

Winterville, NC Quick Builds: Final Report

April 2025



Winterville Quick Builds: Summary

Drivers were **more likely to stop** for pedestrians, but only when crosswalks were also present.

Pedestrians reported **feeling safer** and **more visible** while crossing the street.

Drivers reported **slowing down**, and speeds decreased when interventions were in place.



Community members and staff agreed that **future materials should be more robust and appealing.**

Quick builds **did not improve** long-term stop sign compliance.



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Project need

As with many communities in North Carolina, Winterville, NC is highly car-dependent, with a disconnected network of infrastructure for people walking and biking. Winterville is located within Pitt County, which has some of North Carolina's highest rates of traffic violence: In 2022, Pitt County ranked 10th out of all 100 North Carolina counties for fatal or serious injury crashes. The City of Greenville, located just north of Winterville, was ranked 5th out of 89 North Carolina cities with >10,000 residents for collisions. Pitt County and Greenville's ranking have continued to worsen since 2019.

Winterville is a particularly fast-growing part of the region. It is a desirable place to live for its quiet atmosphere, welcoming people, low crime rates, and proximity to Greenville. The town has made important strides towards creating safer streets: Prior to this award, initiatives included passing a Vision Zero resolution; installing several crosswalks near schools; and starting its first non-infrastructure Safe Routes to School program. Despite these efforts, there is much work to be done, with obstacles that include disconnected sidewalk networks, fast east-west thoroughfares with few to no marked crossings, and a rail line that goes directly through the town center. This is a pivotal moment in the Town's trajectory, where smart planning decisions now can have beneficial impacts far into the future. Nurturing a culture of active mobility among residents and visitors is an important step, especially in an area that has been historically car-centric.

For this project, we identified three intersections along Winterville's two primary east-west vehicular thoroughfares for pedestrian crossing improvements. Main St and Cooper St are state-maintained roads signed at 35 mph and have an annual average daily

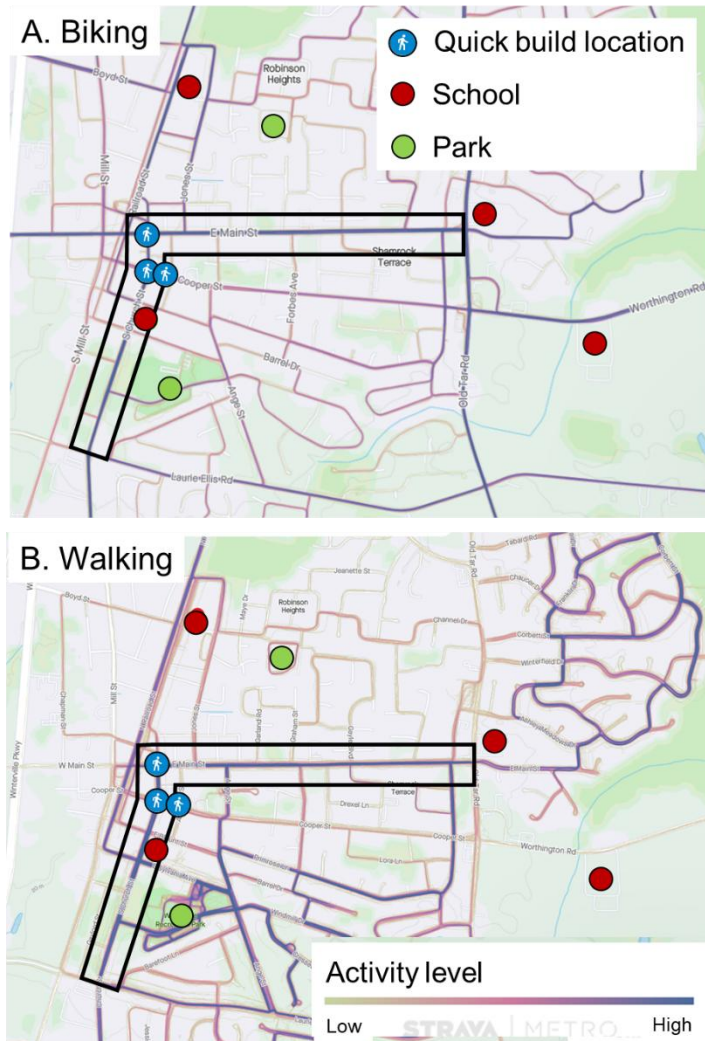


Figure 1. Heatmaps of bike and pedestrian activity for the greater Main St. corridor region indicate that both Main St and Church St (outlined by the black box) are heavily used by people biking and walking.

traffic value of around 5,000 (view NC DOT data [here](#)). There are no east/west stop signs/signals and (prior to this project) no marked crosswalks except at the ends of the corridor segment at Old Tar and Railroad Sts. There were also no crosswalks at any stop-controlled intersections with these thoroughfares (i.e., feeder streets). The intersecting north-south roads of Church St and Academy St are heavily-used corridors for people walking and biking (Fig. 1), particularly as Church St connects two schools, Winterville's largest, most well-used park, and one of the Town's only nearly continuous north-south sidewalk. Fire Chief David Moore qualitatively reported that Academy St, which parallels Church, was used by many students walking to school. Thus, there was a large

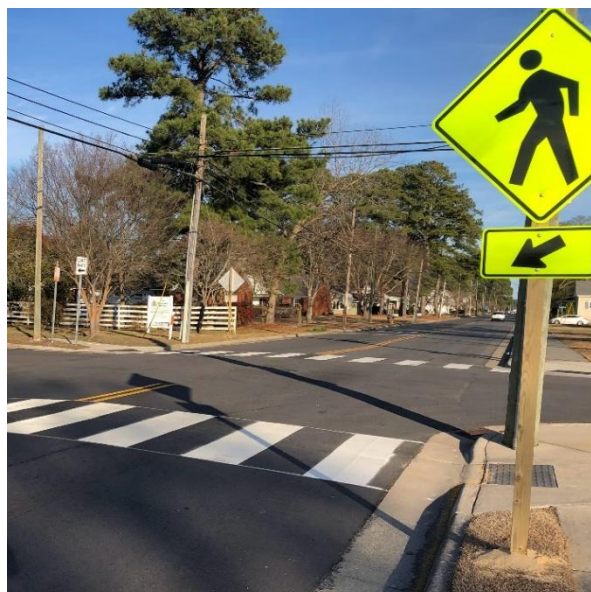


Figure 2. High-visibility crosswalks were installed three days after meeting with NC DOT about the quick builds.

potential for conflicts between motorists and pedestrians/bicyclists, particularly youth. Crosswalks along Church St. are noted by an MPO-level plan and a local plan (Active Transportation Plan, 2019; Worthington Road Gateway Plan, 2020). Restriping to narrow vehicle lanes and add bike lanes on Main St. was recommended in a 2022 Alternative Transportation Plan developed by an ECU planning student (Robinson, 2022)

Two schools are in the vicinity of these intersections: AG Cox Middle School (one block south of proposed intersections) and WH Robinson Elementary (located north of Main St; see Fig. 1). These two schools have a collective enrollment of 1,510 students. 36% of students at AG Cox and 45% of students at WH Robinson are eligible for reduced or free lunch. In the broader context, 76.7% of Winterville residents live in the greater Main St corridor between downtown and Old Tar Rd (Robinson 2022). These crossing improvements aimed to benefit all community members in providing safe routes to Winterville Recreation Park; a greenspace used for events in the town's center; and both schools.

Planning process

Planning and site selection began in November 2024 with initial discussions among key community leaders, including Winterville's planning staff, Parks and Recreation Dept, Police Department, and Fire Department. Partners from county organizations, including Safe Kids Pitt County, Pitt County Community Schools and Recreation, and Greenville Urban Area MPO, also participated in these conversations. After several potential locations/corridors were identified, coalition members and community members were

invited to rank their preferences using an online survey (Appendix 1). We then held a discussion of potential treatment options at the priority locations that emerged with the coalition and three staff members from NC DOT Division 2 (Traffic Engineer, Lead Engineer, and Planning Engineer). This meeting with NC DOT resulted in the rapid installation of high-visibility ladder-style crosswalks at two of the intersections in our project area (Fig. 2). After discussing traffic calming options, we decided to use a combination of bulb-outs and high-visibility crosswalks along the stop-controlled sides of intersections.

Project implementation

After priority locations and treatments were selected, we produced more detailed engineering plans (Fig. 3). Over the course of two months, we went through an iterative process to determine appropriate widths/lengths of bulb-outs with our town staff, coalition, and NC DOT. The fire department requested that a minimum roadway width of 26' be maintained for turning emergency vehicles, and that only two caddy-corner bulb-outs be installed at the intersection adjacent to the fire station (Main/Church). Although this initially seemed to be a compromise, this diagonal configuration ultimately offered a useful opportunity to assess the effectiveness of an alternative bulb-out design. Taper distances were taken from the City of Minneapolis Street Design Guide (2021) and were 30' along stop-controlled sides of intersections and 20' along non-stop-controlled sides. There were two exceptions along Church St, where town staff recommended 20' tapers to the stop bar to preserve on-street parking. Bulb-outs varied in width depending on the intersection to maximize allowable space but were generally 3-6' at their widest point (Fig. 3).

We installed quick builds over the course of ~1.5 weeks, beginning with two weekend workdays attended by 17 community volunteers (Fig. 4a). Bulb-outs were delineated using acrylic blue tennis court paint and 4" removable reflective traffic tape. We used 36" white cylindrical post delineators attached to the asphalt with butyl "melt-down" pads; delineators were placed just inside the tape line in an effort to prevent vehicle strikes. Ladder-style crosswalks were created with 12" removable reflective traffic tape with 12" between each "rung." Community workdays were advertised via yard signs at each intersection, through the town newsletter that accompanies monthly utility bills, on Winterville's Facebook page, and through Winterville Civitan, a service-oriented community group. Winterville Public Works played a critical role in ensuring safety of volunteers, managing traffic, and facilitating installation. Volunteers primarily assisted with painting and installing delineators. Public Works and the town's Safe Routes to School coordinator completed painting and installed traffic tape separately the week following the volunteer events. Several weeks after the quick builds were installed, we held a celebration/ribbon-cutting for project partners and participants, the mayor and Town council, and town staff members (Fig. 4b).

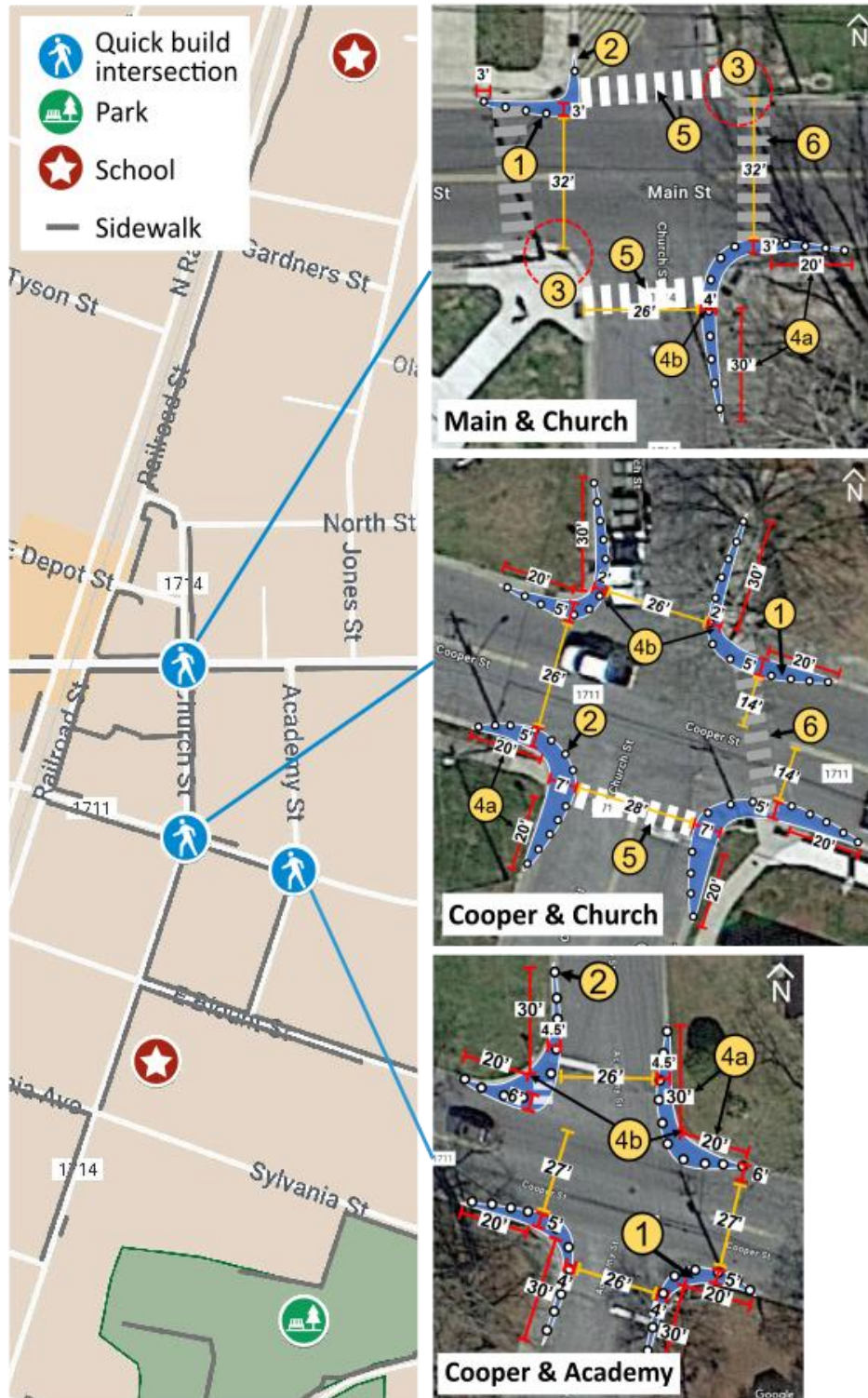


Figure 3. Engineering diagrams and locations for quick builds. 1 & 2: Curb extensions were constructed out of blue paint and white flexible delineator posts. 3: No curb extensions were constructed at two corners of Main/Church to allow for emergency vehicle access. 4a: Tapers were generally 20' along non-stop-controlled sides of intersections and 30' on stop-controlled sides. 4b: Curb extension widths varied to maximize impact while retaining 26' of roadway space. 5: Temporary high-visibility crosswalks were installed at stop-controlled sides of intersections. 6: Existing high-visibility crosswalks (installed January 2024).



Figure 4. A) Volunteer community members and a public works staff member. B) Ribbon-cutting ceremony with town staff from planning, public works, administration, Safe Routes to School, Parks and Recreation, town council members, and project partners such as our MPO, Safe Kids Pitt County, and Pitt County Recreation and Parks.

Assessment

Methods

We gathered both quantitative and qualitative data to assess whether the project met its goals of improving safety for people using the street. Specifically, we examined if the project slowed drivers, improved crosswalk and stop sign compliance, and how users felt about the project. We collected stop sign compliance and crosswalk compliance data at three time points to assess prior conditions, short term effects, and longer-term effects. Data were collected 1-6 weeks prior to installation, 3-6 weeks after installation, and 5-7 months after installation (Table 1). We aimed to collect data during both mornings (7-10a) and afternoons (2-4p) and weekends and weekdays. We followed data collection protocols in the Safe Streets Evaluation Handbook (Vision Zero SF, 2018). Briefly, crosswalk compliance was primarily monitored using a volunteer dressed in nondescript clothing who repeatedly crossed each intersection and recorded the

number, direction, and paths of drivers failing to yield and/or yielding. The direction of pedestrians was also recorded. Stop sign compliance was recorded as “Full stop”, “Partial stop”, and “No stop.” Partial stops included both slow rolling stops as well as full stops where the driver stopped well past the stop bar and encroached into the intersection. Driver direction and path were also recorded. Stop sign compliance at Main & Church is only applicable going north, as the section of Church St beyond this intersection is one-way. We worked with the City of Greenville to perform speed and traffic volume monitoring using pneumatic tubes along the east-west vehicular thoroughfares of Main St

and Cooper St in advance of the quick build locations. Speeds were monitored prior to installation and at the short-term data collection point. Monitoring periods were April 2-7th and June 11-14th for Cooper St and April 2-5 and June 11-17th for Main St.

We used two-tailed t-tests to examine if crosswalk compliance and stop sign compliance were significantly different within each intersection and across all intersections before and after installation.

The proportion of drivers yielding or coming to a full stop during each

observational period was averaged over each observational period. We used additional t-tests to test for differences between afternoons and mornings and driver direction. Directional stop compliance was only assessed for Cooper & Church and Cooper & Academy, as there is only a northbound stop at Main & Church. We additionally ran Analysis of Variance (ANOVA) tests to detect any differences between each of the three measurement periods or intersections; a post-hoc Tukey HSD test was used to identify pairwise comparisons driving differences. All analyses were conducted in R 4.4.1.

To gather community feedback, we created a post-installation survey (Appendix 2). We placed two signs at each intersection with a link and large QR code to the survey as well as a summary of the project. We additionally mailed postcards to 500 nearby households with a link to the survey, posted the survey on the town's Facebook page, shared it via the May and June utility newsletters, and distributed it to the Winterville Baptist Church community (adjacent to the intersections) WH Robinson PTA. We tabled about the project at Winterville's Market on the Square community events throughout the summer.

In the survey, we assessed how drivers, pedestrians, and cyclists felt about the quick builds, focusing on their perceptions of safety while driving or walking, how the quick builds might influence their behavior, and where else in their community they see safety concerns. We additionally collected respondents' relationships to the Town of Winterville (visitor, resident, employee, student) and basic demographic data (age, race, income, gender, primary language spoken at home, disability status).

Time period	Intersection	N stop sign interactions	N crosswalk interactions
Pre-installation	Main & Church	60	44
	Cooper & Church	150	44
	Cooper & Academy	145	32
	TOTAL	355	120
Post-installation (3-6 wks)	Main & Church	4	28
	Cooper & Church	26	36
	Cooper & Academy	53	38
	TOTAL	83	102
Post-installation (6-7 mo)	Main & Church	174	48
	Cooper & Church	110	44
	Cooper & Academy	33	29
	TOTAL	317	121

Table 1. Data on stop sign and crosswalk compliance were collected to assess prior conditions, short term effects, and longer term effects.

Results

A primary goal of the quick builds was to slow drivers and improve crosswalk and stop sign compliance. The major takeaway from our data analysis is that quick builds improve driver speeds and crosswalk compliance, but are most effective when used in conjunction with other treatments (such as crosswalks), and that stop sign compliance did not experience long-lasting improvements.

Crosswalk compliance behavior

Prior to installation, all intersections were equivalent to one another in terms of crosswalk compliance (two-way ANOVA, $p > 0.05$), despite differences in the characteristics of each intersection such as being located adjacent to fire station or church, variations in roadway width, being closer to downtown etc. After installation, we saw a **significant improvement in the frequency of yielding drivers** from pre-installation to post-installation (Fig. 6; two-tailed t-test, $p < 0.05$) for both Cooper & Church and Main & Church. The percentage of yielding drivers increased from 12.2% before installation to 34.0% six months after installation at Cooper & Church, and from 18.1% to 30.8% at Main & Church. At Cooper & Academy Sts, where no temporary crosswalks were permitted due to the absence of sidewalk infrastructure on the north side of the intersection, the **percentage of drivers yielding to crossing pedestrians remained at ~1% post-installation**. This demonstrates

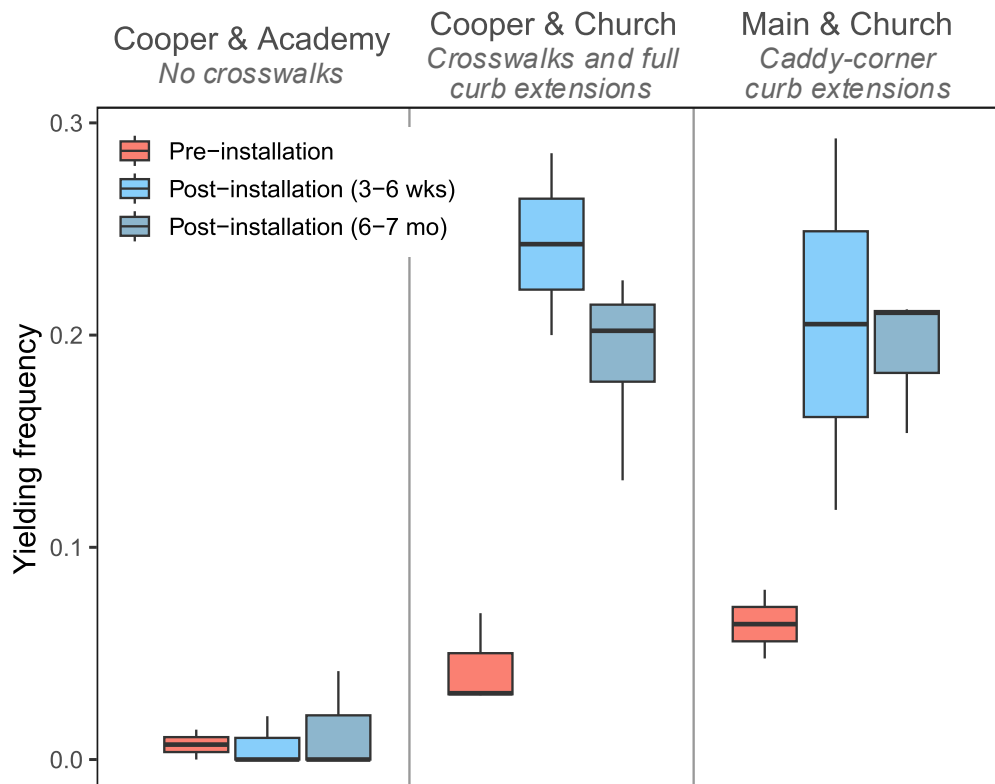


Figure 6. Crossing compliance improved at both Cooper & Church and Main & Church after quick build installation, but only at intersections with crosswalks. At Cooper & Academy, where no crosswalks were present (or permitted to be temporarily installed), we saw no significant increase in crosswalk compliance. Results were not significantly different between Cooper & Church and Main & Church, despite variations in quick build layout.

the importance of using multiple safety interventions, particularly crosswalks. There were no significant differences between the short-term and long-term effects for any intersection, indicating that **crosswalk compliance remained consistent for intersections that saw initial improvements**, and did not increase for Academy & Church even after additional time. In fact, we found that crosswalk compliance at Main & Church and Cooper & Church continued to diverge from Academy & Cooper, with the gap becoming more significant at the 6-month time point (two-way ANOVA and Tukey HSD test, $p = 0.07, 0.05$ at 3-6 weeks; $p = 0.01, 0.002$ at 5-7 months, respectively). There were no significant differences between Main & Church and Cooper & Church at any point, implying that **“caddy-corner” bulb-outs are as effective as bulb-outs installed on all four corners**. We found no differences in crosswalk compliance between driver direction or time of day.

Stop compliance behavior

The proportion of drivers coming to a full stop improved in the short-term for Main & Church and Cooper & Church (Fig. 7, two-way ANOVA and Tukey HSD test, $p < 0.05$), **but this improvement did not last**, and the pre-installation and 6-7 month timepoints were not significantly different for these intersections. At Cooper & Academy, we found **no significant improvement** in the proportion of drivers coming to a full stop after

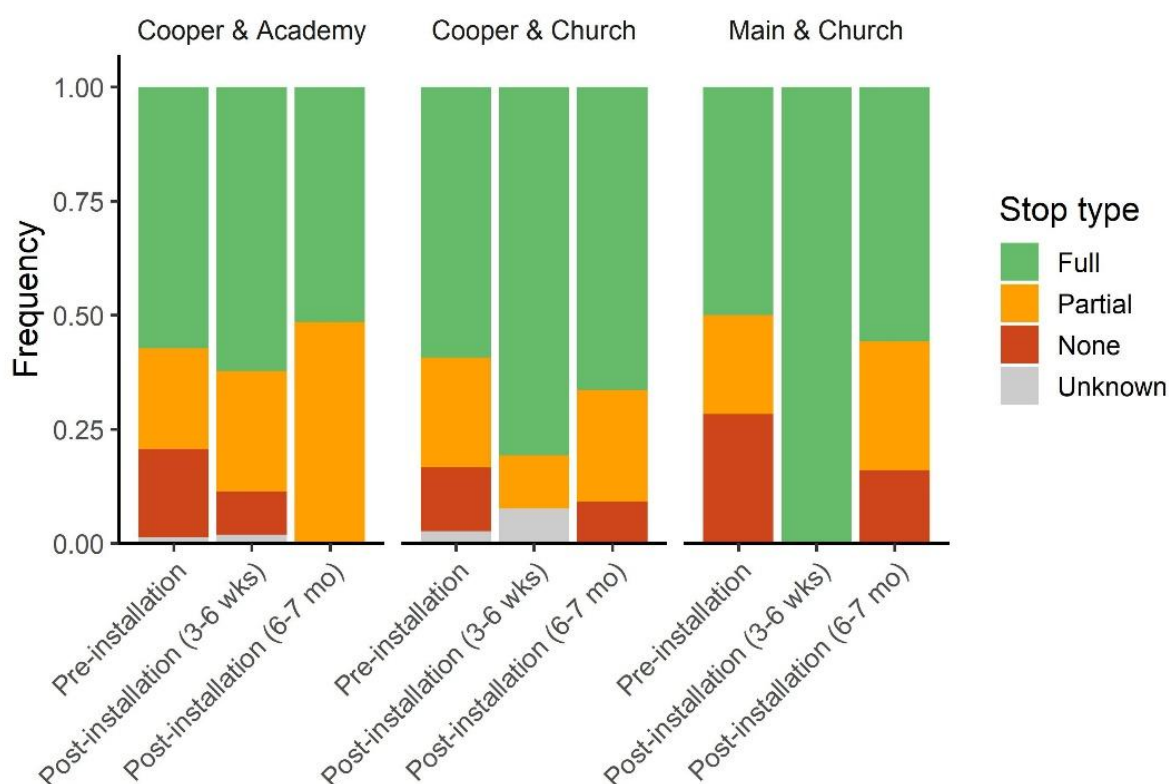


Figure 7. The proportion of drivers coming to a full stop improved at both Cooper & Church and Main & Church in the short-term, but returned to pre-installation levels by the 6-7 month mark. At Cooper & Academy, we saw no significant improvement in the proportion of drivers coming to a full stop, but the proportion of drivers failing to stop entirely decreased by the end of the project.

installation. However, the **proportion of drivers failing to stop** decreased over the course of the project, with the 6-7 month mark showing significantly fewer stop failures at all intersections (Tukey HSD test, $p = 0.04$). However, we did not find that driver approach direction or time of day had significant impacts on the proportion of drivers coming to a full stop, despite a large amount of school drop-off traffic in morning weekday timepoints.

Speed compliance

Speed was measured prior to installation and 5 weeks after installation along Main St and Cooper St. In total, we recorded 53,064 vehicles pre-installation and 44,591 vehicles post-installation (Table 2). A major confound with Main St speed monitoring was the presence of a temporary speed radar sign on the westbound approach that was installed independently by Winterville police prior to installation (Fig. 8). The speed radar sign was not present when the post-installation monitoring took place. Our results indicate that radar signs are substantially more effective at slowing drivers than bulb-outs – after installation, we saw a long distributional “tail” of speeding drivers in the 50-90 mph range along Main St that was not present when the radar sign was present, encompassing 41.2% of all post-installation drivers along Main St. However, speeds were significantly reduced at Cooper post-installation (where no radar sign was present at either time point), decreasing from an average of 34 mph to 30 mph. It is also interesting that no outlier speeding drivers were recorded for Cooper at either monitoring time period. Potentially,

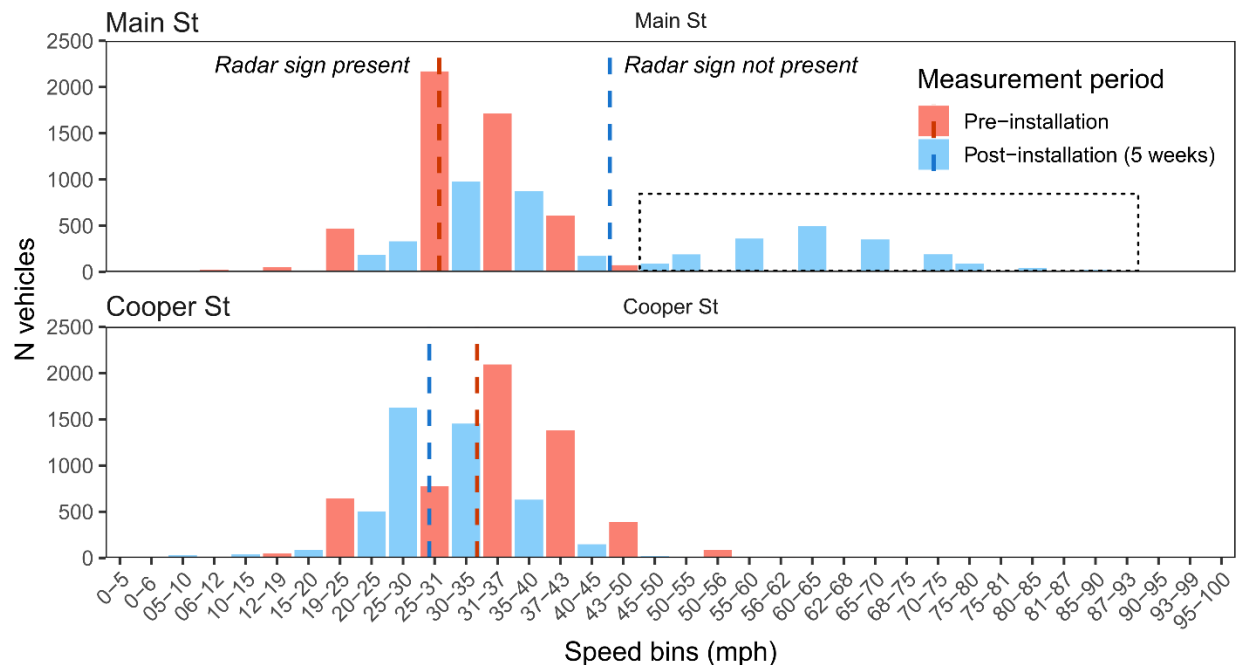


Figure 8. Speed data is somewhat confounded for Main St, where a radar sign present during the pre-installation monitoring period likely had a large effect on slowing drivers. After installation, when the radar sign was no longer present, a striking 42% of drivers were recorded traveling 15-45 mph over the speed limit. More substantial evidence for quick builds decreasing speeds comes from Cooper St, where the average speed dropped by ~4 mph.

this is due to Main St being a slightly more heavily-trafficked thoroughfare than Cooper St (AADT ~5300 versus 4800). This provides limited evidence that bulb-outs may help to control driver speeds, though other active speed control methods (versus passive infrastructure) are also highly effective. Used in combination, bulb-outs and speed monitoring could be a powerful method of encouraging slower speeds.

Data type	Intersection	Date	N vehicles	
Pre-installation	Cooper St	2-Apr	6,066	
		3-Apr	5,574	
		4-Apr	6,321	
		5-Apr	6,145	
		6-Apr	4,652	
		7-Apr	3,838	
		<i>Cooper St Total</i>	<i>32,596</i>	
	Main St	2-Apr	5,544	
		3-Apr	5,432	
		4-Apr	5,778	
		5-Apr	3,714	
		<i>Main St Total</i>	<i>20,468</i>	
		Pre-installation Total	53,064	
		Post-installation	Cooper St	11-Jun
12-Jun	5,064			
13-Jun	5,262			
14-Jun	2,958			
<i>Cooper St Total</i>	<i>18,150</i>			
Main St	11-Jun			3,939
	12-Jun			3,939
	13-Jun		4,395	
	14-Jun		5,623	
	15-Jun		4,606	
	17-Jun		3,939	
	<i>Main St Total</i>		<i>26,441</i>	
Post-installation Total	44,591			
Grand Total	97,655			

Table 2. Speed data was collected pre- and post-installation along the two main E-W vehicular thoroughfares using pneumatic tubes.

Community feedback

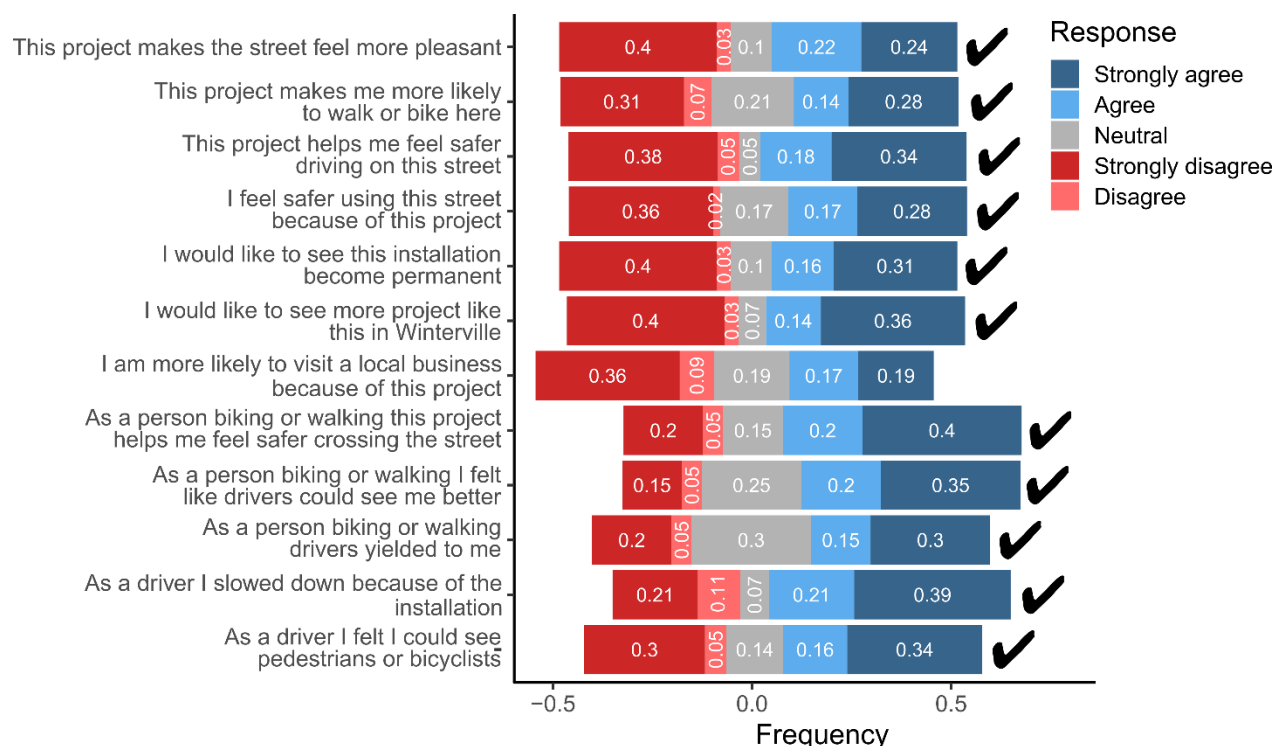


Figure 9. Overall responses were positive regarding improving safety for both pedestrians and drivers by improving the visibility of pedestrians, the perception of safety, and driver speed. Though still overall positive, there was weaker support for the project making the street more pleasant or making visitors more likely to walk or bike. Survey respondents were not more likely to visit a local business due to the project.

We collected 58 survey responses, 72% of whom identified as Winterville residents. Most fell into the 35-44 or 45-54 age categories (21% and 19% of respondents, respectively) and could be classified as middle/upper class (household income \$75k-150k). We had a nearly equal number of respondents identify as male and female. Survey responses were polarized, with most respondents answering either “Strongly disagree” or “strongly agree” for most questions (Fig. 9). Overall, responses were positive towards the project, especially from people using the street as a pedestrian or bicyclist and with regards to safety. Pedestrians indicated they felt safer and more visible while crossing the street; drivers saying they slowed down and felt they could better see pedestrians; and there was an overall desire for additional safety improvements or more permanent solutions in Winterville. However, there was weaker (though still positive) support for making the street feel more pleasant or encouraging people to walk or bike more. In the open response section, supporters of the project discussed wanting wider bulb-outs, feeling more positive towards the project once they understood its purpose, and appreciating the Town’s effort to improve safety. Disapproving comments towards the quick build were more forceful, and included concerns about vehicles that may need to make wide turns, the installation being ugly/a distraction, and the project being a poor use of funds (though the funding

source was misattributed to public taxes rather than a private industry grant). Several responses questioned why these particular intersections were selected; relatedly, two responses (including one person who self-reported as a current or former Winterville police officer) decried the project due to the lack of prior deaths/injuries at these intersections.

Survey responses indicate that in advance of future projects, deeper and more widespread community engagement should be prioritized to inform residents about infrastructure changes (even if temporary!) and to gather feedback on what the project should look and feel like. Greater care should also be placed on making projects aesthetically pleasing.

Project conclusion

In total, the project was installed for 6 months, May to early December. One of the reasons for the short timeframe (where other similar projects can last several years) was the choice to use removable reflective traffic tape to outline extensions. This tape proved to have a very short lifespan, did not effectively attach to the roadway surface without pressure from vehicles, and was a major reason why the project was viewed as unsightly by community members. However, the other materials held up reasonably well, with several of the traffic delineators withstanding multiple collisions before needing replacement, and most of the delineators able to be salvaged for future use. The caps on the delineators were seen to come off and contribute to roadway debris. The tennis court paint proved to be long-lasting and is still visible at the time of this report (April 2025).

Overall reflections

Project successes

- Efficient use of existing Town and community resources; completed three intersections with a limited amount of funding.
- Brought in key partners (NC DOT, fire department) early to understand what would/would not be feasible.
- Demonstrated gratitude throughout the process using handwritten thank-you notes, emails, and a celebration event.
- Used multiple channels for community outreach.
- Held successful community workdays that empowered residents.
- Obtained data that were useful in developing potential permanent outcomes for future planning
- Identified unexpected outcomes as a result of the flashing speed limit signs installed by the Police Department

Future improvements and advice for other communities

- Consider using a different or more permanent tape – removable tape has a very short lifespan and regularly needed to be replaced throughout the project.

- Begin encroachment process early; this can take several months even with helpful DOT partners.
- Focus on earlier, deeper community engagement – many community members we spoke to were unaware of the purpose of the project components, particularly the bulb-outs, despite various outreach initiatives. Meet people where they are, such as tabling at grocery stores, dollar stores, and local businesses.
- Collect more days of pre- and post-installation data.
- Establish work plans and installation support with Public Works department earlier.
- Collect survey data no earlier than 1 month following the project to allow community members to become familiar with the project.

Next steps

About 4.5 months after installation, the Town of Winterville installed 340' of new sidewalk along the north side of Cooper from the previous end of the sidewalk (approximately midblock) along the southern half of Academy. This has now allowed the Town to petition NC DOT to install a high-visibility crosswalk across Cooper at this location, though NC DOT will need to install ADA-compliant curb cut at the SW corner. Our results from this project indicate that using a combination of marked crosswalks and bulb-outs can improve crosswalk compliance. This project also established the potential of using quick build materials at other locations in town where there are high rates of pedestrian usage. The Town has dedicated funding in the 2024-25 FY budget towards sidewalk improvements throughout the community, with several additional projects already planned.

Contributors & Partners

Primary Project Leads

Katherine Dale (Winterville Safe Routes to School Program)

Nancy Pullen-Suffert (National Center for Safe Routes to School)

Anthony Bowers (Winterville Asst Town Manager)

Design & Planning Consultation

Ellen Walston (Safe Kids Pitt Co/Injury Prevention Program)

Diane White (Winterville Parks & Recreation)

Stephen Penn (Winterville Planning)

Eliud De Jesus (Greenville Urban Area MPO)

Jeff Rashko (Greenville Urban Area MPO)

Grant Logistics

Alessandro Figueroa (Highway Safety Research Center)

Lauren Marchetti (Highway Safety Research Center)

Engineering, Safety, and Encroachment

Wes Kumfer (Highway Safety Research Center)
 Len White (NC Department of Transportation)
 Jeremy Stroud (NC Department of Transportation)
 Jim Evans (NC Department of Transportation)
 Bill Cox (NC Department of Transportation)
 Interim Police Chief Chris Williams (Winterville Police Department)
 Fire Chief David Moore (Winterville Fire Department)

Installation

Randall Cobb (Winterville Public Works)
 Dustin Howard (Winterville Public Works)
 Cliff McGuffin (Winterville Public Works)
 17 community volunteers!

Data Collection

Kylie Tannenbaum (ECU Planning & Geography)
 Catherine Spruill (ECU Planning & Geography)
 Sam McCormack (ECU Planning & Geography)
 Debra Franklin (ECU Planning & Geography)
 Mary Archibald (ECU Planning & Geography)
 Stacey Pigford (City of Greenville)

Community Engagement

Don Harvey (Winterville Town Clerk)
 Sarah Gray-Barr (WNCT)

Financial Logistics

Jessica Manning (Winterville Finance Dept)
 Rhonda Barnes (Winterville Finance Dept)
 Amy Pierce (Winterville Finance Dept)

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