

SR 25 Spur at Canal Road Intersection Study-Final

SR 25 Spur at Canal Road

Brunswick, Georgia

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Traffic Impact Analysis Glossary

Access Point = An intersection, driveway, or opening on a public street providing entry to a private development or property.

ADA= Americans with Disabilities Act

Adjacent Street Traffic= All traffic with direct access to a development site

Arterial= A signalized street that primarily serves through traffic and that secondarily provides access to abutting properties, with signal spacing of 2.0 miles or less.

At-Grade Intersection= The location at which two roadways cross and join at the same vertical elevation; access through the intersection may be controlled by traffic signals or stop/yield signs

Background Conditions= Conditions affecting the performance of the transportation network not directly related to the subject development over a designated time period, such as growth in existing traffic volumes, other planned, approved or current developments in the study area, and planned improvements to the transportation network

Capacity= The maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions, usually expressed as vehicles per hour.

Collector= A roadway with no control of access linking residential communities with the arterial system

Cycle= The time period required for one complete sequence of traffic signal indications

Delay= The additional time experienced by a roadway user, typically motorists as a result of constrained movements and deviation from ideal or free flow speeds

Generator= a land use that attracts vehicle, pedestrian, or other modes of traffic

Highway Capacity Manual= A publication of the National Academy of Sciences Transportation Research Board that provides a collection of the state-of-the-art techniques for estimating the capacity and determining the level of service for transportation facilities; first published in the 1950s and most recently published in 2000.

Internally Captured Trip= A trip originating and destined for different land uses within the same development but not traveling on a public street

Level of Service= A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed, travel time, freedom to maneuver, traffic interruption, comfort and convenience.

Modal Split= The percentage of people using a particular means of transport, such as auto, transit, or walking, to make a trip

Multi-modal= A transportation facility for different types of users, modes, or vehicles.

Pass-by Trip= An intermediate stop on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the development.

Peak Hour= The one-hour period of greatest utilization of a transportation facility; weekdays normally have two peaks, one in the morning and one in the afternoon

Phase= A portion of a traffic signal cycle allocated to any traffic movement or combination of traffic movements

Split-Phased Mode= A type of signal control where all movements from one side street at a time move concurrently

Trip/Trip End= A single or one-direction movement by any mode of travel with the origin or destination (exiting or entering) inside the study development.

Total Trips= The total of all trips entering plus all trips exiting during a designated time.

I. Introduction

The intersection of SR 25 Spur at Canal Road is located in Brunswick Georgia as shown in **Figure 1**. SR 25 Spur (Golden Isles Veteran Memorial Parkway) is a major arterial that provides access from I-95 to the Golden Isles region. Canal Road is a minor arterial that connects local residential neighborhoods to SR 25 Spur.

The report is divided in three sections; first the existing conditions are evaluated and documented including the existing roadway network, existing traffic volumes, crash analysis, and existing intersection capacity and level of service. Secondly, Year 2010 conditions are analyzed including the regional growth in existing traffic volumes, traffic from other nearby planned, approved, or current development activity, and planned improvements to the transportation network. Lastly, the Year 2020 conditions are evaluated including the total future traffic volumes, and future intersection capacity and Level of Service (LOS).

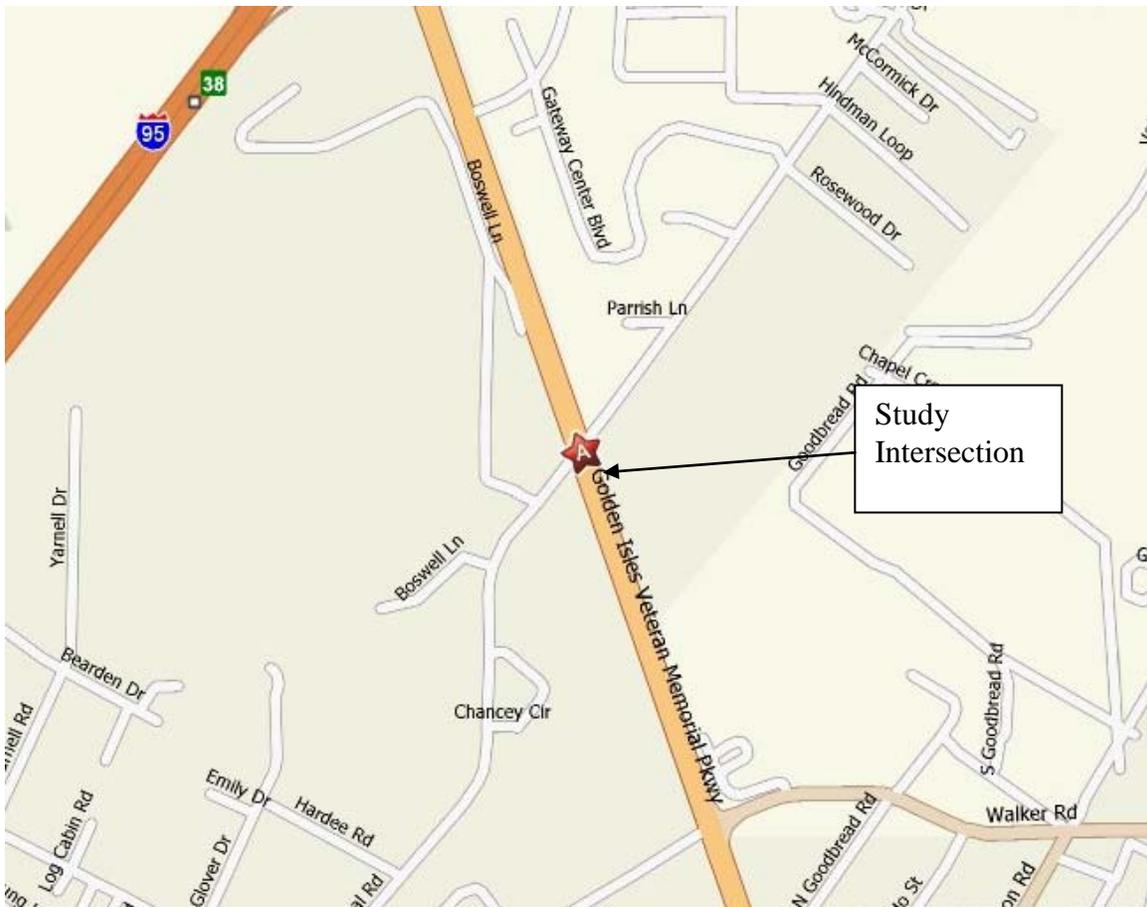
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II. Existing Conditions

SR 25 Spur at Canal Road is located south of I-95 in Brunswick, Georgia. This intersection is controlled by a traffic signal. SR 25 Spur is a four lane facility with two lanes in the northbound direction and two lanes in the southbound direction. Canal Road is a two lane facility with one lane in each direction. There are exclusive left turn lanes on both approaches of SR 25 Spur and Canal Road. There is an exclusive right turn lane on the northbound SR 25 Spur approach. There are channelized right turn lanes on the Canal Road approaches.

Existing peak hour turning movement counts were collected in March, 2009. The counts were collected at the study intersection from 6:00 AM to 8:00 AM and 4:00 PM to 6:00 PM. **Figure 2** summarizes the existing peak hour traffic volumes. The count data indicates that the existing peak hours occur from 7:00 AM to 8:00 AM and 4:00 PM to 5:00 PM.

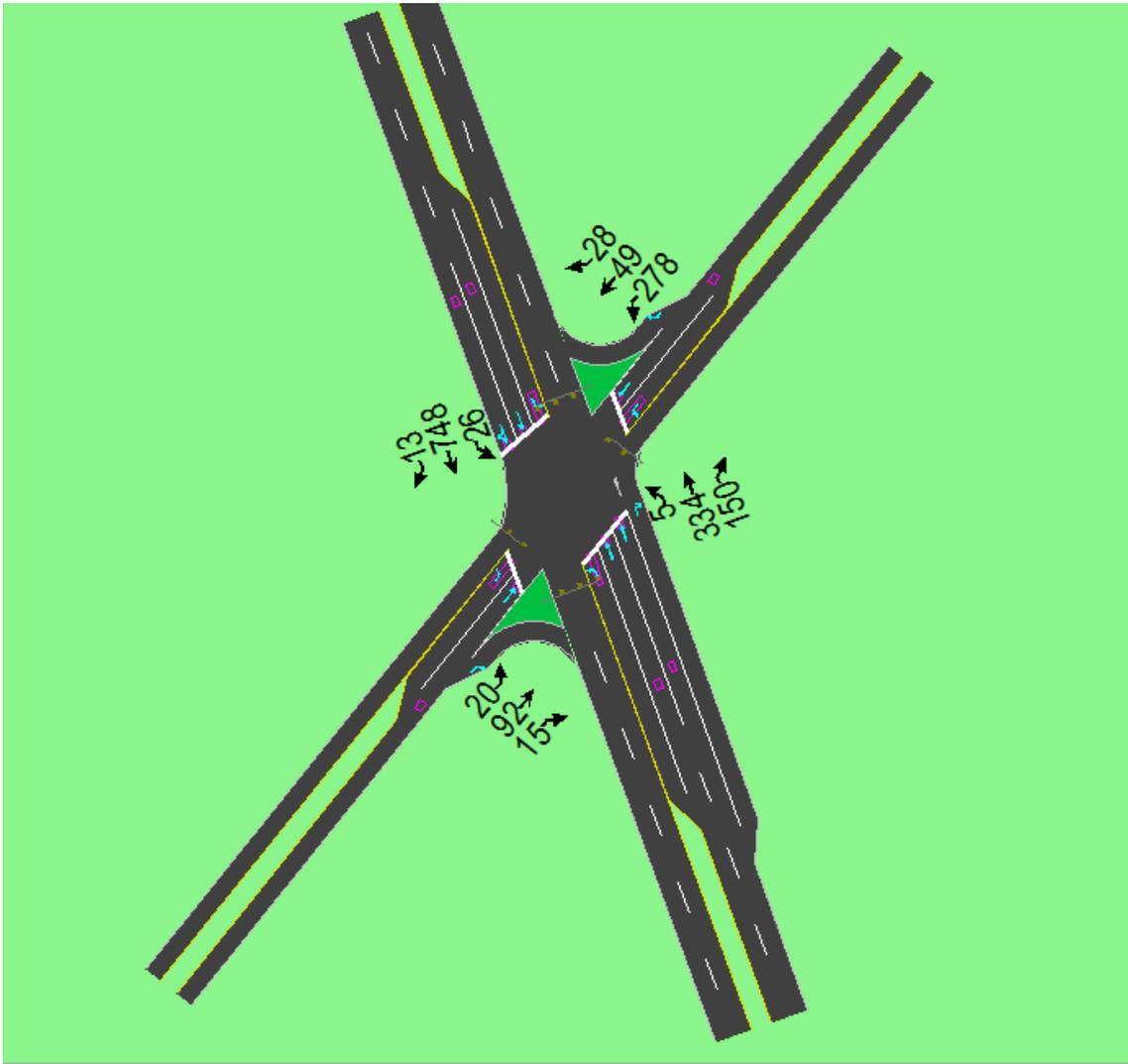
Figure 1 - Area Map (Not to Scale)



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Figure 2 - Existing AM and PM Peak Hour Traffic Volumes

AM Peak Hour



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speaking, a ratio of 1.0 indicates that the roadway is operating at capacity. A ratio of greater than 1.0 indicates that the facility is failing as the number of vehicles exceeds the roadway capacity.

The results of the existing conditions capacity analysis are summarized in the following table; detailed HCM worksheets are included in **Appendix C**.

Table 1 - Summary of Existing Capacity Analysis; AM (PM)

Intersection	AM LOS	AM v/c	PM LOS	PM v/c
SR 25 Spur at Canal Road	C	0.60	C	0.49

The results of the existing conditions capacity analysis indicate that the intersection is currently operating at a LOS C during the AM and PM peak hours with volume to capacity ratios below 1. However, it should be noted that during the PM traffic count, queuing conditions from the I-95 construction zone were observed which spilled back to the Canal Road intersection and effectively reduced the saturation flow rate for the northbound SR 25 Spur approach at Canal Road. Vehicles were also observed turning right onto eastbound Canal Road to avoid the I-95 construction zone. Discussions with the Glynn County Planning Department indicated that this queuing condition existed prior to the reconstruction of I-95.

Crash Analysis

In addition to the operational analysis, a crash analysis was conducted at the intersection to identify crash patterns and develop countermeasures to reduce the number of crashes at the study intersection. The most recent three years of crash data (2006, 2007, 2008) was provided by the Glynn County Planning Department.

Table 2 - Summary of Existing Crash Analysis

	Angle	Rear End	Sideswipe	Other
Number of Crashes	5	36	1	6

The results of the crash analysis indicate that there were a total of 48 crashes at the intersection, the majority of which were rear end collisions which is consistent with crash patterns at signalized intersections. The installation of a traffic signal often reduces the more severe angle collisions while increasing the number of rear end crashes which are typically minor compared to angle

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collisions. One of the five angle collisions occurred when a vehicle making a left turn from southbound SR 25 Spur collided with a thru vehicle traveling northbound on SR 25 Spur. This type of crash could only occur with permitted left turn phasing on SR 25 Spur. Currently, there is protected left turn phasing on the SR 25 Spur approaches, which implies the left turn phasing was recently modified and eliminates the potential for these types of crashes.

Out of the total of 48 crashes, 6 occurred at night and 9 occurred under wet conditions. There were also 2 crashes that can be attributed to the Racetrack Driveway near the intersection.

The overall crash pattern indicates that high speed and aggressive driving are the prevailing factors in most of the crashes. Wet pavement conditions were also a contributing factor in some of the crashes; however, aggressive driving (drivers following too closely, high speeds) in wet conditions increases the likelihood of crashes.

III. Year 2010 Conditions

The Year 2010 Conditions includes the following assumptions:

- ✓ Growth in existing traffic volumes over the study period due to regional growth,
- ✓ Other planned, approved or current developments in the study area,
- ✓ Planned improvements to the transportation network by the County in the study area

A. Growth in Existing Traffic Volumes

As the existing traffic counts were collected in 2009, one years growth (3%) in existing traffic volumes was assumed.

B. Approved Developments

Based on information on planned, approved and current development activity in the study area provided by the Glynn County Department of Planning, the following developments were included for the Year 2010 conditions analysis:

1. 171K square foot department or specialty big box store
2. 136K square foot warehouse/retail club
3. 60K square foot specialty retail
4. 25K square foot restaurant space
5. 200 unit apartment complex

C. Transportation Network Improvements

Based on conversations with Glynn County, there are no planned transportation improvements that will impact the area under study. However, it should be noted that the I-95 at SR 25 Spur interchange is currently being reconstructed.

D. Trip Generation and Distribution

Projecting the number of new vehicular trips generated by proposed development is the most critical aspect of assessing traffic impact. The objective of a trip generation analysis is to forecast the number of new trips that will begin or end at a proposed land use. A primary source for data on vehicular trip generation is the *Institute of Transportation Engineers Trip Generation 7th Edition* handbook. The handbook compiles data from numerous studies of vehicular trip

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rates at hundreds of specific types of land uses such as recreational, residential, commercial, office, institutional, and industrial throughout the country. The data is sorted by various time periods such as morning and evening peak hour, and plotted against independent variables for specific land uses such as square feet of commercial space, number of hotel rooms, number of dwelling units, etc. The data is presented in chart format with mean trip rates, standard deviations, and fitted curve linear regression equations, where enough data is available.

Several site-specific factors can reduce the number of new personal vehicular trips generated by a new development or land use. These include 1) the availability of **alternative modes** of transportation such as sidewalks, bicycle facilities, and public transportation, 2) the effect of **pass-by** traffic which includes personal vehicles already on the roadway network making an intermediate stop on the way from an origin to a primary trip destination without a route diversion, and 3) the effect of **internally captured** trips composed of traffic originating and destined for different land uses within the same development that do not travel on the public roadway network. An example of an internal trip would be a trip from an office building to a restaurant or from a hotel to an office building within the same development.

For this study, the ITE Trip Generation Manual, 7th Edition peak hour trip generation rates were determined based on current land uses. The average number of vehicular trip ends and percentage of entering and exiting volumes were calculated using the land uses for Shopping Center, Specialty Retail Center, Discount Club, High-Turnover (Sit-Down) Restaurant, and Low Rise Apartment.

Information for pass-by and internal capture trip rates for mixed-use developments can also be found in the *Trip Generation Handbook*. In addition, as there are multiple land uses and specialty retail within the development which would also effectively reduce vehicular trips, pass-by and internal capture reductions were calculated for the subject developments. The projected trip generation is summarized in **Table 3**.

Table 3 – Summary of Proposed Land Uses and Trip Generation AM(PM)

Land Use	ITE Code	Total Daily Trips	Peak Hour Trips	Entering		Exiting	
				%	Vehicles	%	Vehicles
Speciality Retail Center	814	2659	0(163)	0(44)	0(72)	0(56)	0(91)
Discount Club	861	5684	0(577)	0(50)	0(288)	0(50)	0(289)
Sit Down Restaurant	932	3179	288(273)	52(61)	150(167)	48(39)	138(106)
Low Rise Apartment	221	1318	92(116)	21(65)	19(75)	79(35)	73(41)
Shopping Center	820	7343	176(641)	61(48)	107(308)	39(52)	69(333)
Less 5% Internal Capture		1009	28(89)		14(46)		14(43)
Less 34% Pass by for Retail		4990	31(380)		22(181)		9(199)
Total Net New Trips		14184	497(1301)		240(683)		257(618)

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The proposed developments are projected to generate, after applicable trip reduction factors, a total of 14184 new daily vehicular trips, of which 497 will occur during the AM peak hour and 1301 will occur during the PM peak hour.

E. Distribution of Site Trips

The distribution of site trips is based on existing traffic patterns, land uses and access points to the proposed development and is summarized as follows: 29% in the AM and 45% in the PM from the north via SR 25 Spur, 48% in the AM and 28% in the PM from the south via SR 25 Spur, 19% in the AM and 21% in the PM from the east via Canal Road, and 4% in the AM and 5% in the PM from the west via Canal Road.

Figure 3-Site Generated AM Peak Hour Trips

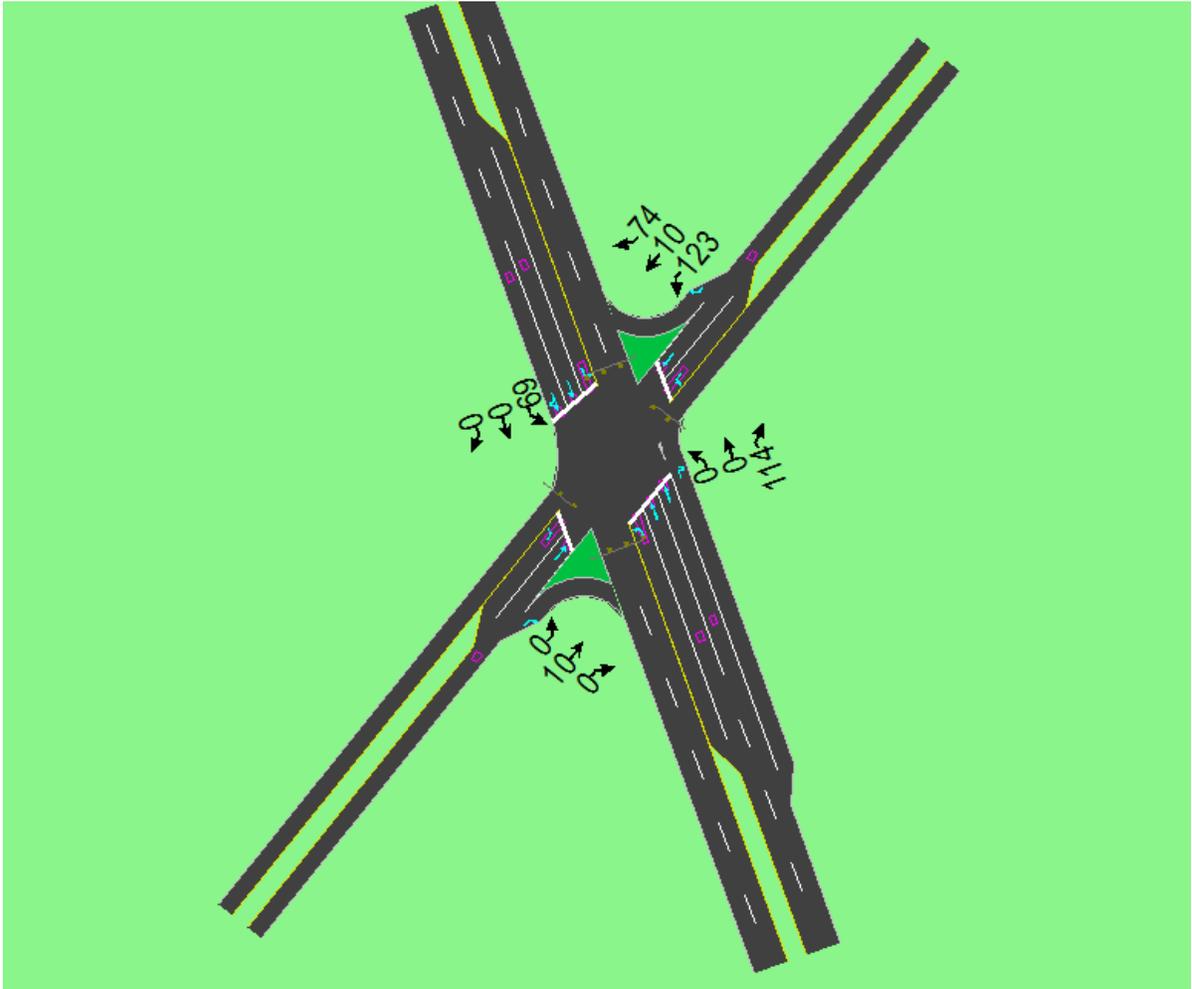
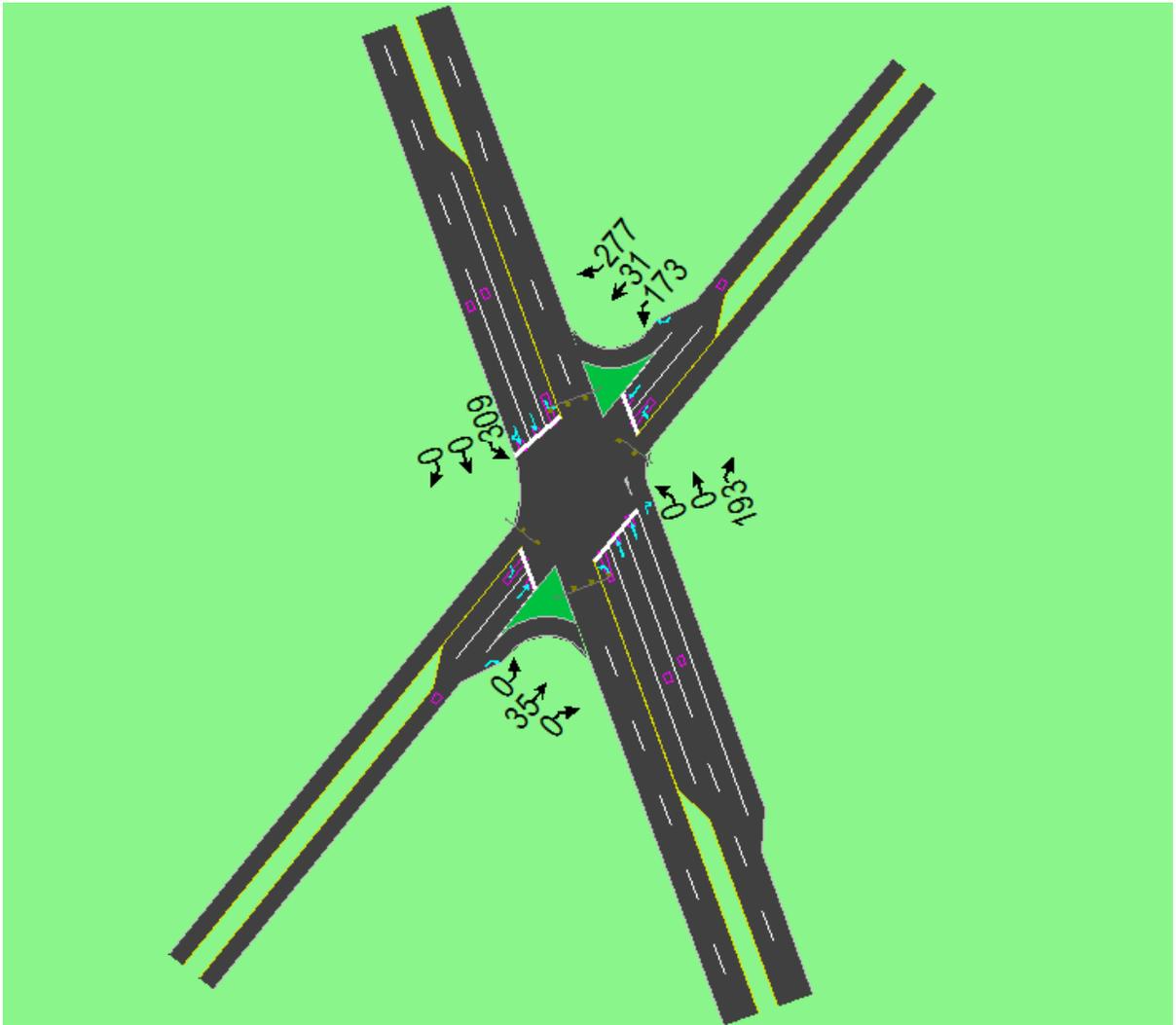


Figure 4-Site Generated PM Peak Hour Trips



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Figure 5-Future AM Peak Hour Volumes

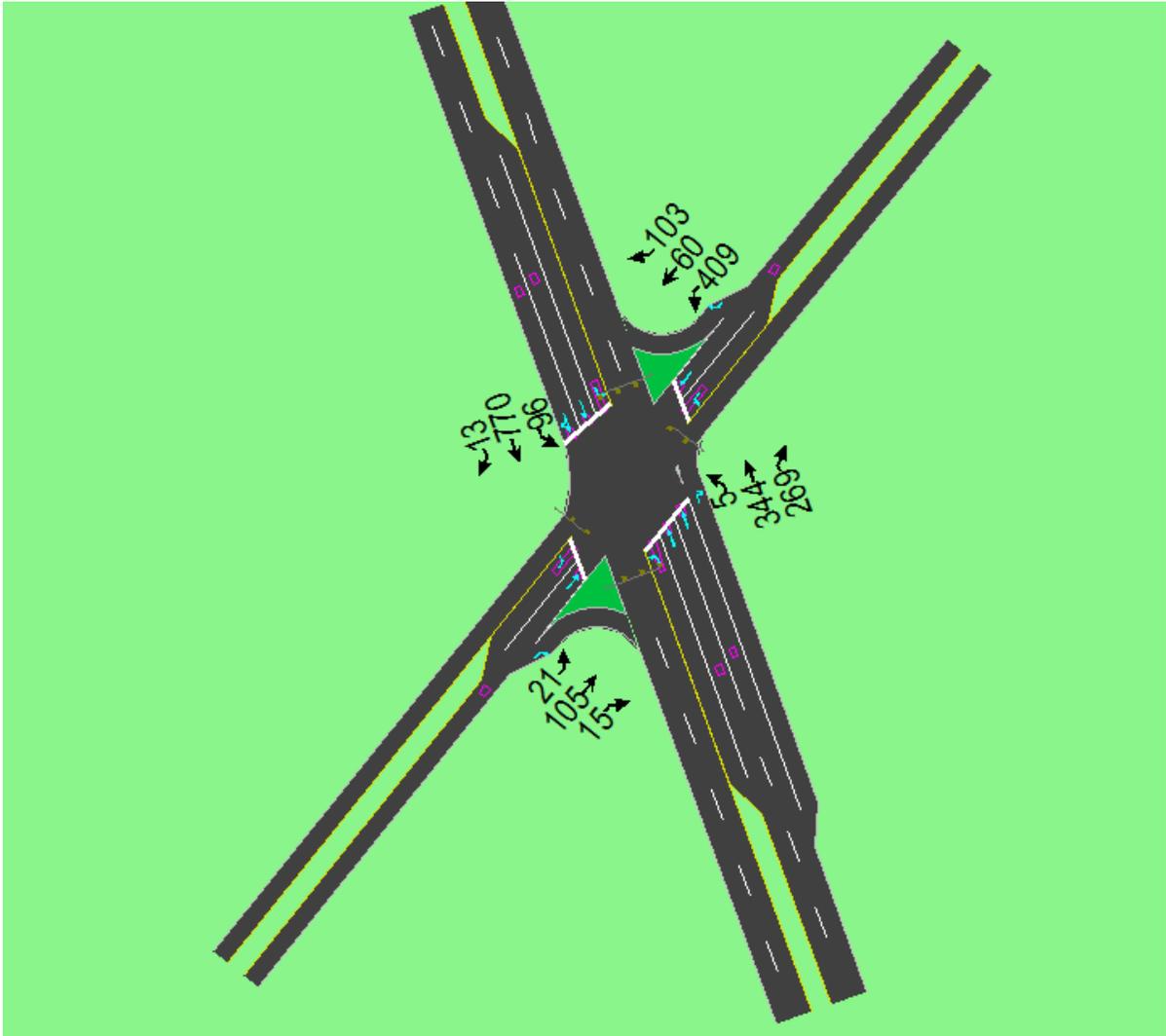
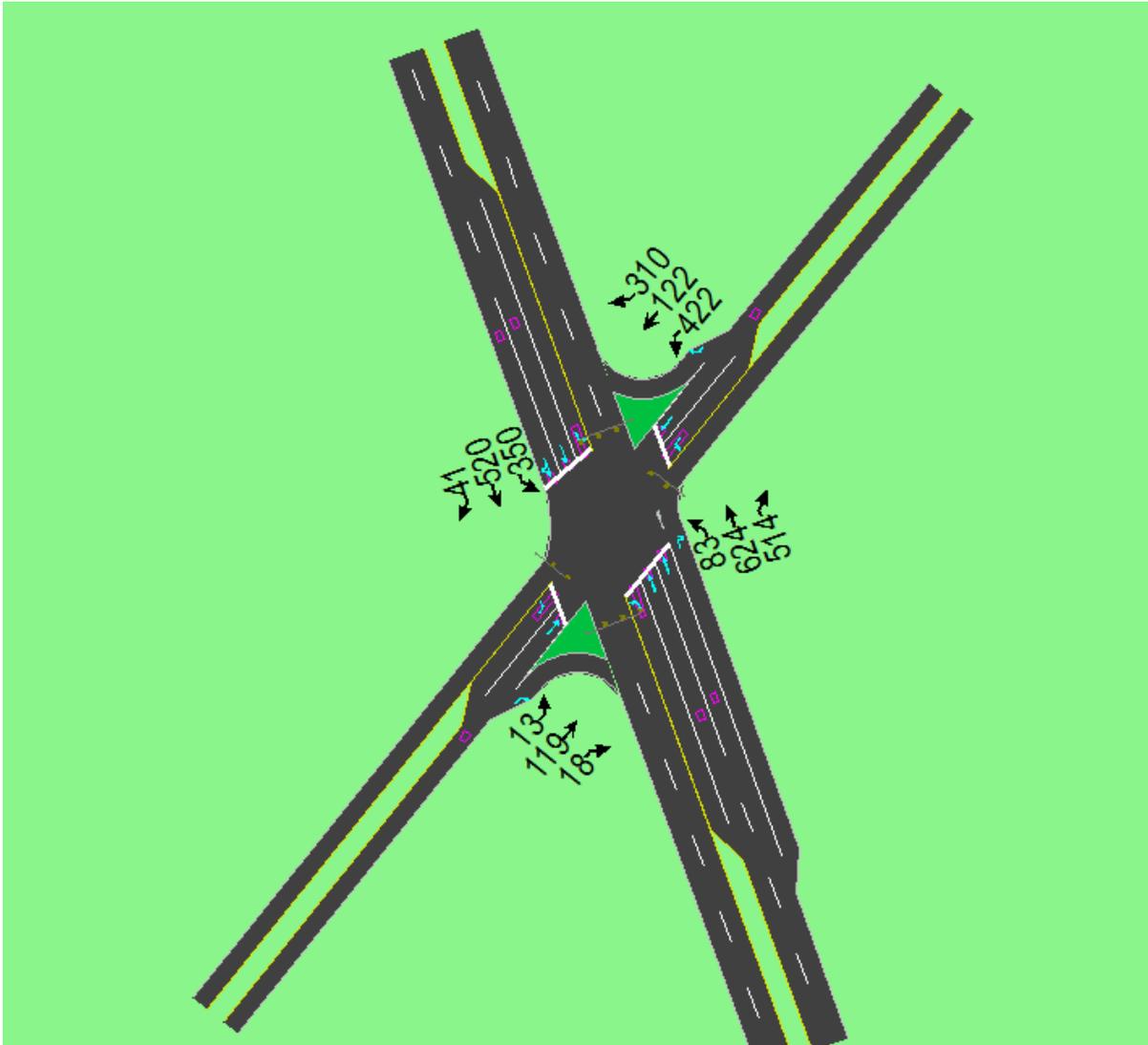


Figure 6-Future PM Peak Hour Volumes



F. Future Intersection Capacity and Level of Service

A capacity analysis was performed for the future conditions with the results summarized in **Table 4**. Detailed HCM worksheets are included in **Appendix C**.

Table 4 - Summary of Future Intersection Capacity Analysis; AM (PM)

Intersection	AM LOS	AM v/c	PM LOS	PM v/c
SR 25 Spur at Canal Road	D	0.70	F	0.93

The results of the future year 2010 conditions capacity analysis indicate that the intersection will operate at a LOS D during the AM peak hour and a LOS F during the PM peak hour.

IV. Year 2020 Conditions

The Year 2020 Conditions includes the following assumptions:

- ✓ Growth in existing traffic volumes over the study period due to regional growth,
- ✓ Other planned, approved or current developments in the study area,
- ✓ Planned improvements to the transportation network by the State and/or County in the study area

A. Growth in Existing Traffic Volumes

Assuming the proposed developments are in place by the year 2010, the year 2010 forecasts were projected to the year 2020 using an additional ten years growth in traffic volumes.

B. Approved Developments

Based on information on planned, approved and current development activity in the study area provided by the Glynn County Department of Planning, there are no additional developments planned near the study intersection between the year 2010 and 2020.

C. Transportation Network Improvements

Based on conversations with Glynn County, there are no planned transportation improvements between the years 2010 and 2020 that will impact the area under study.

D. Future Intersection Capacity and Level of Service

A capacity analysis was performed for the future conditions with the results summarized in **Table 5**. Detailed HCM worksheets are included in **Appendix C**.

Table 5 - Summary of Year 2020 Intersection Capacity Analysis; AM (PM)

Intersection	AM LOS	AM v/c	PM LOS	PM v/c
SR 25 Spur at Canal Road	E	0.77	F	1.04

The results of the future year 2020 conditions capacity analysis indicate that the intersection would operate at a LOS E during the AM peak hour and a LOS F during the PM peak hour.

V. Summary

The following summary of findings is based on the analysis and observations presented in the report:

Under existing conditions, the intersection is operating at a LOS C during the AM and PM peak hours.

The proposed developments are projected to generate 20183 daily trips, after applying applicable trip reduction factors, a total of 14184 new daily vehicular trips, of which 497 will occur during the AM peak hour and 1301 will occur during the PM peak hour.

With the addition of the new developments, the intersection would operate at a LOS D during the AM peak hour and a LOS F during the PM peak hour.

Assuming the developments are in place, the intersection would operate at a LOS E during the AM peak hour and a LOS F during the PM peak hour in the year 2020.

VI. Recommendations

The findings of the report illustrate that the intersection would operate at failing levels of service during the PM peak hour in the year 2010 and during the AM and PM peak hours in the year 2020 with the proposed developments in place.

While signal timing optimization would improve the intersection LOS to D or better during the peak hours, there would be significant queuing in the southwest-bound approach of Canal Road due to the high left turn volume on this approach. Additional analysis was conducted and the following additional recommendations were developed to improve the LOS for this movement and improve the LOS to D or better for all of the movements at the intersection:

- Add a left turn lane on the southwest-bound approach of Canal Road to form a dual left turn lane. This improvement would require modifying the left turn phasing on this approach from permitted left turn phasing to protected left turn phasing.
- Add a left turn lane on the southbound approach of SR 25 Spur to form a dual left turn lane. The existing protected left turn phasing would accommodate this improvement.
- Finally, as the I-95 interchange north of Canal Road causes queuing conditions that extend south of Canal Road during the PM peak hour, a comprehensive traffic operations study is recommended for this interchange, the proposed signalized intersection at SR 25 Spur at Glynco Parkway, and the intersection of SR 25 Spur at Canal Road. It is likely that signal system timing optimization and minor improvements along the SR 25 Spur corridor could alleviate this queuing condition and improve traffic operations in the future.