

FEASIBILITY STUDY

TRAMWAY AREA:

US 1-15-501/ NC78/ SR1303 INTERSECTION
IMPROVEMENTS

Lee County


Division 8

FS-0108C

Prepared For:

N.C. Department of Transportation




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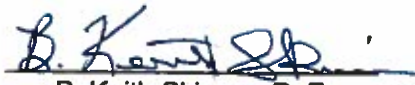
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**TRAMWAY AREA:
 US 1-15-501 FROM 1500' SOUTH OF SR 1157 TO SR 1333
 AND SR 1303 FROM SR 1305 TO US 1-15-501
 AND NC 78 FROM US 1-15-501 TO 1500' EAST OF SR 1156**

**Lee County
 Division 8
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I. General Description

This feasibility study addresses improvements to US 1-15-501 in the vicinity of Tramway, just south of the City of Sanford in Lee County. The intersection of US 1-15-501 and NC 78/SR 1303 is located in the center of the study area. The study area extends north along US 1-15-501 from 1500' south of SR 1157 to the beginning of the existing control of access at SR 1333. The study area includes sections of roadway along NC 78 and SR 1303 that extend east and west from US 1-15-501. The study area along SR 1303 begins at US 1-15-501 and extends west to SR 1305. The portion of the study area along NC 78 begins at US 1-15-501 and extends east 1500' beyond SR 1156. US 1 is a principal arterial connecting Rockingham, Southern Pines and Sanford to Raleigh. NC 78 is designated as a minor arterial on the North Carolina Statewide Functional Classification System and serves as an east-west connector between Tramway and the City of Sanford. See Figure 1 for a vicinity map showing the project's location.

The primary improvement recommended in this study is the widening of US 1-15-501 from an existing four-lane divided highway to a six-lane curb and gutter section with a 30-foot, raised, grass median. Because of the non-uniform existing median width, proposed widening will occur in the existing median as well as to the outside of the existing roadway. The proposed widening of US 1-15-501 has an approximate length of 2.5 miles. Widening NC 78 and SR 1303 from an existing 2-lane open shoulder section to a multi-lane facility (five-lane curb and gutter or a four-lane divided curb and gutter section) is also recommended. The proposed widening of NC 78/SR 1303 has an approximate length of 1 mile. See Figure 2 for all proposed Typical Sections.

Other recommended improvements include additional turn lanes at intersections, existing median crossover removals, intersection relocation and realignment, proposed limited movement crossovers ("leftovers") and traffic signals. These additional improvements are discussed in further detail in Section IV.

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. Project Cost

The associated costs for the project are as follows:

Section	Description	Right-of-Way Cost	Construction Cost	Total Project Cost
1	US 1-15-501	\$700,000	\$8,600,000	\$9,300,000
2	NC 78 and SR 1303	\$800,000	\$4,800,000	\$5,600,000
3	SR 1157 Relocation	\$600,000	\$1,100,000	\$1,700,000
PROJECT TOTAL:				\$16,600,000

III. Need for Project

The region surrounding the Tramway study area is currently considered the most rapidly growing commercial area in Lee County. Presently, there are several approved and proposed developments in the area. Therefore, the purpose of this project is to improve the traffic carrying capacity and safety of US 1-15-501 in the vicinity of the intersection of NC 78 and SR 1303 in Tramway.

IV. Traffic Operations

The base year 2002 Average Daily Traffic (ADT) for US 1-15-501 ranges from 26,200 to 29,200 vehicles per day (vpd) and the volume for NC 78/SR 1303 ranges from 4,200 to 11,600 vpd. The estimated design year 2025 ADT for US 1-15-501 ranges from 55,200 to 61,400 vpd and the volume for NC 78/SR 1303 ranges from 8,400 to 24,200 vpd. With these future traffic volumes, improvements will be required to maintain acceptable levels of service (LOS) in the study area.

During the period from September 1, 1999 through August 31, 2002 there were 165 accidents reported on US 1-15-501 within the study limits. This resulted in an accident rate of 187.74 accidents per 100 million vehicle miles (Acc/100MVM), compared to a statewide average of 137.85 Acc/100MVM for 4-lane divided Rural U.S. Routes with no control of access (from 1999 to 2001). There was one fatality reported during the period, and 59 of the accidents resulted in injuries. Forty-eight percent of the accidents reported along the 3-mile section of US 1-15-501 occurred at or near the intersection of NC 78/SR 1303. Also during the same period, there were 59 total accidents reported on NC 78/SR 1303 within the study limits. This resulted in an accident rate of 685.41 Acc/100MVM, compared to a statewide average of 186.06 Acc/100MVM for 2-lane Rural N.C. Routes (from 1999 to 2001). There were no fatalities reported during the period, and 20 of the accidents resulted in injuries. Fifty-two percent of the accidents reported along the 1-mile section occurred at or near the intersection of US 1-15-501. The most prevalent accident types along US 1-15-501 were rear end and left turn. The proposed widening, intersection improvements and median crossover removals will reduce the potential for these types of traffic accidents.

V. Project Description

For the purpose of this report, the project has been divided into three sections. The improvement recommendations made for each of these sections were based on a capacity analysis using Synchro 5 Trafficware. Signal warrants in this study were determined from the Manual for Uniform Traffic Control Devices (MUTCD 2000). However, the decision to install new traffic signals at any location will be made by the NCDOT Area Traffic Engineer based on more detailed studies. The three sections are described below:

Section 1: US 1-15-501 from SR 1300 to SR 1333/1154 (Intersections 1-8)

Existing US 1-15-501, in the area of Tramway, is a four-lane divided highway with no control of access. The mainline in the study area includes a mix of commercial and residential areas. North of the study limits along US 1-15-501, from the intersection of service roads SR 1333 and 1154, there is full control of access. South of the study limits there is no control of access. US 1 and US 15-501 split approximately 1.5 miles south of the project study limits.

The posted speed limit through the study area varies along US 1-15-501. South of SR 1300, the posted speed limit is 55 mph. Between SR 1300 and SR 1334 the posted speed limit is 45 mph. From SR 1334 to the beginning of control of access, the posted speed limit is 55 mph. At the beginning of the control of access the speed limit increases to 60 mph.

The existing Right-of-Way along US 1-15-501 varies from 150' to 170' south of the NC 78/SR 1303 intersection. From this point northward, it varies from 170' to 260' and includes service roads and a wider median.

A design speed of 50 mph (posted for 45 mph) is assumed for US 1-15-501 in the study area. To improve traffic flow, it is recommended to widen existing US 1-15-501 to a six-lane curb and gutter section with 12-foot travel lanes and a 10-foot berm. The proposed median is a 30' raised grass median, which will accommodate dual left turn lanes where necessary. Because of the non-uniform existing median width, proposed widening will occur in the existing median as well as to the outside of the existing roadway. A combination of proposed Right-of-Way and construction easements are needed for construction along US 1-15-501. See Figure 2 for proposed typical sections.

Other recommended improvements are listed below (See Figure 1 for locations):

◆ Intersection 1 (US 1-15-501 & SR 1300)

Realign SR 1157 to create a 4-way intersection with SR 1300 and US 1-15-501. Presently, the spacing between the intersections of SR 1300 and SR 1157 is approximately 500'. The desirable spacing for median openings is 1,000' for this type of highway facility.

◆ Intersection 2 (US 1-15-501 & SR 1157)

With the realignment of SR 1157 mentioned above, the existing roadway will only have "right-in, right-out" access to US 1-15-501. The existing median crossover at this location will be removed.

◆ Install "leftovers" at the two median crossovers between SR 1157 and SR 1197. The first median crossover is approximately 1,000' north of SR 1157 and is approximately 1,400' south of the next median crossover. Their spacing is acceptable; however installing "leftovers" (limited movement crossovers) will reduce accidents and decrease congestion by restricting crossing movements.

◆ Intersection 3 (US 1-15-501 & SR 1197)

In addition to the extra through lanes on US 1-15-501, it is recommended to add a Northbound exclusive right turn-lane and an exclusive left turn-lane on the Westbound approach. The intersection is stop-controlled and does not warrant signalization. The spacing between SR 1197 and the adjacent median openings is satisfactory.

◆ Intersection 4 (US 1-15-501 & SR 1198)

Remove the median crossover at SR 1198. The spacing between SR 1198 and NC 78/SR 1303 is adequate (approximately 1,300'). However, removing the median crossover reduces the number of access points and the likelihood of future signalization. "Right-in, Right-out" access to US 1-15-501 will remain. The intersection is stop-controlled and does not warrant signalization.

◆ Intersection 5 (US 1-15-501 & NC 78/SR 1303)

This is the main intersection in the study area. The intersection is currently signalized and operates at a LOS E. For this intersection to operate efficiently into the future, major improvements are required. In addition to the extra through lanes on US 1-15-501, it is recommended to add dual left-turn lanes on all approaches. It is also recommended to add exclusive right-turn lanes on all approaches except the westbound SR 1303 approach. Due to extremely heavy volumes, the westbound approach requires dual right-turn lanes.

◆ Remove the median crossover in front of the Tramway Crossing Shopping Center. The crossover at the shopping center is approximately 700' from NC 78/SR1303 and approximately 900' from SR 1334. Since a desirable median opening spacing is 1,000', removing this median opening will improve traffic safety and congestion. "Right-in, Right-out" access to US 1-15-501 will remain.

◆ Intersection 6 (US 1-15-501 & SR 1334)

In addition to the extra through lanes on US 1-15-501, it is recommended to add a southbound exclusive right turn-lane onto SR 1334 to provide optimum traffic safety operations in the 2025 design year. The intersection is currently signalized. The spacing between SR 1334 and the adjacent median openings are satisfactory (with the closure of the shopping center crossover).

◆ Intersection 7 (US 1-15-501 & SR 1237)

Realign SR 1237 to create a more conventional intersection instead of the existing offset "T" intersection configuration. This intersection is currently stop-controlled but may warrant signalization in the future. An alignment that makes use of existing pavement and right-of-way is recommended. SR 1237 will have dual left-turn lanes onto US 1-15-501. Also, the proposed mainline transitions from a 6-lane to a 4-lane highway at this intersection.

◆ Intersection 8 (US 1-15-501 & service roads SR 1333/1154)

This intersection does not warrant signalization, therefore no proposed improvements are recommended.

All the improvements listed above should reduce the potential for traffic accidents and significantly improve traffic flow and service to local businesses and residences. The entire project facility is expected to operate at a LOS D or better in the 2025 design year.

It is anticipated that **Section 1** improvements will require the relocation of no residences or businesses. The total cost, including construction and right-of-way, is estimated to be \$ 9,300,000.

Construction.....	\$8,600,000
<u>Right-of-way.....</u>	<u>\$700,000</u>
Total Cost.....	\$9,300,000

Section 2: NC 78 and SR 1303 from SR 1304/1305 to SR 1156 (Intersections 5, 9, 10)

Section 2 includes NC 78 east of US 1-15-501 and SR 1303 west of US 1-15-501. NC 78 (Tramway Road) is a two-lane minor arterial traversing residential and agricultural areas into the City of Sanford. SR 1303 (Center Church Road) is also a two-lane roadway that runs through residential and agricultural areas. The existing speed limit on NC 78 and SR 1303 is 55 mph through Tramway. However, since Tramway Elementary School is located on SR 1303 within the project study limits, a 45 mph posted speed limit is recommended through this area. It should also be noted that the Sanford Airport is located approximately 1.5 miles east of the study limit.

A proposed multi-lane facility (either a five-lane curb and gutter section or a four-lane divided curb and gutter with a raised narrow median section) is recommended along NC 78/SR 1303 for this study. This will be accomplished by widening symmetrically about the centerline of the existing roadway. The existing Right-of-Way width is 60' on SR 1303 and 100' on NC 78. A 100' Right of Way width plus construction easements will be required to construct the recommended typical section. See Figure 2 for proposed typical sections.

The following are two intersections along Section 2 (excluding the intersection of US 1-15-501) with improvements summarized for each (See Figure 1 for locations).

◆ Intersection 9 (NC 78 & SR 1303/1304)

This is a stop-controlled intersection at the western project limits. The movement from westbound SR 1303 to northbound SR 1305 is currently a free-flowing movement. This intersection does warrant signalization, and improvements to the alignment of the intersecting roadways will be required to facilitate proper operation of the traffic signal. Additional improvements include exclusive left-turn lanes on both approaches of SR 1303 and an exclusive right-turn lane on the westbound approach. SR 1305 will have dual left-turn lanes turning onto SR 1303 toward Tramway. Also, SR 1303 will transition to a five-lane curb and gutter section from the intersection.

◆ Intersection 10 (NC 78 & SR 1156)

This intersection is stop-controlled and does not warrant signalization. However, improvements to the intersection include exclusive turn lanes on each approach. Also, NC 78 will transition to a multilane curb and gutter section from this intersection.

Because of its close proximity to US 15-501 (50 feet), the intersection of SR 1196 and NC 78 will be removed. Remaining access to US 1-15-501 exists via SR 1197 and SR 1198.

All the improvements listed above should reduce the potential for traffic accidents and significantly improve traffic flow and service to local businesses and residences. This section is expected to operate at acceptable levels of service in the 2025 design year.

It is anticipated that Section 2 improvements will require the relocation of approximately one (1) residence and no businesses. The total cost, including construction and right-of-way, is estimated to be \$ 5,600,000.

Construction.....	\$4,800,000
<u>Right-of-way.....</u>	<u>\$800,000</u>
Total Cost.....	\$5,600,000

Section 3: Realignment of SR 1157 to US 1-15-501 at SR 1300 (Intersections 1 & 2)

Section 3 includes the realignment of SR 1157 to create a revised intersection at SR 1300. SR 1157 (Hickory House Road) is a two-lane roadway that runs through residential and agricultural areas. The existing intersection (Intersection 2) at US 1-15-501 is signalized. The spacing between the intersections of SR 1300 and SR 1157 is approximately 500'. The desirable spacing for median openings is 1,000' for this type of highway facility. It is, therefore, desirable to remove one of the openings. The recommended solution is to realign SR 1157 to create a 4-way intersection with SR 1300 and US 1-15-501. The proposed relocation transitions from a two-lane section (at SR 1158 Willet Rd.) to a five-lane curb and gutter section (at Intersection 1) to accommodate the required auxiliary lanes. "Right-in, Right-out" access to US 1-15-501 will remain at existing SR 1157. The proposed intersection is expected to operate at a LOS D or better in the 2025 design year.

It is anticipated that **Section 3** improvements will require the relocation of approximately one (1) residence and no businesses. The total cost, including construction and right-of-way, is estimated to be \$ 1,700,000.

Construction.....	\$1,100,000
<u>Right-of-way.....</u>	<u>\$600,000</u>
Total Cost.....	\$1,700,000

VI. Other Alternates Considered

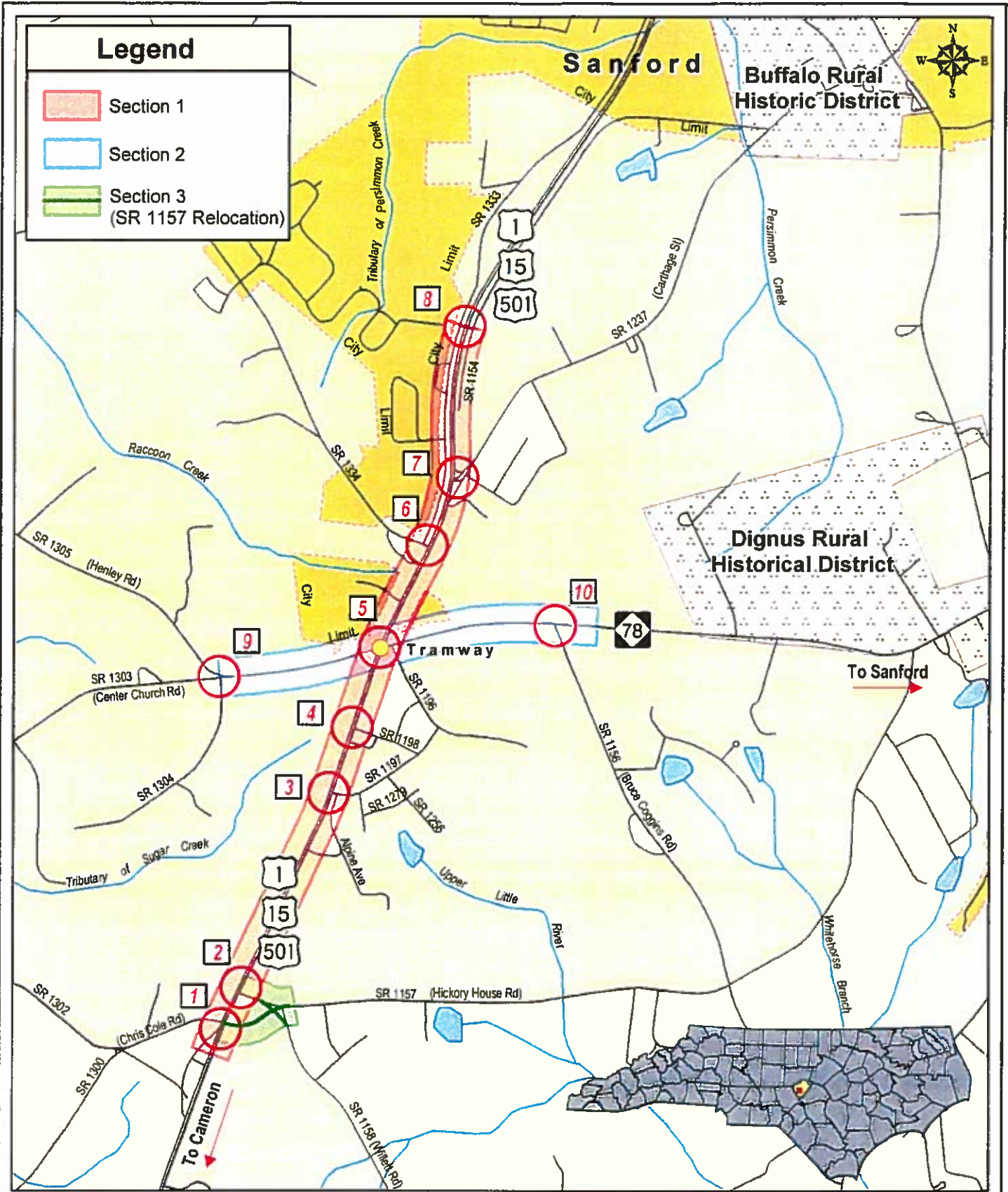
One option for this study, which was recommended by Sanford City Manager, was to realign SR 1237 (Carthage Street). Under this scenario, SR 1237 would intersect US 1-15-501 at the median crossover north of the existing intersection. The existing intersection would then be eliminated. Also, Pioneer Drive and Carthage Street would be connected to the existing service road (SR 1154). However, this alternative alignment did not make the best use of existing Right-of-Way and existing pavement. There would also be additional costs to remove and relocate portions of the existing service road (SR 1154) and the relocation of one (1) residence and one (1) business. Therefore, this alternative intersection design at SR 1237 and US 1-15-501 is not recommended because of the costs and relocations that would result.

Another option that could be considered is converting the facility into a full controlled access facility. This alternative would impact a greater number of residential and commercial landowners due to the added necessity for service roads to gain access to the properties along the project length. To fully evaluate the need for such a facility, additional studies would be required, possibly considering a bypass of the existing roadway. The termini presented in this current study are not logical for a bypass facility. Such a facility and this alternative (full controlled access) are not within the current scope of this project.

VII. Additional Comments

The following items were identified as needing more detailed analyses during future planning and/or design phases:

- ◆ The intersection of US 1-15-501 and NC 78/SR 1303 (See Intersection 5 on Figure 1) should be graded to improve visibility, safety and function.
- ◆ Any improvements to NC 78 should be coordinated with TIP project R-3831. Project R-3831 proposes to widen NC 78 to a three-lane roadway from west of SR 1157 (Hickory House Road) to west of SR 1001. R-3831's project limit is approximately 0.8 miles from the subject project study limit. Currently, this project is not funded and Right-of-Way and Construction are post-year.
- ◆ Future traffic estimates for the area should include the impact of a new high school that is to be located on NC 78 near the Sanford Airport.
- ◆ Consideration should be given to a future study of US 1-15-501 from the southern study limit of this project to the beginning of control-of-access south of the US 1 and US 15-501 split.
- ◆ An exhaustive environmental screening was not conducted for this study. Careful study should be done to minimize all environmental impacts.



Legend

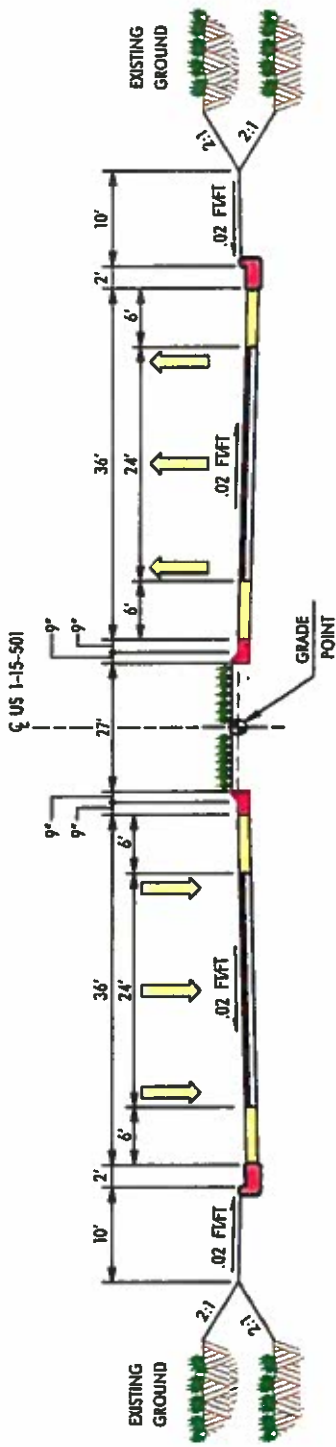
- Section 1
- Section 2
- Section 3
(SR 1157 Relocation)

Tramway Area Feasibility Study FS-0108C
Intersection Improvements
US1 - 15 - 501 from SR 1300 to SR 1333
Lee County, NC

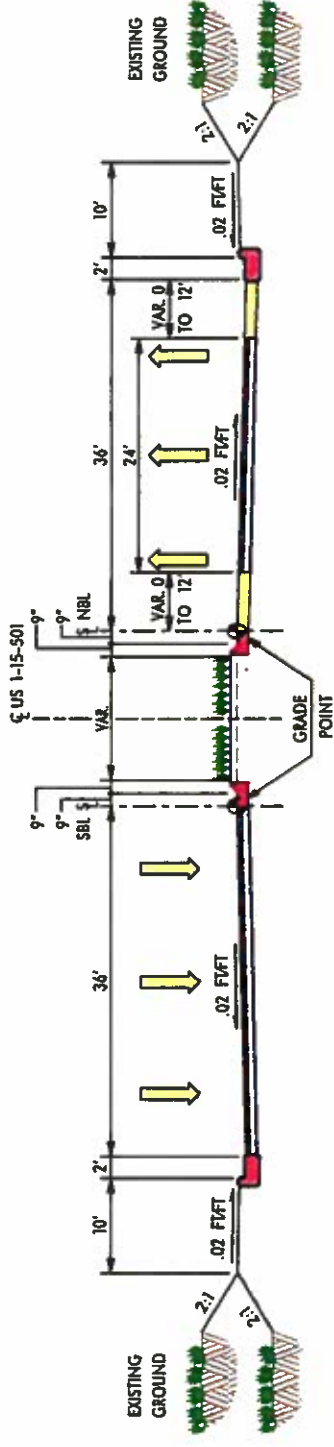
Figure 1
 2
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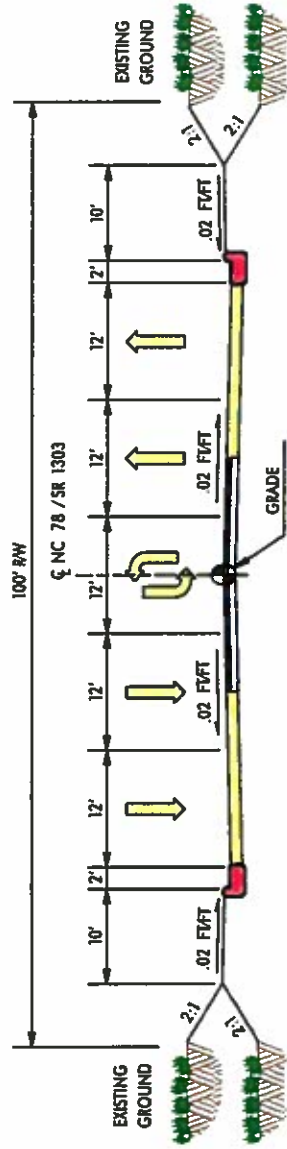
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TYPICAL SECTION A
 (FROM SR 1300 TO NC 78 / SR 1303)



TYPICAL SECTION B
 (FROM NC 78 / SR 1303 TO SR 1237)



TYPICAL SECTION C
 (FROM SR 1304 / SR 1305 TO SR 1156)

FIGURE 2



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NCDOT FEASIBILITY STUDY FS-0100C TRAMWAY AREA
 US 1-15-501 FROM SR1304 TO SR1303 AND SR1303
 FROM SR1303 TO US 1-15-501 AND NC 78 FROM
 US 1-15-501 TO SR1306, LEE COUNTY