

FEASIBILITY STUDY
Belmont – Mt. Holly North Loop

Gaston and Mecklenburg Counties

Division 12

FS-0112A

U-4705

Prepared For:

N.C. Department of Transportation

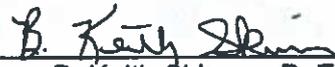


 Derrick W. Lewis, P. E. Feasibility Studies Engineer	<i>4/16/02</i> Date
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Belmont – Mount Holly North Loop

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I. General Description

This feasibility study describes the construction of the Belmont-Mount Holly North Loop from NC 27 just east of SR 1924 in Gaston County looping around the north side of the City of Mount Holly and tying back into NC 27 in the vicinity of Mount Holly-Huntersville Road (SR 1666) in Mecklenburg County. The proposed roadway will have an approximate length of 4.0 miles. See Figure 1 for a vicinity map showing the project's location.

The design speed for the proposed roadway will be 50 mph. It is also recommended that the functional classification for the proposed roadway be an "urban principal arterial". The recommended cross section is a four-lane, curb and gutter roadway with a 16 feet raised median within a new 110-foot right-of-way with access being limited to one access point per parcel. The outside lanes should be two feet wider in each direction to accommodate bicycle traffic. See Figure 2 for proposed typical sections.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including costs, and to identify potential problems that may require consideration in the planning and design phases.

II. Need for Project

The purpose of this project is to construct a loop around the north side of Mount Holly, which will provide a bypass of the central business district. The loop will also allow traffic to travel directly from NC 27 and Mt. Holly-Huntersville Road to NC 273 and SR 1923 (Woodlawn Avenue), thereby relieving traffic congestion on existing NC 27. The loop will also provide another access point across the Catawba River for the Mount Holly area.

An alignment similar to that included in this study, is included on the Mount Holly Thoroughfare Plan as a future major thoroughfare. This segment of roadway is not presently included in the Statewide Functional Classification System.

III. Alternatives Descriptions

Alternative No. 1

The study alignment begins approximately 900 ft. southeast of the intersection of NC 27 and SR 1924 in Gaston County and continues in a northeasterly direction towards SR 1923. After intersecting SR 1923 (Woodlawn Avenue), the alignment curves towards the east and eventually intersects NC 273 north of SR 1931. From this point, the alignment continues in a southeasterly direction and crosses the CSX Railroad and the Catawba River before entering into Mecklenburg County. Upon crossing the county line, the alignment continues in the same southeasterly direction for approximately 4000

ft. and ends at NC 27 after crossing Mt. Holly-Huntersville Road (SR 1666). The approximate length of this alignment is 4.0 miles. This alternative is entirely on new location with all at-grade intersections.

The approximate bridge lengths are 175 ft. over the railroad and 705 ft. over the Catawba River and its adjoining wetlands. This alignment would also require a bridge over Dutchman's Creek. The approximate bridge length over Dutchman's Creek and its adjoining wetlands is 250 ft. All previously mentioned bridges are 82' wide from bridge rail to bridge rail with sidewalk on both sides.

It is anticipated that the above-mentioned improvements will require the relocation of approximately one (1) residence and no businesses. The total cost of Alternative No. 1, including construction and right-of-way, is estimated to be \$ 47,450,000.

Construction.....	\$ 42,350,000
Right-of-way.....	\$ 5,100,000
Total Cost.....	\$ 47,450,000

**Alternative No. 2
(Recommended)**

The study alignment for Alternative 2 is identical to that of Alternative 1 except for the "tie-in" at the beginning of the project. Alternative 2 includes purchasing sufficient right of way for a future grade-separated interchange at the beginning of the project rather than an "at-grade" intersection with existing NC 27 (see figure 3). This interchange will provide for the future extension of the loop around the south side of Mount Holly. With this alternate, only the ramps of the interchange will be constructed initially. The bridge over NC 27 and the loop ramps will be constructed under a future project. The total cost of Alternative No. 2, including construction and right-of-way, is estimated to be \$ 48,750,000.

Construction.....	\$ 42,650,000
Right-of-way.....	\$ 6,100,000
Total Cost.....	\$ 48,750,000

**IV. Traffic Operations
(Alternative No. 1)**

The purpose of this section is to explain the status of future traffic operations for the proposed facility and to recommend any additional measures needed to ensure that traffic will operate at acceptable levels of service.

The decision to install new traffic signals at any location will be made by the NCDOT Area Traffic Engineer based on final design plans. This study only makes recommendations based on the projected traffic volumes.

The estimated base year 2005 Average Daily Traffic (ADT) volume for the Belmont-Mount Holly North Loop ranges from 9,140 to 11,880 vehicles per day (vpd). The estimated design year 2025 ADT volume ranges from 17,700 to 23,800 vpd.

Based on the projected traffic volumes and the proposed four-lane curb and gutter typical section, it is estimated that the mainline portion of this facility will operate at level of service (LOS) A for both the base year (2005) and design year (2025). These

levels of service were determined using the "Multilane Module" of the HCS2000 software package.

The project begins with a signalized intersection with existing NC 27 approximately 1,000 feet southwest of the existing intersection of NC 27 and SR 1924 in Gaston County. It is likely that Improvements will be necessary to existing NC 27 in order to accommodate additional turn lanes with the new intersection of the Belmont-Mount Holly North Loop. These improvements will affect approximately 4,500 feet of existing NC 27 and will be required in order for the signalized intersection to achieve an LOS "C" in the base year and LOS "D" in the design year.

At the intersections of the proposed Belmont-Mount Holly North Loop and SR 1923 (Woodlawn Avenue) and NC 273, signals will likely be warranted for the base and design year traffic volumes. Improvements to both SR 1923 (Woodlawn Avenue) and NC 273 will be needed to accommodate left and right turn lanes onto the Belmont-Mount Holly North Loop. With these improvements, each intersection should operate at LOS "C" in the base year and LOS "D" in the design year.

The terminus of the project is approximately 1,650 feet east of the intersection of NC 27 and Mount Holly Huntersville Road in Mecklenburg County. Improvements, which include additional lanes and tapers, to both NC 27 and Mount Holly-Huntersville Road will be required in order to create a "four legged" intersection with the Belmont-Mount Holly North Loop. These improvements will affect approximately 4,000 feet of NC 27 and Mount Holly-Huntersville Road. With these improvements the signalized intersection should operate at LOS "C" for the base year and LOS "D" for the design year.

**(Alternate No. 2)
(Recommended)**

The two ramps for the Alternate No. 2 interchange intersecting NC 27 will likely require coordinated signals to operate efficiently. Ramp "B", from existing NC 27 onto the proposed bypass, should operate at LOS "B" in the base year and LOS "C" in the design year. Ramp "A", from the proposed Bypass onto existing NC 27, should operate at LOS "B" in the base and design year.

Since volumes for the southern portion of this project were not provided, it should be noted that the design year LOS is based only on the ramp traffic volumes and does not include the volumes and movements of the future loop ramps. It is recommended that these intersections be carefully studied, including all design year movements and traffic volumes, as part of any future planning and or design considerations.

All signalized intersections levels of service were determined using the "Signals Module" of the HCS2000 software package based on traffic projections provided by NCDOT.

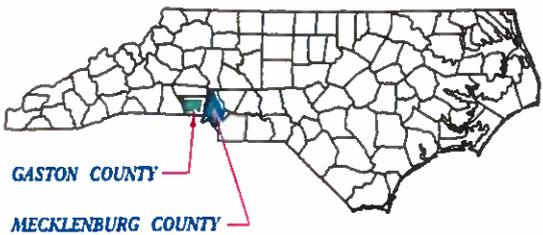
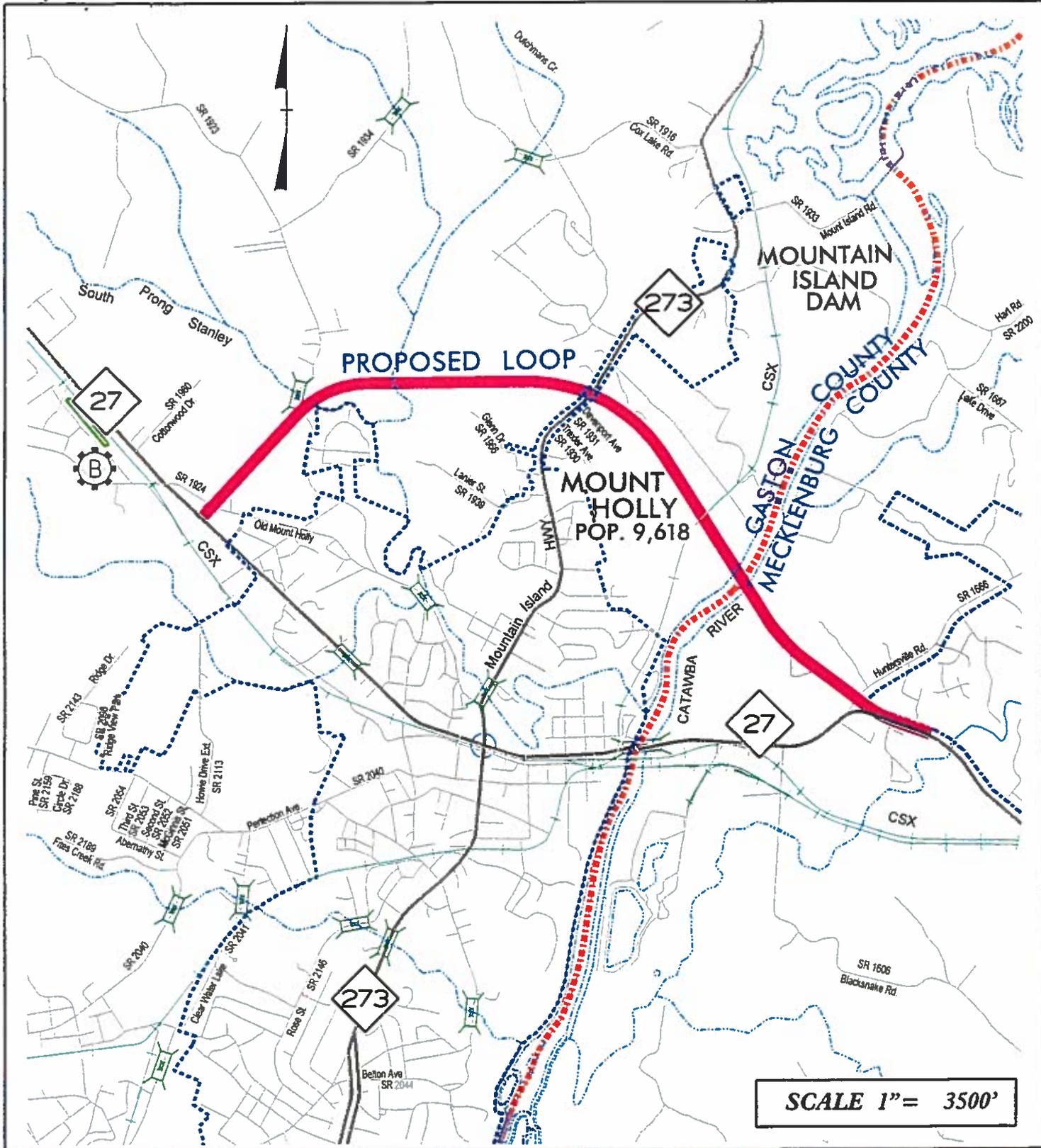
V. Other Alternates Considered

This feasibility study evaluates the two alternatives previously described. Any additional study alignments would not be desirable due to the existence of extensive wetlands and existing residential development.

VI. Additional Comments

An exhaustive environmental screening was not conducted for this study. However, the following items were identified as needing more detailed analyses during future planning and/or design phases:

- West Creek Recreation site may need further investigation.
- Future Catawba River Buffer Rules will have to be implemented.
- The interchange configuration studied for Alternate 2 includes two ramps and two loops on the north side of existing NC 27. This configuration was more obvious because of the railroad on the south side of NC 27. However, during future planning studies, alternate interchange configurations will need to be studied more carefully.
- Careful study should be done to minimize all wetland impacts.



GASTON COUNTY
MECKLENBURG COUNTY

NORTH CAROLINA

**BELMONT-MT. HOLLY
NORTH LOOP
VICINITY MAP**

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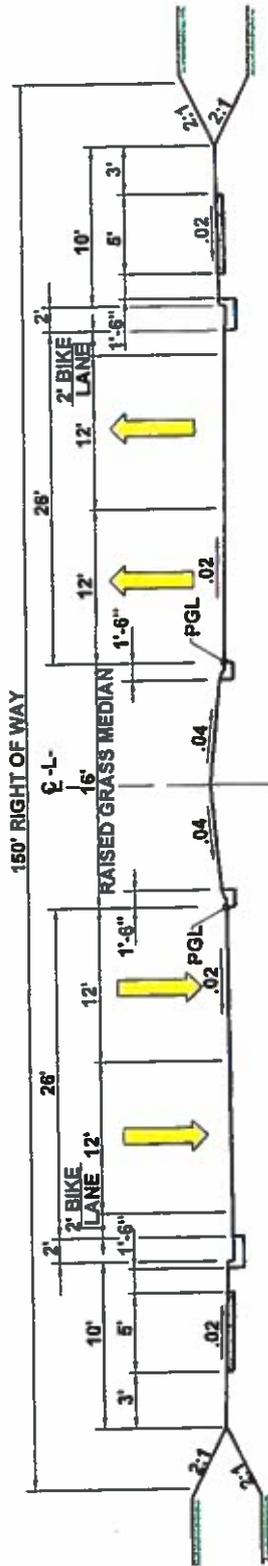
FIGURE 1



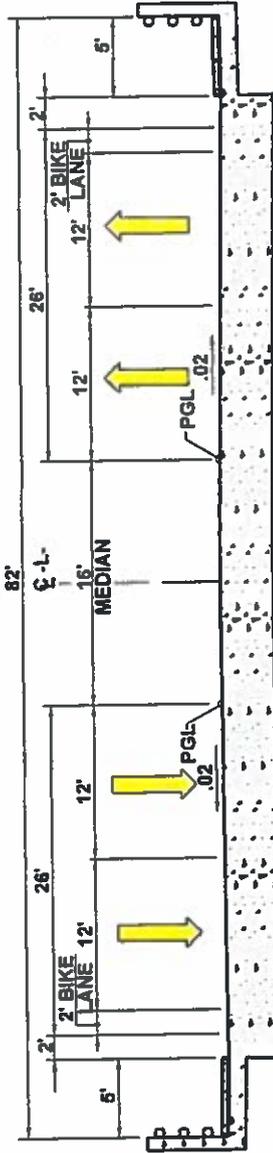
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-L- TYPICAL SECTION



-L- BRIDGE TYPICAL SECTION

**BELMONT-MT. HOLLY
NORTH LOOP
TYPICAL SECTION DETAILS**

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FIGURE 2



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