

July 2009

FEASIBILITY STUDY FS-0510A

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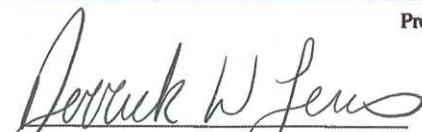


I-77 HOV Improvements From Fifth Street to I-85

Charlotte, Mecklenburg County
Division 10




Prepared For:


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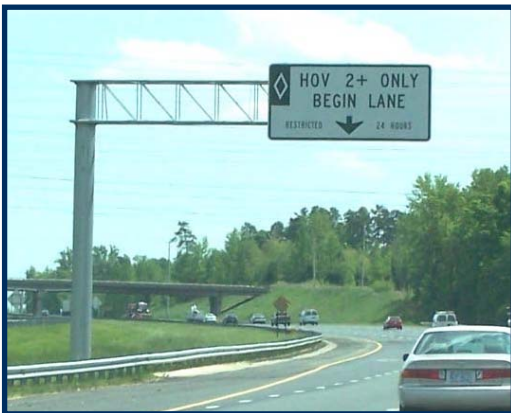
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FEASIBILITY STUDY
FS-0510A
I-77 HOV IMPROVEMENTS
FROM FIFTH STREET TO I-85
CHARLOTTE, MECKLENBURG CO.
DIVISION 10

I - GENERAL DESCRIPTION

This feasibility study addresses High-Occupancy Vehicle (HOV) improvements to the I-77 corridor from Fifth Street (just south of Brookshire Freeway) to I-85 in uptown Charlotte, Mecklenburg County for a distance of 3 miles. The need for the project is based on congestion in the corridor. The purpose of the project is to expand the existing HOV system for this section of I-77, ultimately creating a continuous 10-mile segment from Fifth Street to north of I-485.



Improvements considered in this study include a two-lane reversible barrier-separated HOV alternative and a two-lane concurrent-flow buffer-separated HOV alternative. Widening improvements for the general purpose lanes are included as well. The proposed cross section is an eight-lane divided freeway with 12-foot lanes, 12-foot paved shoulders, and two HOV lanes within varying widths of existing rights-of-way. The **Figure 1 Project Location Map** and the **Figure 2 Typical Sections** can be found in the back of the document.

It should be noted that a Feasibility Study is a preliminary document that is the initial step in the planning and design process for a candidate project and not the product of exhaustive environmental or design investigations. The purpose of this feasibility study is to describe the proposed project including physical cost, and identify potential problems that may require consideration in the planning and design phases.

Once a candidate project is identified for funding in the TIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act (NEPA), where either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) is done.

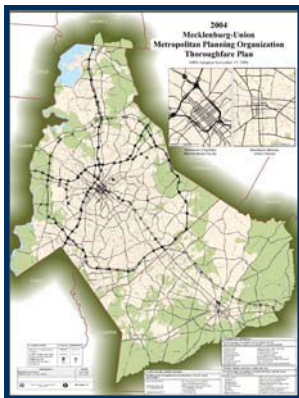
II - BACKGROUND

In December of 2004 the NCDOT opened the first HOV lanes in the state on I-77 in Charlotte. The existing southbound HOV lane runs for almost 10 miles from the I-485 interchange to the Brookshire Freeway and includes a bypass through the I-77/I-85 interchange. The existing northbound HOV lane runs 5 miles from I-85 to the I-485 interchange. These are concurrent-flow HOV lanes with a painted buffer, except for the separated southbound bypass through the I-85 interchange.



As a part of the initial implementation of the HOV system under the NCDOT I-3311 project, the FHWA permitted reduced lane and shoulder widths in the southbound direction from I-85 to Brookshire Freeway with the understanding that the section would be improved to standard widths in the future. This FS-0510A project (in conjunction with the current I-3311E project) will satisfy this requirement. The requirements basically included providing full 12-foot lane widths and 12-foot paved shoulders.

This project will also help to alleviate ongoing traffic congestion in the I-77 corridor. These HOV improvements will help provide alternative, efficient, reliable interstate travel through Charlotte. The NCDOT has identified this interstate corridor as a Strategic Highway Corridor (SHC), as adopted in September 2004. Just as the existing HOV lanes contributed to achieving SHC goals such as transportation mobility, interstate connectivity and environmental stewardship, the expansion of the HOV system to uptown Charlotte as proposed in this study will do so to an even greater extent.



I-77 is designated as an interstate on the NCDOT Functional Classification System and as a freeway-expressway by the 2004 MUMPO (Mecklenburg-Union Metropolitan Planning Organization) Thoroughfare Plan. This section of I-77 currently has 4 General Purpose (GP) and 1 HOV southbound lanes and 4 GP northbound lanes from Brookshire Freeway to I-85. There is a 12 foot wide median with a concrete barrier from Brookshire Freeway to LaSalle Street and a median width varying from 12 to 100 feet from LaSalle Street to I-85 where the north- and southbound lanes crossover each other. The existing right-of-way varies between interchange areas from approximately 250 to 350 feet.

Land use within the study area is a mix of urban residential and industrial, with some institutional, office/business park, greenway, park/open space and retail use interspersed. Development is well-established, dense, and in close proximity to the interstate corridor.

There is a CSX Corporation railroad crossing over the interstate just south of Brookshire Freeway (I-277/NC 16). Improvements considered in this study include replacing the existing overpass bridge and relocating the railroad just to the north at its existing elevation. It has been indicated that the railroad may want additional tracks across the bridge. Additional coordination is needed.

ADJACENT PROJECTS AND STUDIES

There are several NCDOT projects and studies listed in the 2009-2015 State Transportation Improvement Program (STIP) and in the MUMPO DRAFT 2035 Long Range Transportation Plan (LRTP) that are adjacent to the study corridor:

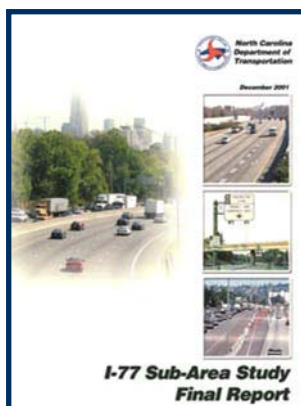
STIP project I-3311E proposes widening the I-77 southbound lanes to standard widths from north of I-277 (Brookshire Freeway) to south of I-85. The project may include some minor ramp improvements. Planning and design are in progress. The project is currently scheduled for right-of-way and construction in 2012 and 2013. These improvements are not accounted for in this study since no designs were yet available.

STIP feasibility study FS-0810A is scheduled and includes the study of widening improvements on I-77 from the South Carolina state line to Fifth Street in Charlotte.

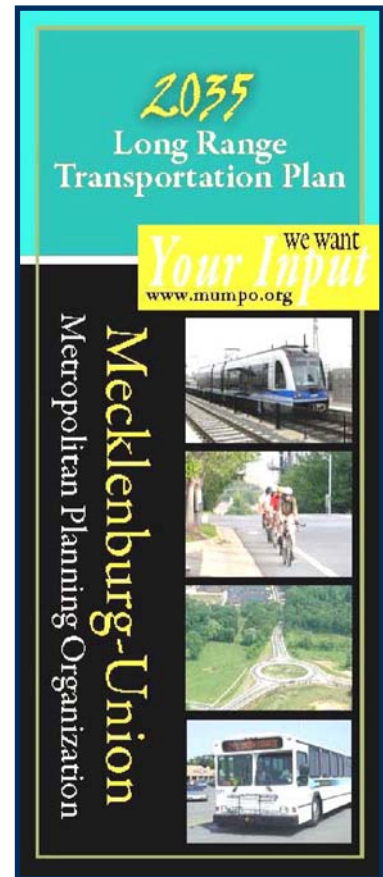
STIP feasibility study FS-0810B is in progress and includes assessing the feasibility of extending the existing HOV facility north to Griffith Street (exit 30) in Davidson, adding a general purpose lane in each direction, and converting the existing and/or extended HOV lanes to HOT (High-Occupancy/Toll) lanes.

There are many other future projects in the area, including, but not limited to:

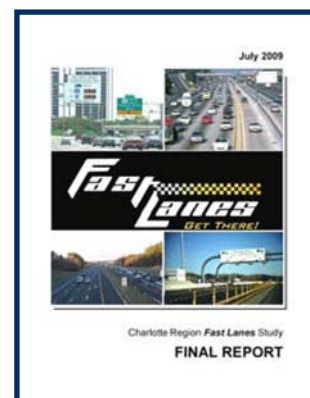
- ◆ Multi-modal “Charlotte Gateway Station” in Center City
- ◆ I-3803, I-85 widening from NC 73 to US 29-NC 49 Connector
- ◆ I-4750, I-77 widening from NC 73 in Huntersville to I-40 in Statesville
- ◆ I-5014, Brookshire Freeway (I-277) interstate lighting
- ◆ R-2248E and R-2123CE, I-485 outer beltway from NC 115 to I-85 North



In addition, two other studies are important complimentary resources for this FS-0510A study. In 2001, the NCDOT published the final report of the I-77 Sub-Area Study. The Sub-Area study included executive and technical steering committees made up of local and state representatives. The purpose of the study was to develop alternatives for addressing existing and projected traffic congestion on the I-77 north corridor in Charlotte. Improvements considered included additional GP lanes, auxiliary lanes, interchange upgrades and HOV/managed lanes. The 2001 Sub-Area study has provided a good baseline for this study’s HOV concepts.



The other, more recent study that is also an important resource for this document is the Charlotte Region *Fast Lanes* Study. The final report for the *Fast Lanes* study was completed this past July 2009. Based on the continued need to “serve travel demand through innovative uses”, “the Charlotte DOT, NCDOT, SCDOT and other regional agencies initiated an examination of existing and planned major highways throughout a 10-county region to identify where *Fast Lanes* – HOV, high-occupancy toll (HOT) or truck-only-toll (TOT) facilities – could improve roadway capacity” (*Fast Lanes*, p.1-1).



The *Fast Lanes* study provides analysis of the “technical, financial and institutional feasibility” of managed lanes in the region (*Fast Lanes*, p. 2-1), including the I-77 north, I-77 south and I-277 corridors. The Phase 2 results showed a significant time savings could be achieved along I-77 with managed lanes. Travelers from Davidson to Center City Charlotte are estimated to save as much as 10 minutes in year 2013 and 20 minutes in year 2030 along the 20-mile stretch (*Fast Lanes*, Ch. 3.2). The analysis also indicates that in 2030 almost all users in the *Fast Lanes* would experience free flow travel conditions compared to just 25% or less of the general purpose lane users. *Fast Lanes* also addresses aspects of traffic analysis such as travel demand and projected HOV usage (*Fast lanes*, Ch. 3).

III - TRAFFIC AND SAFETY

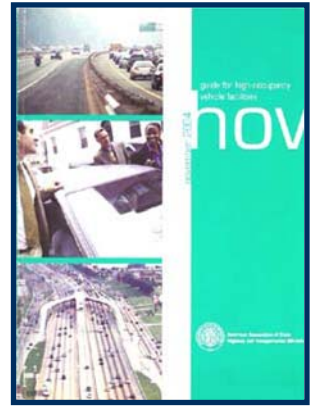
A detailed traffic analysis was not performed for this study. Included here is a general forecast of future traffic with managed lanes and an estimation of the associated levels of service (LOS).

Base year 2007 and horizon year 2035 traffic forecasts for the Annual Average Daily Traffic (AADT) used in this study were provided by the NCDOT Transportation Planning Branch and are based on the Metrolina Regional Travel Demand Model. The horizon year forecasts assume completion of project I-3311 and all projects listed in the MUMPO 2004 LRTP to be completed in year 2030. The traffic forecast diagrams are shown on **Figures 3, 4 and 5** in the back of the document. Forecast Scenario 1 includes an eight-lane I-77 north of I-85. Forecast Scenario 2 includes a ten-lane I-77 north of I-85.

The base year AADT along the No Build corridor ranges from 118,000 to 162,600 vehicles per day (vpd) (including 5,000 HOVs southbound). The predicted horizon year AADT along the No Build corridor ranges from 153,200 to 236,400 vpd (including 12,000 HOVs southbound). The predicted horizon year 2035 AADT along the Build Alternative ranges from 183,600 to 239,200 vpd (including 24,200 to 25,000 two-way HOVs). The percentage of truck traffic is 14% (5% Duals and 9% TTST's) for both base year and horizon year general purpose traffic along I-77 between Fifth Street and I-85.

The No Build alternative indicates failing LOS in both base year 2007 and horizon year 2035 analyses for general purpose traffic. All elements of the proposed HOV lanes are anticipated to operate at a LOS C or better in horizon year 2035.

It should be noted that the peak hour traffic split is predicted to range from 60/40 to 65/35 in horizon year 2035; i.e. 35% of the traffic will be traveling in one direction in the peak hour and 65% in the other. “A 60/40 split or higher in the design year and the absence of anticipated severe freeway congestion in the off-peak travel direction will usually justify consideration of a reversible facility” (2004 AASHTO HOV, p.14). CalTrans (California Dept. of Transportation) says reversible “operation is feasible only if the existing and forecast peak period directional traffic split is 35% or less in one direction during the design life of the project” (2003 CalTrans HOV, Ch. 2, p. 2).



Therefore, the traffic is on the threshold for use of reversible HOV lanes. A barrier-separated reversible HOV option is considered in this study.

Comparative safety studies of concurrent-flow buffer-separated versus barrier-separated managed lanes have not been conclusive. Concurrent flow managed lanes appear to offer more opportunities for violations, since there is no physical obstruction. They can also experience crashes related to the speed differential between adjacent general purpose and managed lanes. Barrier-separated lanes can experience safety issues where barriers limit movement around traffic incidents.



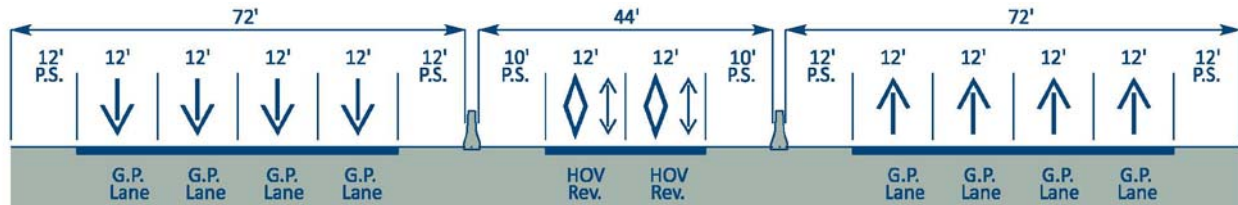
According to the Work Zone Safety and Mobility Policy Guidelines, this will be a Significant, Level 1 project and is anticipated to have transportation network impacts during construction. Future analysis is needed in the subsequent stages of the project to ensure that work zone impacts are identified and traffic management strategies are implemented.

IV - DESCRIPTION OF ALTERNATIVES

The improvements being considered are an expansion of the existing I-77 HOV lanes. The study area extends from Fifth Street (just south of Brookshire Freeway) to I-85 for a distance of 3 miles. Two candidate alternatives are considered in this study: 1) A two-lane reversible barrier-separated HOV alternative (for a total of 10 lanes) and 2) A two-lane painted-buffer concurrent-flow HOV alternative (for a total of 12 lanes). Both alternatives widen the shoulders and narrow southbound lanes to standard widths, accommodate the additional HOV lanes and satisfy FHWA conditions. Proposed structures accommodate an additional north- and southbound general purpose lane on I-77.

ALTERNATIVE 1

Alternative 1 includes the construction of a two-lane reversible HOV system between Brookshire Freeway and I-85. The functional design concept for Alternative 1 can be found on **Figures 6 and 7**. It includes direct HOV connections to I-77 north and south, Brookshire Freeway east, and I-85 north. The I-77 north connections transition back into the existing concurrent flow HOV lanes north of I-85. The other direct connections taper back into existing general purpose lanes.



The cross section for Alternative 1 is an eight-lane divided freeway with 12-foot travel lanes, 12-foot paved shoulders, and a 46-foot median (accommodating the two-lane reversible HOV) all within varying existing rights-of-way. The two-lane reversible HOVs have 12-foot lanes and 10-foot paved shoulders. This results in a roadway section with a total of 10 lanes. Some additional right-of-way is needed along I-77 between Oaklawn Avenue and LaSalle Street and along relocated cross streets.

Alternative 1 costs listed below include the following:

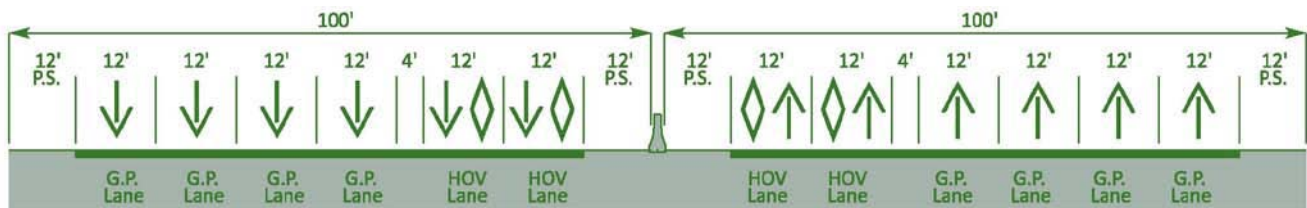
- ◆ New bridges and retaining walls for the direct HOV connections
- ◆ Extension of three large Irwin Creek box culverts
- ◆ Widening of the existing Brookshire Fwy. overpass structure just west of N. Graham Street
- ◆ Removal of the Hamilton Street bridge overpass
- ◆ Replacement of the CSX railroad bridge overpass
- ◆ Replacement of the Oaklawn Avenue bridge overpass
- ◆ Replacement of the LaSalle Street/Atando Avenue interchange bridge overpass
- ◆ Removal of the Pedestrian bridge overpass
- ◆ Replacement of the I-85/Statesville Avenue interchange bridge overpass
- ◆ Retaining walls along the western side of I-77 between Fifth Street and LaSalle Street
- ◆ A noise wall along the western side of I-77 south of LaSalle Street

It is anticipated that Alternative 1 will require the relocation of **22** residences and **0** businesses. There is no Utility Relocation or Utility Right-of-Way anticipated with this project alternative. It is estimated that the scope of ITS deployment for Alternative 1, including replacement of existing devices and installation of new devices, will cost \$ 2,500,000. The total cost, including ITS, construction and right-of-way, is estimated to be \$ 118,450,000.

Right-of-Way.....	\$ 3,950,000
Construction.....	\$ 112,000,000
ITS Deployment.....	\$ 2,500,000
Total Cost (Alternative 1).....	\$ 118,450,000

ALTERNATIVE 2

Alternative 2 includes the construction of a two-lane concurrent-flow HOV system between Brookshire Freeway and I-85. The functional design concept for Alternative 2 can be found on **Figures 8 and 9**. It includes direct HOV connections to I-77 north and south, Brookshire Freeway east, and I-85 north. The proposed HOV lanes begin north of Fifth Street and connect to the existing concurrent-flow HOV lanes north of I-85. The HOV ramps to and from I-85 north connect to existing general purpose ramps.



The cross section for Alternative 2 is a twelve-lane divided freeway with 12-foot travel lanes, 12-foot paved shoulders, 4-foot buffers between general purpose and HOV lanes, and a concrete barrier median divider all within varying existing rights-of-way. Some additional right-of-way is needed along I-77 between Oaklawn Avenue and LaSalle Street and along relocated cross streets.

Alternative 2 costs listed below include the following:

- ◆ New bridges and retaining walls for the direct HOV connections
- ◆ Extension of three large Irwin Creek box culverts
- ◆ Widening of the existing Brookshire Fwy. overpass structure just west of N. Graham Street
- ◆ Removal of the Hamilton Street bridge overpass
- ◆ Replacement of the CSX railroad bridge overpass
- ◆ Replacement of the Oaklawn Avenue bridge overpass
- ◆ Replacement of the LaSalle Street/Atando Avenue interchange bridge overpass
- ◆ Removal of the Pedestrian bridge overpass
- ◆ Retaining walls along the western side of I-77 between Fifth Street and LaSalle Street
- ◆ A noise wall along the western side of I-77 south of LaSalle Street

It is anticipated that Alternative 2 will require the relocation of **22** residences and **0** businesses. There is no Utility Relocation or Utility Right-of-Way anticipated with this project alternative. It is estimated that the scope of ITS deployment for Alternative 2, including replacement of existing devices and installation of new devices, will cost \$ 2,500,000. The total cost, including ITS, construction and right-of-way, is estimated to be \$ 121,100,000.

Right-of-Way.....	\$ 3,600,000
Construction.....	\$ 115,000,000
ITS Deployment.....	\$ 2,500,000
Total Cost (Alternative 2).....	\$ 121,100,000

V - HUMAN AND NATURAL ENVIRONMENT ISSUES

An environmental screening was conducted to identify potential environmental issues; including occurrences of threatened or endangered species, stream and wetland impacts, and human environment issues. The information obtained for the environmental screening is from the Mecklenburg County Geographic Information System (GIS) and NCDOT GIS databases. Please also refer to **Figure 10 – Environmental Features Map** in the back of the report.

HUMAN ENVIRONMENT

- ◇ West Pinewood Cemetery is anticipated to be impacted by this project.
- ◇ Biddleville Park may be impacted by the CSX railroad bridge reconstruction.
- ◇ Several vacant (County owned) and residential properties near Irwin Creek and Oaklawn Ave will be impacted by this project.
- ◇ Several residential properties behind the proposed Noise Wall will be impacted by this project.
- ◇ The Lincoln Heights Elementary School property will be impacted by the reconstruction of the LaSalle Street/Atando Avenue bridge overpass.
- ◇ There are potential environmental justice issues along the project corridor. More detailed investigations will be needed in the later planning stages of this project.
- ◇ No other known community facilities, schools, parks, recreation areas, or historical/archaeological sites observed during the development of this study will be affected by this project.

NATURAL ENVIRONMENT

- ◇ Floodplains and stream buffers of Irwin Creek (along I-77 from Fifth Street to Atando Avenue) will be impacted by this project.
- ◇ The US Fish and Wildlife Service - National Wetland Inventory mapping indicates that this project will not impact wetlands.
- ◇ The NC Department of Environmental and Natural Resources – Natural Heritage Section indicates that there are no known occurrences of threatened or endangered species located within the project area.
- ◇ No known critical watersheds will be affected by this project.

VI - PROJECT COSTS AND RECOMMENDATIONS

TABLE 1: TOTAL PROJECT COSTS						
Alternative	Right-of-Way	Construction	ITS Deployment	Total Cost	Residential Relocations	Business Relocations
1 (Reversible)	\$3,970,000	\$112,000,000	\$2,500,000	\$118,470,000	22	0
2 (Concurrent)	\$3,600,000	\$115,000,000	\$2,500,000	\$121,100,000	22	0

Table 1 above shows that the estimated cost for the proposed project ranges from \$ 118,470,000 to \$ 121,100,000. It is also estimated that the project requires 22 residential relocations.

The comparison points below can help distinguish the two alternatives considered. There are “pros” and “cons” for both reversible HOV lanes and concurrent-flow HOV lanes.

COMPARISON POINTS

Alternative 1 (reversible barrier-separated HOV):

- ◆ PRO: physical separation from general purpose lanes
- ◆ PRO: physical cost is estimated to be less
- ◆ CON: will require additional operational costs (not included in this estimate)
- ◆ CON: requires replacement of the I-85/Statesville Avenue interchange bridge
- ◆ CON: is on the threshold of peak hour splits for use of reversible systems

Alternative 2 (concurrent-flow HOV):

- ◆ PRO: provides a consistent design with the adjoining existing HOV lanes
- ◆ PRO: provides continuous operation
- ◆ PRO: provides a consistent number of lanes in peak and off-peak hours
- ◆ CON: enforcement may be more challenging than barrier-separated
- ◆ CON: requires a 10-foot wider cross-section than Alternative 1

The estimated physical costs for the two alternatives are essentially the same. The costs provide a baseline for improvements that will be further defined and refined once the project is funded. These future refinements can include a third option suggested by the Charlotte DOT (see **Section VII** below).

Guidance from state and local stakeholders will be critical in choosing what form the HOV system expansion should take. Ongoing HOV studies on adjacent portions of I-77, including HOT conversions, should be considered in the subsequent stages of the project as well.

This study recommends Alternative 2 as a reasonable and feasible solution for expanding the existing HOV system on I-77 in Charlotte. The concurrent-flow HOV alternative provides a consistent design with the adjoining existing HOV lanes, provides continuous operation (non-reversible or changing), does not require replacement of the existing I-85/Statesville Avenue interchange bridge, does not require the additional operational costs of a reversible system, and provides this at approximately the same cost as a reversible HOV alternative.

VII - ADDITIONAL COMMENTS

Based on Charlotte DOT comments, an additional HOV configuration could be considered in the subsequent planning stages. It is a 3-lane contraflow movable barrier system where two lanes are in operation for the higher peak hour volume and one lane is open for the lower volume. The barrier between the two directions is a movable, “zipper” type barrier that would be moved between the morning and evening rush hours, switching a direction from one to two lanes and vice versa.

Since the predicted peak hour split is on the threshold for reversible HOVs, a 3-lane contraflow movable barrier configuration may be more desirable than a strictly reversible system. The direct HOV connections would be similar in concept to those in Alternative 2 (the concurrent-flow option). The physical cost is estimated to be within the range of the two alternatives of this study.

The proposed interchange configurations of this study are preliminary and may be modified in the subsequent design and planning stages of the project.

VIII - ADDITIONAL RESOURCES

NCDOT I-77 Sub-Area Study Final Report, December 2001

MUMPO Charlotte Region *Fast Lanes* Study Final Report, July 2009 (www.fastlanes.org)

AASHTO Guide for High-Occupancy Vehicle Facilities, November 2004

CalTrans High-Occupancy Vehicle Guidelines, August 2003(www.dot.ca.gov)

Nevada DOT HOV/Managed Lanes/Ramp Metering Design Manual, March 2006 (www.nevadadot.com)

IX - FIGURES

Figure 1 - Project Location Map

Figure 2 - Typical Sections

Figures 3 through 5 - Traffic Forecast Diagrams

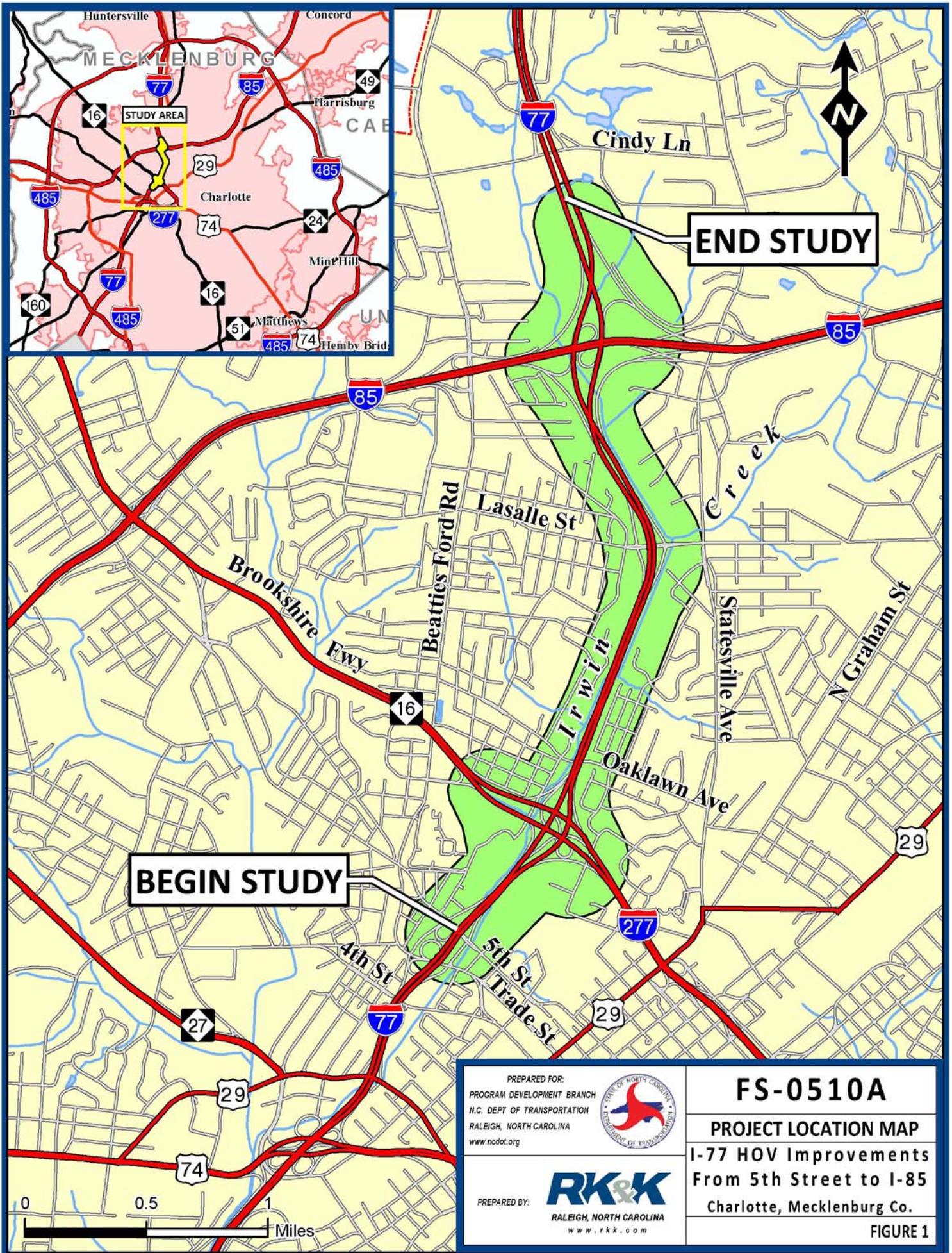
Figure 6 - Alternative 1, Map 1 of 2

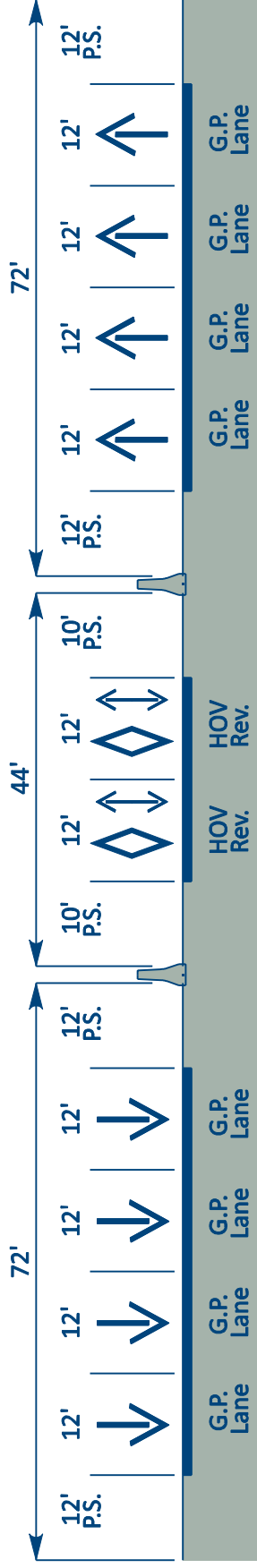
Figure 7 - Alternative 1, Map 2 of 2

Figure 8 - Alternative 2, Map 1 of 2

Figure 9 - Alternative 2, Map 2 of 2

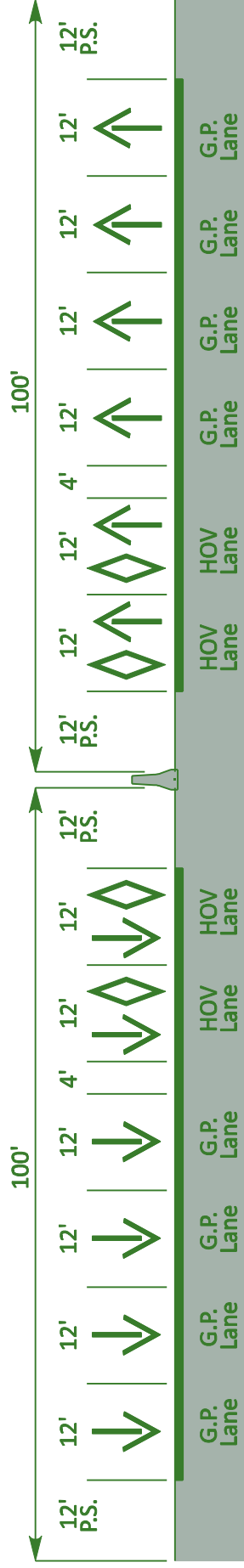
Figure 10 - Environmental Features Map





TYPICAL NO. 1 - ALTERNATIVE 1

10 Lanes - 4+2◇ Barrier-Separated Reversible HOV

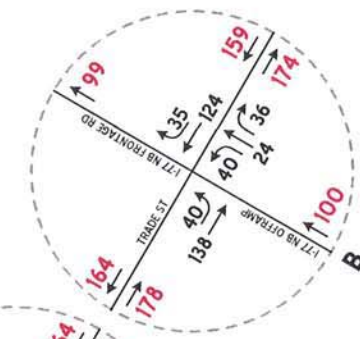
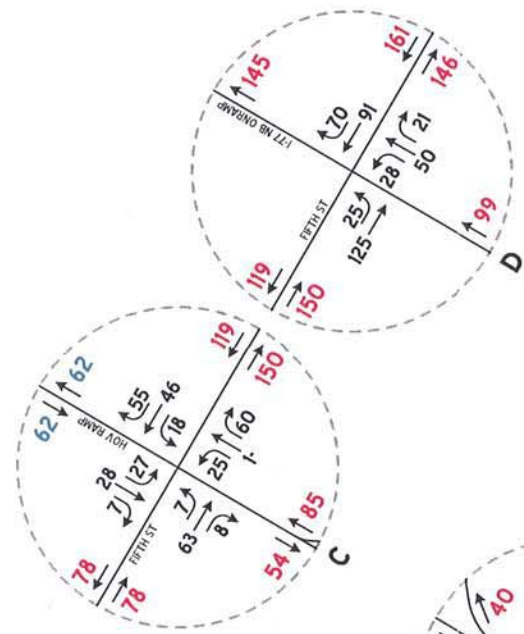
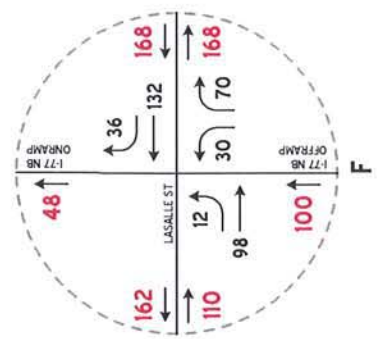
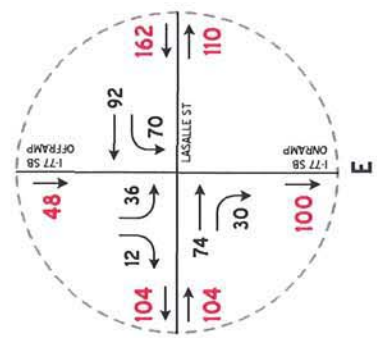
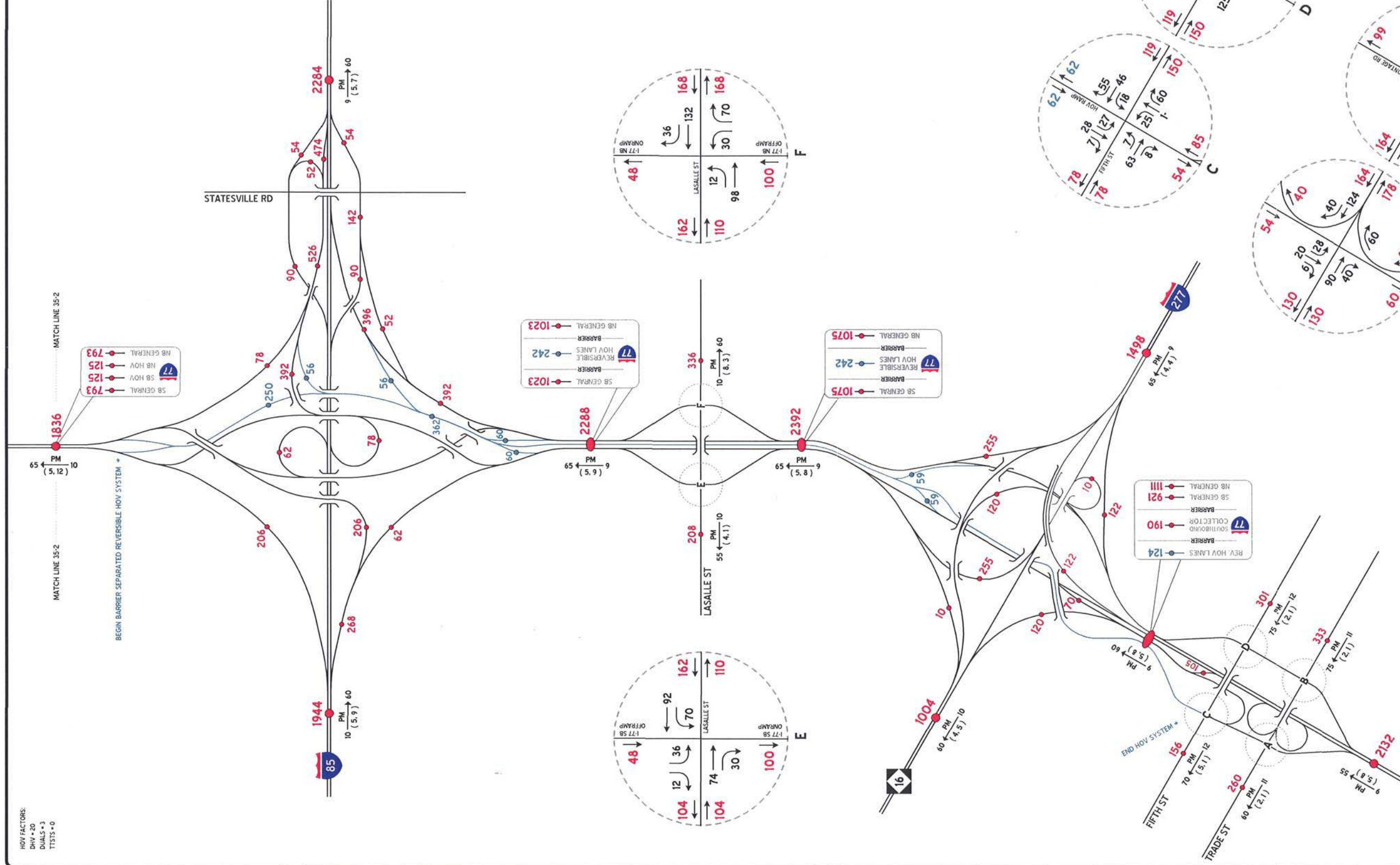


TYPICAL NO. 2 - ALTERNATIVE 2

12 Lanes - 4+2◇ Concurrent Flow HOV

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<p>TYPICAL SECTIONS</p>	<p>I-77 HOV Improvements From 5th Street to I-85 Charlotte, Mecklenburg Co.</p>
<p>RKK RALEIGH, NORTH CAROLINA www.rkk.com</p>	<p>FIGURE 2</p>

HOV FACTORS:
DHV = 20
DUALS = 3
TTSTS = 0



AVERAGE ANNUAL DAILY TRAFFIC WITH TRUCK, DHV AND D FACTORS

2035 HORIZON YEAR Scenario 1* - Figure 4

* with an 8-lane I-77 north of I-85

PROJECT FS-0510A

DATE: June 12, 2007 DIVISION: 10

COUNTY: Mecklenburg WBS: 39929.1.1

LOCATION: I-77 from Fifth St to NC73

PROJECT: Add HOV lanes

PREPARED BY: Tanner

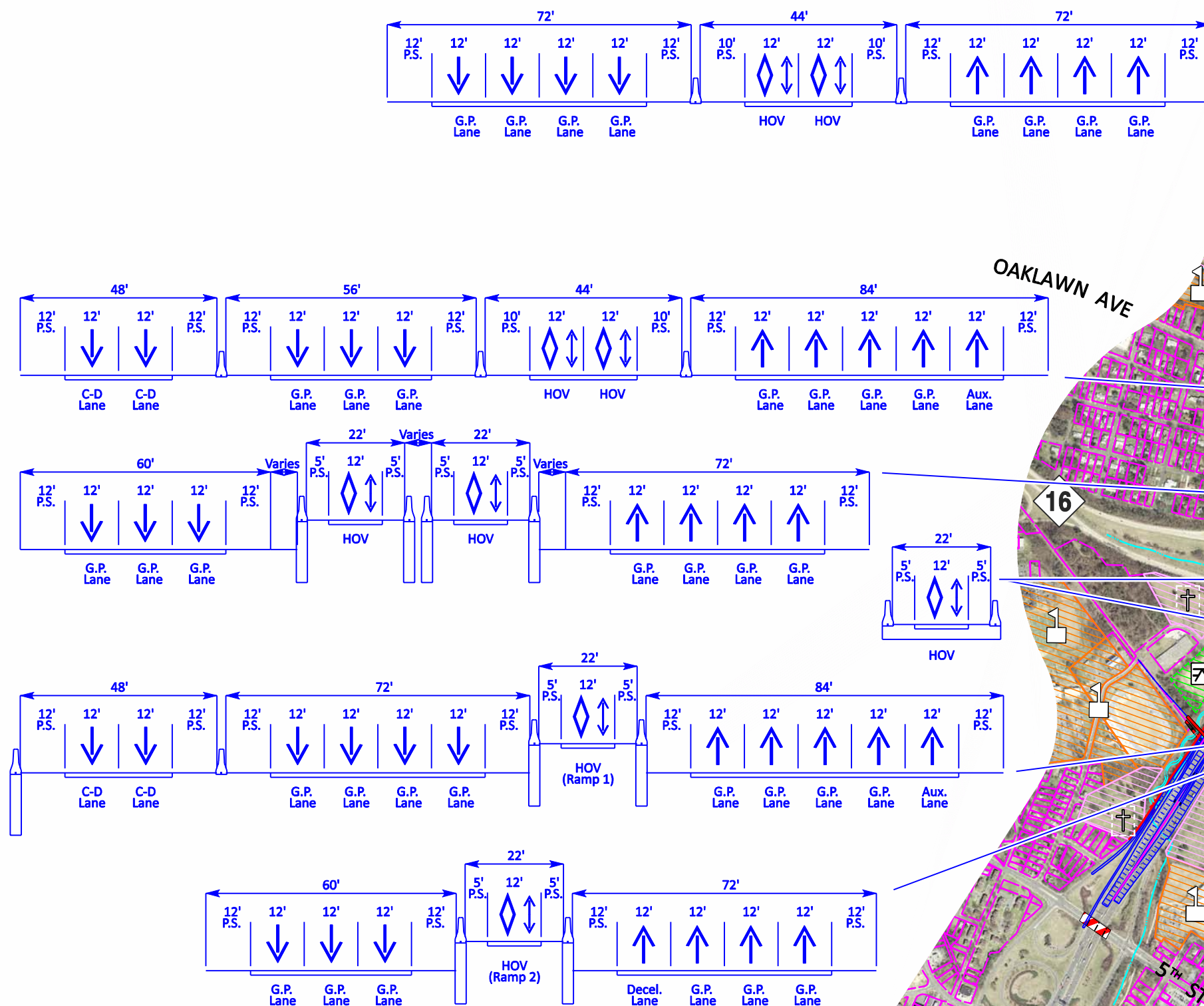
LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- ###- Much less than VPD
- ### Turning volume (VPD)
- DHV PM DHV (d.t.) Design Hourly Volume (%) = K30 PM Peak Period
- D PM Peak Hour Directional Split (%)
- ###- Indicates Direction of D
- ### TT-STs (%)

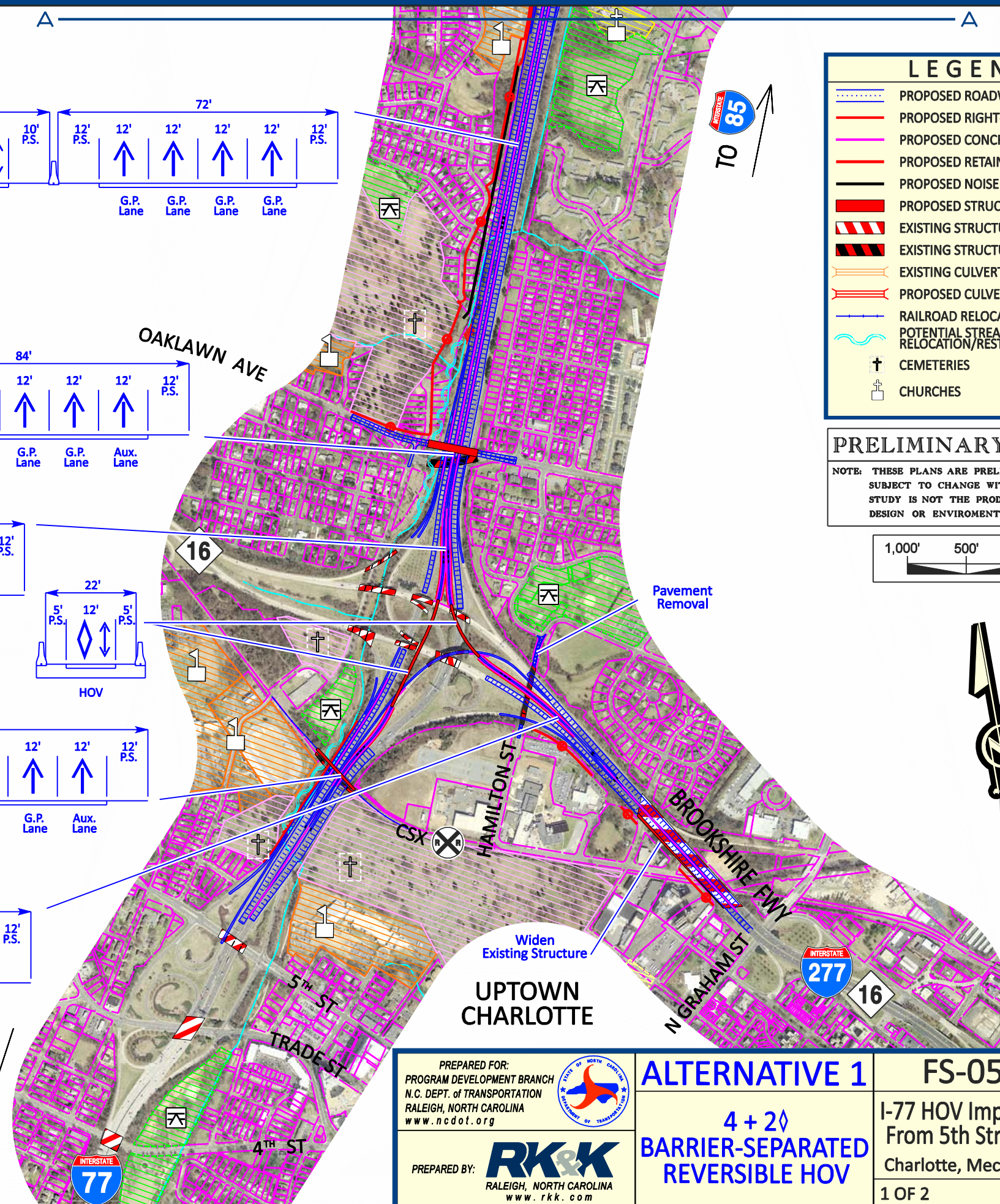


MATCH LINE A

A



TO ROCK HILL, SC

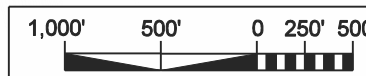


LEGEND

- PROPOSED ROADWAY
- PROPOSED RIGHT-OF-WAY
- PROPOSED CONCRETE BARRIER
- PROPOSED RETAINING WALL
- PROPOSED NOISE WALL
- PROPOSED STRUCTURES
- EXISTING STRUCTURES TO RETAIN
- EXISTING STRUCTURES TO REMOVE
- EXISTING CULVERTS
- PROPOSED CULVERTS
- RAILROAD RELOCATION
- POTENTIAL STREAM RELOCATION/RESTORATION
- CEMETERIES
- CHURCHES
- PARKS
- SCHOOLS, UNIVERSITIES

PRELIMINARY PLANS

NOTE: THESE PLANS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. THIS STUDY IS NOT THE PRODUCT OF EXTENSIVE DESIGN OR ENVIRONMENTAL ANALYSIS.



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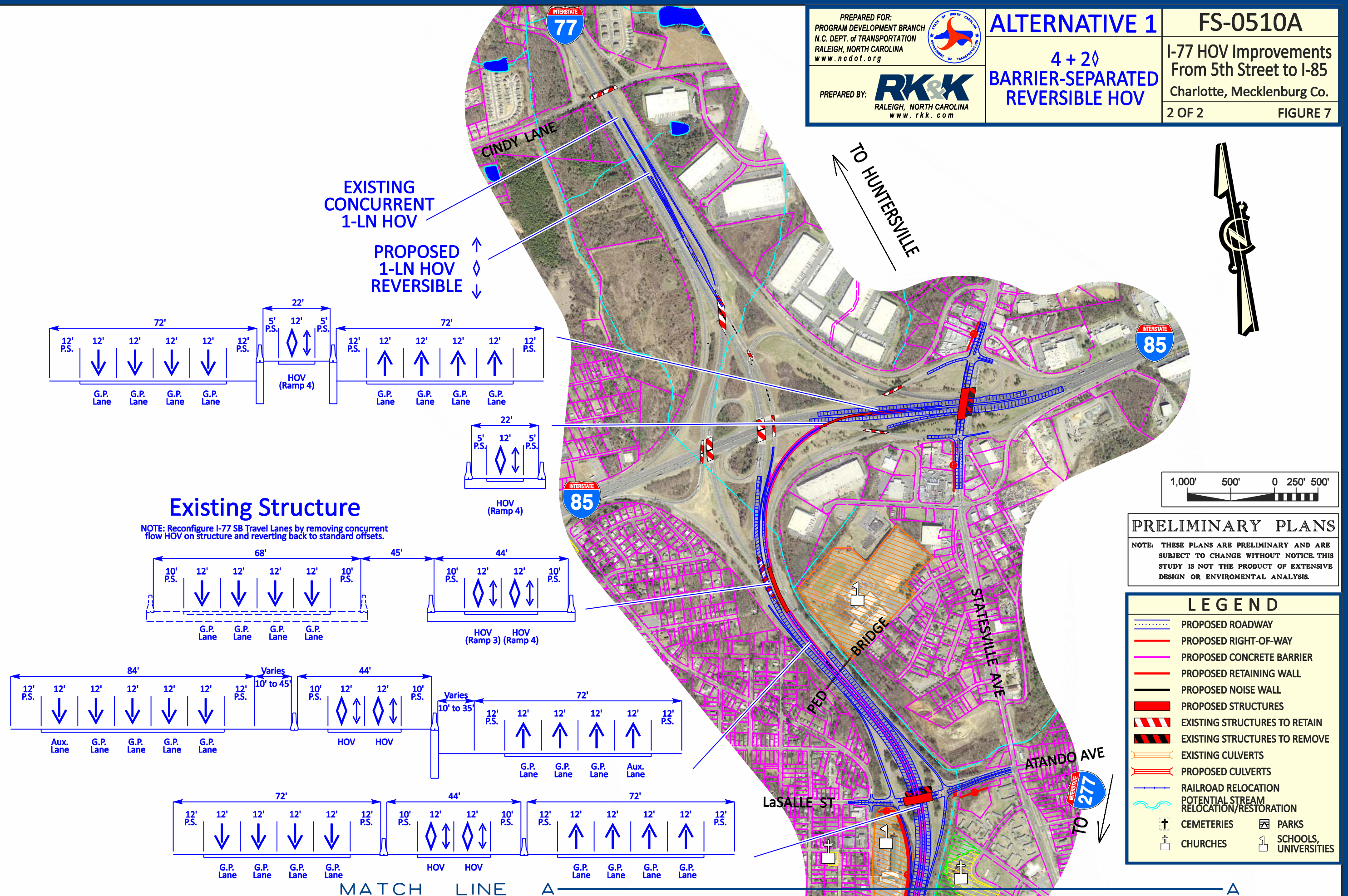
ALTERNATIVE 1

4 + 2
BARRIER-SEPARATED
REVERSIBLE HOV

FS-0510A

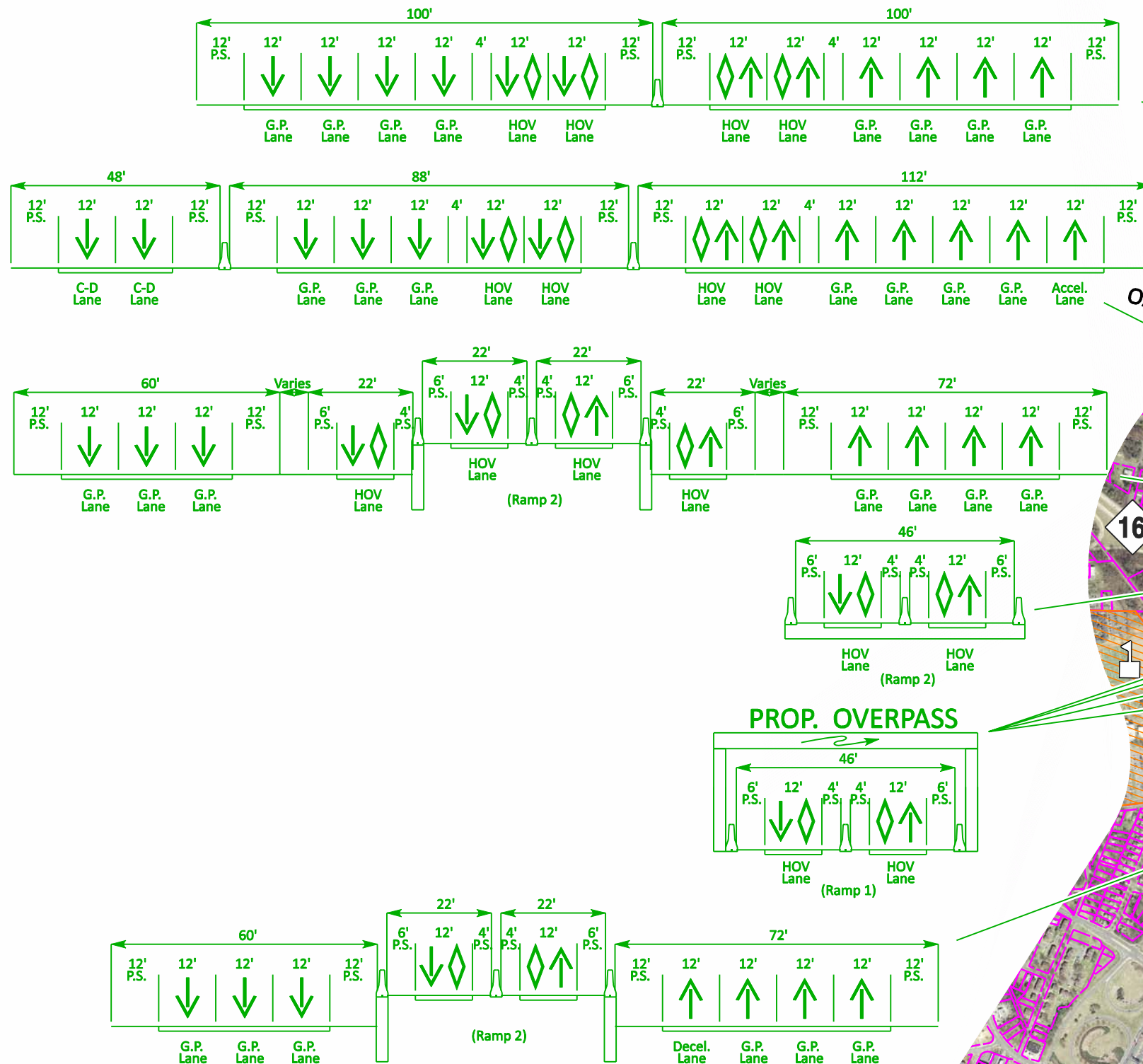
I-77 HOV Improvements
From 5th Street to I-85
Charlotte, Mecklenburg Co.

1 OF 2 **FIGURE 6**

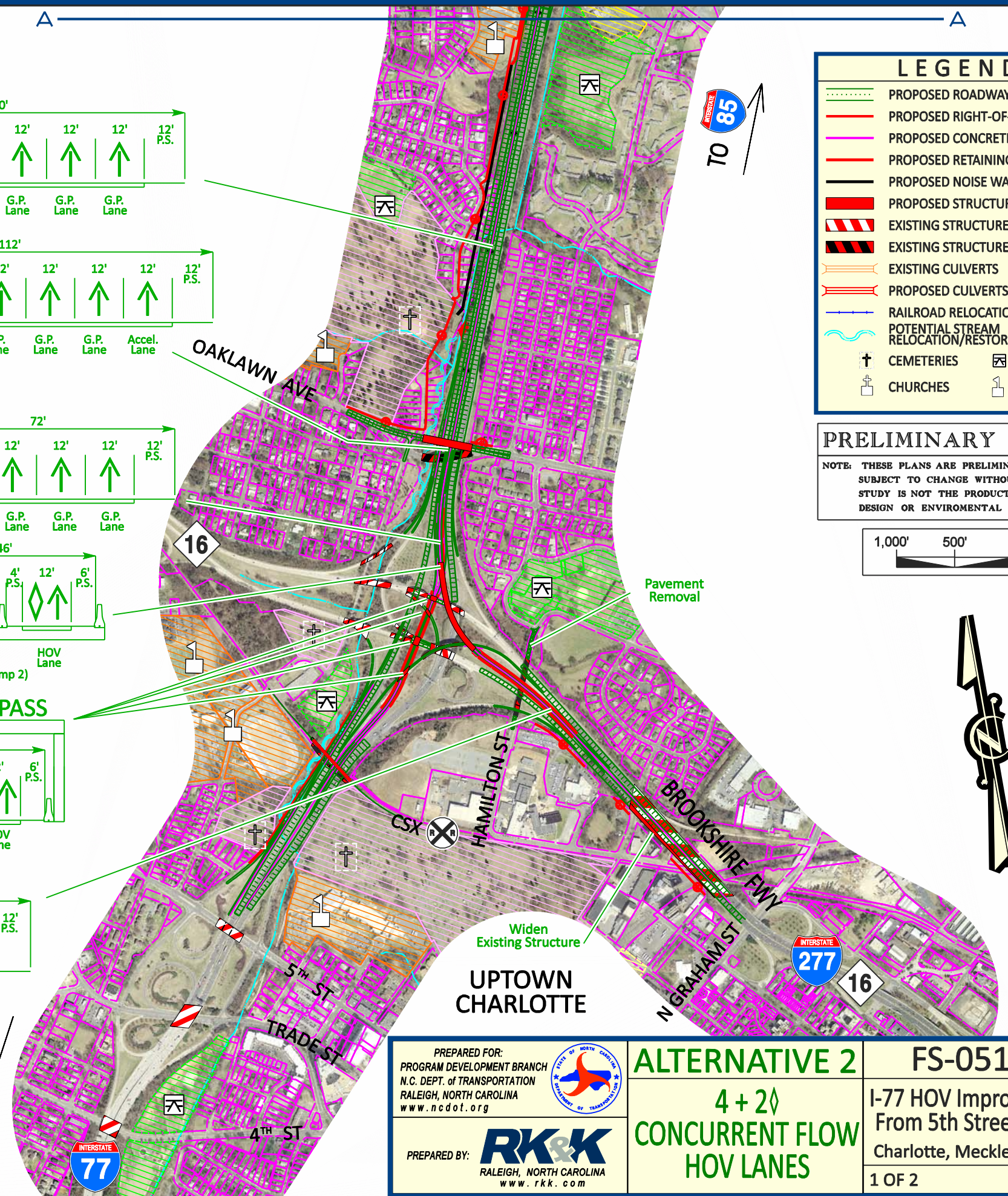


MATCH LINE A

A



TO ROCK HILL, SC



LEGEND

- PROPOSED ROADWAY
- PROPOSED RIGHT-OF-WAY
- PROPOSED CONCRETE BARRIER
- PROPOSED RETAINING WALL
- PROPOSED NOISE WALL
- PROPOSED STRUCTURES
- EXISTING STRUCTURES TO RETAIN
- EXISTING STRUCTURES TO REMOVE
- EXISTING CULVERTS
- PROPOSED CULVERTS
- RAILROAD RELOCATION
- POTENTIAL STREAM RELOCATION/RESTORATION
- CEMETERIES
- CHURCHES
- PARKS
- SCHOOLS, UNIVERSITIES

PRELIMINARY PLANS

NOTE: THESE PLANS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. THIS STUDY IS NOT THE PRODUCT OF EXTENSIVE DESIGN OR ENVIRONMENTAL ANALYSIS.



PREPARED FOR:
PROGRAM DEVELOPMENT BRANCH
N.C. DEPT. of TRANSPORTATION
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ALTERNATIVE 2
4 + 2
CONCURRENT FLOW
HOV LANES

FS-0510A
I-77 HOV Improvements
From 5th Street to I-85
Charlotte, Mecklenburg Co.
1 OF 2 **FIGURE 8**

LEGEND

	PROPOSED ROADWAY		EXISTING CULVERTS
	PROPOSED RIGHT-OF-WAY		PROPOSED CULVERTS
	PROPOSED CONCRETE BARRIER		RAILROAD RELOCATION
	PROPOSED RETAINING WALL		POTENTIAL STREAM RELOCATION/RESTORATION
	PROPOSED NOISE WALL		CEMETERIES
	PROPOSED STRUCTURES		CHURCHES
	EXISTING STRUCTURES TO RETAIN		PARKS
	EXISTING STRUCTURES TO REMOVE		SCHOOLS, UNIVERSITIES

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ALTERNATIVE 2

4 + 2
CONCURRENT FLOW
HOV LANES

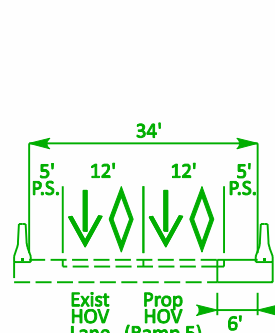
FS-0510A

I-77 HOV Improvements
From 5th Street to I-85
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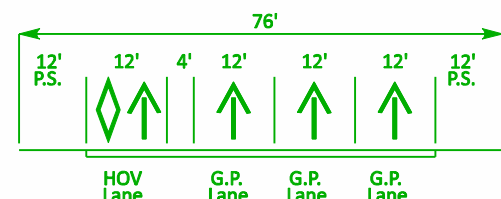
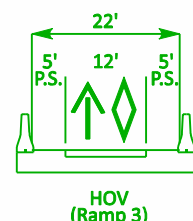
2 OF 2

FIGURE 9

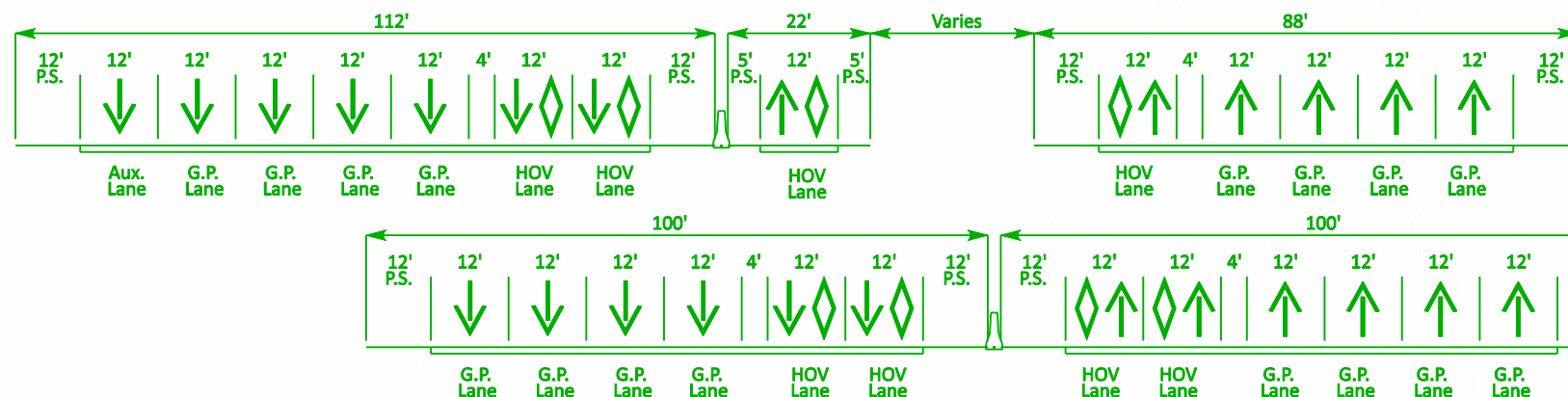
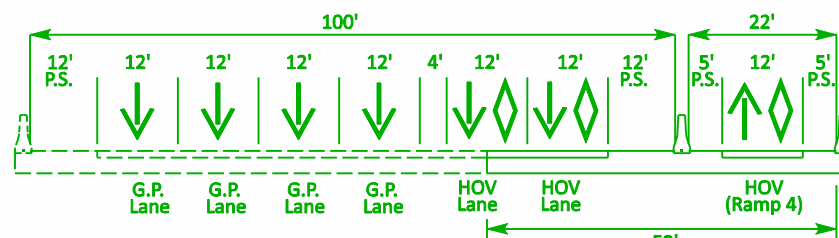
EXISTING
CONCURRENT
1-LN HOV



Widen Existing Structure



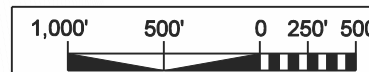
Widen Existing Structure



MATCH LINE A

TO HUNTERVILLE

STRIPE OUT
EXISTING
PAVEMENT



PRELIMINARY PLANS

NOTE: THESE PLANS ARE PRELIMINARY AND ARE
SUBJECT TO CHANGE WITHOUT NOTICE. THIS
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DESIGN OR ENVIROMENTAL ANALYSIS.

LEGEND

	PROPOSED ROADWAY
	PROPOSED RIGHT-OF-WAY
	PROPOSED CONCRETE BARRIER
	PROPOSED RETAINING WALL
	PROPOSED NOISE WALL
	PROPOSED STRUCTURES
	EXISTING STRUCTURES TO RETAIN
	EXISTING STRUCTURES TO REMOVE
	EXISTING CULVERTS
	PROPOSED CULVERTS
	RAILROAD RELOCATION
	POTENTIAL STREAM RELOCATION/RESTORATION
	CEMETERIES
	CHURCHES
	PARKS
	SCHOOLS, UNIVERSITIES

LaSALLE ST

BRIDGE

STATESVILLE AVE

ATANDO AVE

TO 277

