October 2024

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KNIGHTDALE
start something

The Knightdale

SAFETY ACTION PLAN REPORT

KNIGHTDALE
Safety Action Plan

The Safety Action Plan was prepared by:

The Town of Knightdale

with

Kimley-Horn

TABLE OF CONTENTS

1

Introduction

INTRODUCTION

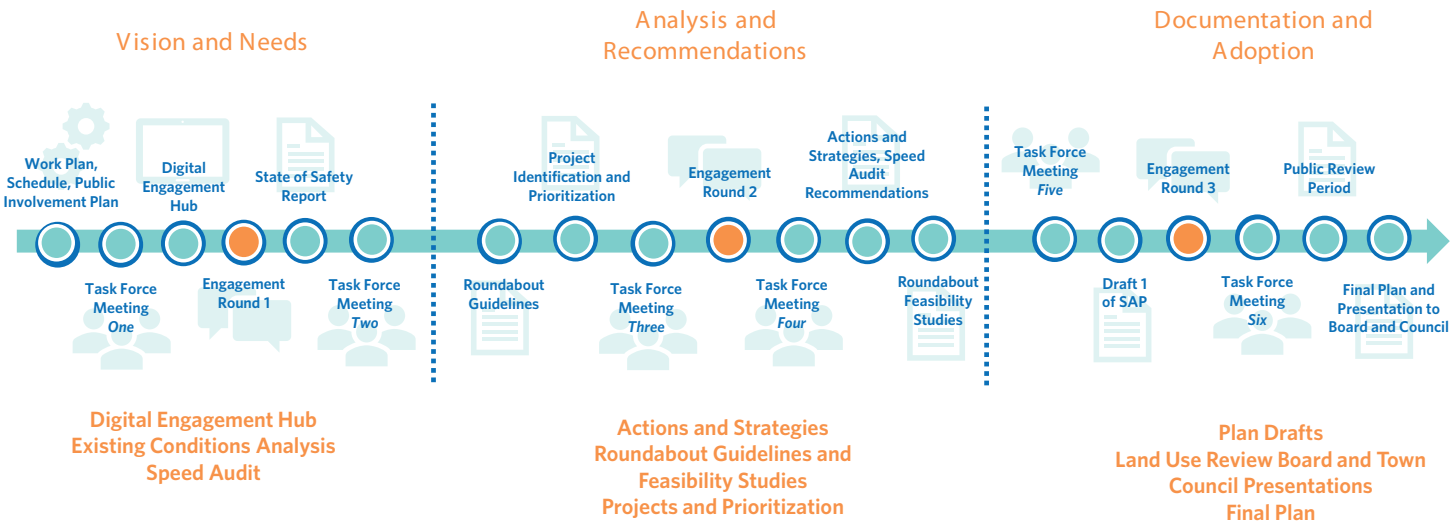
Purpose

The Knightdale Safety Action Plan is the Town's vision for improving transportation safety in Knightdale. It includes a High-Injury Network (HIN), which is a map of the Town's roadway system highlighting the areas historically known to experience the most crashes—particularly fatal and serious injury crashes. The HIN becomes the Town's way of identifying the highest priority road segments for safety improvements.

The accompanying projects, actions, and strategies will help guide investments in roadway safety throughout Knightdale. The Plan uses data to analyze where fatal and serious injury crashes occur and outlines a tailored set of realistic projects and practical strategies that align with Knightdale's needs and the community's vision for transportation safety.

Process

The Knightdale Safety Action Plan includes three phases: Vision and Needs, Analysis and Recommendations, and Documentation and Adoption. Meetings with the Task Force and public engagement opportunities guide each phase, including key interim deliverables, such as the State of Safety Report, the Project Identification and Prioritization, and the Safety Action Plan report document.



Key Elements

The Plan is anchored around three key elements: the High-Injury Network (HIN), project prioritization, and an Action Table that provides a wealth of practical strategies to support the Town's roadway safety goals.

High-Injury Network

Segments with the highest concentration of crashes and any segments with a fatal or serious injury crash

Prioritization

A list of project prioritized using highly vetted criteria that align with the Town's vision for roadway safety

Action Table

Policy and programmatic recommendations to support the Town's roadway safety goals

VISION ZERO OVERVIEW

Roughly 40,000 people are killed each year in roadway crashes in the United States. In 2021, more than 1,700 people died in North Carolina (Source: North Carolina Vision Zero). In recent years, there has been an uptick in roadway deaths and serios injuries.

To help prevent this tragic loss of life and health, there needs to be a coordinated approach among planners, engineers, public health professionals, law enforcement, elected officials, and all who travel our roadways. Vision Zero is a global movement to help provide that coordinated approach to prevent roadway deaths and serious injuries.

The goal of Vision Zero is to eliminate all traffic fatalities and serious injuries, while increasing safe, healthy, and equitable mobility for all.

Safe Systems Approach

To achieve this goal, Vision Zero is grounded in a process called the Safe Systems Approach, which involves proactively implementing strategies most effective at preventing the most dangerous crashes before they even happen and ensuring when crashes do happen, they are not severe.

At the heart of the Safe Systems Approach are six key principles developed by the United States Department of Transportation (USDOT):

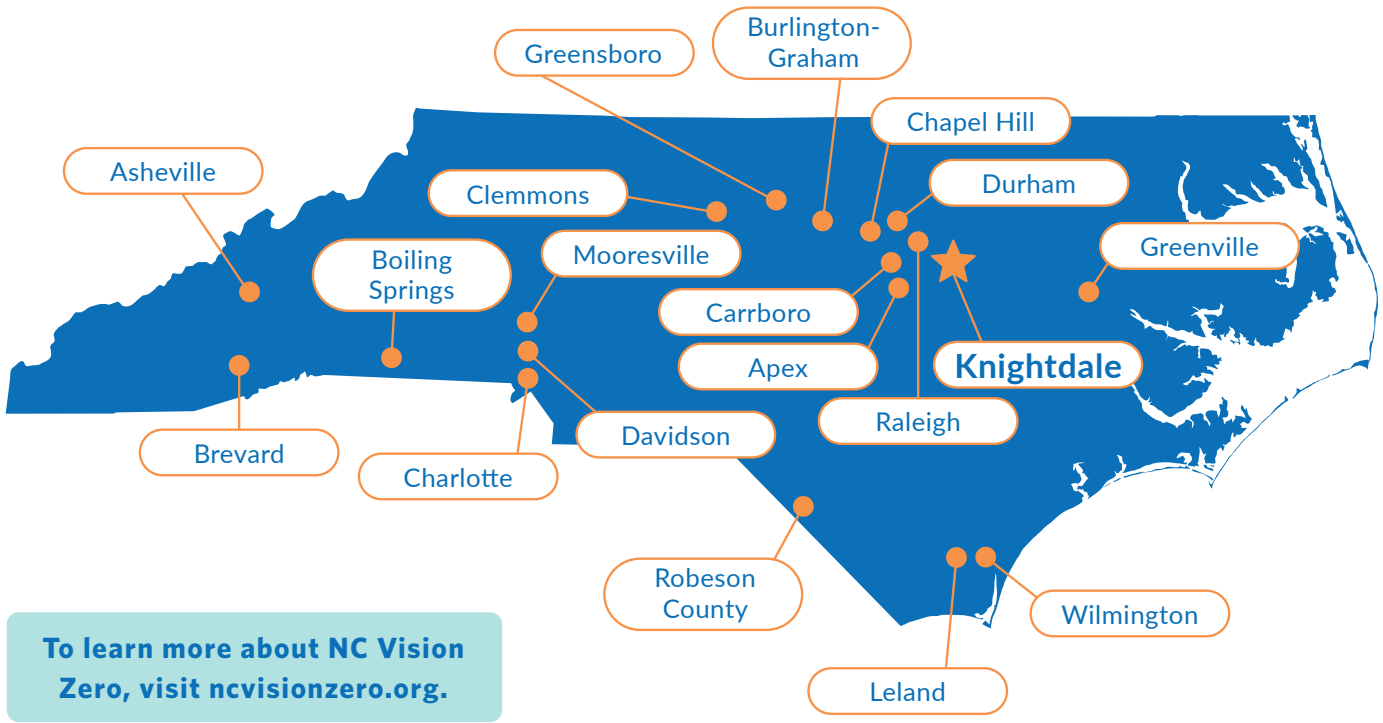
- **Deaths and serious injuries are unacceptable.** A single roadway death or serious injury is too many. Therefore, the Safe Systems Approach prioritizes strategies to prevent crashes that result in death and serious injuries.
- **Humans make mistakes.** Human error is a given, so the Safe Systems Approach emphasizes building a transportation system that anticipates mistakes to prevent the most dangerous crashes.
- **Humans are vulnerable.** The transportation system must be built with these human needs and vulnerabilities in mind, and not simply focus on moving people and goods quickly.
- **Responsibility is shared.** Everyone is responsible for preventing fatal and serious injury crashes, those who plan, design, build, manage the transportation system, and those who use it.
- **Safety is proactive.** The Safe Systems Approach relies on finding proactive solutions to identify risks in the roadway network and implement solutions to mitigate and eliminate those risks.
- **Redundancy is critical.** A robust transportation system that allows all users to travel in the manner they choose safely and efficiently is key to the Safe Systems approach. This acts as a fail-safe to keep roadway users protected if one part fails.

NC Vision Zero

NC Vision Zero is focused on eliminating roadway deaths and injuries in the state. Knightdale is one of 17 communities who have adopted a goal of zero traffic fatalities and serious injuries. As an NC Vision Zero partner community, Knightdale will use this Action Plan to establish and implement data-driven strategies to improve safety, using the following NC Vision Zero principles:

- No loss of life on our roads is acceptable.
- All road users deserve safe streets.
- Injury or death is not an inevitable price to pay for mobility.

Knightdale is one of 18 communities in the state that have adopted the zero traffic fatalities and serious injuries goal.



To learn more about NC Vision Zero, visit ncvisionzero.org.

2

The State of Safety

ABOUT THE STATE OF SAFETY

The Knightdale State of Safety is a foundational assessment of the existing characteristics, physical conditions, and socio-demographic trends related to transportation safety in the community. The intent of this document is to showcase the need for further investment in transportation safety in Knightdale. As a part of this planning process, a wide variety of data was analyzed by the project team. The State of Safety isn't a full accounting of all available data, but showcases the information and trends most relevant for identifying safety needs in Knightdale. **The full State of Safety Report will be included as an appendix to this document.**

Data Sources

This report leverages a variety of data sources that provide unique and foundational data related to transportation safety in Knightdale. Those sources that provided the bulk of the data in this report are identified and described below:

US Census American Community Survey (ACS)

The ACS is an ongoing survey by the US Census Bureau that collects detailed population and housing information on a yearly basis down to block group level.

Connect NCDOT Mapping Resources

The North Carolina Department of Transportation (NCDOT) maintains these mapping resources to help with planning and mapping things like traffic volumes, safety scores, speed limits, planned projects, and other transportation network data.

NCDOT Crash Data

NCDOT maintains a crash database for planning-level analysis. Due to differences in recording methods, not all crashes are captured within the location-based data; however, those recorded act as a good high-level representation of crashes in the area.

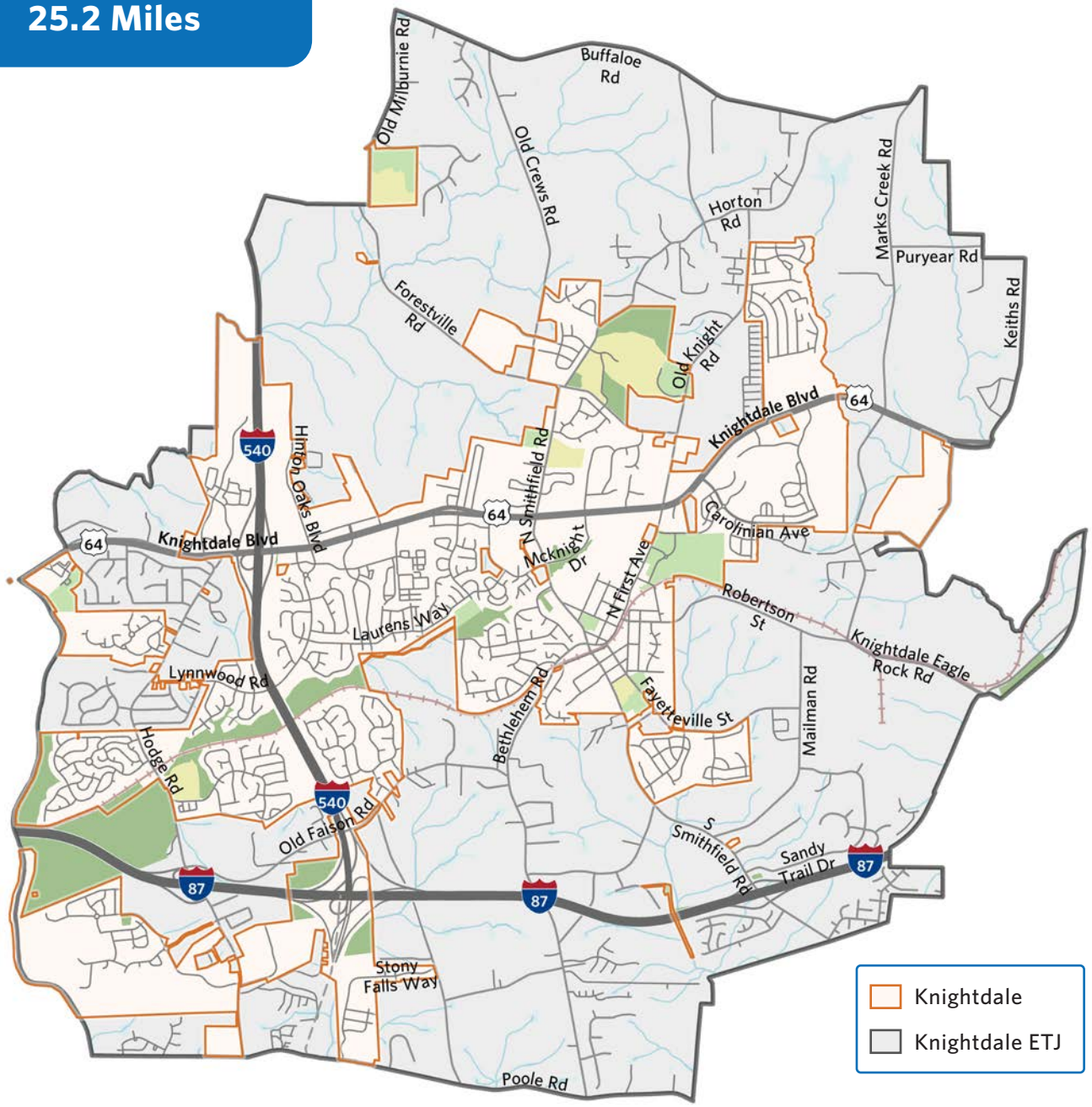
NC OneMap and Wake County GIS

NC OneMap is North Carolina's open data portal with mapping layers for the entire state. Similarly, Wake County maintains a similar open data portal with county-specific data.

Study Area

The Study Area for the Knightdale Safety Action Plan is the extraterritorial jurisdiction (ETJ) for the Town. The ETJ extends beyond formal boundaries of Knightdale, but represents a broader area that the Town has some amount of legal authority. For the purposes of the Knightdale Safety Action Plan, the project team will review and analyze all data within the existing ETJ to ensure a comprehensive approach to transportation safety planning for the community.

Knightdale ETJ Area
25.2 Miles



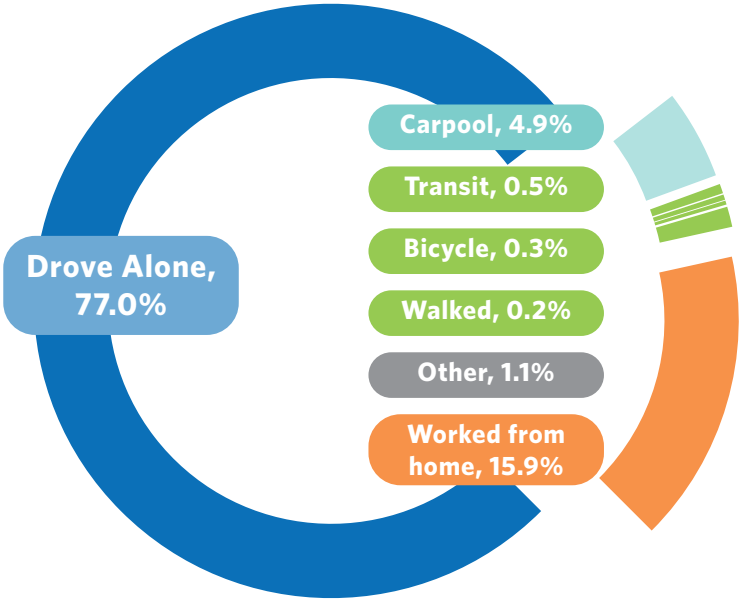
COMMUNITY CONDITIONS

The Community Conditions provide a snapshot of the demographic conditions within the Town of Knightdale. In this section, we outline how people commute to work, where they live, their access to a car, the racial and ethnic makeup of the Town, and the median income.

Commute Mode

Commute data shows us that the majority of Knightdale residents either drive alone (77%) or carpool (4.9%) on their way to work for a typical day. Multimodal options (like transit, biking, and walking) are used sparingly (1% total). It's also worth noting that almost 16% of residents work from home, meaning that their typical driving patterns are different than those that drive to their jobs each day.

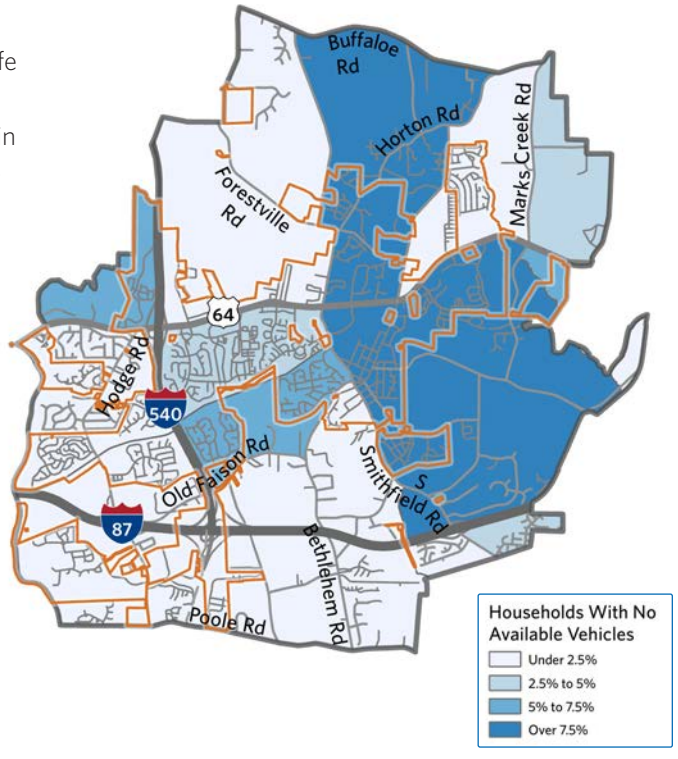
Just over 1.1% of residents commute by transit, walking, or biking.



Vehicle Access

Areas where vehicle access is limited are likely also more in need of safe multimodal transportation options, compared to other parts of the community. Within Knightdale's jurisdiction, over 7.5% of households in areas in the east and north of the ETJ (shown in dark blue) do not have access to a vehicle. It's worth noting that most of these areas are not as densely populated or developed as the central and eastern side of Town. Additionally, households in neighborhoods and apartments west of Downtown, south of Knightdale Boulevard, and east of I-540 show some limited access as well (between 2.5% and 7.5% of households).

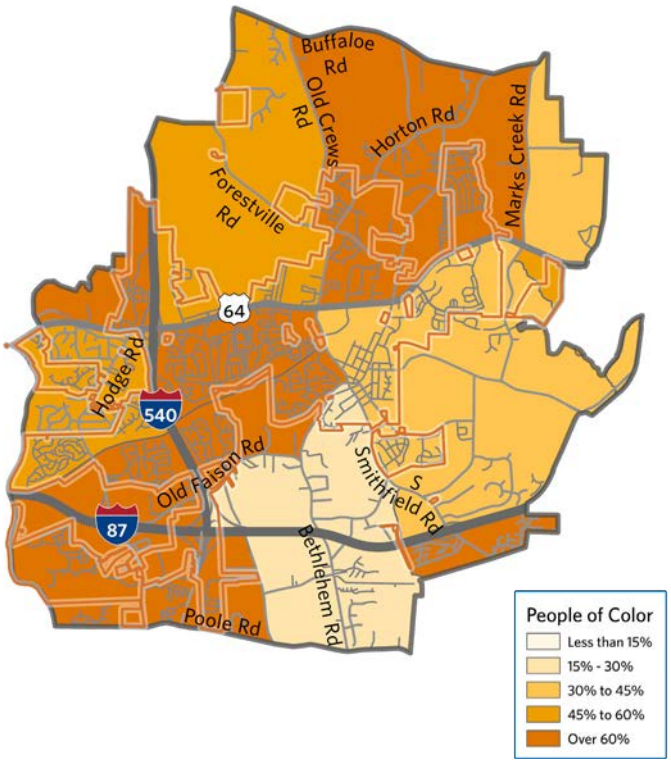
Rural areas in the east and residential areas west of Downtown have some of the most households without access to a vehicle.



Percent People of Color

Statistically, communities of color are most often impacted by transportation safety issues. The highest concentrations of non-white residents are in the central, southwest, and northeast areas (over 60% persons of color). Additionally, there is some correlation between the Town's most diverse communities and the areas that most lack access to a vehicle in the household.

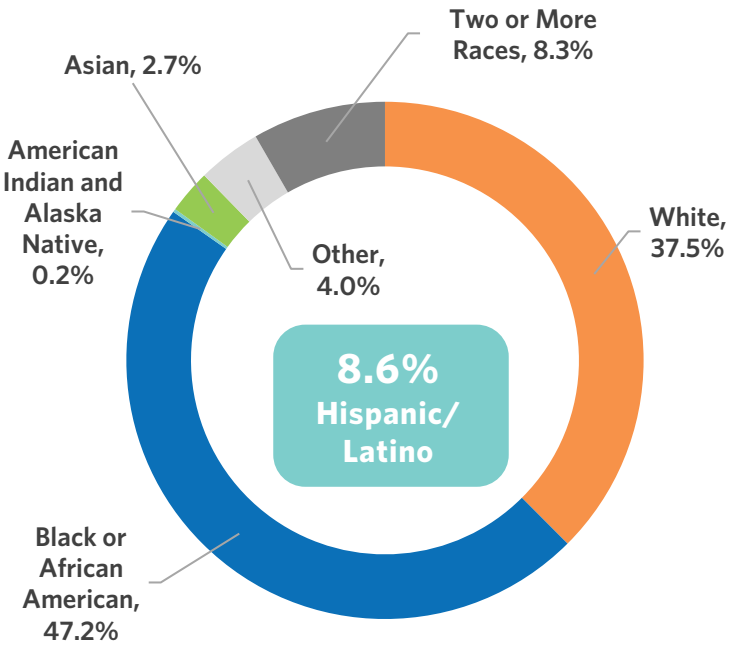
People of color are more than 30% of the population in every part of the Knightdale area except the south central area along Bethlehem Road.



Racial Distribution

Knightdale is a very diverse community, especially when compared with adjacent municipalities. 62.5% of Town residents are non-white, with the highest share in Black or African American communities (47.2%). The next largest ethnic group is Hispanic/Latino at 8.6%. Hispanic/Latino is considered by the US Census Bureau as an ethnicity, not a race—which is why it isn't included in the full chart to the right.

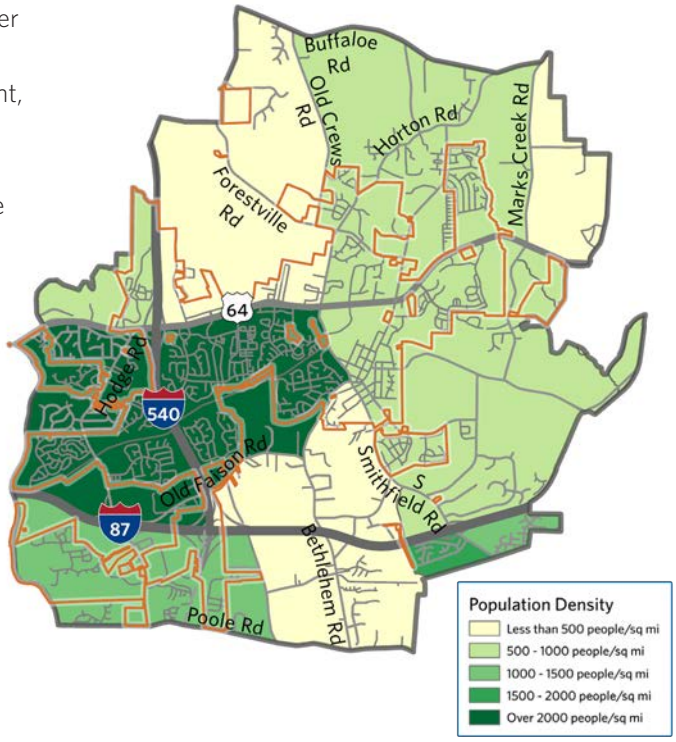
Black/African Americans are the largest racial group in the Knightdale area, making up almost half of the population.



Population Density

The western part of the Town between Knightdale Boulevard and I-87 has the highest population density, largely due to much of Knightdale's older residential neighborhoods and subdivisions being located in that area and growth coming out from the Raleigh area. With recent development, the population density in other areas may begin to rise as new dense residential subdivisions are constructed. Areas with higher population densities are often better areas for multimodal transportation and have increased needs to design for safety of people outside of cars.

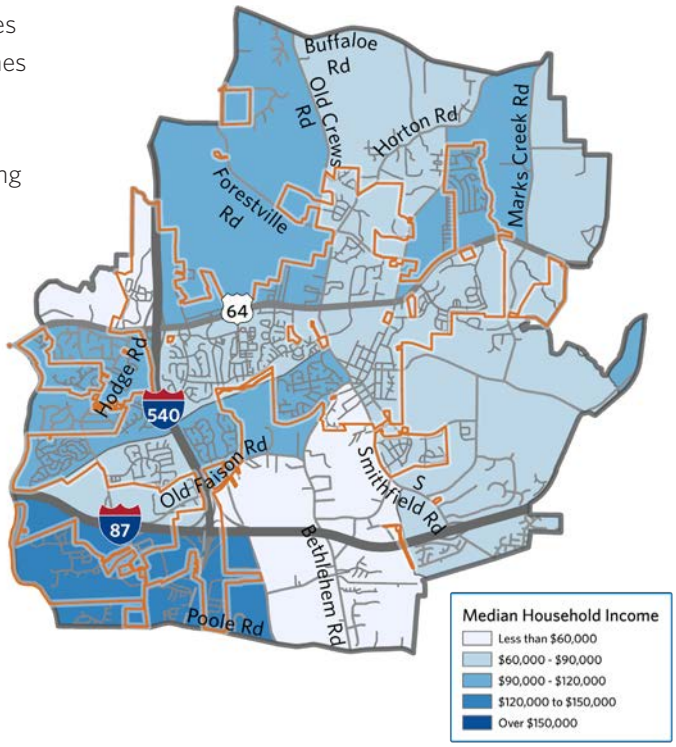
While Knightdale's highest population density is currently in the west, new development will likely increase densities elsewhere in the ETJ.



Median Household Income

Everywhere in Knightdale's ETJ other than its bottom left corner has a median household income of less than $120,000, with the communities in the southern middle along Bethlehem Road having household incomes under $60,000. Other areas have median incomes under $90,000 throughout the more rural parts of the east. Lower income households may find it more difficult to afford transportation costs related to owning a car or have less cars per household than others.

Overall Median Household Income
$79,364



TRANSPORTATION CONDITIONS

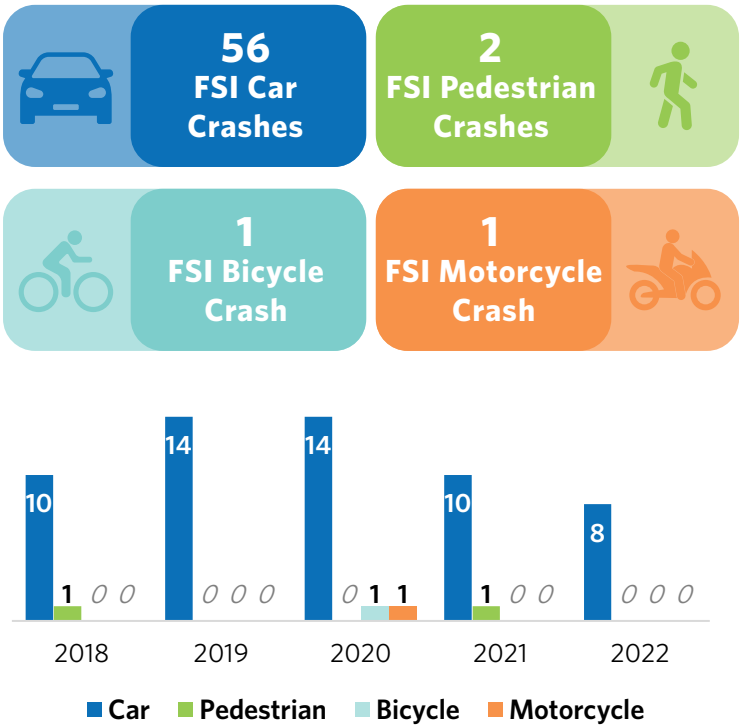
The Transportation Conditions describe the crash history in Knightdale, including overall crash history and contributing factors.

Fatal and Serious Injury (FSI) Crashes By Year, By Mode

Between 2018 and 2022, Knightdale and its extraterritorial jurisdiction experienced over 3,700 crashes. While the area saw a high amount of crashes, only a small percentage were fatal or caused severe injuries (FSI), with 56 fatal or severe car crashes, 2 FSI pedestrian crashes, and one FSI crash each with bicycles and motorcycles.

The vast majority of fatal and severe injury crashes between 2018 and 2022 were car crashes. Only about 3.4% of fatal and severe crashes involved pedestrians, and even fewer involved motorcycles or bicycles.

Of 2018-2022, fatal car crashes were at their highest in 2019 and 2020. 3/4 non-car crashes of the period occurred during the height of the COVID pandemic in 2020-2021.

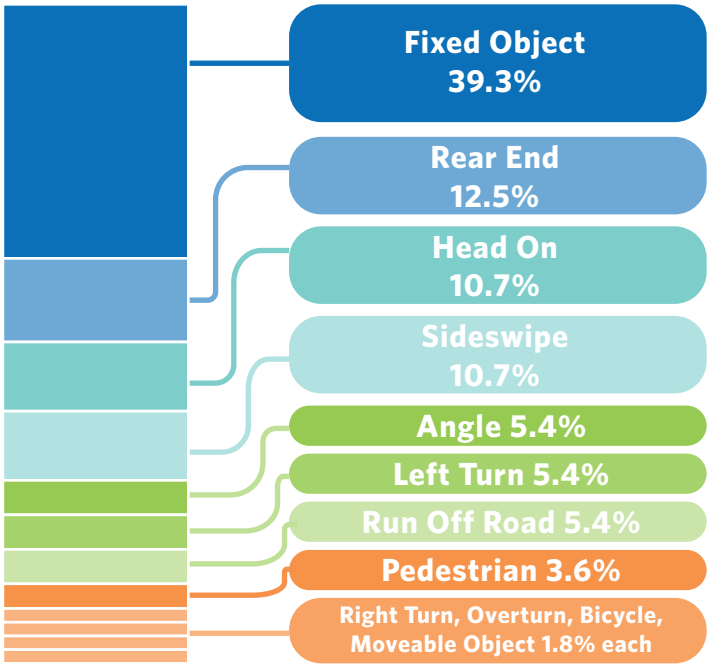


Percent of FSI Crashes By Type

Amongst recorded fatal and severe crashes between 2018 and 2022, most were crashes with a fixed object (39.3%), followed by rear end collisions (12.5%), head on collisions (10.7%), and sideswipes (10.7%).

Head on crashes were one of the most likely crash types to be fatal or severe. 6 out of 21 total head on crashes (28.6%) were fatal or caused severe injury. For comparison, 22 out of all 468 fixed object crashes (4.7%) were fatal or severe, and 7 out of all 1446 rear end crashes (less than 0.5%) were fatal or severe.

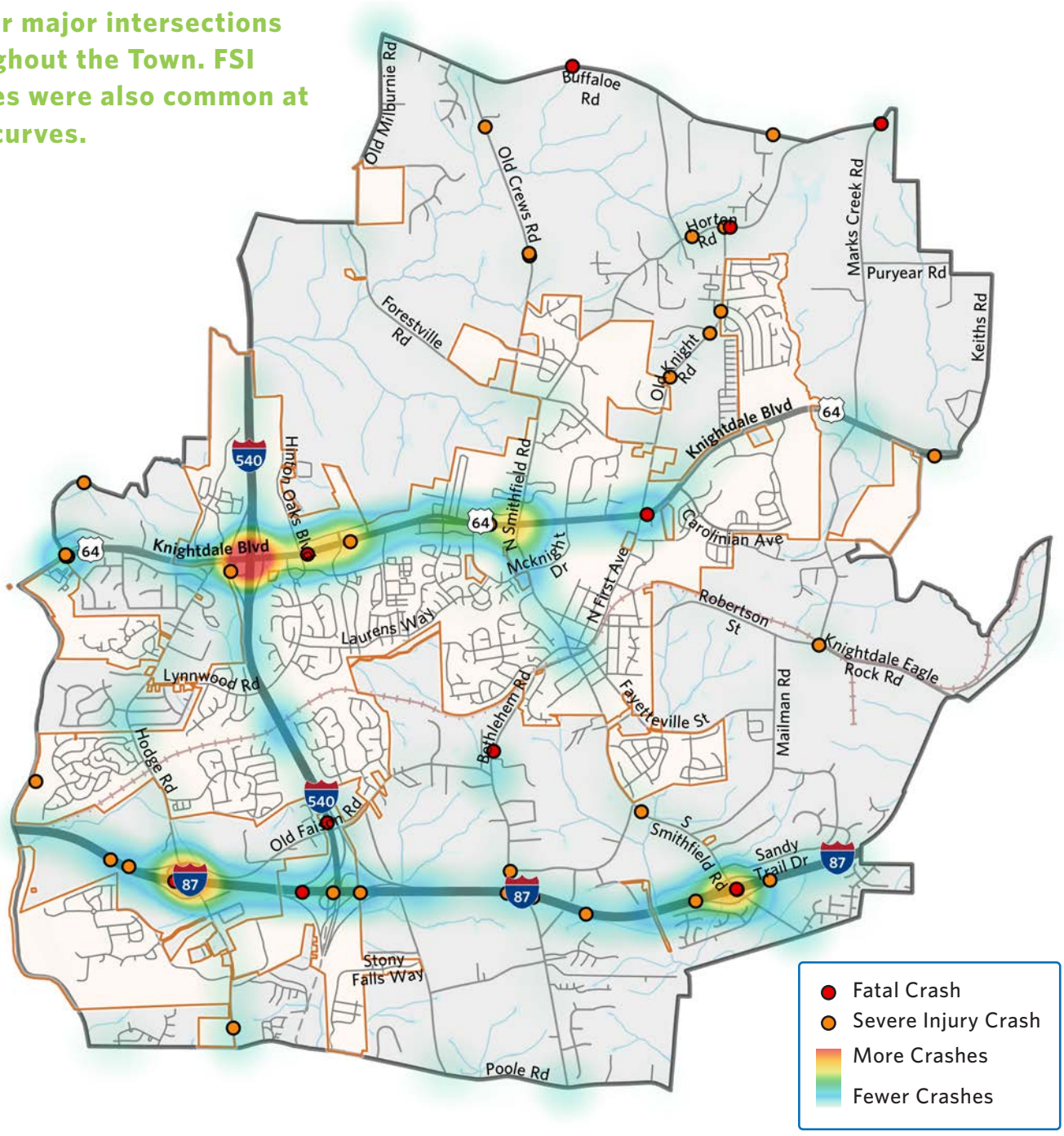
More than a quarter of all head on crashes were either fatal or caused severe injury.



Crash History

From 2018 to 2022, the overall majority of spatially mappable crashes happened on Knightdale Boulevard (Business US 64), I-540, I-87, or Smithfield Road. Hodge Road, Poole Road, and Bethlehem Road also saw some crash hotspots. However, many of the smaller roads in the north with less overall crashes had a larger share of the fatal and severe injury crashes, such as Old Knight Road, Horton Road, and Old Crews Road. Some tight curves and uncontrolled exurban intersections also tended to have a higher number of crashes. Knightdale Boulevard and I-87 saw the most fatal and severe crashes overall.

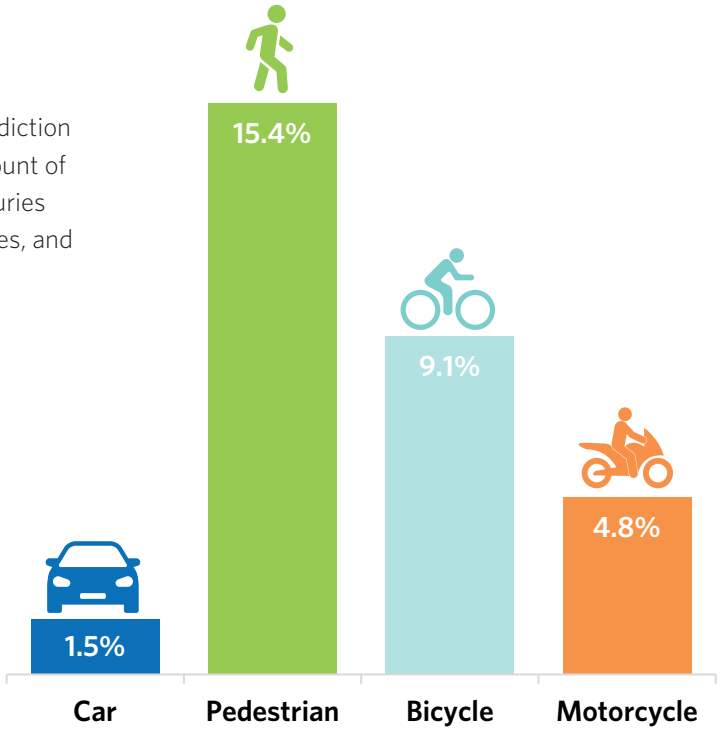
Most crash hot spots were at or near major intersections throughout the Town. FSI crashes were also common at tight curves.



Likelihood of FSI in Crashes Involving Each Mode

Between 2018 and 2022, Knightdale and its extraterritorial jurisdiction experienced over 3,700 crashes. While the area saw a high amount of crashes, only a small percentage were fatal or caused severe injuries (FSI), with 56 fatal or severe car crashes, 2 FSI pedestrian crashes, and one FSI crash each with bicycles and motorcycles.

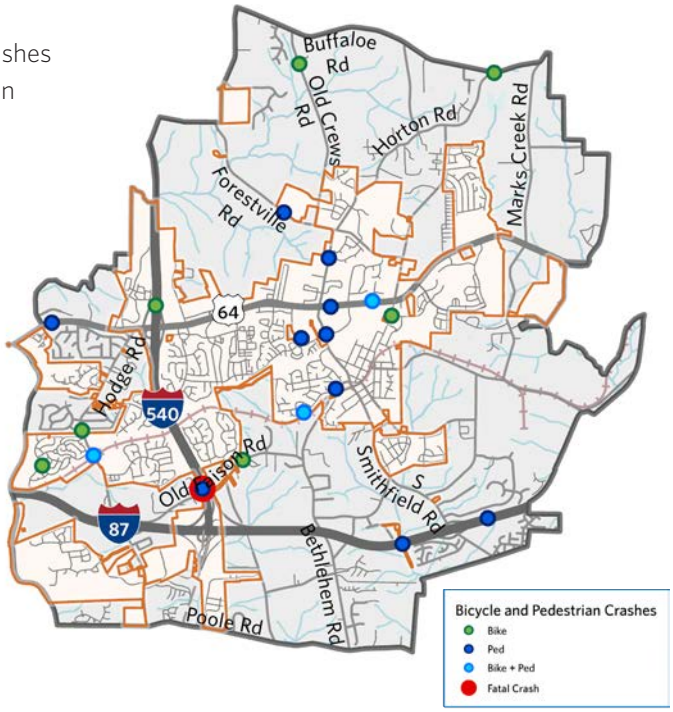
Pedestrians and bicyclists are much more likely to get killed or severely injured if involved in a crash than drivers.



Bicycle and Pedestrian Crashes

Pedestrian crashes seem to occur more in the town core, while bike crashes were often on more rural-suburban roads further out. Several pedestrian crashes roughly followed Smithfield Road near and north of the Town center. In contrast, other than one bike crash near Knightdale Station Park, bicycle crashes followed more rural-suburban roads like Hodge Road, Old Faison Road, Old Crews Road, and Horton Road. Only one pedestrian crash from 2018 to 2022 was fatal, where a pedestrian was hit on the Old Faison Road bridge over I-540.

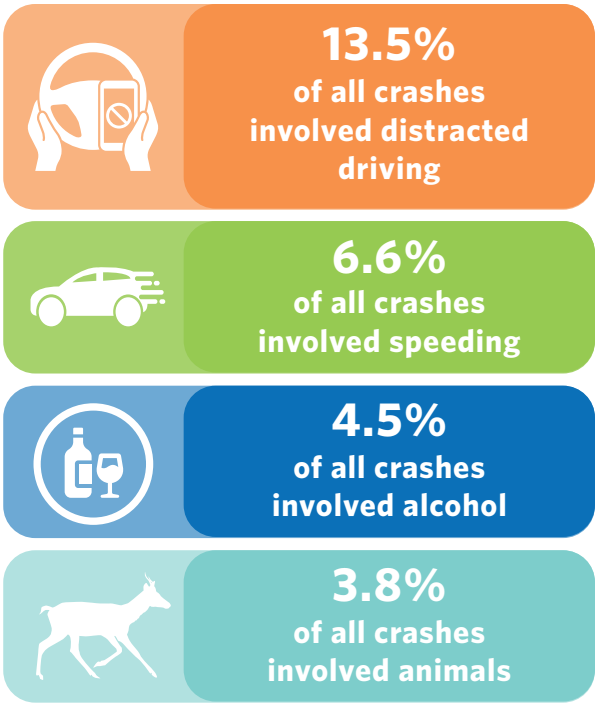
Most pedestrian crashes were roughly along Smithfield Road in central Knightdale.



Contributing Factors

Across all recorded crashes, distracted driving was the most common contributing factor, with over 13% of crashes from 2018 to 2022 involving it. Speeding (6.6%), alcohol (4.5%), and animal crashes (3.8%) were also major contributing factors.

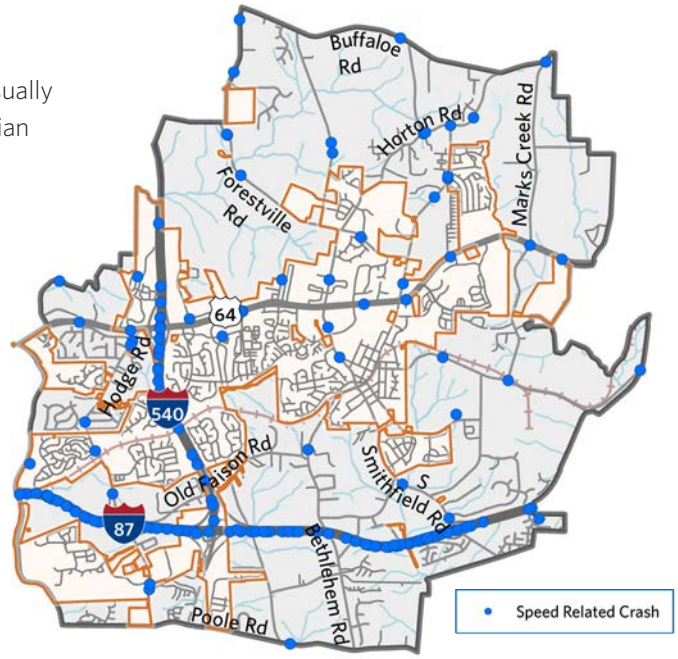
Over half of crashes involving distracted driving were rear end collisions from failing to stop.



Crashes Involving Speeding

Speeding is often part of the cause of crashes and plays a large role in severity. The higher the speed of a crash, the more severe the crash usually is, especially if the crash involved a vulnerable road user like a pedestrian or bicyclist. While the majority of speed related crashes were along I-540 and I-87, higher speed arterials and rural roads where its easier for drivers to pick up speed also saw a lot of speed related crashes. Roads like Knightdale Boulevard, Smithfield Road, Horton Road, Old Knight Road, Hodge Road, and Forestville Road saw the majority of non-interstate speed related crashes.

Out of 246 speed-related crashes, about 3.3% were fatal or caused severe injury.

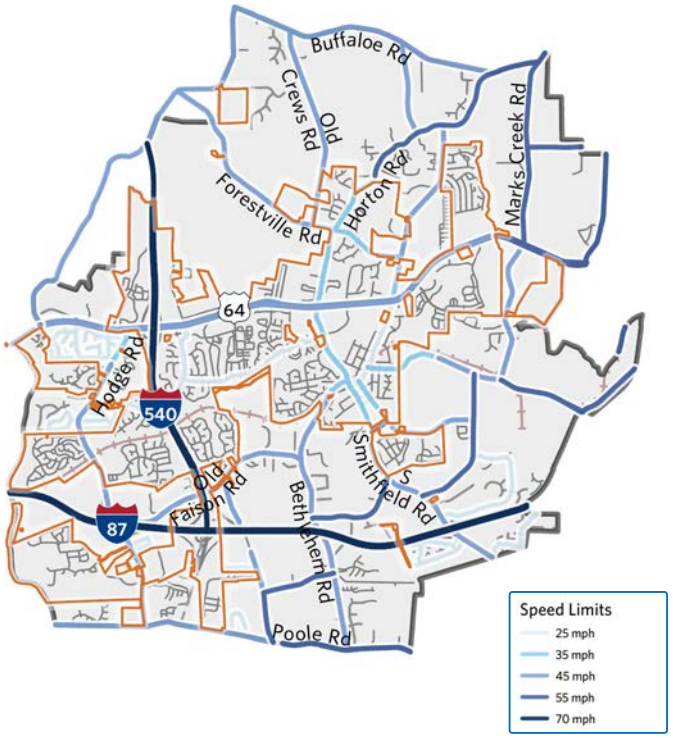


Speed Limits

There is a sharp contrast between speed limits within the Town Limits and speeds on roads outside the Town. Within the Town itself, smaller streets like First Avenue, Laurens Way, and Lynnwood Road have 25 mile per hour (mph) speed limits, and most other major roads through the core of Knightdale have 35 mph speed limits (with the exception of Knightdale Boulevard with a 45 mph speed limit). Most of these speed limits immediately increase at the Town Limits, and outside of the Town most NCDOT controlled roads have a speed limit of 45 or 55 mph.

Notably lower speed limits do not necessarily mean lower speeds- actual traffic speeds depend on the design of the road and surroundings.

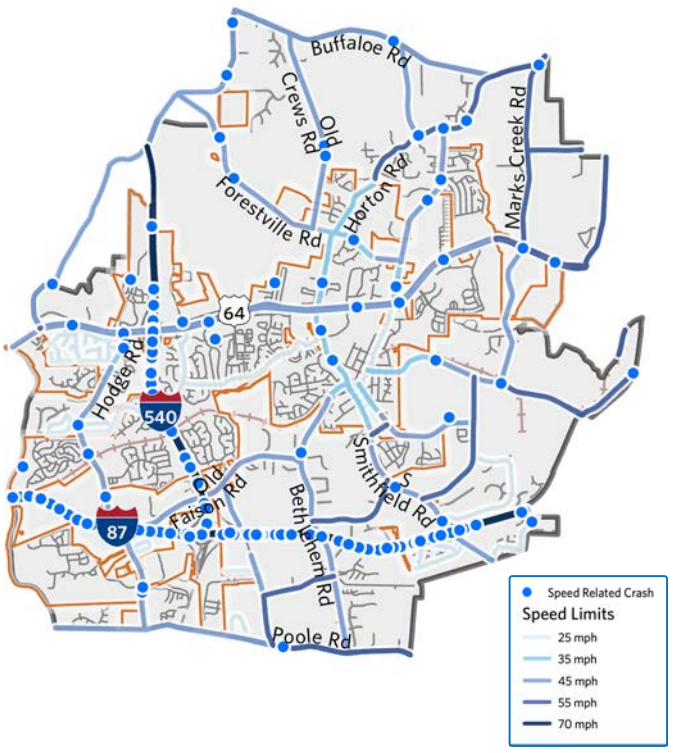
Speed limits are generally lower within the Town, with most roads seeing immediate speed limit increases upon leaving the Town Limits.



Speed Limits and Crashes Involving Speeding

Above 35 miles per hour, speed limits alone do not appear to deter speeding drivers. Very few speed-related crashes in the study area from 2018-2022 occurred on roads with a speed limit of 25 mph or lower. However, for speed limits 35 mph and higher, there was no correlation between speed-related crashes and the speed limit of the road (excluding interstates), with crashes involving speeding appearing on most major roadways.

Most major roads with a speed limit of at least 35 miles per hour experienced a crash involving speeding, with little connection between speeding crashes and speed limit.




SPEED
LIMIT
25

KEY TAKEAWAYS

Our most traveled intersections are in need of safety improvements.

Not surprisingly, our intersections (especially those near interstate interchanges), see the highest volume of crashes. While these high volume crash areas don't directly correlate to crashes that involve serious injuries or fatalities, they do still highlight a need to improve safety at these types of intersections to ensure safety issues don't get worse in the future.

Our more rural corridors are more likely to experience severe crashes.

Our highest volume intersections and corridors don't necessarily yield the majority of our fatal and serious injury crashes (FSI). When normalized using traffic volumes, our more rural corridors often see higher FSI crash rates, indicating a need to improve safety conditions on many of the corridors on the fringe of the community.

Pedestrians and bicyclists are our most vulnerable road users.

Based on the crash analysis, pedestrian and bicyclists are significantly more likely to be killed or seriously injured if involved in a crash. Areas of high multimodal demand (key crossings and intersections, downtown, parks, schools, etc.) are in need of improvements to ensure that those in our community that want to walk or bike are safe doing so.

Areas of higher crash density are more likely to be in communities of color.

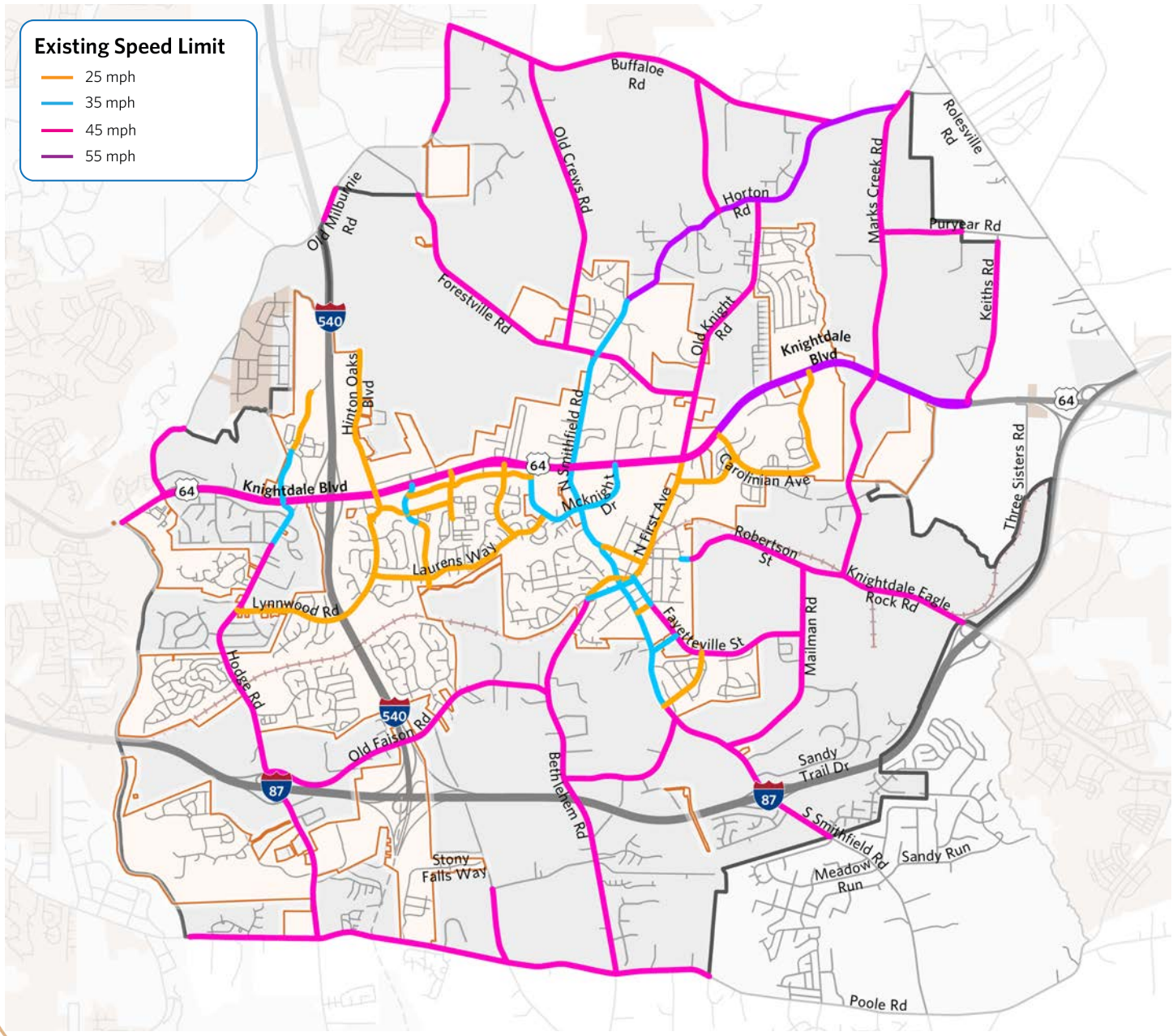
Many of the areas in our community that experience high crash rates are in communities of color. Additionally, these community members may be less likely to have access to a vehicle in the home, therefore making them more vulnerable to multimodal crashes as well.

3

Speed Audit Results

OVERVIEW

Speed related safety concerns are expressed in the Town of Knightdale's Comprehensive Transportation Plan (CTP). In addition, Knightdale is undergoing rapid development, and the analysis described in this section will be a tool to help the Town identify locations where speed limits need to be adjusted to accommodate evolving land use contexts. As part of the Knightdale Safety Action Plan (SAP), the project team partnered with Town staff to undertake a speed audit of the network. The goals of the audit were to identify corridors with speeding concerns and recommend safety improvements. This process followed the Safe Systems Approach adopted by the USDOT, which names safe speeds as a key pillar to achieving Vision Zero. Achieving safe speeds is accomplished through context-appropriate roadway design, education, and enforcement. As vehicles travel at high speeds, the driver's ability to react to hazards is limited—vulnerable road user safety decreases and the severity of crashes increase.




BUS
STOP

METHODOLOGY

Data Collection

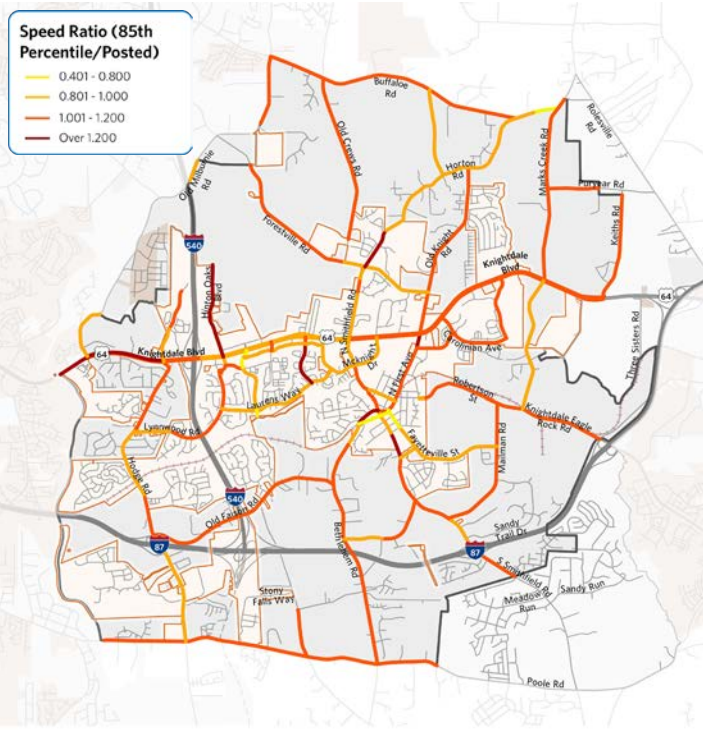
To collect existing operating speed data, various probe data sources were used—the types of speed data collected is important for making informed recommendations. The 85th percentile speed is the speed at, or below which, 85% of drivers travel on the road. The 50th percentile represents the average speed of travelers on a road. One data source, called StreetLight, can provide 50th and 85th percentile speeds on the identified network. For this evaluation, the project team used recorded 50th and 85th percentile speeds from January 2022 to May 2023 from StreetLight.

Evaluation Process

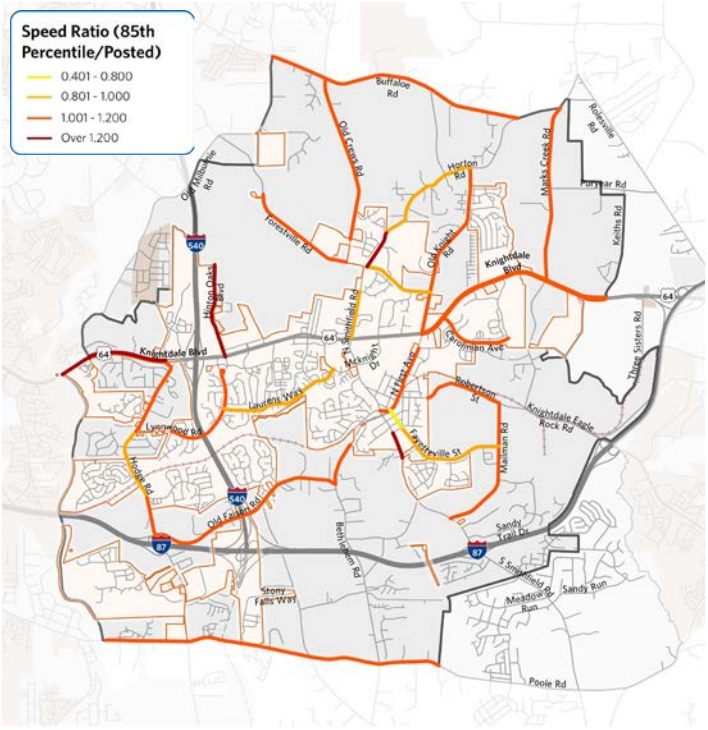
Using the posted speed limits and the 85th percentile speeds from StreetLight, the project team developed a speed ratio that indicated whether cars tended to travel faster or slower than the posted speed limit. The following performance measure thresholds were developed to analyze Knightdale's roadway network:

- **Ratio < 0.4** indicates slowness on the corridor
- **Ratio < 0.401 – 0.99** indicates field conditions operating slightly below posted limits
- **Ratio = 1.0** indicates field conditions operating at posted limits
- **Ratio 1.01 – 1.2** indicates field conditions operating slightly above posted limits
- **Ratio 1.201 <** indicates speeding on the corridor

Speed Ratio—Overall Network



Speed Ratio—Corridors



Using these thresholds, the Town of Knightdale selected 21 corridors for further evaluation to determine if current speed limits were appropriate. These corridors included a range of speed ratios, corridors that were on the High-Injury Network (HIN) and showed speed issues, or corridors for which the Town had received complaints.

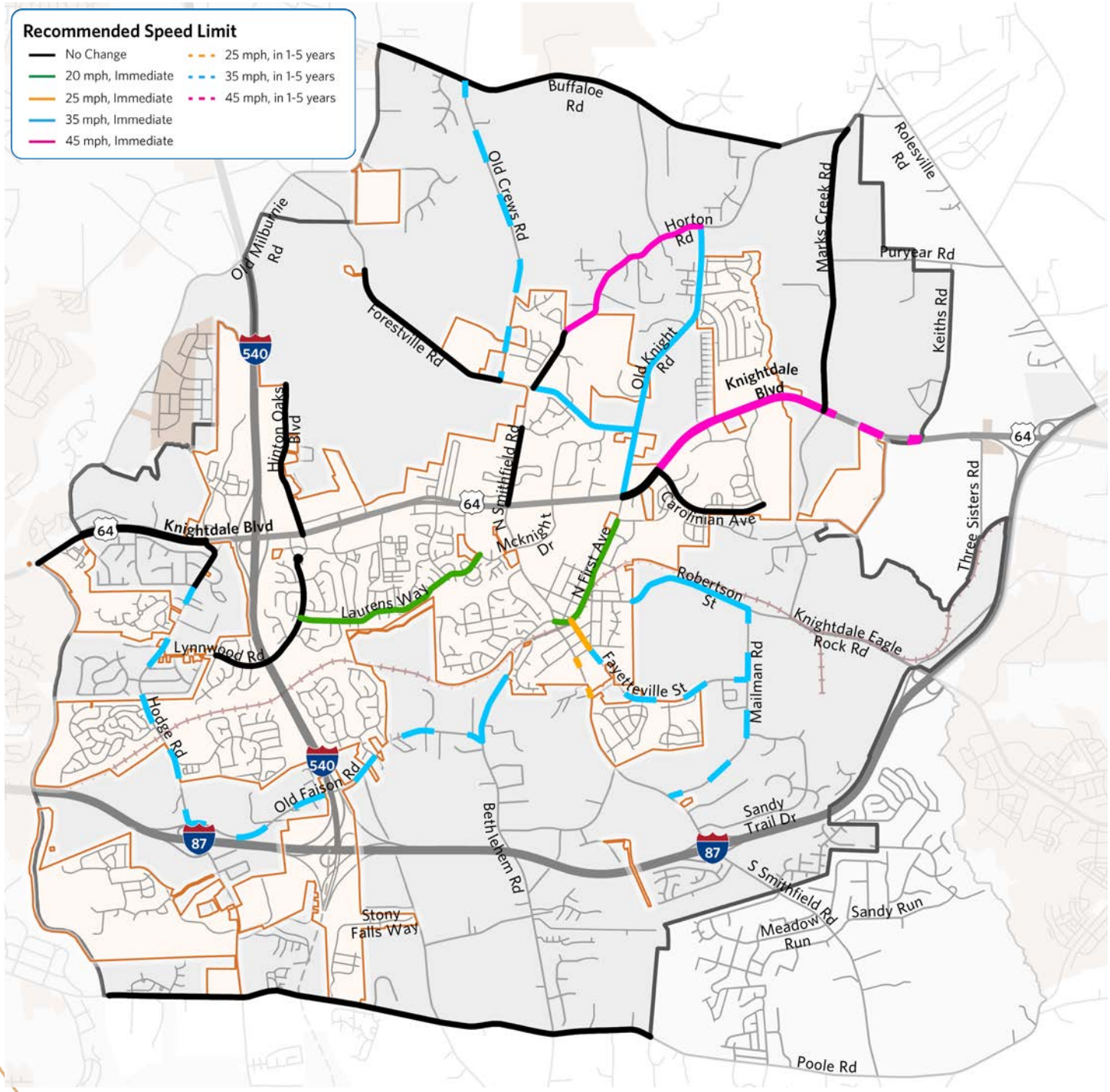
To explore potential speeding reductions and mitigations, the project team used a Federal Highway Administration (FHWA) tool called USLIMITS2. USLIMITS2 uses a variety of factors to evaluate speed limits, including:

- The posted speed limit
- Existing speeds (50th and 85th percentile)
- Average annual daily traffic (AADT)
- Crash data

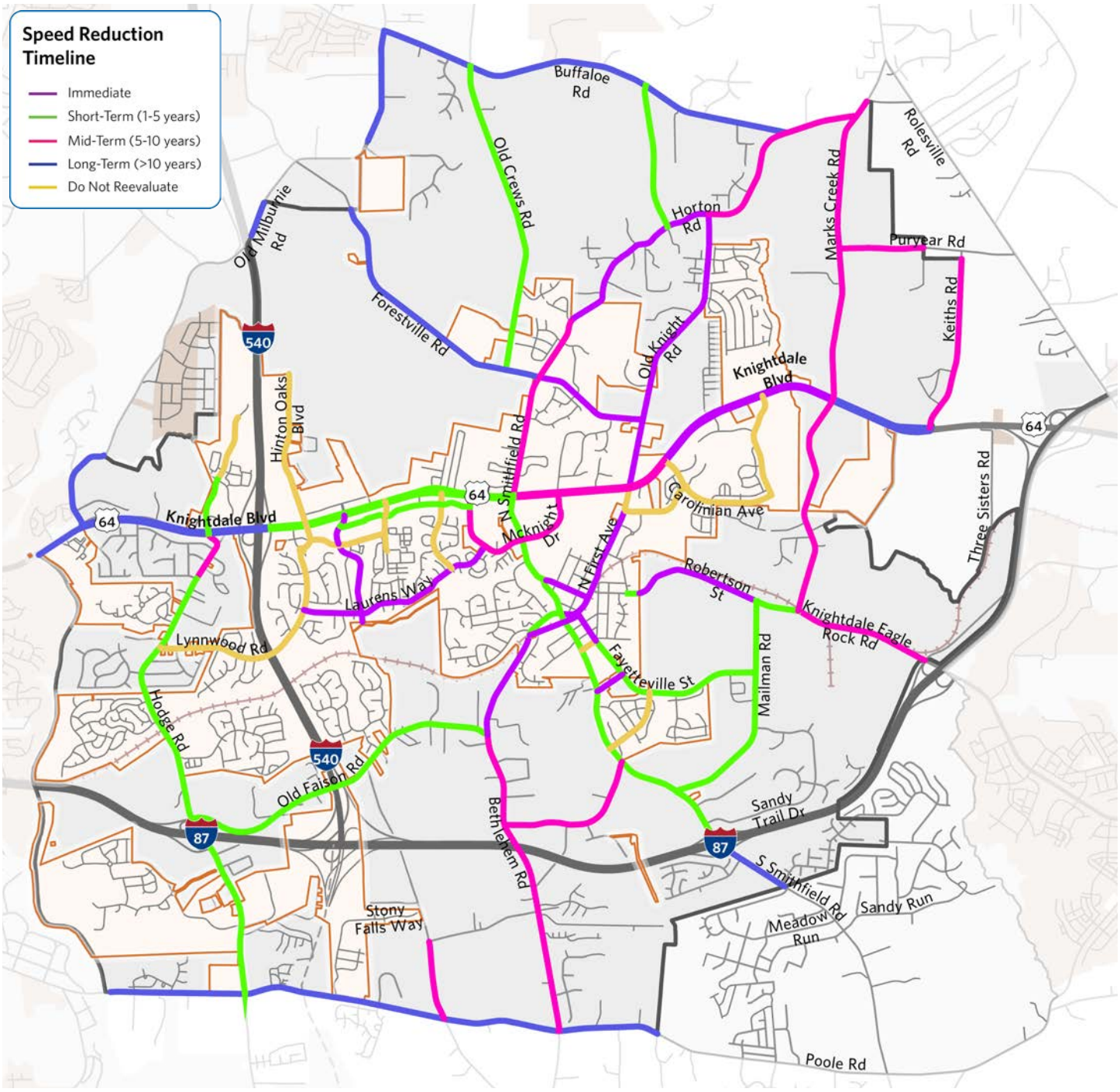
The project team incorporated the results from the USLIMITS2 tool as additional justification for recommended speed limit reductions on certain corridors in Knightdale. When the USLIMITS2 results did not justify a reduction, but notable safety concerns are known to be present—the project team relied on additional engineering judgment, local knowledge, and future plans (sidewalk improvements, bus route expansions, road connectivity).

Recommended Speed Limits

The map below shows the speed recommendations for the 21 corridors analyzed with USLIMTS2.



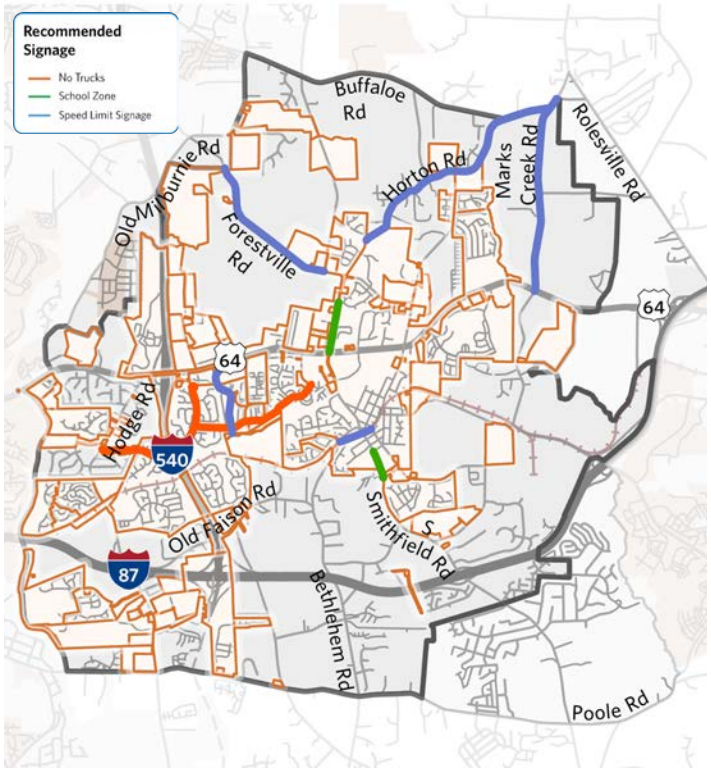
Once each corridor had been given a recommended speed, the project team assessed the remaining network to determine when and where speed limit changes should occur. A timeline of immediate, short (1-5 years), mid (5-10 years), and long-term (10> years) was assigned. The only corridors added to immediate that were not included in the USLIMITS2 analysis were corridors with a speed ratio <0.9, or where the operating speeds were already supportive of a lower speed. Neighborhood streets and roadways that are not anticipated to see an increase in vehicle or pedestrian traffic—that do not have existing crash related issues—were recommended to not be reevaluated, unless the Town receives complaints or a determines a spike in crashes.



Recommended Signage

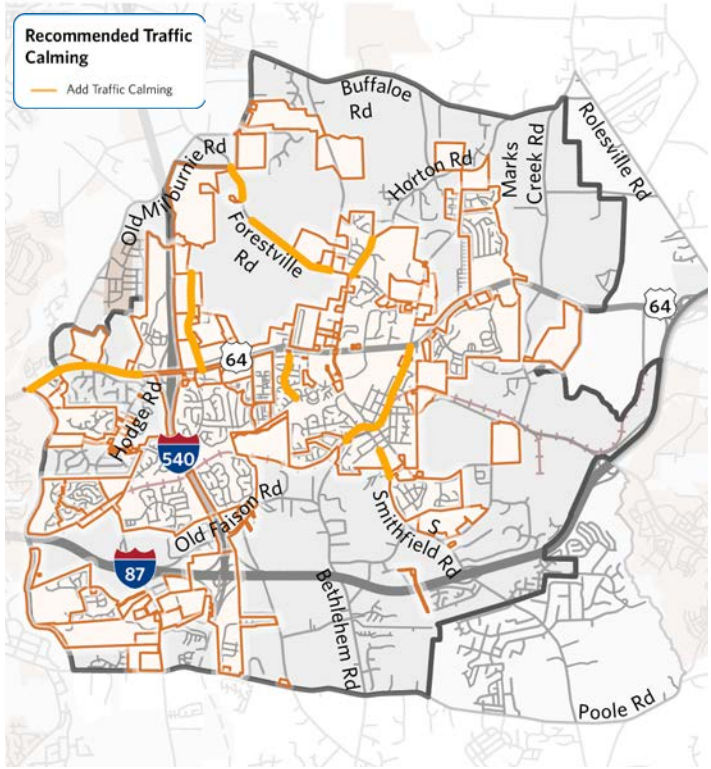
Concurrent with the speed limit audit, the project team reviewed signage across the Town, particularly for the 21 corridors that received a detailed review. In some places, signage preventing truck travel was recommended. In others, School Zone signage was recommended. Finally, where additional speed limit signage is a recommendation, the Town could add posted speed limit signs on corridors where it is lacking and unclear what the speed limits are.

This did not include a review of all signage on all roads, so this list—while useful—should not be considered comprehensive. The map below shows the signage recommendations for the corridors reviewed.



Recommended Traffic Calming

There were several roads with a speed ratio greater than 1.2, indicating excessive speeding. However, due to a variety of factors, several of these corridors were not considered by USLIMITS2 results as supporting a recommendation for lower speed limits. Therefore, these were identified individually for additional traffic calming measures. The map below shows the corridors recommended for additional traffic calming measures.



4

Engagement Summary

ENGAGEMENT

Public Open House

In March 2024, a public open house was held at Knightdale Town Hall to introduce the Safety Action Plan, educate the public on Vision Zero, present the primary safety findings from the State of Safety, and provide interactive ways for attendees to express safety concerns. Photos from the public open house are shown on the page to the right.

The project team asked attendants to pinpoint safety concerns on a map of the study area by type—such as lack of pedestrian or bicycle facilities, congestion, lack of visibility or lighting, unsafe intersections, or speeding. In addition, attendees completed a variety of other activities:

- Showing where they work, play, and live on a map
- Sharing their highest safety priorities
- Providing comments related to specific concerns
- Indicating their perceived level of safety on Knightdale roads

Vision Zero Task Force Meetings

To help guide the planning process and act as a conduit to the residents in Knightdale, a Vision Zero Action Plan Task Force was formed. Our four meetings with the Task Force were key in shaping this plan to ensure it reflects Knightdale's priorities. Task Force members included representatives from the Town Management office, Fire Department, the Police Department, and Town Council.

Joint Planning Open House

In April 2024, Town staff hosted a joint planning open house with the Town Council and the Land Use Review Board (LURB). At the open house, Council and the LURB provided input on the Knightdale Safety Action Plan, the Comprehensive Land Use Plan Update, and the Knightdale Boulevard Pedestrian Project.

Engagement Hub

Housed within the project website, the engagement hub provided a way for anyone interested in the Knightdale Safety Action Plan to share their thoughts and ideas when it was most convenient for them. It included an interactive transportation issues map and digital survey. Similar to the in-person engagement at the public open house, the interactive map allowed participants to pinpoint specific locations of safety concerns on a map of the study area by concern type. These were open from late April to early June on the project website.

Project Website

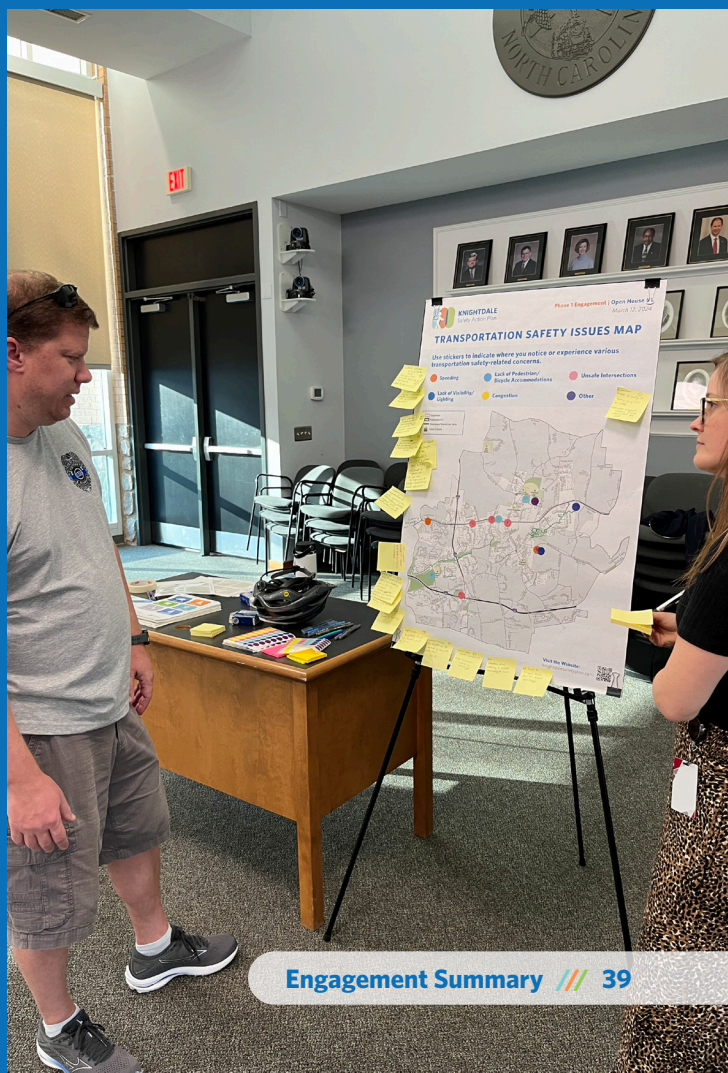
The project team created a website to act as a digital hub for the project, including information about the Safety Action Plan and Vision Zero, links to documents like the State of Safety Report, and an engagement hub where people could virtually participate in engagement about the project. The website also included a built-in translation feature to make the engagement materials and information available in multiple languages.

Community Events

To provide additional opportunities for engagement and continue spreading the word about the project, the Knightdale planning staff attended two community events over the course of the project—including the Latin American Festival in April 2024 and the Arts and Education Festival in August 2024.


POLICE
KNIGHTDALE
KNIGHTDALE
development services


PROJECT OVERVIEW

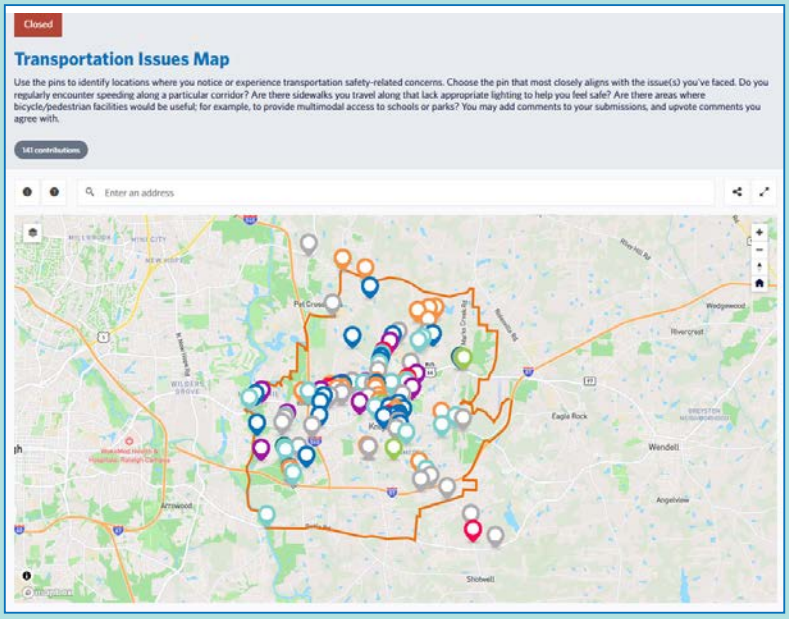

TRANSPORTATION SAFETY ISSUES MAP
Use stickers to indicate where you notice or experience various transportation safety-related concerns.
Speeding
Lack of Pedestrian/Bicycle Accommodations
Unsafe Intersections
Lack of Visibility/Lighting
Congestion
Other

Transportation Issues Map

One of the key activities within the Engagement Hub was the transportation issues map. With this map, participants could drop pins to identify locations where they've noticed or experienced transportation safety-related concerns. They could choose from a variety of categories:

- Speeding
- Lacks Sidewalk
- Lacks Crosswalk
- Lacks Bike Facility
- Unsafe Intersection
- Lacks Lighting
- Congestion
- Other

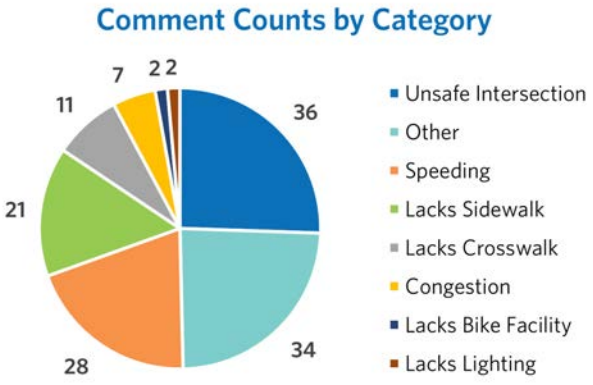
Most comments were about unsafe intersections, following by comments marked "other," concerns about speeding, and areas lacking sidewalks.



141 pins were added to the interactive map by community members. Most comments were about unsafe intersections, followed by "other" comments, concerns about speeding, and areas lacking sidewalks.

In addition, comments were largely concentrated in four areas:

- Downtown Knightdale
- Along Knightdale Boulevard (US-64 Business)
- Along Smithfield Road
- Along Old Knight Road and First Avenue



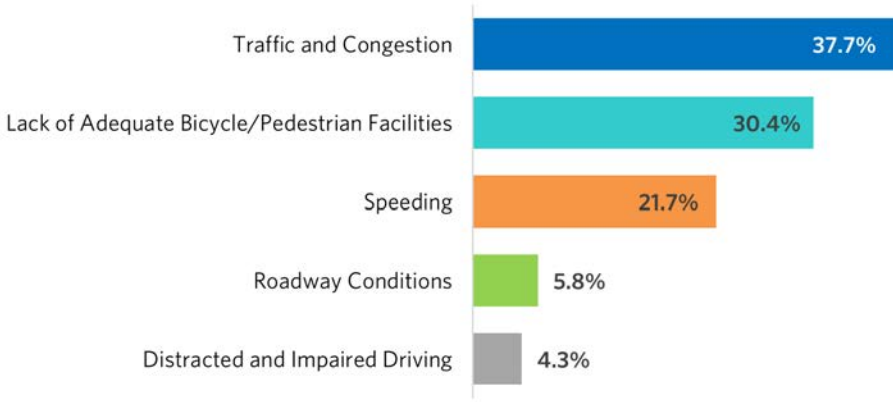
Downtown Knightdale saw several comments focused on speeding, especially along Park Avenue and Hester Street. Knightdale Boulevard saw a significant number of comments about unsafe intersections, followed by equal numbers of comments about speeding and missing sidewalks. Smithfield Road mostly saw comments about unsafe intersections clustered around the downtown area and near Knightdale Boulevard, though other parts of the roadway received comments about congestion. Comments along Old Knight Road focused primarily on missing sidewalks and lack of bike facilities.

Besides the aforementioned corridors, other locations with intersection safety concerns included Bethlehem Road at Old Faison Road, Hodge Road at Old Faison Road, and North Smithfield Road at Carrington Drive.

Quick Poll

The project website homepage included a quick poll that asked people to indicate the most pressing transportation safety issue affecting Knightdale today. The poll received 69 responses with the top three responses being about Traffic and Congestion, Lack of Adequate Bicycle/Pedestrian Facilities, and Speeding.

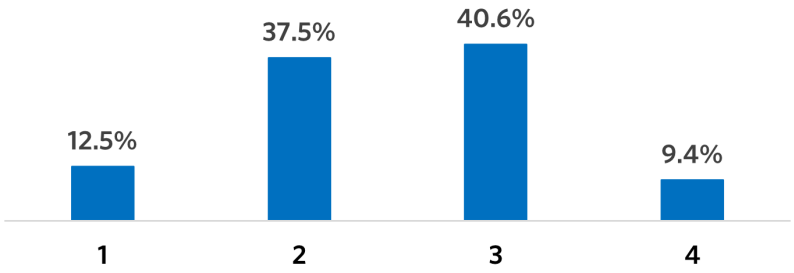
The most pressing concerns are Traffic and Congestion, Lack of Adequate Multimodal Facilities, and Speeding.



Survey

How safe is it to travel in Knightdale?

On a scale of 1 to 5, most responses were in the middle of the range, indicating respondents do not feel completely safe. No responses gave Knightdale a perfect 5 for safety.



What are your thoughts on transportation safety in Knightdale?

Generally, responses indicated driving in Knightdale overall feeling safe outside of dangerous intersections, but that walking and biking felt significantly less safe due to the lack of facilities. While several comments mentioned congestion, many of these comments noted safety concerns from road rage when drivers become frustrated with traffic and drive erratically. Nighttime visibility also emerged as a concern.

"Lots of congestion leads to a large number of people acting irrationally as they try to speed to their destination/ appointments."

"It's generally safe for driving with some problematic intersections. It doesn't feel that safe to walk or bike, with some exceptions like the greenway."

"Crack down on speeders."

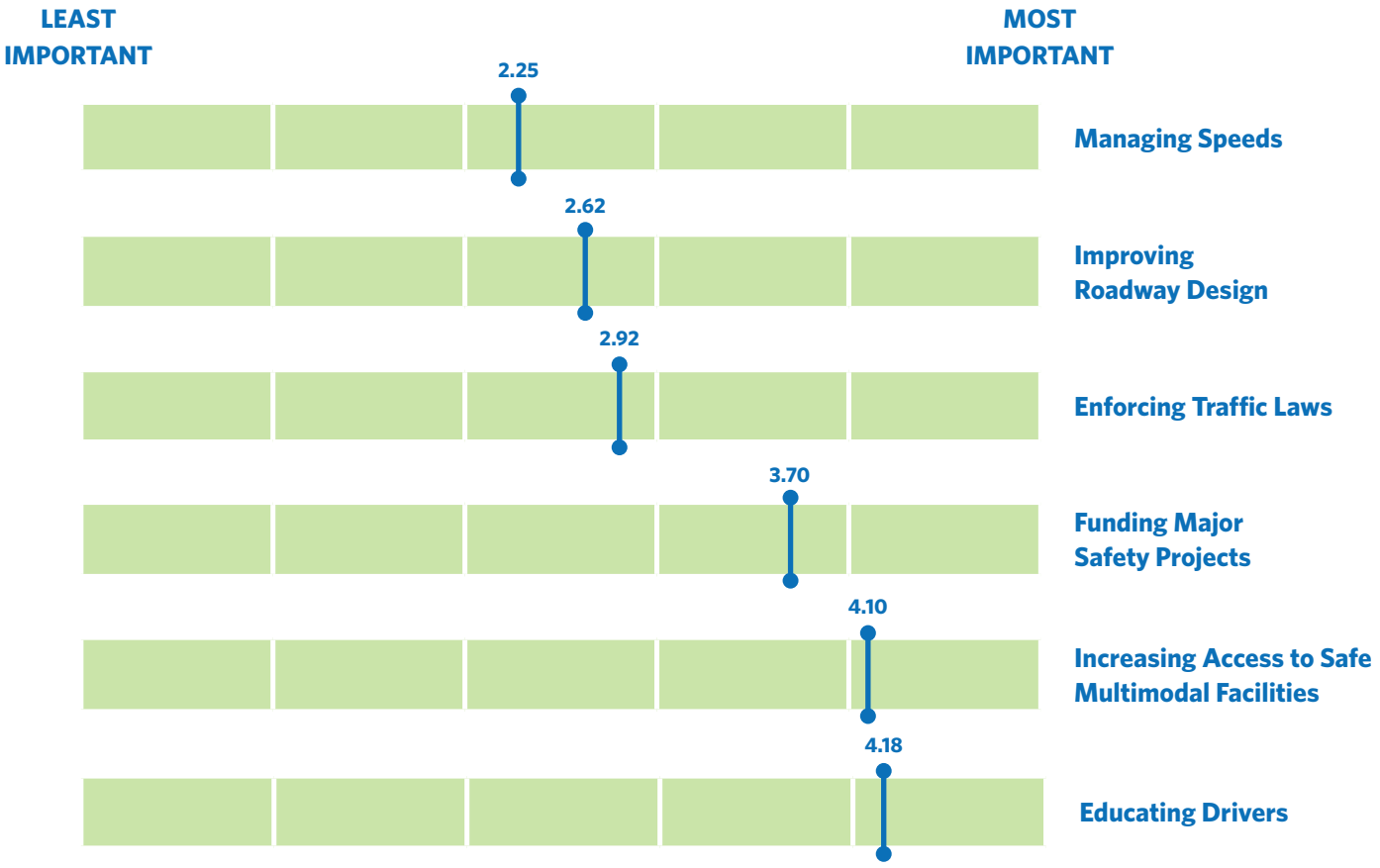
"Fill in all the sidewalks that are needed, add safe bicycle lanes, and expand the greenway."

"It is very unsafe to drive around, especially at night and [during] bad or rainy weather."

"With only a single viable travel corridor running east west, the sheer amount of traffic is unsafe."

What safety improvements are most important and pressing in Knightdale?

On a scale of 1 to 5, most responses were in the middle of the range, indicating respondents do not feel completely safe. No responses gave Knightdale a perfect 5 for safety.



Increasing Access to Safe Multimodal Facilities and Educating Drivers are the improvements the majority of participants feel are most important and pressing.

Demographic Questionnaire

The survey also asked a series of demographic questions to track how closely respondents reflected the population of Knightdale.

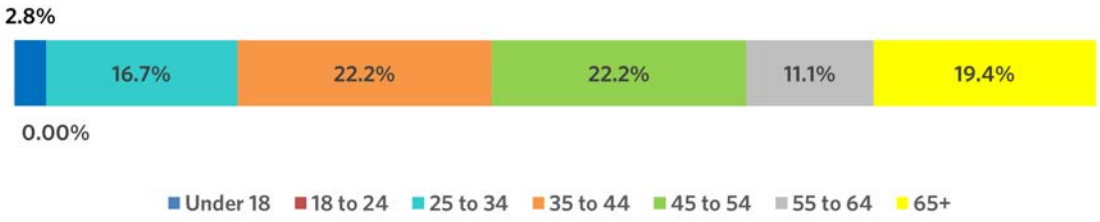
Which of the following best describes you?

I live in Knightdale	91.7%
I work in Knightdale	16.7%
I own a home in Knightdale	80.6%
I own a business in Knightdale	5.6%
I attend school in Knightdale	5.6%
I attend special events in Knightdale	47.2%

Most engagement participants live and own a home in Knightdale (91.7% and 80.6%, respectively). Notably, most work outside of Knightdale, suggesting the potential for high commuter traffic during peak AM and PM times.

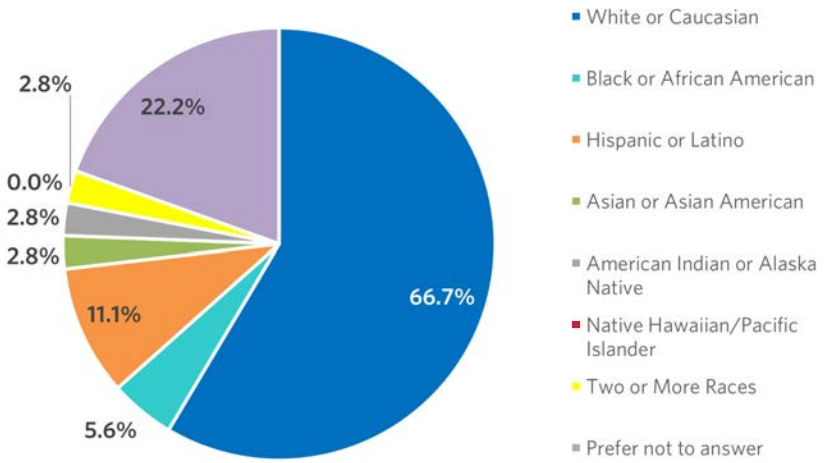
Age

Nearly half of engagement participants are between the ages of 35 to 54 (44.4%).



Race/Ethnicity

The majority of respondents identify as White/Caucasian (66.7%). 11.1% identify as Hispanic or Latino.



5

High-Injury Network

HIGH-INJURY NETWORK

Methodology

After analyzing where and how crashes occur in and around Knightdale, the project team looked closer at what parts of the roadway network have had fatal and serious injury crashes, large numbers of minor injury crashes, and bicycle/pedestrian crashes. Overlaying crash data and the road network revealed what parts of the network have experienced the most injury-causing crashes (or in the case of bicycle and pedestrian crashes, pose injury risks for vulnerable road users). This information led to the generation of a High-Injury Network (HIN) for Knightdale to help guide strategic investments in safety. This section explains the methodology behind the creation of the HIN.

Segmenting the Network

First, the roadway network was split into segments to group related crashes. We generated a network of road segments approximately 0.5 miles in length each (with all segments between one-third and two-thirds of a mile).

Counting Crashes per Segment

Next, we associated crashes with their corresponding street segment(s) in preparation for scoring. For each segment, we calculated the number of crashes by type along each segment and coded the numbers into the network attributes. Since interstates are state-owned, state-operated, and state-maintained with little opportunity for the Town to influence design/construction, crashes along I-87 and I-540 were excluded from this process and from the resulting High-Injury Network.

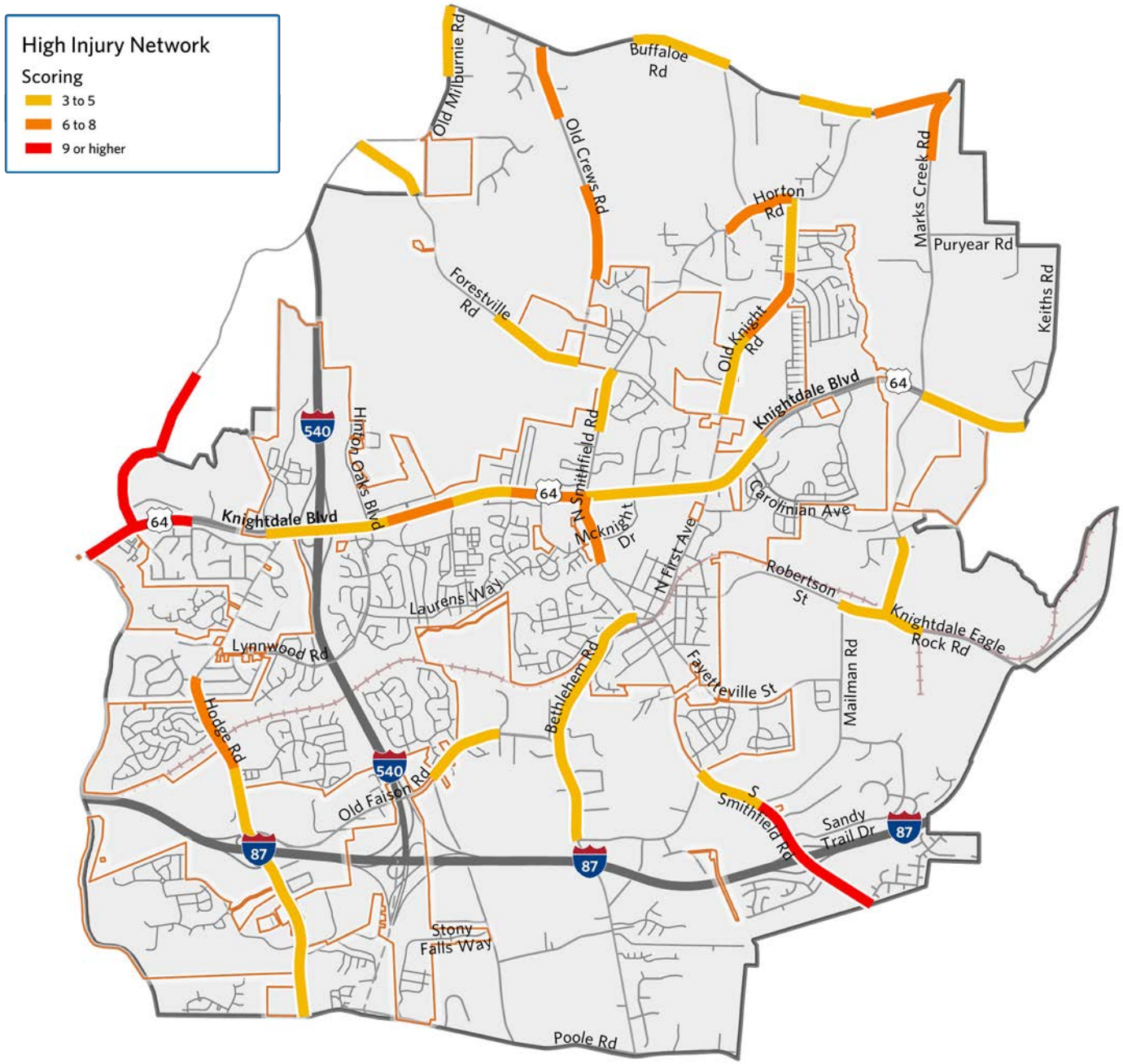
Calculating Scores

Lastly, scores were assigned to all segments based on the crashes that occurred along the segments. Scoring for each crash type was weighted by severity. Fatal and severe injury crashes were weighted the highest individually, while minor injury crashes were scored based on frequency of crashes. Because bicyclists and pedestrians are more vulnerable at the same crash impact level, crashes that involved them were also more heavily weighted. The following formula was used to calculate each segment's severity score:

Fatal or Severe Injury (FSI) Crashes *(Severity of K or A)*	○ Each FSI crash: 3 points
+	
Minor Injury Crashes *(Severity of B or C)*	○ Between 1 and 10 minor injury crashes: 1 point ○ Between 11 and 20 minor injury crashes: 2 points ○ Between 21 and 30 minor injury crashes: 3 points ○ Between 31 and 40 minor injury crashes: 4 points ○ 41 or more minor injury crashes: 5 points
+	
Bicycle or Pedestrian Crashes	○ Each bicycle or pedestrian crash: 2 points

Minor injury crash range score (x1) + Number of bicycle or pedestrian crashes (x2)
+ Number of fatal and severe injury (FSI) crashes (x3)
= severity score

This map shows the resulting High-Injury Network and the score range for each segment. All scored segments that received a score of 3 or higher are included in the HIN, ensuring that segments with at least one fatal or severe crash in the last five years are automatically included in the network. Segments with a score of 6 or higher may either have had multiple FSI crashes or high numbers of minor injury crashes. When referring to the HIN in prioritizing focus and resources, higher scores would help indicate segments with a higher need/priority for safety investments.



6

Projects and Prioritization

PROJECT IDENTIFICATION

The Town of Knightdale has a robust program of pipeline projects to help improve the transportation network. These are projects the Town could implement as well as improvements that will occur through continued development. The Town supports efforts by private development to increase safety, improve access, and provide multimodal connections.

For the Safety Action Plan, the project team drew from project lists identified as part of the Comprehensive Transportation Plan (CTP) as well as documented priorities from the North Carolina Department of Transportation (NCDOT), Town Council, and the Town of Knightdale Development Services Department (Development Services) to first collect a master of list of projects referred to as the universe of projects. Projects that could reasonably be assumed to have an impact on transportation safety in Knightdale were considered, and included:

- Speed issues (prioritized separately based on the findings of the previously mentioned speed audit)
- Bicycle/pedestrian facilities
- Spot safety and maintenance projects
- Intersection improvements

This list was further refined by overlaying the universe of projects over the High-Injury Network (HIN) and determining which projects fell along the HIN. As part of this process, the project team performed a gap analysis of the HIN—or those places along the network where no project had yet been identified to improve safety.

Calculating the Prioritization Score

To prioritize the HIN projects, the project team, in coordination with the Task Force, developed context-sensitive prioritization scores that outline what is most important in Knightdale. This prioritization provides the Town with the guidance necessary to understand where resources are most needed to improve safety.

For each of the three main project types (bicycle/pedestrian facilities, spot safety and maintenance projects, and intersection improvements), project-type specific criteria were developed.

Bicycle/Pedestrian Facilities	Spot Safety and Maintenance Projects	Intersection Improvements
School proximity	Number of crash incidents at project site	Traffic volume
Along a transit route	Severity of crash incidents at project site	CTP / Council Priority
CTP roadway designation	Quality of life improvement	Number of crash incidents at project site
Park proximity		Severity of crash incidents at project site
Downtown proximity		Quality of life improvement
Traffic volume		
Connects residents to commercial destinations		
Fills in a network gap		

OVERVIEW AND METHODOLOGY

In addition to these project-type specific criteria, the project team used a set of universal criteria to help compare the list of projects against one another. The universal criteria included:

- Roadway location (in Town vs. out of Town)
- Cost (low, medium, high)
- Ease of implementation
- Roadway speed
- Demographics
- Public feedback
- HIN score

To further refine the projects and ensure the prioritization captured the Town's vision for safety in Knightdale, each scored criterion was weighted. To determine the weights, the project team used input from the public and the Task Force on the following question:

If you had funding for projects that will improve transportation safety in Knightdale, which projects would you spend your money on?

Projects that provide safer access to important destinations

Projects that incorporate multimodal facilities

Projects that mitigate traffic and congestion

Projects that address safety issues in the roadway

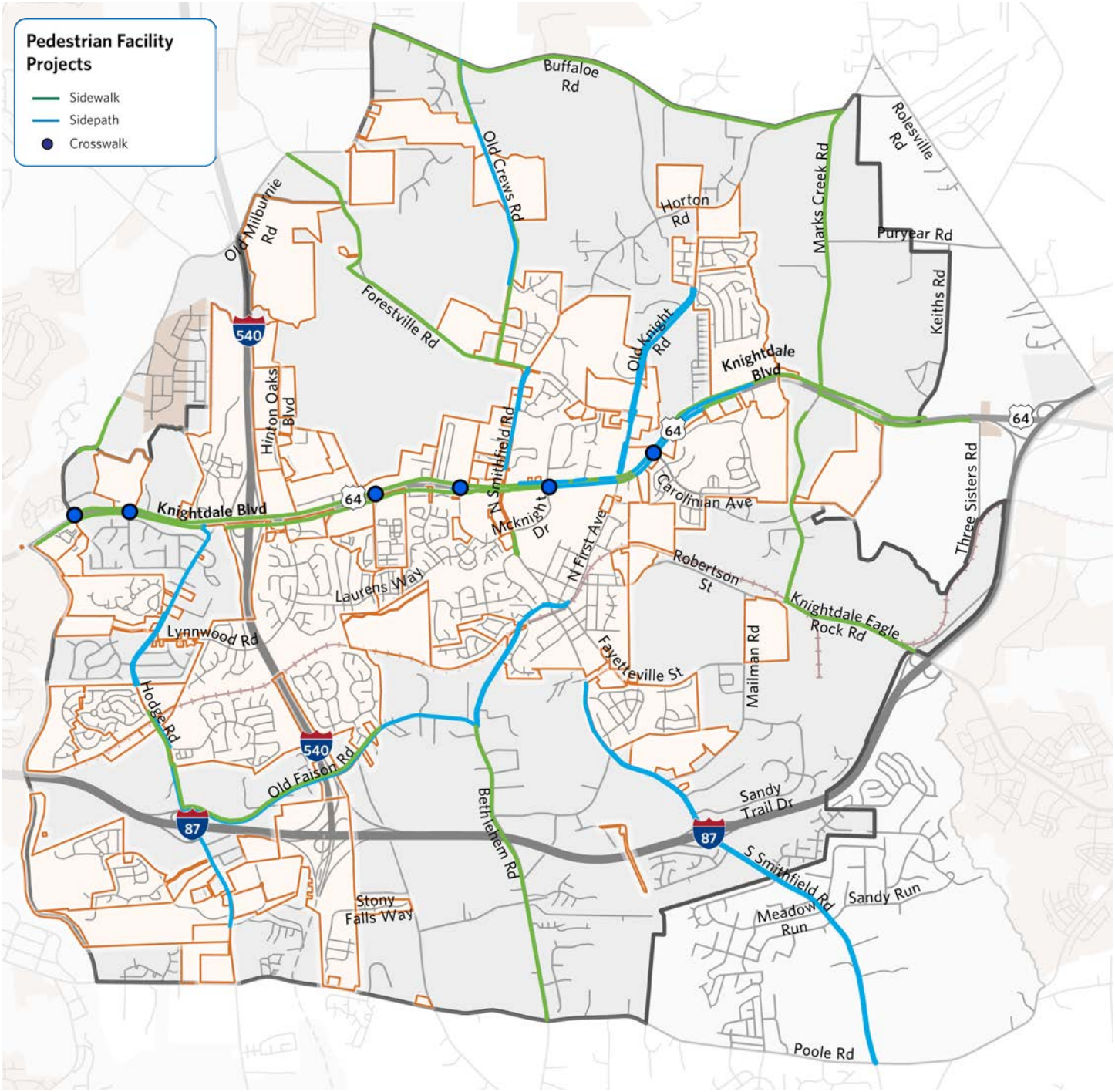
Projects that improve safety in our vulnerable communities

Projects that are easiest to implement

The rankings from the public and the rankings from the Task Force were averaged together to create a multiplier to weight the scores.

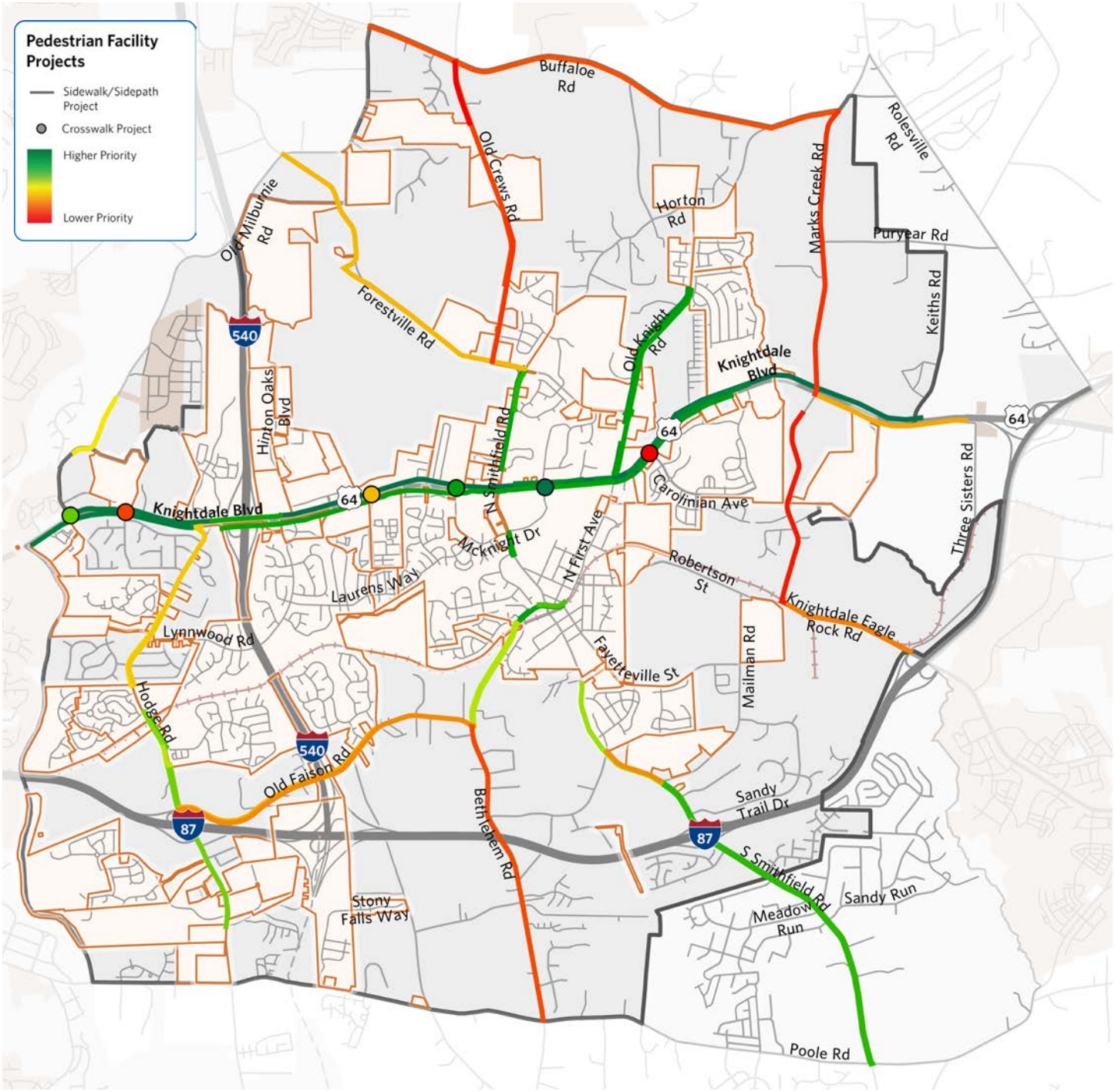
Pedestrian Facilities

Pedestrian facility projects, including sidewalks, sidepaths, and crosswalk locations, were prioritized as a group. 50 of these projects were identified, including 21 sidewalk projects, 23 sidepath projects, and six crosswalk projects.



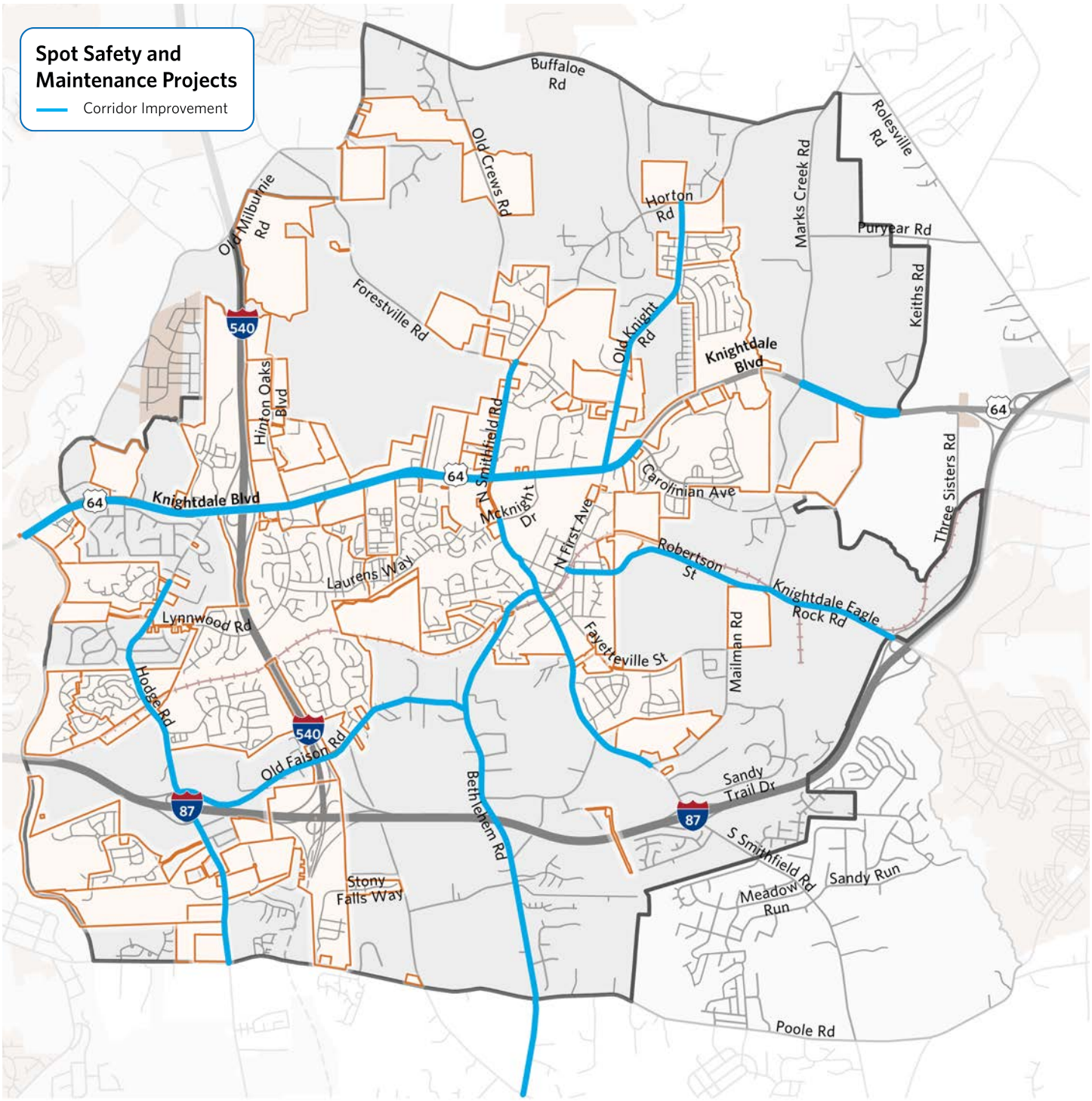
Prioritized Pedestrian Facilies

Projects along Knightdale Boulevard/GoRaleigh Route 33 emerged as top priority projects, along with projects surrounding Downtown.



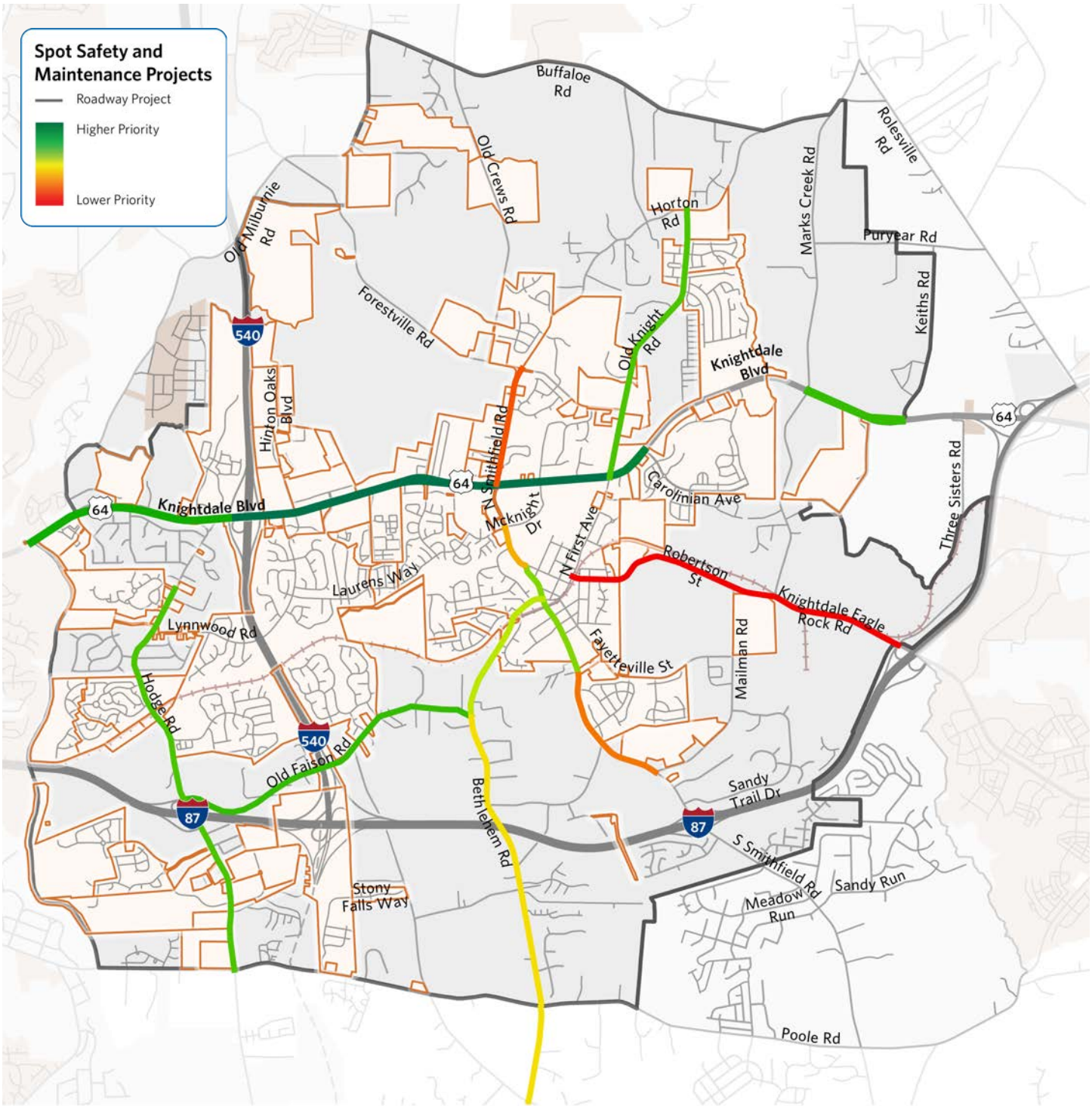
Spot Safety and Maintenance Projects

Spot safety and maintenance projects were categorized broadly as corridor improvement projects. 16 projects were identified, including three access management projects and nine other modifications.



Prioritized Spot Safety and Maintenance Projects

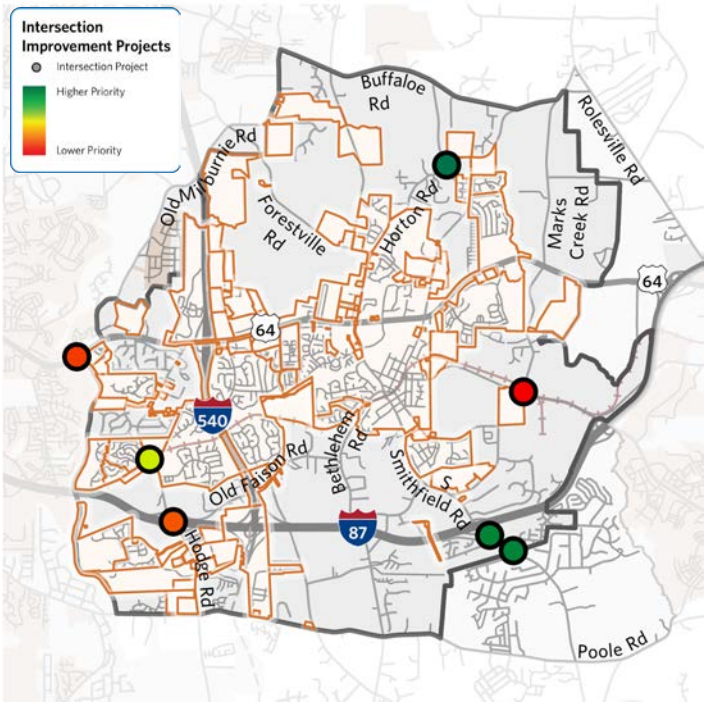
Projects along Knightdale Boulevard received the highest prioritization scores, followed by Old Knight Road and projects around Downtown Knightdale on Smithfield Road and First Avenue/Bethlehem Road.



Prioritized Intersection Improvements

Roadway-focused intersection/point improvements including grade separations, bridge improvements, and other general intersection improvements were grouped together for prioritization. Four projects were identified within this category. **Programmed projects were ommitted from the rankings, including the following NCDOT intersection projects: Poole/Smithfield, Old Faison/Hodge, 1st/Smithfield, Smithfield/I-87, and Poole Road Bridge over the Neuse River. These projects are underway.**

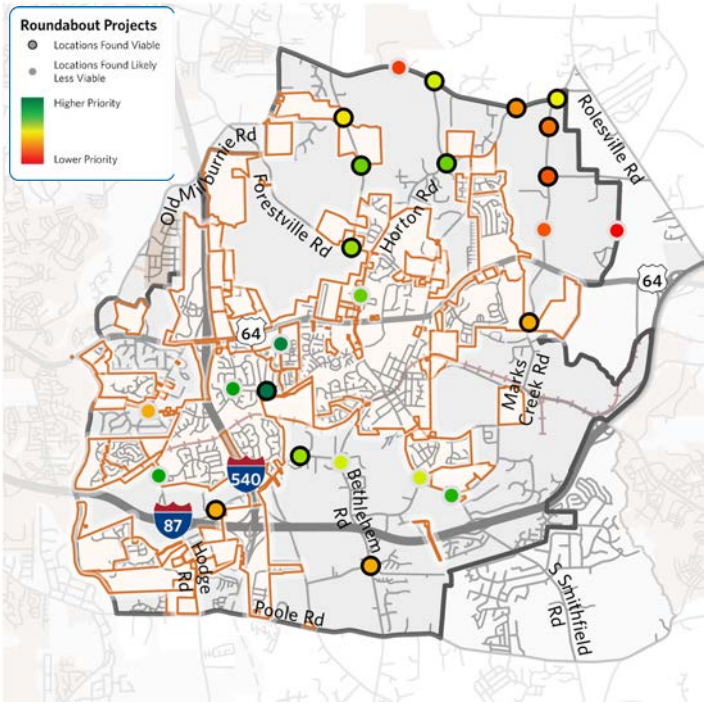
The grade separation of Hodge Road over the railway received the highest prioritization score, followed by the two bridge widenings (Hodge Road over I-87; Knightdale Blvd over the Neuse River). The realignment of the intersection between the Marks Creek Road Extension and Knightdale-Eagle Rock Road ranked lowest; however, there may still be smaller steps taken to improve visibility at said intersection in the interim.



Prioritized Roundabouts

The Town's development ordinance requires that roundabouts be considered at significant intersections. The Town therefore wanted to further refine a list of intersections where roundabouts were the most feasible. While prioritized separately from other intersection projects, the 25 roundabout projects largely followed the same prioritization process. However, when receiving a score for traffic volumes, the results of the roundabout feasibility screening were used to give points to volumes within the optimal range identified for both need and NCDOT viability, rather than to roadways with the highest volumes. While all 25 roundabouts were prioritized, the map below notes which roundabouts were identified as less viable through the screening process.

Out of the roundabouts that both made it through screening as most viable and ranked as high priorities, Laurens Road at Widewaters Parkway emerged as the highest priority, followed by Lucas Road at Horton Road, Old Crews Road at future CTP Avenue South, Old Faison Road at future Widewaters Parkway Extension, and Old Crews Road at Forestville Road. However, several of these roundabouts are dependent on the construction of other projects.

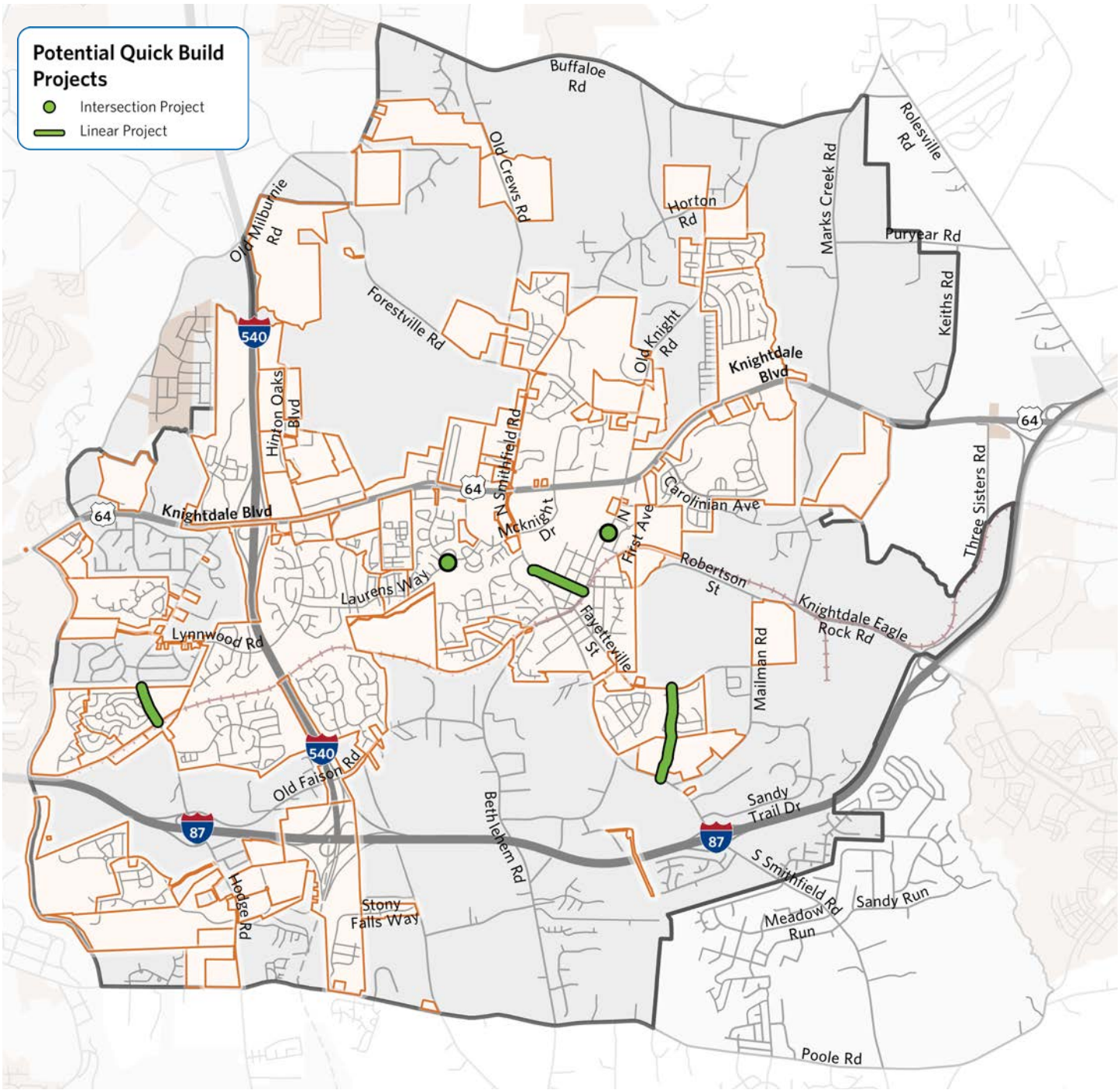


Other roundabouts along Hodge Road, Lynnwood Road, Parkstone Towne Boulevard, and Smithfield Road also ranked high in the prioritization process but were screened as less feasible due to traffic volumes, V/C, or grade concerns.

Quick Build Projects

As part of the Knightdale Safety Action Plan, a selection of quick build projects were identified that could be quickly implemented. They include:

- **Main Street between Smithfield road and 1st Avenue**—parallel parking, stop striping, traffic calming, lane striping, sharrows
- **Hodge Road at Mingo Creek Greenway Crossing**—restripe excess pavement for trail parking and traffic calming
- **Glen Manor Trail between Fayetteville Street and Village Gate Development (under construction)**—stripe bike lanes and a through lane divider
- Raised intersection for 1st Avenue at Sycamore Street—to address speeding at this stop sign
- **Laurens Way at Parkside Commons**—mini roundabout demonstration project



7

Action Plan

OVERVIEW AND ACTIONS

The following actions represent Knightdale's commitment to roadway safety. These are the additional ways—outside of transportation projects that improve safety—that Knightdale will work toward the goal of preventing roadway deaths and serious injuries.

Programs, policies, and strategies are organized around three key themes:

- Roadway design improvements to increase safety
- Community awareness, education, and engagement
- Programmatic actions to support implementation

For each measure, the lead agencies or party as well as key partners are shown.

- PD = Police
- FD = Fire
- NCDOT = North Carolina Department of Transportation
- VZTF = Vision Zero Task Force
- CR = Community Relations

In addition, each action has an associated performance measure and an estimated recommendation for implementation (near term, medium term, long term).

Action Table

Action #	Description	Measure	Lead Agency(ies)	Key Partner(s)	Priority
1	Apply the USDOT Safe Systems Approach to the design of new and improved streets. Prevent crashes by anticipating human mistakes and ensuring that if a crash occurs, it is unlikely to seriously hurt or kill someone.	Per capital and total fata/ severe injury crashes	DS	Other Departments	Near Term
2	Use the results of the speed audit within the Safety Action Plan to update speeds at identified locations. For corridors managed by NCDOT, make requests to change speeds.	Number of street segments reduced in speed limit	DS; PD	NCDOT	Medium Term

Action #	Description	Measure	Lead Agency(ies)	Key Partner(s)	Priority
3	Continue requiring sidewalks with new development.	Miles of sidewalks	DS	NCDOT; development community	Near Term
4	Ensure existing sidewalks are well maintained and meet Town standards.	Maintenance calls fulfilled for sidewalk issues	DS	NCDOT	Near Term
5	Update a comprehensive sidewalk inventory of all existing sidewalks in Knightdale and identify all gaps in the sidewalk network.	Completeness of the digital sidewalk network	DS	NCDOT	Medium Term
6	Create a sidewalk program that leverages Town, state, and federal resources to address gaps in the sidewalk/multimodal network.	Ongoing sidewalk Capital Investment Program created	DS	NCDOT	Long Term
7	Create a program for residents to request new sidewalks or improved pedestrian crossings. Advertise this resource to residents as part of the ongoing Vision Zero campaign.	Creation of request program; number of requests filled	DS	Town residents	Long Term
8	Proactively require traffic calming measures, such as roundabouts, raised intersections, and raised crosswalks where appropriate, in new development.	Number of new development projects including traffic calming measures	DS	Development community	Near Term
9	Identify lane diet opportunities where wide lanes can be reduced in width to slow motor vehicle travel speeds and provide space for other travel modes.	Number of safety conversions on Town-maintained streets and HIN segments	DS	NCDOT	Long Term
10	Use recommendations within the Safety Action Plan to prioritize conversion of existing intersections into roundabouts.	Number of intersections converted to roundabout	DS	NCDOT	Medium Term

Action #	Description	Measure	Lead Agency(ies)	Key Partner(s)	Priority
11	Conduct audit of existing signal operations to support safety goals. This may include considerations for retiming signals to support safe speeds, as well as adding leading pedestrian intervals, restricted turn phases, and walk signals with countdown timers and activation buttons.	Reduction in vulnerable user conflict; reduction in recorded crash modification factors	DS	NCDOT	Medium Term
12	Conduct more comprehensive corridor study of Knightdale Boulevard to assess current conditions and more closely evaluate identified safety improvements for vehicular, bicycle, pedestrian, and future transit users as well as bus rapid transit (BRT) running way locations.	Completion of Knightdale Boulevard Corridor Study	DS; NCDOT	Other Departments; Town residents	Medium Term
13	Meet with the Vision Zero Task Force each quarter to review safety data and continue to develop community messaging to advance Vision Zero.	Facilitation of quarterly meetings	DS; VZTF		Near Term
14	Create a unified communications strategy for Vision Zero in Knightdale. Consistently use the Knightdale Vision Zero brand to publicize safety improvements that are planned or implemented.	Familiarity with Vision Zero and local safety improvements	CR	DS; VZTF	Near Term
15	Collaborate with and continue to learn from other Vision Zero communities in North Carolina, including by sending staff representatives to the NC Vision Zero Leadership Institute each year.	Staff sent to NC Vision Zero Leadership Institute	DS	VZTF, NC Vision Zero, NC Vision Zero Communities	Near Term

Action #	Description	Measure	Lead Agency(ies)	Key Partner(s)	Priority
16	Partner with statewide, regional, and local organizations (such as NCDOT, Wake County Schools, elected officials, and local advocacy groups) to publicize the Vision Zero campaign and promote safe driving to their audiences.	Number of partner organizations	CR; PD; FD	NCDOT; community partners; DS	Medium Term
17	Integrate Vision Zero principles into driver's education programs at local schools by partnering with Police Department and Wake County Public School System (WCPSS).	Number of student drivers educated about Vision Zero principles	CR; PD; DS	WCPSS	Long Term
18	Represent Vision Zero at a minimum of two Town events or festivals per year. At these events, distribute educational resources produced by NC Vision Zero and others to promote bike safety, motorcycle safety, seat belt use, and discourage distracted, impaired, and drowsy driving.	Number of events attended, number of educational materials distributed	DS; PD; VZTF		Near Term
19	Become a Watch for Me NC partner community to receive educational and marketing material to support pedestrian and bicycle safety in Knightdale through a collaborative effort with NCDOT.	Become a Watch for Me NC partner	DS; VZTF	NCDOT	Medium Term
20	Review the Town's updated traffic calming policy to include additional provisions for eliminating fatal and serious injury crashes.	Traffic Calming policy updated	DS	VZTF; PD; FD	Medium Term
21	Continue using the TIA process to intentionally identify opportunities for new development to include multimodal facilities, including the potential for additional safety improvements for projects along the High-Injury Network or near the site of a past fatal or serious injury crash.	TIA policy updated; additional multimodal facilities	DS	Town Boards and Committees; development community	Medium Term

Action #	Description	Measure	Lead Agency(ies)	Key Partner(s)	Priority
22	Track and continuously update relevant data, such as travel speed, traffic volume, posted speed limit, signal locations, sign locations, and street lighting. Partner with the Knightdale Police Department to ensure that crash location data is as accurate as possible.	Number of maintained crash- and transportation-related datasets	DS; PD; FD	Regional partners; NCDOT	Medium Term
23	Research requirements for and pursue state and federal grants to improve safety, especially Safe Streets and Roads for All (SS4A). Use the Safety Action Plan and the High-Injury Network to select projects for grant funding.	Number of projects funded/ Amount of grant funding received	DS; VZTF	State and federal agencies; Town Boards and Committees	Near Term
24	Incorporate elements to improve safety into already planned road improvement, utility, and street maintenance projects.	Number of improvements	DS	NCDOT, utility companies	Near Term

Roundabout Guidelines

As part of the Knightdale Safety Action Plan, the project team developed updated roundabout standards that considered factors like pedestrian and bicycle accommodations, landscaping, traversible truck aprons, entry radius, signage, entry and exit width, and pedestrian crossings. Standard specifications are included for single-land roundabouts, multi-lane roundabouts, and miniature roundabouts. **The full roundabout standards are included in an appendix.**

CONCLUSION

The safety of those who live, work, and play in Knightdale is top of mind in everything we undertake as a Town. We envision a future in Knightdale where everyone—regardless of how they choose to get around—can get to their chosen destinations safely, comfortably, and efficiently. Developing strategies and implementing projects specifically designed to increase roadway safety will be an important step in achieving this goal. The Knightdale Safety Action Plan is the Town's toolkit; it provides the framework, guidance, and strategies to improve roadway safety in the near term and well into the future. The plan outlines how the Town can implement safer roadway design, prioritize pedestrian and bicycle facilities to fill gaps in the multimodal network, and create a culture of safety through education and awareness. Town administration and staff, elected officials, residents, and visitors all have a role to play to ensure the safety needs of this community are met. Through their support, the Knightdale Safety Action Plan will be successful in helping achieve the goal of safety for all.

KNIGHTDALE
Safety Action Plan