Middle Creek Greenway Feasibility Study

Apex, North Carolina

PREPARED FOR

NCDOT IMD and Town of Apex

PREPARED BY

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Acknowledgements

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Table of Contents

Figures

Tables

Executive Summary

The Middle Creek Greenway corridor is a vital bicycle/pedestrian route between the Towns of Apex, Cary, and Holly Springs ideally located to improve active transportation connectivity between the three jurisdictions. The Town of Apex's Master Plan for Parks, Recreation, Cultural Resources, Greenways, and Open Space prioritizes the corridor due to increasing connectivity demand driven by rapid local development.

The purpose of this study is to evaluate the feasibility of possible bike/pedestrian alignments that connect NC 55 and the extension of Jessie Drive (SR 1304) with the Swift Creek Greenway on Ten Ten Road.

Evaluated Alignment Sections

The overall connection can be made in multiple ways, with most of the variation in potential alignments happening within the existing business park. Sections of the connector outside of the business park are assumed to be identical in terms of impact comparison. The comparison effort, therefore, focuses on alignment sections that could make this connection by linking to existing or planned facilities on the edges of the business park.

Alignment A follows Classic Road and Burma Drive, replacing the existing 5′ sidewalk on the respective north and west sides with a 10′ side path (SP). The alignment connects the existing length of 10′ SP on Burma Drive with the Preferred Alignment on Reliance Avenue.

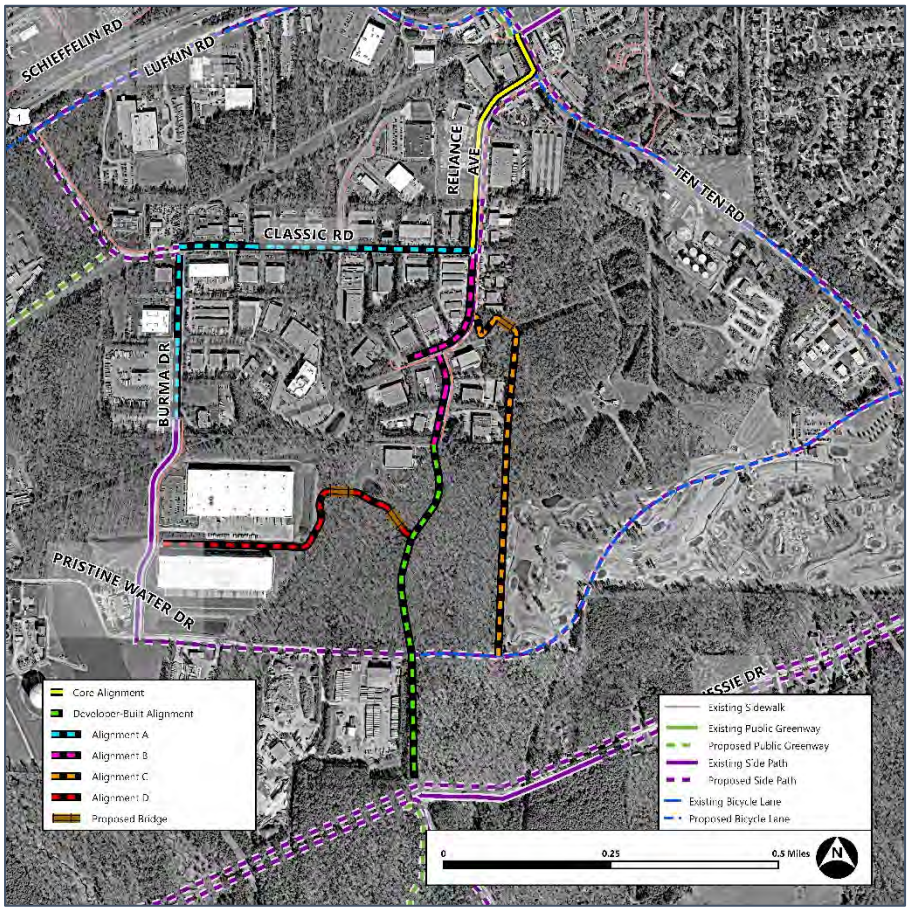


Figure 1: Evaluated Alignments

Alignment B is on Reliance Avenue between Classic Road and Production Drive and on the length of Production Drive, ultimately tying to the planned SP on the Production Drive Extension that will be constructed as part of a commercial development. The alignment is on the west side of both to minimize impacts to existing utilities and avoid conflicts with driveways.

Alignment C is a new location, off-road paved trail that is identical to Alignment B, as it runs along Reliance Avenue until the point where it would diverge from the existing roadway and route through the existed wooded area to the east. The side path would be built on new location, behind the existing buildings, parallel to Production Drive and Production Drive Extension, ending at the future Pristine Water Drive Extension.

Alignment D adds a beneficial east-west connection to the active network but is not required to meet this plan's goals. This alignment would extend from Burma Drive

to the Production Drive Extension on a new location between the recently constructed Cash Corporate Center buildings. This alignment was not evaluated for comparison as it is not an alternative for Alignments A, B, or C but is documented in this study due to its potential benefits.

The *Core Alignment* is comprised of the portion of the connector between the Swift Creek Connector Greenway entry on Ten Ten Road and the intersection of Reliance Avenue and Classic Drive. This portion of the connector makes a critical link along the heavily traveled Ten Ten Road corridor, provides an at grade crossing of Ten Ten Road at Reliance Avenue, and carries into the business park running along the west side of Reliance Avenue to Classic Road.

The *Developer Built Alignment* is the part of the connector that extends from the current end of Production Drive southward along the Production Drive Extension to Pristine Water Drive along the frontage of the approved Apex Commerce Center Lots C&D development and will continue along the roadway extension to Jessie Drive as part of the Apex Commerce Center Lot C development.

Preferred Alignment (Core Alignment + Alignment B + Developer Built Alignment)

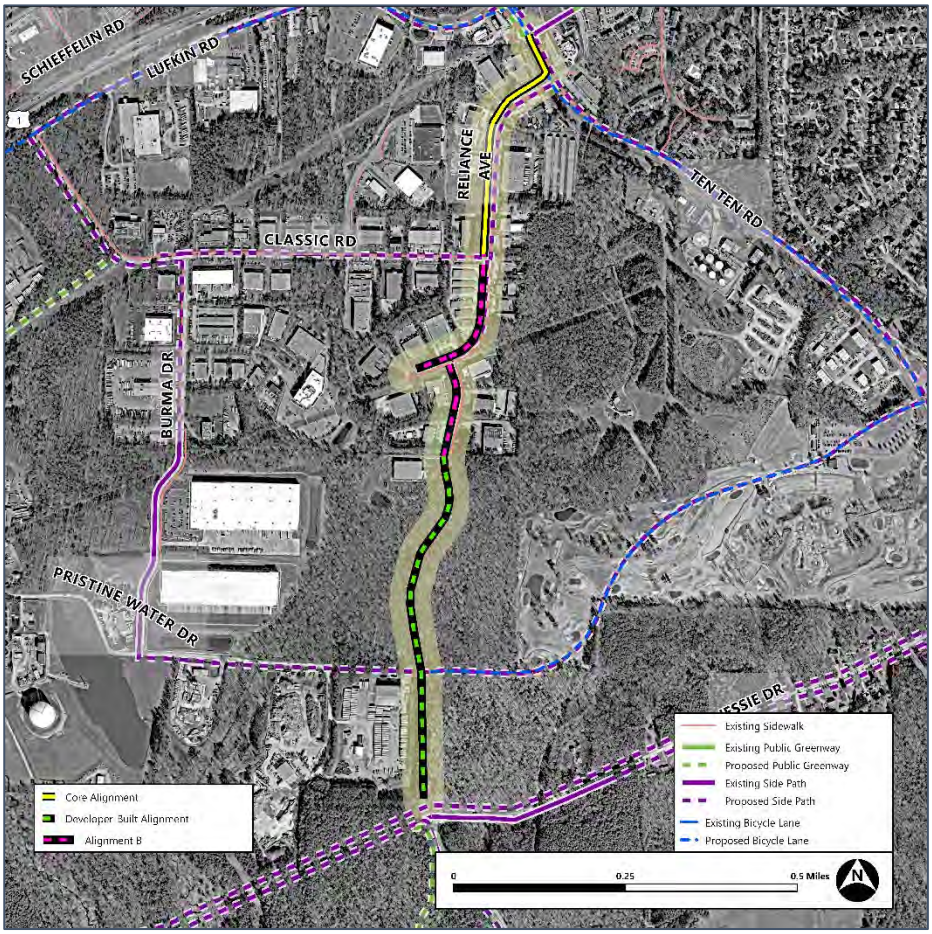


Figure 2: Preferred Alignment

The *Preferred Alignment* is a north-south connection between the Swift Creek Connector Greenway on Ten Ten Road and the Jessie Drive Extension. It is comprised of a combination of evaluated alignments within the study area and is shown in Figure 2. The Preferred Alignment would start at the existing Swift Creek Connector Greenway juncture on Ten Ten Road near Meridian Drive, follow the roadway southeast to Reliance Avenue, crossing Ten Ten Road at-grade at the traffic signal; it would then run along the west side of Reliance Avenue from Ten Ten Road past Classic Road to Production Drive at which point it would follow Production Drive and its developer built extension south to Jessie Drive Extension.

Greenway Design

The connector facility was designed taking into consideration multiple factors, including Town of Apex design standards for bike/pedestrian facilities, long-term maintenance needs, and funding eligibility sources. In some areas, specifically where right-of-way was constrained, the typical 10′ side path (SP) width was reduced to 8′. An asphalt facility is recommended based on site conditions.

Community Engagement

A Steering Committee comprised of Town staff acted in an advisory capacity throughout the project, providing input on outreach methods, existing conditions findings, and alignment alternatives. Additionally, the project team met with a focus group representing local businesses. The input from the local employers confirmed that the greenway could be used by employees during their workday. It is unlikely that employees would use the corridor as a commuting alternative. The project team also met with a bicycle users focus group, learning that bicyclists value safety as a top priority when considering alignments for Middle Creek Greenway. The project team also met with Wake County Public School System Staff, specifically those involved with the Safe Routes to Schools program at Lufkin Road Middle School to share ideas and share information on pros and cons of potential connector options.

To garner input from the larger public, the project team attended the Apex Holiday Lighting event, displaying a map of potential Middle Creek Greenway alignments and asking what factors should be prioritized in the alternative evaluation process. Results of the interactive activity indicated that safety is also the public's biggest consideration when considering using a greenway facility.

Implementation

The implementation of this project should be split into multiple phases, with each building upon the prior phase. Route cut sheets can be found in the Appendix.

- Phase I is to implement the *Core Alignment*, which is the northern portion of the Preferred Alignment, starting at the existing Swift Creek Connector Greenway at Meridian Point Drive, continuing across Ten Ten Road at Reliance Ave and along Reliance Ave to its intersection with Classic Road.
- Phase II is to construct *Alignment B* as the primary north to south connection between Classic Road and the future Jessie Drive extension option either as a standalone project or in coordination with developer driven projects.
- Phase III would include *Alignment A* and/or *Alignment D* as funding and demand supports their implementation.

1 Introduction

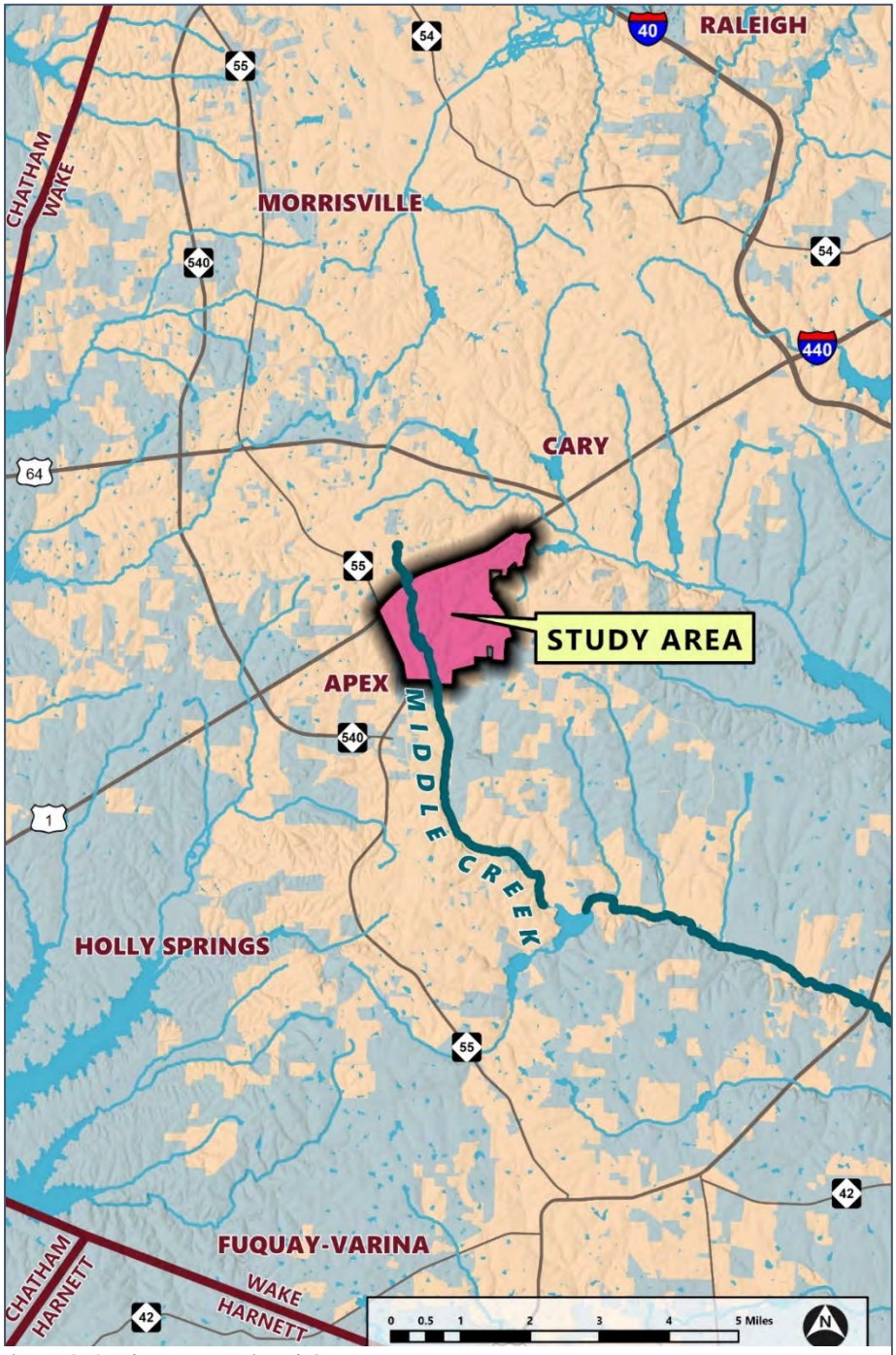


Figure 3: Study Area, Regional Context

1.1 Study Purpose

The Middle Creek Greenway corridor is identified in the Great Trails State Plan as a vital bicycle/pedestrian route between the Towns of Apex, Cary, and Holly Springs. The Town of Apex's Master Plan for Parks, Recreation, Cultural Resources, Greenways, and Open Space prioritizes the corridor due to increasing connectivity demand driven by rapid local development. The development of non-residential and industrial uses within the proposed corridor resulted in the need for an evaluation of the alignment to provide a safe active transportation corridor providing connectivity between the three jurisdictions.

The purpose of this study is to evaluate the feasibility of possible alignments that connect the Swift Creek Greenway to the extension of Jessie Drive (SR 1304), and eventually NC 55.

1.2 Study Area

The feasibility study examines an approximately 1,600-acre area, bounded by US 1 to the north, properties adjacent to the planned Jessie Drive Extension to the south, NC 55 to the west, and the Apex-Cary municipal

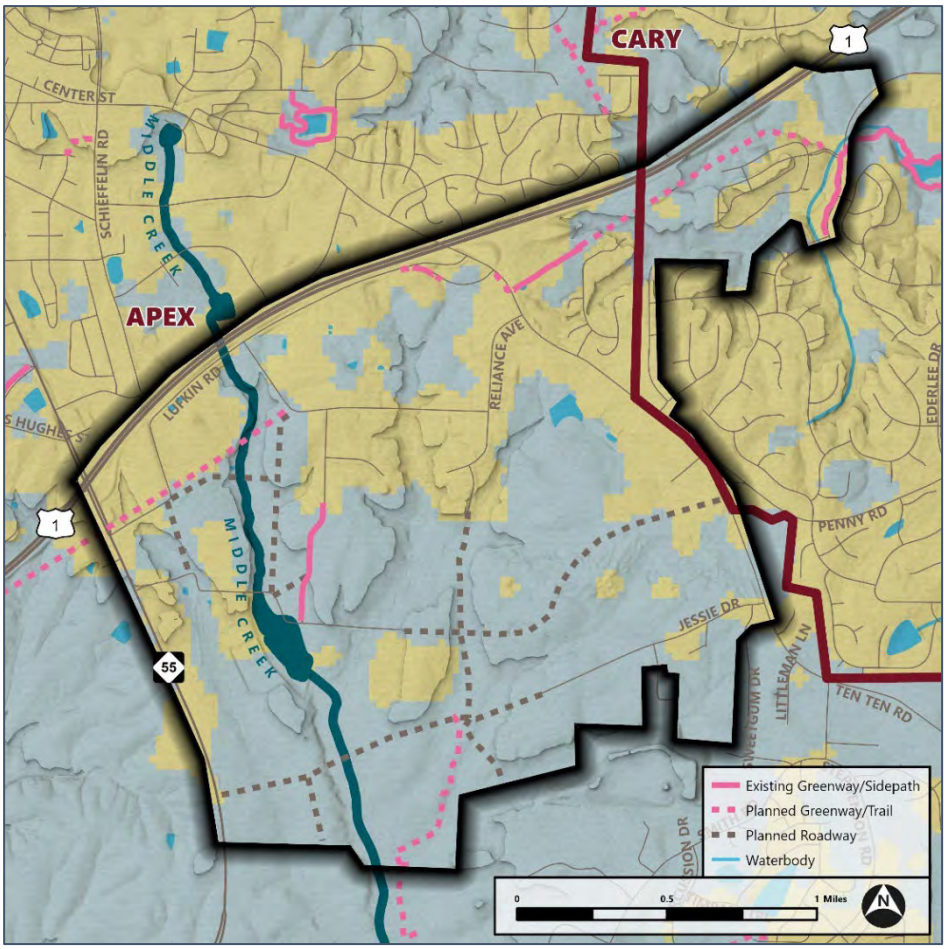


Figure 4: Study Area, Local Context

border to the east; the area also includes a 0.25-mile-wide corridor extending eastward from the municipal border to Regency Parkway (see Figure 3 and Figure 4).

1.3 Plan Goals and Benefits

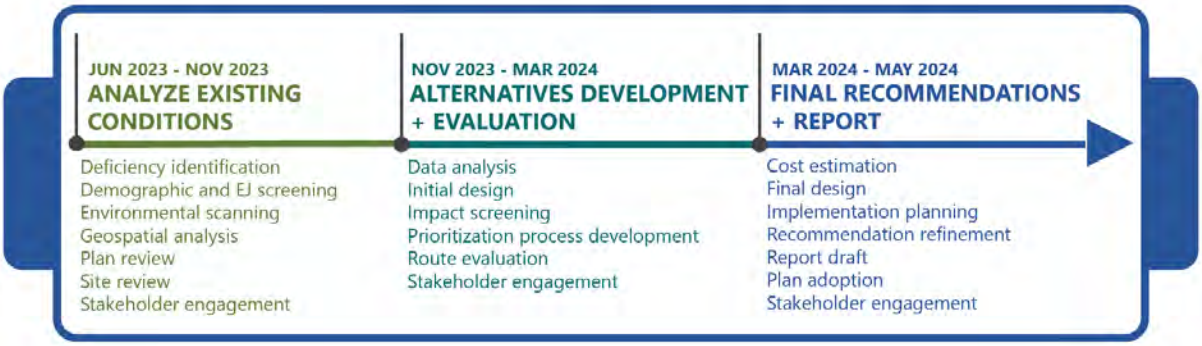
This plan is informed by the vision of the community, addressing the priorities and concerns of residents and workers in Apex. Following conversations with town staff, steering committee meetings, and public engagement events, the most consistently shared values were condensed into an aspirational vision for the Middle Creek Greenway.

The Middle Creek Greenway will complete the regional active transportation network through a high-volume corridor, connecting job centers, neighborhoods, and recreational opportunities to existing greenways. The route will offer multimodal access that prioritizes user safety and comfort. The feasibility study considered the following goals in its analysis of potential connector alignments:

- Improve connectivity to key destinations through the corridor.
- Limit the environmental impact of greenway construction.
- Prioritize the safety of all transportation modes through the corridor.
- Create a comfortable, pleasurable active user experience through the corridor.
- Evaluate cost implications and funding mechanisms to ensure prudent expenditure of public funds.

1.4 Process and Schedule

The Middle Creek Greenway Feasibility Study was conducted between June 2023 and May 2024. Each phase is listed in the graphic below.



1.5 Previous and Relevant Plans Review

To ensure its recommendations are complementary to previously identified community goals, the study is informed by preexisting plans and policies. Design considerations are influenced by mandates set at state and local levels.

The plans consulted are listed below:

- NCDOT IMD
    - Great Trails State Plan (2022)
- NC Capital Area Metropolitan Planning Organization:
    - 2050 CAMPO-DCHC Metropolitan Transportation Plan (2022)
- Wake County:
    - Southwest Area Study (2019)
    - Greenway System Plan (2018)
- Town of Apex:
    - 2045 Land Use Map (2023)
    - Master Plan for Parks, Recreation, Cultural Resources, Greenways, and Open Space (2023)
    - Vision Zero Action Plan (2022)
    - Advance Apex: The 2024 Transportation Plan (2019)
    - Bike Apex (2019)

Key considerations from each plan are noted with the relevant existing conditions analysis in Section 2 and compiled in Appendix B.

2 Existing Conditions and Planning Considerations

This section outlines existing conditions within the study area that are relevant to the connectivity, design, and implementation of the proposed Middle Creek Greenway. Each subsection details a specific resource or parameter for consideration in the planning process and connects those to the evaluation criteria that are used to compare developed alternatives. The data presented in this section is a combination of available data (GIS, census, traffic) and field observations. Fieldwork is an important part of the planning process that helps the project team understand the local culture and existing conditions associated with a site. It also helps the project team evaluate design solutions that respond to the specific needs and characteristics of the site. The project team conducted a field visit along with Town staff, and insights or photos gathered from that fieldwork are summarized in this section. Any previous or relevant plans associated with a subsection were reviewed and are summarized herein.

2.1 Demographics

A spatial understanding of Middle Creek's demography should inform connectivity and safety priorities for alignment development.

Table 1. Evaluation Criteria Informed by Demographic Considerations

Connectivity	Cost	Environmental Impacts	Safety	User Experience
X			X	

To ensure the greenway is as equitable as possible, the study must consider how the project's impacts on different communities may vary. Disadvantaged populations are not concentrated evenly through the corridor, so alignment location will have connectivity implications for those who have been historically excluded from mobility options or harmed by infrastructure projects.

NCDOT's (North Carolina Department of Transportation) TDI (Transportation Disadvantage Index) tool indicates that communities of concern – namely, racial minority groups, those in poverty, senior citizens, zero car households, those who are disabled, and those with limited English proficiency (LEP) – are most prevalent in the southeast of the study area. This census block group scored 16 (of a possible 21) on the TDI index relative to county and state levels, compared with the western block group which scored 11 and the northeastern block group which scored 10 and 9 (state and county). Table 2 details the distribution of disadvantaged populations in the demographic study area (DSA), defined by the boundaries block groups' boundaries.

Table 2. Demographic Detail, Communities of Concern at Block Group Level

Block Group Location (Block Group GEOID)	Poverty (%)	Senior (%)	People of Color (%)	Zero Car (%)	Disabled (%)	Limited English Proficiency (%)	TDI Scores (County/ State)
Northeastern (371830534052)	10.0	13.2	19.1	0.95	7.7	0.94	9/10
Southeastern (371830534312)	30.6	6.6	66.9	4.6	5.2	22.1	16/16
Western (371830534311)	7.8	7.8	24.7	1.4	6.3	2.8	11/11

**Orange values represent those that meet NCDOT's threshold for a block group's consideration as an environmental justice (EJ) community.*

The southeastern block group has notably high rates of poverty, people of color, and LEP persons and should therefore be prioritized when considering the connectivity benefits and adverse impacts of possible alignments. However, it should be noted that households in this block group are concentrated outside the study area, as depicted in Figure 5.

Figure 5 also makes clear that, while the study area itself is not predominantly residential, its location presents the opportunity to interconnect more densely populated areas; however, without strategic connectivity planning, the study area could instead further divide surrounding communities. Prioritizing proximity to more densely populated areas would also increase the likelihood of nighttime activity on the trail, thereby improving its safety.

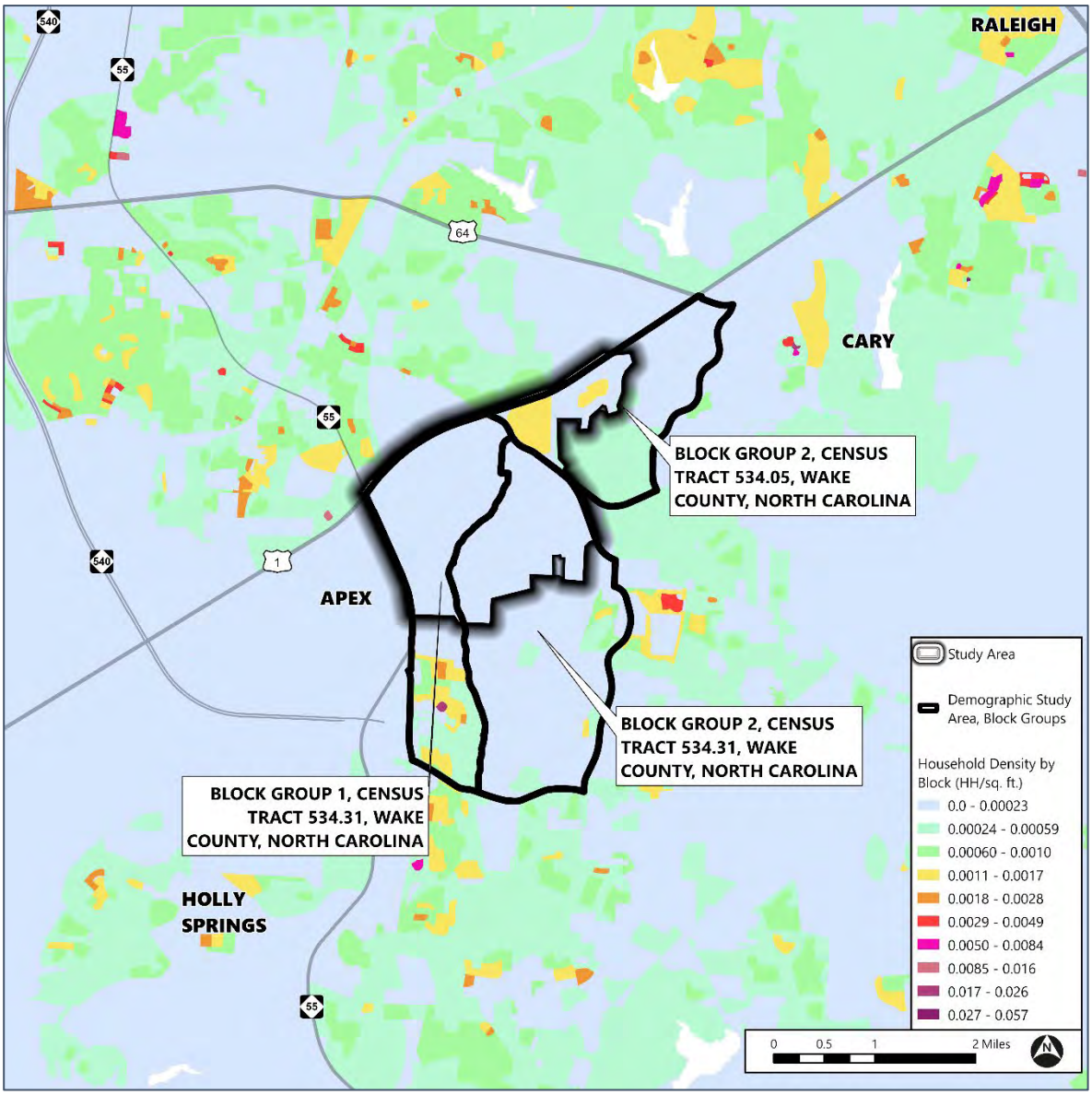


Figure 5: Household Density, Study Area and Vicinity

2.2 Travel Patterns

New greenway connections should link popular local origins and destinations by providing alternate routes for existing travel patterns. Alternatives should also avoid roads with high vehicular traffic for safer, more comfortable user experiences. The study area is within an industrial zoning district and there is a substantial number of heavy truck trips who's travel patterns should be considered.

Table 3. Evaluation Criteria Informed by Travel Pattern Considerations

Connectivity	Cost	Environmental Impacts	Safety	User Experience
X			X	X

The most heavily trafficked roads in the study area are US 1 and NC 55, which define its north and west boundaries respectively (Figure 6). While these routes have high annual average daily traffic volumes (AADT) relative to the surrounding network, limited local roads connect these regional arteries across the study area.

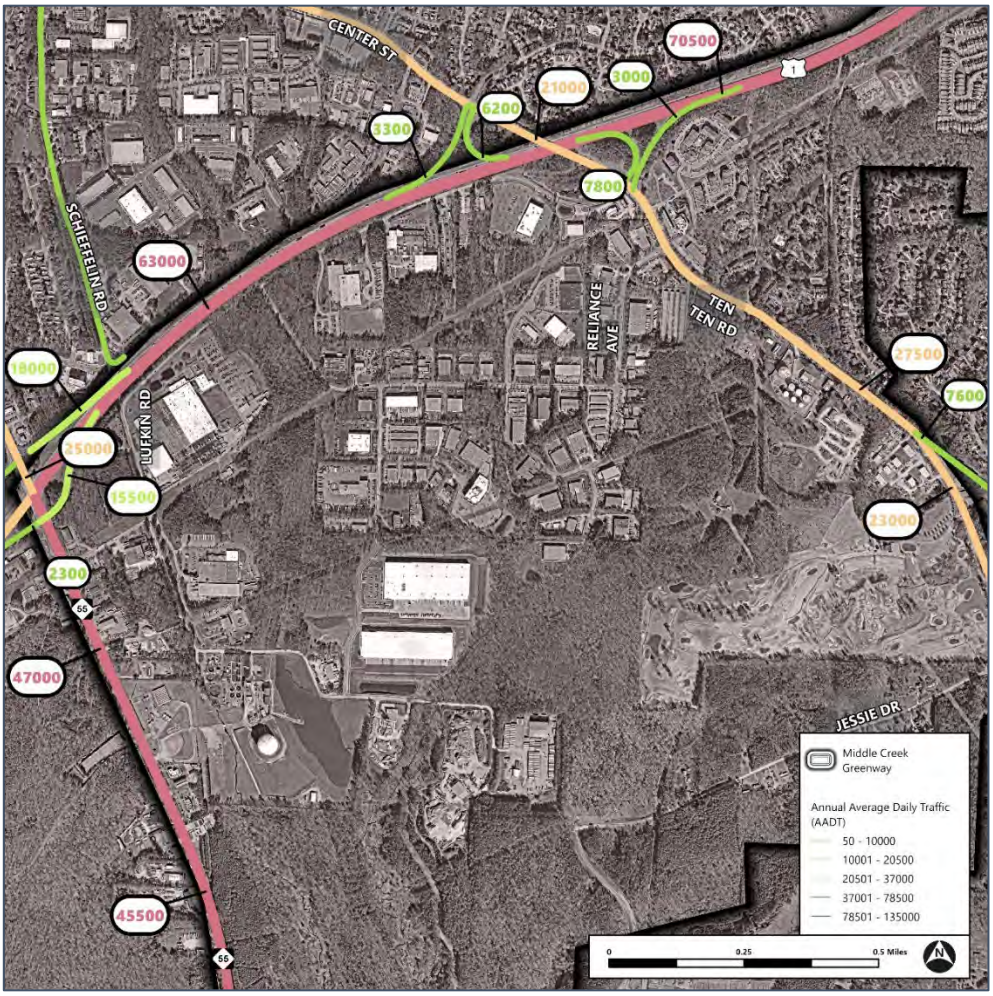


Figure 6: Vehicular Traffic Volume, NCDOT Maintained Roads

Ten Ten Road is the most heavily traveled road that provides local access within the study area; although it receives an average 7,800 vehicles from US 1, the route only delivers approximately 1,000 daily trips to the study area via Lufkin Road, Reliance Avenue, and the apartments and businesses accessible along Ten Ten Road itself.

According to the Census Bureau's Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES), 6,939 workers commuted to the DSA in 2021 while only 3,691 commuted from it. Figure 7 indicates that approximately 15 percent of commuter origins are in the towns of Apex and Holly Springs, within 15 miles of the study area. The Middle Creek Greenway therefore offers an opportunity to provide an active transportation connection for a significant portion of those traveling to the study area for work.

Similarly, Figure 8 shows that many of the DSA's residents commute to job centers along US 1 in Apex, Cary, and Holly Springs. For example, in 2021, 58 workers commuted to jobs between Regency Parkway and Kildaire Farm Road in Cary, immediately adjacent to the DSA. The Middle Creek Greenway could connect the existing active transportation network to the study area's residences and provide multimodal options through a corridor with proven demand. Jobs in the DSA are most concentrated in the Regency Parkway vicinity, highlighting the need for east-west active connections across the study area. In the study area itself, jobs are concentrated in its northwest quadrant (Figure 9). Figure 10 and Table 4 overview the major employers in this area, many of which use large/heavy trucks to transport materials.

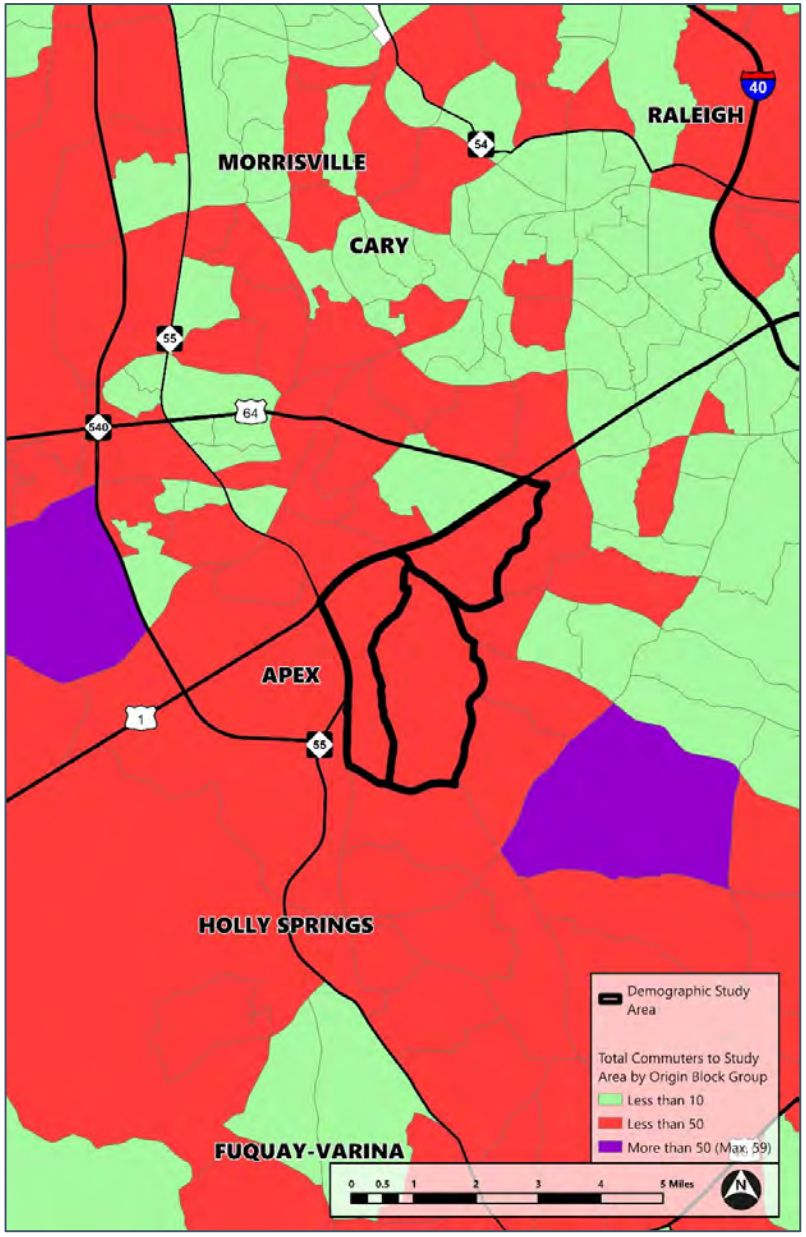


Figure 7: Origins of Workers Commuting to the Study Area, 2021

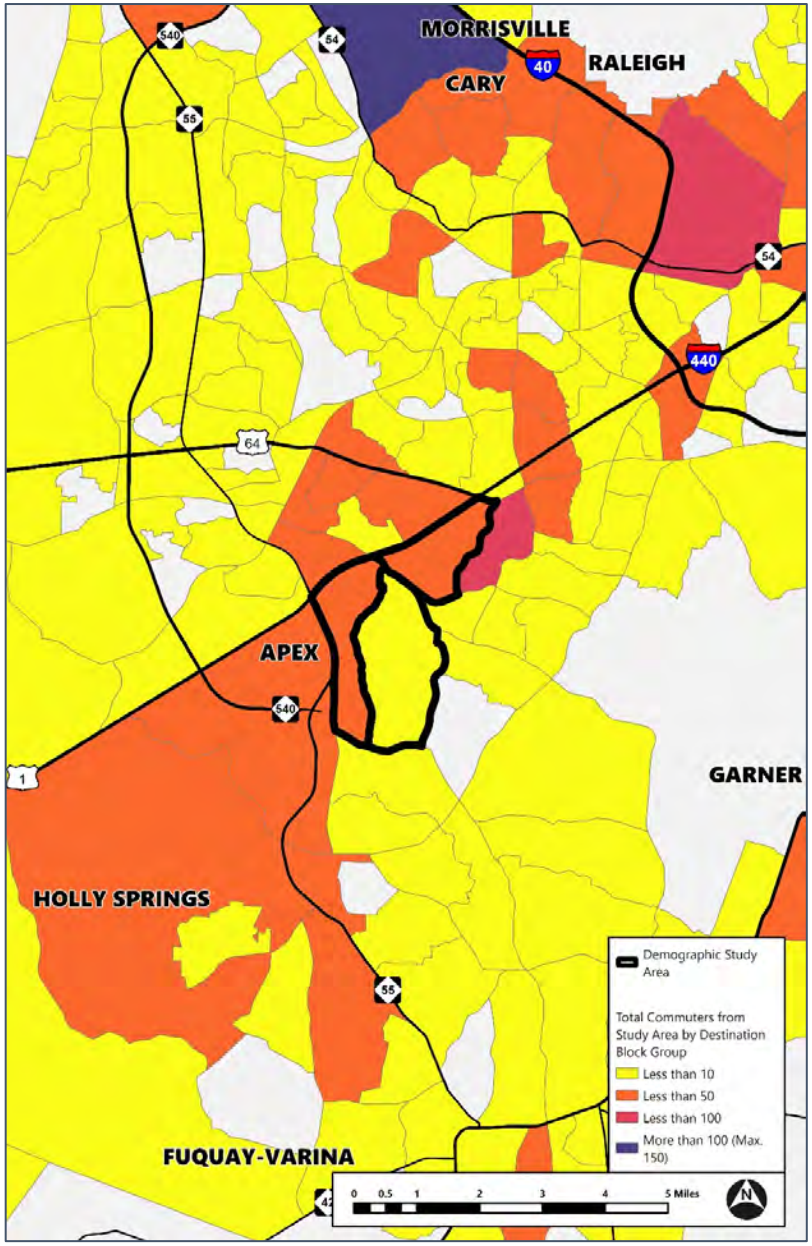


Figure 8: Destinations of Workers Commuting from the Study Area, 2021

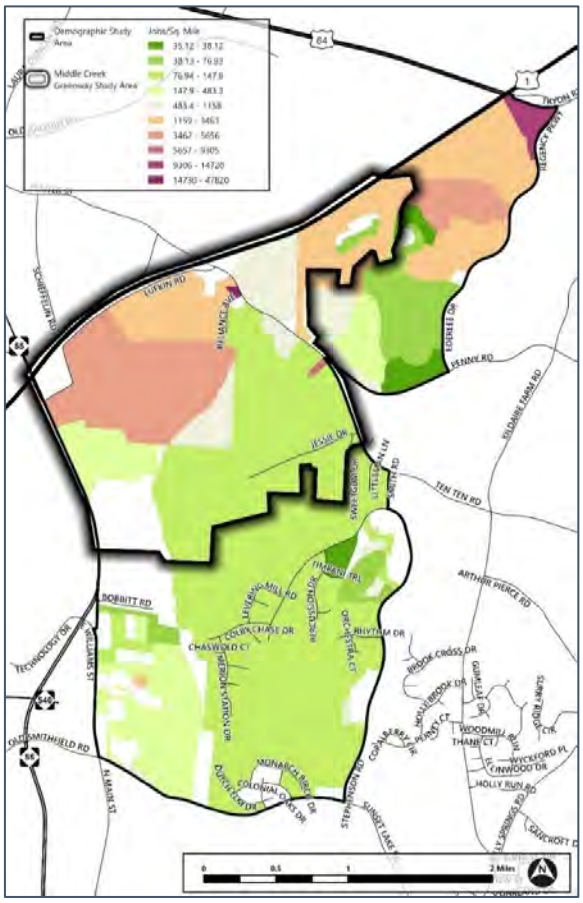


Figure 9: Job Density within DSA

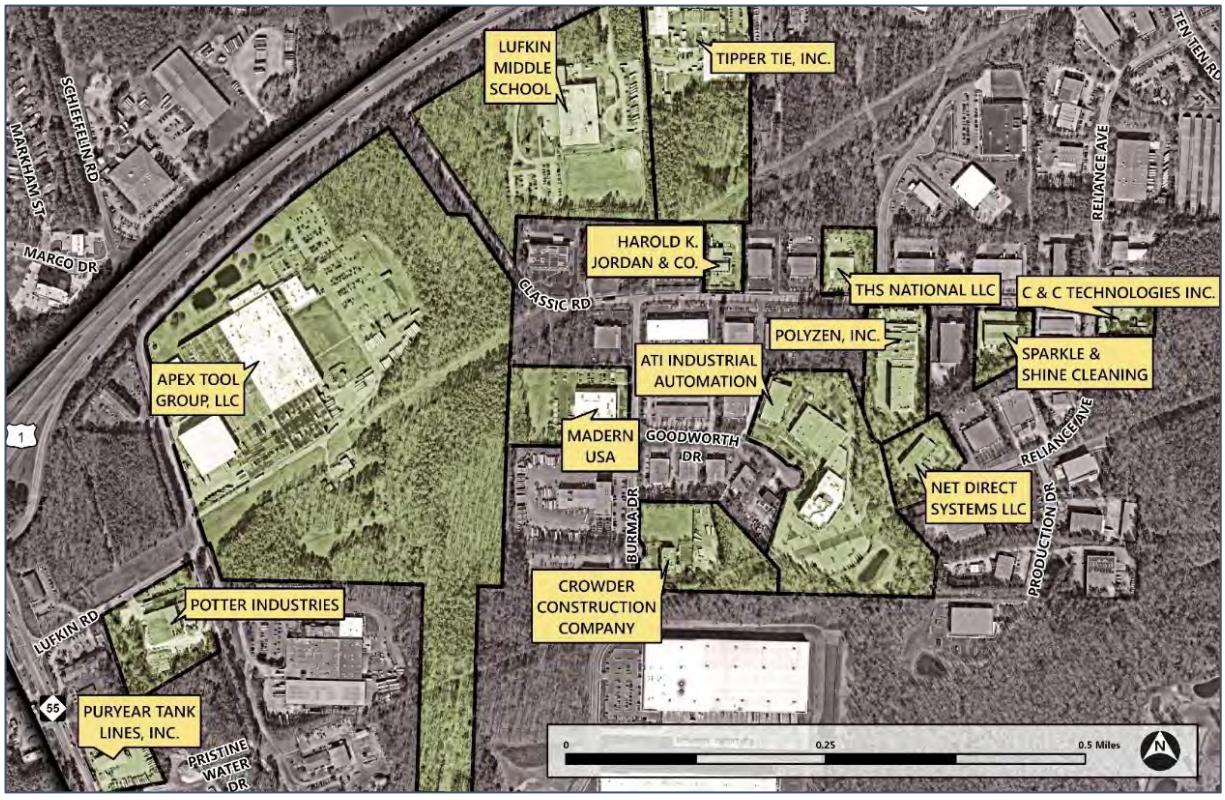


Figure 10: Major Employers in the Study Area

Table 4: Largest Employers in the Study Area[i]

Employer	Industry	Employee Count
Puryear Tank Lines, Inc.	Freight	200
Tipper Tie, Inc.	Manufacturing	156
Apex Tool Group, LLC	Manufacturing	140
Crowder Construction Company	Construction	133
Net Direct Systems LLC	Software Publishing	104
Lufkin Road Middle School	School	101
ATI Industrial Automation	Manufacturing	100
THS National LLC	Construction	87
Sparkle & Shine Cleaning	Janitorial Services	75
C & C Technologies Inc.	Laboratories	67
Harold K. Jordan & Co.	Construction	50
Polyzen, Inc.	Manufacturing	50
Potters Industries	Wholesale	50
Madern USA	Manufacturing	45

2.3 Land Use

The study area's land use arrangement has regulatory and connectivity implications that will inform the greenway's design. Understanding the built environment in its existing and future form offers insight into how an alignment can maximize connectivity benefits while promoting user comfort, improving the overall user experience.

Table 5. Evaluation Criteria Informed by Land Use Considerations

Connectivity	Cost	Environmental Impacts	Safety	User Experience
X				X

247 of the study area's 400 parcels are classified as "residential" with specific uses including single- and multi-family domiciles; however, many, while classified as "residential" by tax data, are functionally commercial or industrial parcels. The majority of homes are accounted for by Renaissance Cottages, a dense development in the northeast of the corridor, in addition, the study area encompasses apartments in the Avalon Peaks and Meridian at Ten Ten complexes and borders the Cambridge, Hunter, and Myrtle Wood neighborhoods.

The study area has few recreational destinations to attract pedestrian and bicycle users, meaning that, at least initially, the greenway will predominantly serve commuters traveling to the study area and commuters/recreationalists travelling through it. Apart from three retail and dining clusters on the area's periphery, Lufkin Road Middle School is the only noteworthy destination for non-commuters. 87 percent of land in the study area – including 47 vacant parcels – is not oriented towards active transportation, and existing facilities do not exist to navigate it (Figure 11).

Figure 12 shows that five developments are either under construction or approved in the study area. Accompanying the extensions of Production Drive and Jesse Drive are two large industrial developments, both of which include roadway infrastructure in their site plans.

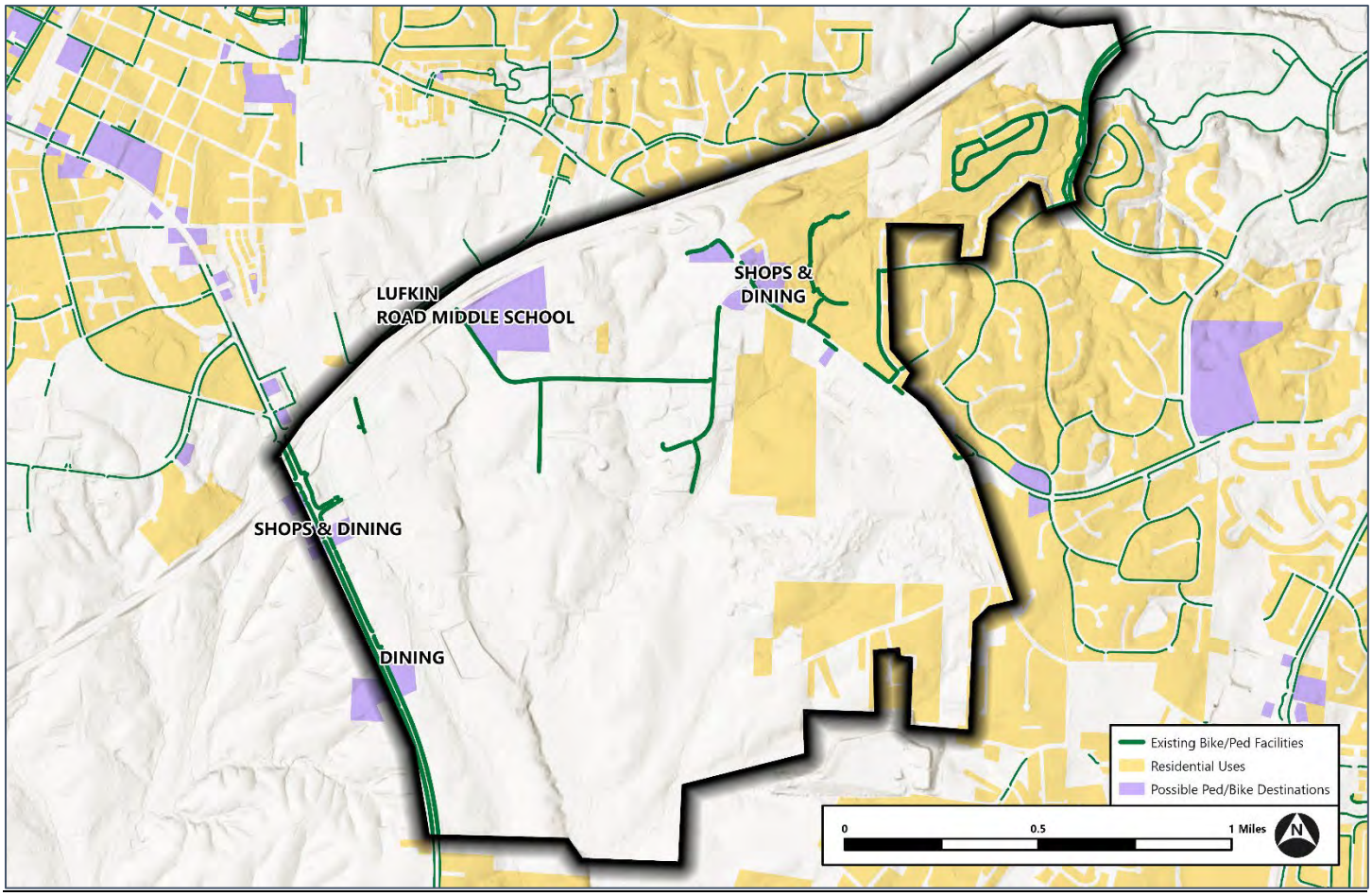


Figure 11: Potential Bike/Ped Origins and Destinations, Study Area and Vicinity

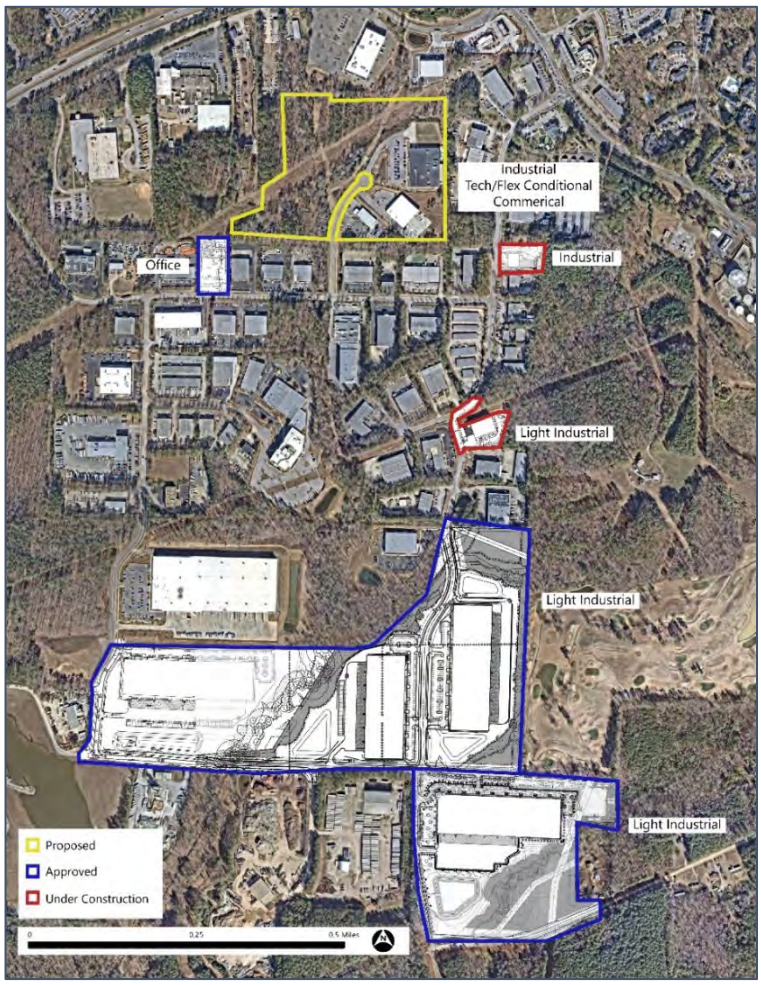


Figure 12: Development in the Study Area

2.3.1 Relevant Plans/Policies

Table 6. Land Use - Relevant Plans/Policies

Planning Document(s)	Relevant Plan/Policy Considerations
Apex Master Plan for Parks, Recreation, Cultural Resources, Greenways, and Open Space (2023)	The Town's implementation plan prioritizes projects that: are compatible with the Town's Future Land Use plan; provide amenities not currently available; and, create a recreation system that connects key destinations.
Apex 2045 Land Use Map (2023)	The Land Use Map classifies the majority of the study area as "Industrial Employment" and identifies it as a potential "Employment Mixed Use Activity Center," setting guidance for the land to be developed for a variety of commercial and industrial intensities.
Great Trails State Plan	Middle Creek Greenway is noted in the Great Trails State Plan network as part of Section 5N, connecting Apex/Cary to Fuquay Varina.

2.4 Natural Environment

Integration of the proposed facility with the natural environment in a context sensitive way will minimize overall impact to protected or sensitive resources and improve user experience.

Table 7: Evaluation Criteria Informed by Natural Environment Considerations

Connectivity	Cost	Environmental Impacts	Safety	User Experience
		X		X

2.4.1 Threatened and Endangered Species

Review of the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) species list revealed no known threatened and endangered species in the study area.

2.4.2 Hydrology

The study area is mostly in the Middle Creek Watershed, a sub-watershed of the Neuse River Basin, but also reaches into the Swift Creek Watershed, approximately where crossing Ten Ten Road eastward. While stream channels exist throughout, the only major waterbody is Middle Creek and its tributaries which generally run from north to south between US 1 and the future Jessie Drive Extension. Impervious surface is concentrated in urbanized areas in the north of the study area, while NWI classified wetlands are present in the south.

Surface waters within the study area drain to two named surface waters (Figure 13). Surface waters in the northeastern project vicinity flow to Regency Park Lake (NCDWR index number 27-43-2.5). Its water quality classification is WS-III;NSW. Regency Park Lake is not listed on the 2022 Final 303(d) list of impaired waters; however, Swift Creek within 1 mile downstream of the project study area is listed due to a fair, poor, or severe fish bioclassification. Surface waters in the remainder of the project vicinity flow to Middle Creek (NCDWR index number 27-43-15-(1)). Its water quality classification is C;NSW. Middle Creek is listed on the 2022 Final 303(d) list of impaired waters due to a fair, poor, or severe benthos bioclassification.

As the moderately sloped landscape rolls evenly across the study area, there are no 100-year flood plains, but alternative evaluations will consider (1) the localized impact of developing where drainage densities are highest – where flooding is most likely – and (2) the downstream impact of additional impervious surface in the watershed (Figure 14).

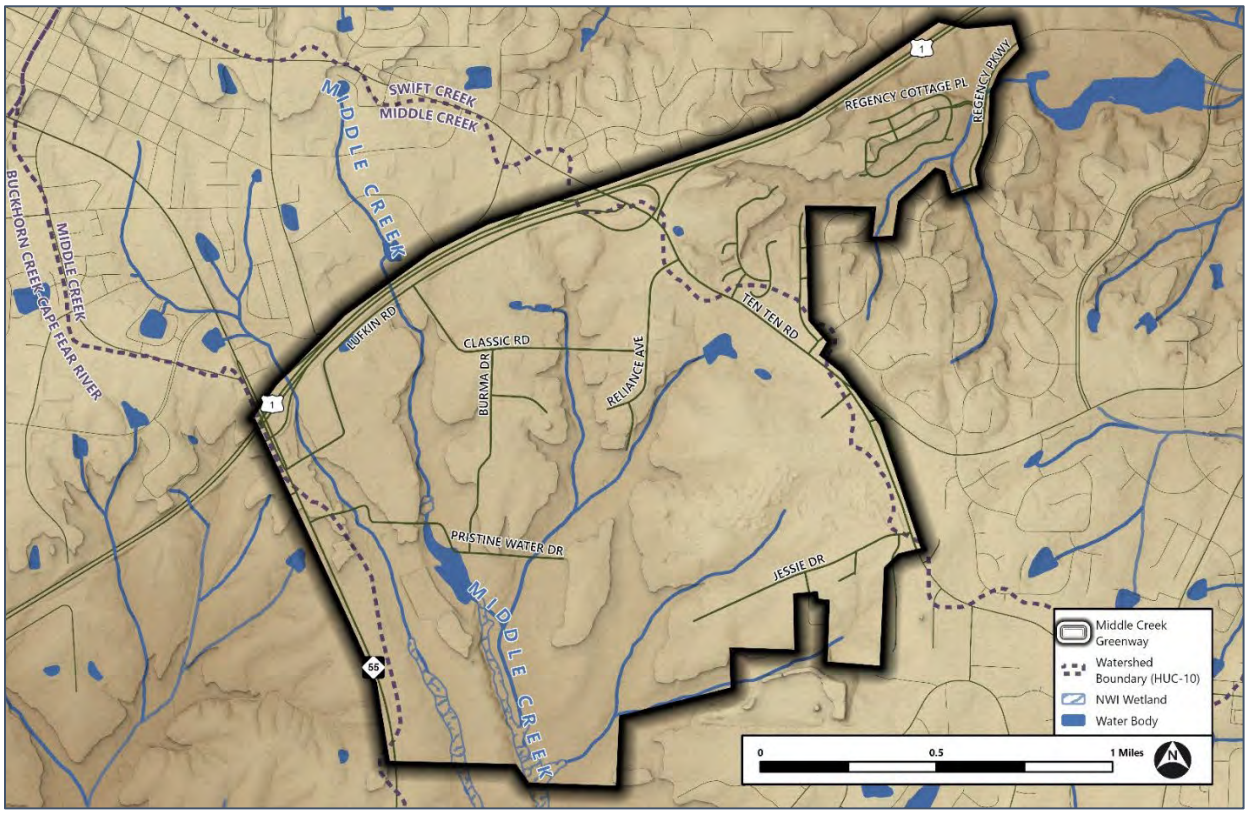


Figure 13: Study Area Hydrology

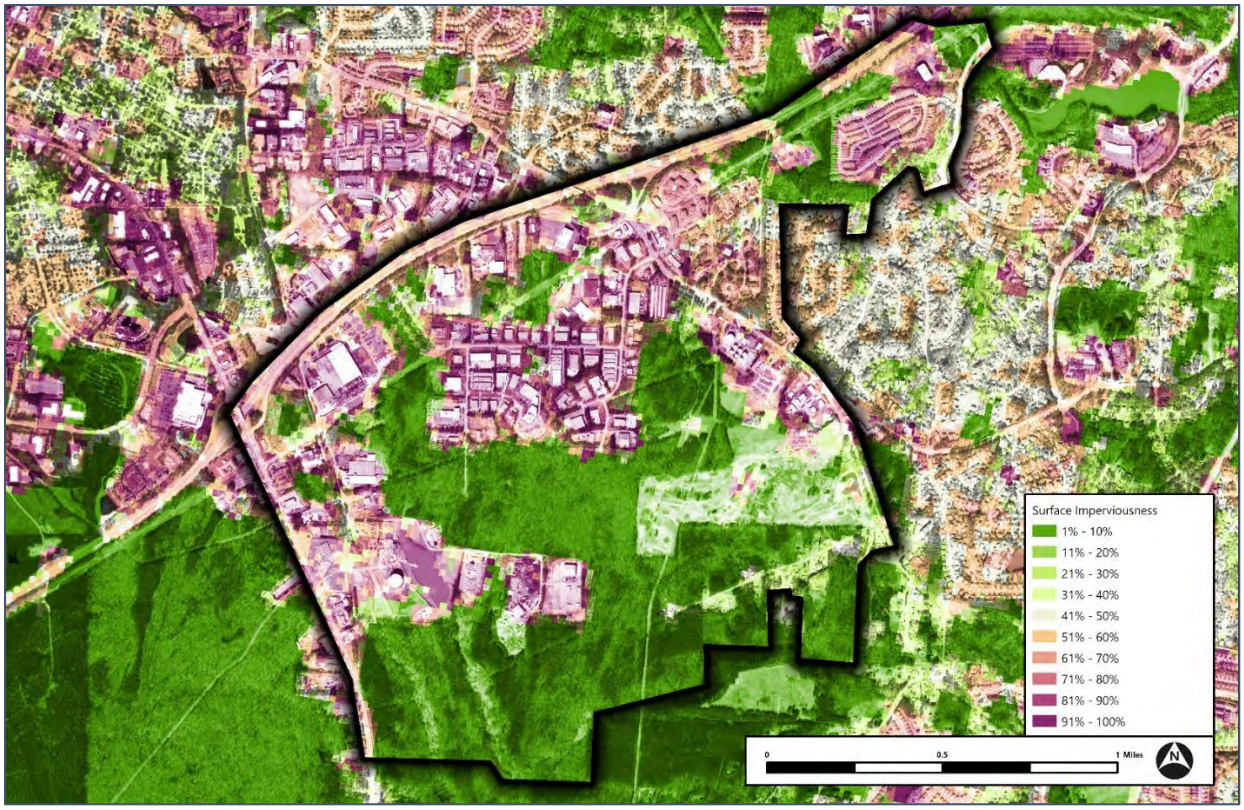


Figure 14: Impervious Surface in the Study Area

2.4.3 Terrain

2.4.3.1 Slopes

Evaluating slopes is critical to understanding natural, accessibility, and regulatory barriers that may impede possible greenway alignments. The average slope in the study area is 5.8 percent meaning that it is largely navigable for all users. Only 671 – or 42.6 percent – of the area's 1,576 acres are at challenging gradients that would require leveling to construct accessible bicycle and pedestrian infrastructure. While proposed alignments' slopes will be considered when evaluating alternatives, Figure 15 indicates a greenway connection between Jessie Drive and Ten Ten Road will likely not be impeded by severe gradients.

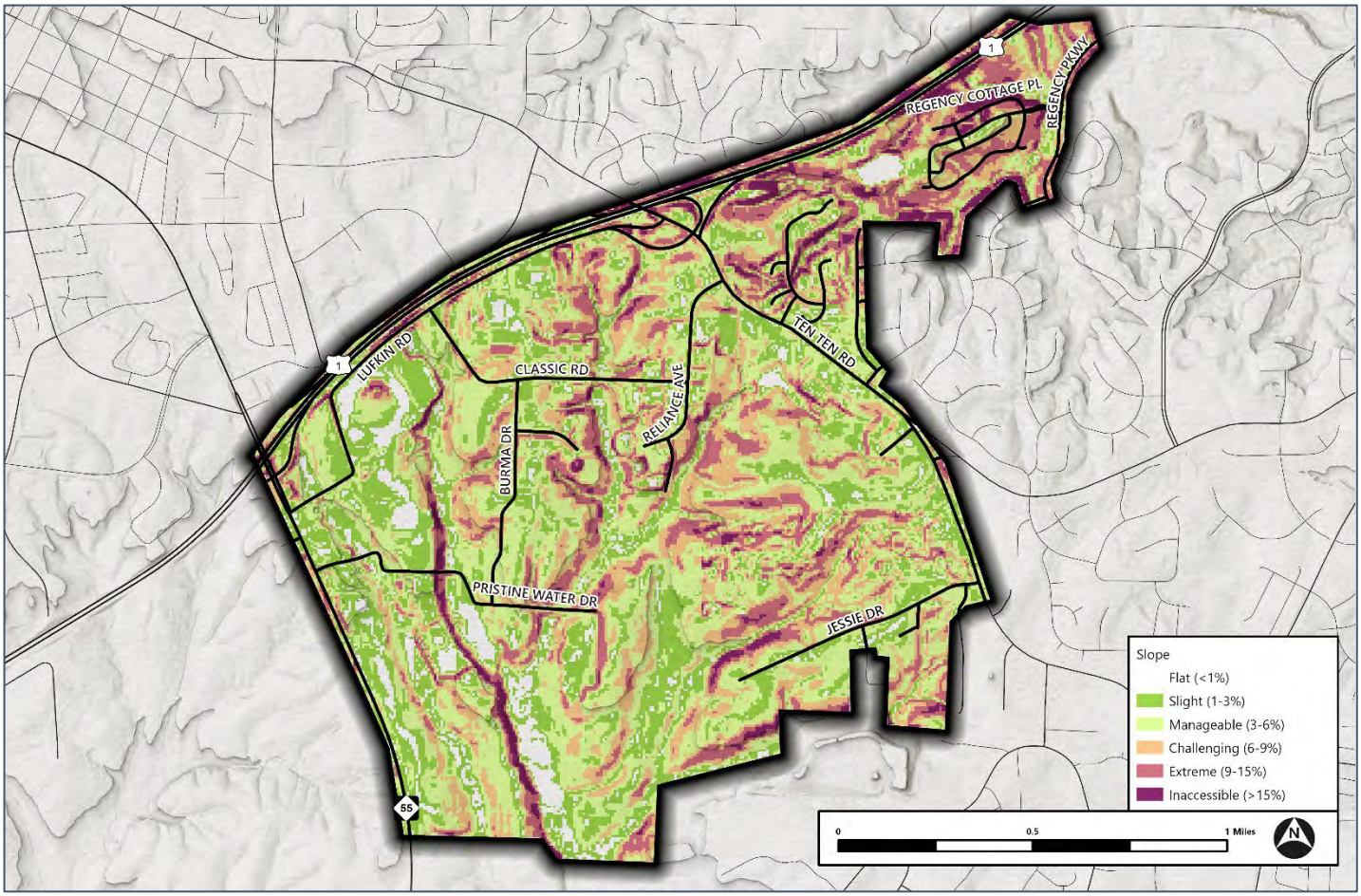


Figure 15: Study Area Slope Severity

2.4.3.2 Land Cover

An area's urbanized extent can be derived from satellite imagery and is useful for predicting alignments' impacts on the natural environment and user experience. While building the greenway in forested areas might be preferable for pedestrians and cyclists, doing so has implications for environmental considerations such as increased impervious surface that could result in additional run-off and a decrease in tree canopy coverage.

Approximately 668 acres (42.3 percent) of the study area is urbanized. The prominence of forest in the study area suggests design alternatives will consider developing existing natural areas (Figure 16).

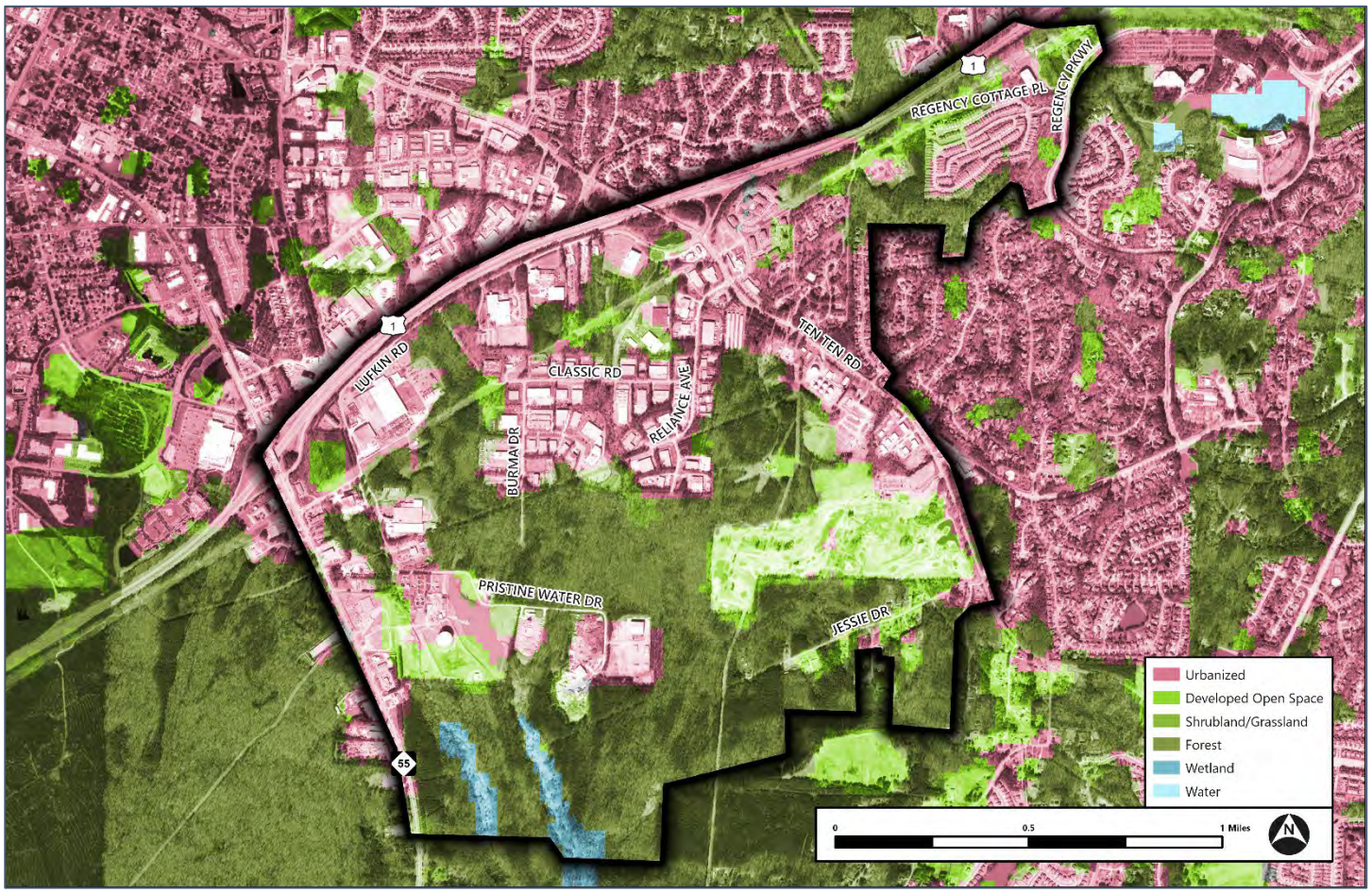


Figure 16: Study Area Land Cover, 2021

2.4.4 Relevant Plans/Policies

Table 8. Natural Environment - Relevant Plans/Policies

Planning Document(s)	Relevant Plan/Policy Considerations
North Carolina Riparian Buffer Protection Program	A delineation must be conducted to determine the status of streams and other surface waters in the study area and to which Neuse riparian buffer rules they are subject.
North Carolina Water Quality Standards	A delineation must be conducted to determine the status and limits of streams and other surface waters in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).
North Carolina Wetland Program Plan	A delineation must be conducted to determine the status and boundaries of wetlands in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).

2.5 Transportation Network

The transportation network is pertinent to most of the identified evaluation criteria referenced in this study. The presence or planned presence of infrastructure and design criteria influence how, when and why people travel s they do.

Table 9: Evaluation Criteria Informed by Transportation Network Considerations

Connectivity	Cost	Environmental Impacts	Safety	User Experience
X	X		X	X

2.5.1 Automobile Infrastructure

Roadway design determines the safety and useability of existing transportation infrastructure for greenway alignment alternatives. US 1 and NC 55, the principal arterials that bound the study area to the north and west respectively, both have two travel lanes in each direction, resulting in wide physical barriers that are hard to negotiate for cyclists and pedestrians. Ten Ten Road, which traverses the study area between US 1 and Jessie Drive, currently has one through-lane in each direction with a center turn-lane throughout; it is

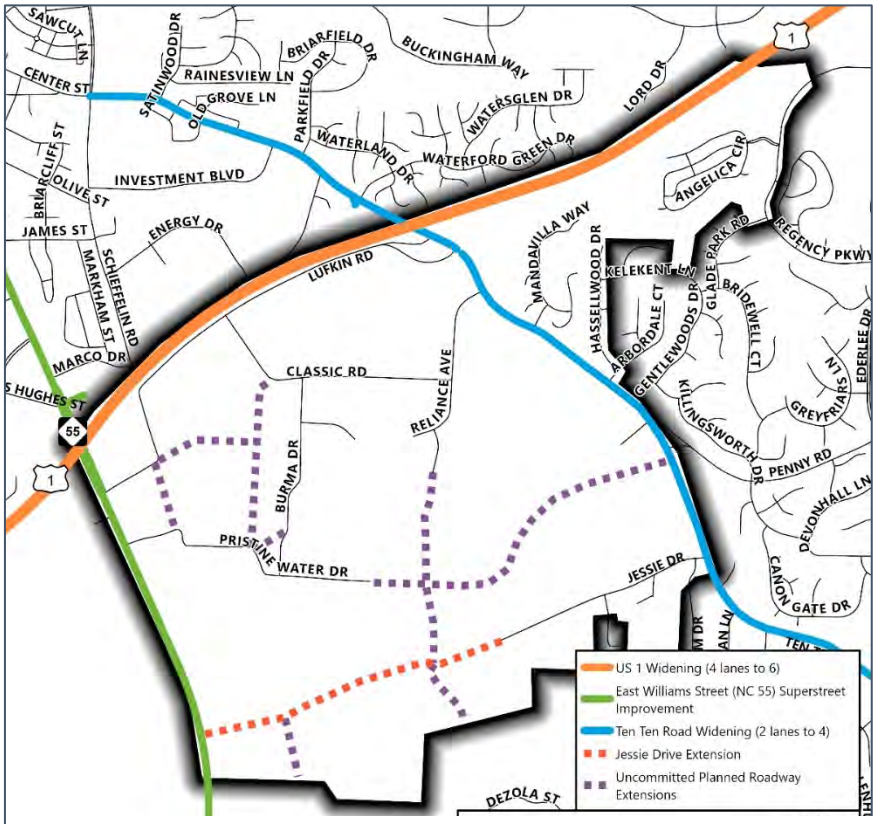


Figure 17: Planned Automobile Infrastructure Improvements

classified as a minor arterial. All three bounding roadways have NCDOT projects on the horizon to widen their cross sections, further widening that physical barrier (Figure 17).

All local roads in the study area have one travel lane in each direction. Speed limits are 25- and 35- miles-per-hour. Lufkin Road and Pristine Water Drive intersect N.C. 55 at traffic signals. Jessie Drive, Lufkin Road, and Reliance Avenue intersect Ten Ten Road, the latter two at traffic signals (Figure 18).

The Renaissance Cottages neighborhood off Regency Parkway is a dense subdivision with a high concentration of intersecting driveways. Burma Drive, Classic Road, Jessie Drive, Lufkin Road, Reliance Avenue, and Ten Ten Road all have segments with relatively high driveway density, mostly to commercial and industrial uses. An automobile turning into or from a driveway that bisects a greenway route poses safety threats to cyclists and pedestrians (Figure 19).

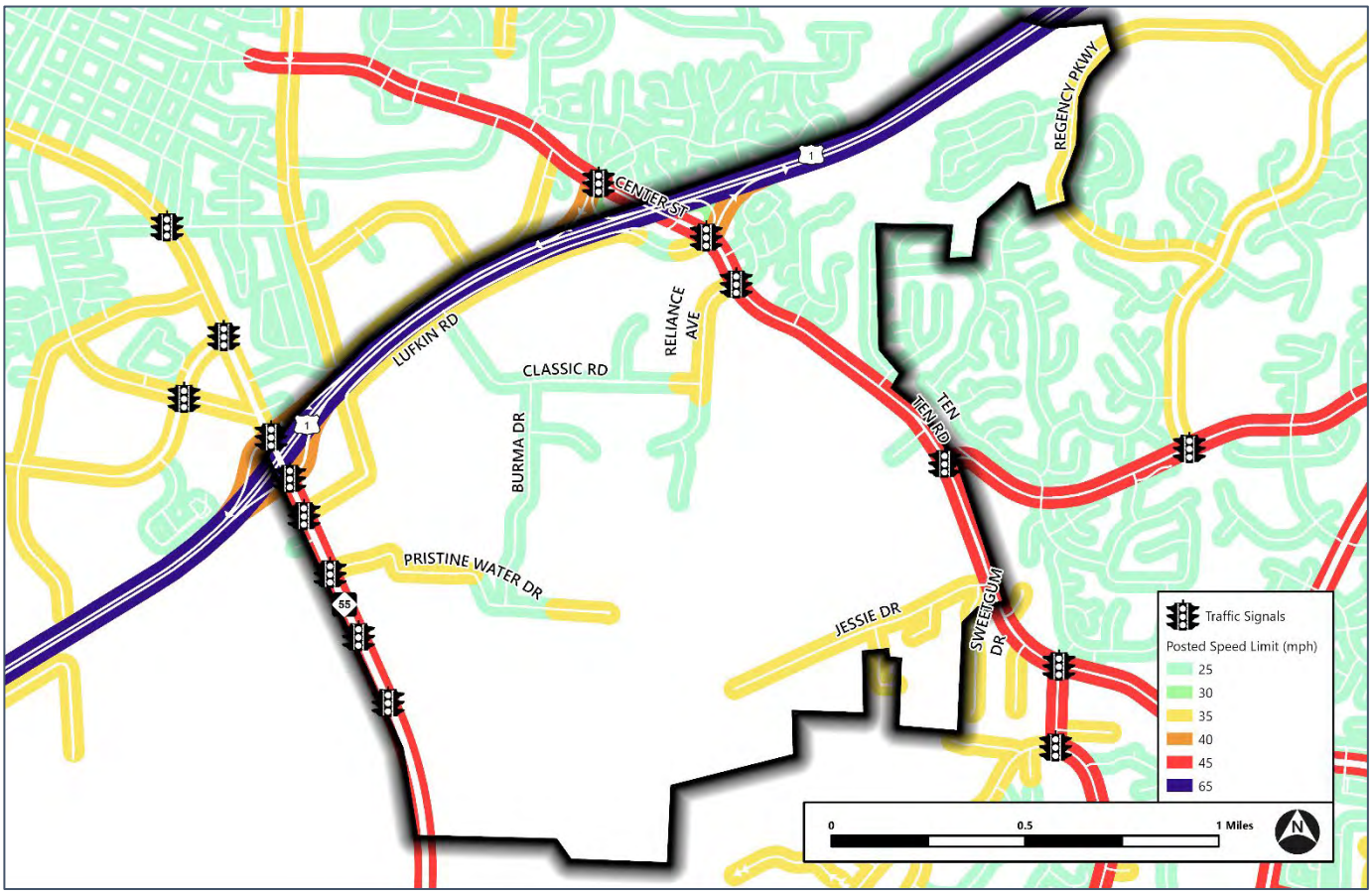


Figure 18: Existing Automobile Infrastructure

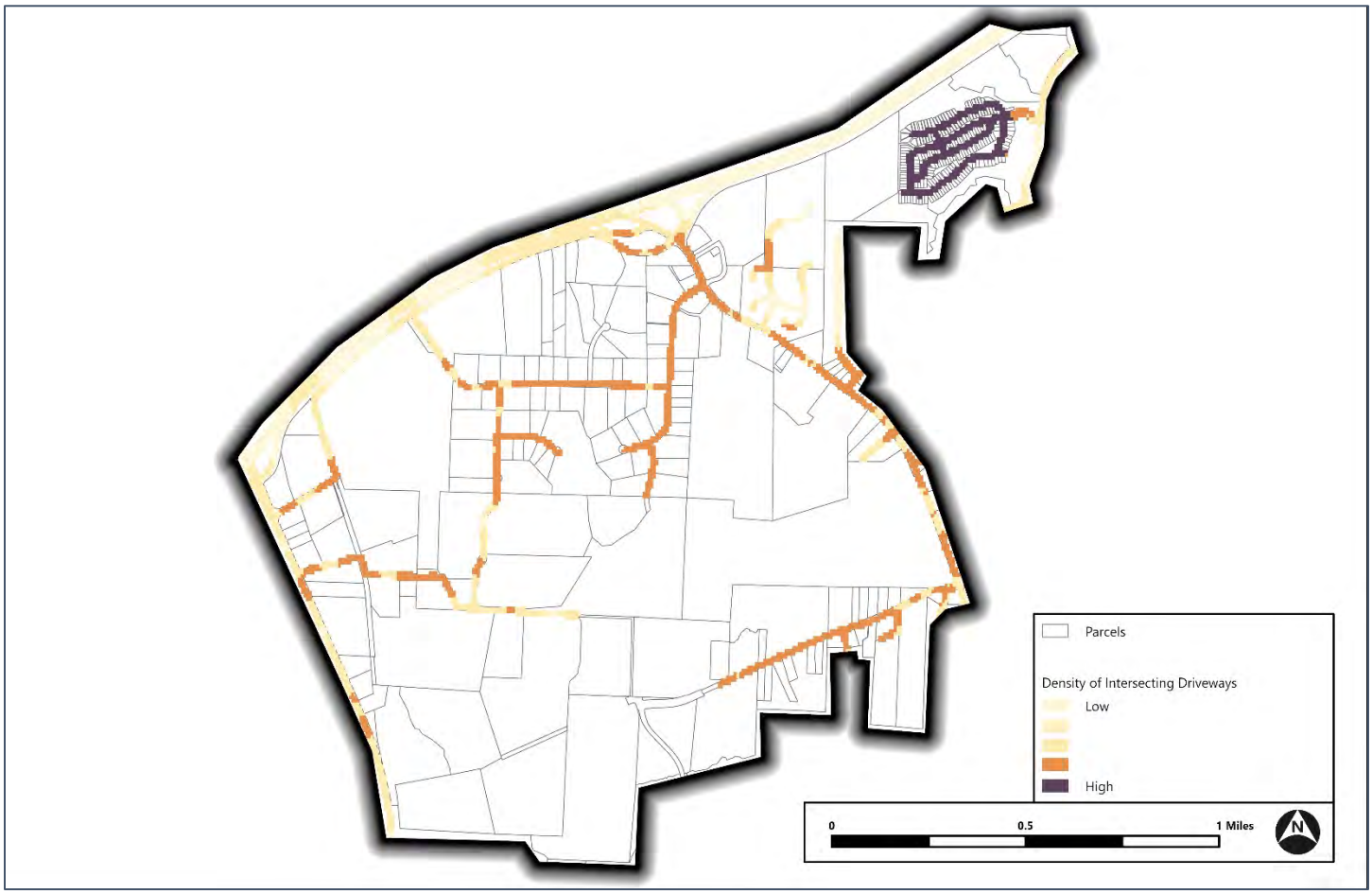


Figure 19: Driveway Density in the Study Area

2.5.2 Active Transportation Infrastructure

Understanding where bicycle and pedestrian infrastructure is already constructed is important for determining the most efficient connection across the study area. The Ton of Apex defines a side path (SP) as a 10' paved facility typically within the right-of-way. The lengths of Classic Road and Reliance Avenue have sidewalks on the north and east side respectively, while Burma Drive has both sidewalk and side path. Stretches of Lufkin Road, Pinnacle Center Drive, Ten Ten Road, and the Avalon Peaks apartment complex also have sidewalks. As well as Burma Drive, side paths run (1) along the front of The Summit Church on Lufkin Road and (2) east from Ten Ten Road through the Meridian at Ten Ten apartment complex. The side paths that currently exist or will be built as part of the preferred alignment for the project would also be designated as greenways. There is no bicycle-specific infrastructure in the study area (Figure 20).

The study area contains seven marked crosswalks. All are within approximately 0.25 square-miles of each other and facilitate pedestrian access to two gas stations on either side of Ten Ten Road, Sheetz and Circle K. No crosswalk traverses Ten Ten Road.

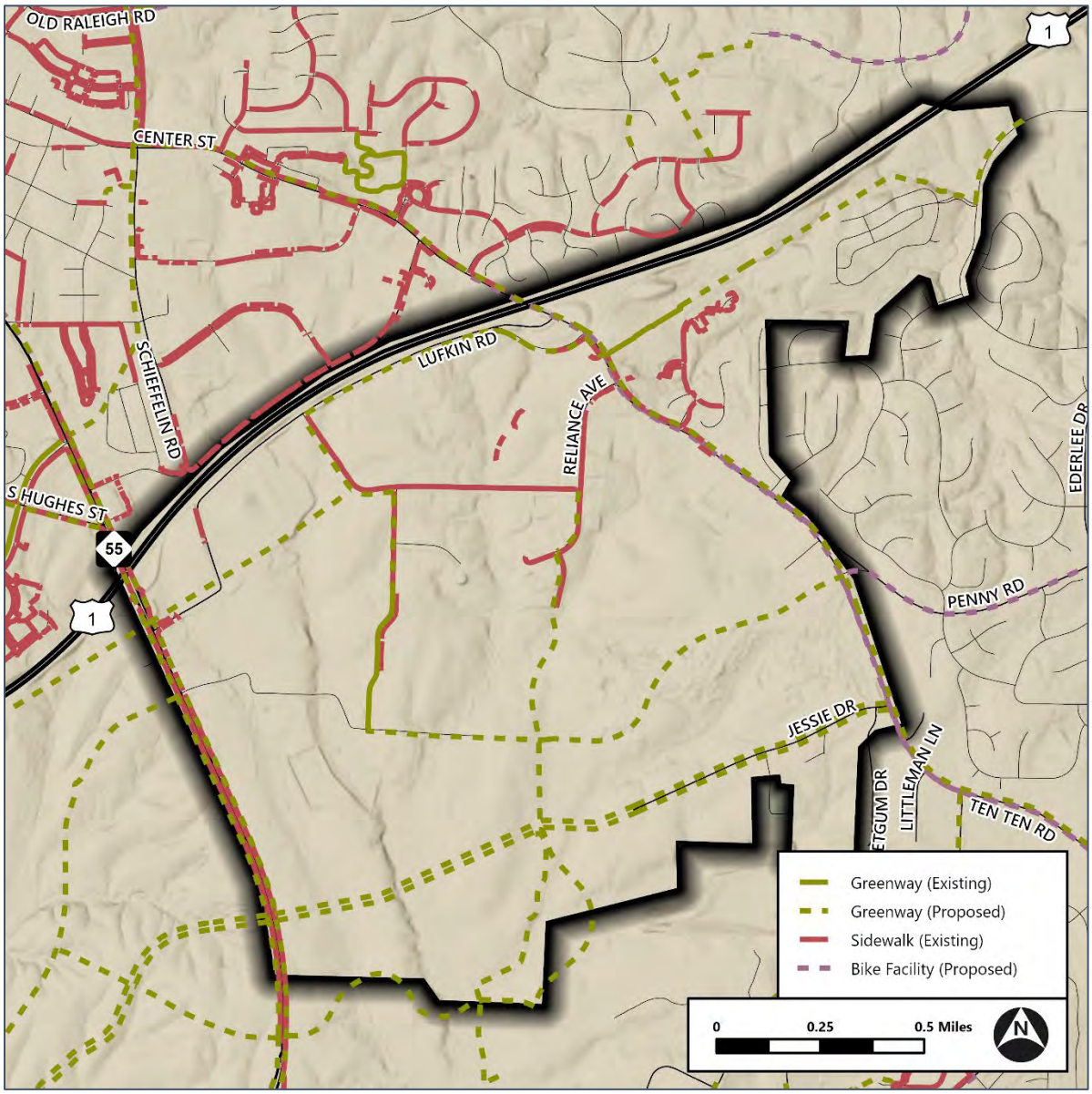


Figure 20: Active Transportation Network in the Study Area

2.5.3 Freight

Freight activity on adjacent roadways can damage the safety and comfort of greenway users. Field visit observations noted large truck volumes in the study area, especially on Pristine Water Drive. Figure 21 depicts the context for this traffic: truck AADT on US 1 and NC 55 are above average for the project vicinity, and many of the study area's largest businesses are likely freight destinations or origins. Puryear Tank Lines, for example, is in the freight industry, while Tipper Tie and Apex Tool Group, among others, are two prominent manufacturers. Construction companies like Crowder and wholesalers like Potters Industries are also in the study area. Apex's 2045 Land Use Map identifies the study area as an "Industrial Employment" center, so freight volumes are anticipated to increase. Alternative evaluation should prioritize how best to co-exist with this traffic.

Figure 21: Truck Volumes and Destinations in the Study Area

2.5.4 Relevant Plans/Policies

Table 10. Transportation - Relevant Plans/Policies

Planning Document(s)	Relevant Plan/Policy Considerations
Advance Apex: The 2045 Transportation Plan (2019)	The proposed transportation network, among other themes, prioritizes active transportation connections. Proposed facilities include the Middle Creek Greenway and sidewalks along N.C. 55 and Jessie Drive.
Apex Master Plan for Parks, Recreation, Cultural Resources, Greenways, and Open Space (2023)	The Town's implementation plan prioritizes projects that: ensure public safety; address existing gaps in the parks and recreation system.

Planning Document(s)	Relevant Plan/Policy Considerations
Bike Apex (2019)	Bike Apex aims to improve multimodal connectivity, accessibility, and safety, in part by developing Beaver Creek, Middle Creek, and Reedy Branch greenways.
Wake County Greenway System Plan (2017, updated 2018)	The plan identifies establishing a greenway tail connection through the Middle Creek corridor as a County priority.
Wake County Southwest Area Study (2019)	The study recommended: connecting Apex to Holly Springs via the Middle Creek Greenway; recreational trails providing connectivity to Regency Park; complete street improvements along Ten Ten Road.
2050 CAMPO-DCHC Metropolitan Transportation Plan (2023)	The 2045 MTP recommends a greenway along Middle Creek as part of its multimodal connectivity plan. It also dedicates funding to extending Jessie Drive and to widening Ten Ten Road and NC-55.
Great Trails State Plan	Middle Creek Greenway is noted in the Great Trails State Plan network as part of Section 5N, connecting Apex/Cary to Fuquay Varina.

3 Community Engagement

This section overviews the public participation process in which the Middle Creek Greenway Feasibility Study is rooted.

3.1 Previous Engagement Efforts

As part of the adoption of the 2023 Master Plan for Parks ,Recreation, Cultural Resources, Greenways and Open Space, the Town of Apex conducted extensive community engagement through surveys, public meetings, and focus groups. In a survey conducted for that plan, residents identified the construction and connection of greenways as their top priority.

In October 2022, the Town of Apex launched a public survey through PublicInput.com to gain such insights as Town values, active transportation facility use, and amenity needs. The survey had 748 total respondents with over 700 comments. The Town held two open house events and four focus groups to understand the recreation needs of groups underrepresented in the community engagement process. These focus groups were invited or selective to provide a diverse and equitable group of subject matter experts to ensure we were meeting the needs of our resident population make up.

3.2 Steering Committee

The Steering Committee acted in an advisory capacity throughout the project, providing input on outreach methods, existing conditions findings, and alignment alternatives. The committee met three times: April 30, 2023; November 27, 2023; and, March 6, 2024. Members, all Town of Apex staff, are listed below:

- Brian Barnes – Public Works Operations Manager
- Will Brown – Senior GIS Analyst
- June Cowles – Senior Planner
- Shannon Cox – Long Range Planning Manager
- Russell Dalton – Traffic Engineering Manager
- Serge Grebenschikov – Traffic Engineer

- Tyler Gumpright – Parks and Greenways Planning Technician
- Joanna Helms – Economic Development Director
- Matthew Kutcher – Police Sergeant
- Angela Reincke – Parks Planning Project Manager
- Jenna Shouse – Senior Long Range Planner

3.3 Focus Groups

Two focus groups were organized to gather further input on the potential use of the Middle Creek Greenway, opportunities for connections, and various concerns. The project team advertised focus group meetings by handing out flyers to each business within the business park along the potential Middle Creek Greenway alignment. The team also connected with local bicycling clubs, to understand how the greenway might be used by cyclists of varying comfortability.

The project team met with the Business Group Focus Group on November 28, 2023, at 6 P.M. Representatives came from Lloyd Builders, Capital Civil Engineering, and Bateman Civil Survey. The input from the local employers confirmed that the greenway could be used by employees during their workday; however, it is unlikely that employees would use the corridor as a commuting alternative.

The project team met with Bicycle Focus Group on December 7, 2023, at 10 A.M. Representatives came from Team CBC, a large bicycling club based in Wake County, and Apex Bicycle Chain, a local bicycle repair shop. Feedback noted that bicyclists would like any opportunity to avoid Ten Ten Road and that safety is important when considering alignments for Middle Creek Greenway.

3.4 Wake County Public School System Outreach

The project team met with representatives from Wake County Public School System (WCPSS) on December 5, 2023, specifically the Lufkin Road Middle School principal and the school's Safe Routes to School program representative. At this meeting, the principal (Ms. Elizabeth Hanna) and Wake County SRTS representative Sara Ellis shared their thoughts on pedestrian and bicycle activity specific to student at that school. They stated that there are not many students who bike or walk due to the school's location and lack of surrounding network links, but those that do walk or bike do so out of necessity more than choice and that the most likely route to be used would be from NC 55 along Lufkin Road. A potential to connect to the back of the school property from Classic Road was discussed and was deemed a potential option, but not ideal in terms of security/safety for students.

3.5 Community Events

To garner input from the larger public, the project team attended the Apex Holiday Lighting event on the evening of December 1, 2023. The project team showed a map of the potential Middle Creek Greenway alignments and asked what factors should be prioritized in the alternative evaluation process. Participants received three "coins" to distribute between the six options listed below, able to place all on one if they chose. 100 people interacted with the project team, and 25 participated in the voting activity. The results are recorded in Table 11.

Table 11: Results from Community Voting Activity

Evaluation Factor	Vote Count	Additional Comments
Connectivity	16	"Connect Beaver Creek Greenway from Jaycee Park/Apex Peakway/Whitehall Manor across from 55 tom Lila Jones Pool, but safely"
Cost	3	
Environmental Impact	22	
Logistics	0	
Safety	20	
User Experience	14	"Less bumpy" "Consistency in mile markers"

4 Alignment Development

Three alternative alignments were developed by reviewing previous plans for the area, evaluating existing conditions, and considering the Town's vision for the greenway, including discussions with Town staff and the project's steering committee. The alternative alignments evaluated in this exercise are limited to the extents within which the alignments differ from one another. There are portions of the greenway alignment that are identical regardless of the alternative chosen, including the alignment along Reliance Avenue north of Classic Road, the at-grade crossing of Ten-Ten Road at Reliance Avenue, and the frontage on the north/east side of Ten-Ten Road that connects to the existing greenway along Meridian Point Drive.

4.1 Design Considerations

A 10' side path with 2' shoulders is recommended for the connector as it will require the least amount of long-term maintenance and has greater eligibility for funding from the widest variety of funding sources. Asphalt pavement is recommended based on site conditions, anticipated trail use, and cost considerations. Limited sections of concrete pavement may be required to accommodate site conditions as necessary. Stream crossings, where present, were chosen to minimize overall bridge length and trail length in order to reduce project cost.

As the trail approaches Ten Ten Rd on Reliance Ave (approximately 200'), an 8' wide SP at the back of curb is recommended to limit additional right-of-way needs and to avoid removal of existing trees.

4.2 Alignment Descriptions

The *Core Alignment* is a north-south connection along Reliance Avenue and Ten Ten Road between Classic Road and the Swift Creek Connector Greenway juncture. An 8' side path would follow the west side of Reliance Avenue between Classic Road and Ten Ten Road. The alignment would cross to Ten Ten Road's east

side at a signalized crossing and continue as a 10′ SP to the Swift Creek Connector Greenway juncture near Meridian Point Drive.

LENGTH: 0.38 miles (2,000 ft.)

ESTIMATED CONSTRUCTION COST: $1,315,200*

Alignment A follows Classic Road and Burma Drive, replacing the existing 5′ sidewalk on the respective north and west sides with a 10′ side path (SP). The alignment connects the existing length of 10′ SP on Burma Drive with the proposed Core Alignment SP on Reliance Avenue.

LENGTH: 0.69 miles (3,650 ft.)

ESTIMATED CONSTRUCTION COST: $2,255,300*

Alignment B is a 10′ SP on Reliance Avenue between Classic Road and Production Drive and along on the length of Production Drive, ultimately tying to the planned SP on the Production Drive Extension that will be constructed as part of commercial developments. The alignment is on the west side of both to minimize impacts to existing utilities and avoid conflicts with driveways.

LENGTH: 0.35 miles (1,825 ft.)

ESTIMATED CONSTRUCTION COST: $1,181,000*

Alignment C is a 10′ SP on Reliance Avenue from Classic Road until the point where it would diverge from the existing roadway and route through the existing wooded area to the east. The off-road portion of this alignment would be a greenway built on new location, behind the existing buildings, parallel to Production Drive and Production Drive Extension, ending at the future Pristine Water Drive Extension.

LENGTH: 0.97 miles (5,130 ft.)

ESTIMATED CONSTRUCTION COST: $3,816,500*

Alignment D adds a beneficial east-west connection to the active transportation network but is not required to meet this plan's goals. This alignment would extend from Burma Drive to the Production Drive Extension on a new location between the recently constructed Cash Corporate Center buildings. This alignment was not evaluated for comparison as it is not an alternative for Alignments A, B, or C.

LENGTH: 0.40 miles (2,125 ft.)

ESTIMATED CONSTRUCTION COST: $3,135,300*

**Details breakdowns of the cost estimates can be found in Appendix D.*

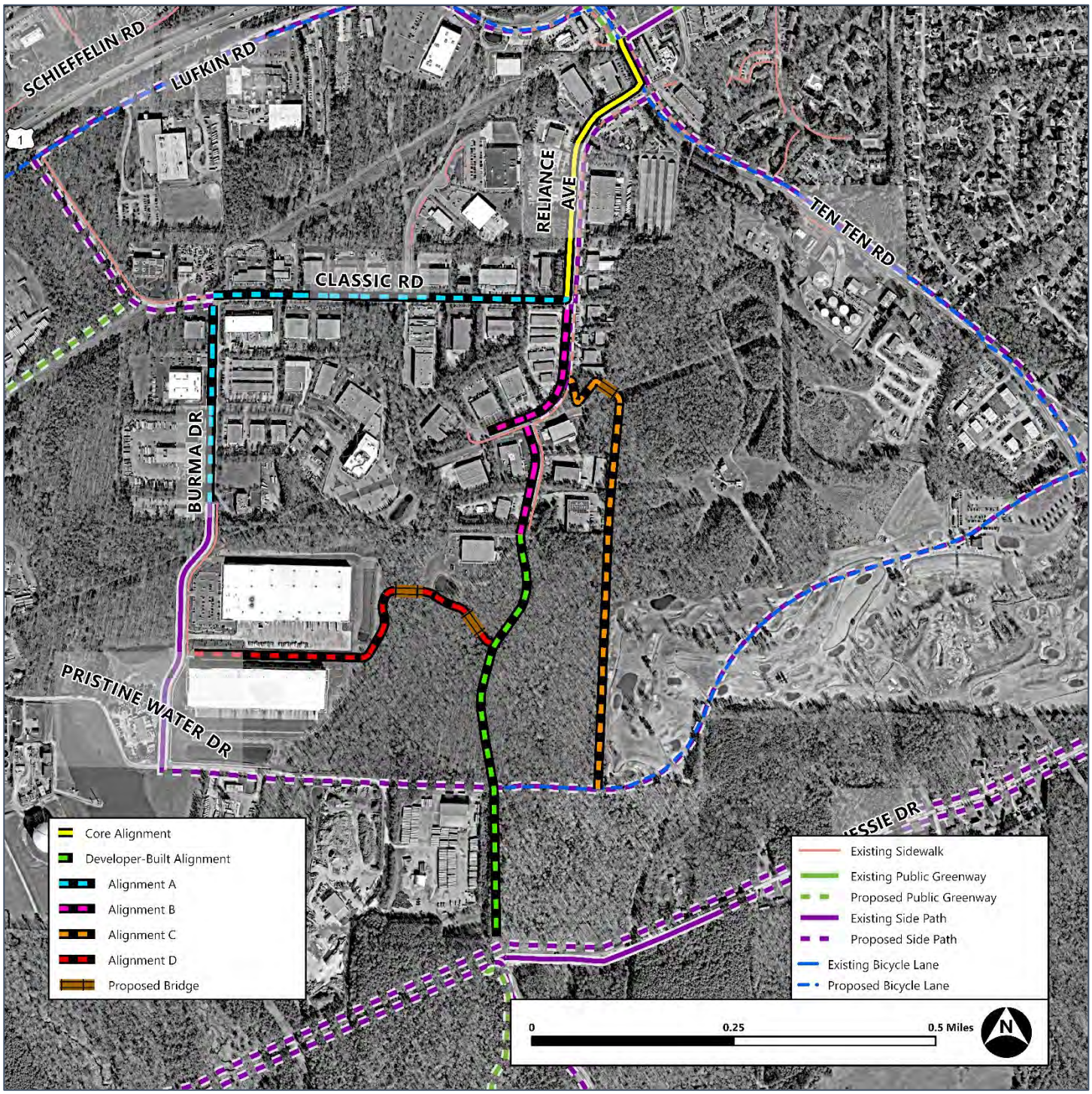


Figure 22 Middle Creek Greenway Alignment Alternatives

5 Alignment Evaluation and Recommendations

This section evaluates each alignment using the criteria identified in Section 2, existing conditions data, and stakeholder input.

5.1 Evaluation Methodology

Using data gathered from existing conditions research, the alternative evaluation scored each alignment alternative (A,B & C) with regard to the criteria listed in Table 12. Weightings were determined by incorporating existing Town prioritization processes, public feedback, and staff comments.

Of the evaluation criteria used in this study, Connectivity was the most emphasized in the prioritization framework documented in Town of Apex's *Prioritization Criteria for Feasibility Studies*; therefore, to align with concurrent planning efforts, this analysis assigns Connectivity the heaviest weight – 25 percent. Safety is also assigned 25 percent due to community concerns about bicycle and pedestrian welfare in the area as well as statewide momentum behind the Vision Zero concept. Environmental Impact was the most frequent concern gathered from public engagement and is always considered in the Town's evaluation of proposed projects; however, this study is focused more on desired connectivity and feasibility of construction as priorities. As such, Environmental Impact is weighted at 20 percent, as is Cost, underscoring how influential funding will be in the greenway's fruition. User Experience is weighted at 10 percent because, while important to consider in design phases, it will bear little impact on the ultimate feasibility of the project.

Table 12: Alternative Evaluation Criteria

Criteria	Weight	Data Inputs
Connectivity	25%	Euclidian distance to existing or planned **active transportation infrastructure**.
		Total population identified as part of a **community of concern** in each intersecting census block group.
		Total number of **jobs** in each intersecting census block.
		Euclidian distance to locations identified as key **recreational destinations**.
		Total **population** in each intersecting census block group.
Safety	25%	Length running **parallel to automobile traffic**.
		Length intersecting **residential or nighttime-recreational land uses**.
		Length **separated from roadway**.
		Speed of adjacent traffic.
		Traffic volume of adjacent roadway.
Cost	20%	Whether **infrastructure outside existing ROW** is required.
		Existing infrastructure utilization.
		Number of **properties impacted**.
		Whether **utilities** pose conflicts to the alignment.
Environmental Impact	20%	Whether **new impervious surface** is required.
		Number of **street parking spaces** displaced.
		Length intersecting **steep slopes**.
		Length intersecting **non-urbanized land cover**.
		Length intersecting **wetlands**.
User Experience	10%	Length intersecting **residential or recreational land uses and job centers**.
		Length adjacent to **pedestrian-oriented land uses**.
		Length **separated from roadway**.
		Average **slope**.
		Tree canopy percentage.

The data inputs listed in Table 12 were combined is ArcGIS Pro using the Raster Calculator function, resulting in the evaluation layers for each of the criteria shown in Figure 23. Figure 23 also shows the overall evaluation layer, calculated with the same function and weighted according to the above explanation. Each pixel of an alignment corridor was scored based on this layer; desirable qualities were assigned lower values and undesirable qualities have higher values, allowing the Zonal Statistics function to sum the scores without crediting an alignment for its length. Therefore**,** *high performing routes were considered those with low cumulative scores***.**

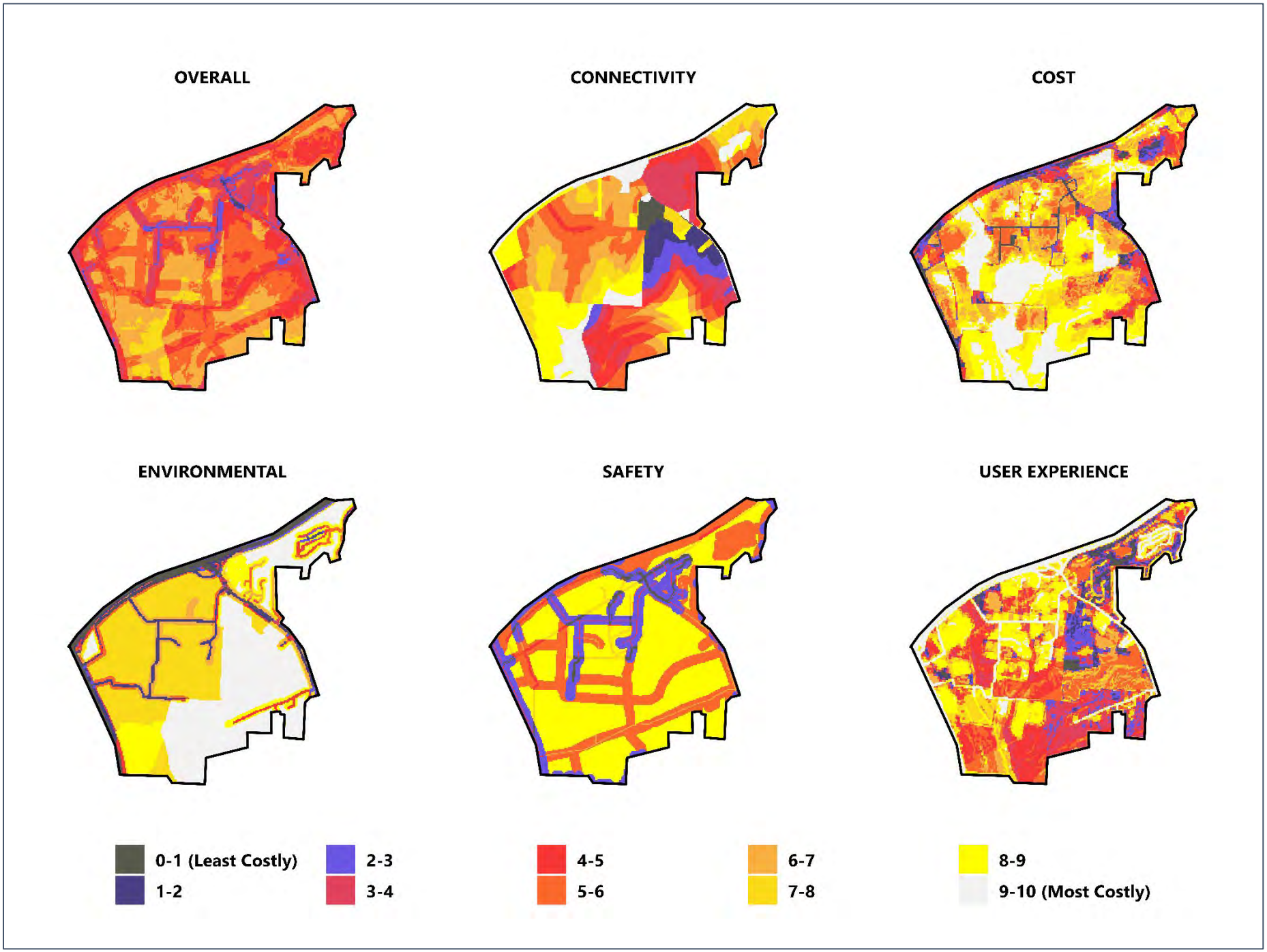


Figure 23: Cost Layers for Alternate Evaluation

5.2 Evaluation Results

Alignment B performed the best in the alternative evaluation and will be recommended as the preferred alignment pending design specific cost estimates. Much of its high score can be attributed to its length; of the alternatives, Alignment B is the shortest and therefore has the lowest cost for equal benefit. Details are presented in Table 13.

Table 13 Alternative Evaluation Results

	Overall Score	Connectivity Score	Cost Score	Environmental Impact Score	Safety Score	User Experience Score
Alignment A	1983	1983	1036	2876	2490	7055
Alignment B	516	476	218	707	556	1609
Alignment C	3218	1864	1862	4426	1357	5375

5.3 Study Recommendations

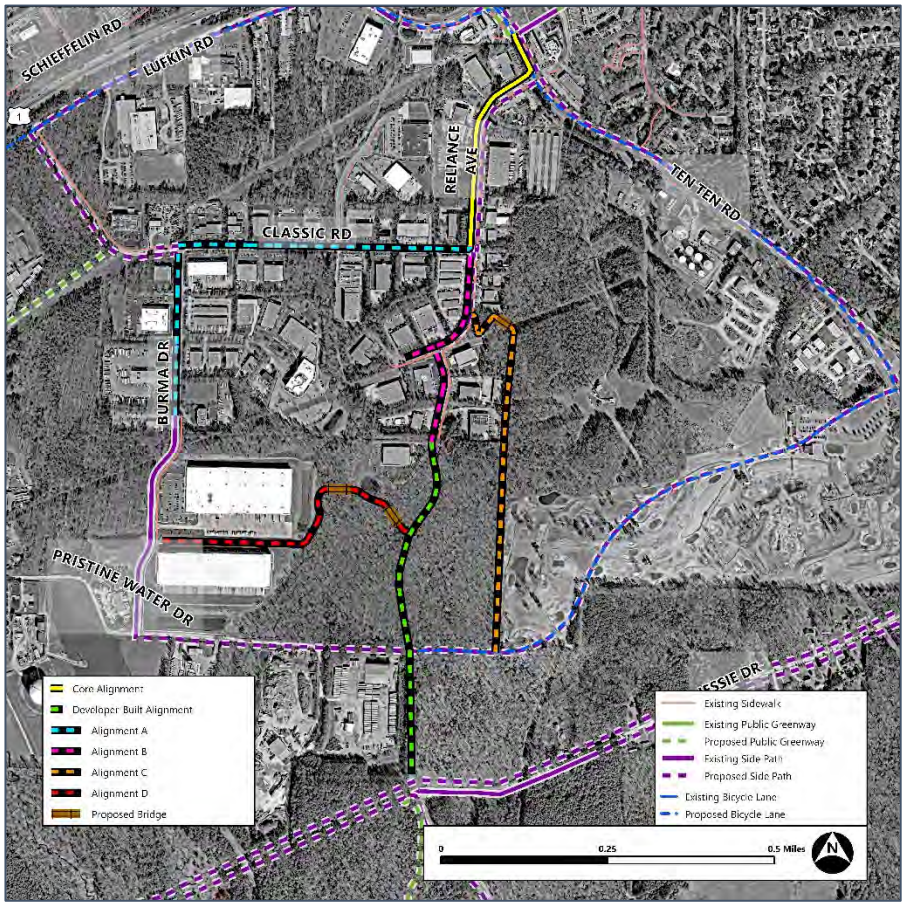


Figure 24: Middle Creek Greenway, Evaluated Alignments

5.3.1 Primary Recommendations

To fully implement the Preferred Alignment, the *Core Alignment* (0.38 miles) should be constructed first. It is the north-south connection between Classic Road and the Swift Creek Connector Greenway. A 10' side path (SP) would follow the west side of Reliance Avenue between Classic Road and Ten Ten Road. The alignment would cross to Ten Ten Road's east side at a signalized crossing and continue as a 10' SP. This alignment should be the first priority for construction, as it connects to an existing facility and would address the crossing of Ten Ten Road.

The next priority is to implement *Alignment B* (0.35 miles), a 10' SP on Reliance Avenue between Classic Road and Production Drive and on the length of Production Drive, ultimately tying to the planned SP on the Production Drive Extension that will stretch to the Jessie Drive Extension. The alignment

is on the west side of both roadways to minimize impacts to existing utilities and avoid conflicts with driveways.

5.3.2 Secondary Recommendations

During the alignment evaluation, the team recognized benefits of the alignments that were not recommended as the preferred alignment. These alignments would provide micro and macro level benefits to the overall connectivity of the study area if implemented.

Alignment A (0.69 miles) follows Classic Road and Burma Drive, replacing the existing 5′ sidewalk on the respective north and west sides with a 10′ side path (SP). The alignment connects the existing length of 10′ SP on Burma Drive with the Core Alignment on Reliance Avenue. This alignment would provide an additional east-west and north-south route but would also benefit the northern part of the business park, including access to the middle school and connection to the west toward the planned Big Branch Greenway.

Alignment D (0.40 miles) adds a beneficial east-west connection to the active network but is not required to meet this plan's goals. This alignment would extend from Burma Drive to the Production Drive Extension on a new location between the recently constructed Cash Corporate Center buildings. This alignment was not evaluated for comparison as it is not an alternative for Alignments A, B, or C. This connector would provide an alternative to the side path along Pristine Water Drive that requires less interaction between users of the greenway and trucks/industrial vehicles.

5.3.3 Alignments Not Recommended

Alignment C, which includes new location greenway through a wooded area is not recommended for implementation within the study area. In addition to higher environmental impacts, the functionality of this alternative would not align with the expected use of the connector within the study area. Due to being built on new location, the cost of this alternative is higher than the others as it does not utilize existing right-of-way or infrastructure.

6 Implementation

It is key to develop an implementation strategy that will ultimately deliver the best project solution in alignment with user demand and funding options.

6.1 Project Phasing

The implementation of this project should be split into multiple phases, with each building upon the prior phase. Route cut sheets can be found in the Appendix.

- Phase I is to implement the *Core Alignment*, starting at the existing Swift Creek Connector Greenway at Meridian Point Drive, continuing across Ten Ten Road at Reliance Ave and along Reliance Ave to its intersection with Classic Road.
- Phase II is to construct *Alignment B* as the primary north to south connection between Classic Road and the future Jessie Drive extension option either as a standalone project or in coordination with developer driven projects.
- Phase III would include *Alignment A* and/or *Alignment D* as funding and demand supports their implementation.

6.2 Funding Sources

6.2.1 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant

The RAISE grant is federal funding allotted for planning and capital investments that support roads, bridges, transit, rail, ports, or other intermodal transportation. A total of $1.5 billon was available for the FY 2023 RAISE grant program for projects that will improve safety, environmental sustainability, quality of life, mobility and community connectivity, and economic competitiveness and opportunity. Additional considerations include demonstrated project readiness and cost effectiveness.

The RAISE Grant program is a suitable funding source for the planning, design and construction of the Middle Creek Greenway. The Town should consider applying for this grant program as long as it is available.

6.2.2 Public Funding Options

6.2.2.1 Capital Improvement Project (CIP) Funding

Specific to the Corridor Improvements, the Town's CIP could include local funding for these short term, low cost/high value improvements.

6.2.2.2 Bond Referendum

The Town could implement a bond referendum that would allow Apex voters to weigh in on the funding of this greenway. A bond can be introduced to cover specific project types, and if passed, the Town could use bond money to implement projects, such as this one, that are included in the comprehensive plan. Additionally, the dollars from the bond referendum can be leveraged to secure additional funding for complementary projects within the Town.

6.2.2.3 NCDOT's State Transportation Improvement Program (STIP) Funding

NCDOT's State Transportation Improvement Program selects projects to be funded through the State Prioritization Process (SPOT). The process involves scoring all roadway, public transportation, bicycle, pedestrian, rail, and aviation projects on several criteria, which are all weighted differently, as follows:

- Local Input Points from the MPO and Division Engineers (50%)
- Safety (20%)
- Connectivity / Accessibility (15%)
- Demand / Density (10%)
- Cost Effectiveness (5%)

If seeking STIP funding, the CAMPO and the NCDOT Division 5 will be key in contributing to the final project score by assigning local priority points to this project. Once the project has been programmed into the STIP, likely at a construction year well into the future, the Town could pursue Federal grant options described above to help accelerate the project implementation timeline. This acceleration would occur because any secured grant funding or increased contribution from the Town would lower the NCDOT project cost portion while maintaining all the benefits; thus, the project would score higher in subsequent rounds of prioritization.

6.2.2.4 North Carolina Highway Safety Improvement Program (HSIP) Funding

Funding through the NCDOT HSIP program may be available for the corridor improvements (lighting, enhanced pedestrian crossings, etc.) either submitted as a single project or as separate projects, however a combined project is recommended. This funding is meant to provide a continuous and systematic process that identifies, reviews, and addresses specific traffic safety concerns throughout the state. There are multiple submittal timeframes throughout the year when projects can be submitted for review, allowing for more frequent review than the SPOT cycle discussed above. This feasibility study establishes and supports the need for this project, which is needed for submittal. The Town and MPO would next work with the NCDOT Traffic Safety Unit and the Highway Safety Improvement Program Engineering staff to have the project formally submitted for consideration. The project would then "compete" against other projects statewide for funding, also on a rolling cycle basis like the submittal process.

If a project does not score well within this process, the Traffic Safety Unit will return feedback that may help future considerations. No resubmittal is needed if the project is not selected; it remains on the list of projects for consideration. Unlike the SPOT process, increased local contributions could make a notable difference in the competitive scoring of HSIP projects.

6.2.3 Private Development Interests

An option to cost share the implementation of this greenway connection should be discussed as other developments continue to evolve in the study area, particularly for the east-west connection.

6.3 Trail Maintenance

The Town Public Works Department is responsible for the maintenance of Town greenways in addition to the maintenance of parks, grounds, athletic fields, and amenities. Proper maintenance ensures that, once constructed, greenways remain a great amenity for the community. Timely maintenance expands the longevity of the trail infrastructure.

6.3.1 Regular Maintenance

Regular maintenance includes the weekly, monthly, and quarterly schedule of tasks to keep the greenway functional for all users. This includes regular clean up and vegetation control but also incorporates minor repairs such as filling cracks and replacing mulch. Simpler tasks are included in the weekly and monthly schedule, whereas larger tasks should be addressed and monitored on a quarterly basis. Examples of the different types of managements tasks are below.

- **Weekly Maintenance Tasks:** Trash pickup, debris removal, vegetation management, and pothole repair.
- **Monthly Maintenance Tasks:** Trail sweeping, signage replacement, mulching and edging, safety evaluations, drainage evaluations, fill cracks, and repair eroding edges.
- **Quarterly Maintenance Tasks:** Vegetation replacement, ADA compliance checks, small resurfacing patches, and seasonal maintenance tasks.

6.3.1.1 Remedial Maintenance

Emergency type of maintenance needs to occur to address specific needs to keep the greenway open. These types of tasks will need to be addressed immediately and are typically in response to major weather events or unforeseen issues such as large debris falling on the greenway, wash out from a major storm, or an eroding greenway edge.

6.3.1.2 Long Term Maintenance

For the long-term success of the greenway, a plan needs to be developed for the replacement and repair of primary elements along the trail. This includes resurfacing, repairing infrastructure, and adding needed elements based on usage and observations. Updating the long-term maintenance plan based on observations and usage will help ensure that maintenance is properly planned and adapting to the needs of the site. Examples of long-term maintenance tasks are:

- Repave/Resurface
- Remove/replace damaged trees
- Re-grading/update drainage
- Add walkways/connections based on usage and access needs
- Realign segments if erosion, tree root, or infrastructure encroaches along edge
- Add culverts, bridges, retaining walls as needed

Appendices

Appendix A – Demographic Snapshot, Middle Creek Greenway Study Area

Demographic	DSA	North Carolina
Median age	38.5	39.0
Unemployment rate	4.2%	5.3%
Workers that work in the state of residence	99.2%	97.5%
Workers that work outside the state of residence	0.8%	2.5%
In-state workers that work in the county of residence	87.0%	73.8%
In-state workers that work outside the county of residence	13.0%	26.2%
Commute alone by auto	79.9%	86.1%
Commute by carpool	15.9%	9.7%
Commute by public transportation	0.0%	1.0%
Commute by bike/ped	2.4%	2.0%
Commute by other mode	1.8%	1.3%
Median household income*	$107,882	$60,516
Occupied housing units	94.2%	86.3%
Vacant housing units	5.8%	13.7%
Median housing value*	$424,867	$197,500
Mobile home rate	5.4%	11.9%
Households with no vehicles available	3.2%	5.5%
Travel time to work less than 15 minutes	17.7%	26.5%
Number of pedestrian crashes	7	30,906
Number of bicyclist crashes	4	13,692

Appendix B – Relevant Plans and Policies, Middle Creek Greenway Study Area

Jurisdiction	Year Approved/ Updated	Planning Document	Relevant Considerations
State of North Carolina	2022	Water Quality Standards	A delineation must be conducted to determine the status and limits of streams and other surface waters in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).
	2021	Wetland Program Plan	A delineation must be conducted to determine the status and boundaries of wetlands in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).
	2020	Riparian Buffer Protection Program	A delineation must be conducted to determine the status of streams and other surface waters in the study area and to which Neuse riparian buffer rules they are subject.
Metropolitan Planning Organizations (CAMPO/DCHC)	2019	2045 CAMPO-DCHC Metropolitan Transportation Plan	The 2045 MTP recommends a greenway along Middle Creek as part of its multimodal connectivity plan.
Wake County	2019	Southwest Area Study	The study recommended: connecting Apex to Holly Springs via the Middle Creek Greenway; recreational trails providing connectivity to Regency Park; complete street improvements along Ten-Ten Road.
	2018	Greenway System Plan	The plan identifies establishing a greenway tail connection through the Middle Creek corridor as a County priority.
Town of Apex	2023	2045 Land Use Map	The Land Use Map classifies the majority of the study area as "Industrial Employment" and identifies it as a potential "Employment Mixed Use Activity Center," setting guidance for the land to be developed for a variety of commercial and industrial intensities.
		Master Plan for Parks, Recreation, Cultural Resources,	The Town's implementation plan prioritizes projects that: are compatible with the Town's Future Land Use plan; provide amenities not currently available; create a recreation system

Jurisdiction	Year Approved/ Updated	Planning Document	Relevant Considerations
		Greenways, and Open Space	that connects key destinations; ensure public safety; and, address existing gaps in the parks and recreation system.
	2019	Advance Apex: The 2045 Transportation Plan	The proposed transportation network, among other themes, prioritizes active transportation connections. Proposed facilities include the Middle Creek Greenway and sidewalks along N.C. 55 and Jessie Drive.
		Bike Apex	Bike Apex aims to improve multimodal connectivity, accessibility, and safety, in part by developing Beaver Creek, Middle Creek, and Reedy Branch greenways.

Appendix C –Alignment Cutsheets

Core Alignment

Core Alignment

The Primary Alignment is a north-south connection between Classic Road and the Meridian Point Greenway. An 8-foot side path would follow the west side of Reliance Avenue between Classic Road and Ten Ten Road. The alignment would cross to Ten Ten Road's east side at a signalized crossing and become a 10-ft shared-use path (SUP).

Details

At-Grade Crossings: 1

Structure: 0

Connections: Meridian Point Drive Greenway

Facilities: 10 ft Side Path; 8 ft Side Path

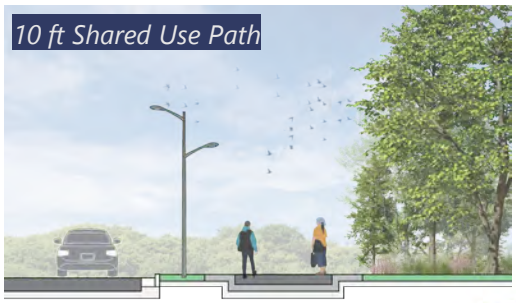
Length: 2,000 ft

Parcel Information: 7 privately owned parcels.

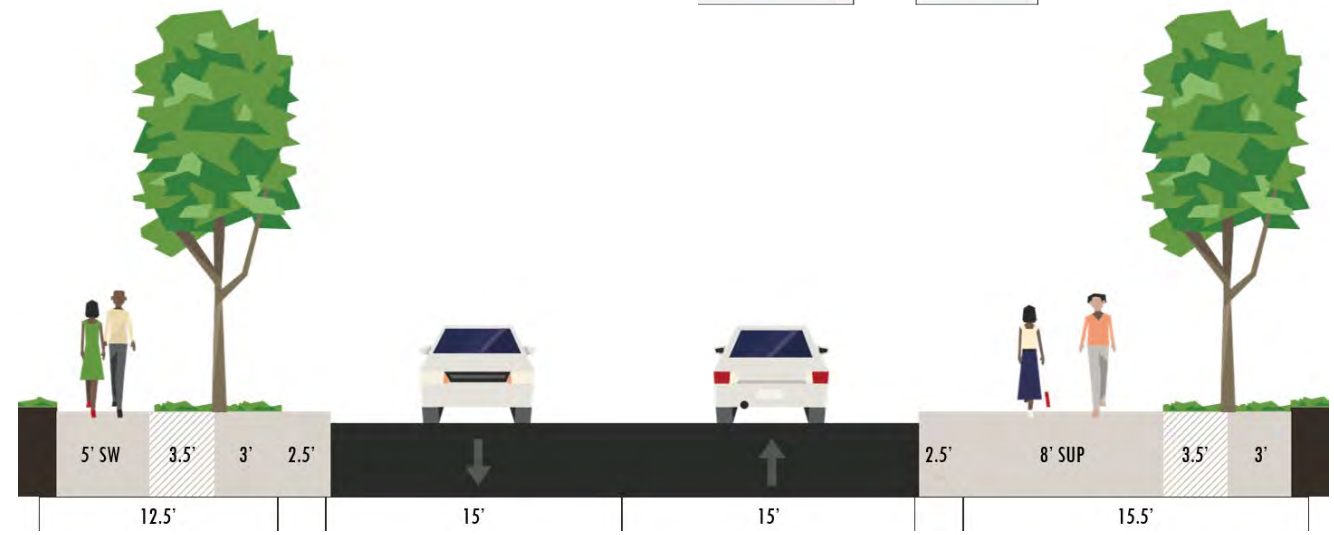
Acquisition may be required.

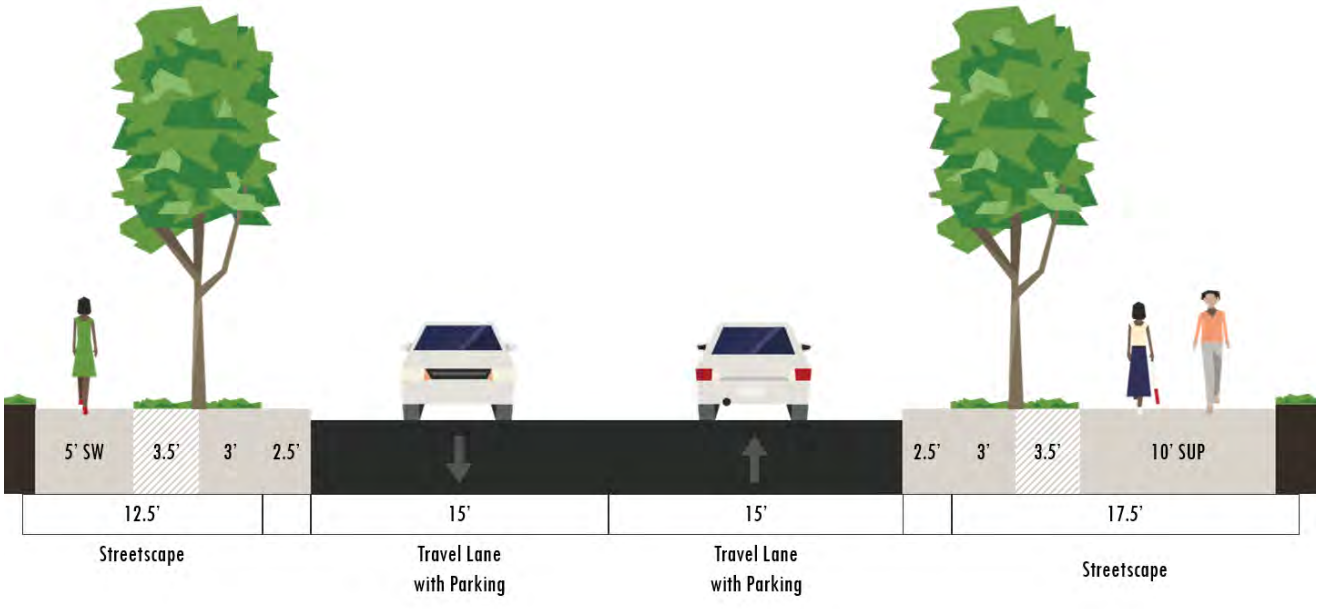
Project Cost

Facility	Primary Alignment
Trail	$1,315,200
Bridge	$0
Total	**$1,315,200**



Typical Sections





Alignment A


CLASSIC RD
RELIANCE AVE
GOODWORTH DR
BURMA DR
PRODUCTION DR
N
0
1,000 US Feet
Alignment A
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Building Footprint
Parcels
Waterbody

Alignment A

Alignment A follows Classic Road and Burma Drive, replacing the existing 5-foot sidewalk on the respective north and west sides with a 10-foot side path (SP). The alignment connect the existing length of 10-foot SP on Burma Drive with the Primary Alignment on Reliance Avenue.

Details

At-Grade Crossings: 1

Structures: 0

Connections: Burma Drive SUP

Facilities: 10 ft Shared Use Path

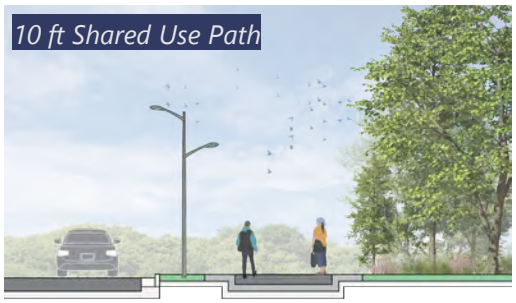
Length: 3,650 ft

Parcel Information: 13 privately owned parcels.

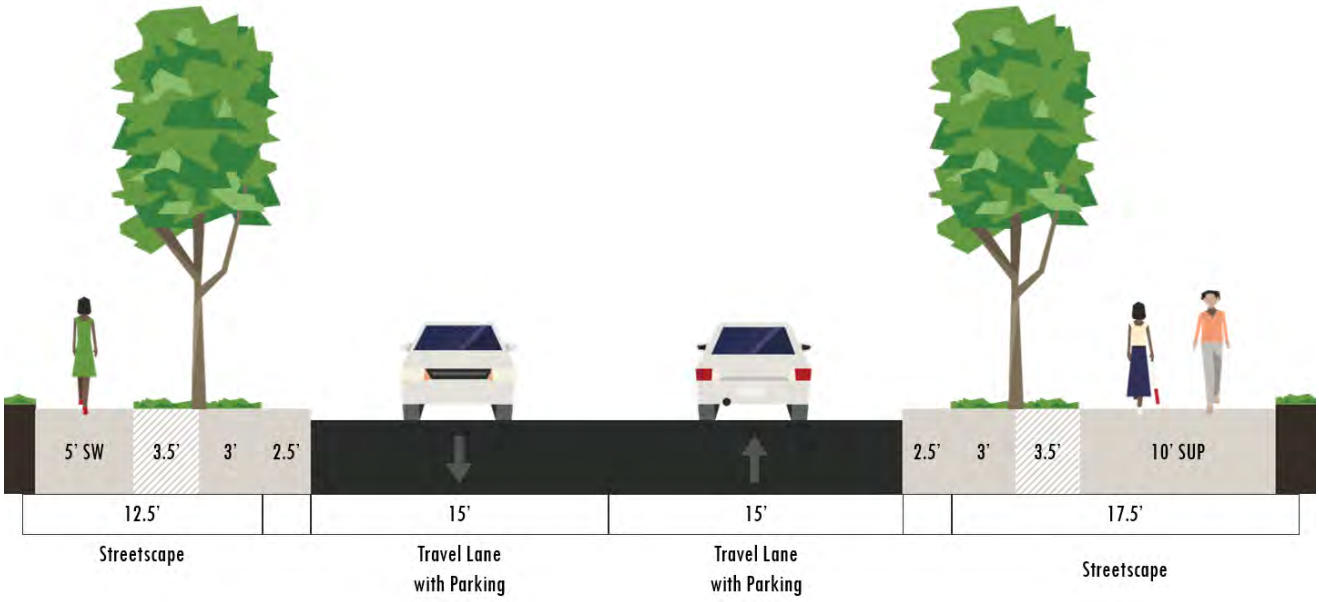
Acquisition may be required.

Project Cost

Facility	Alignment A
Trail	$2,255,300
Bridge	$0
Total	**$2,255,300**



Typical Section



Alignment B


CLASSIC RD
RELIANCE AVE
PRODUCTION DR
0
1,000 US Feet
Alignment B
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Building Footprint
Parcels
Waterbody

Alignment B

Alignment B is a 10-foot SP on Reliance Avenue between Classic Road and Production Drive and on the length of Production Drive, ultimately tying to the planned SP on the Production Drive Extension that will be constructed as part of a commercial development. The alignment is on the west side of both to minimize impacts to existing utilities and avoid conflicts with driveways.

Details

At-Grade Crossings: 2

Structures: 0

Connections: Produce Drive Extension SUP

Facilities: 10 ft Shared Use Path

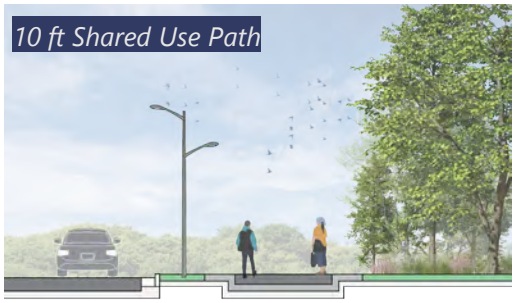
Length: 1,825 ft

Parcel Information: 5 privately owned parcels.

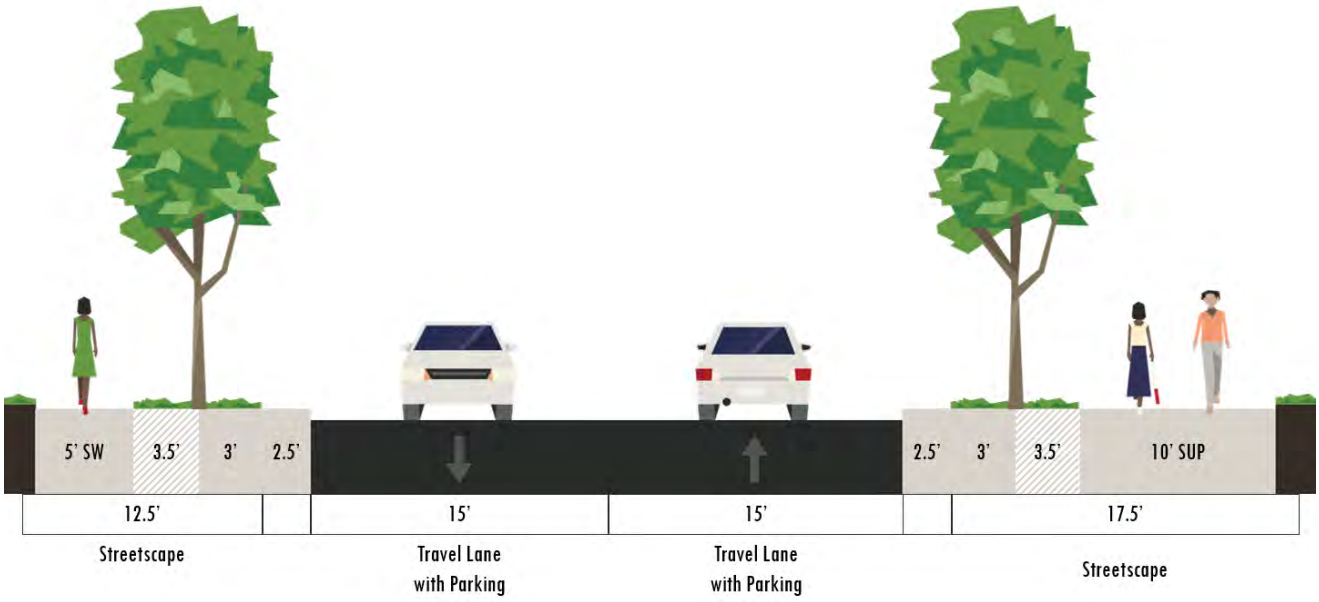
Acquisition may be required.

Project Cost

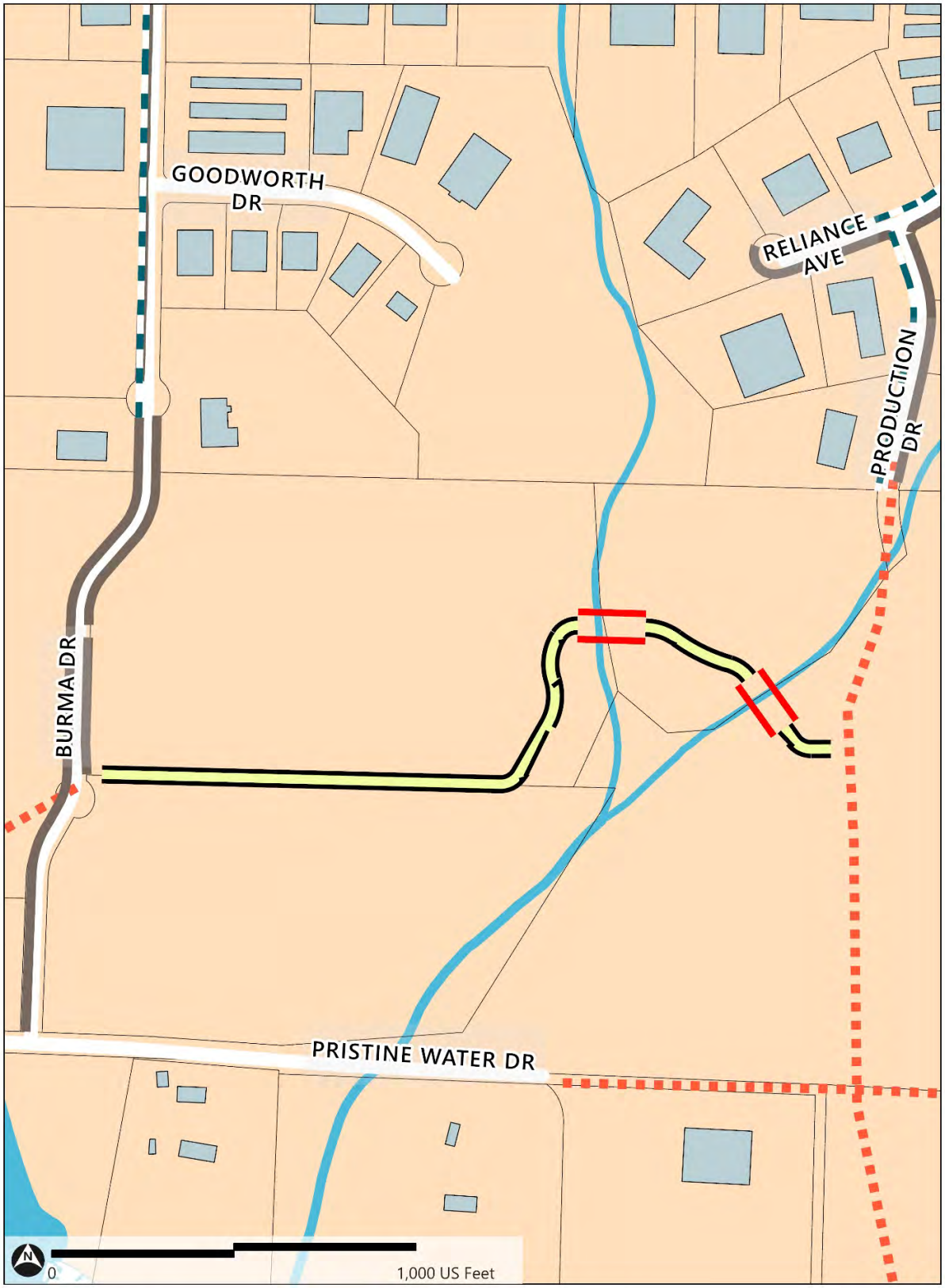
Facility	Alignment B
Trail	$1,181,000
Bridge	$0
Total	**$1,181,000**



Typical Section



Alignment D


GOODWORTH DR
RELIANCE AVE
PRODUCTION DR
BURMA DR
PRISTINE WATER DR
0
1,000 US Feet
Alignment D
Proposed Bridge
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Future Roadway Extension
Building Footprint
Parcels
Waterbody

Alignment D

Alignment D adds a beneficial east-west connection to the active network but is not required to meet this plan's goals. This alignment would extend from Burma Drive to the Production Drive Extension on a new location between the recently constructed Cash Corporate Center buildings. This alignment was not evaluated for comparison as it is not an alternative for Alignments A, B, or C.

Details

At-Grade Crossings: 0

Structures: 2

Connections: Burma Drive SUP, Produce Drive Extension SUP

Facilities: 10 ft Shared Use Path, Bridge (x2)

Length: 2,125 ft

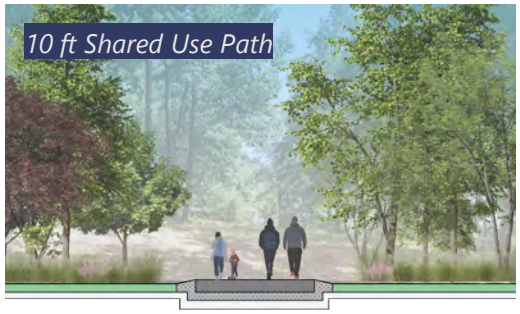
Parcel Information: 3 privately owned parcels. Acquisition may be required.

Environmental Factors

This alignment crosses two streams. Erosion control permits and additional permitting from Wake County may be required.

Project Cost

Facility	Alignment D
Trail	$2,952,800
Bridge	$1,865,000
Total	**$3,135,300**



Appendix D – Cost Breakdown of Alignment Alternatives

Core Alignment

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 39,890.00	$ 39,900.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 60,000.00	$ 60,000.00
Geotextile for Soil Stabilization	2,300	SY	$ 4.00	$ 9,200.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 55,000.00	$ 55,000.00
Pavement				
6" Aggregate Base Course	890	Tons	$ 142.00	$ 126,380.00
Asphalt Type S9.5b	260	Tons	$ 70.00	$ 18,200.00
Asphalt Binder for Plant Mix	17	Tons	$ 760.00	$ 12,920.00
2'-6" Concrete Curb and Gutter	2,000	LF	$ 40.00	$ 80,000.00
Concrete Curb Ramps	18	EA	$ 2,000.00	$ 36,000.00
6" Concrete Driveway Entrance	8	EA	$ 5,000.00	$ 40,000.00
Erosion Control	1.0	LS	$ 55,000.00	$ 55,000.00
Traffic Control				
Thermo and Pavement Marking	1.0	LS	$ 5,100.00	$ 5,100.00
Traffic Signals (Upgrade)	1.0	Each	$ 100,000.00	$ 100,000.00
ROADWAY TOTAL				$ 617,800.00
STRUCTURES				
Bridge	0.00	SF	$ -	$ -
Retaining Walls	1,750	SF	$ 80.00	$ 140,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 40,000.00	$ 40,000.00
STRUCTURES & UTILITY TOTAL				$ 180,000.00
Miscellaneous (10% Strs & Util)				$ 18,000.00
Miscellaneous (45% Roadway)				$ 278,010.00
		Contract Cost	.....	$ 1,133,710.00
		E. & C. 16%	.....	$ 181,393.60
		Construction Cost	.....	**$ 1,315,103.60**

Alignment A

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 70,288.00	$ 70,300.00
Construction Surveying	1	LS	$ 35,000.00	$ 35,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 105,000.00	$ 105,000.00
Geotextile for Soil Stabilization	4,200	SY	$ 4.00	$ 16,800.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 100,000.00	$ 100,000.00
Pavement				
6" Aggregate Base Course	1,630	Tons	$ 142.00	$ 231,460.00
Asphalt Type S9.5b	460	Tons	$ 70.00	$ 32,200.00
Asphalt Binder for Plant Mix	30	Tons	$ 760.00	$ 22,800.00
2'-6" Concrete Curb and Gutter	3,650	LF	$ 40.00	$ 146,000.00
Concrete Curb Ramps	34	EA	$ 2,000.00	$ 68,000.00
6" Concrete Driveway Entrance	15	EA	$ 5,000.00	$ 75,000.00
Erosion Control	1.0	LS	$ 100,000.00	$ 100,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	$ 3,500.00	$ 3,500.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 935,760.00
STRUCTURES				
Bridge	0.00	SF	$ 5,000.00	$ -
Retaining Walls	5,000	SF	$ 80.00	$ 400,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 70,000.00	$ 70,000.00
STRUCTURES & UTILITY TOTAL				$ 470,000.00
Miscellaneous (10% Strs & Util)				$ 47,000.00
Miscellaneous (45% Roadway)				$ 421,092.00
		Contract Cost	.....	$ 1,944,152.00
		E. & C. 16%	.....	$ 311,064.32
		Construction Cost	.....	**$ 2,255,216.32**

Alignment B

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 37,142.00	$ 37,200.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 55,000.00	$ 55,000.00
Geotextile for Soil Stabilization	2,100	SY	$ 4.00	$ 8,400.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 50,000.00	$ 50,000.00
Pavement				
6" Aggregate Base Course	820	Tons	$ 142.00	$ 116,440.00
Asphalt Type S9.5b	230	Tons	$ 70.00	$ 16,100.00
Asphalt Binder for Plant Mix	15	Tons	$ 760.00	$ 11,400.00
2'-6" Concrete Curb and Gutter	1,825	LF	$ 40.00	$ 73,000.00
Concrete Curb Ramps	17	EA	$ 2,000.00	$ 34,000.00
6" Concrete Driveway Entrance	6	EA	$ 5,000.00	$ 30,000.00
Erosion Control	1.0	LS	$ 50,000.00	$ 50,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	$ 3,500.00	$ 3,500.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 467,840.00
STRUCTURES				
Bridge	0.00	SF	$ 5,000.00	$ -
Retaining Walls	3,000	SF	$ 80.00	$ 240,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 35,000.00	$ 35,000.00
STRUCTURES & UTILITY TOTAL				$ 275,000.00
Miscellaneous (10% Strs & Util)				$ 27,500.00
Miscellaneous (45% Roadway)				$ 210,528.00
		Contract Cost	.....	$ 1,018,068.00
		E. & C. 16%	.....	$ 162,890.88
		Construction Cost	.....	**$ 1,180,958.88**

Alignment C

Description	Quantity	Unit	Price		Amount
Mobilization	1	LS	60,244.00	$	60,300.00
Construction Surveying	1	LS	30,000.00	$	30,000.00
Earthwork					
Comprehensive Grading	1	LS	115,000.00	$	115,000.00
Geotextile for Soil Stabilization	3,450	SY	4.00	$	13,800.00
Drainage					
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1	LS	30,000.00	$	30,000.00
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0	LS	$ -	$	-
Pavement					
6" Aggregate Base Course	1,340	Tons	142.00	$	190,280.00
Asphalt Type S9.5b	380	Tons	70.00	$	26,600.00
Asphalt Binder for Plant Mix	25	Tons	760.00	$	19,000.00
2'-6" Concrete Curb and Gutter	0	LF	40.00	$	-
Concrete Curb Ramps	2	EA	2,000.00	$	4,000.00
6" Concrete Driveway Entrance	0	EA	5,000.00	$	-
Erosion Control	1	LS	85,000.00	$	85,000.00
Traffic Control					
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	1,200.00	$	1,200.00
Traffic Signals (Upgrade)	0.0	Each	25,000.00	$	-
ROADWAY TOTAL				$	514,880.00
STRUCTURES					
Bridge	130.00	LF	5,000.00	$	650,000.00
Utility Construction					
Utility Relocation/Adjustment	1.0	LS	40,000.00	$	40,000.00
STRUCTURES & UTILITY TOTAL				$	690,000.00
Miscellaneous (10% Strs & Util)				$	69,000.00
Miscellaneous (45% Roadway)				$	231,696.00
		Contract Cost	.....	$	1,565,876.00
		E. & C. 16%	.....	$	250,540.16
		Construction Cost	.....	**$**	**1,816,416.16**

Alignment D

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 111,851.50	$ 111,900.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 85,000.00	$ 85,000.00
Geotextile for Soil Stabilization	2,450	SY	$ 4.00	$ 9,800.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1	LS	$ 25,000.00	$ 25,000.00
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0	LS	$ -	$ -
Pavement				
6" Aggregate Base Course	950	Tons	$ 142.00	$ 134,900.00
Asphalt Type S9.5b	270	Tons	$ 70.00	$ 18,900.00
Asphalt Binder for Plant Mix	18	Tons	$ 760.00	$ 13,680.00
2'-6" Concrete Curb and Gutter	0	LF	$ 40.00	$ -
Concrete Curb Ramps	2	EA	$ 2,000.00	$ 4,000.00
6" Concrete Driveway Entrance	0	EA	$ 5,000.00	$ -
Erosion Control	1	LS	$ 60,000.00	$ 60,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1	LS	$ 750.00	$ 750.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 372,030.00
STRUCTURES				
Bridge	365.00	LF	$ 5,000.00	$ 1,825,000.00
Utility Construction				
Utility Relocation/Adjustment	1	LS	$ 40,000.00	$ 40,000.00
STRUCTURES & UTILITY TOTAL				$ 1,865,000.00
Miscellaneous (10% Strs & Util)				$ 186,500.00
Miscellaneous (45% Roadway)				$ 167,413.50
		Contract Cost	.....	$ 2,702,843.50
		E. & C. 16%	.....	$ 432,454.96
		Construction Cost	.....	**$ 3,135,298.46**

Appendix A – Demographic Snapshot, Middle Creek Greenway Study Area

Demographic	DSA	North Carolina
Median age	38.5	39.0
Unemployment rate	4.2%	5.3%
Workers that work in the state of residence	99.2%	97.5%
Workers that work outside the state of residence	0.8%	2.5%
In-state workers that work in the county of residence	87.0%	73.8%
In-state workers that work outside the county of residence	13.0%	26.2%
Commute alone by auto	79.9%	86.1%
Commute by carpool	15.9%	9.7%
Commute by public transportation	0.0%	1.0%
Commute by bike/ped	2.4%	2.0%
Commute by other mode	1.8%	1.3%
Median household income*	$107,882	$60,516
Occupied housing units	94.2%	86.3%
Vacant housing units	5.8%	13.7%
Median housing value*	$424,867	$197,500
Mobile home rate	5.4%	11.9%
Households with no vehicles available	3.2%	5.5%
Travel time to work less than 15 minutes	17.7%	26.5%
Number of pedestrian crashes	7	30,906
Number of bicyclist crashes	4	13,692

Jurisdiction	Year Approved/ Updated	Planning Document	Relevant Considerations
State of North Carolina	2022	Water Quality Standards	A delineation must be conducted to determine the status and limits of streams and other surface waters in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).
	2021	Wetland Program Plan	A delineation must be conducted to determine the status and boundaries of wetlands in the study area and what mitigation measures are required; these measures could include creating an on-site mitigation area, creating of an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).
	2020	Riparian Buffer Protection Program	A delineation must be conducted to determine the status of streams and other surface waters in the study area and to which Neuse riparian buffer rules they are subject.
Metropolitan Planning Organizations (CAMPO/DCHC)	2019	2045 CAMPO-DCHC Metropolitan Transportation Plan	The 2045 MTP recommends a greenway along Middle Creek as part of its multimodal connectivity plan.
Wake County	2019	Southwest Area Study	The study recommended: connecting Apex to Holly Springs via the Middle Creek Greenway; recreational trails providing connectivity to Regency Park; complete street improvements along Ten-Ten Road.
	2018	Greenway System Plan	The plan identifies establishing a greenway tail connection through the Middle Creek corridor as a County priority.
Town of Apex	2023	2045 Land Use Map	The Land Use Map classifies the majority of the study area as "Industrial Employment" and identifies it as a potential "Employment Mixed Use Activity Center," setting guidance for the land to be developed for a variety of commercial and industrial intensities.
		Master Plan for Parks, Recreation, Cultural Resources,	The Town's implementation plan prioritizes projects that: are compatible with the Town's Future Land Use plan; provide amenities not currently available; create a recreation system

Jurisdiction	Year Approved/ Updated	Planning Document	Relevant Considerations
		Greenways, and Open Space	that connects key destinations; ensure public safety; and, address existing gaps in the parks and recreation system.
	2019	Advance Apex: The 2045 Transportation Plan	The proposed transportation network, among other themes, prioritizes active transportation connections. Proposed facilities include the Middle Creek Greenway and sidewalks along N.C. 55 and Jessie Drive.
		Bike Apex	Bike Apex aims to improve multimodal connectivity, accessibility, and safety, in part by developing Beaver Creek, Middle Creek, and Reedy Branch greenways.

Core Alignment

Core Alignment

The Primary Alignment is a north-south connection between Classic Road and the Meridian Point Greenway. An 8-foot side path would follow the west side of Reliance Avenue between Classic Road and Ten Ten Road. The alignment would cross to Ten Ten Road's east side at a signalized crossing and become a 10-ft shared-use path (SUP).

Details

At-Grade Crossings: 1

Structure: 0

Connections: Meridian Point Drive Greenway

Facilities: 10 ft Side Path; 8 ft Side Path

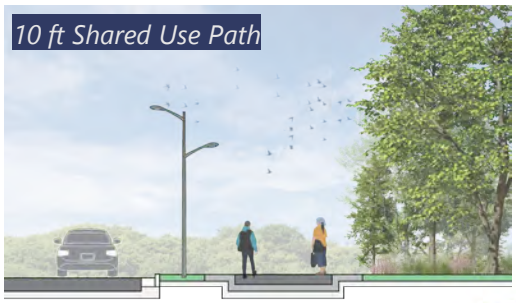
Length: 2,000 ft

Parcel Information: 7 privately owned parcels.

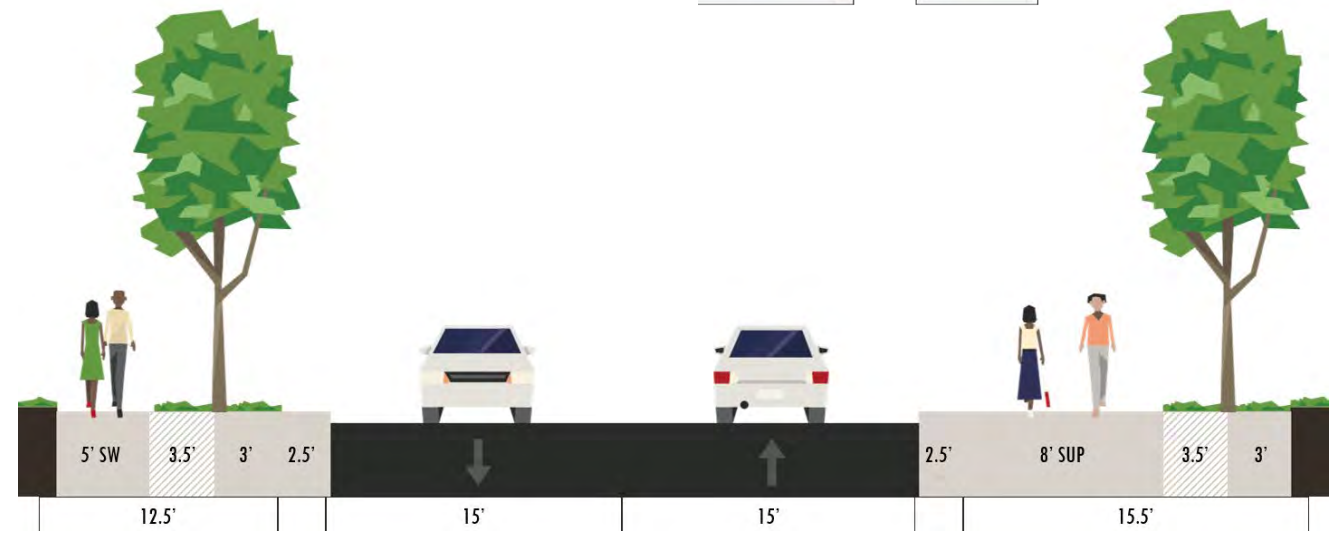
Acquisition may be required.

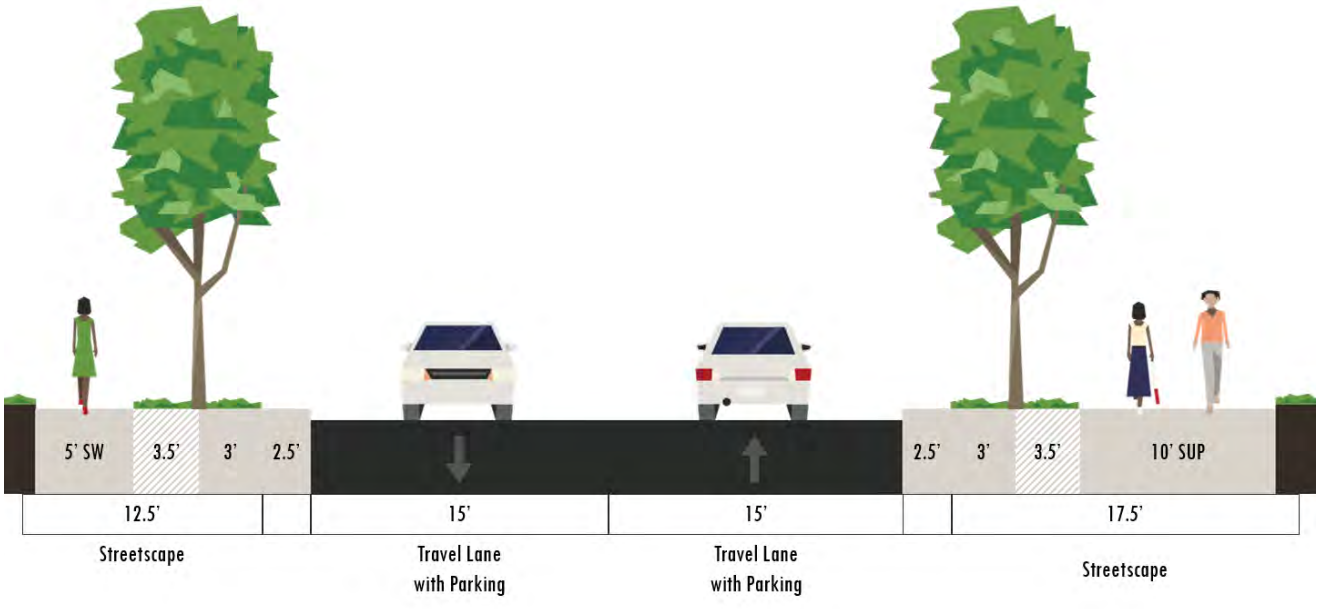
Project Cost

Facility	Primary Alignment
Trail	$1,315,200
Bridge	$0
Total	**$1,315,200**



Typical Sections





Alignment A


CLASSIC RD
RELIANCE AVE
GOODWORTH DR
BURMA DR
PRODUCTION DR
N
0
1,000 US Feet
Alignment A
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Building Footprint
Parcels
Waterbody

Alignment A

Alignment A follows Classic Road and Burma Drive, replacing the existing 5-foot sidewalk on the respective north and west sides with a 10-foot side path (SP). The alignment connect the existing length of 10-foot SP on Burma Drive with the Primary Alignment on Reliance Avenue.

Details

At-Grade Crossings: 1

Structures: 0

Connections: Burma Drive SUP

Facilities: 10 ft Shared Use Path

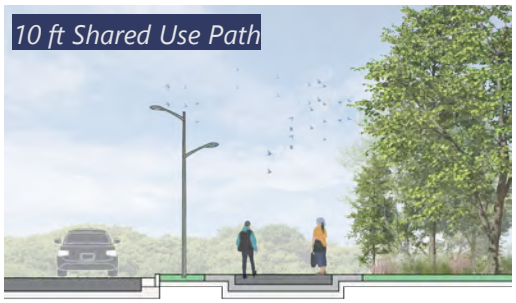
Length: 3,650 ft

Parcel Information: 13 privately owned parcels.

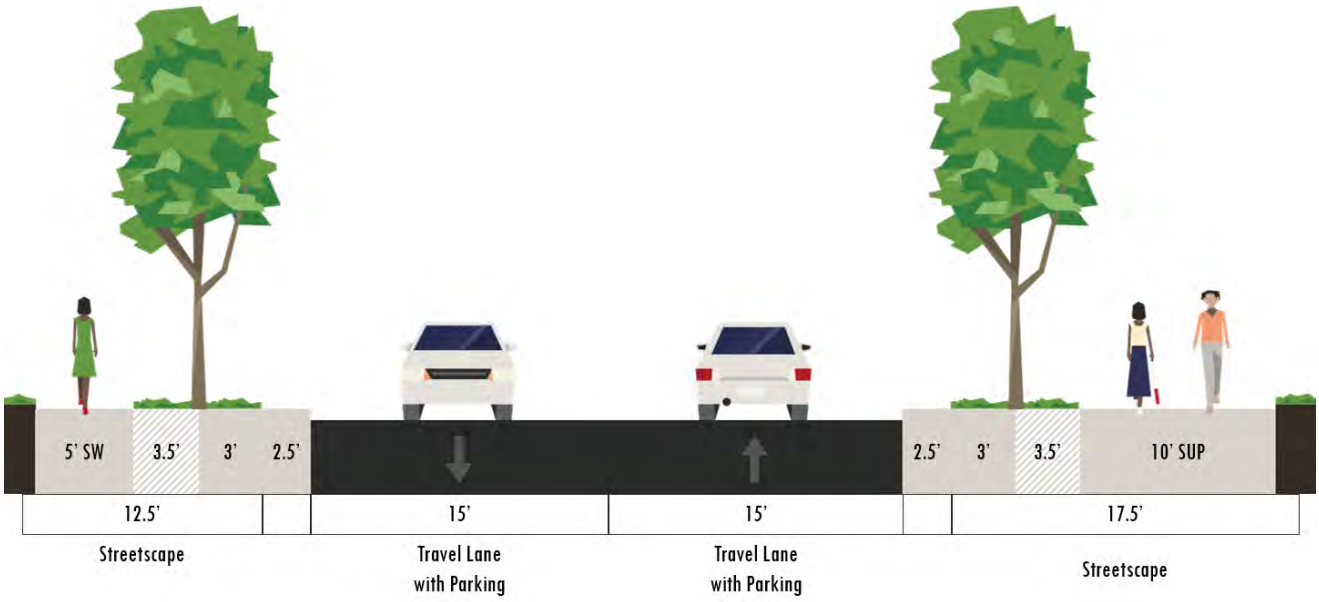
Acquisition may be required.

Project Cost

Facility	Alignment A
Trail	$2,255,300
Bridge	$0
Total	**$2,255,300**



Typical Section



Alignment B


CLASSIC RD
RELIANCE AVE
PRODUCTION DR
0
1,000 US Feet
Alignment B
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Building Footprint
Parcels
Waterbody

Alignment B

Alignment B is a 10-foot SP on Reliance Avenue between Classic Road and Production Drive and on the length of Production Drive, ultimately tying to the planned SP on the Production Drive Extension that will be constructed as part of a commercial development. The alignment is on the west side of both to minimize impacts to existing utilities and avoid conflicts with driveways.

Details

At-Grade Crossings: 2

Structures: 0

Connections: Produce Drive Extension SUP

Facilities: 10 ft Shared Use Path

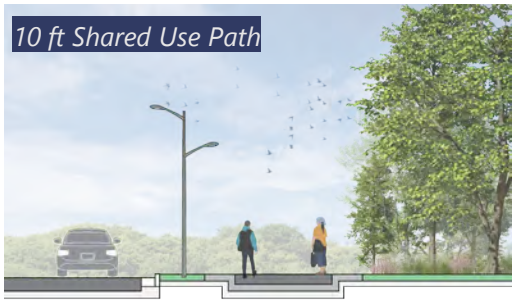
Length: 1,825 ft

Parcel Information: 5 privately owned parcels.

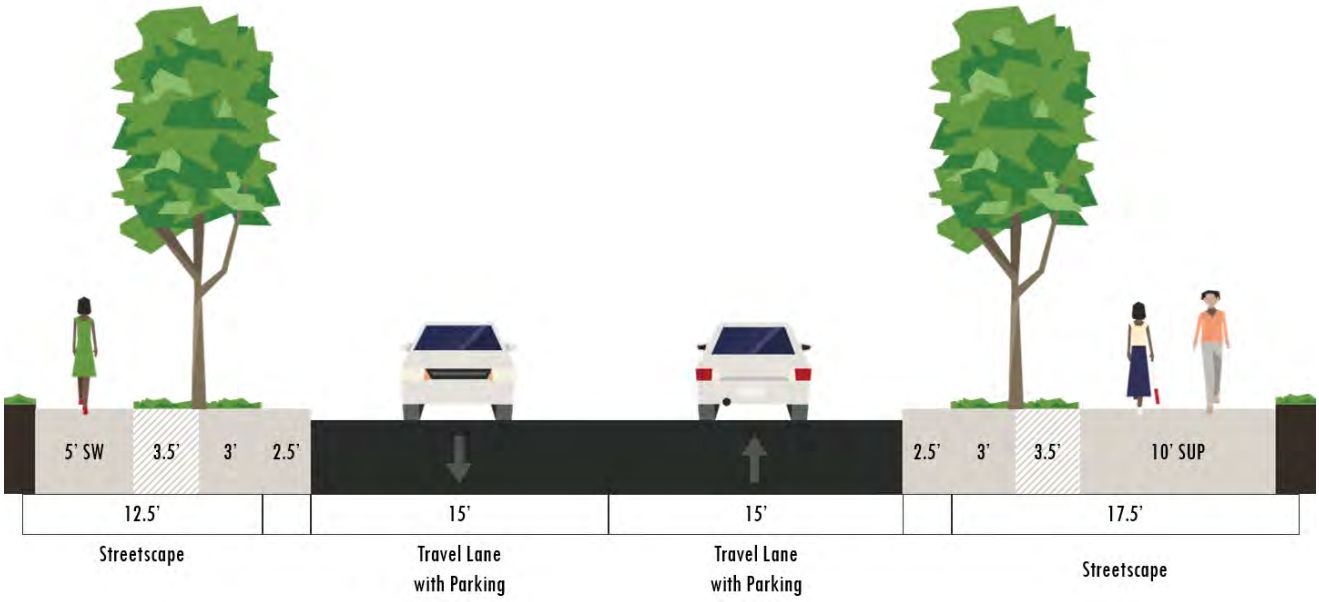
Acquisition may be required.

Project Cost

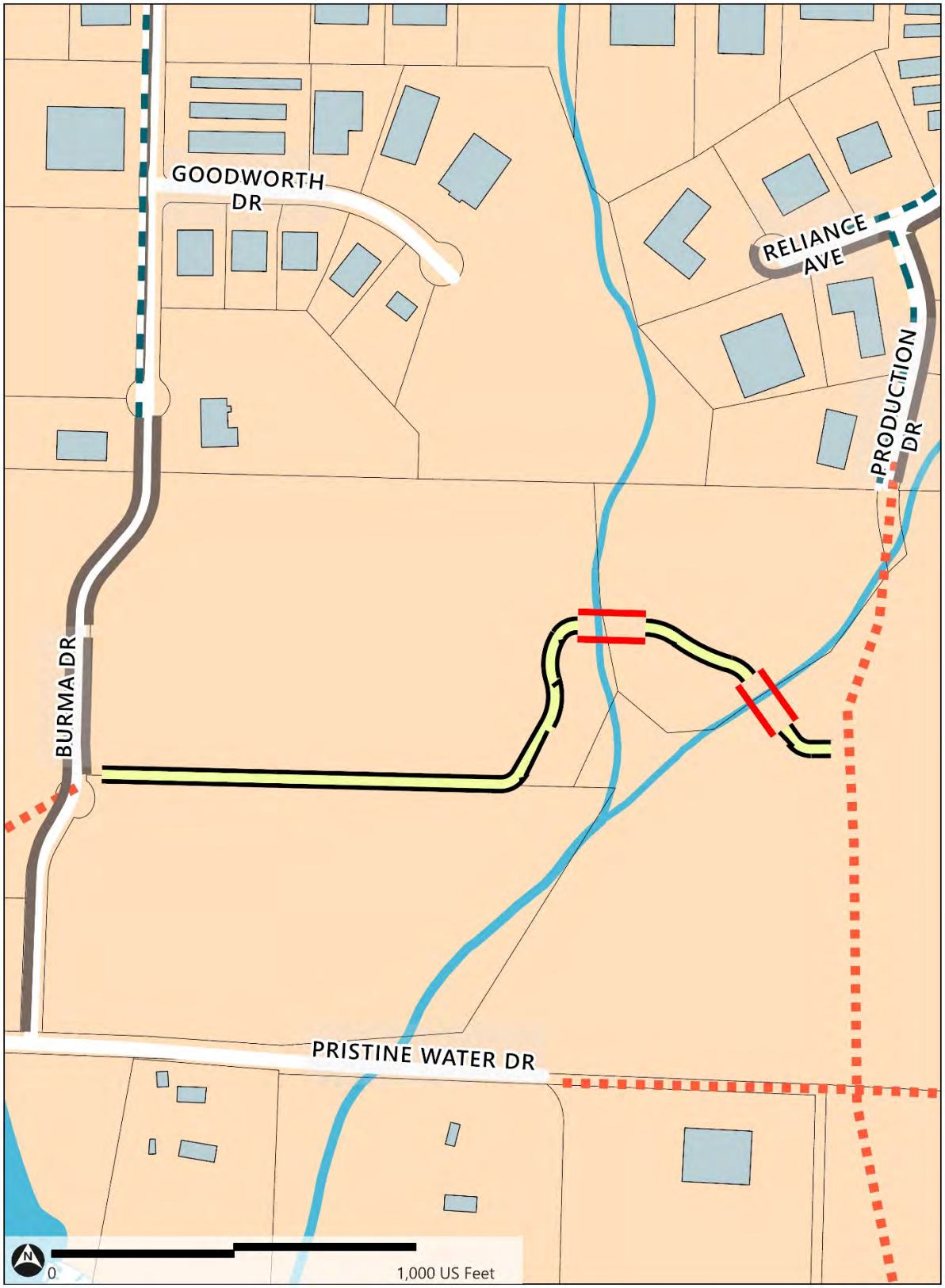
Facility	Alignment B
Trail	$1,181,000
Bridge	$0
Total	**$1,181,000**



Typical Section



Alignment D


GOODWORTH DR
RELIANCE AVE
PRODUCTION DR
BURMA DR
PRISTINE WATER DR
0
1,000 US Feet
Alignment D
Proposed Bridge
Alternative Alignment
Existing Shared-Use Path/Sidewalk
Future Roadway Extension
Building Footprint
Parcels
Waterbody

Alignment D

Alignment D adds a beneficial east-west connection to the active network but is not required to meet this plan's goals. This alignment would extend from Burma Drive to the Production Drive Extension on a new location between the recently constructed Cash Corporate Center buildings. This alignment was not evaluated for comparison as it is not an alternative for Alignments A, B, or C.

Details

At-Grade Crossings: 0

Structures: 2

Connections: Burma Drive SUP, Produce Drive Extension SUP

Facilities: 10 ft Shared Use Path, Bridge (x2)

Length: 2,125 ft

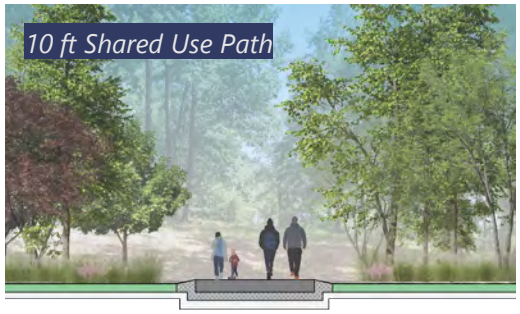
Parcel Information: 3 privately owned parcels. Acquisition may be required.

Environmental Factors

This alignment crosses two streams. Erosion control permits and additional permitting from Wake County may be required.

Project Cost

Facility	Alignment D
Trail	$2,952,800
Bridge	$1,865,000
Total	**$3,135,300**



Core Alignment

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 39,890.00	$ 39,900.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 60,000.00	$ 60,000.00
Geotextile for Soil Stabilization	2,300	SY	$ 4.00	$ 9,200.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 55,000.00	$ 55,000.00
Pavement				
6" Aggregate Base Course	890	Tons	$ 142.00	$ 126,380.00
Asphalt Type S9.5b	260	Tons	$ 70.00	$ 18,200.00
Asphalt Binder for Plant Mix	17	Tons	$ 760.00	$ 12,920.00
2'-6" Concrete Curb and Gutter	2,000	LF	$ 40.00	$ 80,000.00
Concrete Curb Ramps	18	EA	$ 2,000.00	$ 36,000.00
6" Concrete Driveway Entrance	8	EA	$ 5,000.00	$ 40,000.00
Erosion Control	1.0	LS	$ 55,000.00	$ 55,000.00
Traffic Control				
Thermo and Pavement Marking	1.0	LS	$ 5,100.00	$ 5,100.00
Traffic Signals (Upgrade)	1.0	Each	$ 100,000.00	$ 100,000.00
ROADWAY TOTAL				$ 617,800.00
STRUCTURES				
Bridge	0.00	SF	$ -	$ -
Retaining Walls	1,750	SF	$ 80.00	$ 140,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 40,000.00	$ 40,000.00
STRUCTURES & UTILITY TOTAL				$ 180,000.00
Miscellaneous (10% Strs & Util)				$ 18,000.00
Miscellaneous (45% Roadway)				$ 278,010.00
		Contract Cost	.....	$ 1,133,710.00
		E. & C. 16%	.....	$ 181,393.60
		Construction Cost	.....	**$ 1,315,103.60**

Alignment A

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 70,288.00	$ 70,300.00
Construction Surveying	1	LS	$ 35,000.00	$ 35,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 105,000.00	$ 105,000.00
Geotextile for Soil Stabilization	4,200	SY	$ 4.00	$ 16,800.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 100,000.00	$ 100,000.00
Pavement				
6" Aggregate Base Course	1,630	Tons	$ 142.00	$ 231,460.00
Asphalt Type S9.5b	460	Tons	$ 70.00	$ 32,200.00
Asphalt Binder for Plant Mix	30	Tons	$ 760.00	$ 22,800.00
2'-6" Concrete Curb and Gutter	3,650	LF	$ 40.00	$ 146,000.00
Concrete Curb Ramps	34	EA	$ 2,000.00	$ 68,000.00
6" Concrete Driveway Entrance	15	EA	$ 5,000.00	$ 75,000.00
Erosion Control	1.0	LS	$ 100,000.00	$ 100,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	$ 3,500.00	$ 3,500.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 935,760.00
STRUCTURES				
Bridge	0.00	SF	$ 5,000.00	$ -
Retaining Walls	5,000	SF	$ 80.00	$ 400,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 70,000.00	$ 70,000.00
STRUCTURES & UTILITY TOTAL				$ 470,000.00
Miscellaneous (10% Strs & Util)				$ 47,000.00
Miscellaneous (45% Roadway)				$ 421,092.00
		Contract Cost	.....	$ 1,944,152.00
		E. & C. 16%	.....	$ 311,064.32
		Construction Cost	.....	**$ 2,255,216.32**

Alignment B

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 37,142.00	$ 37,200.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 55,000.00	$ 55,000.00
Geotextile for Soil Stabilization	2,100	SY	$ 4.00	$ 8,400.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0.00	LS	$ -	$ -
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1.00	LS	$ 50,000.00	$ 50,000.00
Pavement				
6" Aggregate Base Course	820	Tons	$ 142.00	$ 116,440.00
Asphalt Type S9.5b	230	Tons	$ 70.00	$ 16,100.00
Asphalt Binder for Plant Mix	15	Tons	$ 760.00	$ 11,400.00
2'-6" Concrete Curb and Gutter	1,825	LF	$ 40.00	$ 73,000.00
Concrete Curb Ramps	17	EA	$ 2,000.00	$ 34,000.00
6" Concrete Driveway Entrance	6	EA	$ 5,000.00	$ 30,000.00
Erosion Control	1.0	LS	$ 50,000.00	$ 50,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	$ 3,500.00	$ 3,500.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 467,840.00
STRUCTURES				
Bridge	0.00	SF	$ 5,000.00	$ -
Retaining Walls	3,000	SF	$ 80.00	$ 240,000.00
Utility Construction				
Utility Relocation/Adjustment	1.0	LS	$ 35,000.00	$ 35,000.00
STRUCTURES & UTILITY TOTAL				$ 275,000.00
Miscellaneous (10% Strs & Util)				$ 27,500.00
Miscellaneous (45% Roadway)				$ 210,528.00
		Contract Cost	.....	$ 1,018,068.00
		E. & C. 16%	.....	$ 162,890.88
		Construction Cost	.....	**$ 1,180,958.88**

Alignment C

Description	Quantity	Unit	Price		Amount
Mobilization	1	LS	60,244.00	$	60,300.00
Construction Surveying	1	LS	30,000.00	$	30,000.00
Earthwork					
Comprehensive Grading	1	LS	115,000.00	$	115,000.00
Geotextile for Soil Stabilization	3,450	SY	4.00	$	13,800.00
Drainage					
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1	LS	30,000.00	$	30,000.00
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0	LS	$ -	$	-
Pavement					
6" Aggregate Base Course	1,340	Tons	142.00	$	190,280.00
Asphalt Type S9.5b	380	Tons	70.00	$	26,600.00
Asphalt Binder for Plant Mix	25	Tons	760.00	$	19,000.00
2'-6" Concrete Curb and Gutter	0	LF	40.00	$	-
Concrete Curb Ramps	2	EA	2,000.00	$	4,000.00
6" Concrete Driveway Entrance	0	EA	5,000.00	$	-
Erosion Control	1	LS	85,000.00	$	85,000.00
Traffic Control					
Thermo and Pavement Marking (Typical Section - L or Y)	1.0	LS	1,200.00	$	1,200.00
Traffic Signals (Upgrade)	0.0	Each	25,000.00	$	-
ROADWAY TOTAL				$	514,880.00
STRUCTURES					
Bridge	130.00	LF	5,000.00	$	650,000.00
Utility Construction					
Utility Relocation/Adjustment	1.0	LS	40,000.00	$	40,000.00
STRUCTURES & UTILITY TOTAL				$	690,000.00
Miscellaneous (10% Strs & Util)				$	69,000.00
Miscellaneous (45% Roadway)				$	231,696.00
		Contract Cost	.....	$	1,565,876.00
		E. & C. 16%	.....	$	250,540.16
		Construction Cost	.....	**$**	**1,816,416.16**

Alignment D

Description	Quantity	Unit	Price	Amount
Mobilization	1	LS	$ 111,851.50	$ 111,900.00
Construction Surveying	1	LS	$ 20,000.00	$ 20,000.00
Earthwork				
Comprehensive Grading	1	LS	$ 85,000.00	$ 85,000.00
Geotextile for Soil Stabilization	2,450	SY	$ 4.00	$ 9,800.00
Drainage				
Greenway Drainage - Typical Section / C&G / Shoulder (L or Y Line)	1	LS	$ 25,000.00	$ 25,000.00
Sidepath Drainage - Typical Section / C&G / Shoulder (L or Y Line)	0	LS	$ -	$ -
Pavement				
6" Aggregate Base Course	950	Tons	$ 142.00	$ 134,900.00
Asphalt Type S9.5b	270	Tons	$ 70.00	$ 18,900.00
Asphalt Binder for Plant Mix	18	Tons	$ 760.00	$ 13,680.00
2'-6" Concrete Curb and Gutter	0	LF	$ 40.00	$ -
Concrete Curb Ramps	2	EA	$ 2,000.00	$ 4,000.00
6" Concrete Driveway Entrance	0	EA	$ 5,000.00	$ -
Erosion Control	1	LS	$ 60,000.00	$ 60,000.00
Traffic Control				
Thermo and Pavement Marking (Typical Section - L or Y)	1	LS	$ 750.00	$ 750.00
Traffic Signals (Upgrade)	0.0	Each	$ 25,000.00	$ -
ROADWAY TOTAL				$ 372,030.00
STRUCTURES				
Bridge	365.00	LF	$ 5,000.00	$ 1,825,000.00
Utility Construction				
Utility Relocation/Adjustment	1	LS	$ 40,000.00	$ 40,000.00
STRUCTURES & UTILITY TOTAL				$ 1,865,000.00
Miscellaneous (10% Strs & Util)				$ 186,500.00
Miscellaneous (45% Roadway)				$ 167,413.50
		Contract Cost	.....	$ 2,702,843.50
		E. & C. 16%	.....	$ 432,454.96
		Construction Cost	.....	**$ 3,135,298.46**