

NC 86 / Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Town of Chapel Hill, North Carolina
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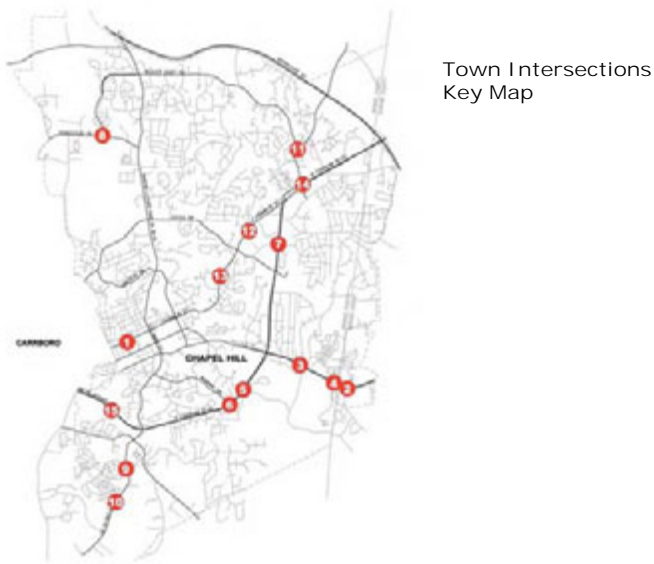
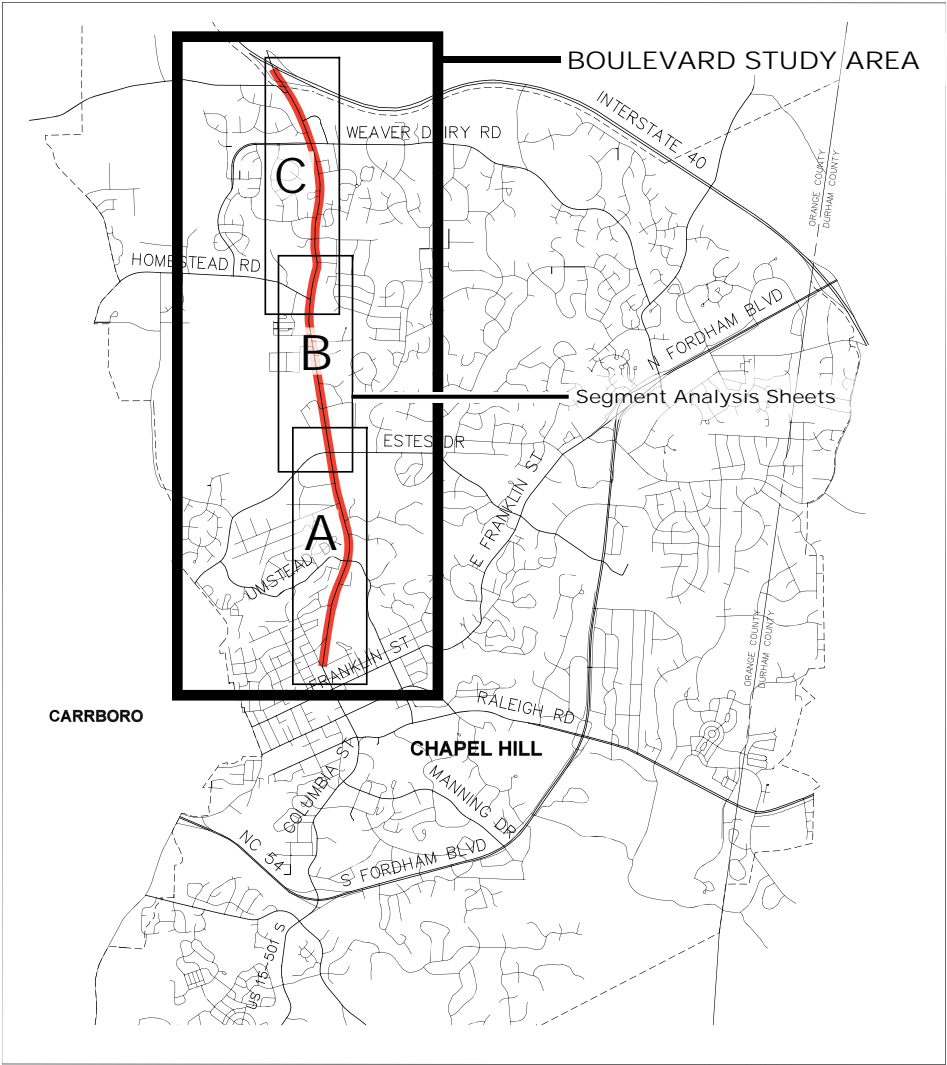


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Purpose and Goals of this Study

In August, 2004, the Highway Safety Research Center of the University of North Carolina published the *NC86/ Airport Road Pedestrian and Bicycle Safety and Mobility Study*, which identified critical safety and access problems for pedestrians, bicyclists, and transit users along a four-mile stretch of NC Highway 86. In addition, the study proposed numerous treatments for the corridor to improve conditions for walking, biking, and transit in a streetscape that is now largely dominated by automobile traffic. NC Highway 86 has since been renamed Martin Luther King Jr. Boulevard.

In April 2006, the Town of Chapel Hill retained a team of consultants from the traffic engineering, planning, and landscape architecture disciplines to study the feasibility of the treatments proposed in the Mobility Study.

The goal of this study is as follows:

- to test the treatments proposed in the earlier report against the specific conditions found in the corridor such as existing road widths, topography, and regulatory constraints.
- to make recommendations for improvements based on the findings of the earlier report and display those recommendations in a series of plan drawings and other graphics.
- to present their recommendations to the public at an open forum and to the Town Council for review.

Method

In spring and summer of 2006, representatives from Lappas+Havener, PA and Ramey Kemp & Associates conducted site visits and noted deficiencies, hazards, and site constraints throughout the corridor. On base maps generated from GIS and aerial photo information provided by the Town, the planning team produced a series of diagrams to document existing conditions in plan format. The team took field measurements at selected locations to confirm dimensions. After consultation with Ramey Kemp about the feasibility of various alternatives from a traffic engineering standpoint, the team developed a series of recommendations for realizing many of the measures proposed by the Mobility Study. These recommendations were drafted on the plan sheets included here and presented to Town staff for review. After revisions, the plans were presented at a public forum for review.

Structure of this Study

This study is divided into two parts.

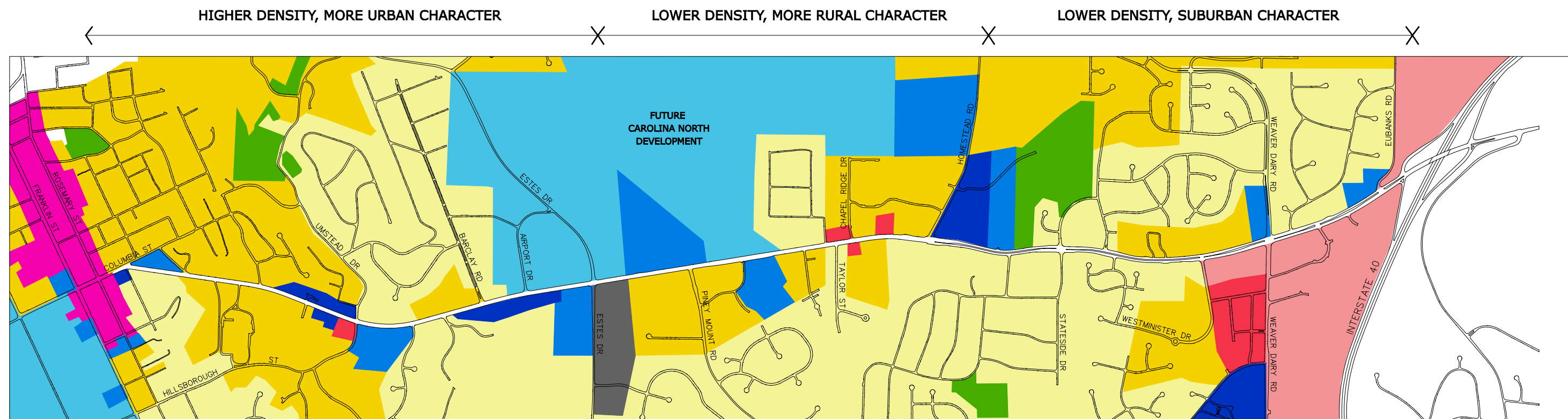
Part I analyses and makes recommendations for the Martin Luther King Jr. Corridor, and Part II presents recommendations for fourteen intersections throughout the Town.

Part I, dealing with the Martin Luther King Jr. Boulevard Corridor, is divided into Analysis and Recommendations portions. Analysis information is presented first at the scale of an overview of the entire corridor, and then in greater detail in three sheets that break the four mile corridor into Segments A, B, and C. Following this documentation of existing conditions, recommendations are presented in a series of 1"=50' scale plan sheets that further break down the A, B, and C segments. Finally, the recommendations are illustrated with perspective drawings in which proposed improvements are keyed to the plans by number.

Part II, dealing with Town intersections, describes recommended improvements through a series of plan graphics. Part II is described in more detail in the Introduction to Part II.

NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Introduction



LEGEND

- LOW DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- OFFICE
- INSTITUTIONAL
- UNIVERSITY
- COMMERCIAL
- MIXED USE
- TOWN CENTER
- PARKS / OPEN SPACE
- AIRPORT HAZARD

Land use in the Martin Luther King, Jr. Boulevard (the Boulevard) Corridor ranges in general from higher density residential in the first half-mile north of Columbia Street, to lower-density residential north of Umstead Drive. Pockets of office, commercial, and higher-density residential also occur in a patchwork fashion throughout the corridor. Near Interstate 40, recent large-scale commercial development has taken place. Between the automobile-oriented activity of this development and the older neighborhoods close to the Town four miles south, most of the corridor has either a suburban or even rural feel, depending on the age and nature of adjoining development.

Most buildings, whether residential, office, commercial, or institutional, are either set well back from the Boulevard or do not face it at all, but rather are oriented to surrounding neighborhoods, parking lots, or adjacent streets. This largely suburban pattern of building orientation is the predominant "look" of the street, except in the half-mile south of the Bolin Creek bridge, where a prewar development pattern of houses facing the street can be seen.

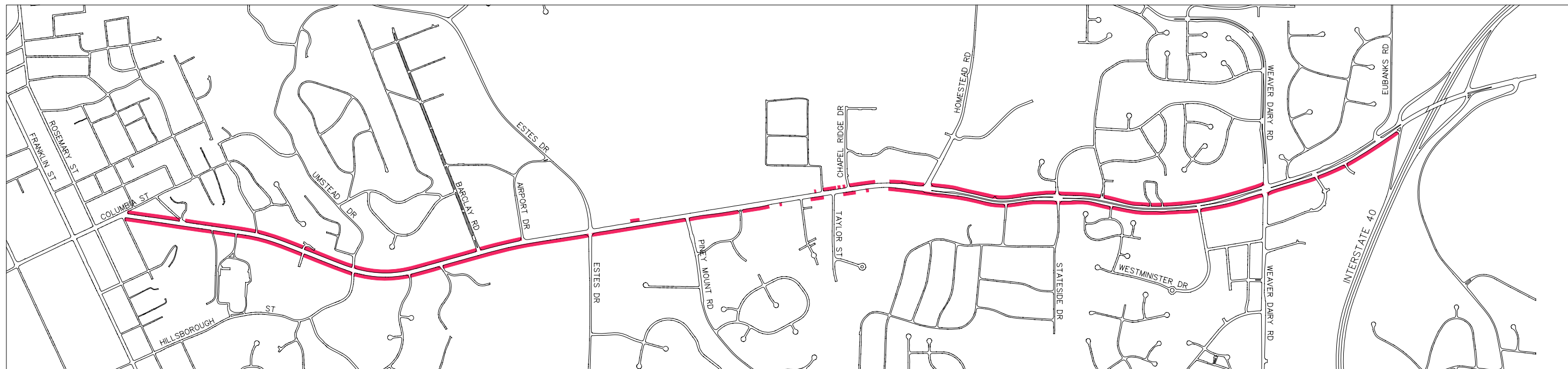
The future development of Carolina North, a new campus of UNC Chapel Hill slated for the old Airport site, will have a significant impact on the character of the middle third of the corridor. Some early proposals have called for utilizing the Boulevard as a "Main Street," thus orienting buildings toward it. Whether this pattern or a more suburban model is chosen will influence the future form of not only the Boulevard but also of other developments nearby.

NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Lappas + Havener, PA LANDSCAPE ARCHITECTS
Ramey Kemp & Associates, Inc. Transportation Engineering

Existing Land Use





LEGEND

— EXISTING SIDEWALKS

Concrete sidewalks line the Boulevard on the northernmost and southernmost thirds of its length, whereas the middle third of the Boulevard generally has either discontinuous sidewalks or none at all.

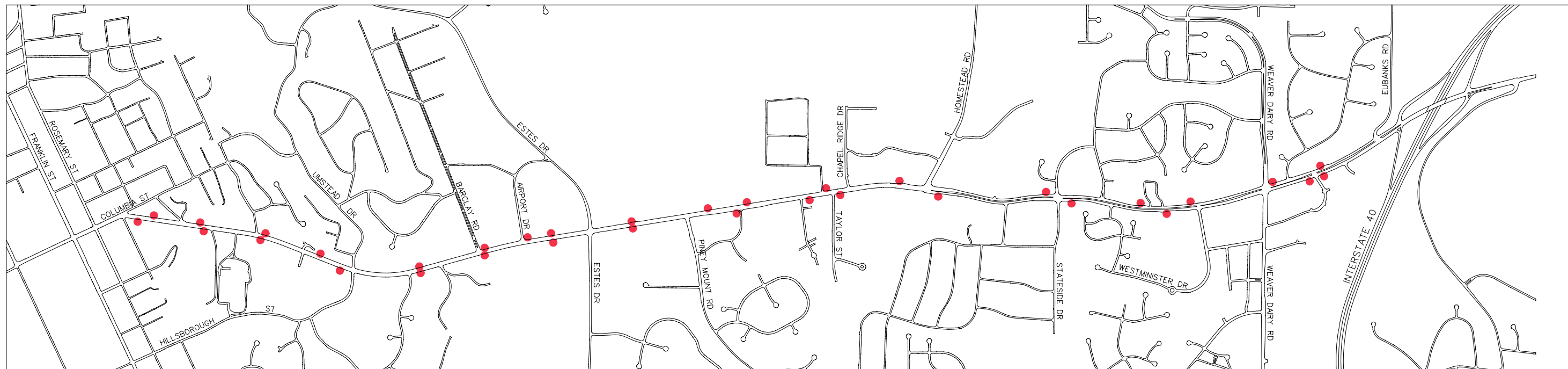
Where they exist, sidewalks are typically five feet wide and are usually separated from the curb by a 24-30" grassed strip. Some sidewalks in the southern third are placed directly behind the curb, with no grassed strip. Between Umstead Drive and Estes Drive, the sidewalk on the east side of the street is about seven or eight feet wide, and heavily used by pedestrians and joggers. Pedestrian use in the northern two-thirds is lighter than in the southern third, and tends to be related to the use of the Town's transit system.

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Lappas + Havener, PA LANDSCAPE ARCHITECTS
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Existing Sidewalks





LEGEND

- BUS STOPS

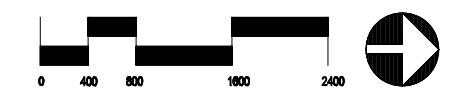
Especially when UNC classes are in session, use of the transit system is heavy during am and pm peak periods. Insufficient benches and lack of waiting room at many stops is evident many mornings as crowds of bus riders fill the sidewalk in many locations. Where they exist, many benches are sited uncomfortably close to the road, or are in poor condition.

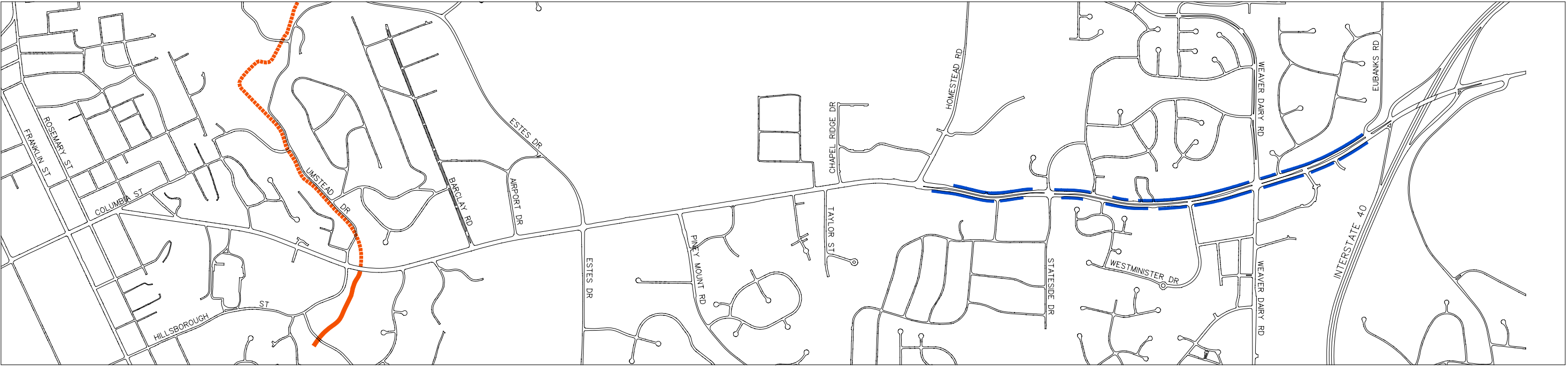
The lack of sufficient crosswalks in the vicinity of the bus stops means that many riders cross the road at mid block locations either while going to their stop or returning home.

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Lappas + Havener, PA LANDSCAPE ARCHITECTS
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Existing Bus Stops





LEGEND

- EXISTING BIKE LANES
- BOLIN CREEK GREENWAY (EXISTING)
- BOLIN CREEK GREENWAY (PROPOSED)

Four-foot-wide bike lanes have been striped from Homestead Road north to Eubanks Road as part of the recent Boulevard widening project. The rest of the corridor lacks bike lanes, though bicyclists can utilize a wide right lane, ranging from 14 to 17 feet wide, in the southern two-thirds of the corridor. Wrong-way and sidewalk bicycle riding occurs throughout the corridor, especially in the vicinity of the Bolin Creek Greenway trailhead near Umstead Drive. The Town is planning a future connection of this greenway underneath the roadway and extending west along the Creek. This extension would include a sidewalk connection from the west sidewalk to the trail. If preliminary design is approved, this connection could be constructed by midsummer of 2008.

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Existing Bike Lanes and Trails





LEGEND:

- INTERSECTION W/ SIGNAL
- MULTIPLE CURB CUTS/DRIVEWAYS
- SIGHTLINE ISSUE
- MEDIAN

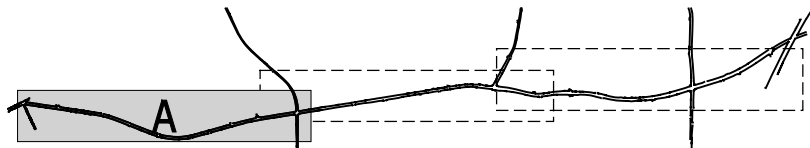
In its southern two-thirds, the Boulevard is a four-lane roadway with a two-way left turn lane, with no median. North of Homestead Road, in the northern third, a variable-width median has been added, in which some trees have been planted. Sight distances are limited by vegetation and by vertical and horizontal curves in several locations in the southern third of the corridor. A few sites along the corridor – primarily gas stations and commercial strips – have multiple driveways that could be consolidated to clarify circulation and make pedestrian passage safer.

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Existing Vehicular Traffic

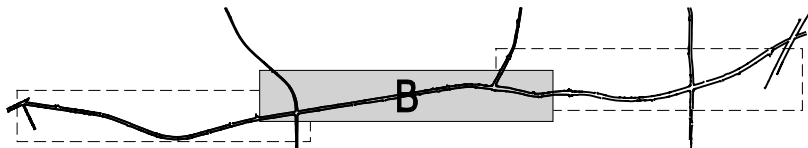




SEGMENT A



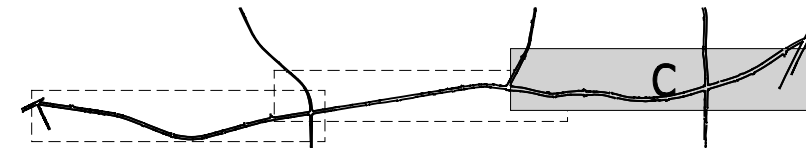
VIEW SOUTH NEAR NORTHAMPTON TERRACE APARTMENTS



SEGMENT B



VIEW SOUTH FROM HOMESTEAD ROAD



SEGMENT C



VIEW SOUTH NEAR WESTMINISTER DRIVE



NARROW SIDEWALK
NEAR BOLIN CREEK



IRREGULARLY ORIENTED
SIDEWALK



STEEP SIDE SLOPE
NEAR UMSTEAD ROAD



WORN FOOTPATH NEAR
BUS STOP AT TIMBER
HOLLOW APARTMENTS



SIDEWALK LACKING
PAVED CONNECTION
NEAR HOMESTEAD ROAD



SIDEWALK LACKING
PAVED CONNECTION
NEAR NORTHFIELD DRIVE



BUS STOP WITHOUT
BENCH NEAR
WESTMINISTER DRIVE



NARROW PLANTING STRIP
BORDERING SIDEWALK



NO PEDESTRIAN REFUGE
LOCATED IN CROSSING

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Lappas + Havener, PA LANDSCAPE ARCHITECTS
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Boulevard Character Images

Key

Bus stop with shelter and bench

Bus stop with sign and bench only

Bus stop with sign only

Limited sight distance location

Multiple driveway location

Curb ramp not in conformance with ADA

Sidewalk not present

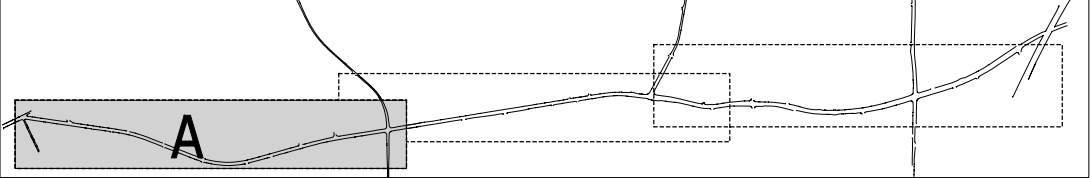
Mid-block jaywalking hazard location

Signalized intersection

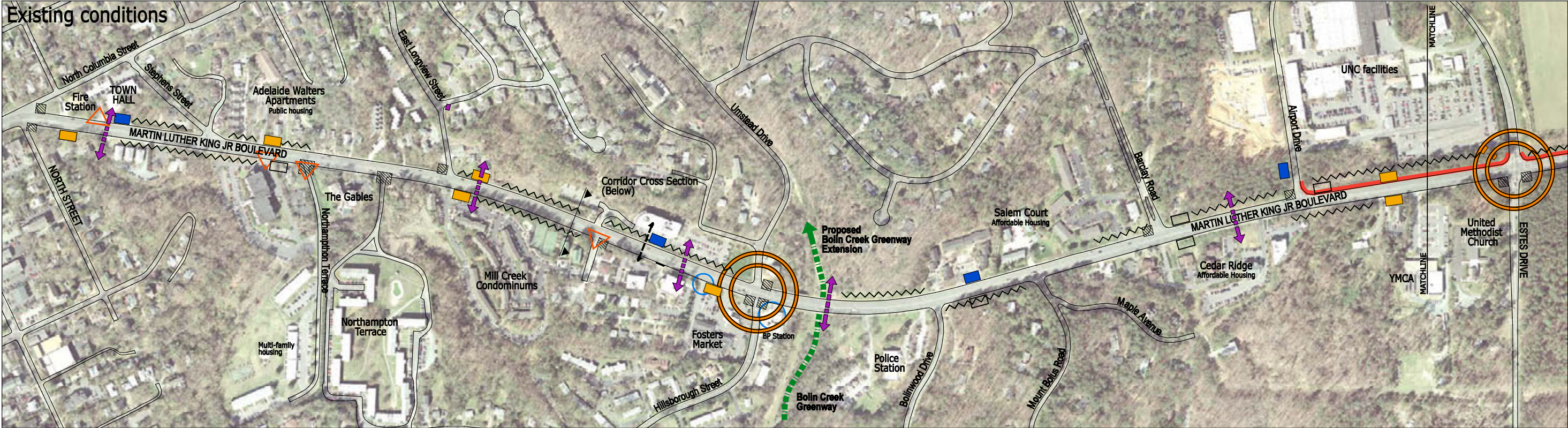
Signalized intersection with pedestrian signals

Steep slope adjacent to road or sidewalk

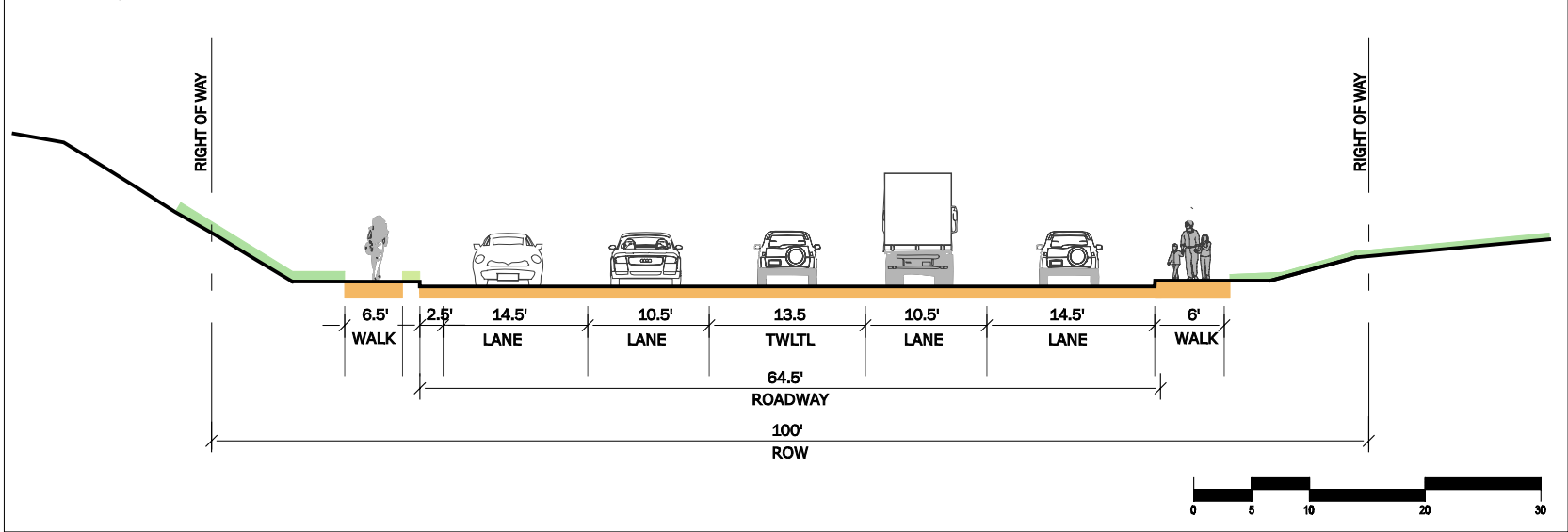
Location Map not to scale



Existing conditions



Existing Cross Section



TRANSIT SYSTEMS

Bus stops are located roughly every 300 feet. Conditions of facilities vary widely; some stops are furnished with shelters and benches and are well lighted. However, more than half are designated only by a sign with no benches. Where present, benches are sited too close to the road or sidewalk.

PEDESTRIAN SYSTEMS

Sidewalks are either "monolithic" (attached to the back of curb), or separated from the curb and roadway by a thin, two-foot-wide grass strip. This lack of adequate separation contributes to an uncomfortable pedestrian experience along much of the segment. Substandard curb ramps and numerous curb cuts for driveways also make use of the sidewalks challenging. Runners make good use of the newer, 8' wide sidewalk on the east side of the street near the Bolin Creek Greenway to access that trail.

BICYCLE SYSTEMS

This segment does not have bike lanes, and bicycles must share the wider outer lanes with motorists. Bicyclists often use sidewalks here, particularly near the Bolin Creek Greenway access. The proposed extension of this greenway to the southwest will provide an alternate route for bicyclists heading to the Town center and the Campus.

VEHICULAR SYSTEMS

This segment consists of two vehicular lanes in each direction with a central two-way left turn lane (TWLTL), with no median, and with curbs on both sides. The speed limit is posted at 35 mph. Primary intersections occur at North Columbia Street, Hillsborough St/Umstead Road, and Estes Drive. Vehicles tend to increase speed when approaching the bridge over Bolin Creek from either direction.

LANDSCAPE AND CONTEXT

This segment has more spatial constraints than the more northerly segments, owing to the older age, finer grain, and higher density of adjacent development. Buildings are closer to the roadway here than in the other two segments. In addition, steep side slopes flank much of the roadway in this segment. Any significant widening of the corridor here would require extensive retaining wall construction and thereby incur significant costs.

NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

ANALYSIS
Segment A: North Street to Estes Drive



Key

Bus stop with shelter and bench

Bus stop with sign and bench only

Bus stop with sign only

Limited sight distance location

Multiple driveway location

Curb ramp not in conformance with ADA

Sidewalk not present

Mid-block jaywalking hazard location

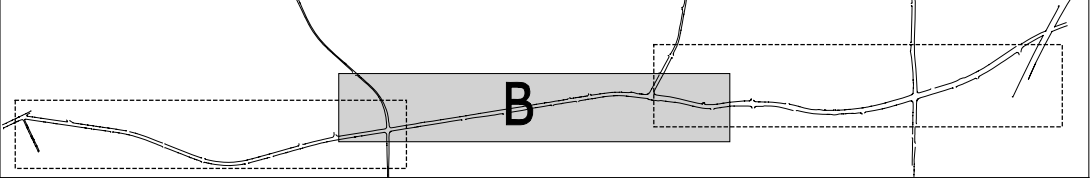
Signalized intersection

Signalized intersection with pedestrian signals

Steep slope adjacent to road or sidewalk

Existing bus pullouts

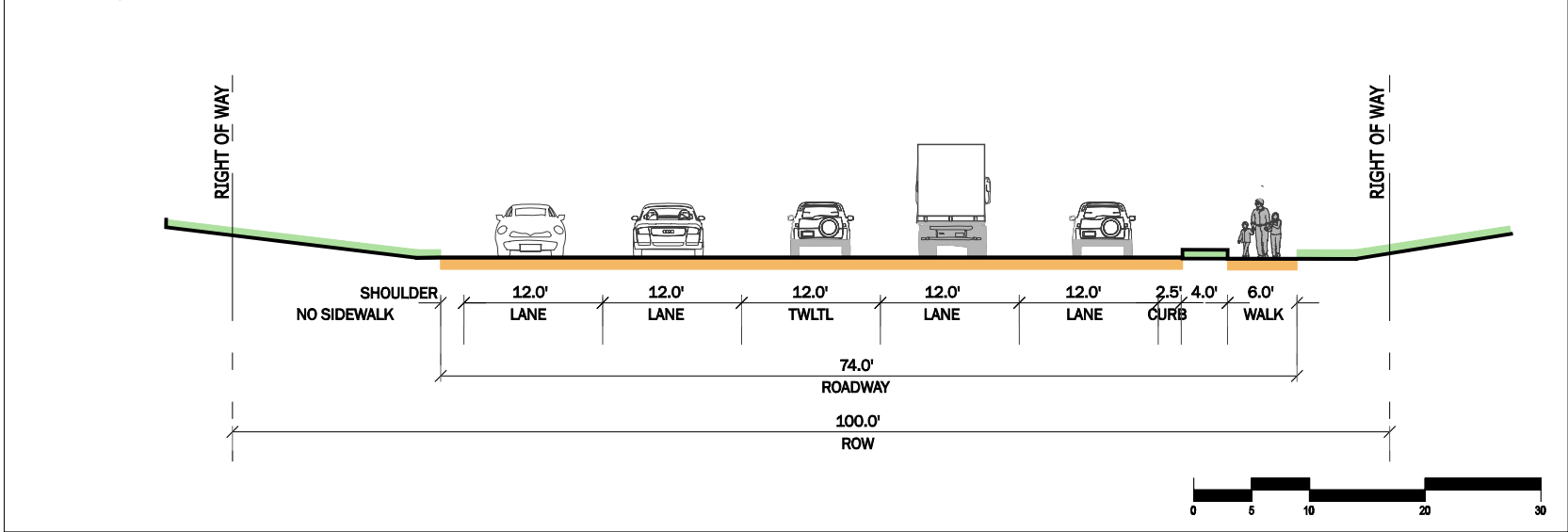
Location Map not to scale



Existing conditions



Existing Cross Section



TRANSIT SYSTEMS

Many bus stops lack shelters and benches. Accessing the stops on the west side of the street is difficult because of a lack of sidewalks there. Southbound bus rides from neighborhoods east of the corridor often cross at midblock locations to get to the bus stop.

PEDESTRIAN SYSTEMS

Most of the west side of the street lacks sidewalks in this segment; pedestrians on the west side walk on the grass shoulder of the road. On the east side of the Boulevard, a gap in the sidewalk between Timber Hollow and Northfield Drive is particularly problematic. Estes Drive and Homestead Road intersections have pedestrian signals in on or two directions only, and not to cross Martin Luther King Jr. Boulevard itself.

BICYCLE SYSTEMS

There are no bike lanes in this segment. Outside vehicular lanes are about 14.5 feet wide, with a three to four-foot shoulder where no curbs exist.

VEHICULAR SYSTEMS

This segment consists of two vehicular lanes in each direction with a central two-way left turn lane (TWLTL), and no median. Most of the roadway is uncurbed. The speed limit is posted at 35 mph. Primary intersections occur at Estes Drive, Piney Mount Road, Northfield Drive, and Homestead Road.

LANDSCAPE AND CONTEXT

This zone is one of transition between the more rural and suburban areas north of Estes Drive and the denser and more "townlike" areas south of Estes Drive. Most buildings in this segment are set far back from the street, and the lack of sidewalks contributes to a rural feel. Past Piney Mount Road traveling south, the Town of Chapel Hill begins to appear to the south atop the opposite hill, where the University tower becomes visible.

The future Carolina North development will occur on the site of the old airport. This development will have a profound impact on the ultimate character of the M.L.K. Boulevard. If the development in configured to face the boulevard, an improved boulevard can support the goal of giving the development a "Main Street" appeal.

NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Segment B: Estes Drive to Homestead Road



Key

Bus stop with shelter and bench

Bus stop with sign and bench only

Bus stop with sign only

Limited sight distance location

Multiple driveway location

Curb ramp not in conformance with ADA

Sidewalk not present

Mid-block jaywalking hazard location

Signalized intersection

Signalized intersection with pedestrian signals

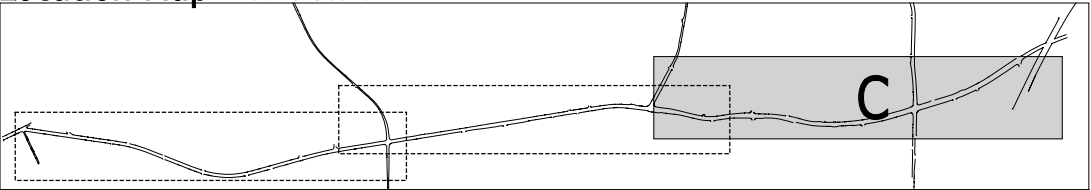
Existing bus pullouts

Steep slope adjacent to road or sidewalk

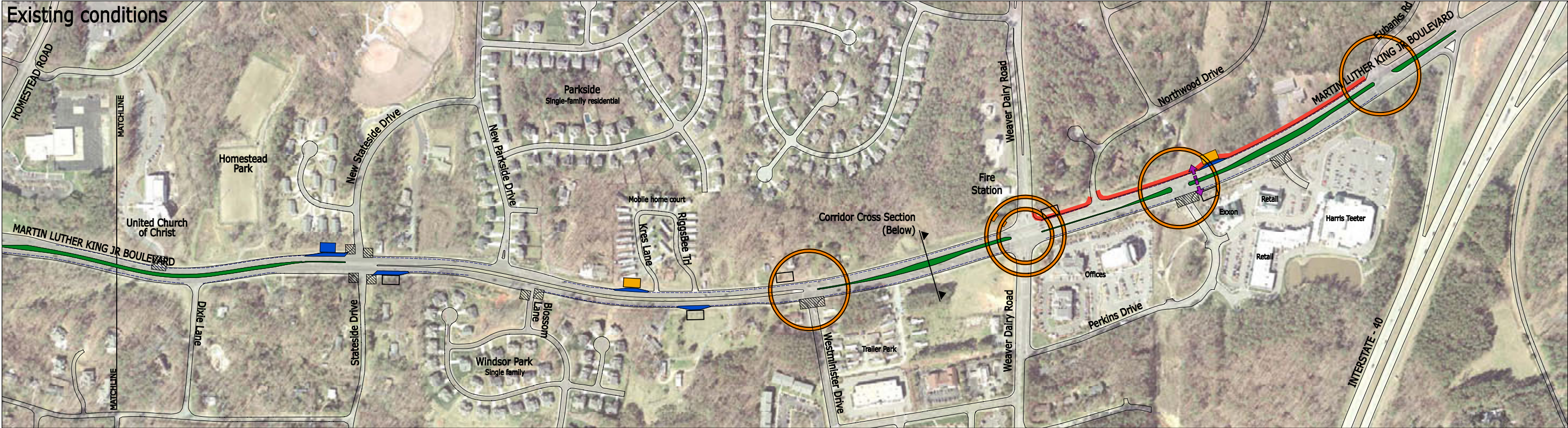
Median

Bike Lane

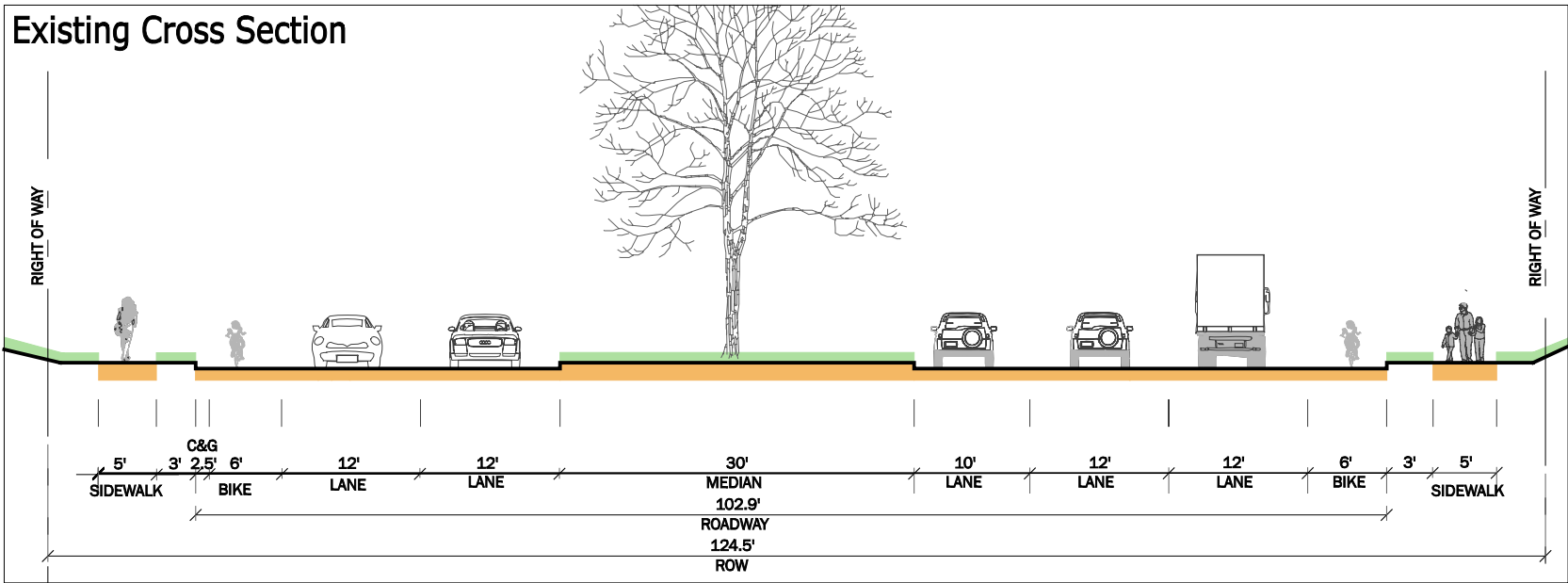
Location Map not to scale



Existing conditions



Existing Cross Section



NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Lappas + Havener, PA LANDSCAPE ARCHITECTS
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TRANSIT SYSTEMS

Roughly half the bus stops in the segment have no benches, and only one has a shelter. Stops are located 1100 feet apart on average. Bus pull-outs have been built at some stops as part of the recent roadwork in the segment.

PEDESTRIAN SYSTEMS

Pedestrian crossings have been striped only to cross side streets in the segment. Median pockets were not included in recent median construction. Five-foot sidewalks are separated from the curb by a 2 1/2 foot grassed strip. The sidewalks are recently constructed and in good condition. Many curb ramps do not conform to current ADA standards.

BICYCLE SYSTEMS

Four-foot bike lanes are provided on both sides of the roadway. These lanes do not run continuously through the intersections but are interrupted by right turn lanes. Despite the provision of bike lanes, some cyclists can be observed using the sidewalks, especially riding against the direction of traffic.

VEHICULAR SYSTEMS

The roadway provides two lanes in each direction separated by a variable-width median. Left-turn pockets are located at six intersections. Right-turn lanes occur at Stateside, Blossom, and Weaver Dairy Road. As a result, the roadway is typically wider here than in the segments further south.

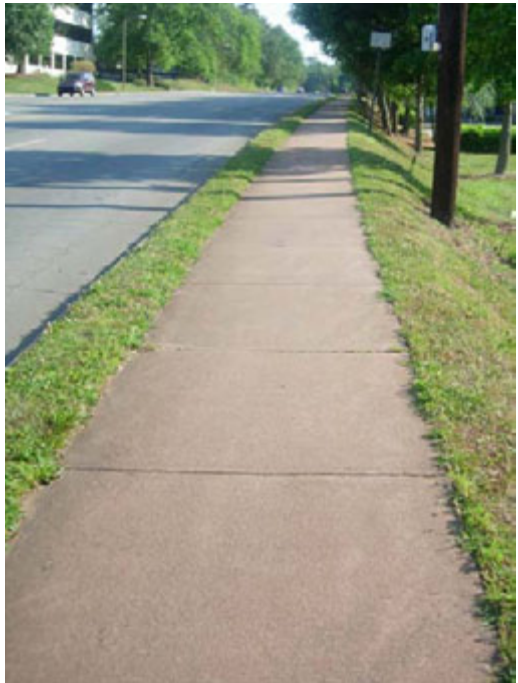
LANDSCAPE AND CONTEXT

The land use in the segment is predominantly single-family residential, with office and retail functions closer to Interstate 40. The corridor in this segment was recently widened and redesigned to accommodate increased vehicular traffic in this area. This redesign includes a median with lawn and primarily ornamental trees, though some larger species have also been planted in the widest median conditions.

ANALYSIS

Segment C: Homestead Road to Interstate 40





Recommendations: Overview

Following a review of the improvement measures recommended by the Pedestrian and Bicycle Mobility Study of 2004, and after an analysis of the physical features and traffic engineering requirements of the Boulevard, the planning team recommends the improvements illustrated on the following pages. The improvements, like those recommended in the Mobility Study, seek to improve conditions for pedestrians, bicyclists, and transit users in the corridor, and to enhance the overall appearance of the Boulevard.

In summary, this Study recommends the following:

- Construct ADA-compliant curb ramps where they are lacking throughout the corridor.
- Provide pedestrian signals where they are absent, especially crossing Martin Luther King Jr. Boulevard.
- Fill in gaps in existing sidewalk coverage to complete the sidewalk network.
- Stripe crosswalks at intersections.
- Construct sidewalks across driveways to provide a continuous walking surface.
- Construct sidewalks with 4' min. planting strips where possible, and wider where conditions permit tree planting.
- Provide median pockets to allow mid-block crossings where warranted by pedestrian activity.
- Construct stone retaining walls at back of walk to retain grade at steep side-slope conditions.
- Stripe 4' or 5' wide bike lanes on both sides of the street the entire length of the corridor; this width is exclusive of the width of the gutter.
- Construct bus pullouts at selected locations.
- Replace benches at bus stops with durable, attractive, standardized furnishings; provide at least two benches at stops that are busy during the morning rush hour.
- Widen the Boulevard at intersections to allow for U-turns and for 8' wide minimum pedestrian refuge areas in the median.
- Stripe 11' wide travel lanes on the Boulevard from Columbia north to Homestead Road.
- Construct a planted, raised median, and include trees where possible in median planting.
- Narrow curb radii at intersections to 25 feet maximum where feasible to shorten pedestrian crossing distances.
- Improve lighting in the corridor, with a focus on intersections, mid-block crossing locations, and other high pedestrian use areas.

Some of the above measures, such as completing the sidewalk network and updating curb ramps to ADA-compliant standards, can be achieved at relatively little cost and pursued immediately. Other measures, such as widening the Boulevard at intersections and providing a raised median, will require further study based on information such as ground survey, traffic counts, and midblock crossing warrant studies.

Among the “big-ticket” items that will create the most benefit for pedestrians, bicyclists, and transit users are the creation of a raised median, striping of bike lanes, and narrowing of vehicular lanes. These measures will all contribute to an actual and perceived narrowing of drive lanes, which will encourage slower driving. A raised median will eliminate many of the conflict points that currently obtain in the corridor as a result of a continuous two-way left-turn lane. A median can also provide pedestrian refuge areas at intersections and midblock crossing locations that reduce crossing length.

For the southern two-thirds of the corridor where no median currently exists, the implications of providing a raised median are the following:








- Since the median would be continuous with gaps only at major intersections, U-turns would have to occur at those intersections. To enable these U-turns, some widening of intersections would be required.
- This Study recommends providing a pedestrian refuge of 8 feet minimum at major intersections. The roadway widening at intersections would also make this provision possible.
- This study also recommends four-foot bike lanes adjacent to a two-foot concrete gutter that is not a part of the bike lane. Ideally, the Boulevard would be widened along much of its length to provide both a twelve to twenty-foot median as well as bike lanes. However, this study suggests that with an eight-foot median, both a median and bike lanes can be provided without moving curbs. Since eight feet is a minimum practicable width for a grassed median, the exact dimensions of the existing roadway are critical in determining the feasibility of this option. Precise ground survey is beyond the scope of the present Study. Dimensions given on these plans are based on rough field measurements only.
- If the option of a continuous median is not pursued, this Study recommends that smaller medians, with median pockets, be provided to allow for midblock crossings of pedestrians at selected locations. Locations of these items are indicated on the plans following. Median pockets will require further study in the form of a MUTCD Warrant Study to determine whether conditions are appropriate for their construction.

All changes to the Boulevard within the Right of Way are subject to the review and approval authority of NCDOT, who is the owner of the Boulevard. That agency has been informed of this study and should continue to be a part of any proposal to modify the existing roadway and associated facilities.

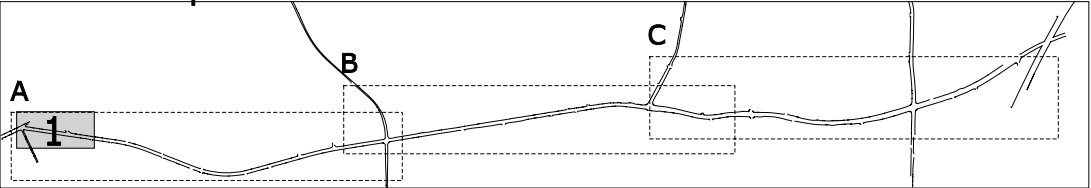
NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Recommendations

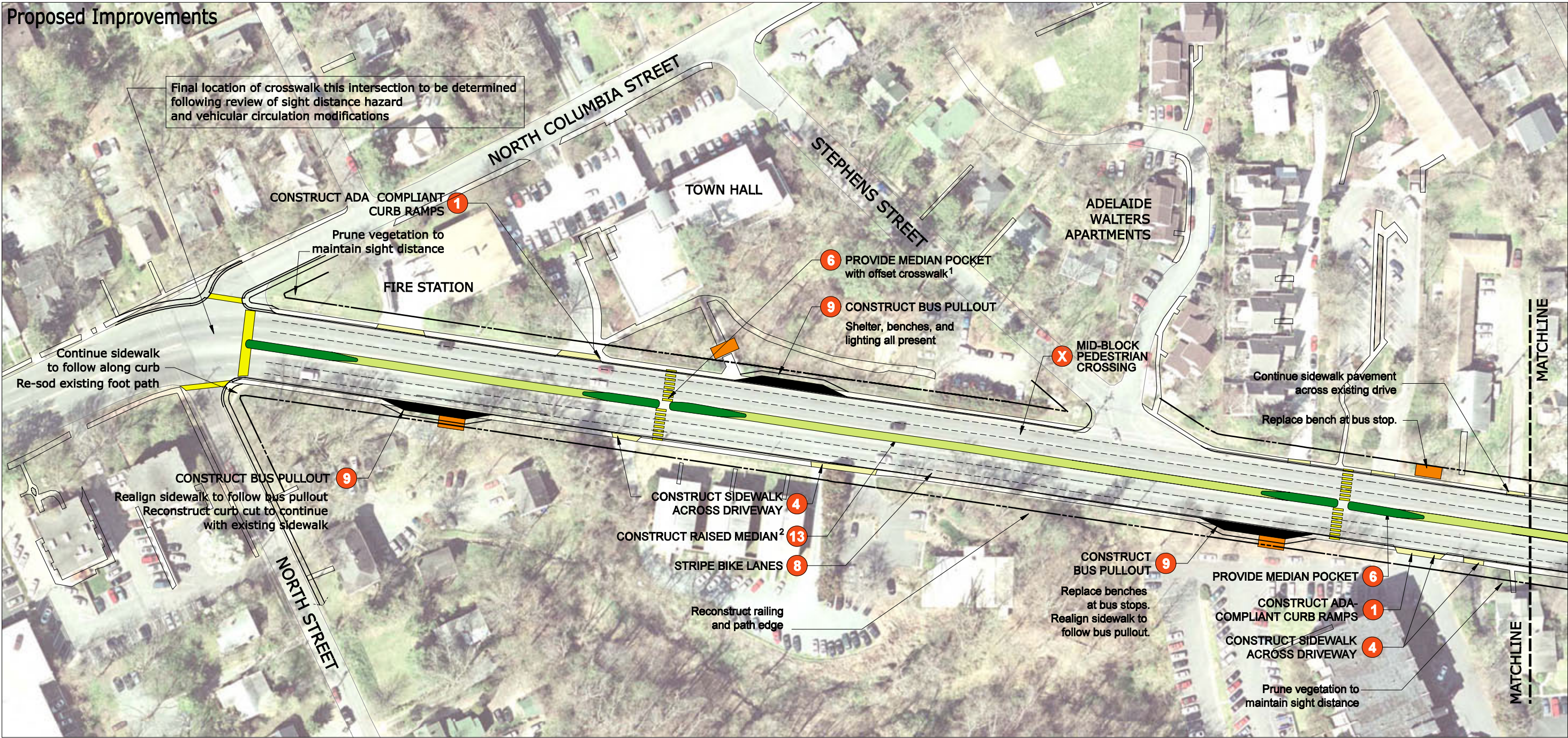
Key

	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



Proposed Improvements



Notes:

1. A threshold of 100 alighting's/day at nearby bus stops was used to determine the location of marked crosswalks at median pockets. Most median pockets in the project area do not currently meet this threshold; however, these locations should be re-evaluated as conditions change.
2. A raised median is intended as a long-term goal for the Boulevard. By contrast, the median pockets shown are intended as a short-term and relatively low-cost solution to the problem of pedestrian crossings of the Boulevard. In the future, the median area may serve as a bus or rail corridor instead of a planted median; in that case, pedestrian crossings at the selected locations shown must also be part of the final design.



NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Lappas + Havener, PA LANDSCAPE ARCHITECTS
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PLAN A1

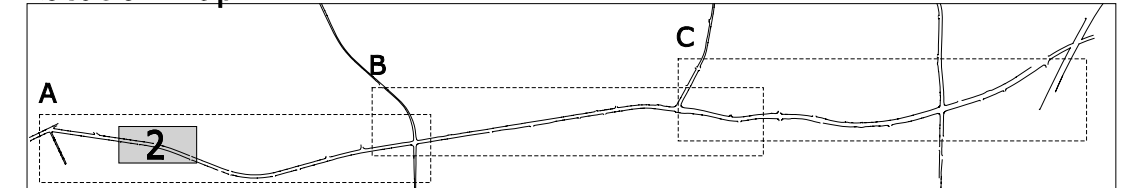


Key

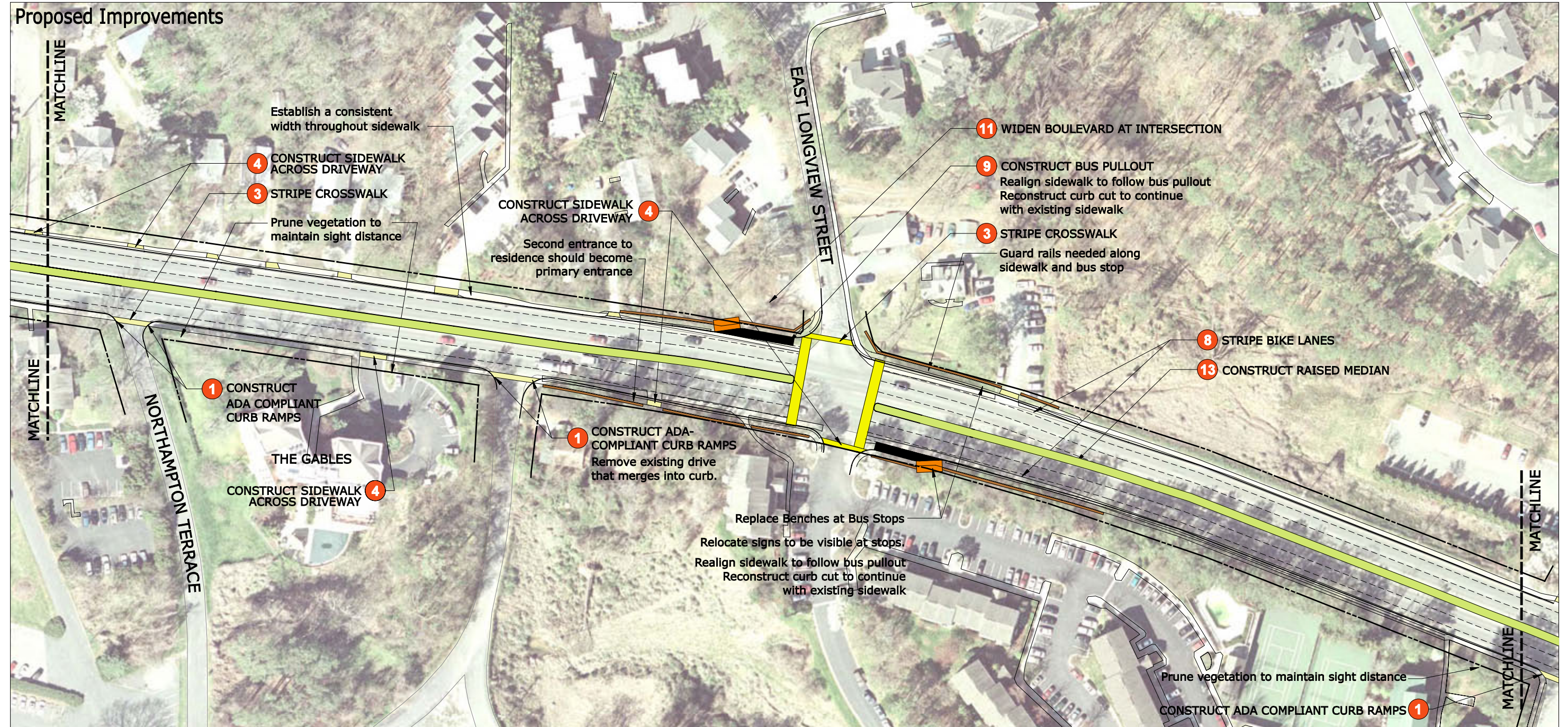
	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale

page 13



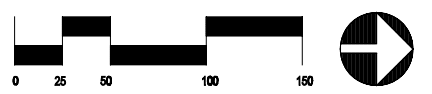
Proposed Improvements



NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study








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PLAN A2

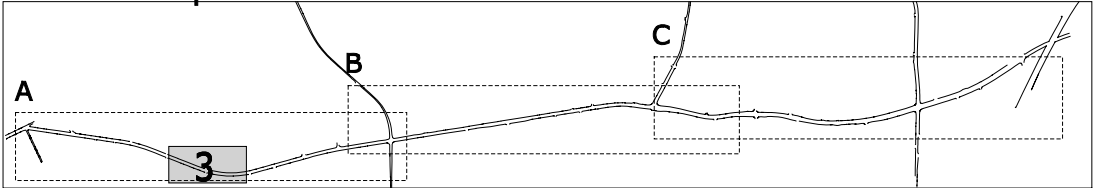


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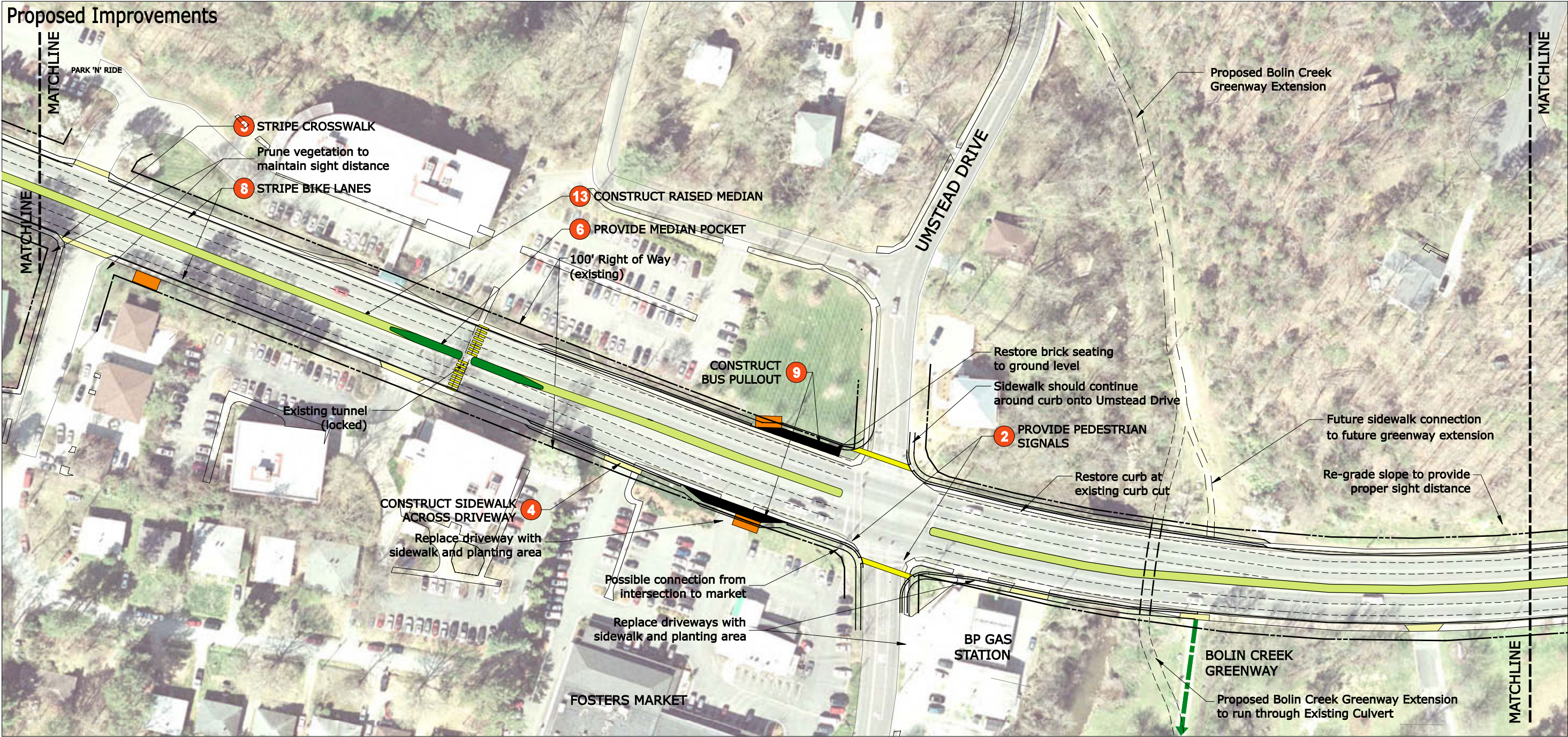
Key

	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale

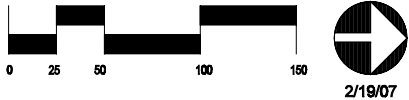


Proposed Improvements



NC 86/Martin Luther King Jr. Boulevard Corridor
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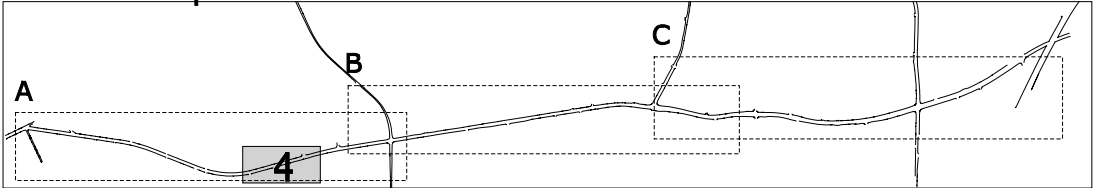
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2/19/07

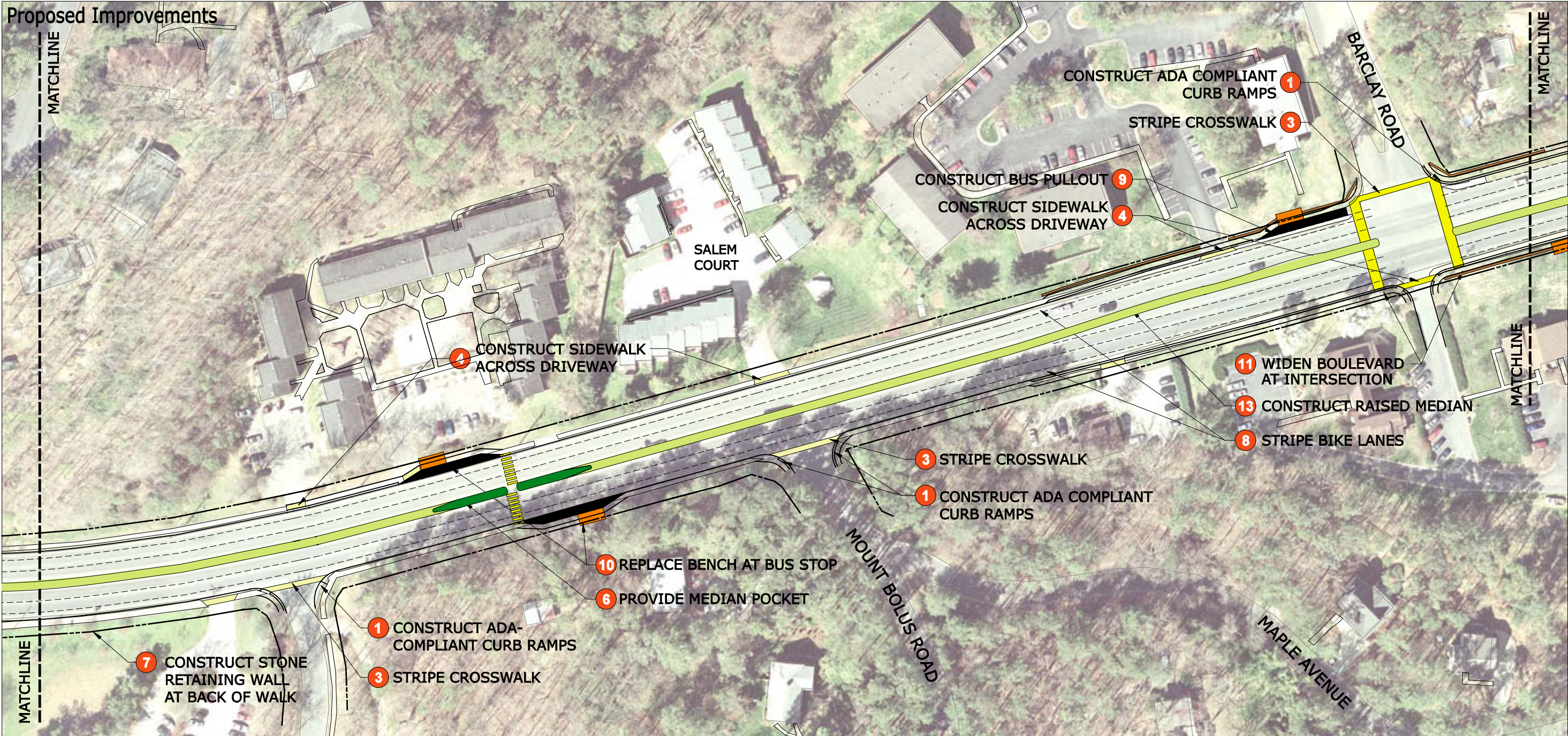
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	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



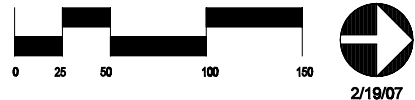
Proposed Improvements










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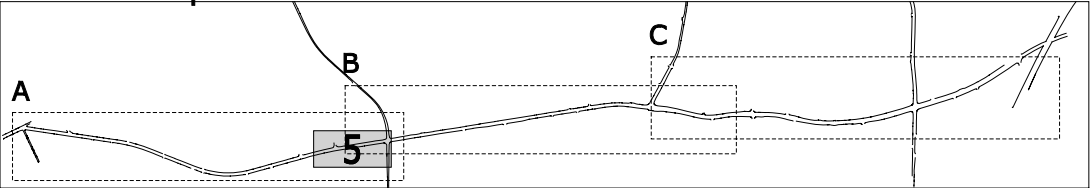
PLAN A4



Key

	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



Proposed Improvements










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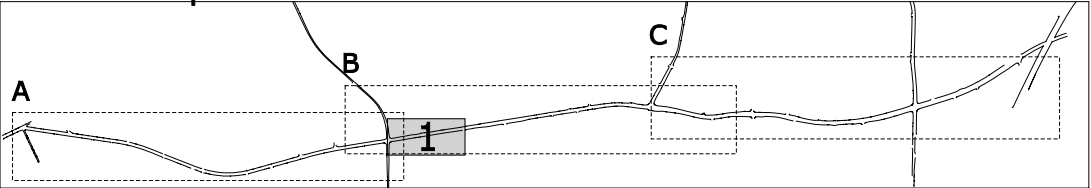
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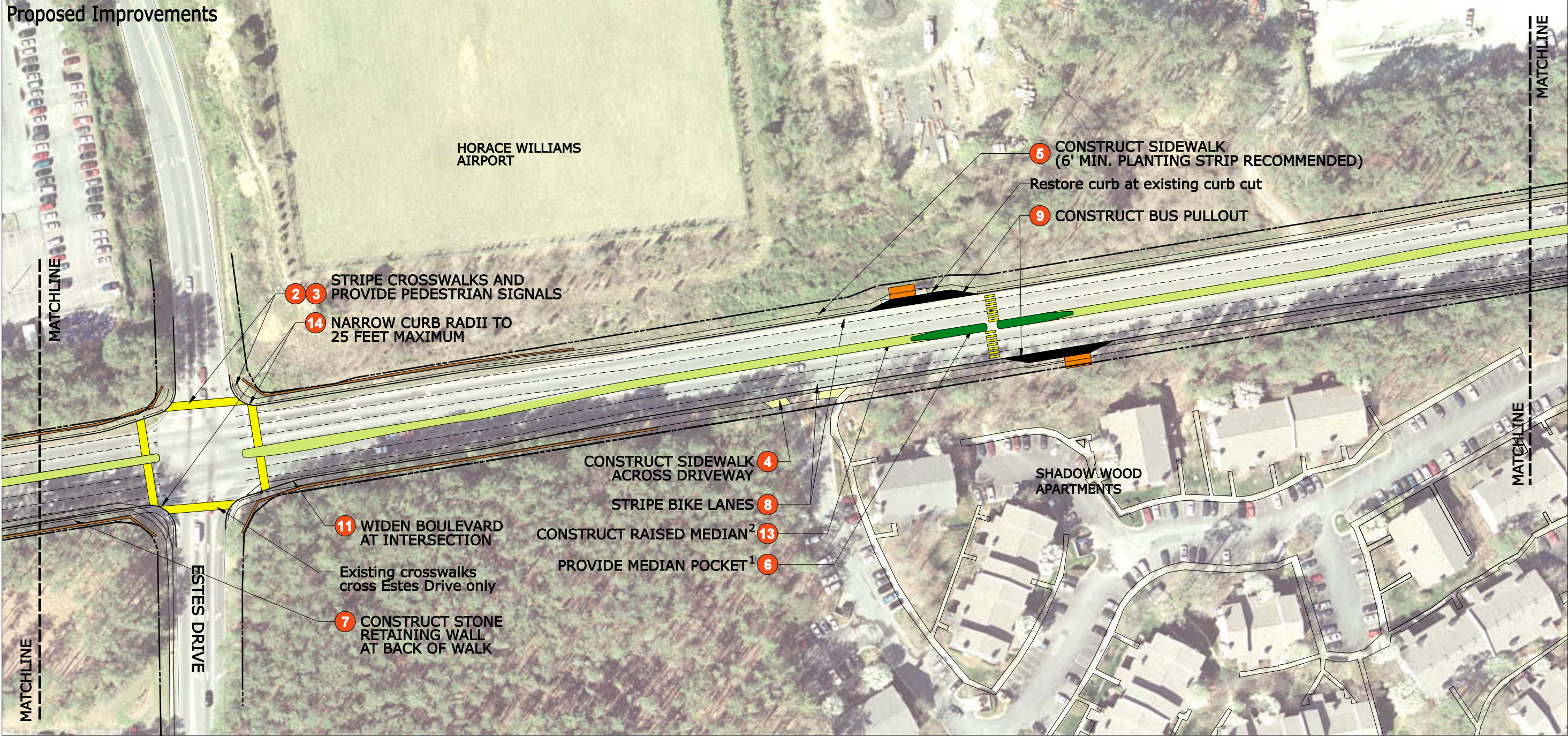
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	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



Proposed Improvements



Notes:

1. A threshold of 100 alighting's/day at nearby bus stops was used to determine the location of marked crosswalks at median pockets. Most median pockets in the project area do not currently meet this threshold; however, these locations should be re-evaluated as conditions change.
2. A raised median is intended as a long-term goal for the Boulevard. By contrast, the median pockets shown are intended as a short-term and relatively low-cost solution to the problem of pedestrian crossings of the Boulevard. In the future, the median area may serve as a bus or rail corridor instead of a planted median; in that case, pedestrian crossings at the selected locations shown must also be part of the final design.








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PLAN B1

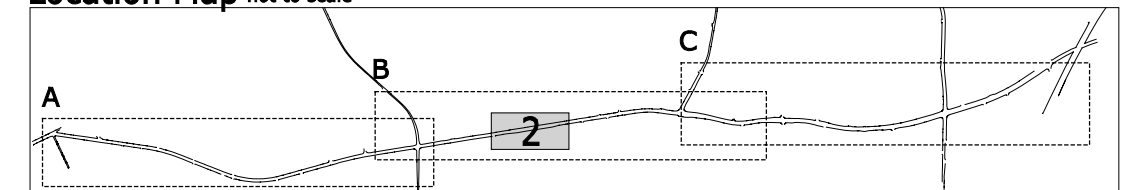


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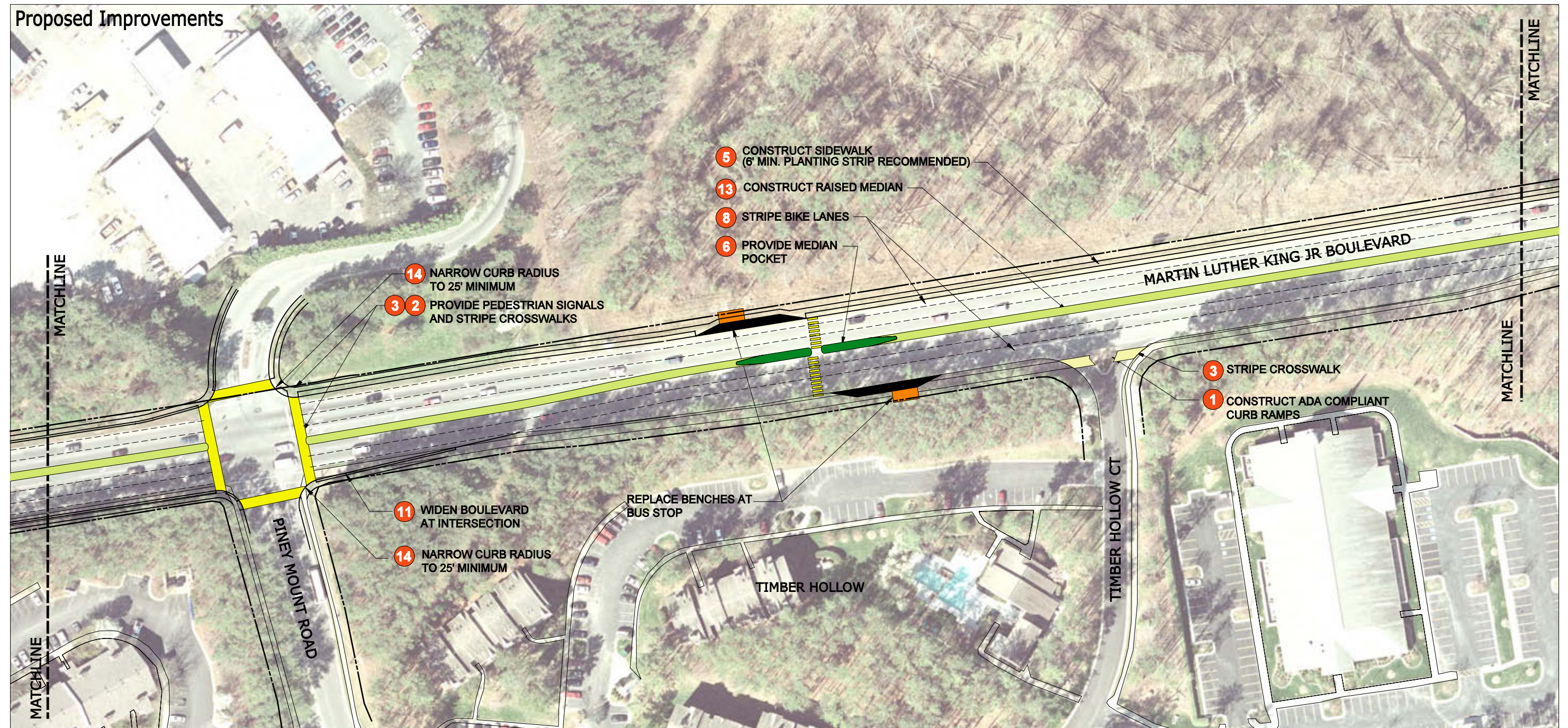
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	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale

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Proposed Improvements



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PLAN B2

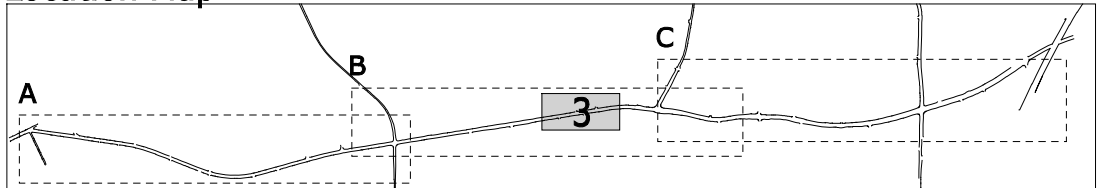


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Key

	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map



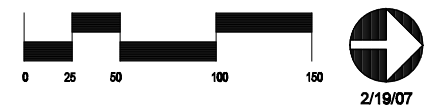
Proposed Improvements










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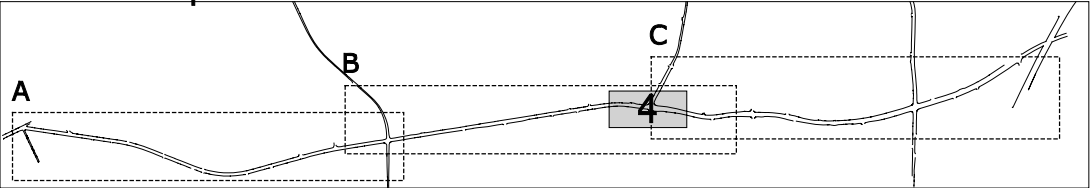
PLAN B3



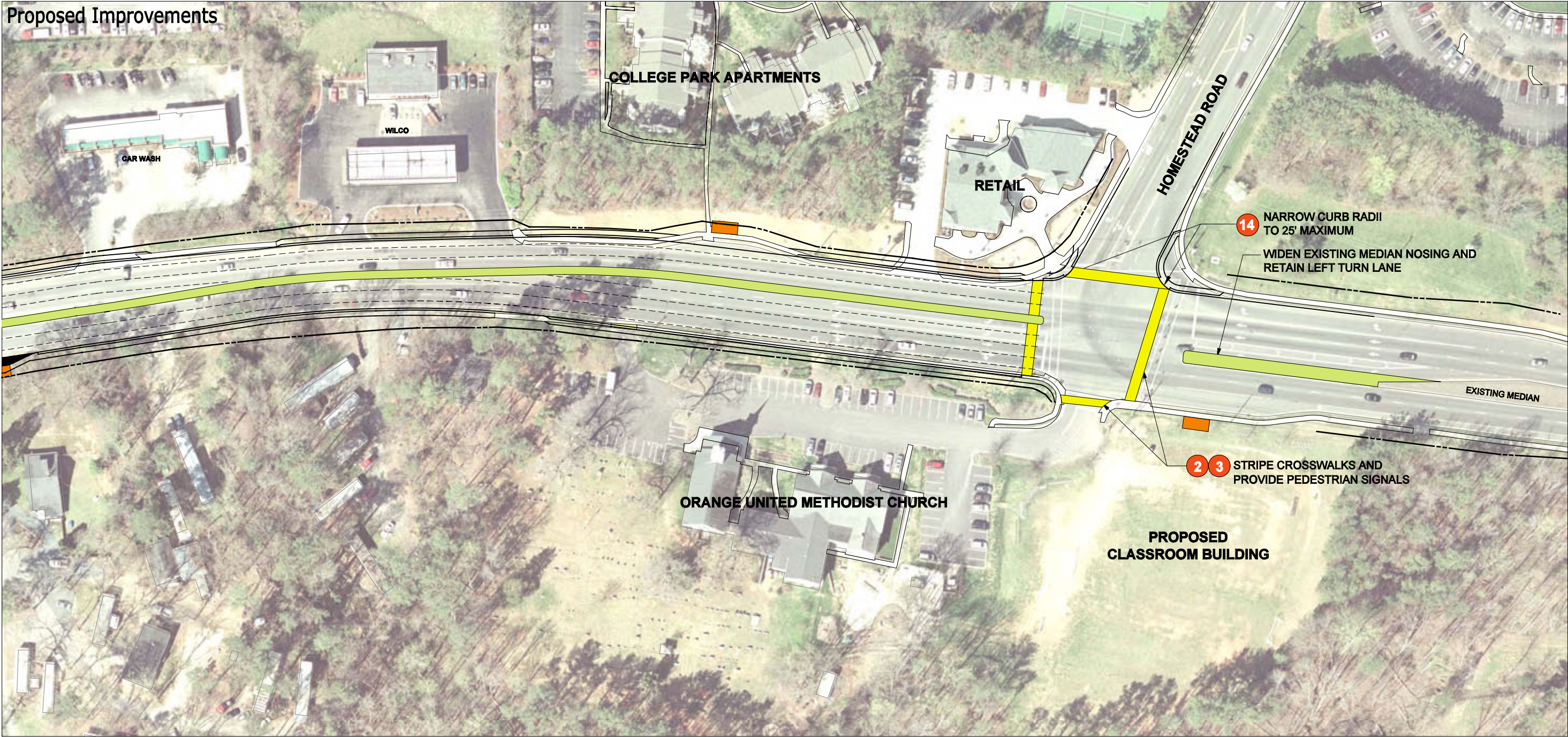
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	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



Proposed Improvements










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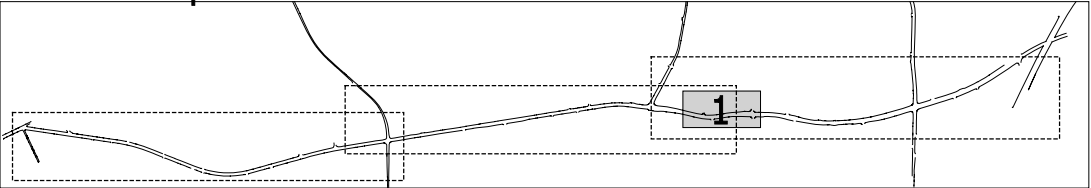
PLAN B4



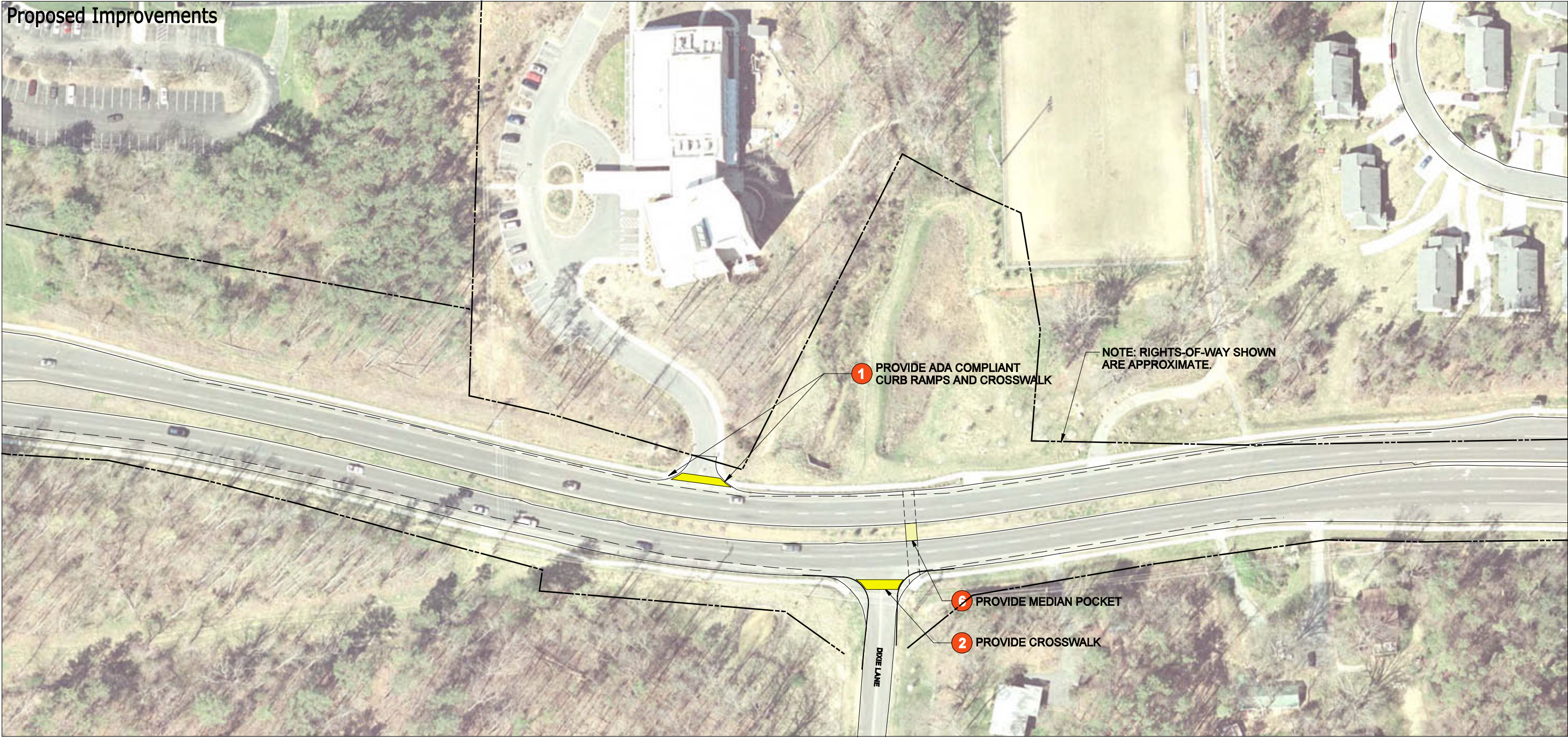
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	SIDEWALK		BUS PULLOUT		
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Location Map not to scale



Proposed Improvements










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PLAN C1

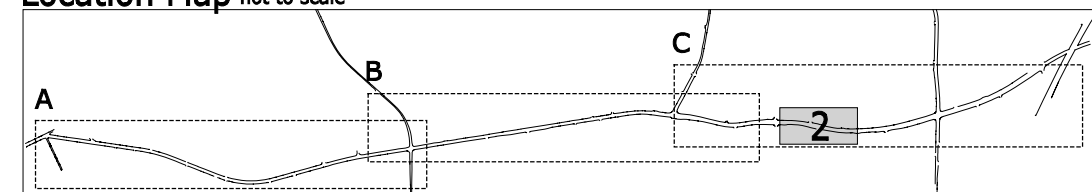


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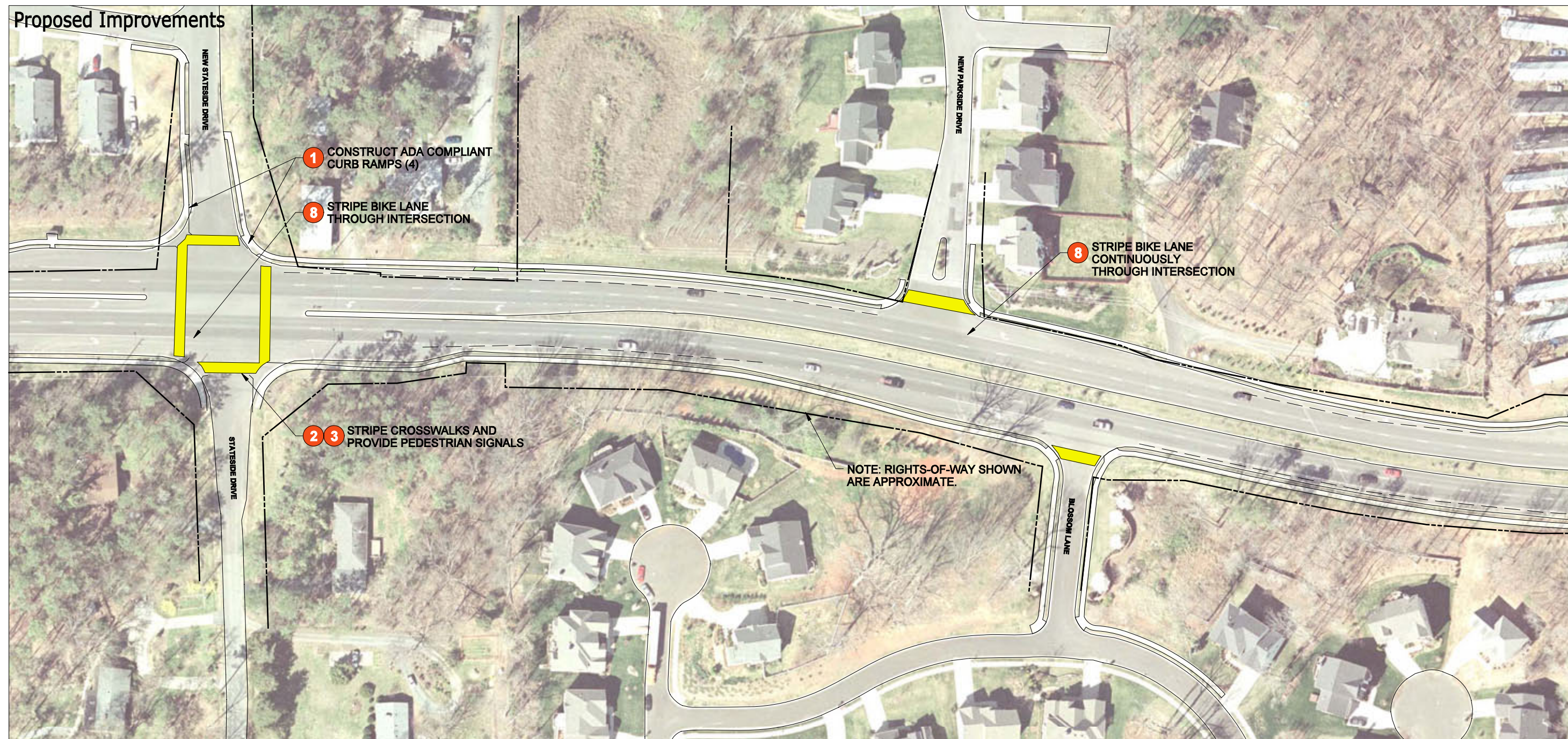
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|  SIDEWALK |  BUS PULLOUT | |
|  CROSSWALK |  MEDIAN POCKET | |

Location Map not to scale

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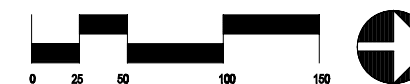
Proposed Improvements



NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study








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PLAN C2

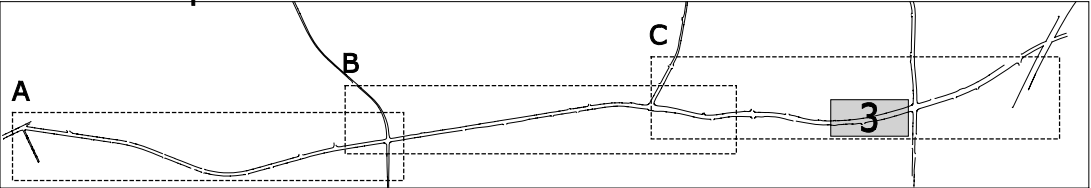


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Key

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Location Map not to scale



Proposed Improvements










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Lappas + Havener, PA LANDSCAPE ARCHITECTS
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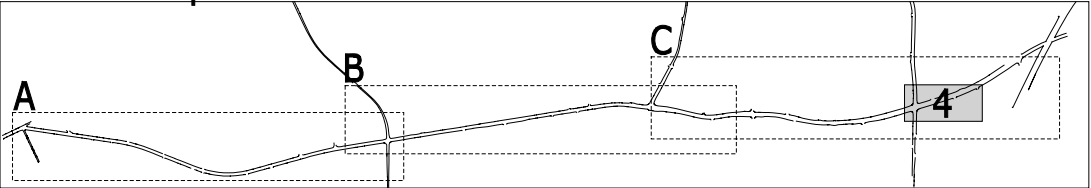
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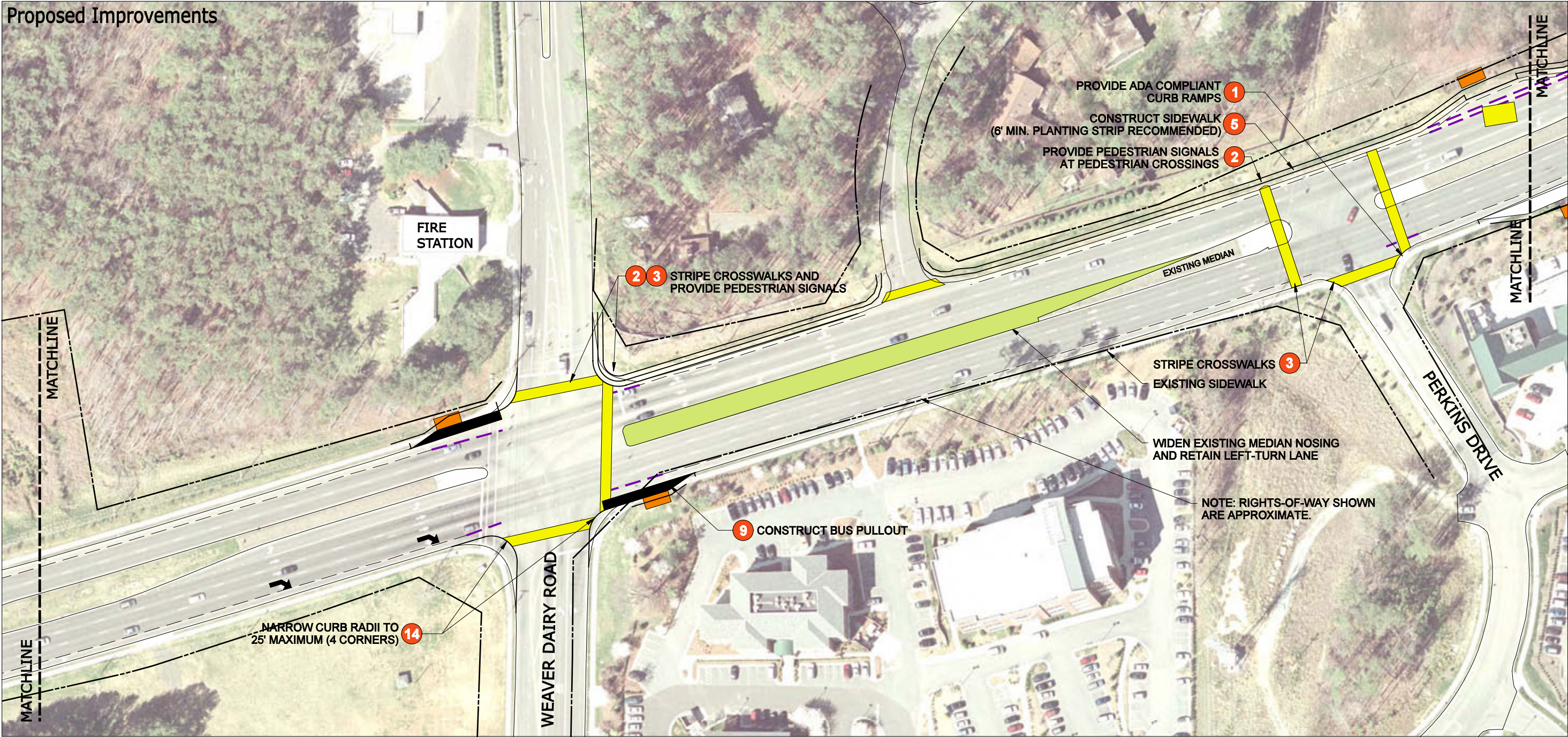
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	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



Proposed Improvements










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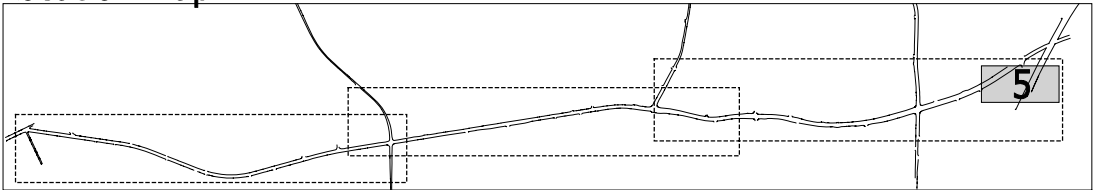
PLAN C4



Key

	RETAINING WALL		BUS SHELTER		SEE ILLUSTRATIONS #1 AND #2 FOR DETAILS OF PROPOSED IMPROVEMENTS
	SIDEWALK		BUS PULLOUT		
	CROSSWALK		MEDIAN POCKET		

Location Map not to scale



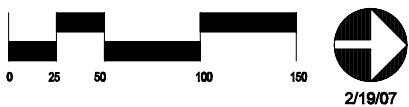
Proposed Improvements

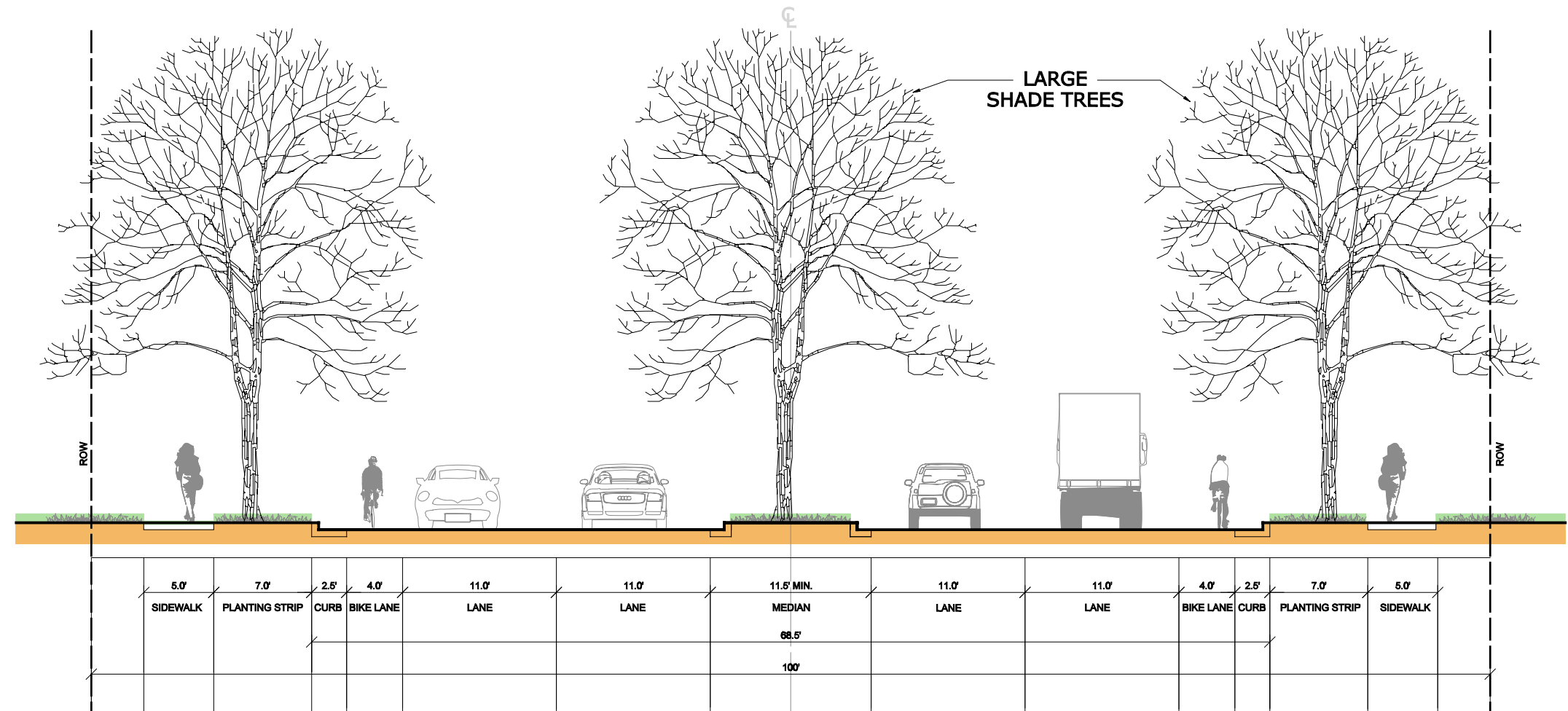


NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

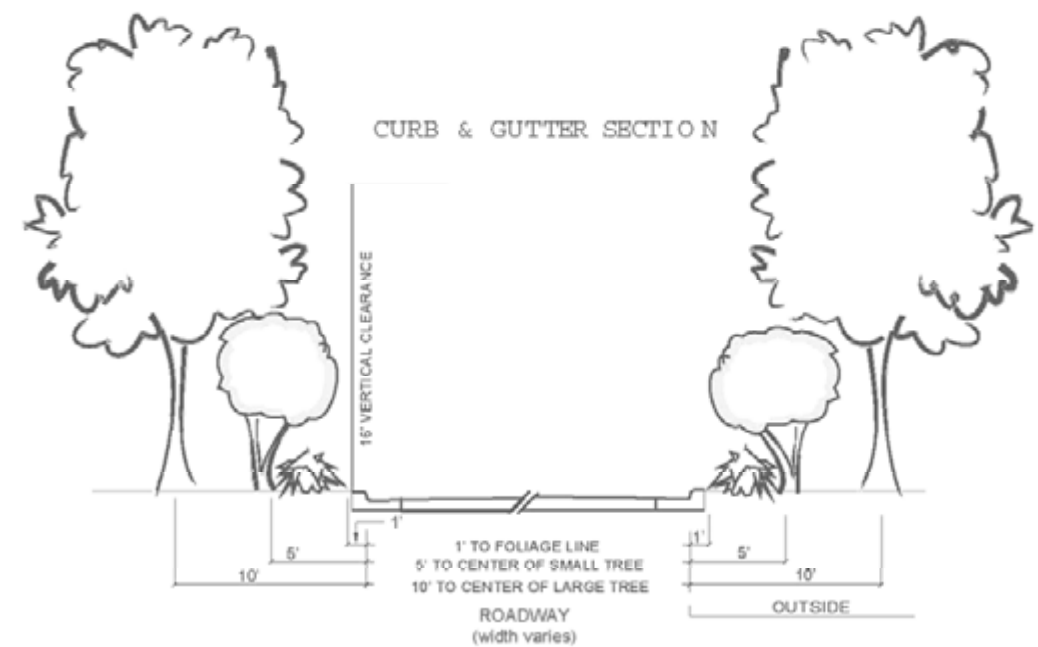
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PLAN C5





Idealized Boulevard Section



NCDOT Standard for 35 MPH Roadway

IDEALIZED BOULEVARD SECTION

Ideally, the typical cross-section for the Boulevard would resemble the illustration shown at left, which is adapted from the publication *Creating Livable Streets: Street Design Guidelines for 2040* (Second Edition, June 2002) by Portland Metro.

This idealized section features shade trees planted both in the median and in seven-foot-wide planting strips on either side of the roadway, which is comprised of eleven-foot lanes and four-foot bike lanes. Five-foot minimum sidewalks are placed on the outside of the tree planting strip. This street configuration has the following advantages:

- The raised median narrows the roadway and encourages slower vehicular traffic speeds.
- Marked bike lanes further narrow the roadway and create dedicated space for bicyclists.
- Trees between the roadway and the sidewalk form a visual barrier that clearly divides pedestrian space from vehicular space.
- Trees, especially shade trees, provide shade that makes the pedestrian and vehicular environments more pleasant by moderating heat and glare.
- A seven-foot minimum width planting strip provides enough space and soil volume for street trees to thrive.

This street configuration, however, may be difficult to achieve fully in the context of the Martin Luther King, Jr. Boulevard, given the following constraints:

- NCDOT Planting guidelines govern the distance that trees of various types may be planted relative to the roadway (see below).
- The Boulevard corridor is constrained by topography in several locations and by a typical 100'-wide Right of Way (ROW), both of which limit the space available for modification and tree planting. Moving the sidewalks out, for example, will require the construction of retaining walls in several locations.
- If the existing outside curbs remain where they are in a typical cross-section, the addition of bike lanes reduces the available median width to about eleven feet, which leaves about eight feet of lawn width in the median. An eight-foot grassed median may be difficult to maintain, since mowers will be quite close to traffic.
- The cost of maintenance of trees and lawn in the Boulevard ROW will have to be added to the Town's landscape maintenance budget.

NCDOT STANDARDS

The diagram at left is taken from NCDOT's Guidelines for Planting within Highway Right-of-Way, for roadways signed at 35 MPH. It should be noted that traffic frequently moves faster than 35 MPH on the Boulevard at present.

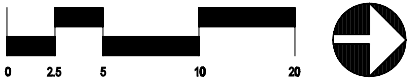
Given that NCDOT has jurisdiction of the Boulevard, these guidelines are expected to apply. The pertinent restrictions shown here are the minimum planting distances from edge of curb of five and ten feet, for small and large trees, respectively.

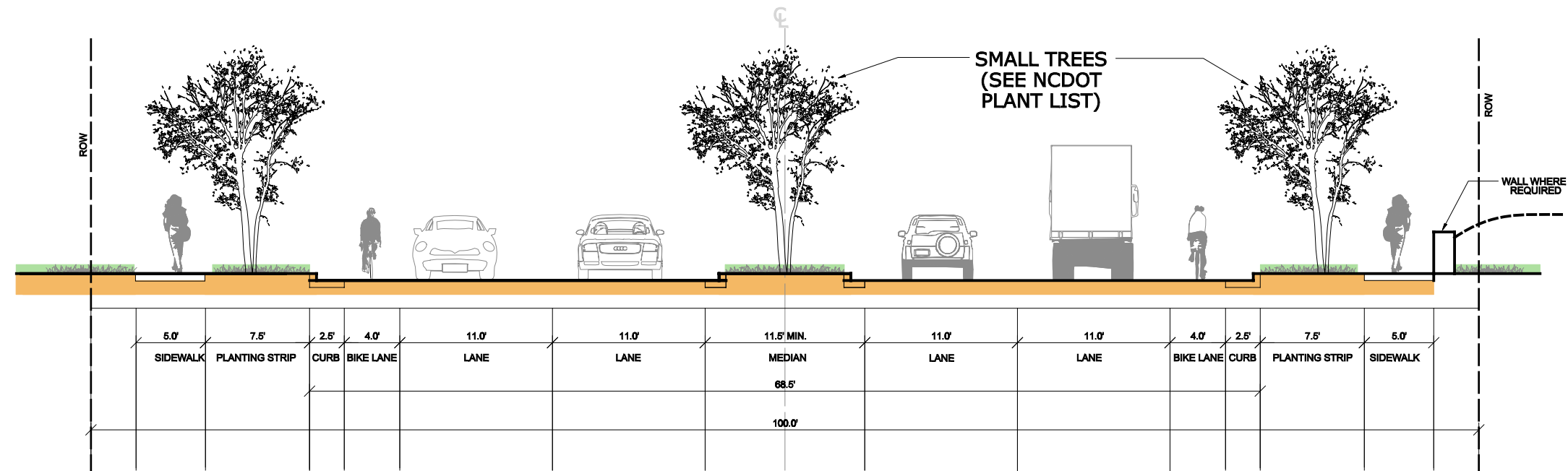
This restriction compels modification of the idealized cross-section shown above; see the following page for two examples of such modification.

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Boulevard Design Issues





Alternative A

Given the practical considerations discussed on the previous page, the adaptation of an idealized Boulevard cross-section to these conditions is illustrated by the following two illustrative options:

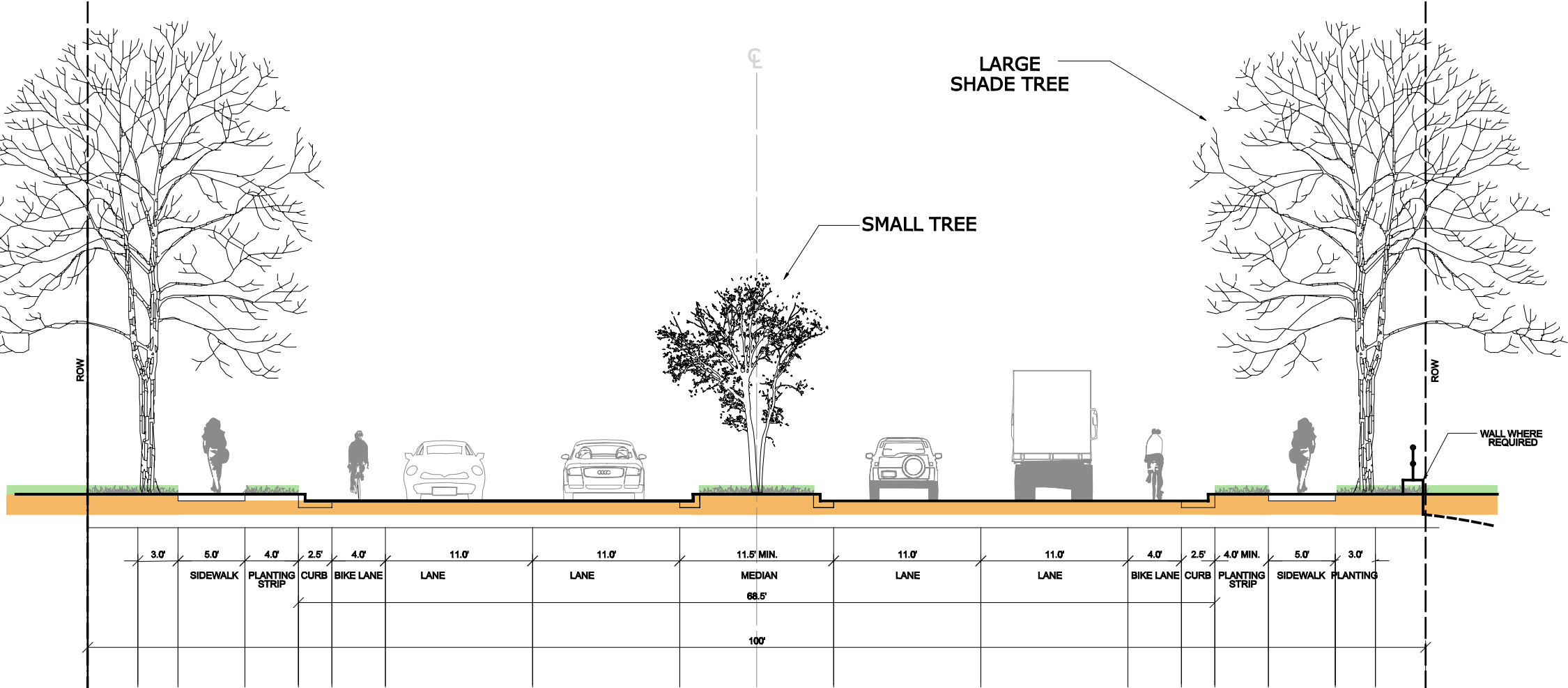
ALTERNATIVE A

MEDIAN

The NCDOT minimum distance from the face of curb to the centerline of a small tree is five feet for this roadway. Given a typical median curb and gutter width of 18 inches, the minimum width for a median with small trees is 11.5 feet, measured from the outside edge of each gutter. This dimension, however, should be increased wherever conditions permit.

PLANTING STRIP

Given the same five-foot minimum setback distance from the curb, a 7.5' wide planting strip will accommodate a small tree planted five feet from the curb and three feet from the sidewalk, as shown at left.



Alternative B

ALTERNATIVE B

MEDIAN

If the median can be constructed at least twenty feet wide measured from face of curb, large trees may be accommodated in the median under NC DOT planting guidelines. However, unless the outside curbs are moved out, this width will not be available through much of the corridor. Thus, this option shows small trees in the median similar to Option A. A site survey and curb relocation study should be done to determine the feasibility of creating wider medians, particularly north of Mt. Bolus Road. Provision of wider medians must be weighed against the cost of additional curb relocation and other site work.

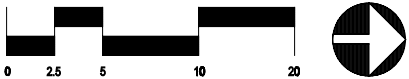
PLANTING STRIP

This Option shows a narrower, four-foot lawn planting strip without trees, a five-foot sidewalk, and shade tree planting behind the walk. The four-foot minimum planting strip is recommended to serve as increased buffer space between the sidewalk and vehicular traffic, and is double the space that is currently found between the curb and sidewalk in much of the corridor. The recent widening of the MLK Boulevard north of Homestead employs a three-foot standard planting strip width. The goal of Option B is to allow tree planting as close to the roadway as possible while still maintaining generous buffer space between the sidewalk and the curb, and between the trees and the sidewalk. A four- or five-foot lawn strip offers the added benefit of giving the Boulevard a greener appearance than is possible with a two-foot strip, particularly considering the overall scale of the roadway.

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Boulevard Design Alternatives





KEY to Improvements*

- 1. Construct ADA-compliant curb ramps
- 2. Provide pedestrian signals
- 3. Stripe crosswalk
- 4. Construct sidewalk across driveway
- 5. Construct sidewalk with 6' min. planting strip
- 6. Provide median pocket
- 7. Construct stone retaining wall at back of walk
- 8. Stripe bike lanes

- 9. Construct bus pullout
- 10. Replace bench at bus stop
- 11. Widen Boulevard at Intersection
- 12. Stripe 11' wide travel lanes
- 13. Construct raised median
- 14. Narrow curb radius to 25 feet maximum

Note: If crosswalks are marked, they must be accompanied by pedestrian signals or other approved signage. Midblock crossings like those shown at median pockets are subject to NCDOT certification of warrant and approval, based on MUTCD Guidelines.

* Not all improvements shown in each illustration

NC 86/Martin Luther King Jr. Boulevard Corridor
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Illustration 1: Median Pocket and Bus Stops



KEY to Improvements Shown*

- 1. Construct ADA-compliant curb ramps
- 2. Provide pedestrian signals
- 3. Stripe crosswalk
- 4. Construct sidewalk across driveway
- 5. Construct sidewalk with 6' min. planting strip
- 6. Provide median pocket
- 7. Construct stone retaining wall at back of walk
- 8. Stripe bike lanes

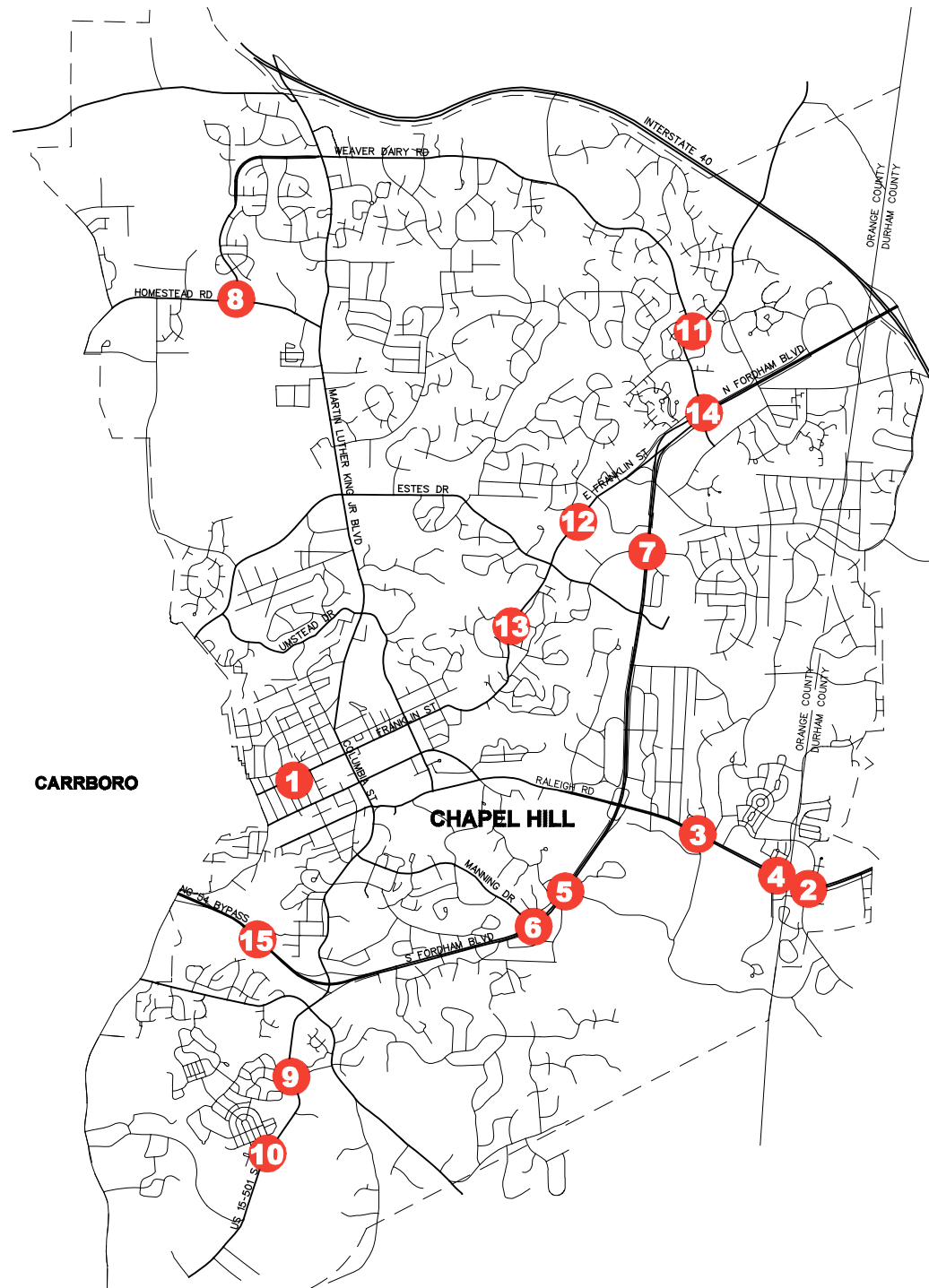
- 9. Construct bus pullout
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Illustration 2: Typical Intersection



Introduction to Part II: Town Intersections

In Spring of 2006, the Town of Chapel Hill identified a number of primary locations that merited study with a view toward improving pedestrian safety. The Town selected these locations because of a high number of crashes, the incidence of pedestrian injury or fatality, or because of other known dangerous conditions. The locations chosen for study are shown at left, and are predominately intersections.

The Town selected Ramey Kemp and Associates, a traffic engineering firm, and Lappas + Havener, PA, a landscape architecture and planning firm, to perform an evaluation of these fifteen intersections and to make recommendations for improvement. That work was performed in Summer and Fall of 2006, and the result is contained in the following plan sheets.

Concurrently with this Study, a Community Task Force explored options for the short- and long term improvement of pedestrian safety at two locations of particular interest to their surrounding communities: Fordham Boulevard at Manning Drive and at Old Mason Farm Road. The improvements at those locations recommended in this Study are intended to help further that community planning process, and not to preclude any additional improvements that this Task Force may recommend.

Intersections in Study

1. West Franklin Street at McDonald's
2. NC 54 at East Barbee Chapel Road
3. NC 54 at Finley Golf Course Road/Burning Tree Drive
4. NC 54 at Meadowmont Lane
5. Fordham Boulevard at Old Mason Farm Road
6. Fordham Boulevard at Manning Drive
7. Fordham Boulevard at Willow Drive
8. Homestead Road at Weaver Dairy Road Extension
9. US 15-501 South at Bennett Road
10. US 15-501 South at Market Street
11. Erwin Road at Weaver Dairy Road
12. East Franklin Street at Couch Road
13. East Franklin Street at Elizabeth Street
14. Roedham Boulevard at Erwin Road ("Superstreet" Intersection)
15. NC 54 Bypass east of Greensboro Street

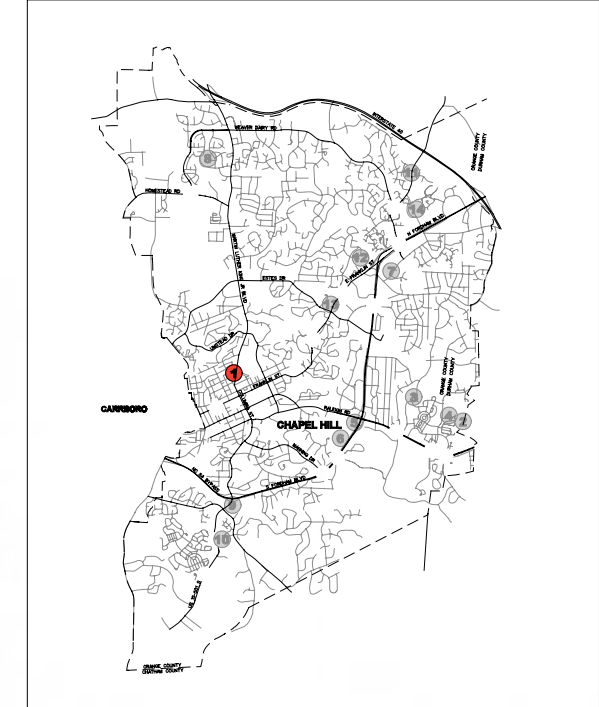
NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

Key

-  SIDEWALK
-  CROSSWALK
-  HIGH VISIBILITY CROSSWALK
-  PEDESTRIAN REFUGE
-  FLASHING WARNING SIGN

Vicinity Map not to scale

page 31



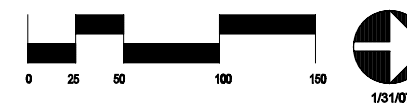
Proposed Improvements



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1. West Franklin Street at McDonald's



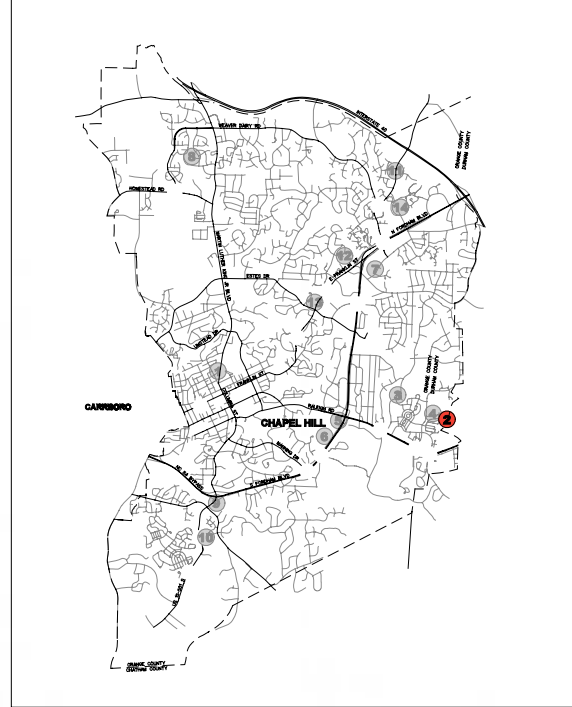
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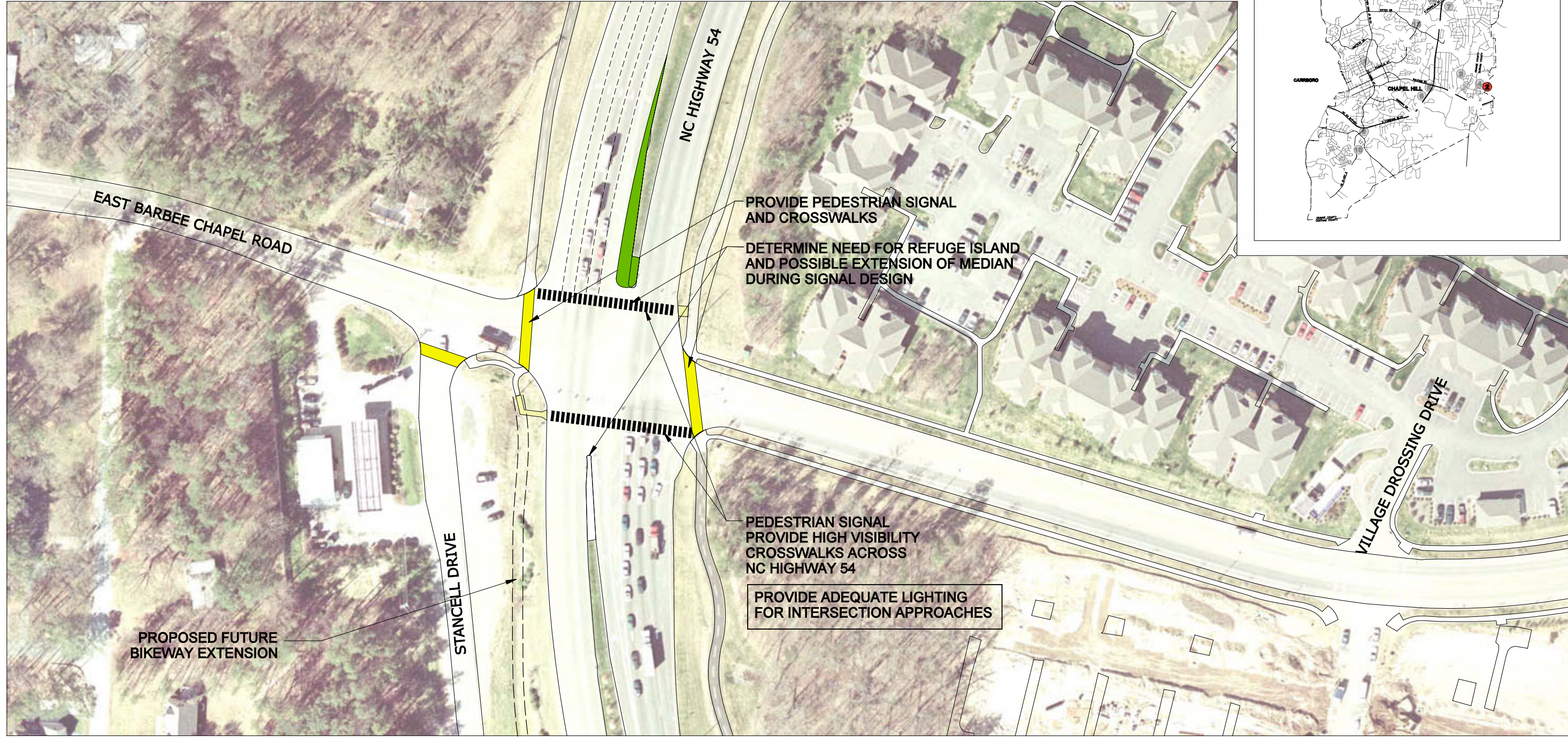
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	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

page 32



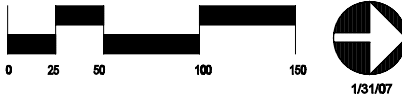
Proposed Improvements



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2. NC 54 at East Barbee Chapel Road



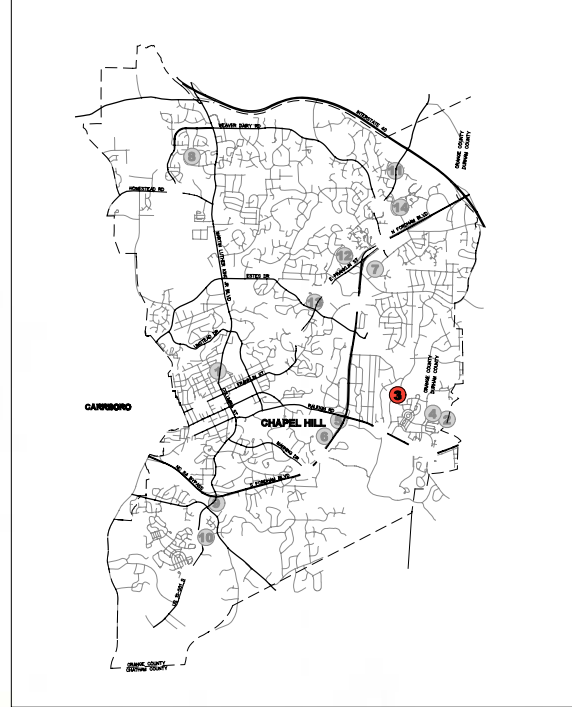
1/31/07

Key

	SIDEWALK		PEDESTRIAN REFUGE
	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

page 33



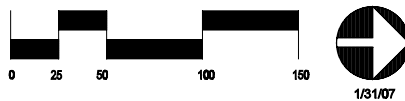
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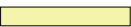




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3. NC 54 and Finley Golf Course Road/Burning Tree Drive



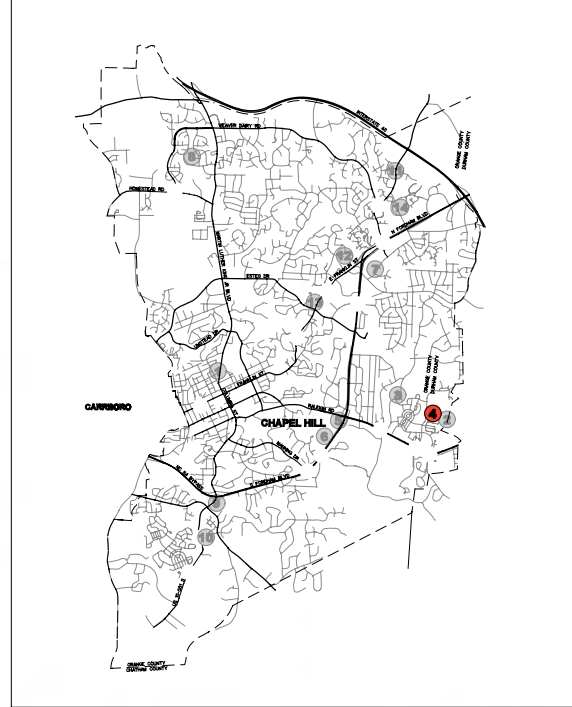
1/31/07

Key

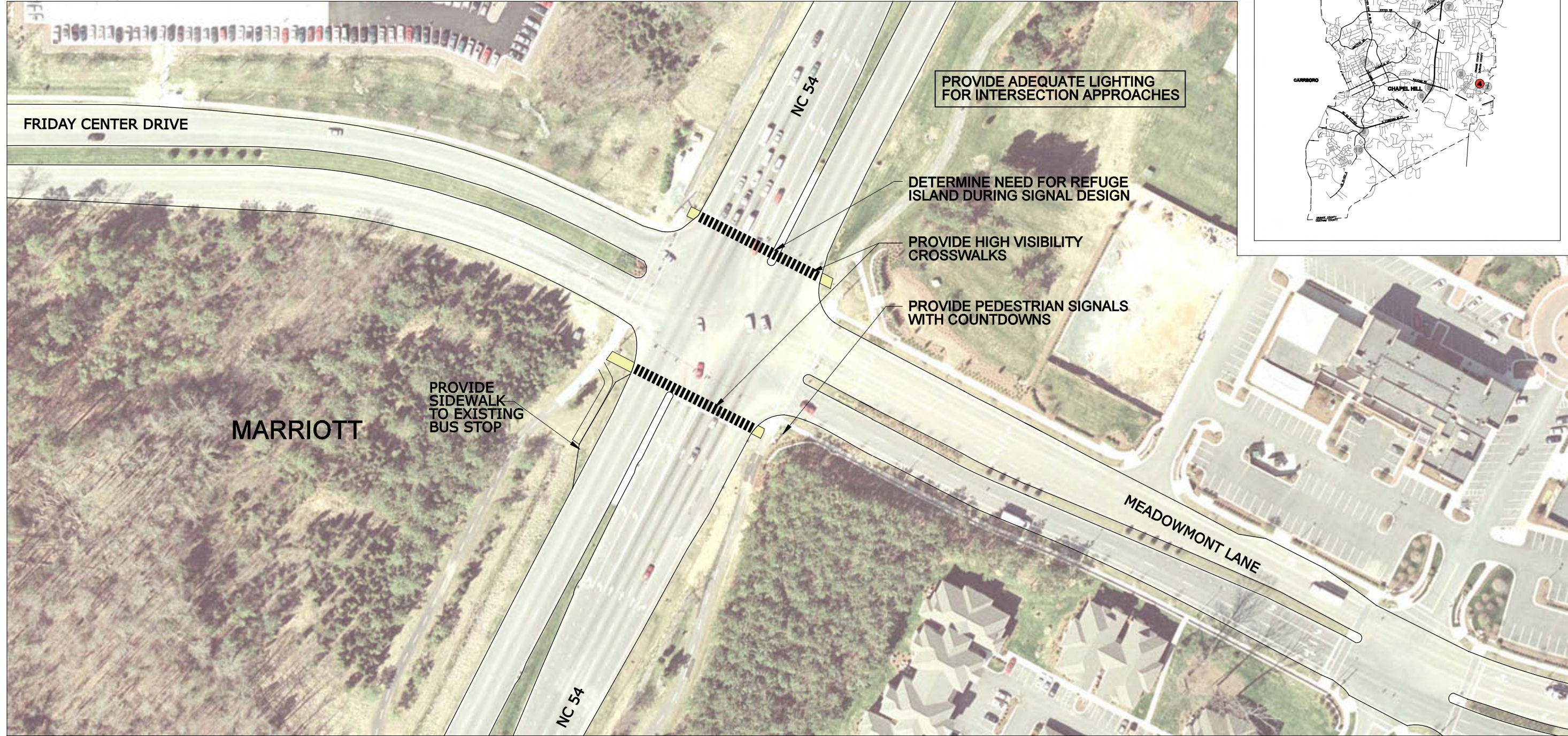
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	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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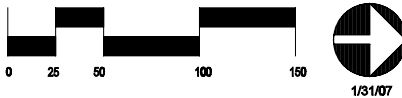
Proposed Improvements



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and Town-Wide Pedestrian Safety Evaluation Study

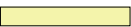




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4. NC 54 at Meadowmont Lane



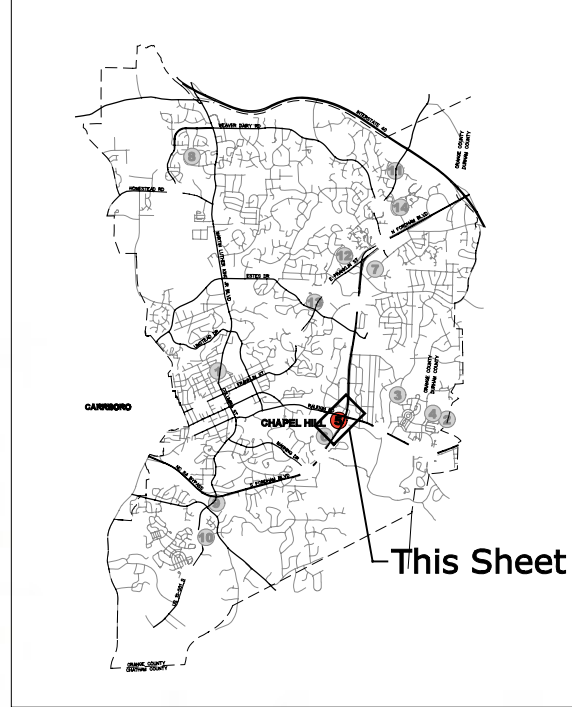
1/31/07

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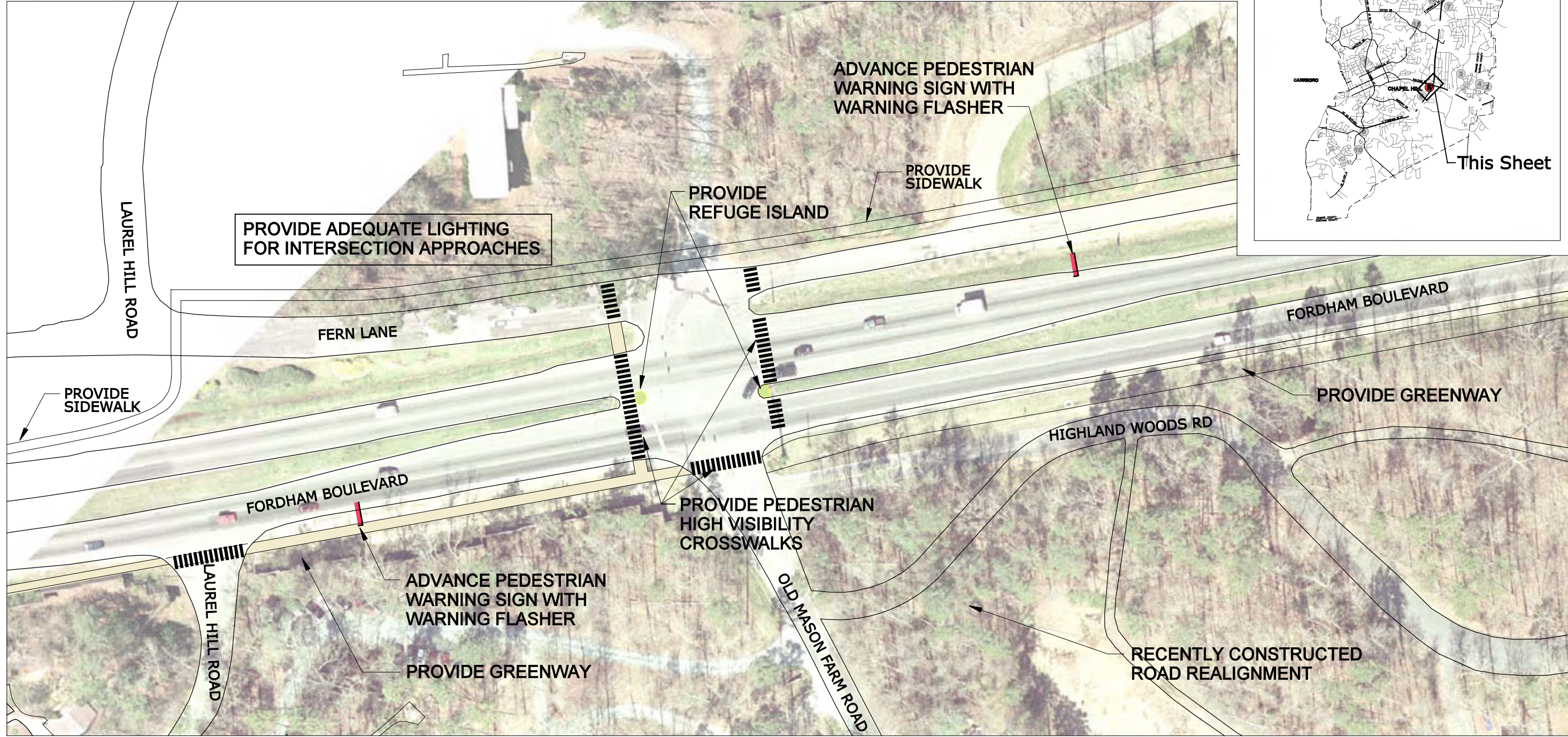
	SIDEWALK		PEDESTRIAN REFUGE
	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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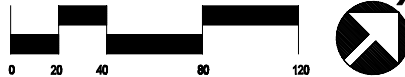
Proposed Improvements



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5. Fordham Boulevard at Old Mason Farm Road
(Task Force Recommendations for Buildout Conditions)

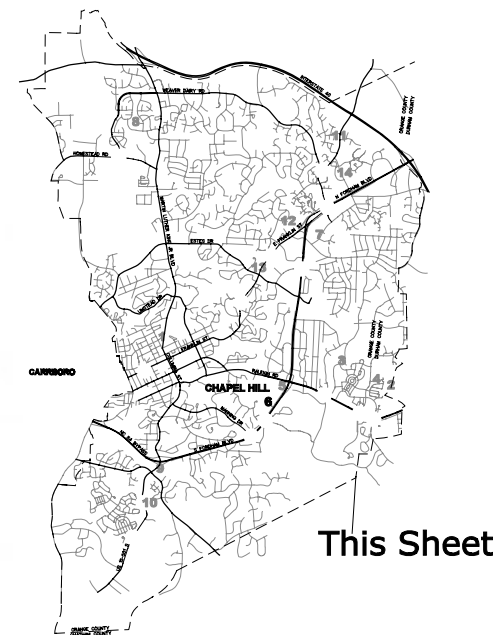


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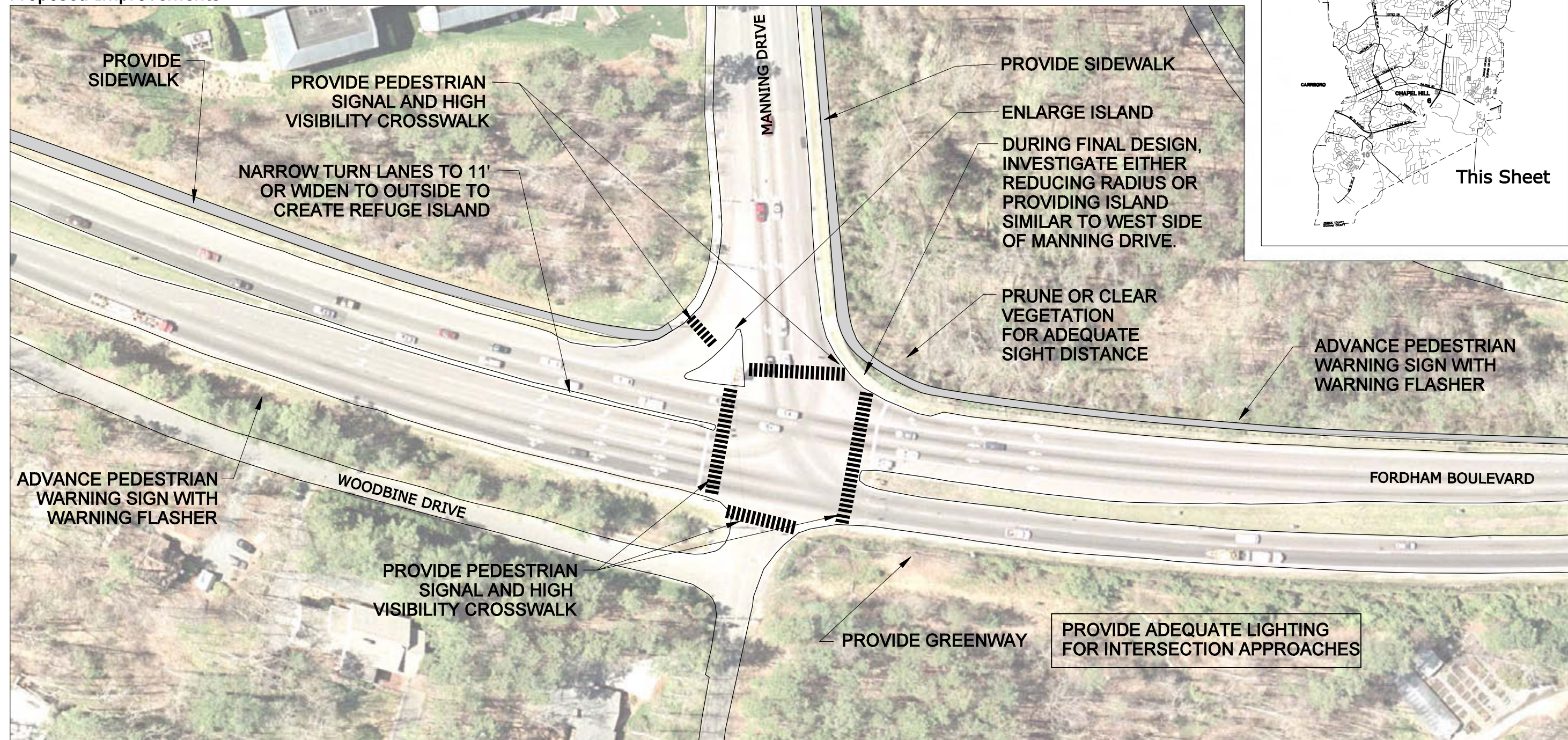
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|---|---------------------------|---|-----------------------|
|  | SIDEWALK |  | PEDESTRIAN REFUGE |
|  | CROSSWALK |  | FLASHING WARNING SIGN |
|  | HIGH VISIBILITY CROSSWALK | | |

Vicinity Map not to scale

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6. Fordham Boulevard at Manning Drive
(Task Force Recommendations for Buildout Conditions)

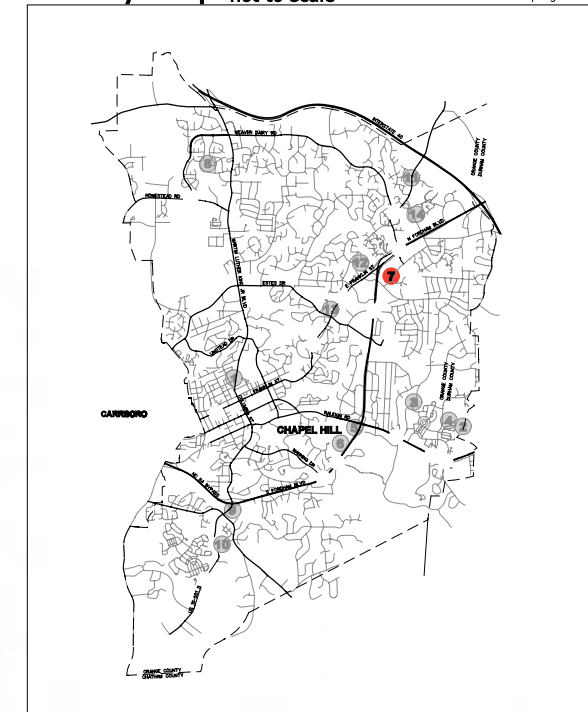


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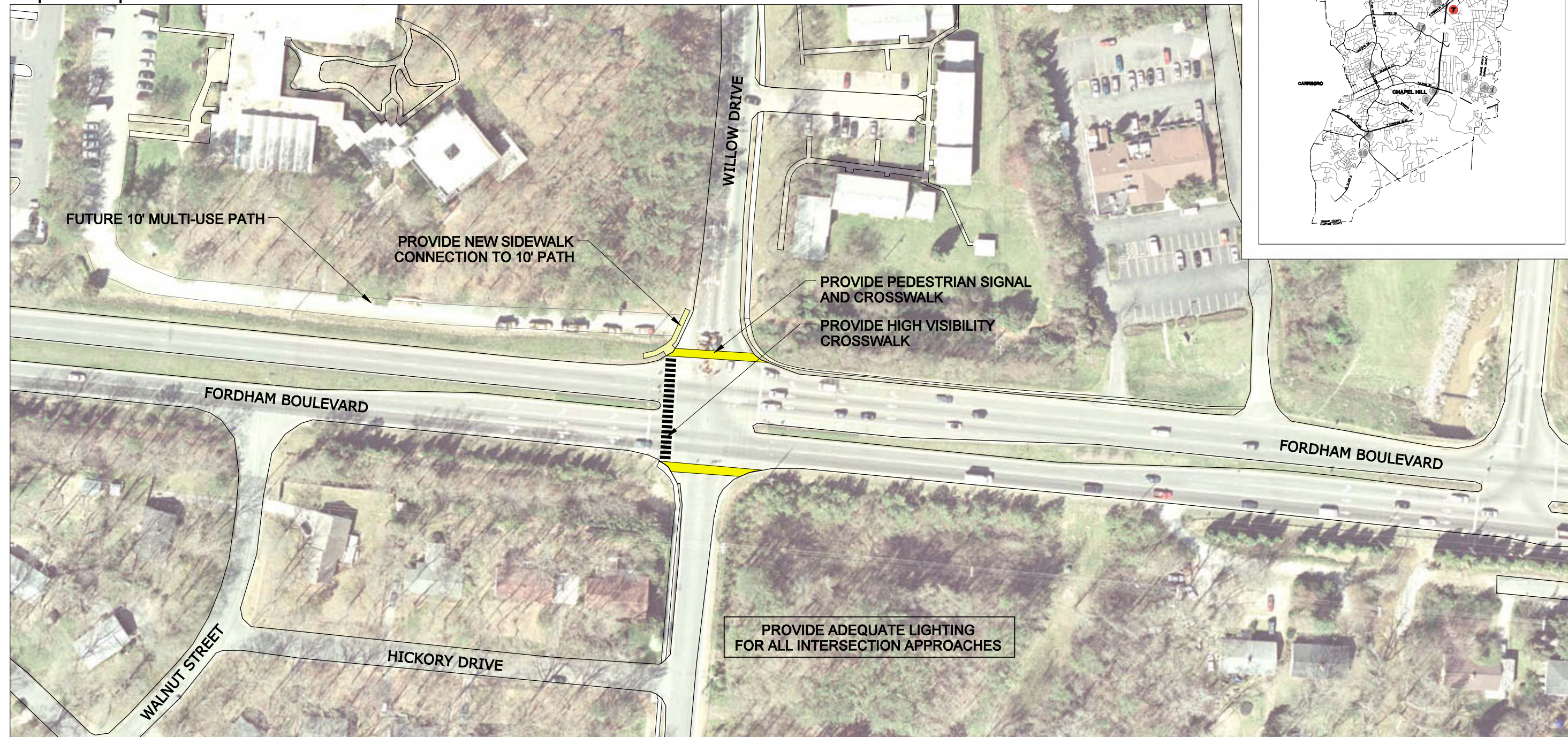
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|---|---------------------------|---|-----------------------|
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|  | CROSSWALK |  | FLASHING WARNING SIGN |
|  | HIGH VISIBILITY CROSSWALK | | |

Vicinity Map not to scale

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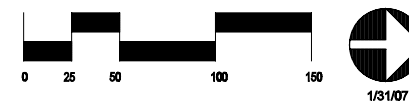
Proposed Improvements



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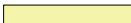
Lappas + Havener, PA LANDSCAPE ARCHITECTS
Ramey Kemp & Associates, Inc. Transportation Engineering

7. Fordham Boulevard at Willow Drive



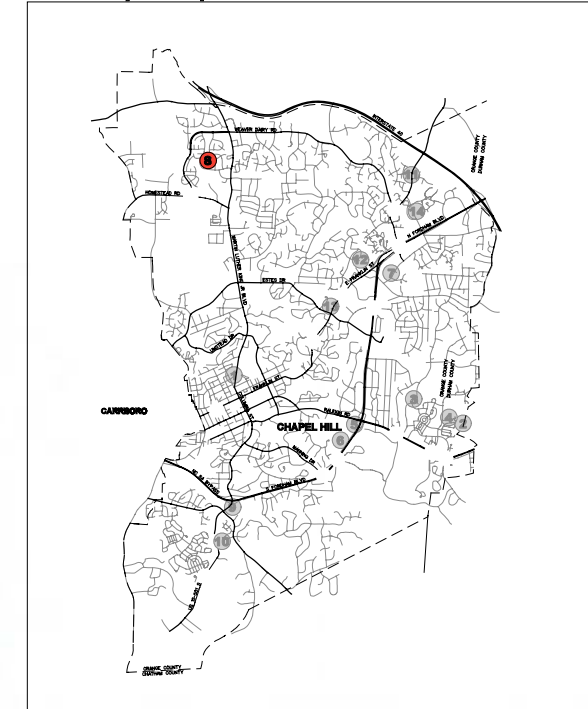
1/31/07

Key

-  SIDEWALK
-  CROSSWALK
-  HIGH VISIBILITY CROSSWALK
-  PEDESTRIAN REFUGE
-  FLASHING WARNING SIGN

Vicinity Map not to scale

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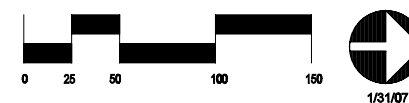
Proposed Improvements



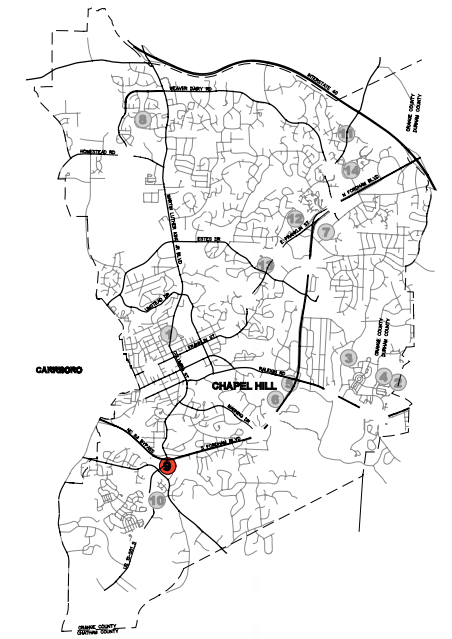
NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study

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8. Homestead Drive at Weaver Dairy Road Ext.



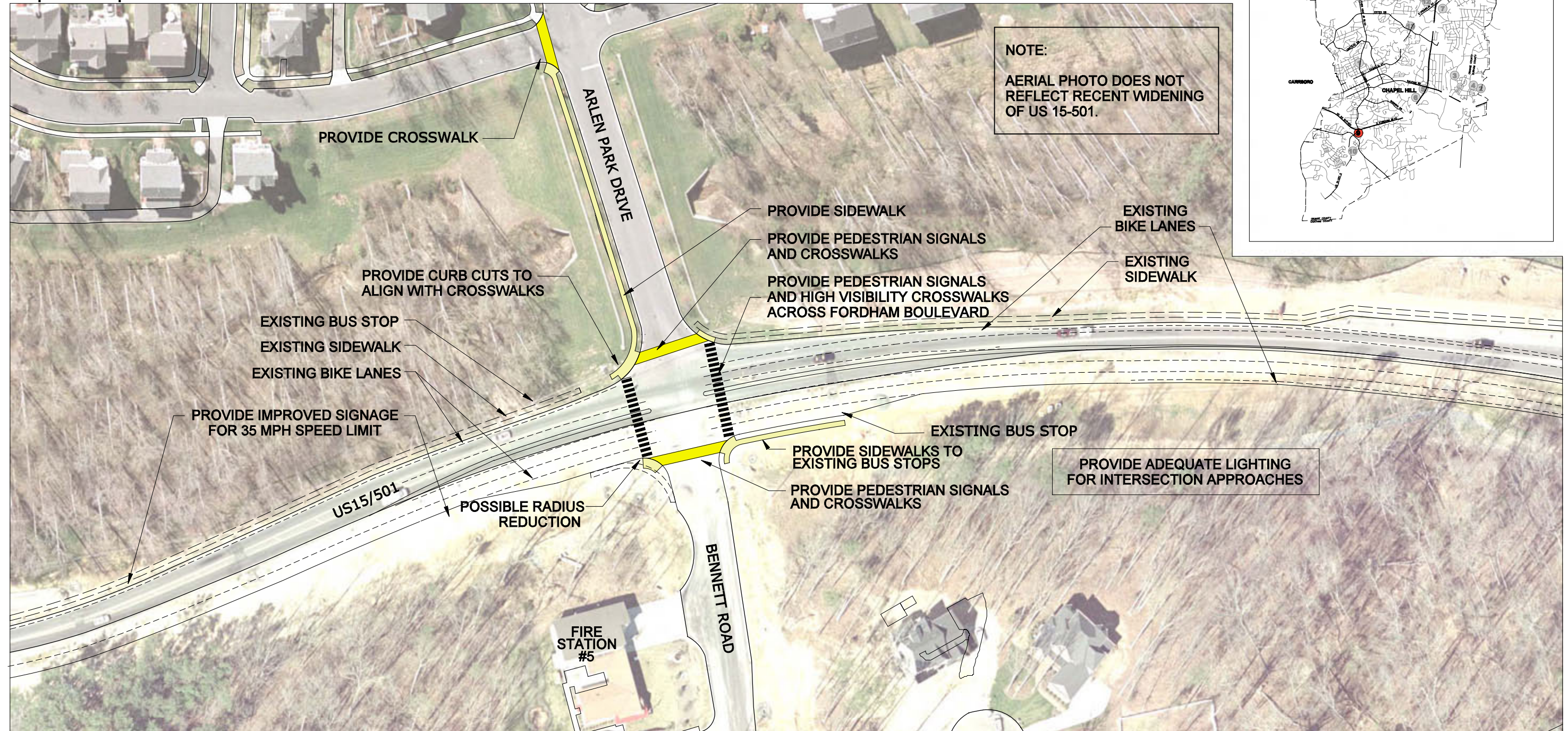
1/31/07



Key

- | | | | | |
|---|---------------------------|---|--|-----------------------|
|  | SIDEWALK |  |  | PEDESTRIAN REFUGE |
|  | CROSSWALK |  | | FLASHING WARNING SIGN |
|  | HIGH VISIBILITY CROSSWALK | | | |

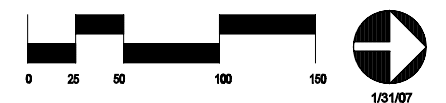
Proposed Improvements



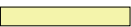




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9. US 15-501 South at Bennett Road

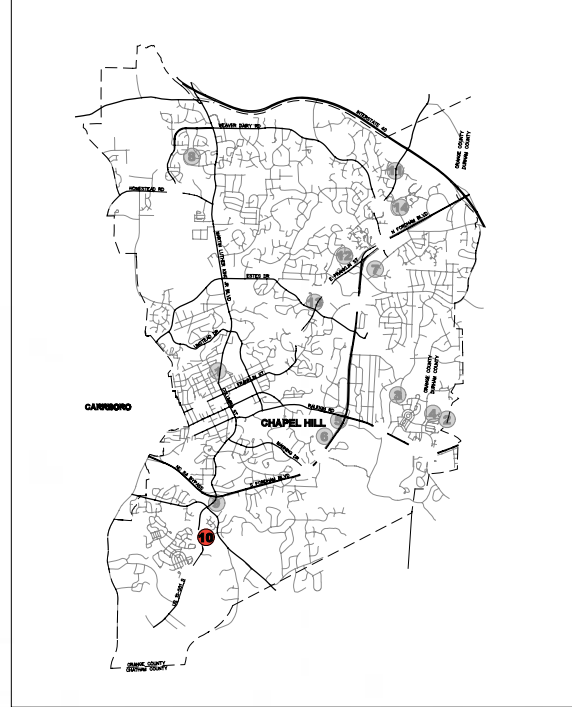


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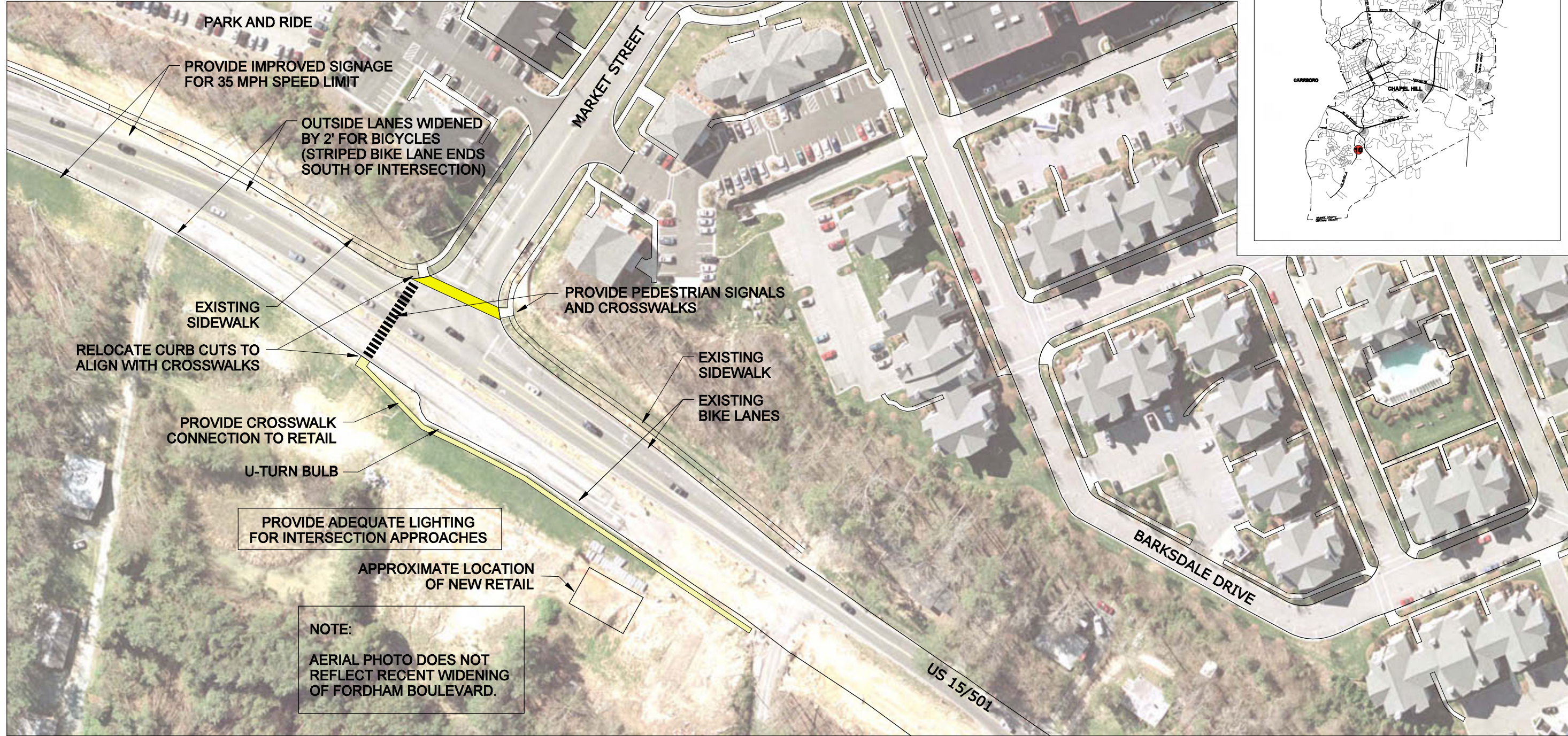
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	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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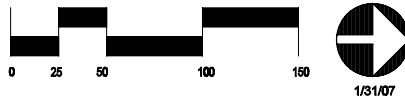
Proposed Improvements








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10. US 15-501 South at Market Street

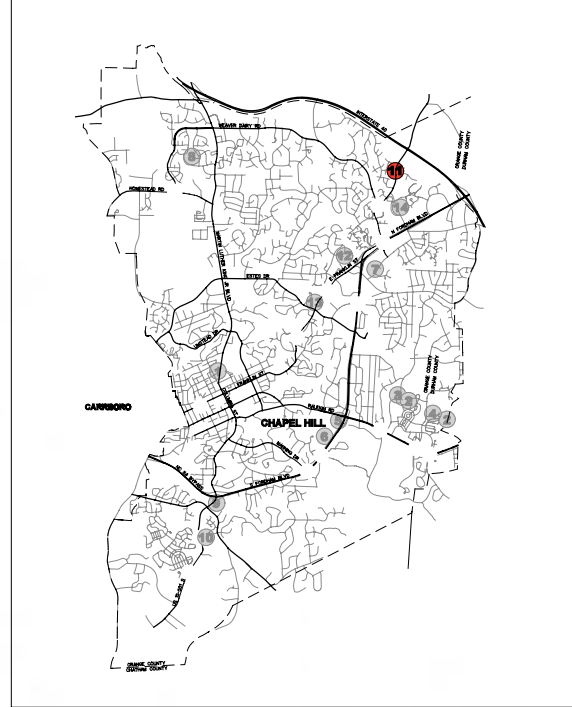


Key

	SIDEWALK		PEDESTRIAN REFUGE
	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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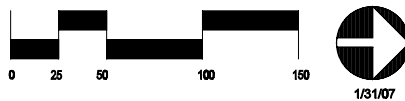
Proposed Improvements



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11. Erwin Road at Weaver Dairy Road



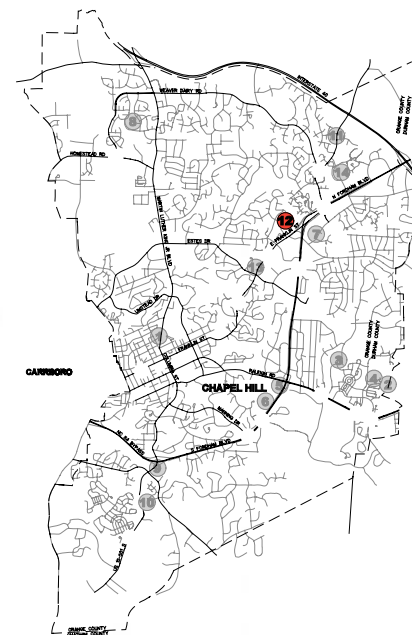
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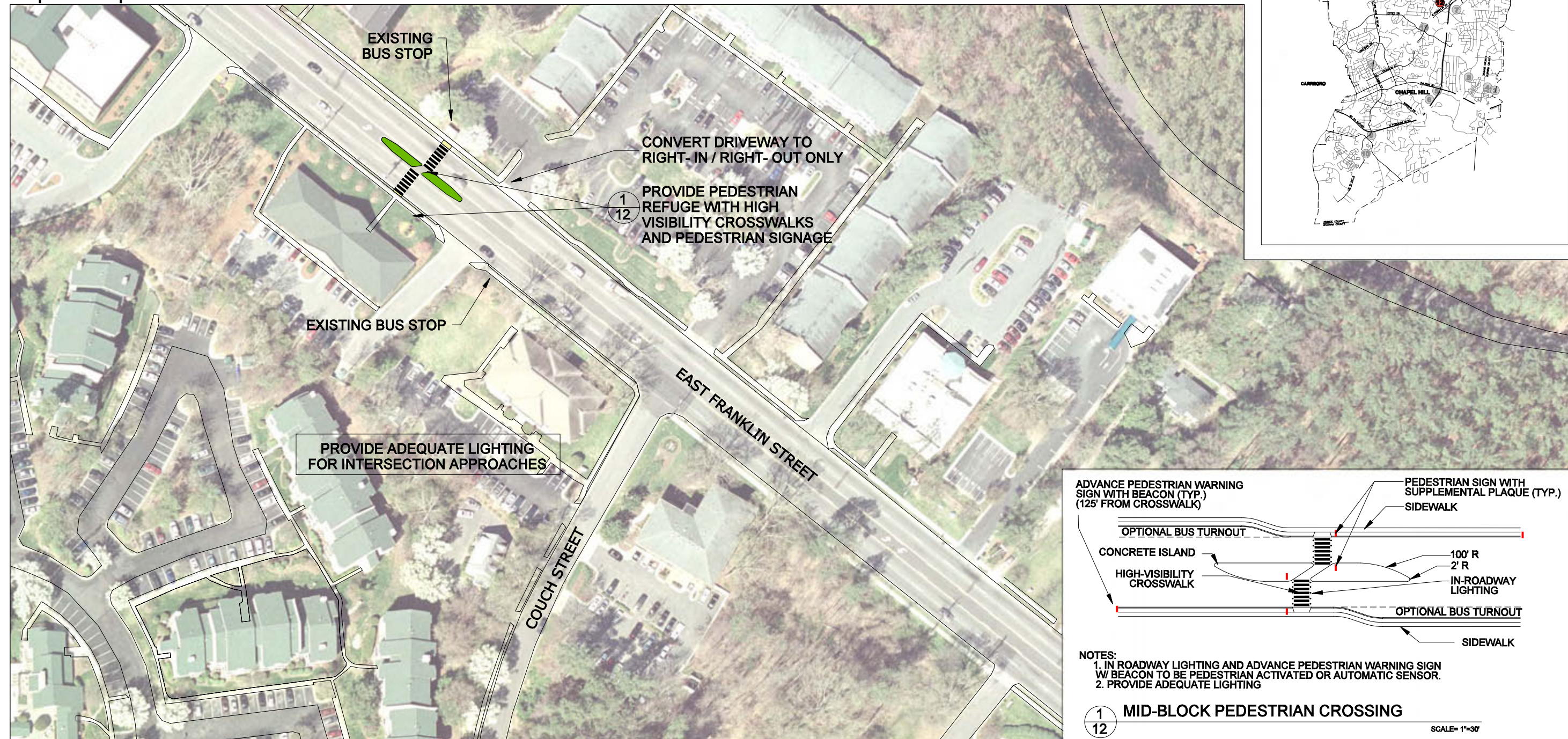
-  SIDEWALK
-  CROSSWALK
-  HIGH VISIBILITY CROSSWALK
-  PEDESTRIAN REFUGE
-  FLASHING WARNING SIGN

Vicinity Map not to scale

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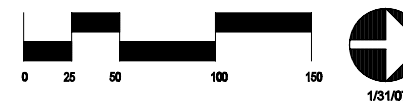
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12. East Franklin Street at Couch Street



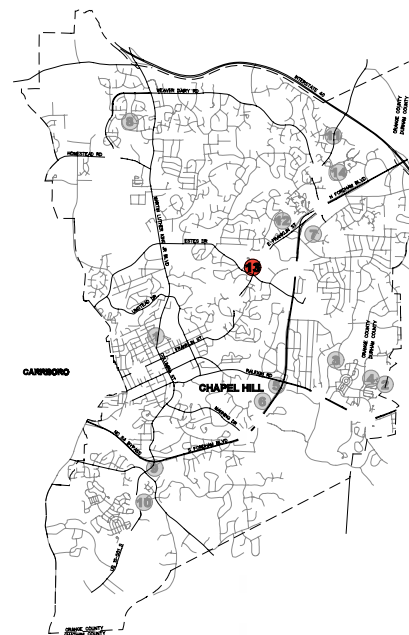
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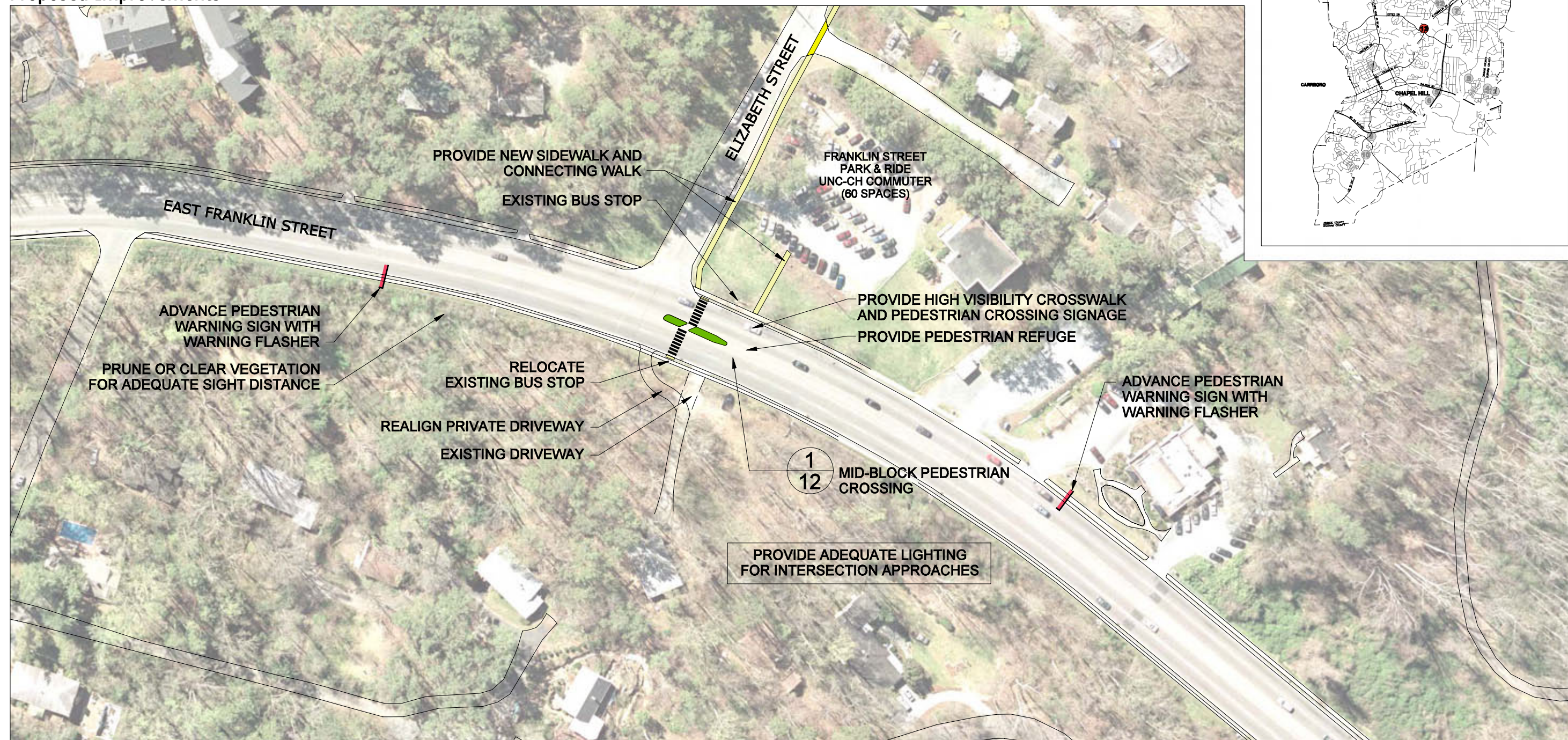
- | | | | |
|---|---------------------------|---|-----------------------|
|  | SIDEWALK |  | PEDESTRIAN REFUGE |
|  | CROSSWALK |  | FLASHING WARNING SIGN |
|  | HIGH VISIBILITY CROSSWALK | | |

Vicinity Map not to scale

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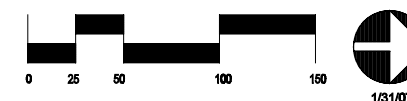
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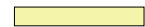


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13. East Franklin Street at Elizabeth Street



1/31/07

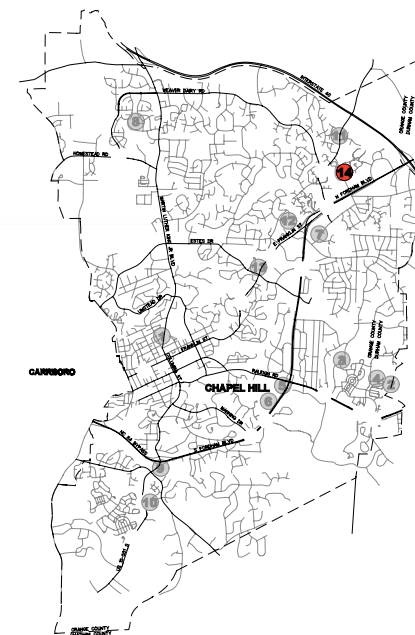
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-  CROSSWALK
-  HIGH VISIBILITY CROSSWALK

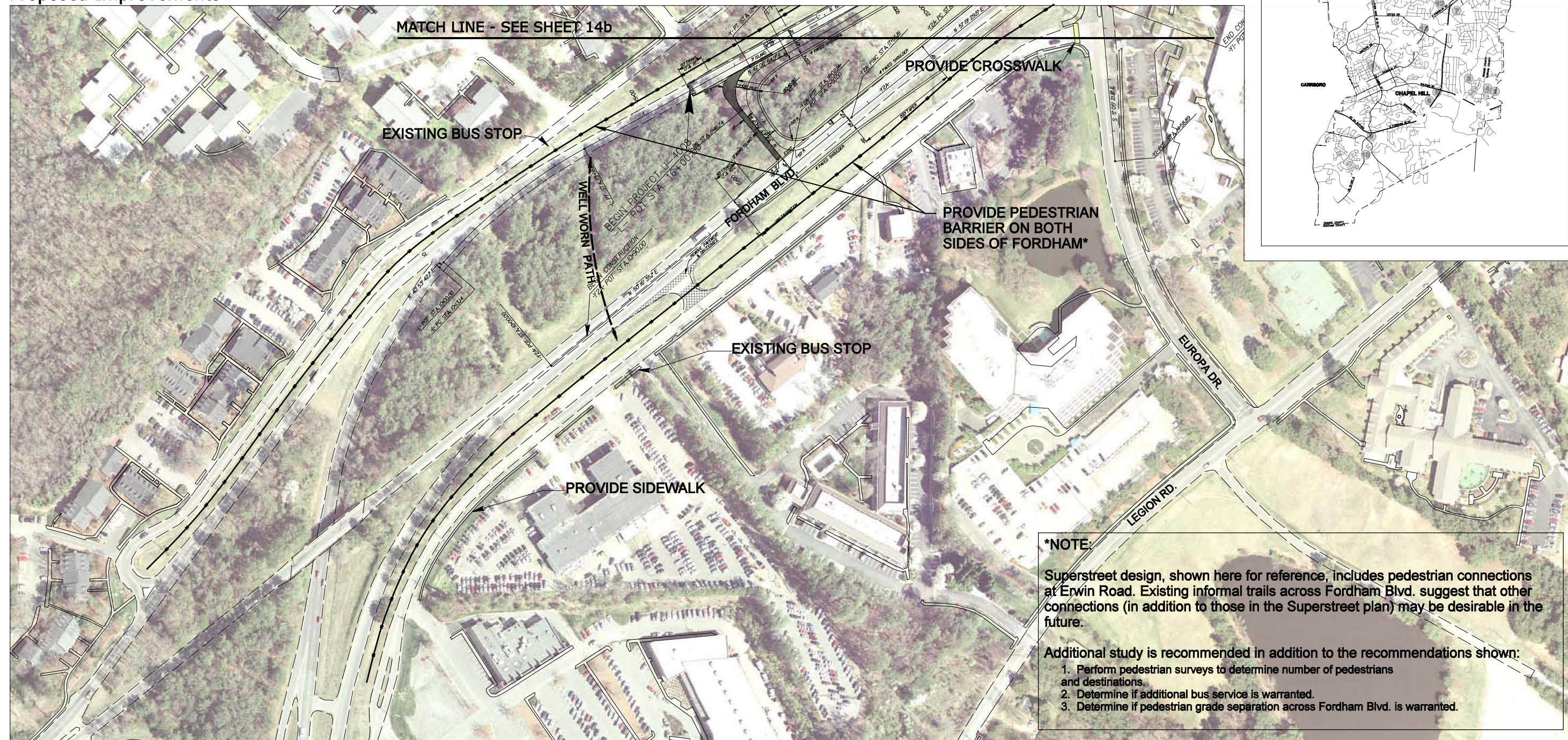
-  PEDESTRIAN REFUGE
-  FLASHING WARNING SIGN

Vicinity Map not to scale

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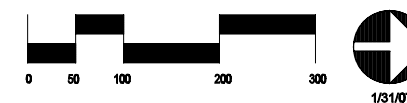
Proposed Improvements



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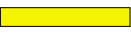


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14a. Fordham Boulevard at Erwin Road ("Superstreet" Intersection)



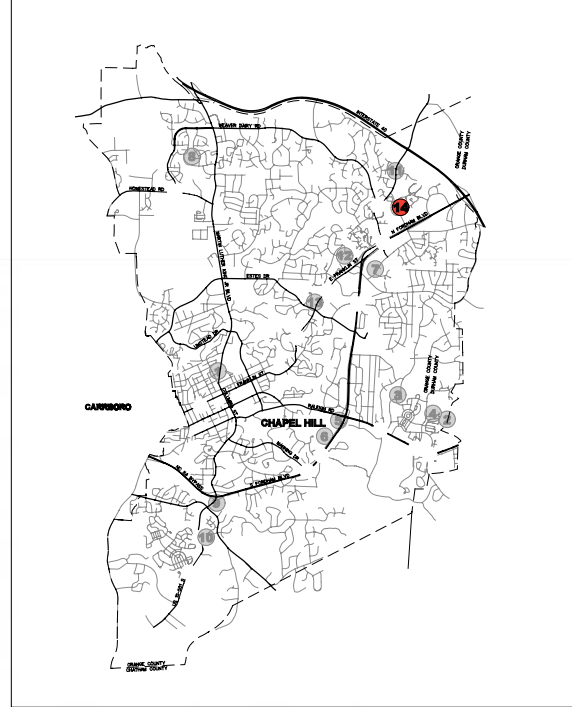
1/31/07

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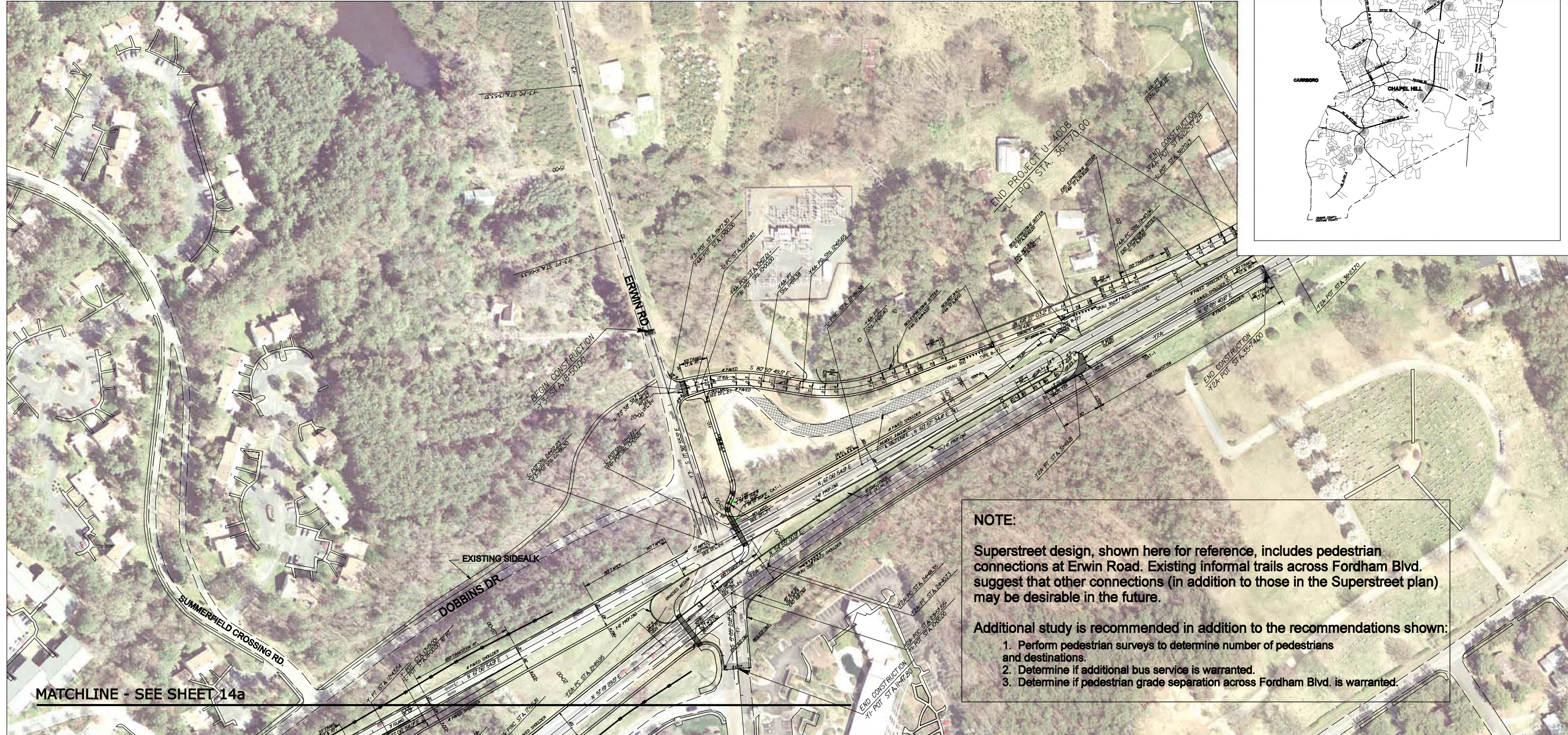
	SIDEWALK		PEDESTRIAN REFUGE
	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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Proposed Improvements



NOTE:

Superstreet design, shown here for reference, includes pedestrian connections at Erwin Road. Existing informal trails across Fordham Blvd. suggest that other connections (in addition to those in the Superstreet plan) may be desirable in the future.

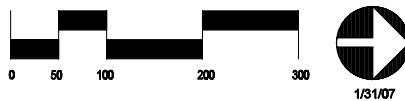
Additional study is recommended in addition to the recommendations shown:

1. Perform pedestrian surveys to determine number of pedestrians and destinations.
2. Determine if additional bus service is warranted.
3. Determine if pedestrian grade separation across Fordham Blvd. is warranted.

NC 86/Martin Luther King Jr. Boulevard Corridor and Town-Wide Pedestrian Safety Evaluation Study






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14b. Fordham Boulevard at Erwin Road ("Superstreet" Intersection)



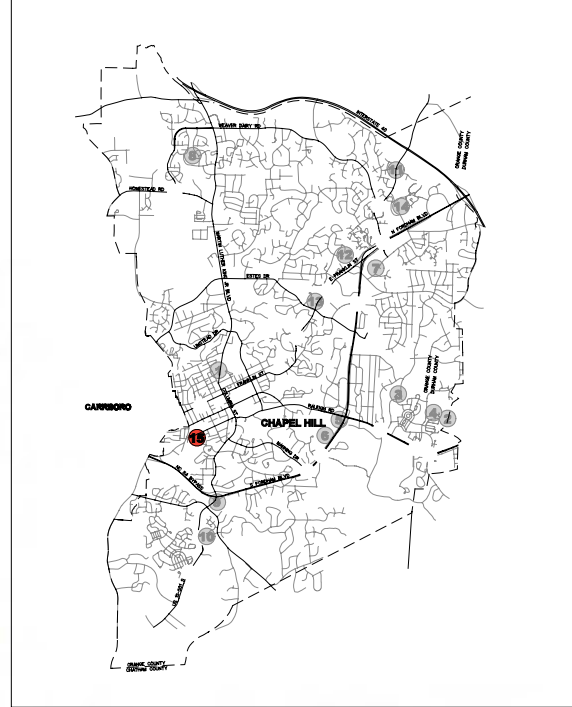
1/31/07

Key

	SIDEWALK		PEDESTRIAN REFUGE
	CROSSWALK		FLASHING WARNING SIGN
	HIGH VISIBILITY CROSSWALK		

Vicinity Map not to scale

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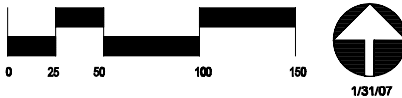
Proposed Improvements



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15. NC 54 Bypass East of Greensboro Street



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