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Project Description

The Wake Forest Mobility Hub will advance regional multimodal transportation within Wake Forest and surrounding areas - enhancing mobility options, improving social equity, increasing the resilience of the transportation network, improving the environment, and spurring economic growth.

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant is critical to advancing the connectivity along the S-Line corridor, specifically in the Town of Wake Forest. This S-Line segment is a missing link in the regional vision for high-performance passenger rail set by the Southeast Corridor Commission (SEC Commission), a partnership between North Carolina, South Carolina, Virginia, Tennessee, Georgia, Florida, and Washington, D.C. (Figure 1). The Town of Wake Forest is the gateway connecting rural communities along the northern S-Line corridor to the economic and social resources in the Triangle region. The **Wake Forest Mobility Hub** will connect the community to various modes of transportation, including passenger rail and bus services, pedestrian and bicycle facilities, and integrated mobility technology. The hub will serve as a key connector for surrounding rural communities, improving access to education, jobs, and healthcare for disadvantaged populations along the northern portion of the S-Line corridor while also generating localized economic growth. The Wake Forest Mobility Hub will serve as the backbone of multimodal connectivity for Wake Forest and numerous other communities in the Triangle region.

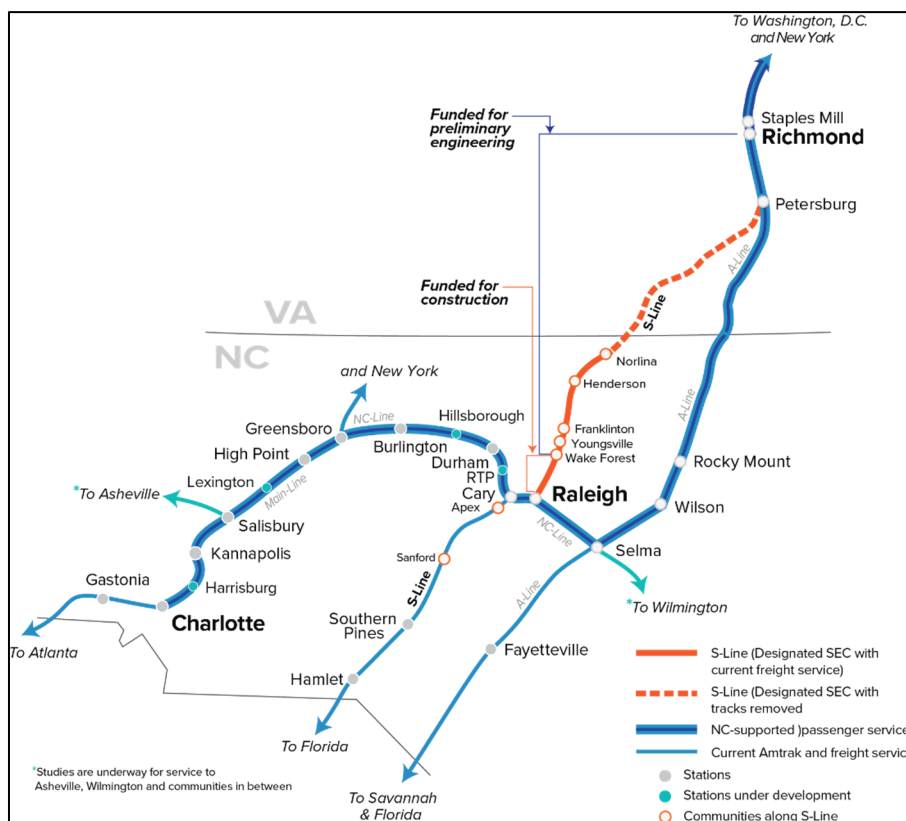


Figure 1: NC Rail Corridors

Project History

The Wake Forest Mobility Hub builds on significant past efforts to prepare the S-Line corridor for passenger rail and other mobility options. In 1992, long after the last passenger rail service through Wake Forest ended, the Federal Railroad Administration (FRA) identified the Southeast Corridor as one of five high-performance rail corridors to support safe, efficient, and sustainable



transportation across growing regions. The NCDOT’s Rail Division and the Virginia Department of Rail and Public Transportation (VDRPT), in partnership with the FRA and the Federal Highway Administration (FHWA), developed a program-level Tier I Environmental Impact Statement (EIS), reviewing several route corridors from Washington, D.C. to Charlotte, with a Record of Decision (ROD) completed in 2002.¹ After extensive coordination, engineering, and public involvement, a Tier II EIS was completed for the 162-mile corridor from Richmond to Raleigh (R2R) in 2015.² A 2017 ROD solidified the route, identified necessary corridor improvements, and estimated preliminary intercity passenger ridership, allowing the project to move to final design and construction once funded by federal grants.³ Wake Forest was noted as a key community along this corridor.

In 2017, the SEC Commission developed the Southeast Regional Rail Plan in partnership with the FRA. The plan explored the potential for high-performance rail projects and intercity connections over a 40-year period. Subsequent reports identified growth opportunities, reported the economic benefits, and created a development strategy, clearing identifying the S-Line and the Town of Wake Forest as key to growth.⁴

NCDOT and partners have a strong grant strategy in place to realize the S-Line vision. These grant funds are helping communities along the corridor plan for transit-oriented development (TOD) in anticipation of future passenger rail service. The FTA/USDOT TOD Planning Study grant supported the evaluation of market conditions, affordable housing considerations, multimodal transportation connections, and other local policies, resulting in an actionable implementation playbook with concept designs. Currently, Wake Forest is utilizing funds from the 2022 RAISE grant to carry their mobility hub through a feasibility study, NEPA, and preliminary design. Each grant has been a key contributor to the evolution and development of the S-Line program overall, and they have each paved the way for Wake Forest to implement the first mobility hub along the S-Line corridor.

Addressing Transportation Burdens

With the removal of passenger rail, Wake Forest is now automobile-dependent, but the rail line bifurcates its downtown, dividing the community and exacerbating transportation burdens, particularly for zero-vehicle households or those that choose not to drive. Most of the communities along the S-Line corridor have limited access to mobility options and include transportation disadvantaged populations, as detailed in subsequent sections. Small transit agencies exist on a county level to serve rural communities. More transit options are available in the Triangle, but many still need connectivity improvements. Wake Forest currently operates transit service in coordination with the City of Raleigh but does not support their own system. Micromobility options are sparse, and bicycle infrastructure is limited. The demand for

¹ Tier I Final Environmental Statement, 2002. <https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/SEHSR%20Tier%20I%20FEIS%20Study%20-%202002.pdf>

² Tier II Final Environment Statement, 2015. <https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/2015%20SEHSR%20FEIS%20-%20Executive%20Summary.pdf>

³ SEHSR Record of Decision, 2016. <https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/SEHSR%20Raleigh%20to%20Richmond%20Signed%20Record%20of%20Decision.pdf>

⁴ Southeast Corridor Commission, Southeast Regional Rail Plan, December 2020, <https://www.southeastcorridor-commission.org/commission-reports>



multimodal options will only continue to grow with industry and population moving to the Triangle region and sprawling out into communities like Wake Forest. The Wake Forest Mobility Hub can serve as the epicenter of more connected regional travel and as the launching pad for other S-Line community mobility hubs, providing new connections, alleviating travel demands, addressing environmental concerns, and providing economic development opportunities for the Town of Wake Forest. Thorough planning in the TOD Study and the RAISE 2022 Mobility Hub Program, followed by thoughtful design and construction of this Wake Forest Mobility Hub will ensure that there is equitable access to multimodal transportation options.

Project Location

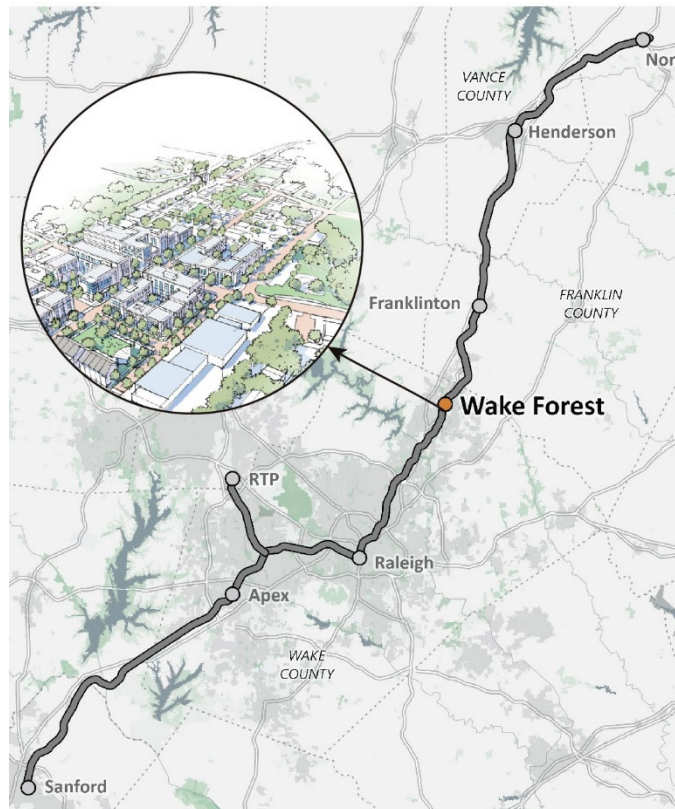


Figure 2: Wake Forest Mobility Hub Location

This grant will support the construction of the Wake Forest Mobility Hub- the first Mobility Hub along the S-Line corridor. The urbanization designation is based on definitions from the grant’s Notice of Funding Opportunity (NOFO) and data from the 2010 U.S. Census.⁵ The Wake Forest Mobility Hub is considered “urban”.

Wake Forest, centered in the middle of the North Carolina S-Line corridor, has grown from a quaint small town to a bustling, urban community in a short period of time. From 2010 to 2020, its population grew by over 20,000 people, making it one of the fastest growing communities in North Carolina. Wake Forest connects with communities in the Triangle region, a metropolitan statistical area with 2 million people that is experiencing significant growth. The nearby rural communities of Norlina, Henderson and Franklinton will use the Wake Forest Mobility Hub to access locations and amenities along the S-Line corridor including healthcare, social services, employment, and leisure destinations. Figure 2 depicts the community of Wake Forest along the S-Line Corridor. The downtown station area is adjacent to a low-income, minority neighborhood in Wake Forest.

The selected Mobility Hub site will be designed to meet the needs of its surroundings. Decisions about architecture, land uses, and amenities will be informed by public engagement and local plans, especially during the ongoing feasibility study, NEPA, and preliminary engineering. The Hub will be designed to be dynamic, adapting as community needs change.

⁵ Rural America. 2010 U.S. Census Data. <https://mtgis-portal.geo.census.gov/arcgis/apps/MapSeries/index.html?appid=49cd4bc9c8eb444ab51218c1d5001ef6>



Project Budget

NOFO Table 2a

2020 Census Tract(s)	Project Costs per Census Tract
542.24	\$16,500,000.00
Total Project Cost:	\$16,500,000.00

NOFO Table 2b

2010 Census Tract(s)	Project Costs per Census Tract
542.06	\$16,500,000.00
Total Project Cost:	\$16,500,000.00

NOFO Table 2c

Urban/Rural	Project Costs
Urban (2020 Census-designated urban area with a population greater than 200,000)	\$ 16,500,000.00
Rural (Located outside of a 2020 Census designated urban area with a population greater than 200,000)	\$ 0.00
Total Project Cost:	\$16,500,000.00

Sources, Uses, and Availability

A 20% match has been provided and approved by the Town of Wake Forest. A Resolution Letter has been included as part of this application. NCDOT will be administering the grant.

Table 1. Funding Commitments

Mobility Hub Location	Total Cost	Match Required	Community Match	RAISE Funding Request
Wake Forest	\$16,500,000	Yes	\$3,300,000 (20%)	\$13,200,000



Contingency Amount

A 9% contingency of total cost has been budgeted for this project. The total contingency is \$1,485,000.00. In the event of cost overruns, the Town of Wake Forest would seek procurement of additional funds or pursue cost saving opportunities.

Level of Design

The Mobility Hub is currently undergoing feasibility study, NEPA, and preliminary engineering, expected to be complete in December 2024.

Cost Estimates

Because this project is one of the first of its kind, cost estimates were based on comparative station types and collaboration between industry professionals. It is assumed that the Wake Forest Mobility Hub will include a low-level platform, meet basic parking requirements, and have relatively low investment for building changes. Stations and mobility hubs of this size were estimated to range from \$10 million to \$17 million dollars. It was also assumed that final design would be 10% of construction costs and right-of-way would be 5% of construction costs. These costs were estimated in 2023 and remain consistent with the Reconnecting Communities and Neighborhoods 2023 grant application. Cost estimates are provided by NCDOT.

Cost Share

As an urban project, the required match is 20%. The Town of Wake Forest is providing the 20% match. NCDOT is requesting an 80% cost share for this grant.

Table 2. Mobility Hub Cost Breakdown

Mobility Hub Location	Mobility Hub Type	Task	Cost	Total
Wake Forest	Standard	Final Design	\$1,500,000	
		ROW	\$750,000	\$16,500,000
		Construction	\$14,250,000	

Merit Criteria

Safety

KEY HIGHLIGHTS

- Reduces vehicle volumes on roadways, reducing the potential for crashes and fatalities
- Provides equitable multimodal options for vulnerable roadway users
- Incorporates pedestrian-oriented design
- Easily accessible and low barrier to entry
- Promotes compact, mixed-use development near station
- Supports rail travel, the second safest form of travel

The Wake Forest Mobility Hub will reduce vehicular travel on Wake Forest and the Triangle Region’s rural and suburban roads by offering a reliable, alternative method of transportation, consequently reducing the potential for vehicular crashes and associated injuries and fatalities. The Mobility Hub will create a space for people to move safely and conveniently between transportation modes in one location. This approach is consistent with the USDOT’s National Roadway Safety Strategy, specifically addressing elements of the Safe System Approach and the associated impacts on climate change and equity.⁶ The Mobility Hub will link numerous communities in and around Wake Forest through rail travel, which is the second safest form of transportation after flying.⁷ Based on a previous NC Model and DC2RVA Model from the 2015 R2R EIS, it was found that more than two-thirds of predicted train trips would otherwise be made by highway.

As previously detailed, Wake Forest and the other partner communities and S-Line corridor are expected to continue rapidly growing in the future, adding more travelers to the transportation network. The Wake Forest Mobility Hub will offer vulnerable roadway travelers equitable mode options other than individual vehicular travel on area roadways. Furthermore, the Mobility Hub will spur other non-motorized transportation projects for first/last mile connections within Wake Forest (such as bike and pedestrian facilities) and greater mobility diversity throughout the S-Line corridor. With respect to vulnerable users and an equitable transportation system, the Mobility Hub will consider pedestrian-oriented design as well as moderating vehicle speeds due to the high pedestrian activity at mobility hubs. These design components will consider all ages and abilities for access and ease of travel. Site circulation and separation of vehicle movement at the Mobility Hub will be important in designing a safe and user-friendly space. Through the completion of the TOD Planning Study, recommendations were made to Wake Forest to enhance multimodal infrastructure for the support of transit, adding protection for non-motorized travelers. Because of the prioritization of multimodal transportation and multi-use development

⁶ <https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf>

⁷ Savage, Ian. Comparing the fatality risks in United States transportation across modes and over time, 2013. <https://www.sciencedirect.com/science/article/abs/pii/S0739885912002156>



in the design of the Mobility Hub, multimodal forms of transportation will be easily accessible and have a low barrier to entry.

Environmental Sustainability

KEY HIGHLIGHTS

- Reduces the need for private vehicle, VMT, associated congestion, and emissions
- Reduces potential for negative environmental impacts
- Multiple connections in central location, minimizing ecological footprint
- Options for area delivery services and amenities
- Natural home for electric vehicle charging
- Supports Mobility as a Service (MaaS)
- Sustainable construction practices and building materials
- Resilience alternatives, compliance with Federal Flood Risk Management Standard

Mobility Hub

The Wake Forest Mobility Hub will inherently promote the use of multimodal transportation by providing multiple connections in one central location, reducing the need for a private vehicle, and minimizing the ecological footprint in the region.⁸ The Mobility Hub will offer an integrated suite of mobility services, amenities, and supporting technologies: intercity trains, passenger rail service, pedestrian and bicycle facilities, transit/microtransit, and shared mobility options. The Wake Forest Mobility Hub be a community resource that significantly improves the environment, minimizes the ecological footprint of transportation, boosts mental and physical health, and creates places that can be used and showcased by everyone in the community.

The Mobility Hub brings transportation options together that can reduce or optimize private car parking and use, reducing congestion on highways—a major step in reducing greenhouse gas emissions. The Hub will be a natural home for electric vehicle (e.g., car, e-bike, e-scooter, e-cargo bike) charging, parcel pick up and drop off, and other logistical uses. NCDOT’s Mobility as a Service (MaaS) initiative (a sister project to the Mobility Hub Plan), detailed in a later section, is a natural partner for the Hub, creating an attractive and efficient way to use travel modes other than a car. The Wake Forest Mobility Hub will create a transportation node on planned or existing multimodal networks to boost cycling and walking.

Overall S-Line Initiatives Supporting Sustainability

TOD itself is sustainable, offering a broad range of health, environmental and economic benefits.⁹ The Wake Forest Mobility Hub is building off significant TOD planning for its future site, which will help reduce the need for driving, preserve rural/natural areas, and prevent suburban sprawl by supporting more transportation choices.

The overall future improvements of the S-Line corridor will lead to new opportunities for job growth, TOD, and transportation equity by providing enhanced mobility opportunities to underserved communities. On a per-passenger-mile basis, rail travel is more energy efficient than

⁸ <https://www.rtachicago.org/communities/toolkits-and-education/what-are-mobility-hubs>

⁹ <https://tod.itdp.org/why-tod-matters.html>



traveling by car or air and provides lasting environmental benefits.¹⁰ According to the EPA, almost 60 percent of transportation sector emissions are from personal vehicles.¹¹ Over a 20-year horizon, the intercity service along the S-Line would attract 51.4 million new rail passengers, approximately 1.7 million riders per year. The majority of these riders (approximately 75%) would divert to rail from highways where the average vehicle occupancy is 1.67 people per car. Therefore, over 20 years, the service would remove over 23 million cars from the highway, approximately 770,000 cars per year on average. For Wake Forest itself, annual passengers are estimated around 179,000, capturing 95,000 total passenger miles daily. **The diverted cars, buses and air trips would reduce air emissions resulting in around \$92.2 million total emissions savings.**

Quality of Life

KEY HIGHLIGHTS

- Lessens the burden of transportation costs—provides easy access to mode options
- Saves on commuting time, giving people time back in their day
- Supports active transportation (walking, biking) and greater physical activity
- Creates vibrant shared spaces accessible to all, creating a strong sense of community
- Supports equitable transit-oriented design (eTOD) principles
- Connects rural communities with more opportunities
- Supports active transportation (walking, biking) and greater physical activity
- Creates vibrant shared spaces accessible to all, creating a strong sense of community

Mobility hubs inherently become an essential local destination and foster a strong sense of place. The continuous activity supported by a mobility hub makes it a vibrant, social community center that is accessible to everyone. The Wake Forest Mobility Hub is committed to supporting equitable TOD (eTOD), which seeks to address the inequities of the past, prevent displacement, and provide opportunities for all residents. TOD provides many benefits like improved mobility and access, economic development, and climate resilience; however, development pressure can cause harm by displacing longtime residents and businesses or increasing racial and economic segregation. In 2022, Wake Forest created a Housing Affordability Plan to help address these issues.¹² Along the S-Line corridor, eTOD will catalyze communities to prevent further segregation or displacement by acknowledging and addressing past harms from transportation investments in Black and Brown communities, operationalizing racial equity through intentional policy, and eliminating disparities for BIPOC communities.

¹⁰ <https://doi.org/10.2172/1767864>

¹¹ US Environmental Protection Agency. <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

¹² Wake Forest Housing Affordability, September 2022, <https://online.flippingbook.com/view/89376253/>

NCDOT has created the Transportation Disadvantaged Index (TDI)—an index based on carless households, low-income households, mobility impairments, youth, seniors, Limited English Proficiency (LEP) populations, and BIPOC populations—to identify the transportation disadvantaged communities in North Carolina. This index aligns closely with the AOPP and goes beyond the typical Environmental Justice (EJ) indicators. A higher score for a community indicates the higher transportation disadvantage (with 21 as the maximum). The TDI score for Wake Forest is 11.5. The

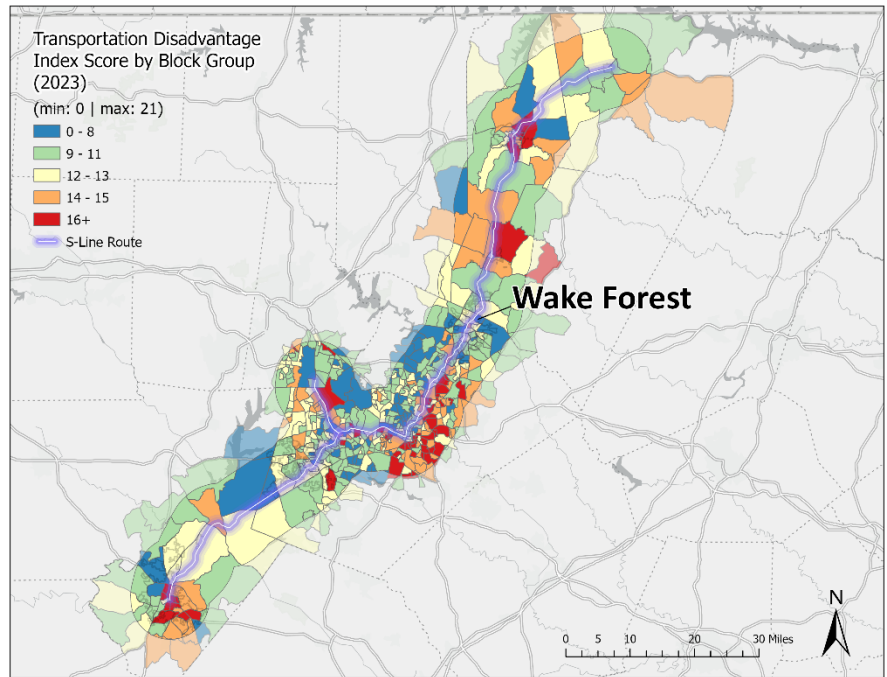


Figure 3: Transportation Disadvantaged Index of Partner Communities & S-Line Corridor

average score for the entire corridor is 11.64. Figure 3 illustrates the TDI scores along the corridor and demonstrates several areas within the connecting communities that are identified as transportation disadvantaged, particularly Norlina, Henderson, and Sanford. As noted above, the construction of the Wake Forest Mobility Hub will be the first step in a programmatic approach to provide transportation connection to these rural communities.

Mobility and Community Connectivity

KEY HIGHLIGHTS

- Connects rural communities to Wake Forest job centers
- Supports a thriving community where all people can work, live, and play
- Supports efficient freight movement
- Enhances community connectivity with a central multimodal hub
- Provides access to mode choices for users of all ages, abilities, and backgrounds

The Wake Forest Mobility Hub will result in immediate mobility and connectivity benefits for Wake Forest independent of rail. The Mobility Hub will include transit connections, bicycle infrastructure, pedestrian connectivity and rideshare opportunities. The future S-Line intercity passenger rail service—together with the regional, ADA-compliant mobility hubs in each community—will also create a regional transportation system that is connected, safe, and equitable, providing access and mode choices for users of all ages, abilities, and backgrounds. Wake Forest’s Mobility Hub will be the first step in creating these connections.

The design of the Wake Forest Mobility Hub is considering the physical infrastructure of the site (parking, building, bus and bike facilities, EV charging stations) in addition to the physical

infrastructure connecting to the site (first/last mile connections, multimodal networks, and wayfinding). Design is also considering the digital amenities needed for connection, including real-time information and app integration. Some of these amenities are depicted in Figure 4.

The downtown core of Wake Forest also connects to a major university, numerous restaurant and food options, housing options, and options for medical care. These amenities will be a key driver in the use of the Wake Forest Mobility Hub and will enhance mobility and connectivity for all.

Passenger rail is likely to become the most efficient form of travel in the region for many to connect to the Raleigh urban core and downtown Wake Forest. According to the FEIS, this intercity passenger rail service could result in a mode shift from highway to rail of over 65% for intrastate and interstate rail travel.¹³ Freight rail will also benefit from the intercity passenger rail investment. The S-Line is roughly parallel to the A-Line, a freight rail line just east of the S-Line. The A-Line is CSX's primary north-south corridor that generally parallels I-95 along the eastern seaboard and also carries passenger rail. Improving the S-Line for high-performance passenger rail will increase the potential freight capacity on the A-Line. Completion of the project and implementation of the proposed passenger rail service along the newly restored and upgraded portions of the S-Line will provide an alternative to 133 miles of the congested A-Line between Selma, NC and Collier, VA, improving mobility. However, the rail and then the mobility hubs must be constructed for this connection to come to fruition. Shifting the daily passenger trains to the S-Line and off of the A-Line will relieve train delays on the A-Line corridor, thereby improving freight train service and reliability, reducing total train hours in road service and related freight rail operating costs and emissions. The S-Line restoration also provides an additional line for freight when the A-Line has to be closed due to hurricanes and storms.



Figure 4: Example image of Downtown Wake Forest's Mobility Hub

¹³ <https://connect.ncdot.gov/resources/Rail-Division-Resources/Pages/Reports-Projects.aspx>



Economic Competitiveness and Opportunity

KEY HIGHLIGHTS

- Connects rural communities to the urban core of the region
- Supports growth—mix of uses, affordable housing, and employment concentration
- Improves regional economic strength
- Supports management of travel demand for goods
- Supports affordable housing and reduces the burden of commuting

As detailed in previous sections, the Wake Forest Mobility Hub will serve as an inter-regional destination and attract supportive levels of mixed-use development. The Wake Forest Mobility Hub will be located on White Street, a convenient location on the main street of downtown that is accessible and will foster concentrations of employment. This Hub will create financial synergy between transit access and surrounding development—concentrating housing and jobs through mixed-use developments near the Hub.¹⁴

Figure 5 illustrates existing jobs in the region, which are expected to grow exponentially. With almost 440,000 jobs within a 5-mile radius, the S-Line corridor between Norlina and Sanford is an economic engine for the region, with Wake Forest at the center. The North Carolina Department of Commerce projects the addition of 9,100 wage and salary jobs annually through 2028, which supports this significant regional development.¹⁵ The construction of the proposed Wake Forest Mobility Hub is the next step in successfully preparing the Town for passenger rail service and connections to the economic centers in the corridor.

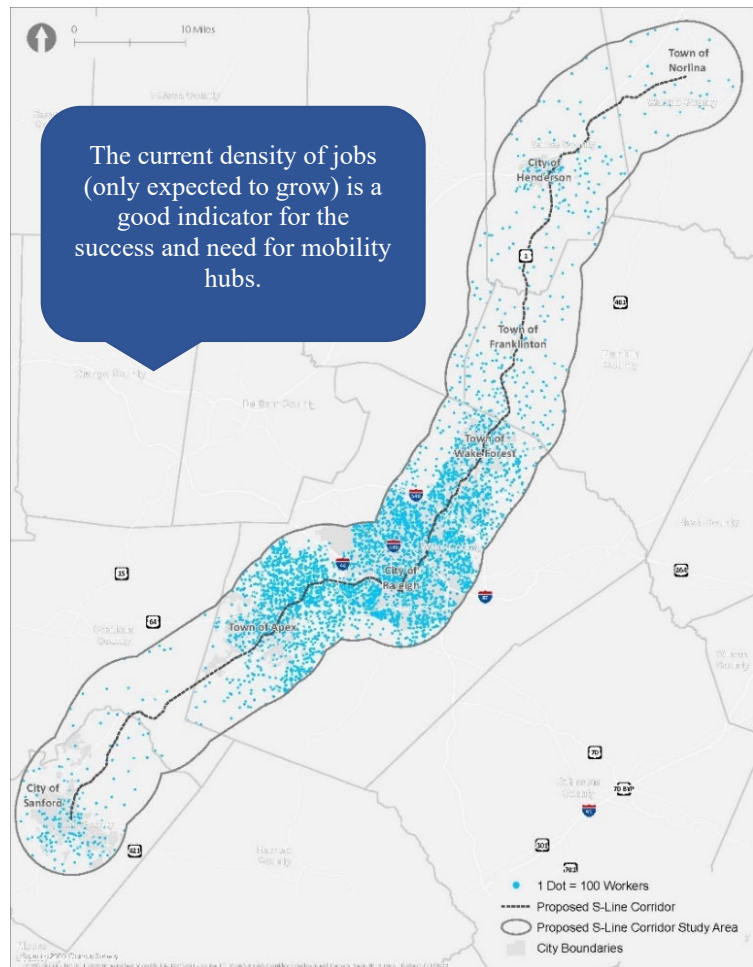


Figure 5: Corridor-wide job density

¹⁴ <https://www.wakeforestnc.gov/sites/default/files/uploads/planning/renaissance-plan-for-downtown-wake-forest-2017.pdf>

¹⁵ <https://www.nccommerce.com/data-tools-reports/labor-market-data-tools/employment-projections>

In the FEIS, projections were done with base year 2012 to project volumes for a full build alternative.¹⁶ In 2040, 2.5 million riders per year were projected along the corridor, around 78,000 for Wake Forest. After full build of the corridor, the intercity passenger rail service, and Wake Forest, would see approximately five or more round trips per day. Additional commuter services could be overlaid along the corridor. These trips provide frequent and reliable service along the corridor. The FEIS also identified that there would be a travel time savings of approximately 26 minutes for a traveler within North Carolina, and over one hour for travelers outside of North Carolina, supporting a region that is economically competitive within the state and the nation. These time savings can be a significant benefit for use of the Wake Forest Mobility Hub where commuters are often found traveling the parallel U.S. 1 route south to Raleigh or North to other industries. The BCA found that around \$2 million annually and more than \$42 million over the life of the project will be saved in these travel time savings.

The growth of the Triangle region has added more than 300,000 new residents, and growth is only expected to continue. Wake Forest's growth of 20,000 people from 2010 to 2020 emphasizes the importance and growing need for the Mobility Hub. High-quality transit service would improve commuting trips to job centers, as well as recreational travel to and from the rural communities along the corridor. Increasing accessibility through multimodal transportation connecting labor markets to economic hubs results in benefits such as:

- More people at work as a result of commuting travel time savings;
- Enabling people to work longer or more flexible hours because they spend less time commuting;
- Enabling people to work while in transit;
- Some people changing to higher paying and a more productive jobs, as better transportation increases the accessibility of more employment options; and.
- Greater tax revenues from increased business and employment.

In addition to supporting where people can work, the Wake Forest Mobility Hub will create engaging public spaces, safe and comfortable transportation choices, and equitable access to services. With the Wake Forest Mobility Hub being the catalyst for more regional transportation options, it can revitalize the communities along the S-Line that were originally built on the rail. The rural communities surrounding Wake Forest and along the S-Line corridor were once robust, booming communities dependent on the rail line. Both the restoration of a passenger rail service and the creation of the Wake Forest Mobility Hub would support revitalization efforts in these communities and bridge significant gaps between the urban and rural centers.

¹⁶ <https://connect.ncdot.gov/resources/Rail-Division-Resources/Pages/Reports-Projects.aspx>



State of Good Repair

KEY HIGHLIGHTS

- Supports the viability of passenger rail on the S-Line
- Positions the community for future maintenance success
- Presents opportunities for public-private partnerships
- Mode options support the resiliency of roadways
- Prioritizes long-term maintenance expansion alternatives and partnerships

In the feasibility and analysis activities for the Wake Forest Mobility Hub, the future State of Good Repair (SGR) will be considered for future maintenance success. Maintaining and expanding these investments is crucial for safety, access, and reliability of the transit infrastructure at the Mobility Hub. Mobility Hub construction will restore and modernize the existing infrastructure currently on the site, providing new options for access and use. Because much of the S-Line rail corridor is currently an abandoned line, the Mobility Hub construction is critical to the success of the restored S-Line, as its construction will support the overall use of intercity rail opportunities.

The Wake Forest Mobility Hub also contributes to the viability of the S-Line through development opportunities, and public-private partnerships. In addition, due to the mode shift this will inevitably support, the resiliency of roadways will be improved by reduced traffic and therefore reduced operations and maintenance costs incurred by the communities and state for roadway maintenance. According to the BCA, the diversion of automobile and air trips will realize operating cost savings around \$339 million 20 years out from construction. This will allow for improved investment in other modes and a broader impact on the overall transportation system. To maintain a state of good repair, the Wake Forest Mobility Hub will approach design and construction with long-term maintenance in mind. The feasibility assessment will evaluate the Hub site for efficient maintenance opportunities and access for equipment, supporting the resiliency of the Hub assets. This long-term approach will help address the current lack of mobility options outside of the automobile and ensure access well into the future. NCDOT will also partner with Wake Forest to maintain the Hub, to include the maintenance of the rail track or sponsorship of transit operators. Additionally, the connected retail and commercial businesses (revenue generators) will create a unique opportunity to generate revenue to assist in the state of good repair. Public-private partnerships will be evaluated for the long-term operations of each Hub.



Partnership and Collaboration

KEY HIGHLIGHTS

- Partnership of public and private stakeholders, state and local officials, regional and non-profit organizations
- Built from existing partnerships that have successfully moved the S-Line vision forward
- Significant community engagement to date, bringing diverse populations to the table
- Limiting impacts on private property

As detailed in previous sections, partnerships for revitalizing the overall S-line corridor have been strong for numerous years, and Wake Forest has been at the table from the very beginning. During the NEPA-compliance efforts for the rail infrastructure, NCDOT worked with Wake Forest through community outreach and stakeholder meetings. Wake Forest, in partnership with NCDOT, also completed the TOD Planning Study, which fostered clear and regular collaboration through committee membership for municipal leadership and staff. Wake Forest has been a key contributor to required matches, not only providing a 20% match for this grant, but also providing match for the RAISE 2022 grant. Other stakeholders currently at the table for the Wake Forest Mobility Hub include staff from local agencies, local government, and community organizations, many of which provided Letters of Support for this application (see Letter of Support Attachment).



Community Leaders gathered for the S-Line TOD Study Meeting in Wake Forest

Equitable Planning

The planning and development of the Wake Forest Mobility Hub is built upon the TOD planning efforts catalyzed the community to acknowledge and address past harms from transportation investments in BIPOC communities, operationalize racial equity through intentional policy, eliminate disparities for BIPOC communities, and improve quality-of-life outcomes for all. Supporting affordable housing policies and best practices, mitigating the potential displacement of existing residences and businesses, will be prioritized during conversations and decision-making for the mobility hubs. Wake Forest is currently undergoing an update of their Downtown Plan, which will finish in late 2024.¹⁷ This plan is furthering the TOD Study work and studying more opportunities to support affordable housing. The Wake Forest Mobility Hub will continue

¹⁷ <https://www.wakeforestnc.gov/planning/wake-forest-downtown-plan>



to grow collaboration efforts with stakeholders, regional and state interested parties, and, more importantly, members of the local community.

Innovation

KEY HIGHLIGHTS

- Offer integrated mobility options, amenities, and technology
- Unique service delivery approach through MaaS initiatives
- Project delivery through continuous partnerships to ensure transit-readiness
- Create space for emerging mobility services and new technology
- Advance multimodal transportation in the region

Innovative Technology

Mobility hubs are new to the state of North Carolina, and Wake Forest’s will be the first to be constructed along the S-Line corridor. Not only is the partnership between NCDOT and Wake Forest unique and innovative, but the project delivery methods to accomplish both the rail construction and mobility hub construction in a timely fashion are innovative as well. While design and construction continue for rail, the planning for the Mobility Hub has accelerated, ensuring that Wake Forest is well-prepared long before intercity passenger rail service is established.

The Wake Forest Mobility Hub will also offer innovative transportation options, including electric vehicle charging stations, electric bicycle docking, and rideshare pick-up and drop-off. North Carolina is creating an innovative service delivery approach through the statewide MaaS program. The MaaS solutions will change the way riders and agencies interact, allowing for passengers to select among ridesharing, bike-sharing, public transit services, and private transit services to fully customize their travel preferences and choose the solution that fits their needs. Transport Service Providers (TSPs) across the state will partner with MaaS operators, who will package services and offer plans and payment options to suite consumers. TSPs will also have Application Programming Interface (APIs) that feed schedules, real-time info as well as the ability to book and pay for services to MaaS operators. This statewide MaaS will transform how people research, schedule, and pay for transportation—improving accessibility to all users. The mobility hubs are a major component of the MaaS program. These mobility hubs will create a space for emerging mobility services and new technologies that can be built upon in the future. Options for automated vehicles, microtransit, ride-share services, and electric vehicle charging stations will all have a place in the mobility hub concept. The MaaS and Wake Forest Mobility Hub will both work together to drive benefits for underserved and disadvantaged communities.

Project Readiness

Schedule

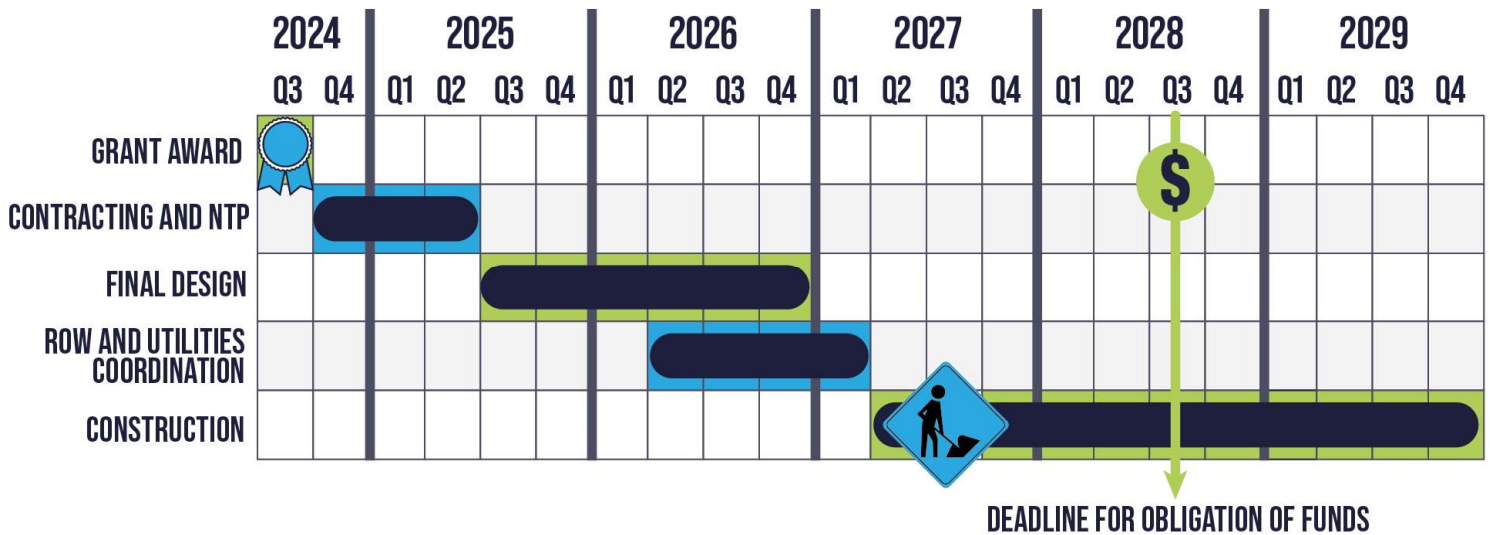


Figure 6: Wake Forest Mobility Hub Schedule

Figure 7 shows the progression of the Mobility Hubs, how they have been funded, and the intent of this RAISE grant to support the construction of the Wake Forest Mobility Hub.

WAKE FOREST	
TOD STUDY 2020	TOD Planning
RAISE GRANT 2022	Feasibility Study
	NEPA
	PE
RAISE GRANT 2024	Final Design
	ROW
	Construction

Figure 7: Mobility Hub Development Phases



Environmental Risk Assessment

Required Approvals

The NEPA process for the Wake Forest Mobility Hub is underway, with an anticipated completion date of December 31, 2024. The Wake Forest Mobility Hub may be located within a national registered historic district and may require compliance with Section 106. Right-of-way acquisition plans are not final but will be pursued after NEPA.

Public engagement for NEPA and Preliminary Engineering is currently being scoped. This engagement will include dissemination of information via a project website, a questionnaire, 10 stakeholder interviews, two pop-up events, one open house, and a multiday workshop. Significant engagement efforts also occurred in Wake Forest as part of the TOD Planning Study.¹⁸

State and Local Approvals

Wake Forest has provided immense support for the overall S-Line process and is providing 20% match for this application. This project is included in the TOD Planning Study that NCDOT completed in 2023 and the Wake Forest Transit Plan, also completed in 2023. The project will also include all necessary review and approval from NCDOT.

Assessment of Project Risks and Mitigation Strategies

Based on local knowledge, coordination with the Wake Forest, and a high-level analysis, a risk register continues to be updated and reviewed to proactively identify solutions. A summary of risks identified to date and mitigation measures is shown in Table 1.

Table 3: Project Risks and Mitigation

Risk	Mitigation
Site Conditions	Feasibility and the site assessment will be completed for all communities by the end of 2024 to identify any site constraints. The schedule has built in contingency to address environmental uncertainties, such as historic properties and utility conflicts.
Federal Process Compliance	Wake Forest and NCDOT have extensive experience complying with federal processes, including grants, NEPA, and permitting. Coordination efforts with agencies will continue throughout all phases of the Wake Forest Mobility Hub.
Community Buy-in	To accomplish consensus-driven, individualized outcomes, it will be critical for community members to have a seat at the table during all phases of the Wake Forest Mobility Hub.

¹⁸ <https://www.ncdot.gov/divisions/integrated-mobility/innovation/s-line-study/Pages/default.aspx>



	Community outreach is a key part of every step through construction.
ROW Acquisition	Potential ROW needs will be defined by the end of 2024 and early discussions with property owners will occur.
Construction Environment & Impacts	Construction cost estimates include a contingency for escalation. Trends will be monitored, and the project risk assessment will be updated as necessary. Availability of resources will also be monitored.
Schedule	The current schedule provides flexibility for unforeseen delays or potential issues to ensure funds are obligated and activities complete in compliance with the grant requirements.

Technical Capacity Assessment

Federal Funding

NCDOT will serve as the RAISE 2024 applicant and recipient responsible for administration of the grant if selected for award and will provide program management and oversight of project delivery. NCDOT will lead the administrative requirements of grant management and will conduct reviews during the design and construction submittal processes. NCDOT will also oversee the CEI process. For day-to-day management, a project manager will be assigned for all construction-related issues, and a grant coordinator will be assigned for grant-related tracking and compliance. Working in close collaboration with its partners and the design and construction teams, NCDOT will be a successful manager and steward of these funds. NCDOT will leverage its extensive experience completing successful TIGER, BUILD, RAISE, NSFLTP, and INFRA projects and administering federal transit and rail funding to reduce and mitigate risk. NCDOT will also leverage its expertise in understanding USDOT's requirements and maintains the records and accounting systems that will allow it to comply with the RAISE program's reporting and administration requirements. This project will provide leadership for safe, affordable, and innovative multimodal transportation throughout North Carolina. To deliver the Project, NCDOT will work closely with Wake Forest to improve mobility and system performance.

Benefit-Cost Analysis

The following section details the benefit-cost analysis (BCA) used to evaluate the degree of positive impact expected from anticipated financial investment in the Wake Forest Mobility Hub. The results conclude that the project will augment the economic activity, quality of life, and sustainability of the Wake Forest community and the surrounding region.

The BCA compares the measurable benefits yielded from the Mobility Hub with the incurred costs. Costs are assumed to begin accruing in FY 2027 when construction is expected to start, while benefits are assumed to begin accruing in FY 2029 when construction is expected to be complete. Both are examined through FY 2048 – 20 years after construction begins – using discount rates to account for the net present value of future monetary gains and expenses, so all values are measured by 2024 dollars. USDOT guidelines prescribe a 7 percent discount rate on all values other than Emissions benefit related to CO₂ for which 3 percent is used.

The project is estimated to cost \$72,173,584.84 over a 20-year horizon – reflecting totaled capital expenditures, operations and maintenance costs, and train service stoppages – while its resulting benefits are valued at \$157,347,067. All measured benefits are the outcomes of mode-shift and lowered vehicle miles traveled (VMT). With a benefit-cost ratio of 2.18, the BCA analysis concludes that, while the Wake Forest Mobility Hub requires significant investment, its benefits significantly outweigh its costs. Table 1 summarizes these findings.

Table 1. Summary, Wake Forest Mobility Hub Benefits and Costs

Benefit/Cost	Measure	Value (\$)
Benefits		
Safety	Crash reduction	\$40,604,159
Environmental Sustainability	CO ₂ emissions	\$88,604,021
Health	SO _x , NO _x , and PM 2.5 emissions	\$14,261,840
	Mortality reduction from walking	\$848,671
Quality of Life	Pedestrian journey quality	\$13,054
Economic Activity	Reduced operating costs from mode shift	\$339,968,653
Useful Life	Residual value	\$4,632,191
	Travel time savings	\$40,646,532
Total (Undiscounted)		\$529,579,121
Total (Discounted)		\$157,347,067
Costs		
Capital Expenditure		\$43,930,881.07

Operations and Maintenance	\$735,000.00
Train Idle and Stop Impacts	\$186,036,238.84
Total (Undiscounted)	\$230,702,119.91
Total (Discounted)	\$72,173,585.84
Net Present Value	\$85,173,481
Benefit-Cost Ratio	2.18


Analytical Assumptions

The BCA assumes the following:

- Public and active transportation ridership will increase over the period of the analysis.
- Increased ridership will result in mode-shift away *only* from personal motorized vehicles. All VMT reductions are therefore reflective of personal motorized vehicle VMT reductions.
- Reduced VMT will reduce crashes, emissions, and congestion.
- Benefits and costs are discount at 7 percent for all factors except CO₂ which is discounted at 3 percent.
- Costs begin accruing in FY 2027; benefits, FY 2029.
- This project is not anticipated to provide stormwater runoff benefits. The benefits of the new infrastructure have not been included in this BCA, per the USDOT BCA Guidance.
- Capital expenditures were assumed at 5% of total cost.
- Ridership values are derived from previous BCAs completed on behalf of the overall S-Line Rail Program. These were applied to Wake Forest individually by future automobile use taken from the growth in Work from Home (assumed to double) and future train passenger growth.
- The previous S-Line BCAs also accounted for trips from Charlotte to New York City, as part of the Southeast Rail System, and they have been modeled in this BCA for consistency.
- The percent population growth for Wake Forest based on the US Census was estimated at 6.8% from April 2020 – July 2022. It is noted that this timeframe was a significant social and cultural shift that resulted in town like Wake Forest seeing exponential growth. This growth is not appropriate to use for the purposes of this BCA. The growth rate of 1.9% was used instead, as it was a consistent growth rate for the region from 2010 – 2020.

Benefits

The BCA uses crash reduction associated with decreased VMT to measure the safety benefits expected to result from the Wake Forest Mobility Hub. To calculate the value of safety increases associated with the VMT reduction, the BCA uses USDOT fatality and injury rates per 100 million VMT and the monetary costs of fatalities and injuries according to the BCA guidance. These numbers are multiplied with the VMT reduction the project is expected to cause each year to produce a dollar valuation of the lives saved and injuries prevented by the Mobility Hub's



completion. The safety benefit induced by the project is valued at \$40,604,159 which accounts for approximately 8 percent of the total benefit.

To evaluate the sustainability benefit of the project, the BCA calculated the value of reduced CO₂ emissions. The BCA Guidance recommends a monetized value for CO₂ emissions which was multiplied by the EPA's estimate for per-mile emissions and the expected VMT reduction induced by the Mobility Hub. The sustainability benefit created by the Mobility Hub is \$88,604,021, which accounts for approximately 17 percent of the total benefit.

Two measures were used to determine expected health benefits from the Mobility Hub: SO_x, NO_x, and PM 2.5 emissions reduction, and mortality reduction from walking. As for CO₂ emissions, the BCA Guidance recommends a monetized value for each pollutant which was multiplied by the EPA's estimate for per-mile emissions per pollutant and the expected VMT reduction induced by the Mobility Hub. The BCA Guidance also presents an average monetized benefit of a walking or cycle trip that was multiplied by the expected increase in those trips via those modes. Emissions reduction benefit is valued at \$14,261,840, mortality reduction \$848,671. Combined, health benefits account for approximately 3 percent of the total.

Quality of life benefit is measured by pedestrian journey quality, a value provided by BCA Guidance which is then multiplied by the length of new sidewalk. Quality of life benefit is valued at \$13,054, accounting for approximately 0.002 percent of the total benefit.

Economic activity benefit is valued at \$339,968,653, which accounts for approximately 64 percent of the total benefit. This value was derived from the BCA Guidance's estimate for net economic activity induced per VMT reduction and the expected VMT reduction from the project.

Construction of the Wake Forest Mobility Hub will have residual value after the end of the 20-year analysis period. Assuming a useful life of 30 years with 7 percent depreciation, the BCA calculated a residual value of \$4,632,191. Useful life accounts for approximately 0.09 percent of the total benefit.

Derived from the BCA Guidance's travel time improvement rate estimates, travel time savings are valued at \$40,646,532, which accounts for approximately 8 percent of the total benefit.

Costs

The capital cost for this project is projected to be \$43,930,881.07, including \$16,500,000 net build costs, a 5 percent annual assumption for the cost of repairs, and the labor value of four employees. Operation and maintenance costs are expected to be \$35,000 annually across the project's lifetime, totaling \$735,000. Using the BCA Guidance's for the cost of idling for train travel, these impacts were costed at \$186,036,238.84, the most expensive component of the project's life cycle.