and wildlife must cross the road in a section with steep grades and sharp curves, limiting drivers' and cyclists' visibility and vehicular control.

The Project will address these safety challenges in several ways. By constructing 10 foot paved shoulders, where no or inadequate shoulders currently exist, GRAHAM will provide a safe area pull-off area for motorists and help drivers safely recover from lane departures. The addition of alternating climbing and passing lanes will reduce the potential for lane departure-related crashes associated with drivers passing in areas of limited sight distance. GRAHAM will also improve safety for pedestrians and bicyclists by constructing



new sidewalks in Robbinsville, a multi-use path in Stecoah, and full shoulders throughout the project corridor to provide separation between motorists and other roadway users. The new land bridge

at the ANST crossing of NC 143 will provide a safer, grade separated passage to protect wildlife and provide tourists and hikers with a safe way to cross NC 143.

## 4. Project Location

The A-0009C portion of the Project includes 12.6 miles of roadway modernization and multimodal improvements on US 129 in Robbinsville NC, NC 143 between US 129 in Robbinsville and NC 28 at Johnson Gap, and NC 28 between NC 143 and Edwards Gap in Graham County, NC. The ITS components of the Project are located along the A-0009C corridor as well as along US 19/74 between Andrews, NC and Fontana Lake in Graham, Swain, and Cherokee Counties.

GRAHAM invests in safety and access improvements for the transportation disadvantaged communities along the corridor, in alignment with Executive Order 13985 and the Justice40 initiative. The project area exceeds State and county rates for multiple transportation disadvantage indicators. The town of Robbinsville

is located in an Area of Persistent Poverty and Historically Disadvantaged Community. Forty-five percent of households in Robbinsville are below the poverty line and median household income is only \$16,150, as compared to \$42,207 for the County and \$56,642 for the State. Robbinsville also contains concentrations of minority and disabled populations and zero-vehicle households. These underserved populations suffer disproportionately negative air quality and noise impacts due to congestion at the intersection of US 129 and NC 143 during high traffic volumes and emergency events. Zero-vehicle households will benefit from new sidewalks that will close a gap in the pedestrian network and improve access to Robbinsville High School.

**Transportation Disadvantaged Populations Benefiting from GRAHAM**

Census Tract	Component	APP/HDC	Poverty	Minority	Zero Vehicle Households	Disability	Over 65	Under 18
9203	ITS, roadway improvements, sidewalks	HDC, APP	37%	34%	23%	21%	16%	22%
9202	ITS, roadway improvements, land bridge	-	8%	5%	10%	25%	22%	21%
9201	ITS, roadway improvement, multi-use path	-	4%	4%	-	20%	29%	19%
9603.01	ITS	APP	15%	11%	2%	23%	22%	14%
9301.02	ITS		12%	0.1%	-	22%	28%	16%
Graham County	-	-	14%	14%	7%	22%	24%	20%
North Carolina	-	-	14%	37%	6%	13%	16%	22%

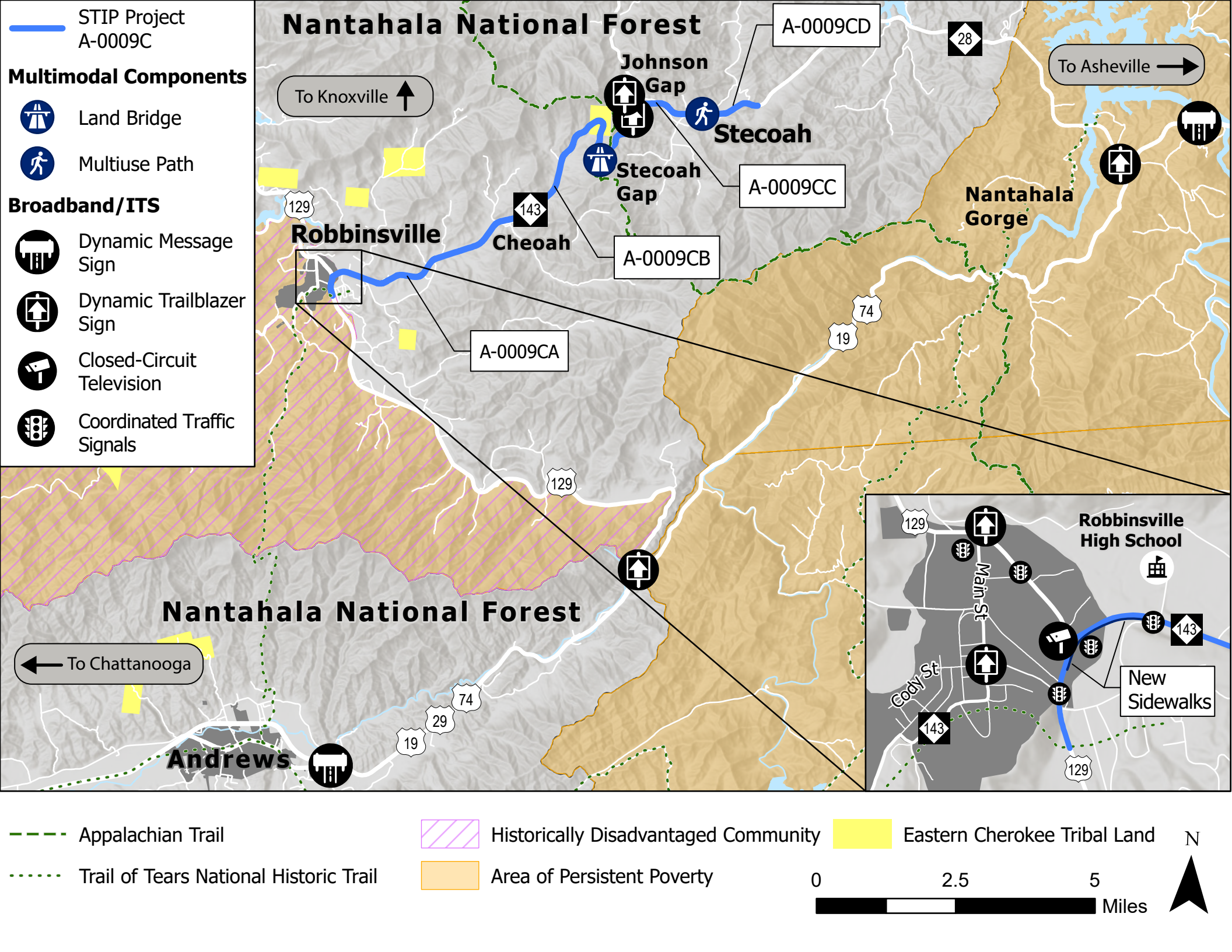
State and County FIPS = 37075

Demographics for each Census Tract were calculated based on U.S. Census Bureau ACS 5-year Estimates (2016-2020) collected at the Block Group level.

APP: Area of Persistent Poverty

HDC: Historically Disadvantaged Community





**USDOT Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Application**

February 2023

# GRAHAM

**Greater Rural Access and Highways to Accelerate Mobility**



**N.C. Department of Transportation**

1 South Wilmington Street

Raleigh, NC 27601

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