NCDOT Broadband Project

By North Carolina Department of Transportation

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Benefits Statement

The NCDOT's initiatives to enhance ITS infrastructure and expand rural broadband access aim to save lives through better emergency management and traffic flow, save time by improving traffic data for navigation, and save money with efficient O&M contracts and revenue generation. These efforts will boost public safety, reduce commute times, and stimulate economic development, ultimately benefiting North Carolina residents.

In this case study you will learn:

1. How NCDOT enhances ITS and expands broadband in rural areas through the NC Broadband Project, spanning 600 miles, for traffic management, emergency response, universal access, and commercialization.
2. How NCDOT employs a multi-track procurement, separately contracting design-build and operate-maintain-commercialize segments, with a focus on performance-based incentives.
3. How ongoing construction promises economic development, improved public safety, connected vehicle readiness, and innovative fiber optic methods, with lessons learned centered on coordination for future projects.

Case Study #168

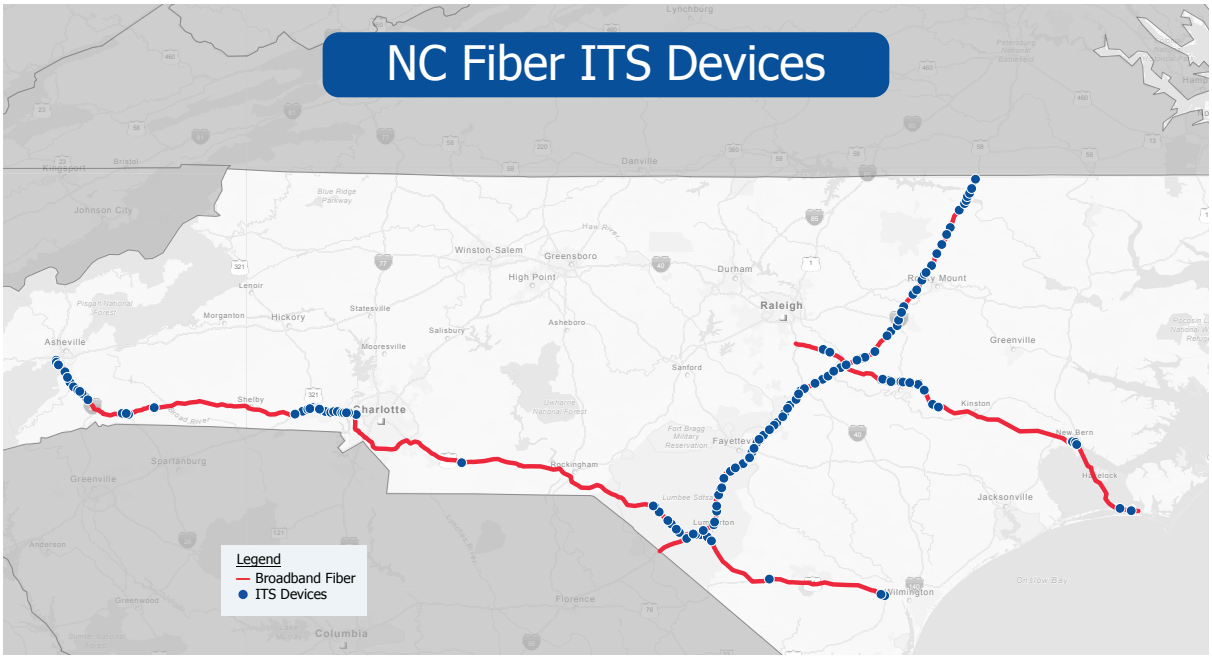
Version Number: 1

BACKGROUND

NCDOT is a strong proponent of deploying Intelligent Transportation System (ITS) infrastructure to support traffic operations and provide traveler information. However, funding and staffing constraints over the past several years have been insufficient to provide the level of Operations and Maintenance (O&M) the Department requires to achieve its O&M goals, much less expand the program. The far-reaching rural areas of North Carolina require increased device density for incident and emergency management, but due to lack of reliable communications and funding for O&M, the device deployments have been sparse in these areas. The limited funding has also caused the Department's maintenance program to regress to a state of being more reactive to the higher needs with little emphasis on growth. Ultimately, this has had a negative impact on the otherwise thriving Transportation Systems Management and Operations (TSMO) program for NCDOT.

NCDOT embarked on a project to enhance the statewide ITS infrastructure and expand the footprint of broadband opportunities in our rural communities. Through creative procurement and partnering, NCDOT was able to offer excess spare conduit space within the DOT right-of-way for commercialization of broadband fiber and has defined the following objectives for the 600-mile NC Broadband Project:

- Creating a fiber backbone for NCDOT's current and future TSMO technology needs;
- Enabling enhanced traffic operations and emergency management along key coastal evacuation routes;
- Expanding the State's fiber network for universal access, including rural areas, schools, police, emergency response, and economic development; and
- Unlocking commercialization opportunities from excess capacity to share with the private sector.
- The NC Broadband Project extends along I-95 from SC to VA, along US 74 from Asheville to Wilmington (with a small gap to be connected by existing infrastructure in Charlotte), and along US 70 from Raleigh to Morehead City, as shown on the map below.



TSMO PLANNING, STRATEGIES AND DEPLOYMENT

NCDOT developed a "multi-track" procurement process to enable design-builders, operate-maintainers, and investors to bid on the scope and more accurately consider the level of risk acceptable to them. The procurement tracks included:

- Track 1a: Design Build (DB) only
- Track 1b: Operate, Maintain, & Commercialize (OMC) only
- Track 2: Design, Build, Operate, Maintain, and Commercialization under a single contract.

Evaluation of proposals received for all tracks identified a simultaneous procurement of Track 1a and 1b as offering better value compared to Track 2. Therefore, NCDOT began contract procurement for the DB and the OMC contracts separately. NCDOT received an INFRA Grant to fund the DB portion and the up-front OMC costs are state-funded.

Design Build

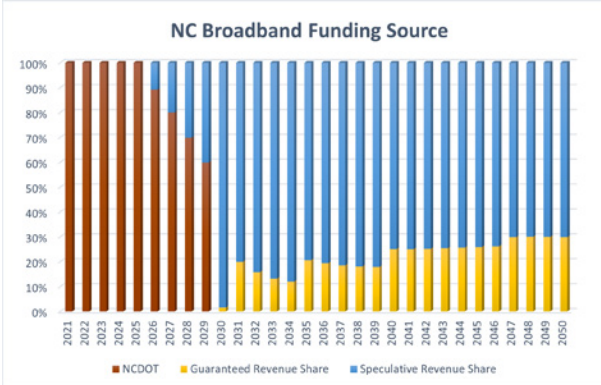
The DB contract is constructing approximately 600 miles of fiber along Interstate and US Highway routes across the state. The route required extensive environmental and railroad encroachment permitting as well as crossing several major, ongoing active roadway construction projects.

Operate, Maintain, and Commercialize

The OMC contract provides exclusive rights to an industry partner to commercialize portions of the communication infrastructure. The OMC contractor is responsible for O&M of both the commercialized infrastructure and the NCDOT ITS infrastructure.

The O&M scope within the OMC Contract utilizes a pay-for-performance (PFP) model where the OMC contractor is paid based on the percent-uptime of ITS assets. The PFP includes incentives for meeting uptime thresholds above goal and disincentives for failing to meet uptime goals or failing to repair devices within specified timeframes. The OMC contractor will invest their own funds to build out the commercialization network over eight years and will provide revenue share with NCDOT. ROW access will be granted to the OMC. The OMC contractor will have the right to use the installed commercialization assets for 30 years.

The OMC contractor proposed cost for performance based ITS maintenance as well as credits to NCDOT for revenue share of commercialized assets. The proposed costs are anticipated to partially pay for O&M costs for the first four years after construction is complete and to completely pay for the O&M costs over the remaining 21 years of the contract period.



COMMUNICATIONS PLANNING AND EXECUTION

The NC Broadband Project was vetted through a data-driven planning process that coordinated transportation needs with commercial viability and rural community broadband needs. Additionally, NCDOT completed market research and commercial market soundings to inform the choice of investments, cost estimates, environmental approach, and technical feasibility. Through this Broadband Project, NCDOT will be expanding the State's fiber network for universal access by providing the private sector with the opportunity to commercialize fiber assets in rural communities. Constructability is highly dependent on the coordination of environmental and railroad permitting, as well as concurrent roadway construction projects. This continuous coordination involves various departments internal to NCDOT, the NCDOT Division offices, RR agencies, and a number of construction contractors.

The NC Broadband Project has also introduced innovations within fiber optic construction methods used by NCDOT. Innovations include:

- Fiber jetting using buried couplers, allowing for longer lengths of fiber installation.
- Buried junction boxes with electronic marker balls to reduce surface level exposure and risk of damage.

OUTCOME, BENEFITS AND LEARNINGS

With construction underway for 30+% of the proposed segments, the benefits of the NC Broadband project are not yet fully realized. However, NCDOT is literally laying the groundwork for long-term partnerships that will enable NCDOT to enhance the TSMO program, support rural broadband expansion, and increase economic development potential for rural communities and the broadband industry.

Public and Community Benefit

The NC Broadband Project supports economic vitality benefits across the state in a variety of ways. Emergency services, evacuation, public safety, and roadside safety can all be improved with better broadband connectivity. The installation of fiber allows for more granular and accurate data to support navigation apps that allow users to anticipate traffic conditions. The installation of fiber along the corridor provides the foundation for the future of connected and autonomous vehicles. As the prevalence of connected and autonomous vehicles increases in the overall fleet the transportation infrastructure is better equipped to integrate the new vehicle capabilities and allow for the continued safe and efficient movement of goods and people. The eventual utilization of connected and autonomous vehicles will further improve safety.

Lessons Learned

The success of the NC Broadband Project is still being written since NCDOT has only been managing the two NC Broadband contracts for several months. It is expected there will be challenges and the response to these challenges will guide the needle on the program effectiveness. Managing two contracts simultaneously places NCDOT in a negotiation seat between two contractors. Having used a contract mechanism that included both DB and OMC under one contract would have minimized NCDOT's involvement in the coordination between the two contractors. However, the increased value of procuring the contracts separately was appealing to NCDOT. The high level of coordination efforts necessary may not have been known at the on-set, but it is anticipated the coordination will become more seamless as time passes.

NCDOT understands how important this upfront coordination will be to the overall success of the NC Broadband Project. NCDOT is excited about the opportunities to serve rural communities and enhance the TSMO program throughout the state. Working through the details of this Broadband project will establish a framework that can be replicated on other corridors and boost the TSMO and broadband capabilities for the residents of North Carolina.