


FEASIBILITY STUDY
**US 17/US 158 INTERSECTION:
CONVERT EXISTING INTERSECTION INTO A GRADE-
SEPARATED INTERCHANGE**

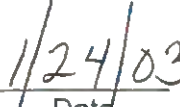
Morgan's Corner
Pasquotank County
Division 1
FS-0101C

Prepared For:

N.C. Department of Transportation




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**US 17/US 158 INTERSECTION:
CONVERT EXISTING INTERSECTION INTO A GRADE-SEPARATED INTERCHANGE**

Pasquotank County

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I. General Description

This feasibility study addresses converting the existing "at-grade" intersection of US 17/US 158/SR 1416 in Pasquotank County into a "grade separated" interchange. (See Figure 1 for a vicinity map showing the project's location.)

The "grade separation" for the proposed interchange will be accomplished by raising the grade on US 158/ SR 1416 (Northside Road) and constructing dual bridges over existing US 17. Access Ramps and loops will be added in three of the four quadrants creating a "full movement" interchange. In order to minimize traffic congestion and increase safety, driveway access will be controlled along US 17 and 1000' beyond the proposed ramp terminals on US 158/ SR 1416. Service roads will also need to be constructed to provide access to several properties.

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 increase the traffic carrying capacity and improve safety at the existing "at-grade" intersection of US 17/US 158/SR 1416 in Morgan's Corner. In addition, US 17 and US 158 through Pasquotank County is part of the North Carolina Intrastate System, which is designated to support statewide growth and development objectives and to connect to major highways of adjoining states. US 17 is also a STRAHNET route developed by the Department of Defense to provide defense access, continuity, and emergency capabilities. Since this proposed interchange is considered an integral part of the future widening of the US 158 intrastate corridor, it is recommended that these improvements be closely coordinated with TIP project R-2579.

III. Description of Project

Existing US 17, in the area of Morgan's corner, is a four-lane median divided facility with partial control of access. South of the above-referenced intersection, US 158 coincides with US 17. US 158, east and west of the intersection, is a two-lane roadway that runs through a residential and agricultural area. However, TIP projects R-2578 and R-2579 propose to widen US 158 from Morgan's corner west to US 13 in Gates County. It is anticipated that the future typical section for R-2578 and R-2579 will be a four-lane, divided roadway. A four lane divided section with 12-foot travel lanes, a 16-foot raised grass median, and 10-foot shoulders was used along US 158/SR 1416 for this study. See Figure 2 for proposed typical sections.

This study addresses the raising of the existing grade on US 158/ SR 1416 (Northside Road) and the construction of dual bridges over US 17 in order to create a grade separated interchange at this location. The bridges will be approximately 245 feet in length and will each be 34 feet wide from bridge rail to bridge rail.

The proposed right-of-way width for US 158/SR 1416 is 200 feet with access being controlled 1000 feet beyond the proposed ramp terminals. Proposed right-of-way for the proposed interchange will generally be 100 feet from the survey line of the ramps. No additional right-of-way will be needed along US 17.

Ramps and loops will be constructed in the northwest and the southeast quadrants of the interchange. In the southwest quadrant, only a ramp will be built. This ramp is needed for the anticipated heavy volume of traffic from Eastbound US 158 to Southbound US 17. No ramps or loops will be built in the northeast quadrant of the interchange because an existing pond is located in this area.

Four service roads will be constructed to properties that would otherwise lose their access after the project is completed.

US 17 through the project limits has partial control of access. It is recommended to close the existing median opening for the driveway on US 17 south of the project and to close the median opening for the access to SR 1417 (Morgan's Corner Road) on US 17 north of the project. Closing these access points will improve the safety and operation of the proposed ramps.

A temporary, on-site, detour will be constructed on the south side of US 158/SR 1416. This detour will be used to maintain traffic on US 158/SR 1416 while the new bridge and its approaches are being constructed.

It is anticipated that the above-mentioned improvements will require the relocation of approximately four (4) residences and one (1) business. The total cost, including construction and right-of-way, is estimated to be \$12,700,000.

Construction	\$10,800,000
Right-of-way	\$ 1,900,000
<u>Total Cost</u>	<u>\$12,700,000</u>

IV. Traffic Operations

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 estimated base year 2002 Average Daily Traffic (ADT) volume for US 158/SR 1416 ranges from 1,800 to 5,200 vehicles per day (vpd) and the volume for US 17/US 158 ranges from 9,200 to 12,200 vpd. The estimated design year 2025 ADT volume for US 158/SR 1416 ranges from 2,800 to 9,800 vpd and the volume for US 17/US 158 ranges from 20,200 to 26,800 vpd.

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. For this report it is assumed that the proposed ramp terminal intersections will be signalized.

The level of service (LOS) for the proposed ramp terminal intersections was determined using the "Signalized Intersections Module" of the HCS2000 software package.

The proposed geometry for the eastern ramp terminal intersection includes two westbound through lanes. The eastbound approach includes two through lanes and an exclusive right-turn lane. The northbound approach includes an exclusive left-turn lane and an

exclusive right-turn lane. Based on the projected traffic volumes, it is estimated that this intersection will operate at LOS A for both the base year (2002) and the design year (2025).

The proposed geometry for the western ramp terminal intersection includes two westbound through lanes and an exclusive right-turn lane. The eastbound approach includes two through lanes and an exclusive left-turn lane. The southbound approach includes an exclusive left-turn lane and a shared through/right-turn lane. Based on the projected traffic volumes, it is estimated that this intersection will operate at LOS B for both the base year (2002) and the design year (2025).

V. Warrant Summary

This feasibility study evaluates replacing the existing "at-grade" intersection with an interchange. However, several issues must be addressed before a recommendation is made.

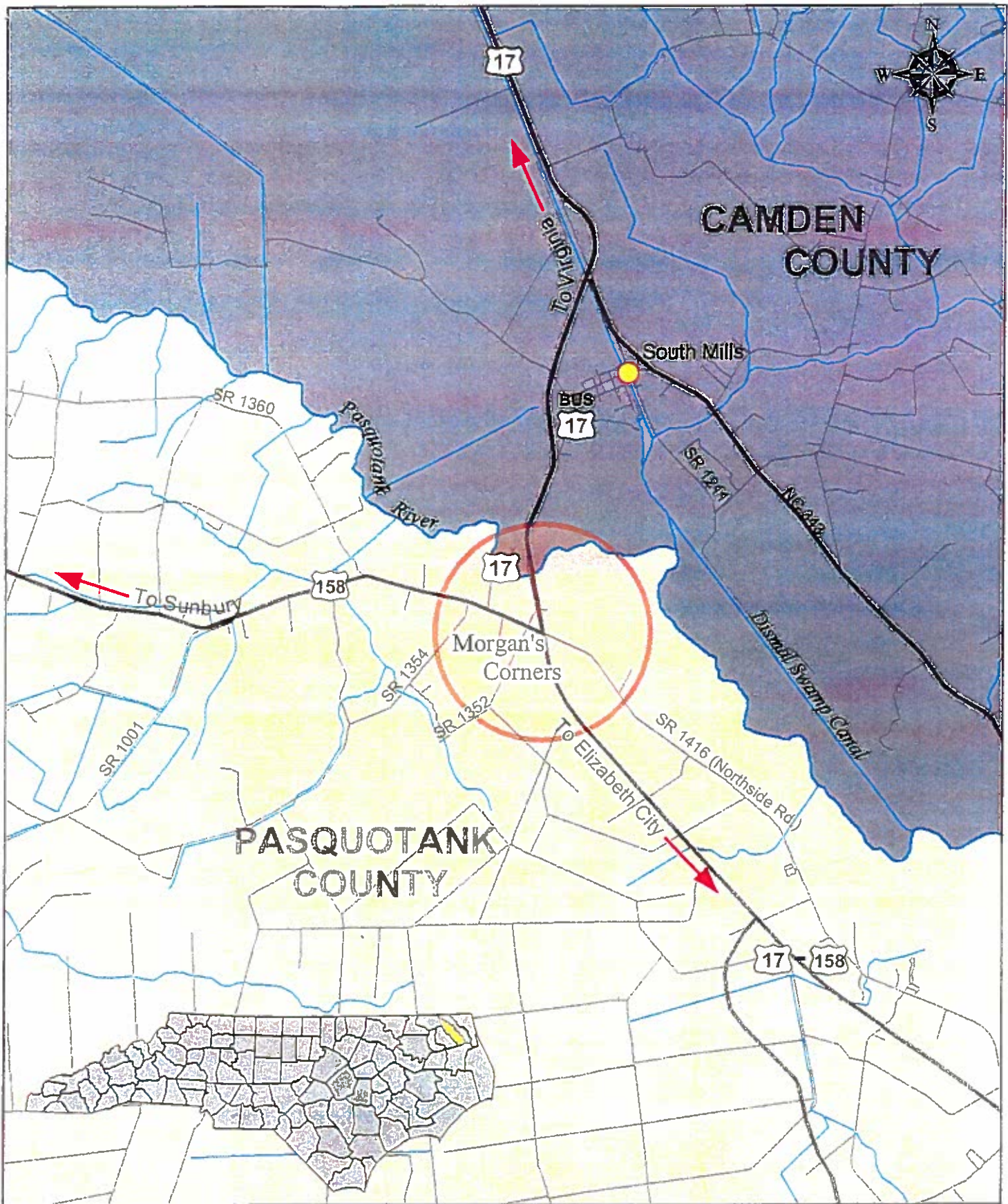
One issue for interchange warrant is traffic carrying capacity. A capacity analysis was performed for the existing signalized intersection to determine how it would operate in the future. Based on the projected traffic volumes provided by NCDOT and the current lane configuration, it is estimated that the intersection will operate at LOS C for the base year (2002) and LOS D for the design year (2025). Therefore, since the existing intersection will operate at an "acceptable" LOS (LOS D) an interchange is not warranted from strictly a "capacity" standpoint.

Another issue for interchange warrant is safety. The three-year accident analysis for the intersection indicates no fatalities and a severity index of 9.27, which is above the statewide average (7.65) for this type of intersection. Since the accident history for this intersection indicates an above average severity index it would seem to indicate that an interchange would be needed for safety reasons. Any "at-grade" intersection on a four-lane divided US Route with partial control of access has the potential for severe accidents. Therefore, an interchange at this location with full control of access would greatly enhance safety for motorists on US 17 and US 158.

VI. Additional Comments

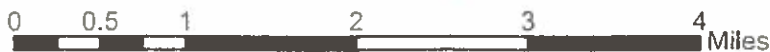
An exhaustive environmental screening was not conducted for this study. However, the following items were identified as needing more detailed analyses during future planning and/or design phases:

- The historical property on SR 1416 needs further investigation. However, the widening of US 158/SR 1416 will be to the south, which would minimize impacts to the property.
- A more thorough study of proposed service roads should be conducted.
- The design of the interchange should be closely coordinated with TIP projects R-2578 and R-2579.
- Careful study should be done to minimize all wetland impacts.



Feasibility Study FS-0101C
 US 17 and US 158 Interchange at Morgan's Corner
 Pasquotank County, NC

Figure 1



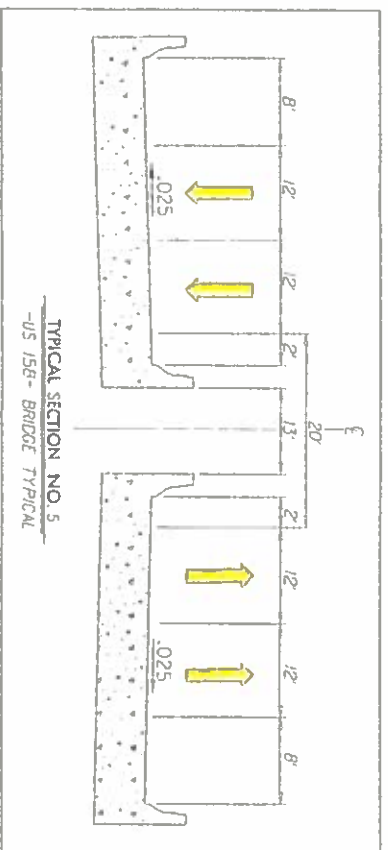
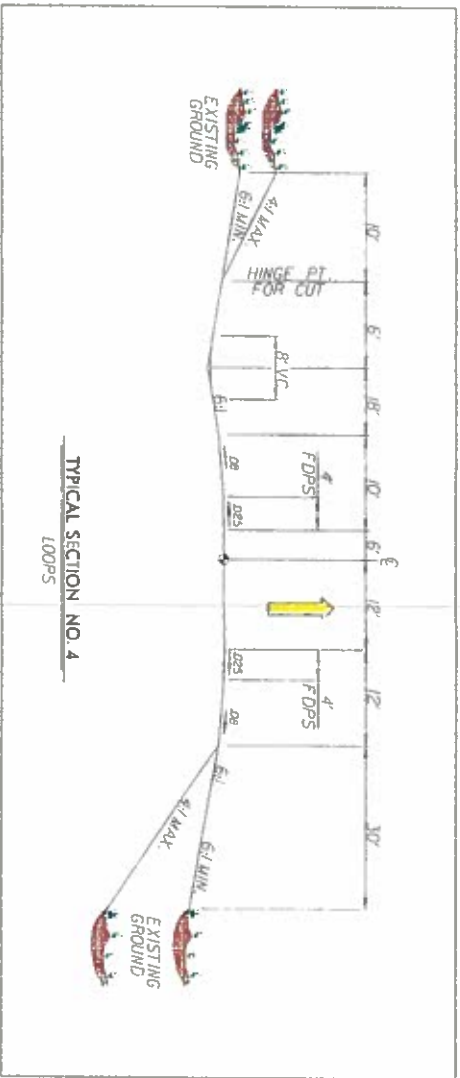
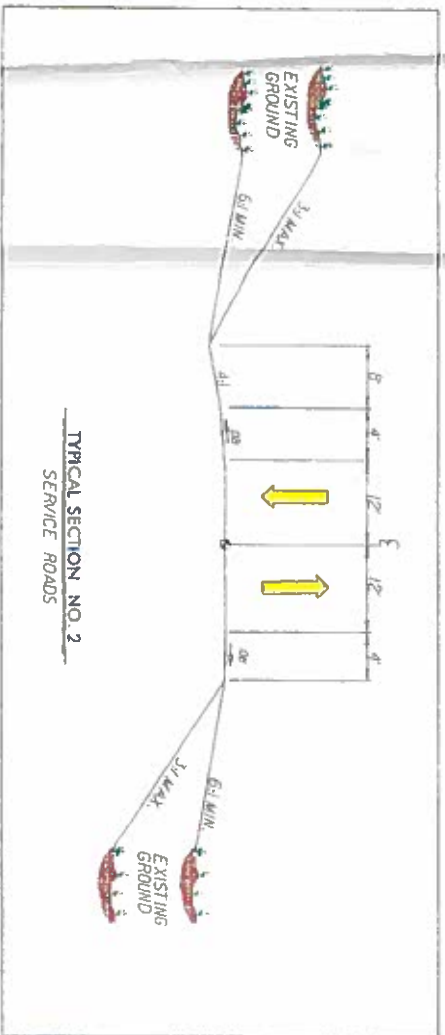
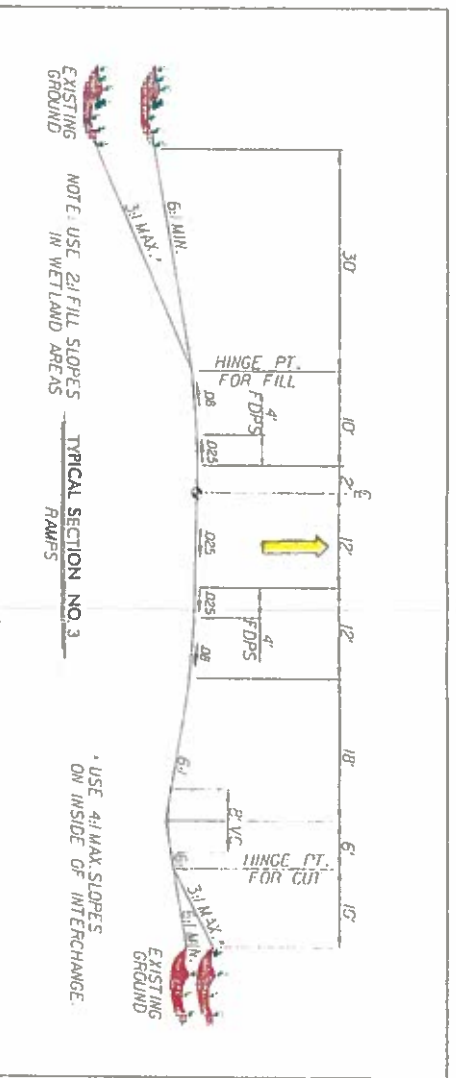
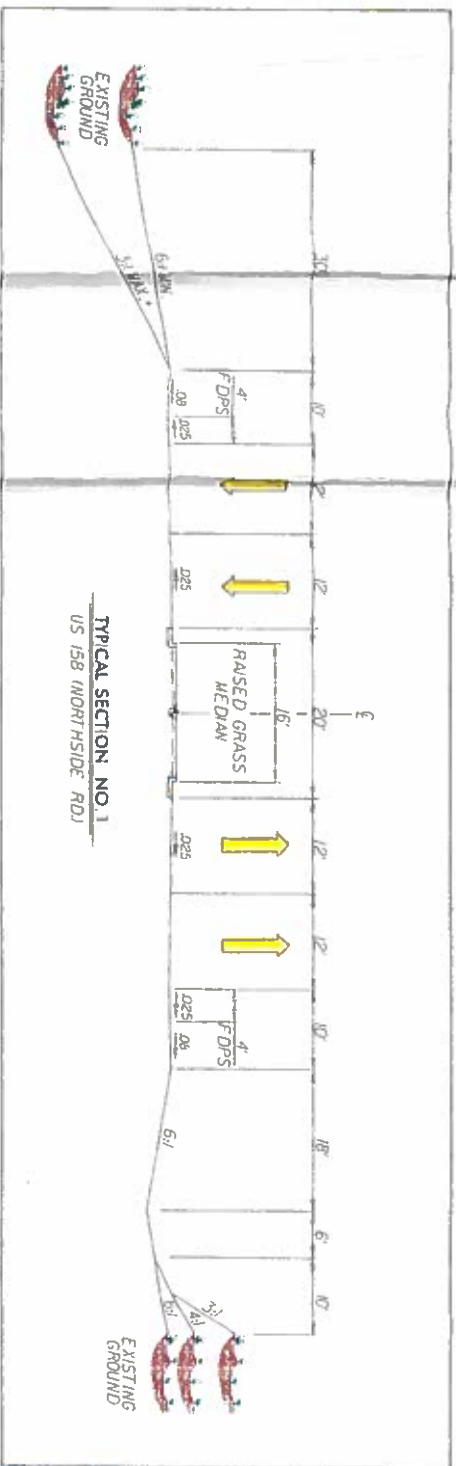


FIGURE 2

FEASIBILITY STUDY, FS-0101C
US 17 / US 158 INTERCHANGE AT MORGAN'S CORNER
PASOQUOTANK COUNTY



Preliminary Plans
For Feasibility Studies Only
Not For Construction

LEGEND

- PROPOSED ROADWAY
- PROPOSED RESURFACING
- PROPOSED DETOUR
- PROPOSED STRUCTURE
- PROPOSED CONTROL OF ACCESS
- PROPOSED RIGHT OF WAY
- NWI WETLANDS
- PARCELS
- COUNTY LINE
- HISTORICAL STRUCTURES
- RIVERS /LAKES/PONDS



NOTE:
- THE PASQUOTANK RIVER DEPARTMENT SUPPLIED THE INFORMATION AND LOCATION OF THE PARCEL LINES.
- THE U.S. GEOLOGICAL SURVEY GEOGRAPHIC SUPPLIED THE ORTHOPHOTOGRAPHY.

NC DOT FEASIBILITY STUDY FS-0101C CONVERT EXISTING US 158/US 17 AT-GRADE INTERSECTION TO AN INTERCHANGE MORGAN'S CORNER, PASQUOTANK COUNTY

JANUARY 2003

FIGURE 1

RDW
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