

TRANSPORTATION STUDY

TASK 1

For the Proposed:

BEAUFORT BYPASS

BEAUFORT, SC

Prepared for:

Beaufort County
Beaufort, SC



Prepared by:

Wilbur Smith Associates
Columbia, SC



Draft Report November 2001

Finalized Report December 2001



Wilbur Smith Associates

January 17, 2002

Mr. Robert Klink, P.E., County Engineer
Beaufort County Development & Services Division
100 Ribaut Road
PO Box 1228
Beaufort, SC 29901-1228

1301 Gervais Street (29201)
Post Office Box 92
Columbia, SC 29202-0092
(803) 758-4500
(803) 251-2064 fax
www.wilbursmith.com

**RE: Beaufort Bypass
Extension of Bellamy's Curve**

Dear Bob:

As requested, WSA has completed a supplementary analysis of the potential of extending US 21 through Bellamy's Curve, across the Beaufort River to SC 802 on Lady's Island. This letter is intended to supplement the Transportation Study: Task 1 for the Beaufort Bypass finalized December 2001. The following presents our findings regarding this potential alternative:

Utilizing the County Transportation Model, the 2020 Future Condition Scenario was programmed to provide for a new roadway link to extend from US 21 at Bellamy's Curve across the Beaufort River to SC 802 at the Brickyard Road intersection. It should be noted that no other segments of the Beaufort Bypass (Northern, Western or Eastern) were included in this scenario alternative analysis.

According to the model, this new link could be expected to carry 12,900 vehicles per day (vpd), while the Woods Memorial Bridge would be expected to serve 11,100 vpd. The following table compares the anticipated traffic volume projections for the Bellamy Curve alternative, and the Northern Bypass segment from the Transportation Study Report.

**Table 1
2020 TRAFFIC VOLUME PROJECTIONS**

Facility	Scenario		
	No Bypass	Northern Bypass	Bellamy Extension
Woods Memorial Bridge	19,300	14,000	11,100
McTeer Memorial Bridge	19,500	17,500	17,100
Northern Segment	-	9,300	-
Bellamy Curve Extension	-	-	12,900

Albany NY, Anaheim CA, Atlanta GA, Baltimore MD, Bangkok Thailand, Burlington VT, Charleston SC, Charleston WV, Chicago IL, Cincinnati OH, Cleveland OH, Columbia SC, Columbus OH, Dallas TX, Dubai UAE, Falls Church VA, Greenville SC, Hong Kong, Houston TX, Iselin NJ, Kansas City MO, Knoxville TN, Lansing MI, Lexington KY, London UK, Milwaukee WI, Mumbai India, Myrtle Beach SC, New Haven CT, Orlando FL, Philadelphia PA, Pittsburgh PA, Portland ME, Poughkeepsie NY, Raleigh NC, Richmond VA, Salt Lake City UT, San Francisco CA, Tallahassee FL, Tampa FL, Tempe AZ, Trenton NJ, Washington DC

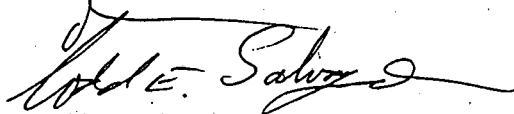
As shown by the modeled numbers, the Bellamy Extension is expected to attract nearly 13,000 vpd as compared to the 9,300 vpd with the northern section. This difference occurs because the traffic using the Bellamy Extension is comprised of traffic destined to/from the downtown area and through traffic headed to the north on US 21, whereas the Northern Segment alignment attracted through traffic destined to/from Lady's , St. Helena, Fripp Islands to/from US 21 to the north. Based on this, while the Bellamy Extension would serve a significant volume of traffic, it is not serving in the capacity of a bypass around Beaufort, but more of a local street simply allowing another connection to the downtown area.

This alternative does achieve a major goal of extending the life of the Wood's Memorial Bridge by reducing the future vehicular demand placed on this limited capacity facility. However, it should be noted that with the Bellamy Extension scenario the 5 block section of US 21 that currently provides a two-lane section just west of the curve would have to be upgraded to a continuous four/five-lane section to accommodate the future traffic due to the consolidation of both through and local traffic in this section of US 21. Additionally, like the Northern Segment, the crossing over the Beaufort River must be a high level bridge to accommodate the passage of marine traffic. This needed elevation may become an issue in the downtown area due to the historic nature of the town.

If you have any questions, please contact me at 803-251-2982.

Sincerely,

WILBUR SMITH ASSOCIATES



Todd E. Salvagin
Senior Project Manager

TES/mc

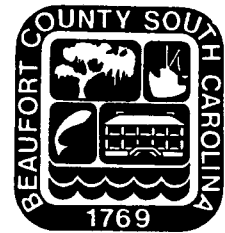
Attachment

TRANSPORTATION STUDY TASK 1

**For the Proposed:
BEAUFORT BYPASS
BEAUFORT COUNTY, SOUTH CAROLINA**

Prepared for:

Beaufort County, SC



**Draft Report
November 2001**

*Finalized Report
December 2001*

Prepared by:

**WILBUR SMITH ASSOCIATES
Columbia, SC**



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EXISTING CONDITIONS

INTRODUCTION

Wilbur Smith Associates has been retained by Beaufort County to evaluate the potential effectiveness of a new roadway facility to be known as the Beaufort Bypass. This new transportation facility could provide for a new loop roadway around the City of Beaufort/Town of Port Royal and provide an additional crossing over the Beaufort River between Beaufort/Port Royal and Lady's Island. This new facility is anticipated to relieve some of the traffic congestion in downtown Beaufort at the existing Woods Memorial Drawbridge and along SC 802 (Ribaut Road) in the Port Royal area. To address these issues, this study includes the following:

- A brief review of existing traffic volume conditions in the Beaufort (city), and Port Royal areas;
- Projections of future traffic growth; and
- Conclusions and recommendations.

Evaluation of the effectiveness of the bypass first requires a thorough description of the study area which is included in the following sections.

PROJECT DESCRIPTION

The proposal of the Beaufort Bypass consists of the planning of a loop road around the City of Beaufort which could result in an alternative route for traffic to travel between Lady's/St. Helena Islands, and the City of Beaufort/Town of Port Royal. This new loop road could potentially extend from SC 802 to SC 170 extending to US 21, across the Beaufort River (north of the Marine Airbase at Jacks Island) to Lady's Island at Brickyard Road, then extending across the Morgan River to Eddings Point Road on St. Helena Island.

In order to review the feasibility of this new facility, the Beaufort Bypass has been broken down into three logical segments as defined by the following:

- Northerly Segment : US 21 to Brickyard Road to SC 802
- Easterly Segment : Brickyard Road to Eddings Point Road
- Westerly Segment : SC 170 to US 21
- Western Segment Extension : SC 802 to SC 170

Figure 1 projects the potential alignment of the Beaufort Bypass and illustrates each of the segments. Logically, the Beaufort Bypass could be planned/constructed in one, two, three, or all four of the above stated segments, where the critical/key segment would be the northerly segment

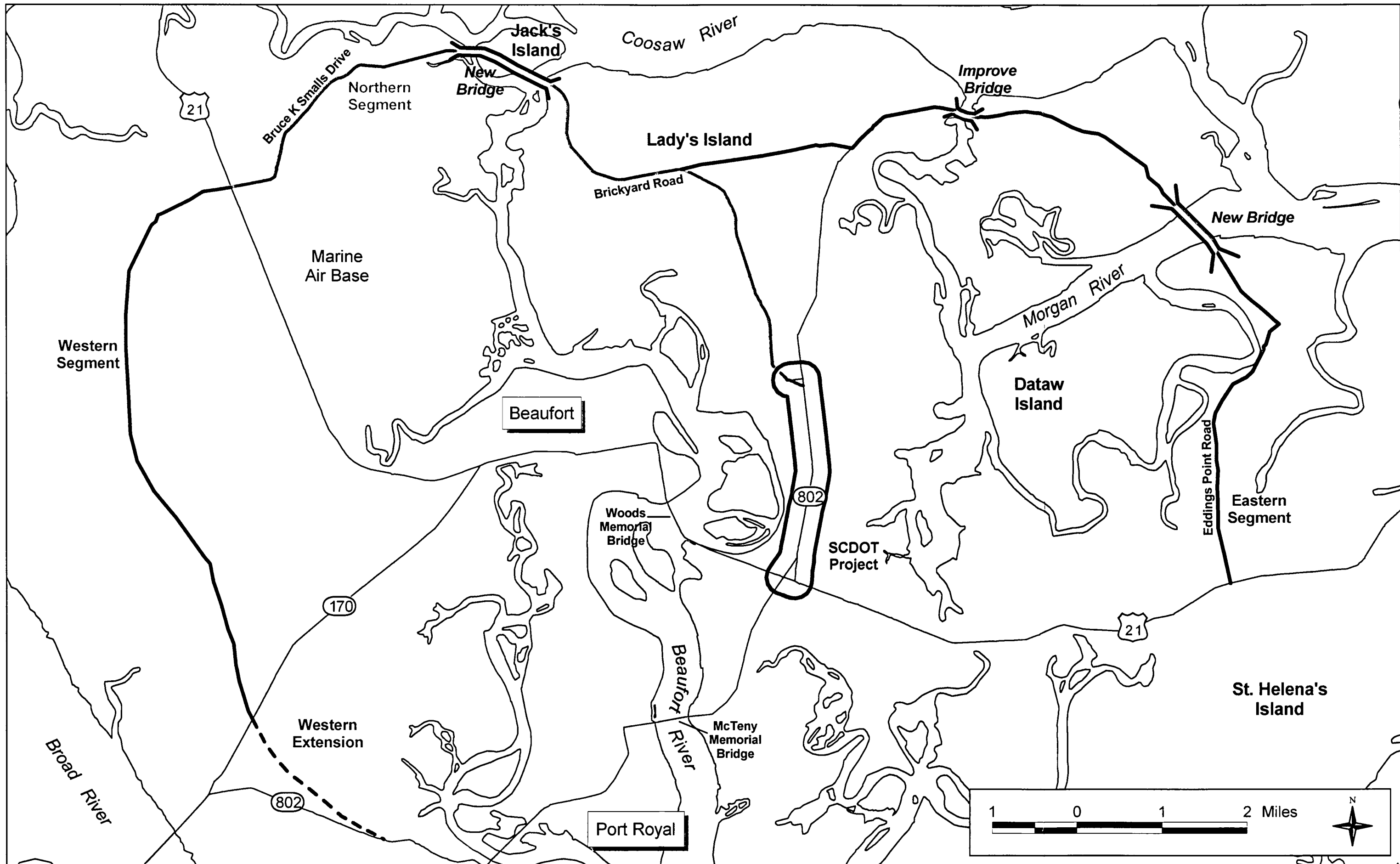


FIGURE 1

between US 21 and Brickyard Road which would provide an additional intracoastal waterway crossing of the Beaufort River.

CURRENT TRAFFIC CONDITIONS

Existing traffic volumes in the areas of the City of Beaufort and Town of Port Royal has been provided by the SCDOT as part of their annual traffic count program and presents the existing data in the form of average annual daily traffic volumes. **Table 1** depicts the available existing traffic data for the study area.

Table 1
EXISTING TRAFFIC VOLUME DATA

<u>Facility</u>	<u>2000 AADT¹</u>
US 21 Business north of Woods Memorial Bridge	14,200
Bay Street west of US 21 Business	8,100
US 21 Business/Woods Memorial Bridge	17,200
SC 802/ McTeer Memorial Bridge	18,000
SC 802 south of McTeer Memorial Bridge	23,700

1. AADT = Average Annual Daily Traffic.

As shown by the table, currently traffic volumes in the area are high, especially along US 21 Business and SC 802, but are not significant enough to be a capacity problem by themselves. Congestion occurs not due to insufficient roadway geometry (number of travel lanes) but rather the nodes or intersections between two roadways. This congestion is very apparent at intersections in the downtown Beaufort and Port Royal areas along the roadways of Bay Street, Ribaut Road and US 21 Business.

A particular concern to the City of Beaufort exists along US 21 Business between Beaufort and Lady's Island. The existing intracoastal waterway crossing (Woods Memorial Bridge) is a functioning drawbridge. This drawbridge opens frequently for marine traffic which closes the roadway and causes significant backups into the downtown Beaufort area. During some drawbridge events, it has been observed that vehicles backup eight to ten blocks along US 21, and six to eight blocks on Bay Street for durations of three to five minutes or longer while multiple marine vessels pass. This causes significant gridlock in the downtown area resulting in driver frustration and an overall dissatisfaction with the current transportation system. This dissatisfaction is even greater during the peak summer season when Lady's, St. Helena's and Frapp Islands are attracting large volumes of tourists/recreation traffic.

In the Port Royal area, the intersection of SC 802 and US 21 is a major concern. This intersection serves as access to the McTeer Memorial Bridge and is currently operating poorly due to the current high volume of traffic at this location, plus the geometry/traffic control at this intersection which necessitates "split signal phasing" which is very inefficient but is required due to geometry.

FUTURE TRAFFIC CONDITIONS

To estimate the impact of traffic volume growth on the roadway network under Future conditions, the Beaufort Count Transportation Model was used.

For the process of evaluating the feasibility of the Beaufort Bypass, the model was programmed to reflect the addition of different scenarios of the potential new bypass segment(s), and then the benefits/impacts of each development scenario have been quantified.

FUTURE TRAFFIC VOLUMES

Future traffic volumes for the year 2020 have been developed using the Beaufort County Transportation Model. The traffic volume projections have been completed for multiple scenarios assuming the implementation of one or more segments of the bypass. These scenarios are as follows:

- a. Future 2020 No Bypass;
- b. Future 2020 Northern Segment only;
- c. Future 2020 Northern and Western Segments
- d. Future 2020 Northern and Eastern Segments;
- e. Future 2020 Northern, Western and Eastern Segments.
- f. Future 2020 Western Segment only; and
- g. Future 2020 Western Segment and Extension.

Each of these alternatives account for the anticipated growth that is expected within the County based on the Socio-economic data as defined in the model and approved by County Planning staff. **Table 2** depicts the resultant 2020 Future traffic volumes for each of the scenarios of the bypass, and key locations/roadway segments in the City of Beaufort/Town of Port Royal area, and segments of the bypass.

Table 2
FUTURE 2020 TRAFFIC VOLUME PROJECTIONS

	US 21 North of Bypass	US 21 South of Bypass	Woods Memorial Bridge	McTeer Memorial Bridge	SR 802 South of Bridge	Northern Segment	Western Segment	Eastern Segment	Western Extension
Future 2020 (No-Bypass)	27,400	31,700	19,300	19,500	23,000	-	-	-	-
Future 2020 North Segment Only	30,600	30,600	14,000	17,500	21,100	9,300	-	-	-
Future 2020 North & West Segments	30,900	22,500	14,000	17,400	21,000	9,600	17,200	-	-
Future 2020 North & East Segments	30,100	28,200	12,600	16,800	20,200	11,400	-	5,000	-
Future 2020 North, West & East Segments	31,100	22,000	12,300	16,800	20,500	12,200	17,800	5,100	-
Future 2020 Western Segment Only	30,000	22,800	19,100	19,600	23,000	-	17,000	-	-
Future 2020 Western with Extension	30,000	23,200	19,200	19,400	22,100	-	17,000	-	9,000

As shown by the table, traffic volumes are anticipated to increase significantly in the study area as compared to the current 2000 traffic volumes. Traffic volumes on the bridges are anticipated to grow when the total volume of traffic crossing the Beaufort River (sum of the Woods and McTeer Memorial Bridges) is 38,800 vpd.

Other traffic volumes along SC 802, US 21, etc. are also expected to have significant growth which will result in the continued increase of congestion along these routes, especially in the downtown Beaufort area of Bay Street and US 21 Business. In this area, if no additional improvements are made, congestion, delay and driver dissatisfaction will become greater with the expected growth in traffic.

Traffic projections on the proposed Beaufort Bypass range from 9,000 – 12,000 vehicles per day (vpd) on the northerly segment (US 21 to Brickyard Road), 17,000 vpd on the westerly segment (SC 170 to US 21), 9,000 vpd on the Western Extension (SC 802 to SC 170) and 5,000 vpd on the easterly segment (Brickyard Road to Eddings Point Road). If an alternative is chosen that includes the northerly segment (adds a new river crossing) the bypass is expected to reduce the need to travel through the downtown Beaufort roadways between 5,000 – 7,000 vehicles per day while reductions in the Port Royal area along SC 802 could be expected to be reduced by 2,000 – 3,000 vehicles per day.

An interesting characteristic of the traffic projections both for the western segment both with or without the extension is that the projections are nearly equal for each analyzed scenario. This indicates that these roadway segments do not serve as a bypass function, but would serve the land areas between SC 802 and US 21 for both future and existing development in this area. Because of this, both the westerly segment and the extension should not be considered as a bypass but rather a development roadway/circulation element oriented to serve these land areas.

It should also be noted that the easterly segment is also nearly equal for all scenarios however, unlike the westerly segment, the easterly segment is serving traffic which would normally travel through the City of Beaufort destined to St. Helena/Fripp Islands. This traffic is originating from areas to the north of the City of Beaufort (on US 21) and would logically use the bypass alternative to their destination in the far eastern sections of the County.

Growth east of Beaufort on Lady's, St. Helena and Fripp Islands is expected to increase by approximately 35 percent over the next 20 years, according to the socio-economic data or approximately 1½ percent per year. When compared to other areas of the County (for example, Beaufort is 2¼ percent per year and Bluffton is 23 percent per year), this expected growth is very minimal. This minimal growth is due to the current planning/zoning of the area which maintains much of the area as low density defined as rural residential development. If growth in this area occurs at a greater pace/more densely than what is projected by the current count plan, it is cautioned that traffic crossing the Beaufort River will also increase. Therefore, due to socio-economic data, it is anticipated that the projected 2020 traffic volumes may be considerably low given the current "development environment" to increase densities where possible.

SUGGESTIONS

Roadways

The Beaufort Bypass will serve traffic destined to the Lady's, St. Helena, and Fripp Islands areas. The greatest benefit to traffic will be vehicles originating from the north on US 21 to the Bypass across the Beaufort River. This could reduce the volume of traffic traveling in the downtown Beaufort area by 5,000 – 7,000 daily vehicle trips.

Depending on the segment of the bypass, traffic volumes will vary significantly. The northerly segment which is the critical segment should at a minimum be a two/three-lane section. The westerly segment should be a 4-lane divided section, and the easterly segment should be a 3-lane section. Table 3 presents each of the prospective bypass segments, applicable capacities and respective traffic volume on each.

**Table 3
BYPASS CROSS-SECTIONS**

Segment	Designation	Suggested Cross-Section	Typical Row (ft)	2020 Volume¹	Capacity	LOS
Northern	Principal Arterial	2-Lane Divided	66	12,200	16,800	C+
Eastern	Collector	3-Lane	66	5,100	9,800	C+
Western	Collector	4-Lane Divided	100	17,800	19,600	C+

1. Greatest 2020 volume based on Table 2 regardless of alternative.

Northern Segment

This segment is anticipated to extend from US 21 just north of the Airbase to the Beaufort River, cross the river and intersect with Brickyard Road on Lady's Island. This segment is the critical section of the bypass because it provides a new crossing over the Beaufort River. Without this segment, the remainder of the bypass segments should not be considered for the purposes of providing a bypass around Beaufort.

This segment begins at US 21 above the Marine Airbase and is proposed to follow the current alignment of Bruce Smalls Drive which currently serves limited low density residential land uses. Based on this, this segment prior to a new bridge should provide a 2-lane cross-section, where left-turns are provided for at major intersections however, it is suggested that for current planning purposes, right-of-way should be obtained for a 4-lane divided roadway. This would build in the future potential that the bypass may serve greater volumes of traffic than is projected in this report if the Lady's, St. Helena and Fripp Islands communities grow at a greater rate than is expected by the County's land plan.

The bridge segment of the northern bypass would have to be a new high level structure allowing the uninterrupted passage of marine vessels. It should be planned as a two-lane divided cross-section. However, this design should allow the potential future need of a 4-lane divided section if needed.

This new intracoastal crossing will pose design and environmental challenges. Clearance of the bridge must be sufficient to allow the passage of marine traffic and not interfere with the current flight path of the airbase. Environmentally, this roadway will cross a salt-water environment which will involve the Army Corp of Engineers, DNR, OCRM and other regulatory agencies.

On the Lady's Island side, this roadway should provide a 2-lane divided section (provisions for left-turns at major intersections) and follow the Brickyard Point Road to Middle Road alignment to SC 802. It should be noted that as part of an SCDOT widening project, the alignment of MiddleRoad/Brickyard will align opposite Holly Hall Road, and that SC 802 will be widened to a 5-lane section (with a center left-turn lane) from Holly Hall Road to US 21. This SCDOT project completes the SC 802 portion of the northerly bypass with very little additional widening needed.

Western Segment

The general alignment of this segment is between SC 170 to US 21. At US 21, the alignment should intersect opposite the northerly bypass segment at Bruce Smalls Drive. The intersecting point on SC 170 is flexible, and has been selected as Castle Rock Road for this study. This roadway should provide a 4-lane divided cross-section (left-turns to be provided at planned major intersections) between SC 170, and US 21 and will intersect many local roadways including Laurel Bay Road. The exact layout of this roadway must take into account the topography, and land development that is occurring in the area to adequately serve the existing and future traffic anticipated to be generated in this area. As has been pointed out prior in this document, this section of the bypass is not anticipated to serve significant volumes of traffic destined to Lady's Island and the northerly side of Beaufort. Traffic wishing to go to Lady's/St. Helena/Fripp Island from SC 170 (at the Broad River Bridge) logically would use SC 802 to Lady's Island via the McTeer Memorial Bridge. Based on this, this segment should be constructed as a circulation element orientated to serving current and future land uses, not as a bypass.

Western Segment Extension

This segment would extend the western segment from SC 170 to SC 802 towards the Town of Port Royal. This segment should provide a 4-lane divided cross-section with provisions for left-turns at major intersections. As with the westerly segment, this segment does not serve as a bypass, and should be constructed as a circulation element for land-uses.

Eastern Segment

This segment of the bypass would extend from Brickyard Point Road follow the Springfield Road adjacent to SC 802 to Coosaw Island along Coosaw River Drive. As such, the current bridge to Coosaw Island would have to be upgraded to accommodate the additional traffic loadings anticipated. A new bridge would have to be constructed to cross the Morgan River with a new roadway connection to Eddings Point Drive, which will then terminate at US 21. The entire eastern segment should be planned as a three-lane roadway section with exception of the two bridges which should provide a two-lane section.

COST OPINIONS

Cost opinions for each of the bypass segments have been completed. These costs anticipate current costs for construction of each segment, but do not include right-of-way, utility relocation, or permitting costs. The following presents the summarized costs:

Table 4
COST OPINION

<u>Bypass Section</u>	<u>Estimated Cost Opinion</u>
Northern Segment	\$148,500,000
Western Segment	\$ 42,000,000
Western Extension	\$ 10,500,000
Eastern Segment	<u>\$100,100,000</u>
Total	\$301,000,000

As shown, the total cost of the bypass is estimated at slightly over \$300 million with the critical segment of the bypass (northerly segment) being nearly half of the cost of the entire bypass.

It should be noted that these costs are of high estimates for the purposes of this planning report. A more detailed cost will be prepared upon approval of the next phases of work on this project which include the design feasibility and identification of environmental issues.

Project Prioritization

Prioritization of the bypass segments has been completed based on logical necessity rather than cost. The highest priority of the segments should be given to the northern segment based on the fact that without this segment, a bypass around the City of Beaufort is not possible.

The choice between which segment is second or third is not as easily selected. Based on the projected traffic volumes, the westerly segment or the western extension will not serve as a bypass, and the easterly segment is not projected to carry a great enough traffic volume to justify the expenditure of \$100 million.

Since the western segment is not anticipated to function as a bypass, but is anticipated to carry a significant volume of traffic due to existing and planned development in this area of the County. It is suggested that this "development roadway" be funded fully, or partially by development planned in this area which would be the greatest user and have the most benefit of this roadway.

The western extension should be given the least priority of the segments. This segment is anticipated to carry 9,000 vpd and will not benefit the downtown areas of either the City of Beaufort or the Town of Port Royal.

CONCLUSIONS

As requested by the County, this report addresses the feasibility of the transportation needs of the Beaufort Bypass. Within this report, it has been determined that the northern segment of the bypass which will extend from US 21 to Brickyard Road on Lady's Island would provide a much needed alternative to the Woods Memorial Bridge in downtown Beaufort. Although not as high of a priority, the eastern and western segments also provide a benefit, however these benefits as it

relates to vitality of a bypass are marginal at best. The next step would be to begin to address a conceptual design of the bypass, and begin to investigate potential environmental hurdles of the project. By choosing such, the County may begin to better address the cost of the project and expand upon this first phase of the feasibility of the Beaufort Bypass.