



NORTH CAROLINA
Department of Transportation




DOWNTOWN RALEIGH

PEDESTRIAN SAFETY STUDY

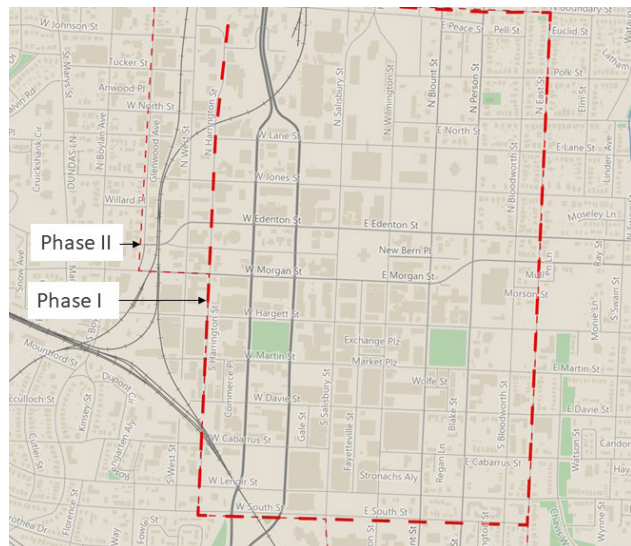
SDITE Awards Submittal

 Raleigh, NC

Downtown Raleigh Pedestrian Safety Improvements and Speed Management

In early 2019, the North Carolina Department of Transportation (NCDOT) Traffic Safety Unit (TSU) partnered with the City of Raleigh and VHB to develop a pedestrian safety study, focusing on the State Government Complex within Downtown Raleigh. The Pedestrian Safety Study was completed in early 2020.

The City and NCDOT moved quickly to implement Leading Pedestrian Interval (LPI) at all signalized intersections in Downtown Raleigh, install No Right on Red turn restrictions across the study area, and upgrade crosswalks with high visibility markings. Additional improvements are scheduled for installation in 2025. The City and NCDOT also began work to manage speeds on several multi-lane arterials. The project team collected baseline condition data measuring operating speeds, queue lengths, travel time and traffic volumes in February 2020. The City implemented signal timing adjustments in two stages (March 2020 and April 2021), and the team collected data for the same measures as the baseline in three stages between 2021 and 2023. The results of the speed management improvements resulted in a 13 - 41 percent reduction in the percentage of vehicles traveling at speeds exceeding 25 mph in the study area. The City voted to reduce the posted speed limit to 25 mph in September 2022.

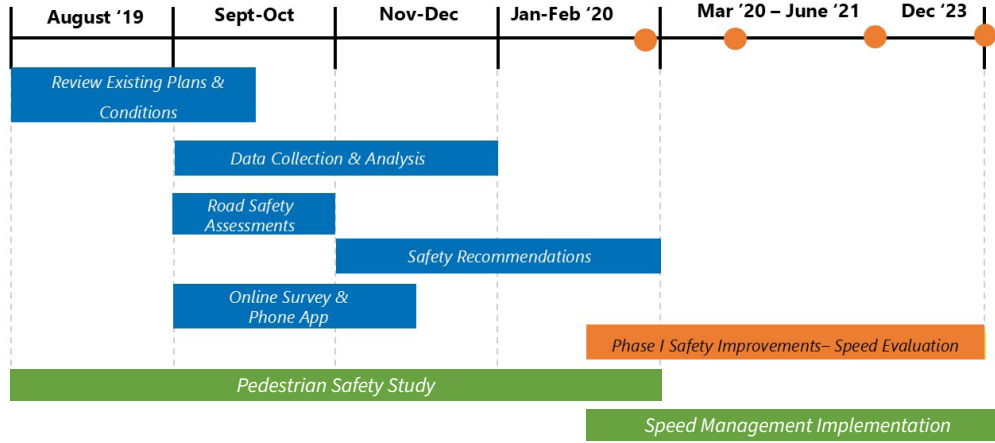


Phase I was reviewed as part of the original safety study in 2019-2020. Phase II was added while systemic safety improvements, such as LPI, were implemented.

The Downtown Raleigh Pedestrian Safety and Speed Management project had three goals:

- 1.** Manage operational speeds to support a target speed of 25 miles per hour (mph)
- 2.** Improve visibility for pedestrians at intersections and crossings
- 3.** Ensure consistency of treatments across the urban center

Project Timeline

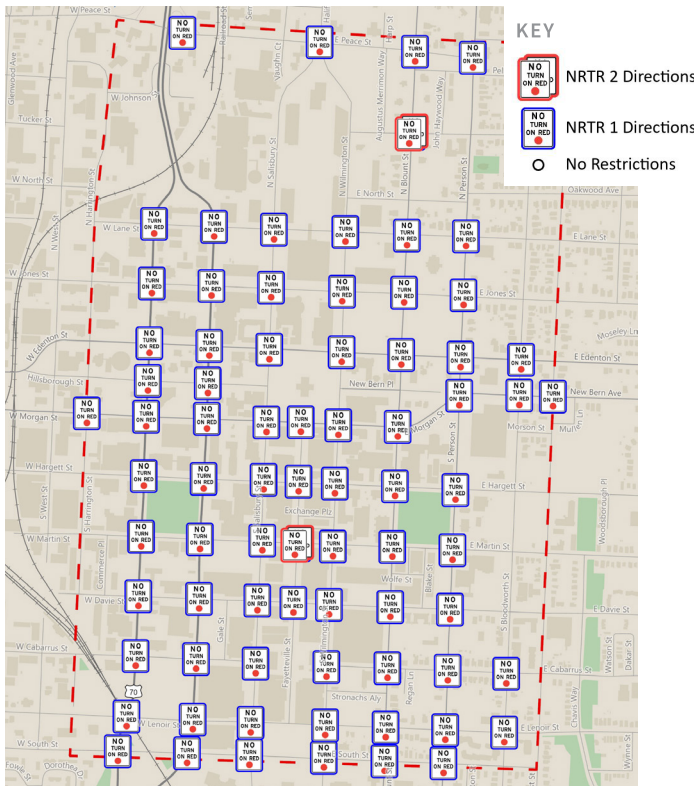


Pedestrian Safety Improvements

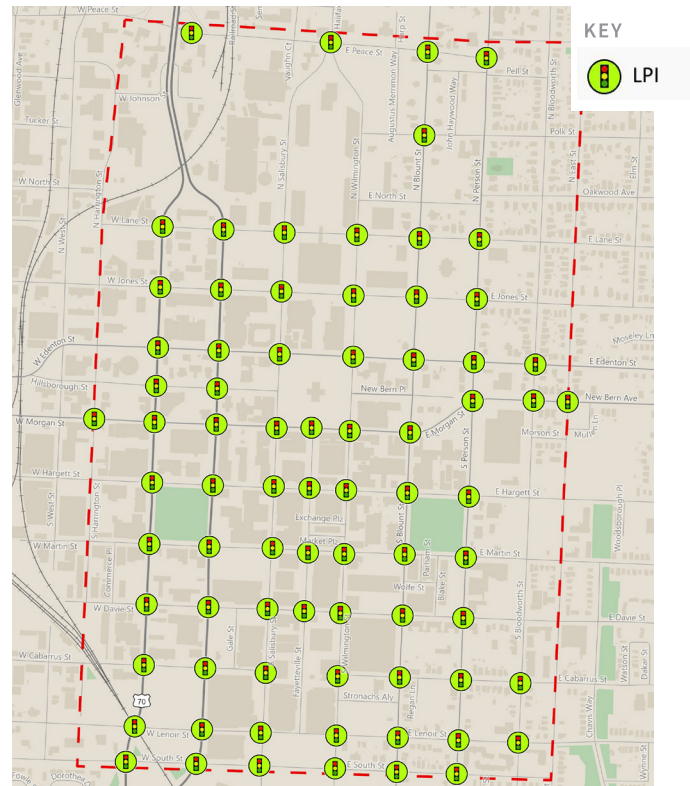
The Downtown Raleigh Pedestrian Safety Study compiled data describing pedestrian activity and traffic volumes to develop exposure estimates for all intersections and to prioritize needs in the study area. VHB facilitated a day long Road Safety Assessment (RSA) including more than 60 representatives of state government, business and stakeholder interests. The study process also invited stakeholders to complete an online survey and track their walking routes using a phone app created specifically for the project.

Data and field observations revealed intersections with multiple high-risk conflict points, high speed corridors, and midblock crossings with limited visibility. The team helped develop pedestrian safety improvement projects eligible for the NCDOT Highway Safety Improvement Program (HSIP) and Spot Safety program, and to leverage companion City funding to implement projects.

Completed Improvements

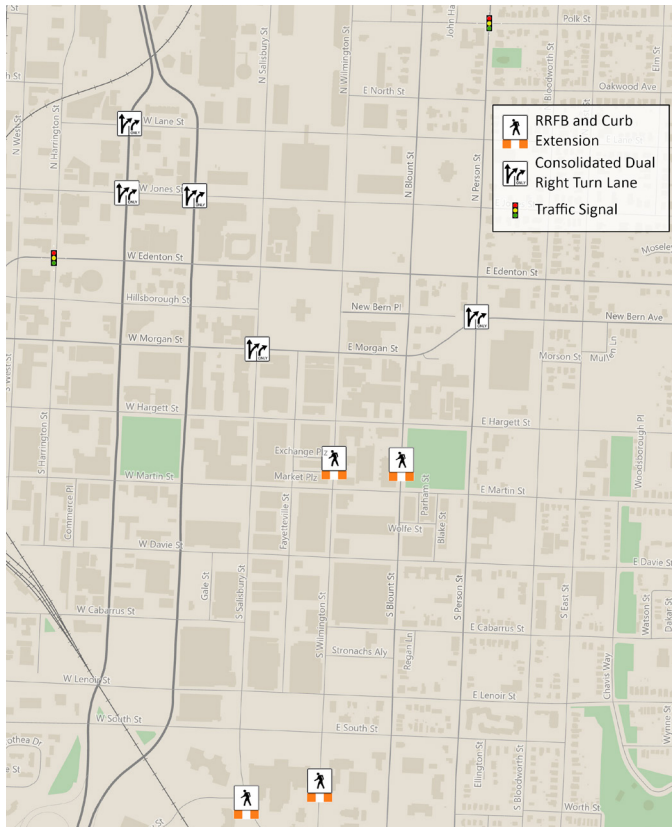


No Right on Red signs were installed at all intersections where right turns were in conflict with pedestrian crossings.



The City implemented Leading Pedestrian Interval (LPI) at all signalized intersections in Downtown Raleigh.

Improvements In Progress



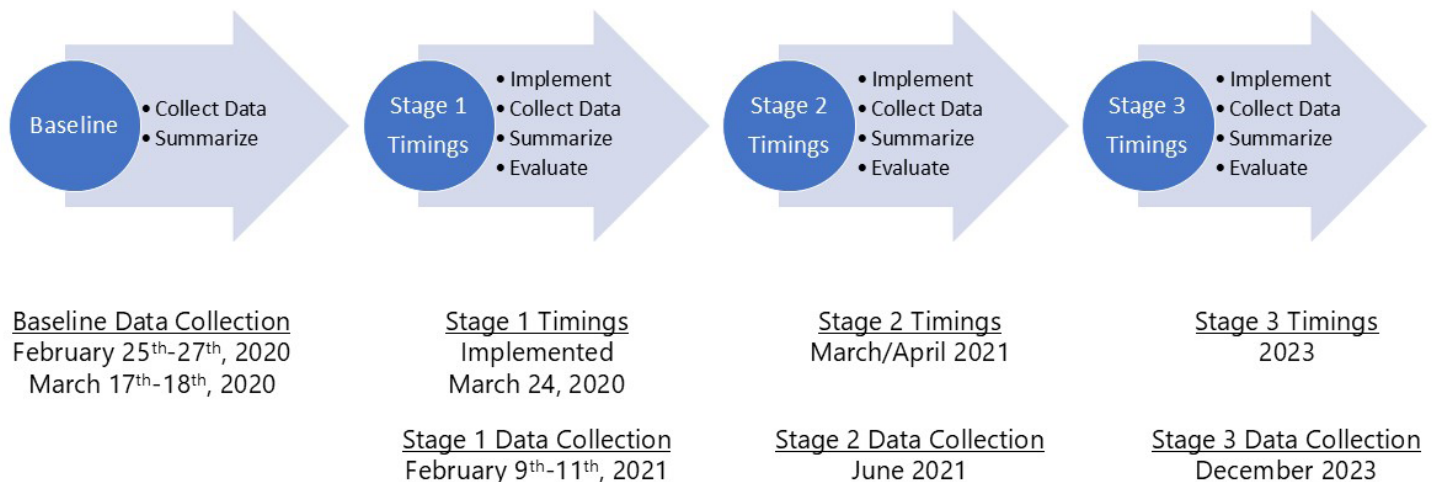
NCDOT recently awarded more than \$1.3 million for constructing pedestrian crossing improvements and signal improvements in Downtown Raleigh.

Several improvements were constructed soon after the close of the pedestrian safety study, including consolidation of several dual right turn lanes, and two Rectangular Rapid Flashing Beacons (RRFBs). Additional improvements are funded for implementation in 2025 including two additional RRFBs, 3 new traffic signals or Pedestrian Hybrid Beacons (PHBs) at uncontrolled crossings; and raised crossings or curb extensions at more than a dozen crossings.

Speed Study: Pre and Post Evaluation

Immediately following the completion of the pedestrian safety study, NCDOT and the City of Raleigh began to review options for reducing speeds along US 401 (McDowell and Dawson Streets) in Downtown Raleigh. This phase of the study involved three phases of designed changes to signal timing; collecting speed, queuing and travel time data; and analysis of the impacts on operating speeds along these major routes. The results of the analysis demonstrated that **operating speeds had approached the desired target speed of 25 miles per hour** (posted at 35 miles per hour). **This led to permanent changes to signal timing and changing posted speed limits to 25 miles per hour.** NCDOT provided financial support to develop the safety study and fund crossing improvements.

Speed Management Study Process



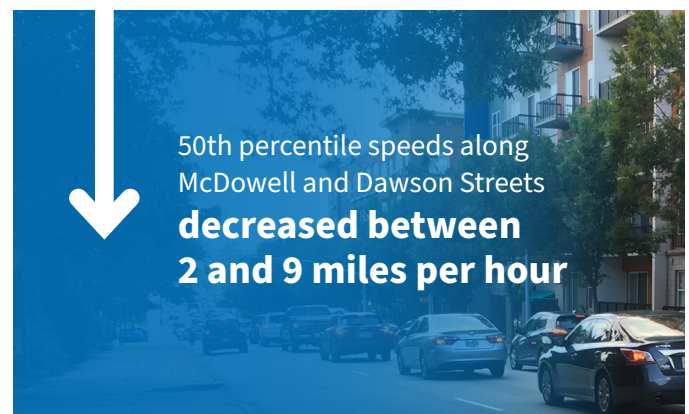
Speed - Measures of Effectiveness Summaries by Location Stage 3 (Net Change from Baseline)

Roadway	Area	Segment Between	Average Speed (mph)	Median / 50 th % Speed (mph)	85 th % Speed (mph)	95 th % Speed (mph)	Vehicles Exceeding 25 mph (%)	Vehicles Exceeding 35 mph (%)	10-mph Pace Range Lower Boundary	10-mph Pace Range Upper Boundary
Dawson	North	Jones St and Edenton St	22 (-3.4)	22.5 (-3.2)	27.9 (-3.9)	31.6 (-4.3)	31.5% (-24%)	2.1% (-4%)	18 (-3)	27 (-3)
	Central	Hargett St and Martin St	24 (-5.6)	24.6 (-5.6)	31 (-5.9)	34.6 (-6.5)	47.6% (-27%)	4.4% (-19%)	20 (-7)	29 (-7)
	South	Cabarrus St and Lenoir St	27.7 (-5.6)	28.7 (-5)	33.3 (-5.6)	35.9 (-6.3)	74.6% (-17%)	7.5% (-33%)	24 (-5)	33 (-5)
McDowell	South	Davie St and Cabarrus St	23.4 (-2.2)	23.6 (-1.9)	28.7 (-3.3)	32.2 (-3.9)	38.8% (-15%)	2.1% (-5%)	19 (-1)	28 (-1)
	Central	Morgan St and Hargett St	25.8 (-2.9)	26 (-3.1)	31.1 (-4.6)	34.6 (-5.2)	58% (-14%)	4.4% (-14%)	21 (-4)	30 (-4)
	North	Lane Street and Jones St	24.9 (-9)	25.1 (-9)	29.3 (-10.6)	32.2 (-11.5)	51.4% (-41%)	1.9% (-42%)	20 (-9)	29 (-9)
Edenton	East	Blount St and Person St	23.4 (-2.2)	23.6 (-2.2)	28.3 (-3.3)	31.5 (-3.3)	37.2% (-18%)	1.5% (-3%)	19 (-2)	28 (-2)
	West	East of Harrington St	23.5 (-4.4)	23.4 (-4.7)	28.1 (-5.7)	31.2 (-6.6)	35.7% (-36%)	0.9% (-10%)	19 (-5)	28 (-5)
Morgan	East	Wilmington St and Blount St	24.6 (-1.8)	24.8 (-2)	30.5 (-1.6)	33.9 (-1.5)	48.8% (-13%)	3.4% (-3%)	20 (-1)	29 (-1)

Safety Outcomes

NCDOT and the City of Raleigh evaluated results of the signal timing and projects safety countermeasures implemented as of 2023. **All crashes in the Downtown area decreased by 33 percent** (comparing crashes 2017-2019 to 2021-2023), including a significant reduction in pedestrian crashes and a **24 percent reduction in fatal and serious injury crashes (all types)** in Downtown Raleigh. **50th percentile speeds along McDowell and Dawson Streets decreased between 2 and 9 miles per hour.**

The study and its outcomes will serve as a model for NCDOT to work with other cities to manage speeds and improve pedestrian safety along major arterial routes and in urban areas. NCDOT provided financial support to develop the safety study and fund improvements. The City of Raleigh worked with NCDOT to complete more than 100 signal plan revisions, replace signs to indicate the new posted 25 mph speed limit, and implement systemic pedestrian safety improvements such as Leading Pedestrian Interval (LPI) and No Right on Red restrictions across Downtown Raleigh. NCDOT continues to work with the City of Raleigh to evaluate changes to the operating speeds and study benefits to pedestrian safety in Downtown Raleigh.



Project Outcomes

The NCDOT and City of Raleigh identified several keys to success for the Downtown Raleigh Pedestrian Safety and Speed Management project. The following are most applicable in urban centers where pairs of one-way, multi-lane arterials are operated in a coordinated signal system:

- ✔ **Tightly spaced signals support effective speed management** (less than 600 foot block lengths)
- ✔ **Cycle length** reduction is key to moderating speed
- ✔ Consider **incremental change** for interim evaluation and ease of change to roadway users
- ✔ **Traffic impacts in urban areas** are less of a concern
- ✔ **Regular communication** and partnership with NCDOT (North Carolina Department of Transportation) leads to faster and more robust implementation

The City of Raleigh, NCDOT and VHB are pleased to nominate the Downtown Raleigh Pedestrian Safety and Speed Management project for the 2025 Southern District ITE awards. The project is an innovative example of Complete Streets and safety improvements, with focus on pedestrian safety and mobility.

For more information about the Downtown Pedestrian Safety Study, please visit <https://files.nc.gov/ncoshr/DT-Raleigh-Pedestrian-Safety-Study-2019.pdf>

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