

# 3

# RECOMMENDATIONS



### Chapter Outline:

- 3.0** Overview **3.1** Methodology **3.2** Safety Improvements **3.3** Infrastructure Facility Types **3.4** McDougle Elementary **3.5** McDougle Elementary Priority Projects **3.6** Carrboro Elementary **3.7** Carrboro Elementary Priority Projects

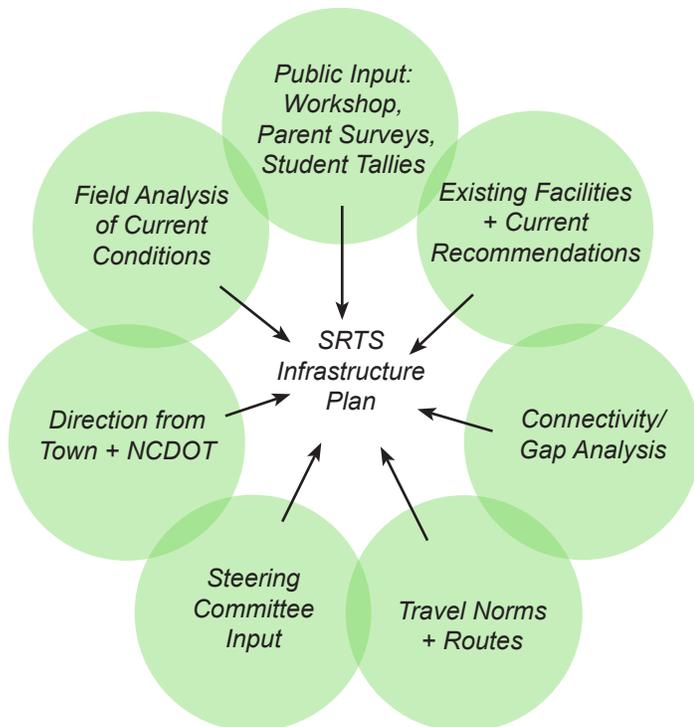
## 3.0 OVERVIEW

There are two main strategies for creating a safe environment where more students are walking and bicycling to school: physical improvements (engineering) and programs (education, encouragement, and enforcement activities). Engineering topics are covered in this chapter, while programming recommendations are covered in Chapter 5.

The proposed physical recommendations for McDougle Elementary and Carrboro Elementary are a series of bicycle and pedestrian improvements that create a safe, connected, and comprehensive system. This chapter presents those recommendations along with key SRTS recommendations and a proposed infrastructure map of both schools.

## 3.1 METHODOLOGY

A variety of sources were consulted during the development of the infrastructure recommendations: previous



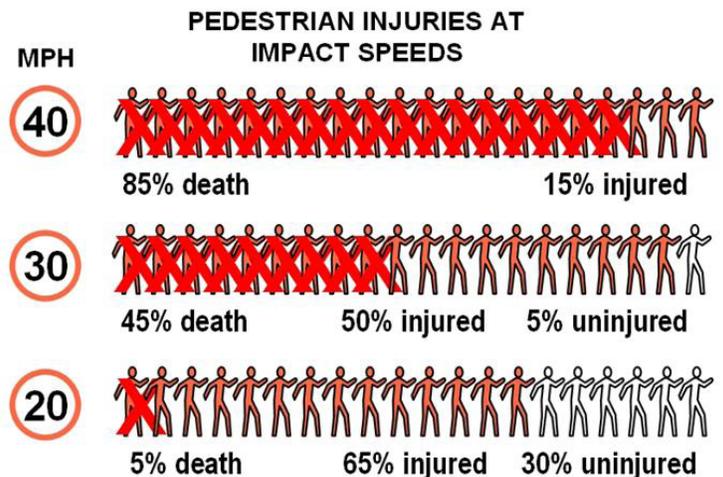
plans and studies, existing conditions, the Consultant's fieldwork inventory, public input, and noted patterns of travel. Fieldwork included an examination of conditions at major crossings, conditions along primary corridors, and a consideration of gap connectivity. Map discussion and analysis was conducted at steering committee meetings and public meetings to pinpoint specific areas in need of infrastructure improvements.

## 3.2 SAFETY IMPROVEMENTS

One of the main outcomes of the SRTS program and this planning process is the provision of safe bicycle and pedestrian facilities. This not only makes walking or bicycling to school a feasible option, but a safer one as well. The infrastructure recommendations are geared towards areas in need - where children and parents live and where they are walking today.

It is important to consider current statistical information and national design standards when making these recommendations. Some key statistics include:

*(continued on next page)*



From: *Killing Speed and Saving Lives*, U.K. Department of Transportation, London, 1987.

A diagram of the methodology described in section 3.1 to develop the SRTS Infrastructure Plan.

- The age group with the highest rate of pedestrian crashes are boys ages 5-9 because of darting across roadways.
- Pedestrians struck at 40 mph have 15% survival rate; 95% of those hit by a vehicle moving at 20 mph survive.

Some of the treatments recommended in this chapter have been proven to reduce crashes, as shown in the 2007 FHWA Crash Reduction Factors Study (<http://safety.fhwa.dot.gov>). Table 3.1 shows some typical countermeasures and associated crash reduction factors from that study.

- Pedestrians struck at 40 mph have 15% survival rate; 95% of those hit by a vehicle moving at 20 mph survive.

**Table 3.1: Crash Reduction Factors**

Countermeasure	Crash Reduction Factor
Install sidewalk	74%
Install pedestrian countdown signal heads	25%
Install pedestrian refuge islands	56%
Improve/install marked crosswalks	25%

2007 FHWA Crash Reduction Factors Study (<http://safety.fhwa.dot.gov>)

Together, all proposed facilities should be developed and existing facilities improved to create a safer and connected pedestrian network to and from McDougle Elementary and Carrboro Elementary. On-road and off-road components should be integrated to provide a connected pedestrian transportation and recreation network. All pedestrian facility projects undertaken by the Town of Carrboro should aim to meet the highest standards possible (using NCDOT, ADA, and AASHTO standards).

### 3.3 INFRASTRUCTURE FACILITY TYPES

While recommendations are made for bicycle and pedestrian facilities, the majority of improvements are pedestrian-focused due to the age of the children and the desire of the community. There are six project types typically recommended for bicycle and/or pedestrian infrastructure:

- **Corridor Improvements** - The recommended corridor projects are linear in nature and aim to expand upon the existing network of sidewalks, bicycle lanes, paved shoulders and trails to provide a more connected system which adequately separates pedestrians from roadway travel lanes.

- **Crossing Improvements** - Pedestrians have a much greater risk of being struck by a vehicle when crossing a roadway as opposed to walking on the shoulder or sidewalk beside it. Nationally, nearly 75% of all police-reported pedestrian crashes involve pedestrians crossing roadway travel lanes. Typical crossing improvement recommendations may include: marking intersection crossings, installing or retrofitting curb ramps, or adding signalization.

- **Traffic Calming Measures** - This comprehensive approach seeks to reduce traffic speeds and create a balance between cars, pedestrians, and bicyclists. Traffic calming helps pedestrians and bicyclists feel less threatened by traffic, and helps drivers be more aware of pedestrians. Many installations reduce the width of the roadway at the intersection, also reducing the pedestrian's exposure to traffic. Slowing speeds makes a big difference in safety.



*These existing speed tables on Pathway Drive provide traffic calming.*

Traffic calming may include speed humps, median islands, curb extensions, lane width reduction, etc.

- **On-campus Improvements** – Once students have reached campus, they need continuous infrastructure to support the completion of their trip. This may include sidewalks, marked crosswalks, covered walkways, and bicycle parking options.
- **Other Safety Improvements** – Additional, site-specific issues and needs may exist such as signage, lighting, flashing beacons, crossing guards, and maintenance.
- **Long Term Improvements** – These projects are also critical for SRTS safety but may require a longer-term process or be dependent upon future reconstruction project

**Table 3.2: Recommended McDougle Elementary Corridor Projects**

Improvement Type	Description	Length	Cost
New Sidewalk	Add sidewalk along west side of Hillsborough Road from Old Fayetteville Road to Main Street	6,200 LF	
New Multi-use Path	Horne Hollow road/path from existing bicycle path near Autumn Drive to Hillsborough Road	1,200 LF	
Repair pathway	Repair pavement of Quail Roost Drive path to McDougle Elementary		

### 3.4 MCDOUGLE ELEMENTARY

The following section outlines specific recommendations for each project type. Short-term or high priority projects are identified and further discussed in Section 3.5.

#### CORRIDOR IMPROVEMENTS

Table 3.2 describes the recommended corridor projects for McDougle Elementary School

#### CROSSING IMPROVEMENTS

##### 1. Hillsborough Road/School Entrance

- Add sidewalk on west side of Hillsborough Road.
- Restripe existing high visibility marked crosswalk (fading).
- Add median refuge island.
- Add in-roadway pedestrian sign.
- Maintain a crossing guard at this location (large numbers of pedestrians cross here every day).

##### 2. Greensboro Street/Hillsborough Road

- Add sidewalk on west side of Hillsborough Road.
- Stripe new high visibility crosswalk markings across Hillsborough Road with advanced stop lines.
- Reconstruct curb ramps.
- Expand to full pedestrian median refuge island for crossing Hillsborough Road.
- Add curb extensions on north corner of intersection (reducing turning radius).
- If stoplight is installed in future, add countdown signal heads for crossing Greensboro Street.
- Maintain a crossing guard at this location (large numbers of pedestrians cross here every day).

##### 3. Hillsborough Road/James Street

- Add sidewalk on west side of Hillsborough Road.
- Stripe new high visibility crosswalk markings across Hillsborough Road; and across James Street with advanced stop lines. Restripe existing marked crosswalks to make highly visible.
- Add curb extensions with curb ramps on NW side of intersection.
- Consider adding a crossing guard to this location (With the Quail Roost cut-through path, this is a popular place to cross Hillsborough Road).
- Consider pedestrian warning signs or in-roadway pedestrian signs.

##### 4. Hillsborough Road/Parkview Avenue

- Stripe high visibility crosswalks across Parkview Avenue with advanced stop lines for Parkview traffic.
- Add curb extensions on north corner.
- Add marked crosswalks to maintain sidewalk facility on Hillsborough Road for all intersecting roads.

##### 5. Old Fayetteville Road/School Entrance

- Stripe new high visibility crosswalk markings across school entrance road with advanced stop lines for leaving traffic.
- Reconstruct curb ramps.
- Maintain a police officer or crossing guard at this location.

##### 6. Hillsborough Road/Old Fayetteville Road

- Add sidewalk on west side of Hillsborough Road.

- Restripe existing marked crosswalk to make highly visible.
- Reconstruct curb ramps.
- Provide median refuge island for long crossing of Hillsborough Road.
- Provide high visibility pedestrian warning signs.
- Consider adding a crossing guard to this location if pedestrian traffic is significant.

### TRAFFIC CALMING MEASURES

- Provide curb extensions at locations of wide curb radii and long pedestrian crossing distances such as Hillsborough/Greensboro and James/Hillsborough intersections.



Existing crosswalks on-campus are painted onto the roadway and are fading (above). Installing high visibility thermoplastic crosswalks, as shown below in the photo rendering, will make these crossing areas safer for schoolchildren.



- Extend school zone on Hillsborough Road from Old Fayetteville Road to James Street.
- Provide median refuge islands at Hillsborough Road school entrance midblock crossing, Greensboro/Hillsborough intersection, Hillsborough/James intersection, and Hillsborough/Old Fayetteville intersection.
- Slow traffic through speed tables or chicanes on Pathway Drive.

### ON-CAMPUS IMPROVEMENTS

- Enhance and stage bicycle rack area near Hillsborough Road. Currently, this is situated in a muddy area. A covered shelter should be added above the bicycle rack area, as well as a concrete pad underneath the bicycle racks (see photo renderings below).



Current bicycle parking is in a muddy area and lacks shelter (above). Adding pavement under all of the bicycle racks and covering the entire area would greatly enhance bicycle parking, as shown in this photo rendering (below).



- Add additional bicycle racks near Hillsborough Road entrance.
- Restripe on-campus crosswalks as they are faded (see photo renderings below).
- Extend covered walkway out to Hillsborough Road.

## OTHER IMPROVEMENTS

- Keep bicycle lanes swept along Hillsborough Road.
- Improve all curb ramps to follow ADA compliance.
- Add flashing light in advance of James Street/Hillsborough Road traffic coming from the south.

### **Long-term Improvements**

#### **1. Old Fayetteville Road/NC 54 intersection**

- Significant improvements are needed that include intersection reconfiguration, sidewalk, countdown signals, median refuge islands, and marked crosswalks.

#### **2. Main Street/James Street intersection**

- Because an apartment complex resides south of Main Street at James Street, there may be students needing to cross here. Currently, this is not a signalized intersection so further study is warranted. Improvements might include a marked crosswalk, refuge island, flashing lights, and a crossing guard.

#### **3. NC 54 sidewalk**

- Sidewalk is needed along NC 54.

#### **4. Old NC 86 (to Dairyland Road)**

- Install sidepath on east side of Old 86 (see Carrboro Bicycle Plan).



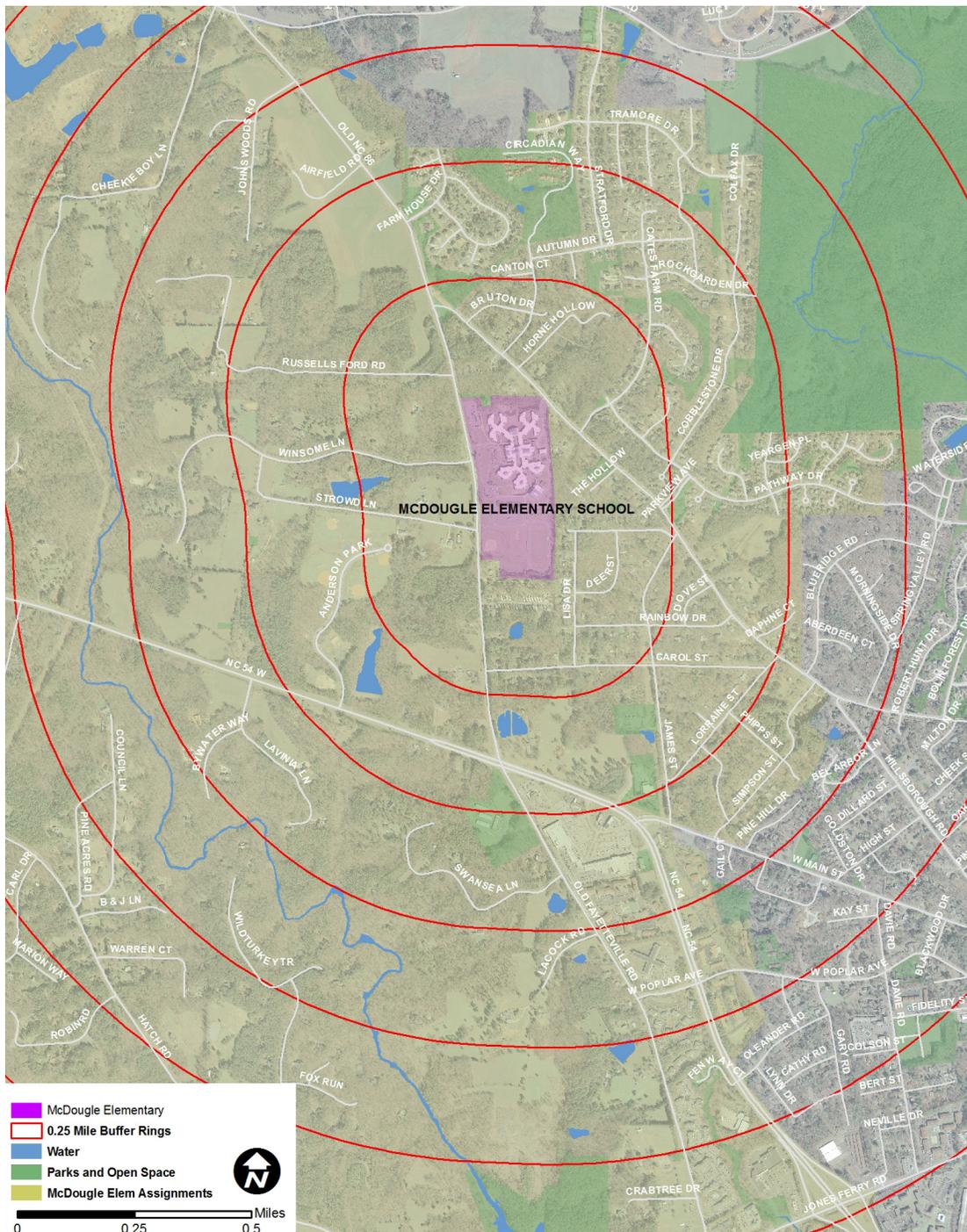
*Providing pedestrian connections along Old 86 is an important goal to meet the needs of Carrboro residents in the future.*

### 3.5 MCDOUGLE ELEMENTARY PRIORITY PROJECTS

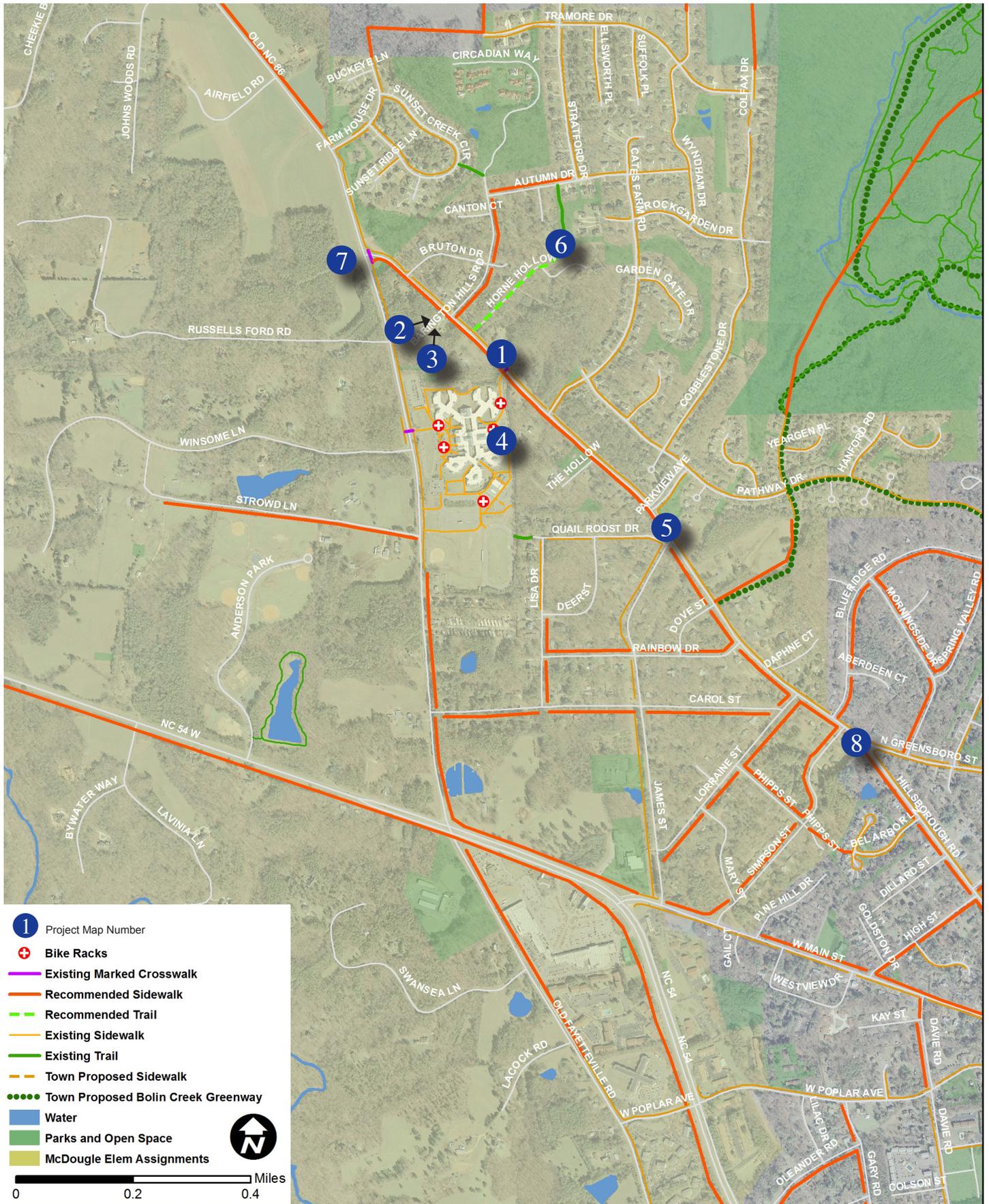
#### Overview

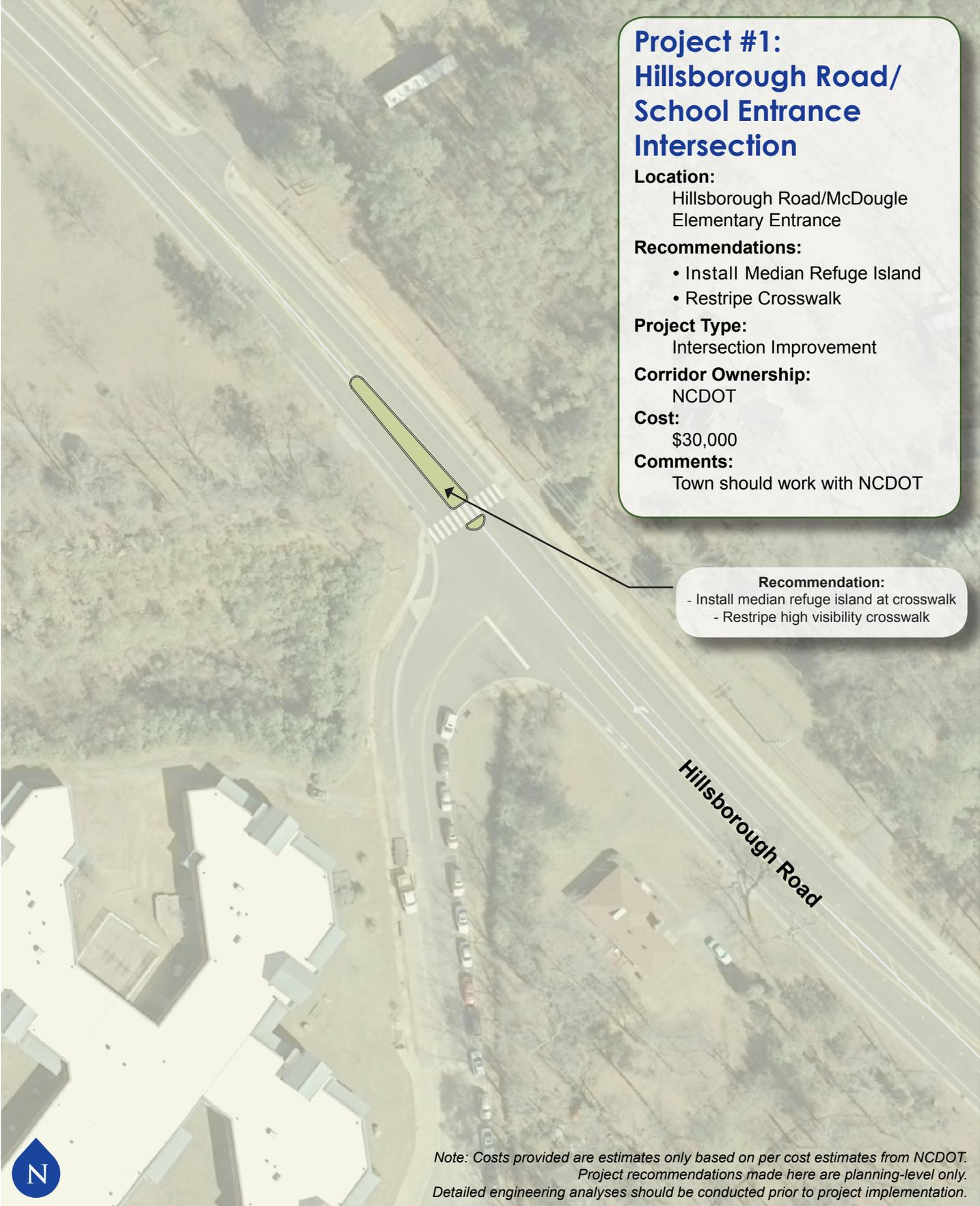
A comprehensive network of engineering improvements are recommended for the McDougle Elementary School area. In Map 3.1, approximate travel distances are shown in concentric rings. Specific network projects have been identified as integral to improving bicycle and pedestrian safety around McDougle Elementary School. These are the top priority projects of the comprehensive recommended network seen in Map 3.2. The project cutsheet number on the map identifies the location of each priority project. The following pages provide detailed cut-sheet map recommendations, photos, and cost estimates.

**Map 3.1: McDougle Elementary Travel Map**



Map 3.2: McDougle Elementary Priority Projects





### Project #1: Hillsborough Road/ School Entrance Intersection

**Location:**  
Hillsborough Road/McDougle  
Elementary Entrance

- Recommendations:**
- Install Median Refuge Island
  - Restripe Crosswalk

**Project Type:**  
Intersection Improvement

**Corridor Ownership:**  
NCDOT

**Cost:**  
\$30,000

**Comments:**  
Town should work with NCDOT

**Recommendation:**  
- Install median refuge island at crosswalk  
- Restripe high visibility crosswalk

*Note: Costs provided are estimates only based on per cost estimates from NCDOT.  
Project recommendations made here are planning-level only.  
Detailed engineering analyses should be conducted prior to project implementation.*

# Project #1: Hillsborough Road/School Entrance Intersection

## Importance

The majority of students and parents walking to school cross Hillsborough Road at this location. Therefore, it is important to maintain and even improve this crossing.

## Recommended Solutions

- The current high visibility marked crosswalk should be restriped as it is fading. This striping should continue to be maintained in the future.
- A median refuge island should be installed as a traffic calming element and a refuge for pedestrians in the middle. The refuge should include curb ramps and be maintained as grass and/or very low shrubs. The median refuge island can easily be installed on top of median-striped pavement.
- It is critical to maintain a crossing guard at this location. The current crossing guard has been a fixture in this community and stops rush-hour traffic on Hillsborough Road.

## Design Guideline: Median Refuge



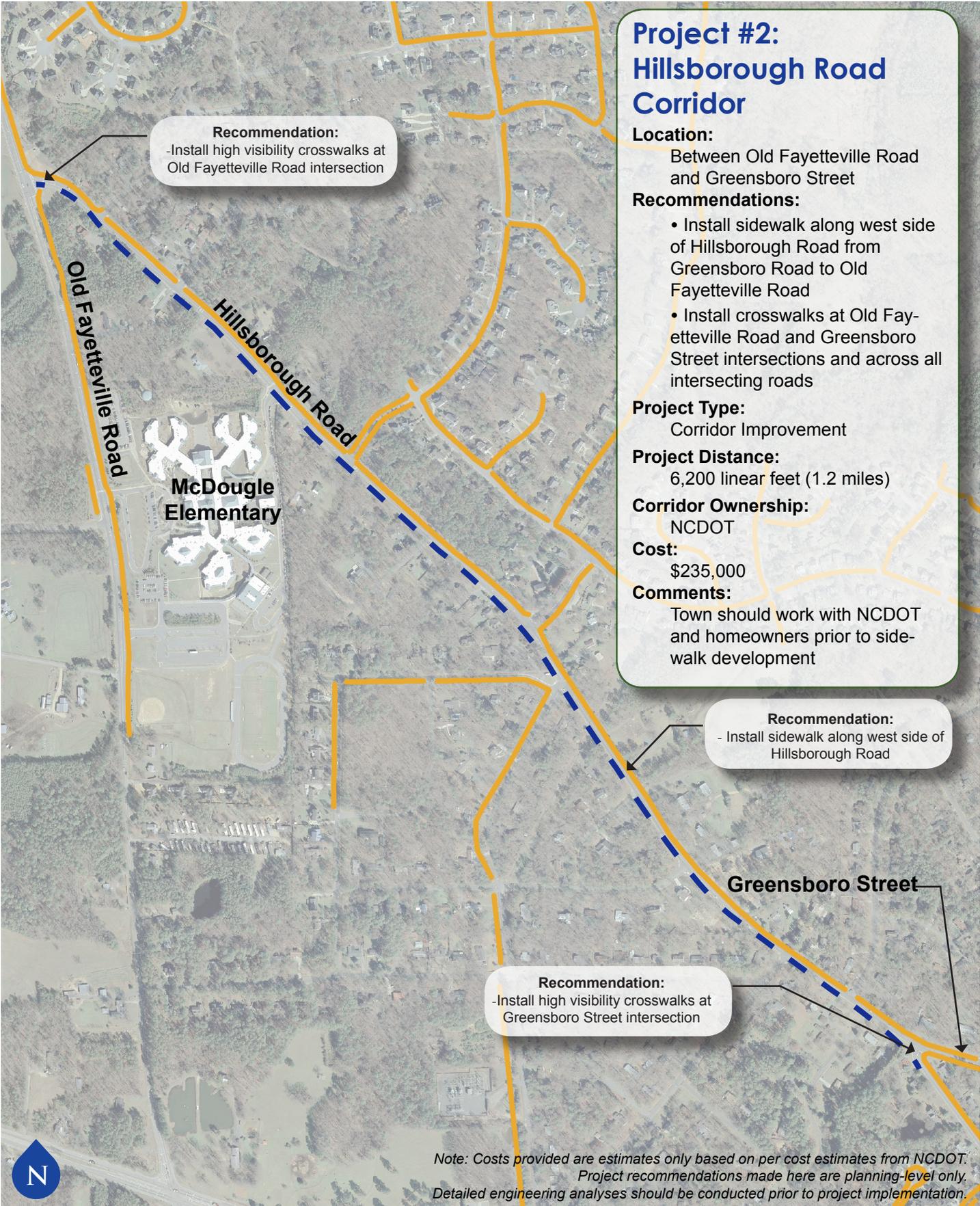
(Left): Example of a properly executed median refuge island with crosswalk and curb ramps. (Below): signage for median refuge islands.



This photo shows the crosswalk striping beginning to disintegrate. Restriping will prolong visibility.



Existing roadway width and striping on Hillsborough Street will allow for a median refuge island, thereby increasing pedestrian safety.



# Project #2: Hillsborough Road Corridor

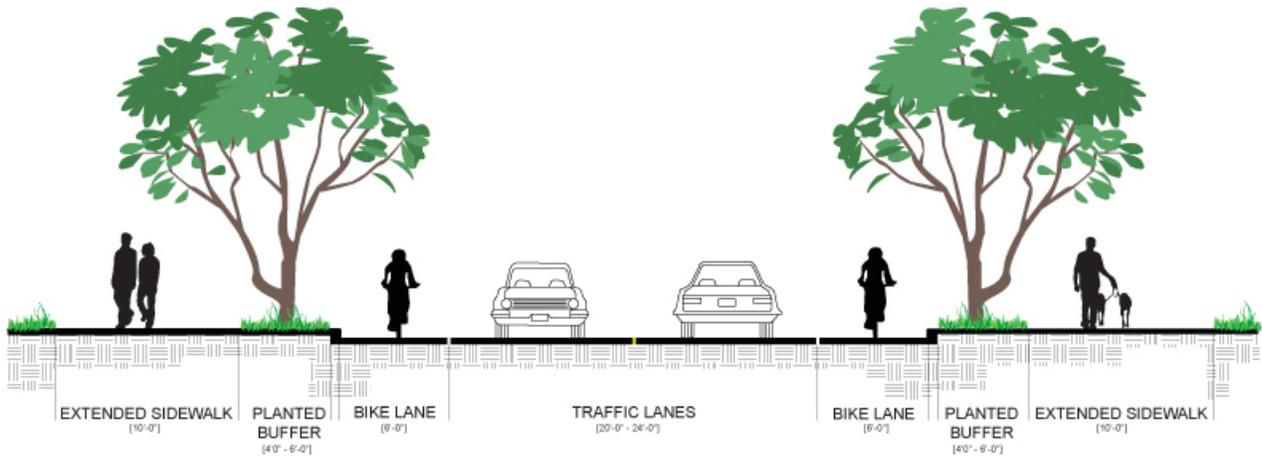
## Importance

The majority of students and parents walking to school come along Hillsborough Road from the south. With heavy pedestrian and bicycle use in the area, Hillsborough Road should have sidewalks on both sides in addition to its bicycle lanes to create a safer, more “complete street”.

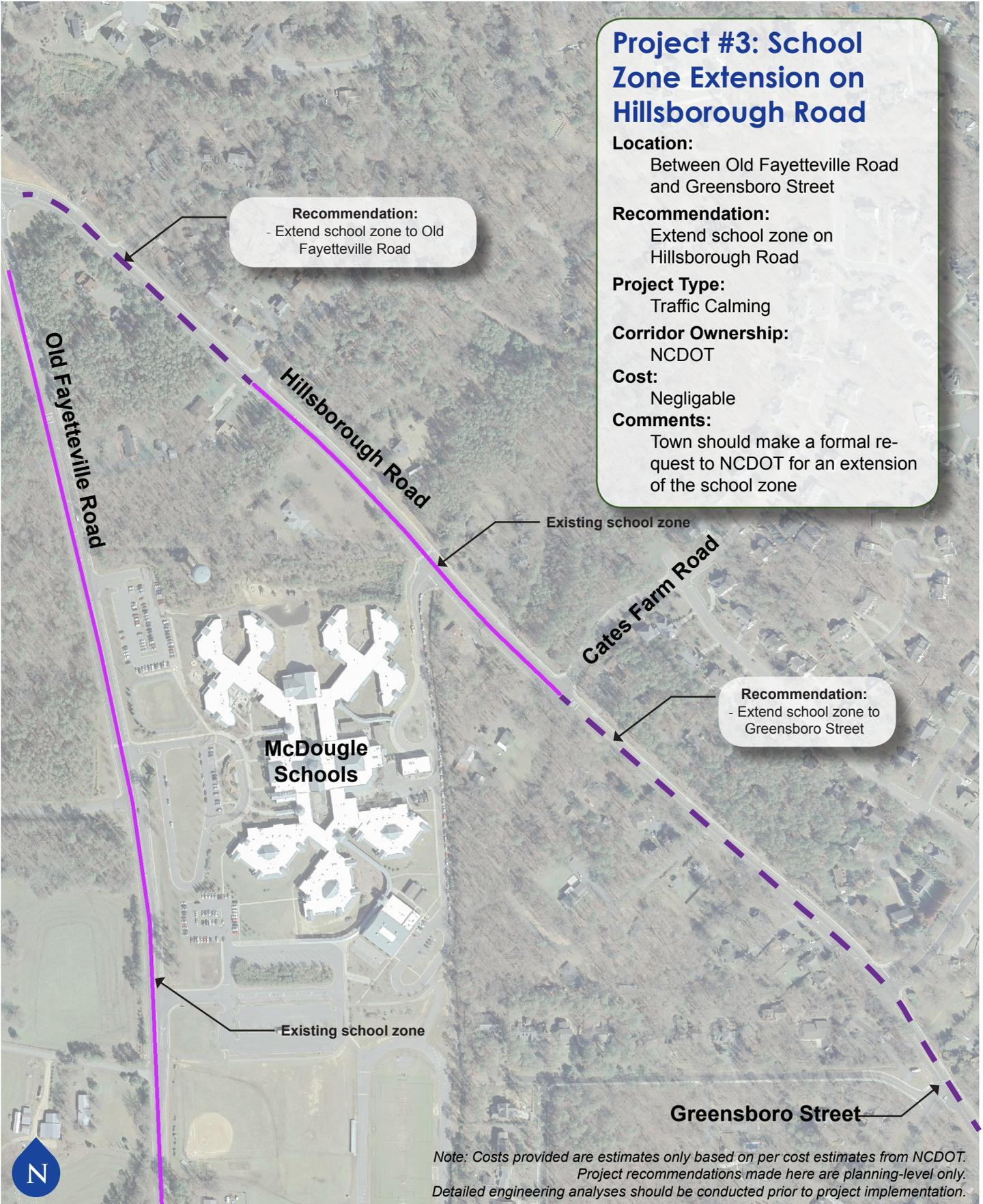
## Recommended Solutions

- Add minimum 5' sidewalk along west side of Hillsborough Road.
- Marked crosswalks should be added along Hillsborough Road across all intersecting streets (both sides in the long term).

## Design Guideline: Extended Sidewalk



*In these pictures, a foot path showing visible signs of use indicates the need for sidewalk on the west side of Hillsborough Road.*



## Project #3: School Zone Extension on Hillsborough Road

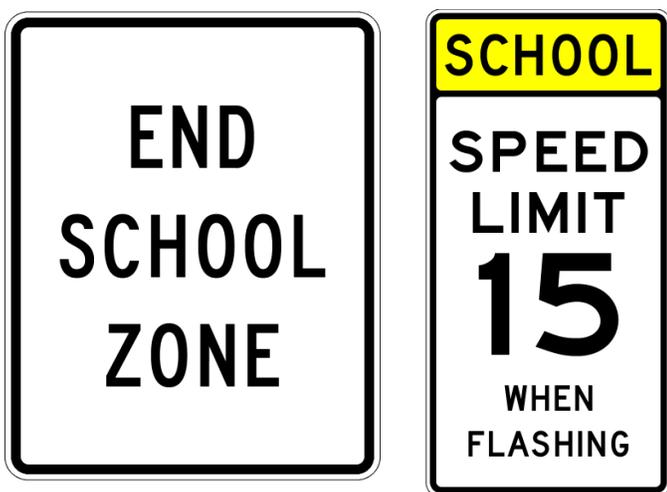
### Importance

Students are walking along and across Hillsborough Road well outside the current school zone. Citizens requested an extension of this zone during the public workshop for this planning process.

### Recommended Solutions

- Extend school zone boundary northward to Old Fayetteville Road and southward to near Greensboro Street.
- The Town will need to work with NCDOT to determine the precise alignment for this extension.

### Design Guideline: Extended School Zone Signage



(Left): Installing signage and flashing lights at the extended school zone locations will increase motorist awareness and pedestrian and bicycle safety around the school.



Photos showing existing school zone on Hillsborough Road, from Cates Farm Road to Barington Hills Road.



## Project #4: Improved Bicycle Parking On-Campus

**Location:**

McDougle Elementary School  
- East Side of Campus

**Recommendations:**

Install and improve bicycle parking at existing bicycle racks

**Project Type:**

Ancillary Improvements

**Ownership:**

Chapel Hill-Carrboro Schools

**Cost:**

Further research needed



**Recommendation:**

- Install more bicycle racks
- Improve concrete pad
- Install covered walkway

Covered Walkway

**Recommendation:**

- Install more bicycle racks at this location
- Install covered walkway
- Relocate bicycle parking beneath covered walkway

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*



# Project #4: Improved Bicycle Parking On-Campus

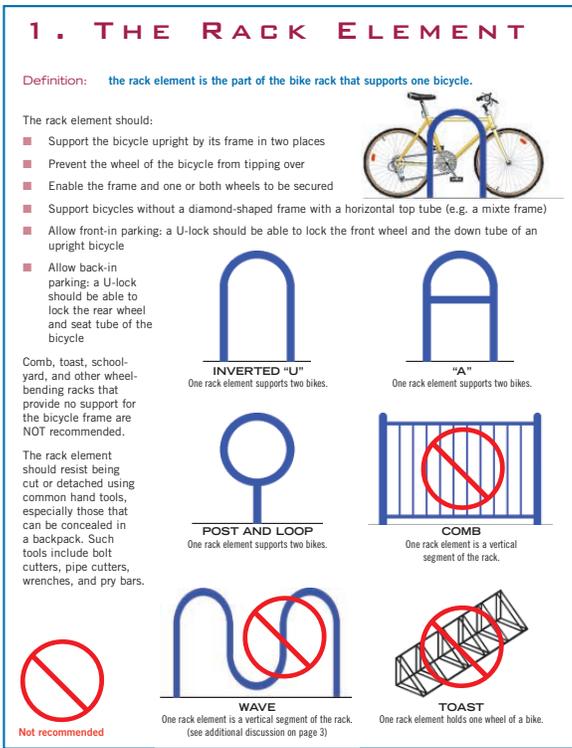
## Importance

Bicycle racks at McDougale Elementary are currently overflowing from heavy use. Providing adequate parking is key to keeping kids bicycling to school.

## Recommended Solutions

- Add additional bicycle parking at the two locations identified on this map.
- Improve northernmost bicycle parking rack area by enlarging concrete pad, decreasing erosion/muddiness, and adding shelter.
- Consider extending sheltered walkway to each bicycle rack to keep bicycles dry during the day and to improve the overall experience of bicycling to school.

## Design Guideline: Bicycle Parking



This diagram shows appropriate designs for bicycle racks.



The existing northern bicycle rack suffers from erosion problems and crowding.



The existing southern bicycle rack was full, despite the cold winter morning temperatures at the time this photo was taken.

## Project #5: Hillsborough Road/ James Street/Quail Roost Road Intersection

**Location:**

Hillsborough Road/James Street/Quail Roost Road

**Recommendations:**

- Curb extension at Quail Roost Road and Hillsborough Road
- Install sidewalk and curb ramps on west side of Hillsborough Road
- Install high visibility crosswalk across Quail Roost Road and James Street
- Restripe standard crosswalk on Hillsborough Road to high visibility
- Install flashing school crossing lights
- Consider HAWK signal

**Project Type:**

Intersection Improvement

**Ownership:**

NCDOT (Hillsborough Road) and Town of Carrboro

**Cost:**

\$25,000

**Comments:**

Will require working with NCDOT. Crossing guard should be considered at this location.

**Recommendation:**

- Install sidewalk and curb ramps on west side of Hillsborough Road

**Recommendation:**

- Tighten curb radius to slow turning vehicles and reduce crossing distance

Quail Roost Rd.

**Recommendation:**

- Install high visibility crosswalks across Hillsborough Road., Quail Roost Road, and James Street
- Relocate stop bar further back

James Street

Hillsborough Road

**Recommendation:**

- Install flashing school crossing signage at this location

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #5: Hillsborough Road/James Street/Quail Roost Road Intersection

### Importance

Other than the Hillsborough Road crossing described in Project #1, this is likely the second most significant pedestrian crossing. A crossing guard has worked here in the past. There is a pathway connecting to the school's campus at the end of Quail Roost Road making this an attractive, shorter-trip entrance. Also, with three roadways coming together, this is a confusing and dangerous area for both motorists and pedestrians.

### Recommended Solutions

- Replace marked crosswalk across Hillsborough Road with high visibility marked crosswalk.
- Provide the following traffic calming elements: curb extensions for curb radius reduction (reducing crossing distance and slowing traffic around turns) and flashing school crossing lights for northbound traffic on Hillsborough Road.
- Relocate stop bars appropriately behind marked crosswalks at Quail Roost Road and James Street.
- Consider HAWK signal

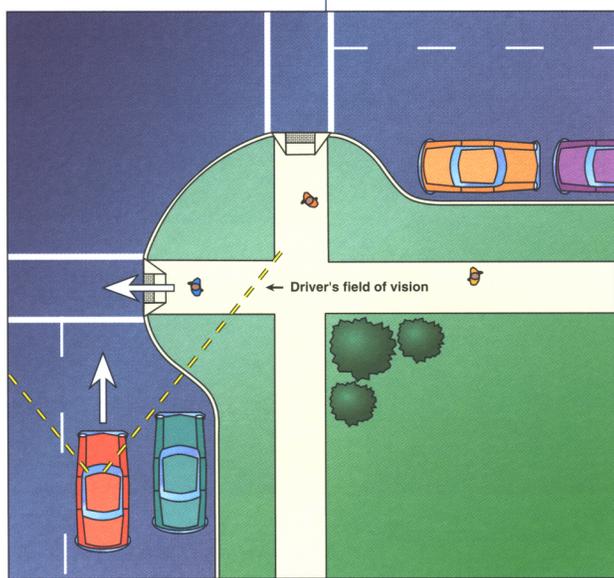


*The existing intersection is lacking highly visible crossing facilities such as ladder-style crosswalks. Site lines, traffic patterns, and lack of sidewalk on west side of Hillsborough Road do not make it pedestrian-friendly.*



*Installing a similar sign on the south side of the intersection will improve motorist awareness of the upcoming intersection.*

### Design Guideline: Curb Extension



*Reducing the curb radius at the corner of Hillsborough Road and James Street would slow traffic around turns and reduce the crossing distance for users. This diagram shows how to properly locate sidewalk and curb ramps at the crosswalks.*

## Project #6: Horne Hollow Bicycle Path Extension

**Location:**

End of Horne Hollow Bicycle Path to Hillsborough Road

**Recommendations:**

Extend paved trail to Hillsborough Road with new development

**Project Type:**

Facility Improvement

**Ownership:**

Town of Carrboro and Private Owner.

**Distance:**

1,200 linear feet

**Cost:**

\$175,000

**Comments:**

Town should require new developer to construct and extend paved multi-use trail

Existing Horne Hollow Bicycle Path.

**Recommendation:**  
- Extend Horne Hollow Bicycle Path to Hillsborough Road

Hillsborough Road

School Entrance

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*



# Project #6: Horne Hollow Bicycle Path Extension

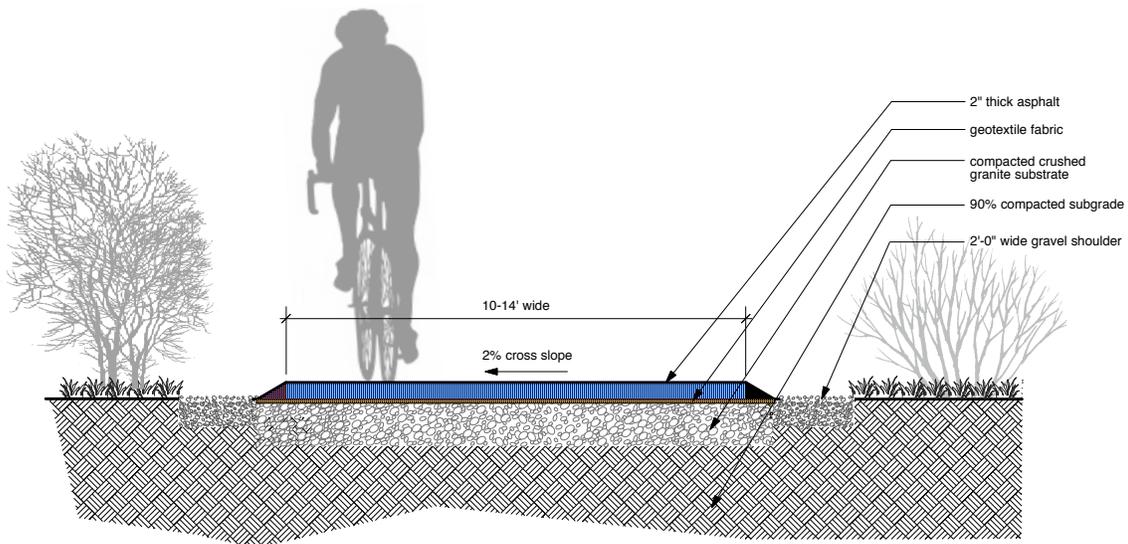
## Importance

Extending this multi-use paved trail would provide a short and easy connection for neighborhoods to the north and east of McDougle Elementary. The trail would lead them out to the Hillsborough Road crossing guard. The corridor is already cleared and used.

## Recommended Solutions

- Extend multi-use paved trail to Hillsborough Road.
- Because development of this tract of land is likely, the cost of the trail development should be the responsibility of the developer.

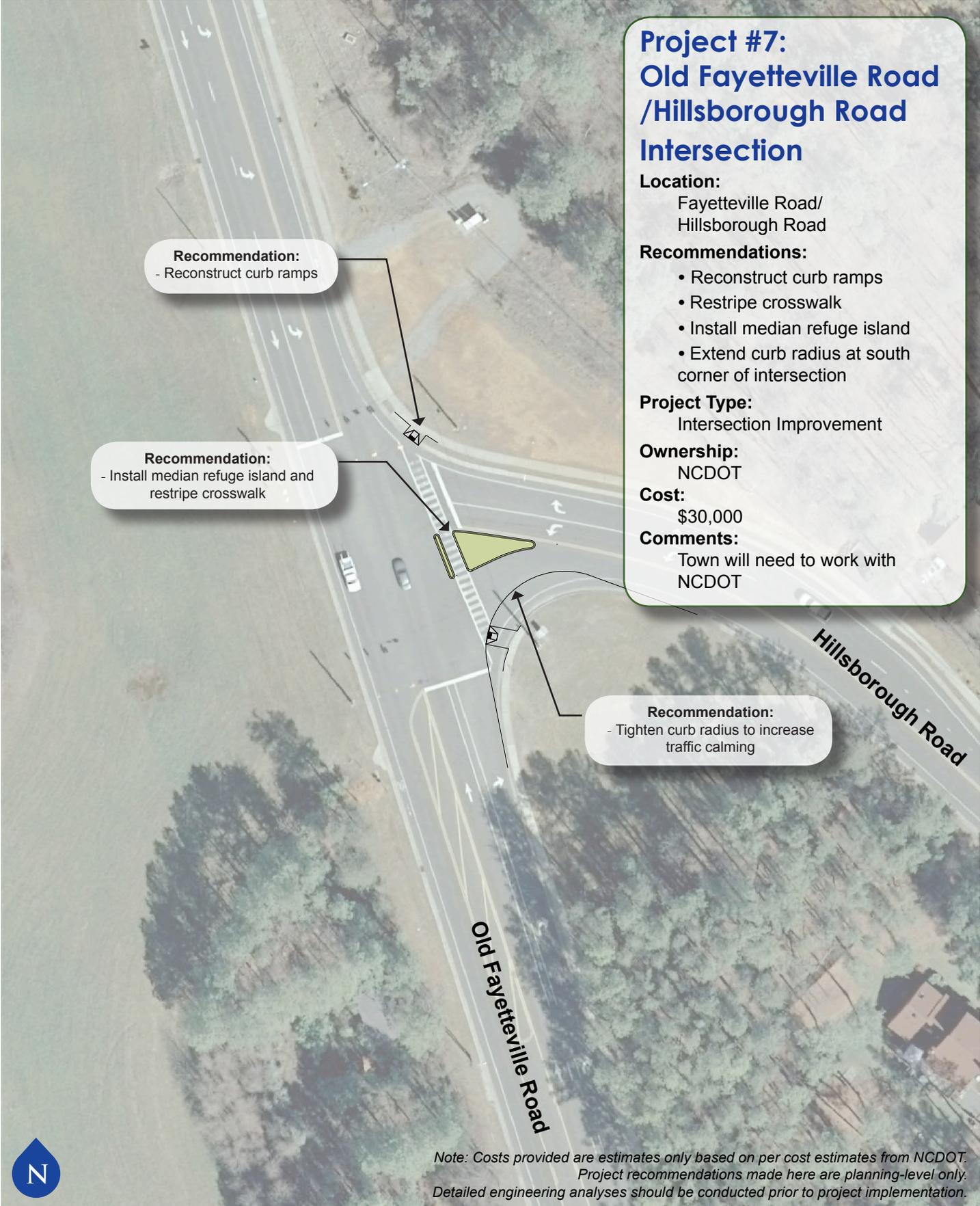
## Design Guideline: Paved Multi-Use Trail



Where the existing Horne Hollow Bicycle Path ends, a footpath continues, indicating circulation through this area.



Continuing the paved trail through this area would connect users to Hillsborough Road where they could pick up sidewalk leading to the school entrance.



**Recommendation:**  
- Reconstruct curb ramps

**Recommendation:**  
- Install median refuge island and restripe crosswalk

**Recommendation:**  
- Tighten curb radius to increase traffic calming

**Project #7:  
Old Fayetteville Road  
/Hillsborough Road  
Intersection**

**Location:**  
Fayetteville Road/  
Hillsborough Road

**Recommendations:**

- Reconstruct curb ramps
- Restripe crosswalk
- Install median refuge island
- Extend curb radius at south corner of intersection

**Project Type:**  
Intersection Improvement

**Ownership:**  
NCDOT

**Cost:**  
\$30,000

**Comments:**  
Town will need to work with NCDOT



*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #7: Old Fayetteville Road/Hillsborough Road Intersection

### *Importance*

This is a major intersection that sees significant traffic. A number of students live north of this intersection off Old Fayetteville Road and walk to this intersection.

### *Recommended Solutions*

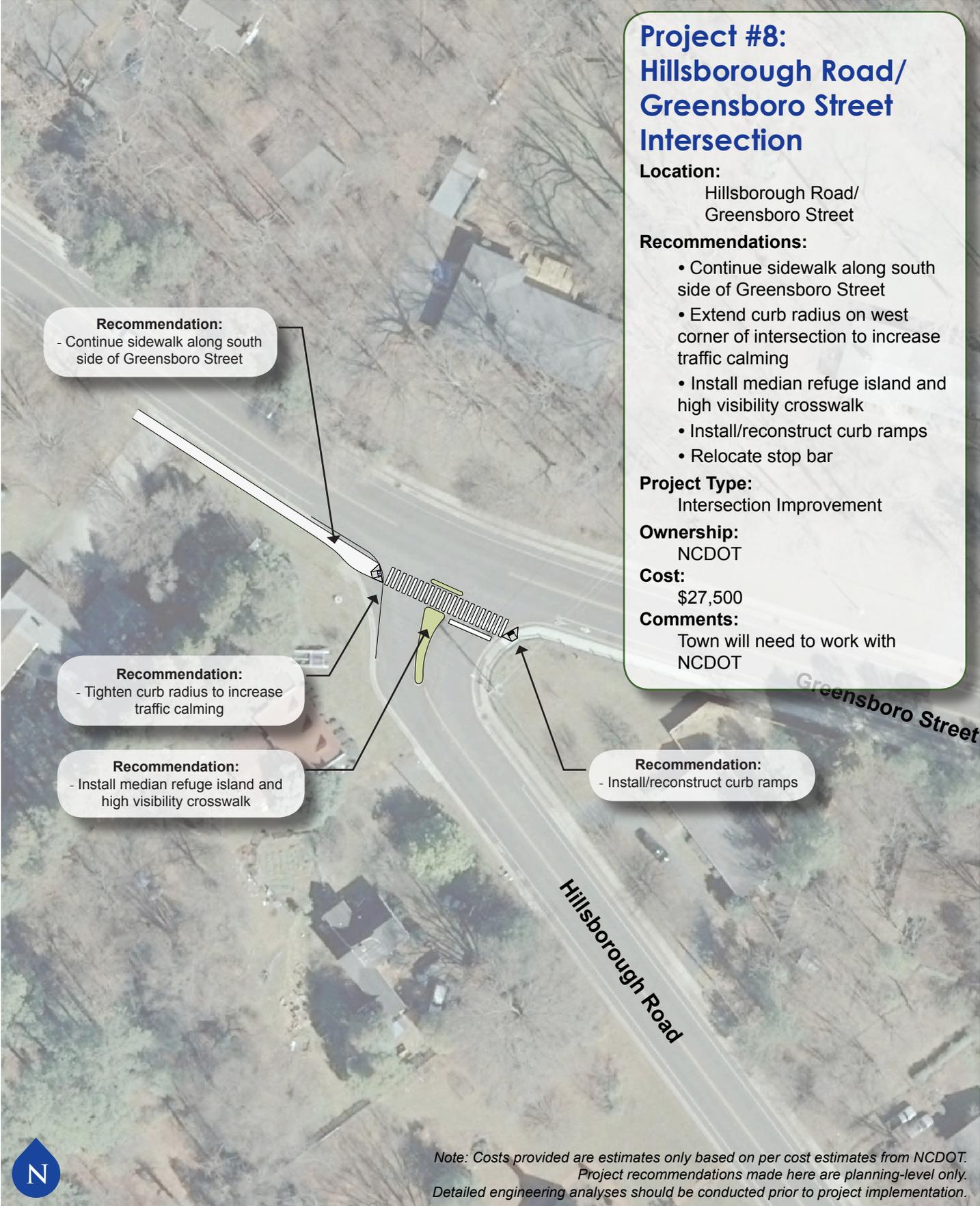
- Restripe existing, but faded, high visibility marked crosswalk.
- Add median refuge island to address the long crossing distance and to slow traffic.
- Reconstruct curb ramps so that they meet ADA requirements and are safe for pedestrians.
- Add curb extension to tighten curb radius on south side. This reduces crossing distance and slows traffic.



*The existing intersection. Crosswalk striping is faded and there is a very long cross time which can be challenging for schoolchildren.*



*This photo rendering illustrates the proposed restriping of crosswalk and the median refuge island.*



**Project #8:  
Hillsborough Road/  
Greensboro Street  
Intersection**

**Location:**  
Hillsborough Road/  
Greensboro Street

- Recommendations:**
- Continue sidewalk along south side of Greensboro Street
  - Extend curb radius on west corner of intersection to increase traffic calming
  - Install median refuge island and high visibility crosswalk
  - Install/reconstruct curb ramps
  - Relocate stop bar

**Project Type:**  
Intersection Improvement

**Ownership:**  
NCDOT

**Cost:**  
\$27,500

**Comments:**  
Town will need to work with NCDOT

**Recommendation:**  
- Continue sidewalk along south side of Greensboro Street

**Recommendation:**  
- Tighten curb radius to increase traffic calming

**Recommendation:**  
- Install median refuge island and high visibility crosswalk

**Recommendation:**  
- Install/reconstruct curb ramps

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #8: Hillsborough Road/Greensboro Street Intersection

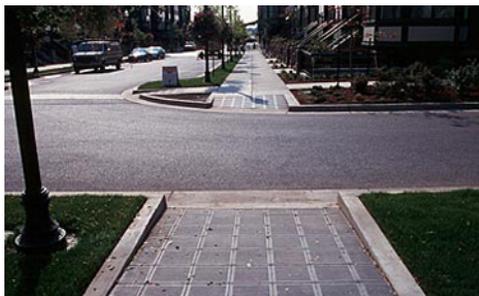
### Importance

This is a significant intersection of two chief arterials through Carrboro. There is no stoplight and no pedestrian facilities currently. Both roadways see heavy pedestrian and bicycle use.

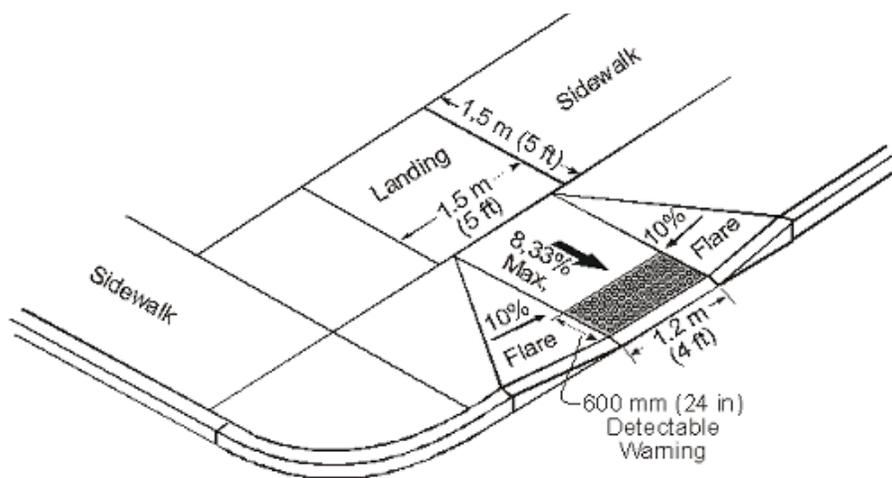
### Recommended Solutions

- Stripe highly visible marked crosswalks as shown on map.
- Add median refuge island to slow traffic and provide the pedestrian with a stopping point.
- Provide curb extension on west side of intersection to slow fast-moving traffic around corner and to reduce crossing distance for pedestrians.
- Install/reconstruct curb ramps so that they meet ADA requirements and are safe for pedestrians.

### Design Guideline: Curb Ramps



Two separate curb ramps, one for each crosswalk, should be provided at intersection corners. Curb ramps should have a slope no greater than 1:12 (8%). Side flares should not exceed 1:10 (10%).



The existing intersection of Hillsborough Road and Greensboro Street already has a small median. Reconstructing it would allow a safe crossing for pedestrians.

## 3.6 CARRBORO ELEMENTARY

### CORRIDOR PROJECTS

Table 3.3 describes the recommended corridor projects for Carrboro Elementary School.

**Table 3.3: Recommended Carrboro Elementary Corridor Projects**

Improvement Type	Description	Length	Cost
New Sidewalk	Construct sidewalk on Pine Street from North Greensboro Street to Hillsborough Road	1675 Ft	
Greenway/Crossing	Provide a lighted multi use path / trail from Estes Apartments to Pleasant Drive	Approx 250 Ft	
Greenway/Crossing	Provide a path / trail from Pine Street to Carrboro Elementary School Property	Approx 450 Ft	
Greenway/Crossing	Provide a path / trail from Todd Street to Carrboro Elementary School Property	Approx 300 Ft	
New Sidewalk	Construct sidewalk on the north side of West Main Street from Pine Hill Drive to Hillsborough Road	4000 Ft	
New Sidewalk	Construct sidewalk on the south side of West Main Street from Poplar Avenue to Fidelity Street	425 Ft	
New Sidewalk	Construct sidewalk on Davie Road from West Poplar Avenue to West Main Street	850 Ft	
New Sidewalk	Construct sidewalk on the west side of Hillsborough Road from Simpson Street to West Main Street	3900 Ft	



*New sidewalk on Pine Street, shown above, is on the recommended corridor project list.*

### CROSSING IMPROVEMENTS

#### **1. Shelton Street / Hillsborough Road / Main Street**

- Re-mark all existing crosswalks with high visibility crosswalks.
- Install in-roadway pedestrian signage.
- Install an advance stop bar in front of the crosswalk on Hillsborough Road.
- Add a pedestrian signal across Main Street.

#### **2. Shelton Street / Greensboro Street**

- Extend the 20 miles per hour (mph) speed limit zone further north on Greensboro Street. It currently changes to 20 mph going southbound at the crosswalk.

- Install pedestrian-activated warning beacon, such as a Rectangular Rapid Flashing Beacon or in-street pedestrian lighting at the crosswalk

### **3. Greensboro Street / Estes Drive / Frances Lloyd Shetley Greenway**

- Re-mark all existing crosswalks with high visibility crosswalks.

### **4. Poplar Avenue / Main Street**

- Construct sidewalk on Main Street to fill in existing gaps.
- Provide high visibility crosswalks parallel to Main Street.
- Construct islands to reduce crossing distances and reduce speeds.

### **5. Oak Avenue / Greensboro Street**

- Provide high visibility crosswalks parallel to Main Street.
- Construct an island on the Oak Avenue approach where there is a painted island to reduce crossing distances and reduce speeds.

## TRAFFIC CALMING MEASURES

- Install speed bumps or other appropriate traffic calming measures on Oak Avenue and Lindsay Street to deter reported speeding issues.



*Speed bumps or other appropriate traffic calming measures on Oak Avenue would deter speeding issues. Also this intersection with Greensboro Street is need of high visibility crosswalks.*

## ON-CAMPUS IMPROVEMENTS

- Provide covered bicycle rack areas.
- Carpool riders coming from the east side of Shelton Street could drop students off at the entrance to the greenway and let them walk to the school from that location. A teacher or parent volunteer could monitor activities on the greenway during drop off times. This way, the students do not have to walk through the vehicular conflicts that occur at the Shelton Street / Ashe Street / Bus Loop intersection. Drivers can take a left on Elm Street; thereby, not having to pass through campus to exit. This alternative provides a safer entrance for the children and less congestion around the school.

## OTHER IMPROVEMENTS

- Fill in missing gaps in sidewalk on Shelton Street and Main Street.
- Improve all curb ramps to follow ADA compliance.
- Ensure that regular maintenance is scheduled to cut back trees and bushes so that appropriate sight distance is provided. This issue was observed primarily in the street network located just southeast of the school.
- Ensure that greenways are kept free of trash.
- Provide an additional crossing guard at the Shelton Street / Greensboro Street intersection.

## LONG-TERM IMPROVEMENTS

- Provide sidewalks on Estes Drive from the Estes Park Apartments to Greensboro Street (approximately 1900 feet).
- Construct additional pedestrian facilities as needed by the Town of Carrboro
- Conduct study to determine location(s) for mid-block crossings along Greensboro Street between Hillsborough Road and Estes Drive.

### 3.7 CARRBORO ELEMENTARY PRIORITY PROJECTS

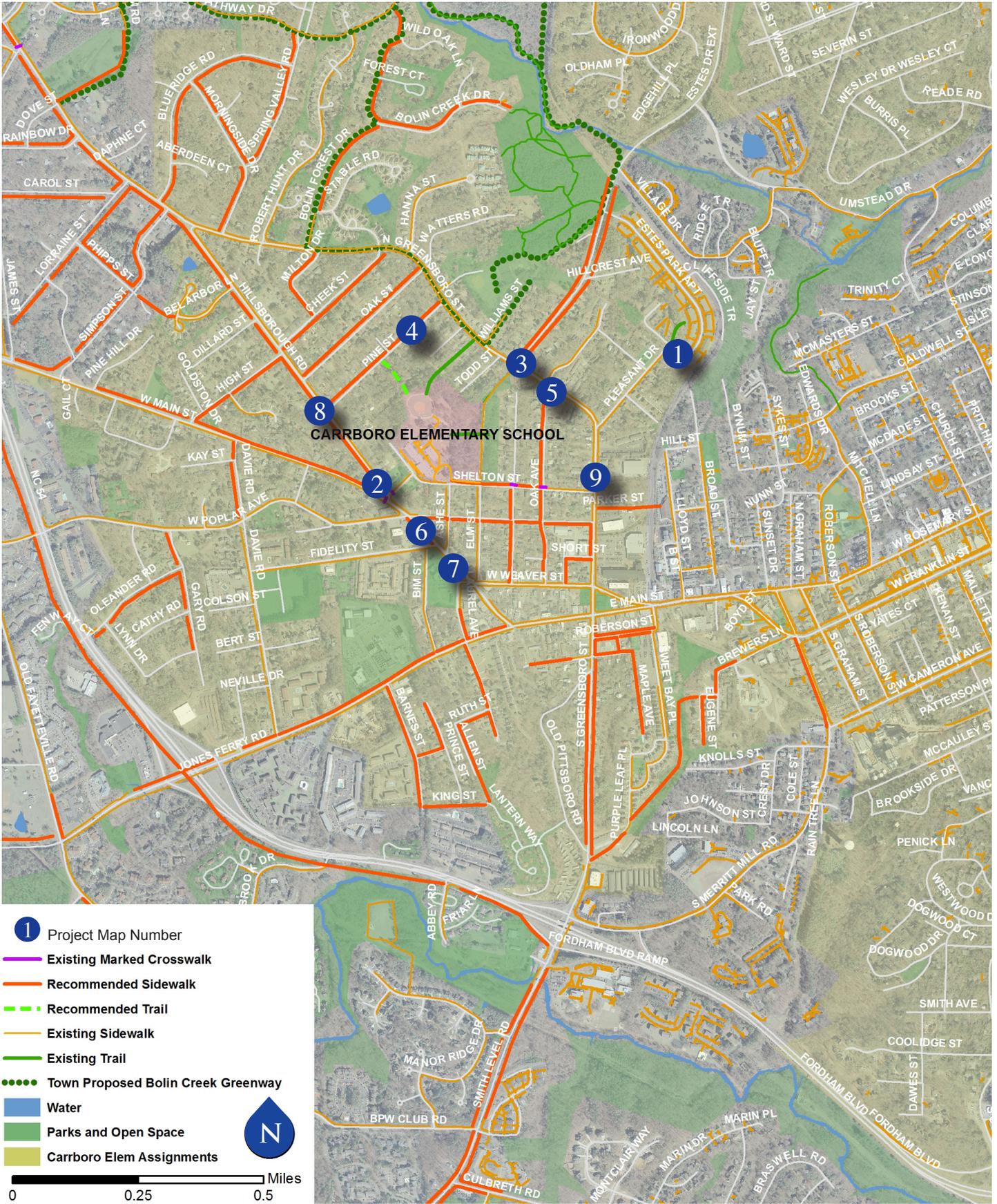
#### Overview

A comprehensive network of engineering improvements is recommended for the Carrboro Elementary School area. In Map 3.3, approximate travel distances are shown in concentric rings. Specific network projects have been identified as integral to improving bicycle and pedestrian safety around the elementary school. These are the top priority projects of the comprehensive recommended network seen in Map 3.4. The project cutsheet number on the map identifies the location of each priority project. The following pages provide detailed cutsheet map recommendations, photos, and cost estimates.

**Map 3.3: Carrboro Elementary Travel Map**



Map 3.4: Carrboro Elementary Priority Projects



## Project #1: Estes Park Multi Use Path

### Location:

Between Estes Park and Pleasant Drive

### Recommendations:

- Provide a 10' wide paved path between the Estes Park Apartments and Pleasant Drive
- Provide Lighting

### Project Type:

Corridor Improvement

### Ownership:

Town of Carrboro and Private Owner

### Distance:

250 feet

### Cost:

\$40,000

### Comments:

Town should require new developer to construct and extend paved multi-use trail

**Recommendation:**  
- Create paved path with lighting

*Note: Costs provided are estimates only based on per cost estimates from NCDOT.  
Project recommendations made here are planning-level only.  
Detailed engineering analyses should be conducted prior to project implementation.*

## Project #1: Estes Park Multi Use Path

### *Importance*

Several students attending Carrboro Elementary live in the nearby Estes Park Apartments. There are currently no sidewalks on Estes Drive, so the path that vehicles take is not walkable/bikable. Estes Drive is narrow, with high traffic volumes that travel at high speeds. There are currently multiple established cut-throughs between the west side of the Estes Park Apartments and the properties behind it. Unfortunately, they are muddy when there is rain or snow and they are currently littered with various assortments of trash. The best connection to the school is the path that leads to Pleasant Drive. Pleasant Drive currently has sidewalk that connects to Greensboro Street. Students can access the school from the Pleasant Drive / Greensboro Street intersection via the Frances Lloyd Shetley Greenway or Shelton Street. Both walks are about 0.5 miles from the Pleasant Drive / Greensboro Street intersection.

### *Recommended Solutions*

- Provide a multi use path between the Estes Park Apartments and Pleasant Drive.
- Provide lighting for the path.
- Organize a group to provide parental supervision when school aged children would utilize the path.



*The current path behind the Estes Apartments is full of litter and becomes muddy when it rains or snows.*

## Project #2: Shelton Street/ Main Street/ Hillsborough Road Intersection Improvements

### Location:

Shelton Street / Hillsborough Road and Hillsborough Road / Main Street

### Recommendations:

- Provide high visibility crosswalks where current low visibility crosswalks are located
- Provide an advance yield bar on Hillsborough Road so cars will stop prior to the crosswalk
- Pursue the option of installing a pedestrian signal across Main Street

### Project Type:

Intersection Improvement

Ownership: NCDOT

Cost: \$4,500

### Comments:

Town should work with NCDOT

**Recommendation:**  
- Add yield bar on Hillsborough Road

**Recommendation:**  
- Provide high visibility crosswalks

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are **planning-level** only. Detailed engineering analyses should be conducted prior to project implementation.*

# Project #2: Shelton Street/ Main Street/ Hillsborough Road Intersection Improvements

## Importance

The Shelton Street / Hillsborough Road and Hillsborough Road / Main Street intersections provide primary pedestrian access to the school from the south. The existing crosswalks are not high visibility and therefore make it hard for a motorist to identify the crossing in advance. Additionally, a combination of the speeds that vehicles drive and the existing grade make it hard for vehicles to see and be seen from the west. During school hours, no left turns are allowed at the Hillsborough Road / Main Street intersection. During field observation, several drivers were observed not obeying this directive. Once police enforcement arrived, there was 100% compliance.

## Recommended Solutions

- Provide high visibility crosswalks where current low visibility crosswalks are located.
- Provide an advance yield bar on Hillsborough Road so cars will stop prior to the crosswalk. Maintain existing stop bar at Hillsborough/Main Street intersection.
- Pursue the option of installing a pedestrian signal across Main Street.



The current crosswalk across Hillsborough Street at the Main Street intersection is low-visibility.



Shown in this photo rendering is a new high visibility crosswalk and a new yield bar.

### Project #3: Greensboro Street/ Estes Drive/ Frances Lloyd Shetley Greenway Entrance Intersection Improvements

**Location:**

Greensboro Road / Estes Drive Intersection

**Recommendations:**

- Stripe High Visibility Crosswalks
- Provide ADA compliant curb ramps at all crosswalk locations
- Install pedestrian signage on westbound Greensboro Road
- Maintain a crossing guard at this location

**Project Type:**

Intersection Improvement

**Ownership:** NCDOT

**Cost:** \$9,000

**Comments:**

**Recommendation:**

- Install pedestrian signage

**Recommendation:**

- Restripe high visibility crosswalks, and install ADA compliant curb ramps

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

N

# Project #3: Greensboro Street/ Estes Drive/ Frances Lloyd Shetley Greenway Entrance Intersection Improvements

## Importance

This intersection serves as the primary entrance to the Frances Lloyd Shetley Greenway, which ultimately provides a connection to Carrboro Elementary School. Currently, there are marked crosswalks and pedestrian countdown signals. With the amount of traffic and the speed of the traffic in this area, improvements can be made to make this intersection more noticeable to the travelling public.

## Recommended Solutions

- Stripe High Visibility Crosswalks.
- Provide ADA compliant curb ramps at all crosswalk locations.
- Install pedestrian signage on westbound Greensboro Road.
- Maintain a crossing guard at this location.



The current intersection of Estes Drive and Greensboro Road lack high-visibility crosswalks.



Shown here is a photo rendering of the intersection with new crosswalks and ADA compliant curb ramps at all locations.

## Project #4: Pine Street Improvements

**Location:**

Pine Street between Greensboro Street and Hillsborough Road

**Recommendations:**

- Construct a sidewalk on Pine Street between Greensboro Street and Hillsborough Road
- Provide high visibility crosswalks parallel to Greensboro Street and Hillsborough Road
- Provide a greenway / path between Pine Street and Carrboro Elementary School

**Project Type:**

Corridor / Greenway Improvement

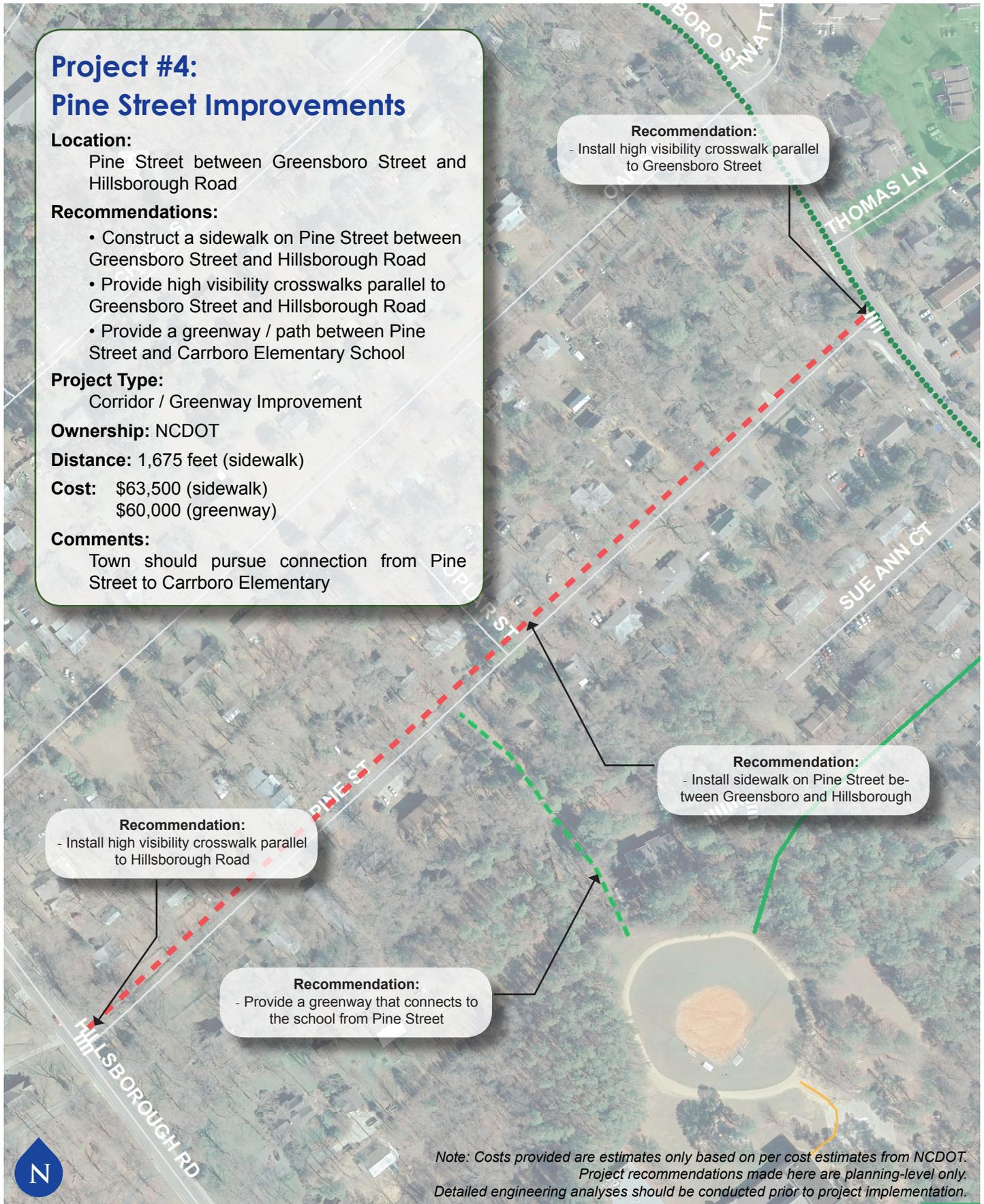
**Ownership:** NCDOT

**Distance:** 1,675 feet (sidewalk)

**Cost:** \$63,500 (sidewalk)  
\$60,000 (greenway)

**Comments:**

Town should pursue connection from Pine Street to Carrboro Elementary



**Recommendation:**  
- Install high visibility crosswalk parallel to Greensboro Street

**Recommendation:**  
- Install sidewalk on Pine Street between Greensboro and Hillsborough

**Recommendation:**  
- Install high visibility crosswalk parallel to Hillsborough Road

**Recommendation:**  
- Provide a greenway that connects to the school from Pine Street

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*



## Project #4: Pine Street Improvements

### *Importance*

Pine Street provides a convenient connection between Hillsborough Road and Greensboro Street. With a greenway between Pine Street and the Elementary School, children could have a safe, convenient connection to access the school property.

### *Recommended Solutions*

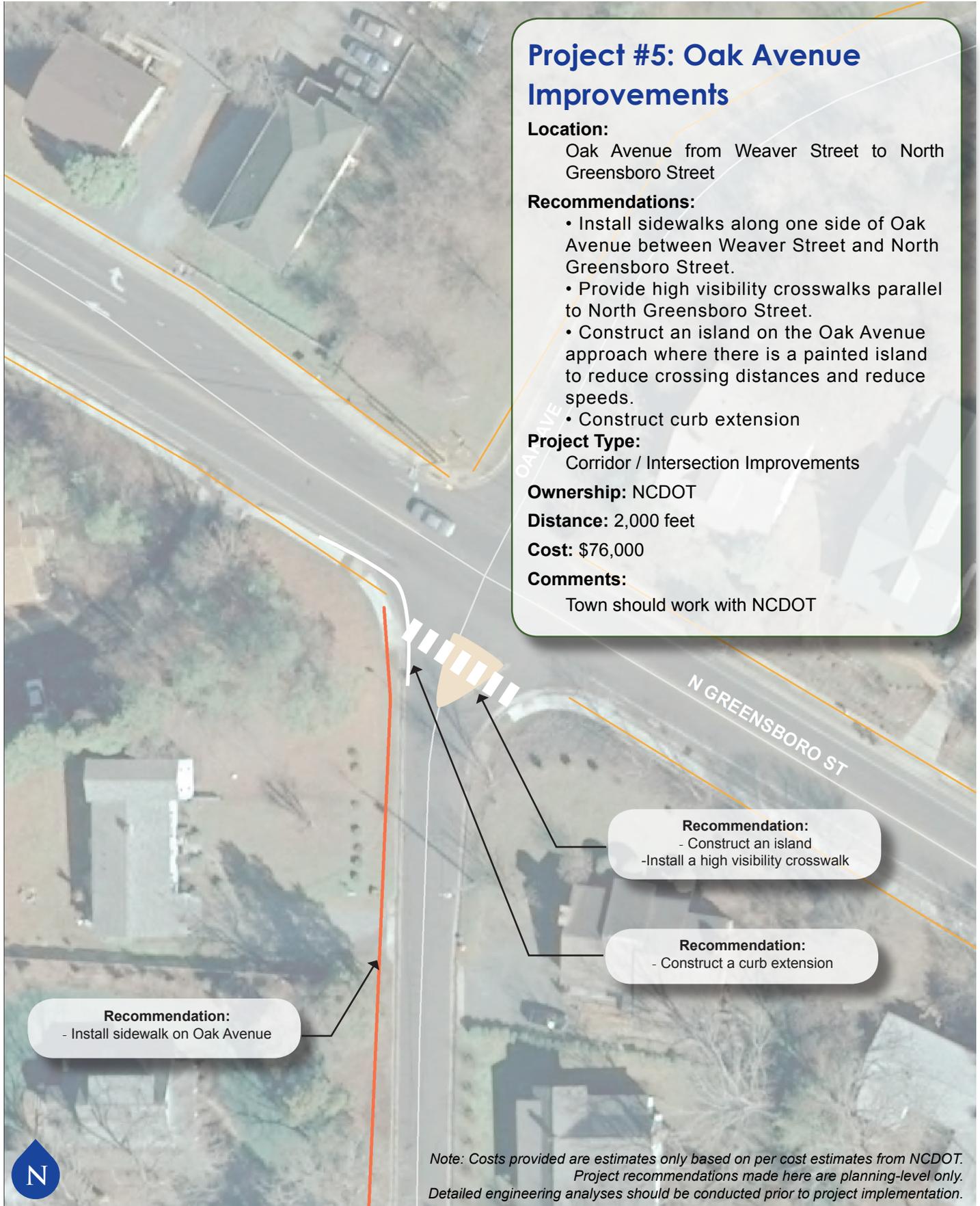
- Construct a sidewalk on Pine Street between Greensboro Street and Hillsborough Road.
- Provide high visibility crosswalks parallel to Greensboro Street and Hillsborough Road.
- Provide a greenway / path between Pine Street and Carrboro Elementary School.



*Pine Street currently has no sidewalks, but would be a perfect place for children to walk to school because of its proximity.*



*The Pine and Greensboro Street intersection also is in need of high visibility crosswalks.*



## Project #5: Oak Avenue Improvements

**Location:**

Oak Avenue from Weaver Street to North Greensboro Street

**Recommendations:**

- Install sidewalks along one side of Oak Avenue between Weaver Street and North Greensboro Street.
- Provide high visibility crosswalks parallel to North Greensboro Street.
- Construct an island on the Oak Avenue approach where there is a painted island to reduce crossing distances and reduce speeds.
- Construct curb extension

**Project Type:**

Corridor / Intersection Improvements

**Ownership:** NCDOT

**Distance:** 2,000 feet

**Cost:** \$76,000

**Comments:**

Town should work with NCDOT

**Recommendation:**  
- Install sidewalk on Oak Avenue

**Recommendation:**  
- Construct an island  
-Install a high visibility crosswalk

**Recommendation:**  
- Construct a curb extension

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #5: Oak Avenue Improvements

### *Importance*

Oak Avenue provides a connection between Weaver Street and North Greensboro Street. There is currently sidewalk on one side of Oak Avenue on the opposite side of North Greensboro Street. Bicycle incidents have been reported at the Oak Avenue / North Greensboro Street intersection. The west side of Oak Avenue at this location has a wide approach with large turning radii. The extra width in the driveway coupled with the wide turning radius encourages vehicles to make a fast turn. There is currently an island painted on the pavement which provides no physical barrier for vehicles. There are no marked crossings at this intersection.

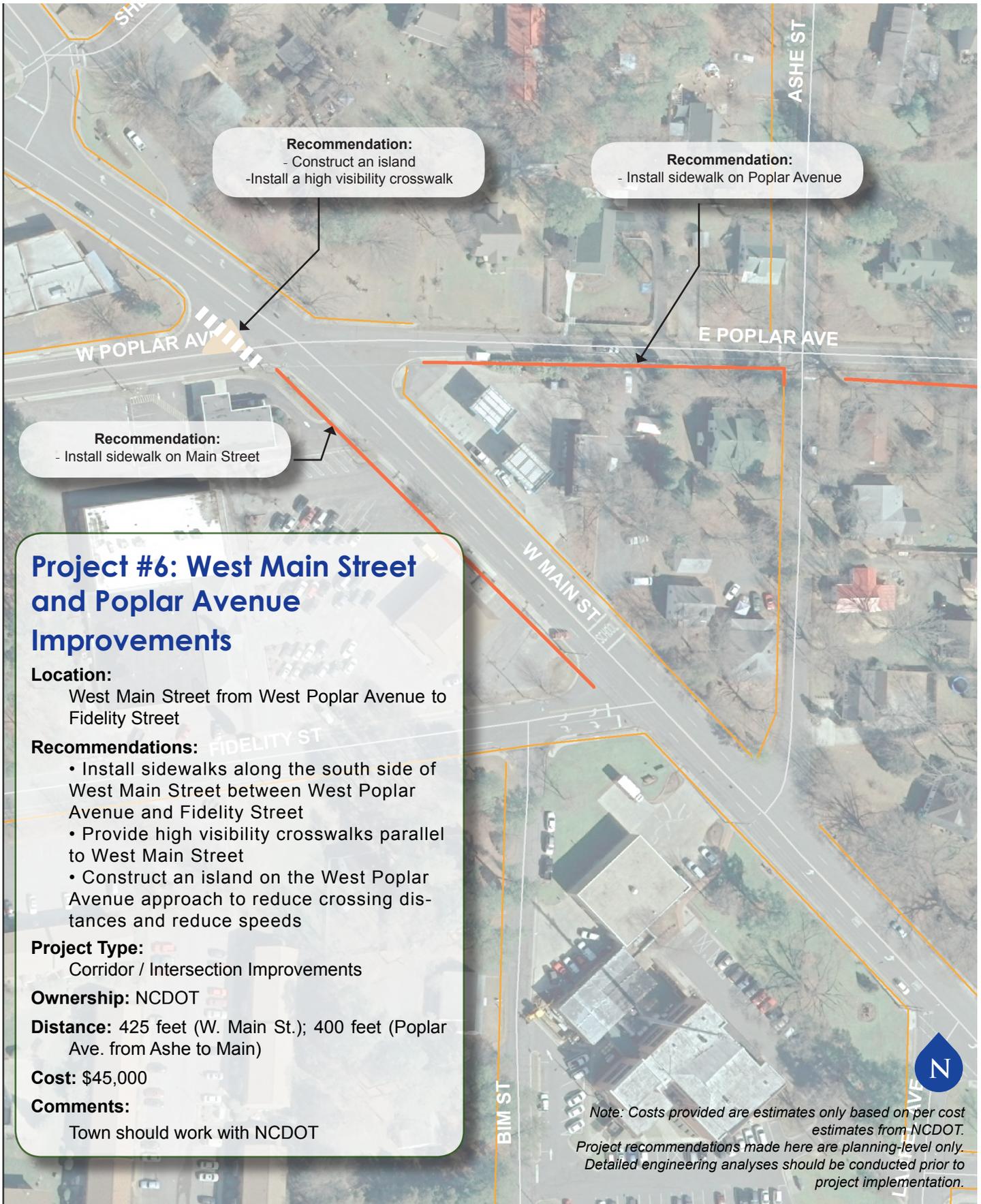
### *Recommended Solutions*

- Install sidewalks along one side of Oak Avenue between Weaver Street and North Greensboro Street.
- Provide high visibility crosswalks parallel to North Greensboro Street.
- Construct an island on the Oak Avenue approach where there is a painted island to reduce crossing distances and reduce speeds. Also, construct a curb extension to tighten curb radius.



*Oak Avenue currently has a very large turning radius onto N Greensboro Street, making the roadway an abnormally wide distance for pedestrian to cross. In the photo rendering below, a refuge median island and high visibility crosswalks are installed, as well as a sidewalk on Oak Avenue, making this a much safer place for pedestrians.*





## Project #6: West Main Street and Poplar Avenue Improvements

**Location:**

West Main Street from West Poplar Avenue to Fidelity Street

**Recommendations:**

- Install sidewalks along the south side of West Main Street between West Poplar Avenue and Fidelity Street
- Provide high visibility crosswalks parallel to West Main Street
- Construct an island on the West Poplar Avenue approach to reduce crossing distances and reduce speeds

**Project Type:**

Corridor / Intersection Improvements

**Ownership:** NCDOT

**Distance:** 425 feet (W. Main St.); 400 feet (Poplar Ave. from Ashe to Main)

**Cost:** \$45,000

**Comments:**

Town should work with NCDOT

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #6: West Main Street and Poplar Avenue Improvements

### *Importance*

West Main Street has significant pedestrian activity. Currently there is no sidewalk on the south side between West Poplar Avenue and Fidelity Street. Constructing this section of sidewalk would fill a significant gap in this sidewalk corridor on the south side of West Main Street.

Poplar Avenue currently intersects West Main Street at a skewed angle. Due to the skew, the approaches at East and West Poplar Street are excessively wide with large turning radii. The extra width in the roadway coupled with the wide turning radius encourages vehicles to make a fast turn. This poses the biggest concern for vehicles headed east on West Main Street since they will not have to slow down much to access West Poplar Avenue. The large turning radius on the north side of the street is not as critical since East Poplar Avenue is one-way going east (cars cannot access West Main from this direction). Additionally, there are no marked crossings at this intersection to make drivers more alert to pedestrians.

### *Recommended Solutions*

- Install sidewalk along the south side of West Main Street between West Poplar Avenue and Fidelity Street.
- Provide high visibility crosswalks parallel to West Main Street.
- Construct an island on the West Poplar Avenue approach to reduce crossing distances and reduce speeds.



*The intersection of Poplar Avenue and West Main Street has a large turning radius, and therefore is a very wide intersection. A crosswalk, a median island, and sidewalk additions would help pedestrians cross more safely at this location.*

## Project #7: West Main Street Road Diet

**Location:**

West Main Street between Shelton Street and Weaver Street

**Recommendation:**

- Reduce existing 4-lane cross section to a 3-lane section with bicycle lanes.

**Project Type:**

Corridor Improvements

**Ownership:** NCDOT

**Distance:** 1,200 feet

**Cost:** \$8,000 (restripe)

**Comments:**

This improvement is currently being considered by NCDOT.

**Recommendation:**  
- Reduce existing 4-lane cross section to a 3-lane section with bicycle lanes.

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #7: West Main Street Road Diet

### *Importance*

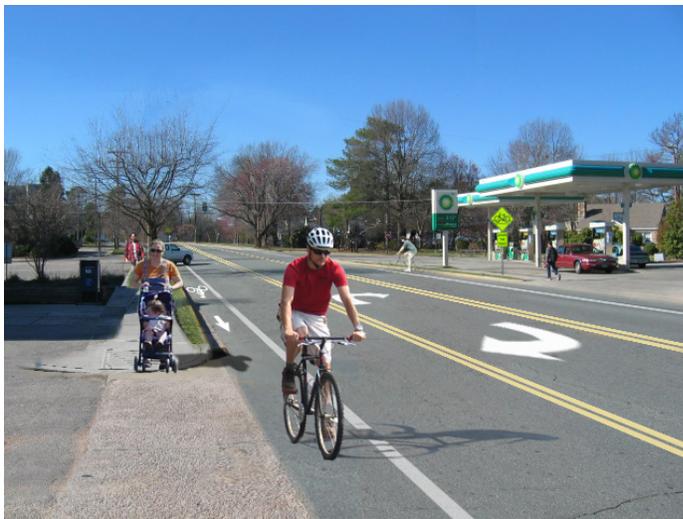
West Main Street is a primary roadway through Carrboro, providing access between NC 54 and Jones Dairy Road. It is also just west of Carrboro Elementary School and is a route that is used by students and parents walking or bicycling to and from school. A majority of the roadway is currently a 2-lane section, but this short section of roadway has additional width to accommodate a 4-lane section. The 2009 average daily traffic volume reported by NCDOT is approximately 4,500 vehicles per day. Therefore, the traffic volumes could be accommodated by the proposed cross section. Due to the high number of cyclists, the recommended cross section would provide a safer travel way by separating the bicycles from traffic.

### *Recommended Solutions*

- Reduce the existing 4-lane cross section to a 3-lane cross section with bicycle lanes.
- Evaluate the area for potential locations for pedestrian refuges.

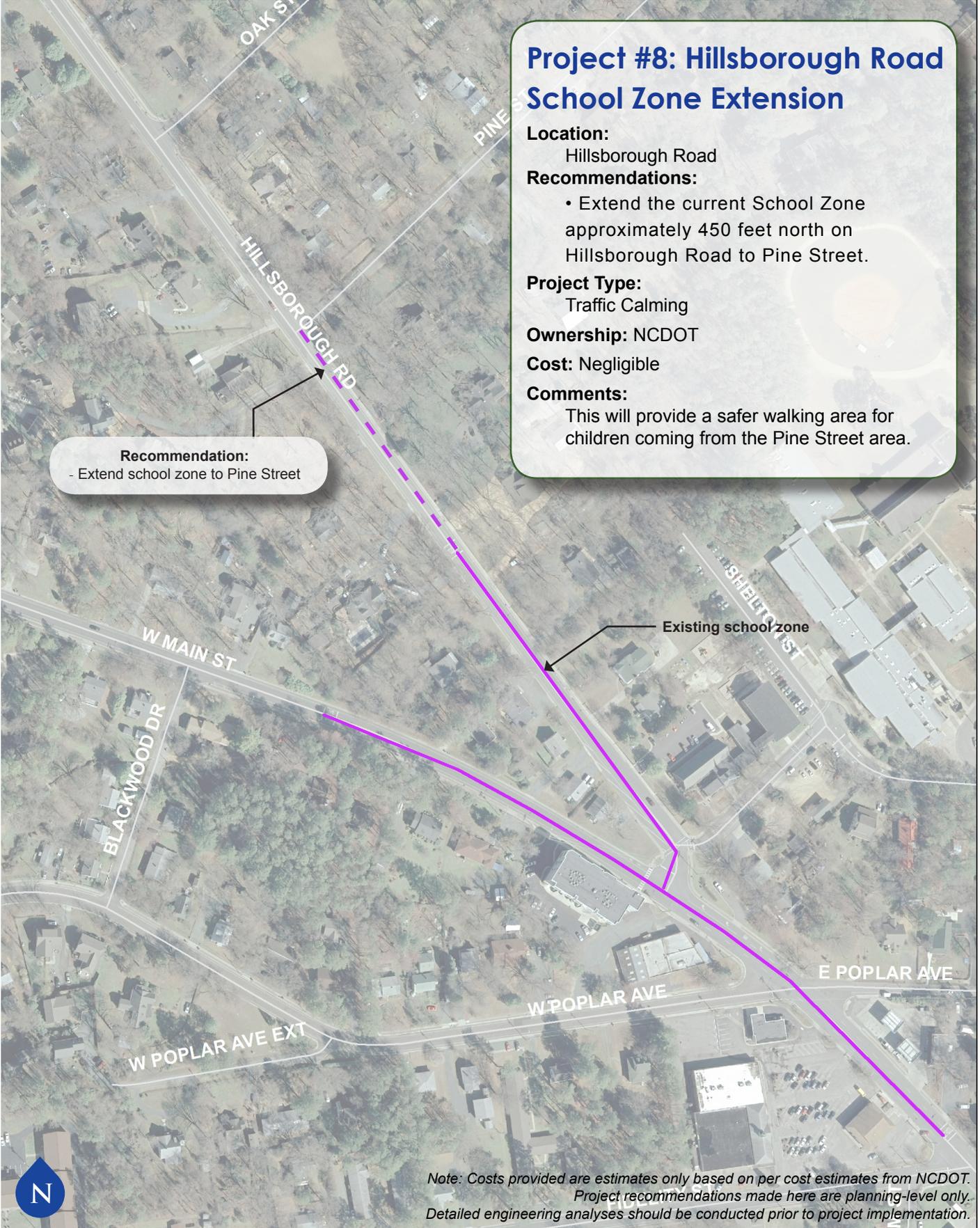


*Existing conditions along West Main Street.*



*Improvements could be made with a road diet and striping for bicycle lanes.*

*(Above photo renderings from Carrboro Bicycle Transportation Plan)*



### Project #8: Hillsborough Road School Zone Extension

**Location:**  
Hillsborough Road

**Recommendations:**

- Extend the current School Zone approximately 450 feet north on Hillsborough Road to Pine Street.

**Project Type:**  
Traffic Calming

**Ownership:** NCDOT

**Cost:** Negligible

**Comments:**  
This will provide a safer walking area for children coming from the Pine Street area.

**Recommendation:**  
- Extend school zone to Pine Street

Existing school zone

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #8: Hillsborough Road School Zone Extension

### *Importance*

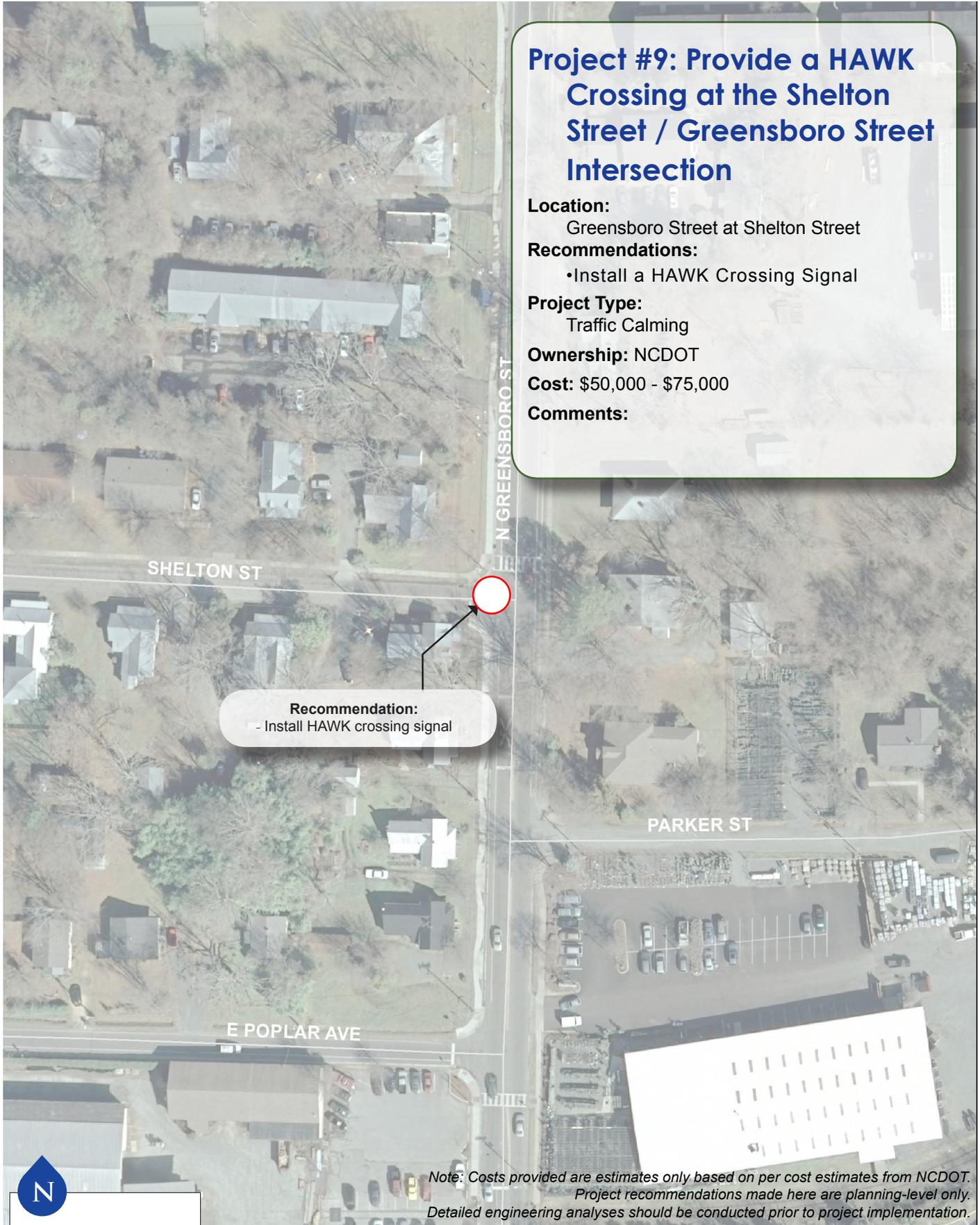
Students are walking along and across Hillsborough Road well outside of the current school zone. Citizens requested an extension of this zone during the public workshop for this planning process.

### *Recommended Solutions*

- Extend the current School Zone approximately 450 feet north on Hillsborough Road to Pine Street.



*A flashing sign alerts drivers to the current school zone on Hillsborough Street.*



### Project #9: Provide a HAWK Crossing at the Shelton Street / Greensboro Street Intersection

**Location:**  
Greensboro Street at Shelton Street

**Recommendations:**  
• Install a HAWK Crossing Signal

**Project Type:**  
Traffic Calming

**Ownership:** NCDOT

**Cost:** \$50,000 - \$75,000

**Comments:**

**Recommendation:**  
- Install HAWK crossing signal

*Note: Costs provided are estimates only based on per cost estimates from NCDOT. Project recommendations made here are planning-level only. Detailed engineering analyses should be conducted prior to project implementation.*

## Project #9: Provide a HAWK Crossing at the Shelton Street / Greensboro Street Intersection

### *Importance*

Carrboro residents are walking regularly along and across Greensboro Street in this area. It is the priority of the Town and the SRTS Advisory Committee to enhance the pedestrian crossing at Shelton Street.

### *Recommended Solutions*

- Install HAWK signal for crossing of Greensboro Street at Shelton Street.



*Greensboro Street is regularly crossed by pedestrians at the intersection of Shelton Street.*