



BUCKHOLZ TRAFFIC
3585 KORI ROAD
JACKSONVILLE, FLORIDA 32257
(904) 886-2171 jwbuckholz@aol.com

February 17, 2021

Memphis, Tennessee 38119

Re: Sea Island Road / Frederica Road Intersection - Traffic Engineering Evaluation

Dear Recipient :

As requested, I have reviewed the April 2016 Final St. Simons Island Traffic Study by Pond and Company and the recommended roundabout design for the Frederica Road/Sea Island Road intersection. I have also reviewed the November 2020 Draft Final Report - St. Simons Island Area Sector Study completed for BATS (Brunswick Area Transportation Study) by CDM Smith. In addition, Buckholz Traffic personnel completed pre-virus weekday AM and PM peak period manual turning movement counts at the following Sea Island Road cross streets during March of 2020: Frederica Road, Market Street, and Stable Street. The count data is included in Attachment A with a graphical summary provided as Figure 1.

Pond projected traffic at the Sea Island Road/Frederica Road intersection for the weekday AM peak hour, PM peak hour, and midday peak hour for both May and July of 2035. The July traffic volumes were generally higher than the May volumes in 2035 so only the July volumes were included in our analysis. Also, the midday traffic volumes were generally similar to the PM peak volumes so only the AM and PM peak hour volumes were included. The growth factor derived from the Pond traffic volumes is about 1.20 (representing a 20% overall increase or about 1% per year) and this factor was applied to our counts to obtain projected 2035 traffic volumes at the Sea Island Road/Market Street intersection and the Sea Island Road/Stable Street intersection (see Figure 2).

A review of Table B1 in Attachment B, which is derived from 2019 GDOT (Georgia Department of Transportation) traffic volume graphs that are also included in Attachment B, suggests that March is the highest volume traffic month on the island.

Using these traffic volumes, the following analyses have been completed:

- A March 2020 weekday AM and PM peak hour capacity analyses for the existing Sea Island corridor from Frederica Road to Market Street using the operational methodology of the signalized intersection module discussed in Chapter 18 of the latest (sixth) edition of the Highway Capacity Manual. Provided in Attachment C are the existing traffic signal timings (dated 1/19/16) that were used in this analysis. The

signalized intersection capacity analysis calculations are provided in Attachment D with the results summarized in Table 1.

- B. July 2035 weekday AM and PM peak hour capacity analyses for the existing Sea Island corridor from Frederica Road to Market Street using the operational methodology of the signalized intersection module discussed in Chapter 18 of the latest (sixth) edition of the Highway Capacity Manual. Optimized coordinated timings were used in the analysis. The signalized intersection capacity analysis calculations are provided in Attachment E with the results included in Table 1.
- C. July 2035 weekday AM and PM peak hour capacity analyses for the Sea Island Road/Frederica Road intersection assuming the installation of a roundabout and using the latest version (4.2) of GDOT's Roundabout Analysis Procedure. The roundabout analysis calculations are provided in Attachment F with the results summarized in Table 2. In Attachment G are the roundabout calculations provided in the Pond report with the results summarized in Table 3. The Pond calculations use an older version (2.1) of the GDOT software that produces slightly different results and which do not provide a level of service result for the entire roundabout. All roundabout analyses use the same basic lane configuration proposed by Pond which is provided in Attachment H.

A review of the top half of Table 1 shows that the existing signalized intersections along this stretch of Sea Island Road currently operate in an acceptable manner, even with timings that are less than optimal (although the side street approach lanes at Market Street experience high delay during the weekday PM peak hour due to these inefficient timings). A review of the bottom half of Table 1 indicates that, if properly coordinated with optimized timings, these intersections will operate in an acceptable manner in 2035 although the overall intersection level of service will deteriorate somewhat with the increasing traffic volumes. This is the case with the existing lane configuration and signal phasing; there is no pressing need to provide a second left turn lane on the west approach of the Sea Island Road/Frederica Road intersection as suggested in the Pond report.

A review of Table 2 indicates that a roundabout would function in an acceptable manner during the weekday AM peak hour but that, during the PM peak hour, it would operate at an unacceptable level of service F with extremely long queues (27 vehicles) on the westbound approach and a volume-to-capacity ratio on that approach of much more than one (1.31). The Table in Appendix E of the Pond report mistakenly provides a roundabout level of service of E during the July 2035 weekday PM peak hour. The fact that an overall roundabout level of service is provided at all in the Pond report is curious since the GDOT roundabout software was not capable of providing this information prior to the release of the current version - which did not occur until December of 2019.

It should be noted that our roundabout analysis assumes the construction of a "standard" size roundabout with reasonably sized medians on the various legs. There is no need from a capacity and level of service standpoint for the expansive medians and large islands that are part of the Pond roundabout design contained in Attachment H. Nor is there any need to skew the roundabout eastward as is shown in that design.

Based on these analyses and my review of the reports, I offer the following additional comments:

1. 2035 is the design year for the Pond study, which is quite a ways into the future for a study of this type. Long-range studies with a 20-year time horizon are usually reserved for large metropolitan areas to answer big-ticket questions such as "Do we need a new bridge?" or "Do we need a beltway around the city?" Using a 20-year time horizon to make decisions on individual intersections is, in

my professional opinion, a mistake that could easily result in over-building. A 10 year time horizon (2025) would be much more practical.

2. The growth factor used in the study to project 2035 traffic volumes at the Frederica Road/Sea Island Road intersection is about 1.2 which represents 20% growth over the 20-year time horizon or about 1% per year in annual growth. The BATS report uses a 17% population growth rate and a 20% jobs growth rate between 2015 and 2045 – an even slower growth rate than in the POND report. A review of the traffic volumes contained in Table B2 of Attachment B shows that traffic volumes near this intersection have stagnated since 2015, a trend that has occurred in many areas of the US. Aging baby boomers, the reluctance of millennials to drive as much as their parents, the trend of working at home spurred on by the virus, and other demographic/economic trends have reduce vehicle miles of travel in many areas and there is no reason to think that this trend will change. Also, with autonomous vehicles making their way onto our streets - vehicles that will make more efficient use of our existing road system – planning for continued traffic growth may no longer be the smartest thing to do.
3. Using one growth factor for the entire intersection is less than desirable. By going into the area wide model one should be able to determine a growth factor for each movement at the intersection. Applying growth factors by movement would produce a better set of future traffic volumes for intersection design - which will result in a better solution.
4. Although roundabouts do have certain safety and aesthetic advantages in comparison to traffic signals, a major disadvantage of roundabouts is that you cannot adjust signal timing to clear queues on a particular approach. When you approach capacity at a roundabout, bad traffic operations occur (long queues, long wait times) and these items are not controllable.
5. The savings in maintenance and energy costs associated with a multilane roundabout as compared to a traffic signal comes nowhere close to making up the huge difference in initial capital cost. Traffic signal timings can be optimized for well less than \$20,000 and this is peanuts compared to a \$4,000,000 cost for construction of the proposed roundabout. Even a multilane roundabout with a smaller footprint at this location would probably cost \$500,000 - which is still a lot of money.
6. American drivers have become fairly accustomed to negotiating single lane roundabouts but multilane roundabout are less prevalent and, contrary to drivers in Europe and Asia, many American drivers are not familiar with their use. The end result is that the circulating lanes of these multilane roundabouts are not efficiently used here in the US and the calculated capacities may not be achieved – resulting in longer than expected queues and increased delay.
7. Roundabouts generally reduce the severity of crashes at an intersection as compared to a signalized intersection. However, the accident analysis for both Frederica Road and Sea Island Road contained in Appendix C of the Pond Report shows that the current accident rate along both of these roadways is substantially lower than the state average. There's apparently not much of an accident problem to solve.

8. Whether or not a roundabout is preferable to a traffic signal for pedestrians is a matter of both design and opinion. A traffic signal can be designed with signalized pedestrian crossings and pedestrian refuge medians and islands, as well as other pro-pedestrian features such as leading pedestrian intervals and pedestrian-activated NO TURN signs. A roundabout, however, requires pedestrians to make all road crossings without any form of vehicular control - although the pedestrian does have the advantage of crossing only one direction of vehicular travel at a time.
9. The "BATS" study raises the possibility of a new northern causeway connection between St. Simons Island and the mainland sometime in the future. If this occurs then traffic volumes at the Sea Island Road/Frederica Road intersection can be expected to drop. The roundabout could end up being oversized for future conditions.

A prudent course of action would be to simply retune the existing traffic signals and repeat this retuning every 5 years or so. If traffic volumes increase at a rate that exceeds what is expected then there may come a point where lane additions need to be made at the Sea Island Road/Frederica Road intersection. The addition of a second west approach left turn lane (and associated northbound receiving lane) could be a potential future improvement of considerable benefit. The provision of an exclusive right turn lane on the west approach of this intersection might also be of future benefit.

If you have any questions or comments concerning my evaluation, please contact me.

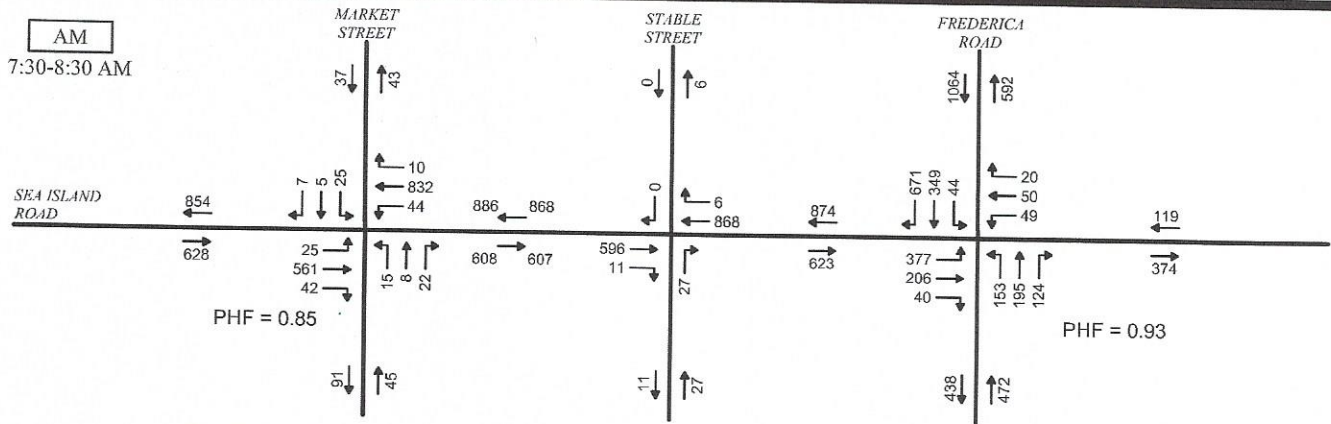
Sincerely,



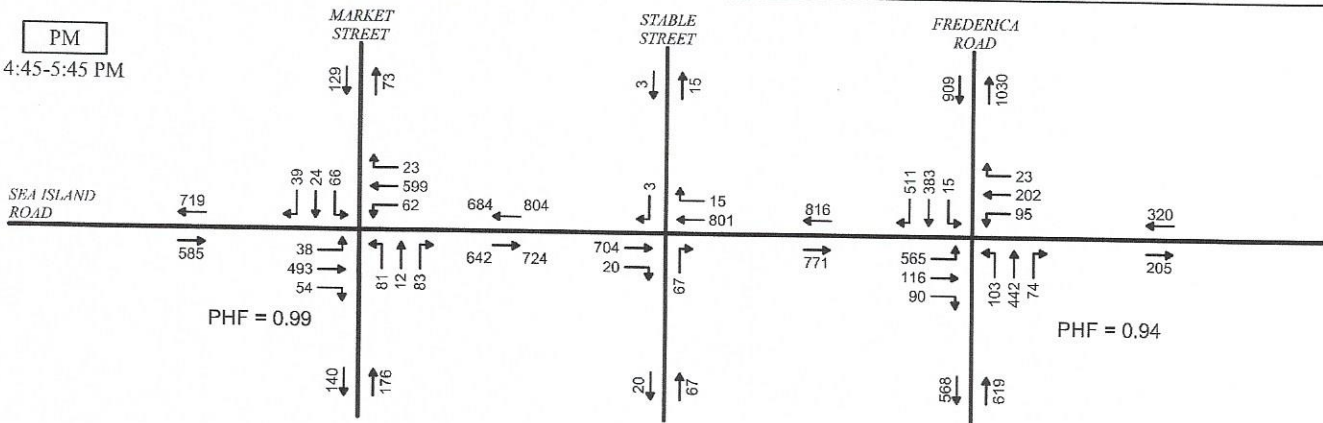
Digitally signed by Jeffrey
W. Buckholz
DN: cn=Jeffrey W. Buckholz,
o=BUCKHOLZ TRAFFIC
ENGINEERING, ou,
email=jwbuckholz@aol.co
m, c=US
Date: 2021.02.17 18:06:15
-05'00'

Jeffrey W. Buckholz, PhD, P.E., PTOE
Principal and Chief Traffic Engineer

AM
7:30-8:30 AM



PM
4:45-5:45 PM



MARCH 2020

Buckholz Traffic

FIGURE 1

BUCKHOLZ TRAFFIC
TRAFFIC COUNTS

WEEKDAY PEAK HOURS



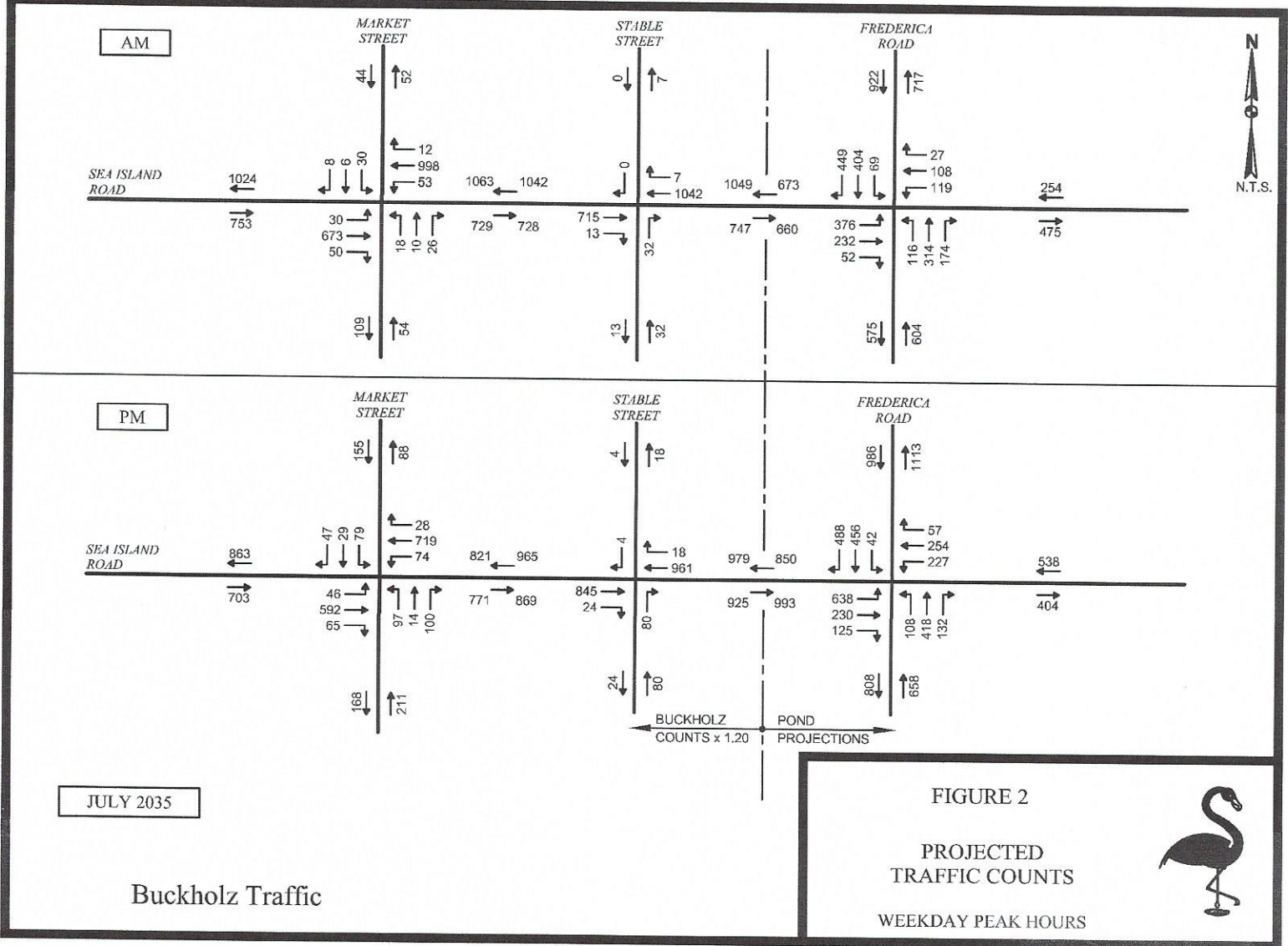


TABLE 2
SUMMARY OF SIGNALIZED INTERSECTION CAPACITY RESULTS
SEA ISLAND ROAD CORRIDOR

AT FREDERICA ROAD	EXISTING (2020) CONDITIONS				
	Highest v/c Ratio	Highest Queue Storage Ratio	Worst Movement Delay & LOS	Intersection Delay & LOS	Cycle Length
AM PEAK HOUR	0.79 EBLT	0.75 SBRT	WBT 40.2 sec/veh LOS D	22.7 sec/veh LOS C	90 sec
PM PEAK HOUR	0.93 EBLT	0.87 EBLT	WBT 43.0 sec/veh LOS D	28.6 sec/veh LOS C	89 sec
AT MARKET STREET	EXISTING (2020) CONDITIONS				
	Highest v/c Ratio	Highest Queue Storage Ratio	Worst Movement Delay & LOS	Intersection Delay & LOS	Cycle Length
AM PEAK HOUR	0.83 WBT	0.24 NBLT	NBLT 29.6 sec/veh LOS C	12.9 sec/veh LOS B	62 sec
PM PEAK HOUR	0.89 SBT	2.41 NBLT	SBT 90.8 sec/veh LOS F	25.0 sec/veh LOS C	75 sec

AT FREDERICA ROAD	JULY 2035 CONDITIONS – WITH OPTIMIZED TIMINGS				
	Highest v/c Ratio	Highest Queue Storage Ratio	Worst Movement Delay & LOS	Intersection Delay & LOS	Cycle Length (Coordinated)
AM PEAK HOUR	0.76 EBT	0.98 EBLT	SBT 54.4 sec/veh LOS D	37.9 sec/veh LOS D	160 sec
PM PEAK HOUR	0.85 SBT	1.20 EBLT 1.13 WBLT	WBT 63.7 sec/veh LOS E	46.1 sec/veh LOS D	160 sec
AT MARKET STREET	JULY 2035 CONDITIONS – WITH OPTIMIZED TIMINGS				
	Highest v/c Ratio	Highest Queue Storage Ratio	Worst Movement Delay & LOS	Intersection Delay & LOS	Cycle Length (Coordinated)
AM PEAK HOUR	0.86 EBT	0.57 NBLT	WBT 45.1 sec/veh LOS D	42.0 sec/veh LOS D	160 sec
PM PEAK HOUR	0.85 WBT	3.11 NBLT	WBT 52.5 sec/veh LOS D	43.5 sec/veh LOS D	160 sec

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TABLE 2
ROUNDBOUT CAPACITY RESULTS

SEA ISLAND ROAD / FREDERICA ROAD
JULY 2035 CONDITIONS

BUCKHOLZ TRAFFIC CALCULATIONS (VERSION 4.0)
HCM SIXTH EDITION MODEL

WEEKDAY AM PEAK HOUR	LOS	Delay	v/c Ratio	95th % Queue (vehicles)
INTERSECTION	B	13.1 sec/veh		
Northbound Left/Thru	B	13.5 sec/veh	0.50	2.8
Northbound Thru/Right	B	12.6 sec/veh	0.51	3.0
Southbound Left/Thru	B	13.1 sec/veh	0.59	4.0
Southbound Right Turn By-Pass	A	8.3 sec/veh	0.46	2.6
Eastbound Left Turn	B	12.6 sec/veh	0.52	3.2
Eastbound Left/Thru/Right	B	11.2 sec/veh	0.46	2.5
Westbound Approach	C	15.9 sec/veh	0.57	3.6

WEEKDAY PM PEAK HOUR	LOS	Delay	v/c Ratio	95th % Queue (vehicles)
INTERSECTION	F	55.9 sec/veh		
Northbound Left/Thru	C	22.4 sec/veh	0.67	5.0
Northbound Thru/Right	C	19.5 sec/veh	0.65	4.8
Southbound Left/Thru	D	25.0 sec/veh	0.77	7.6
Southbound Right Turn By-Pass	A	9.8 sec/veh	0.51	3.0
Eastbound Left Turn	D	29.0 sec/veh	0.82	8.9
Eastbound Left/Thru/Right	C	21.9 sec/veh	0.73	6.4
Westbound Approach	F	3.0 min/veh	1.31	26.9

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TABLE 3
ROUNDBOUT CAPACITY RESULTS

SEA ISLAND ROAD / FREDERICA ROAD
JULY 2035 CONDITIONS

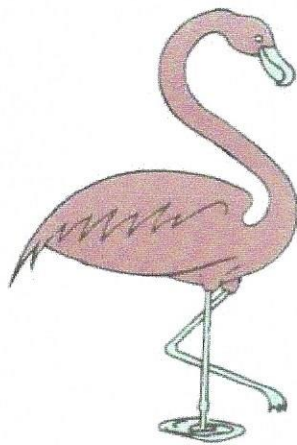
POND CALCULATIONS (VERSION 2.1)
HCM 2010 MODEL

WEEKDAY AM PEAK HOUR	LOS	Delay	v/c Ratio	95th % Queue (vehicles)
INTERSECTION	NOT	AVAILABLE		
Northbound Left/Thru	B	14.6 sec/veh	0.53	3.1
Northbound Thru/Right	C	15.5 sec/veh	0.57	3.7
Southbound Left/Thru	B	14.7 sec/veh	0.62	4.5
Southbound Right Turn By-Pass	B	10.7 sec/veh	0.52	3.1
Eastbound Left Turn	C	23.5 sec/veh	0.70	5.6
Eastbound Left/Thru/Right	C	19.4 sec/veh	0.62	4.3
Westbound Approach	C	19.1 sec/veh	0.62	4.4

WEEKDAY PM PEAK HOUR	LOS	Delay	v/c Ratio	95th % Queue (vehicles)
INTERSECTION	NOT	AVAILABLE		
Northbound Left/Thru	C	23.0 sec/veh	0.67	5.2
Northbound Thru/Right	C	23.9 sec/veh	0.71	5.8
Southbound Left/Thru	C	23.7 sec/veh	0.76	7.2
Southbound Right Turn By-Pass	B	14.3 sec/veh	0.62	4.5
Eastbound Left Turn	F	100.7 sec/veh	1.11	18.5
Eastbound Left/Thru/Right	F	64.7 sec/veh	0.98	13.3
Westbound Approach	F	3.2 min/veh	1.35	28.4

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ATTACHMENT A



AM PEAK PERIOD

DAY: THURSDAY
 DATE: 03/12/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 11111111
 Start Date: 03/12/20
 File I.D. : 20159506
 Page : 1

AUTOMOBILES, COMMERCIAL VEHICLES

Date 03/12/20	MARKET STREET From North				SEA ISLAND ROAD From East				MARKET STREET From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
06:30	1	0	1	0	0	73	1	0	0	0	1	0	0	51	4	0	132
06:45	1	1	1	0	2	100	0	0	1	0	0	0	0	86	6	0	198
07:00	5	0	0	0	7	127	0	0	1	0	2	0	2	113	14	0	271
07:15	4	1	0	0	8	126	0	0	3	2	4	0	2	100	7	0	257
Hr Total	11	2	2	0	17	426	1	0	5	2	7	0	4	350	31	0	858
07:30	5	0	1	0	1	189	2	0	4	1	3	0	3	113	12	0	334
07:45	0	1	2	0	10	277	3	0	3	3	7	0	5	151	5	0	467
08:00	6	1	3	0	20	200	2	0	6	2	3	0	6	148	16	0	413
08:15	14	3	1	0	13	166	3	0	2	2	9	0	11	149	9	0	382
Hr Total	25	5	7	0	44	832	10	0	15	8	22	0	25	561	42	0	1596
TOTAL	36	7	9	0	61	1258	11	0	20	10	29	0	29	911	73	0	2454

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/12/20

Peak start 07:30					07:30				07:30				07:30			
Volume	25	5	7	0	44	832	10	0	15	8	22	0	25	561	42	0
Percent	68%	14%	19%	0%	5%	94%	1%	0%	33%	18%	49%	0%	4%	89%	7%	0%
Pk total	37					886					45					628
Highest	08:15					07:45					07:45					08:00
Volume	14	3	1	0	10	277	3	0	3	3	7	0	6	148	16	0
Hi total	18					290					13					170
PHF	.51					.76					.87					.92

DAY: THURSDAY
 DATE: 03/12/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 11111111
 Start Date: 03/12/20
 File I.D. : 20159506
 Page : 1

AUTOMOBILES

MARKET STREET				SEA ISLAND ROAD				MARKET STREET				SEA ISLAND ROAD				Total	
From North				From East				From South				From West					
Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other		
Date 03/12/20																	
06:30	1	0	1	0	0	73	1	0	0	0	1	0	0	51	4	0	132
06:45	1	1	1	0	2	100	0	0	1	0	0	0	0	86	6	0	198
07:00	5	0	0	0	7	127	0	0	1	0	2	0	2	113	14	0	271
07:15	4	1	0	0	8	126	0	0	3	2	4	0	2	100	7	0	257
Hr Total	11	2	2	0	17	426	1	0	5	2	7	0	4	350	31	0	858
07:30	5	0	1	0	1	189	2	0	4	1	3	0	3	113	12	0	334
07:45	0	1	2	0	10	277	3	0	3	3	7	0	5	151	5	0	467
08:00	6	1	3	0	20	200	2	0	6	2	3	0	6	148	16	0	413
08:15	14	3	1	0	13	166	3	0	2	2	9	0	11	149	9	0	382
Hr Total	25	5	7	0	44	832	10	0	15	8	22	0	25	561	42	0	1596
TOTAL	36	7	9	0	61	1258	11	0	20	10	29	0	29	911	73	0	2454

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/12/20

Peak start	07:30				07:30				07:30				07:30			
Volume	25	5	7	0	44	832	10	0	15	8	22	0	25	561	42	0
Percent	68%	14%	19%	0%	5%	94%	1%	0%	33%	18%	49%	0%	4%	89%	7%	0%
Pk total	37				886				45				628			
Highest	08:15				07:45				07:45				08:00			
Volume	14	3	1	0	10	277	3	0	3	3	7	0	6	148	16	0
Hi total	18				290				13				170			
PHF	.51				.76				.87				.92			

DAY: THURSDAY
 DATE: 03/12/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 11111111
 Start Date: 03/12/20
 File I.D. : 20159506
 Page : 1

PEDESTRIAN & BICYCLE

Date 03/12/20	MARKET STREET From North				SEA ISLAND ROAD From East				MARKET STREET From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/12/20

Peak start 07:30	07:30				07:30				07:30				07:30			
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pk total	0				0				0				0			
Highest 06:30	06:30				06:30				06:30				06:30			
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hi total	0				0				0				0			
PHF	.0				.0				.0				.0			

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 FREDERICA ROAD @ SEA ISLAND ROAD
 GLYNN COUNTY, GEORGIA

Site Code : 22223333
 Start Date: 03/11/20
 File I.D. : 20159504
 Page : 1

AUTOMOBILES, COMMERCIAL VEHICLES

Date 03/11/20	FREDERICA ROAD From North				SEA ISLAND ROAD From East				FREDERICA ROAD From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
06:30	2	25	58	0	3	3	1	0	7	17	5	0	35	16	0	0	172
06:45	5	50	88	0	4	7	3	0	10	11	5	0	73	35	3	0	294
07:00	3	66	97	0	12	8	2	0	12	26	18	0	51	39	4	0	338
07:15	7	66	135	0	9	6	5	0	18	41	21	0	68	51	7	0	434
Hr Total	17	207	378	0	28	24	11	0	47	95	49	0	227	141	14	0	1238
07:30	7	103	167	0	6	9	3	0	38	56	20	0	83	41	5	0	538
07:45	8	81	209	0	12	16	8	0	48	61	19	0	87	33	2	0	584
08:00	18	95	169	0	15	14	4	0	39	39	44	0	95	62	18	0	612
08:15	11	70	126	0	16	11	5	0	28	39	41	0	112	70	15	0	544
Hr Total	44	349	671	0	49	50	20	0	153	195	124	0	377	206	40	0	2278
TOTAL	61	556	1049	0	77	74	31	0	200	290	173	0	604	347	54	0	3516

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/11/20

Peak start 07:30	07:30				07:30				07:30				07:30			
Volume	44	349	671	0	49	50	20	0	153	195	124	0	377	206	40	0
Percent	4%	33%	63%	0%	41%	42%	17%	0%	32%	41%	26%	0%	61%	33%	6%	0%
Pk total	1064				119				472				623			
Highest	07:45				07:45				07:45				08:15			
Volume	8	81	209	0	12	16	8	0	48	61	19	0	112	70	15	0
Hi total	298				36				128				197			
PHF	.89				.83				.92				.79			

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 FREDERICA ROAD @ SEA ISLAND ROAD
 GLYNN COUNTY, GEORGIA

Site Code : 22223333
 Start Date: 03/11/20
 File I.D. : 20159504
 Page : 1

AUTOMOBILES

Date 03/11/20	FREDERICA ROAD From North				SEA ISLAND ROAD From East				FREDERICA ROAD From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
06:30	2	25	58	0	3	3	1	0	7	17	5	0	35	16	0	0	172
06:45	5	50	88	0	4	7	3	0	10	11	5	0	73	35	3	0	294
07:00	3	66	97	0	12	8	2	0	12	26	18	0	51	39	4	0	338
07:15	7	66	135	0	9	6	5	0	18	41	21	0	68	51	7	0	434
Hr Total	17	207	378	0	28	24	11	0	47	95	49	0	227	141	14	0	1238
07:30	7	103	167	0	6	9	3	0	38	56	20	0	83	41	5	0	538
07:45	8	81	209	0	12	16	8	0	48	61	19	0	87	33	2	0	584
08:00	18	95	169	0	15	14	4	0	39	39	44	0	95	62	18	0	612
08:15	11	70	126	0	16	11	5	0	28	39	41	0	112	70	15	0	544
Hr Total	44	349	671	0	49	50	20	0	153	195	124	0	377	206	40	0	2278
TOTAL	61	556	1049	0	77	74	31	0	200	290	173	0	604	347	54	0	3516

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/11/20

Peak start 07:30	07:30				07:30				07:30				07:30			
Volume	44	349	671	0	49	50	20	0	153	195	124	0	377	206	40	0
Percent	4%	33%	63%	0%	41%	42%	17%	0%	32%	41%	26%	0%	61%	33%	6%	0%
Pk total	1064				119				472				623			
Highest	07:45				07:45				07:45				08:15			
Volume	8	81	209	0	12	16	8	0	48	61	19	0	112	70	15	0
Ht total	298				36				128				197			
PHF	.89				.83				.92				.79			

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 06:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 FREDERICA ROAD @ SEA ISLAND ROAD
 GLYNN COUNTY, GEORGIA

Site Code : 22223333
 Start Date: 03/11/20
 File I.D. : 20159504
 Page : 1

PEDESTRIAN & BICYCLE

Date 03/11/20	FREDERICA ROAD From North				SEA ISLAND ROAD From East				FREDERICA ROAD From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
TOTAL	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2

Peak Hour Analysis By Entire Intersection for the Period: 07:30 to 08:30 on 03/11/20

Peak start 07:30	07:30				07:30				07:30				07:30			
Volume	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Percent	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
Pk total	0				2				0				0			
Highest	06:30				07:45				06:30				06:30			
Volume	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Hi total	0				1				0				0			
PHF	.0				.50				.0				.0			

PM PEAK PERIOD

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 77668844
 Start Date: 03/11/20
 File I.D. : 20159505
 Page : 1

AUTOMOBILES, COMMERCIAL VEHICLES

MARKET STREET From North					SEA ISLAND ROAD From East				MARKET STREET From South				SEA ISLAND ROAD From West						
Left	Thru	Right	Other		Left	Thru	Right	Other		Left	Thru	Right	Other		Left	Thru	Right	Other	
Date 03/11/20																			
15:30	20	3	9	0	20	168	6	0	25	7	10	0	4	130	10	0		412	
15:45	15	5	8	0	13	149	9	0	20	3	18	0	10	155	13	0		418	
16:00	19	8	8	0	12	177	4	0	17	4	21	0	8	123	15	0		416	
16:15	12	5	7	0	21	158	6	0	16	4	21	0	5	149	15	0		419	
Hr Total	66	21	32	0	66	652	25	0	78	18	70	0	27	557	53	0		1665	
16:30	17	2	7	0	15	163	3	0	11	2	15	0	4	129	18	0		386	
16:45	22	4	7	0	14	127	6	0	11	0	21	0	10	120	16	0		358	
17:00	13	4	8	0	12	168	9	0	25	3	22	0	11	135	16	0		426	
17:15	11	10	13	0	20	163	4	0	20	7	15	0	13	111	9	0		396	
Hr Total	63	20	35	0	61	621	22	0	67	12	73	0	38	495	59	0		1566	
17:30	20	6	11	0	16	141	4	0	25	2	25	0	4	127	13	0		394	
17:45	9	2	5	0	20	151	8	0	21	2	16	0	9	138	17	0		398	
Hr Total	29	8	16	0	36	292	12	0	46	4	41	0	13	265	30	0		792	
TOTAL	158	49	83	0	163	1565	59	0	191	34	184	0	78	1317	142	0		4023	

Peak Hour Analysis By Entire Intersection for the Period: 15:30 to 16:30 on 03/11/20

Peak start 15:30	15:30				15:30				15:30				15:30			
Volume	66	21	32	0	66	652	25	0	78	18	70	0	27	557	53	0
Percent	55%	18%	27%	0%	9%	88%	3%	0%	47%	11%	42%	0%	4%	87%	8%	0%
Pk total	119				743				166				637			
Highest	16:00				15:30				15:30				15:45			
Volume	19	8	8	0	20	168	6	0	25	7	10	0	10	155	13	0
Hi total	35				194				42				178			
PHF	.85				.96				.99				.89			

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 77668844
 Start Date: 03/11/20
 File I.D. : 20159505
 Page : 1

AUTOMOBILES

MARKET STREET From North					SEA ISLAND ROAD From East				MARKET STREET From South				SEA ISLAND ROAD From West						
Left	Thru	Right	Other		Left	Thru	Right	Other		Left	Thru	Right	Other		Left	Thru	Right	Other	Total
Date 03/11/20																			
15:30	20	3	9	0	20	168	6	0	25	7	10	0	4	130	10	0		412	
15:45	15	5	8	0	13	149	9	0	20	3	18	0	10	155	13	0		418	
16:00	19	8	8	0	12	177	4	0	17	4	21	0	8	123	15	0		416	
16:15	12	5	7	0	21	158	6	0	16	4	21	0	5	149	15	0		419	
Hr Total	66	21	32	0	66	652	25	0	78	18	70	0	27	557	53	0		1665	
16:30	17	2	7	0	15	163	3	0	11	2	15	0	4	129	18	0		386	
16:45	22	4	7	0	14	127	6	0	11	0	21	0	10	120	16	0		358	
17:00	13	4	8	0	12	168	9	0	25	3	22	0	11	135	16	0		426	
17:15	11	10	13	0	20	163	4	0	20	7	15	0	13	111	9	0		396	
Hr Total	63	20	35	0	61	621	22	0	67	12	73	0	38	495	59	0		1566	
17:30	20	6	11	0	16	141	4	0	25	2	25	0	4	127	13	0		394	
17:45	9	2	5	0	20	151	8	0	21	2	16	0	9	138	17	0		398	
Hr Total	29	8	16	0	36	292	12	0	46	4	41	0	13	265	30	0		792	
TOTAL	158	49	83	0	163	1565	59	0	191	34	184	0	78	1317	142	0		4023	

Peak Hour Analysis By Entire Intersection for the Period: 15:30 to 16:30 on 03/11/20

Peak start 15:30	15:30				15:30				15:30				15:30			
Volume	66	21	32	0	66	652	25	0	78	18	70	0	27	557	53	0
Percent	55%	18%	27%	0%	9%	88%	3%	0%	47%	11%	42%	0%	4%	87%	8%	0%
Pk total	119				743				166				637			
Highest	16:00				15:30				15:30				15:45			
Volume	19	8	8	0	20	168	6	0	25	7	10	0	10	155	13	0
Hi total	35				194				42				178			
PHF	.85				.96				.99				.89			

DAY: WEDNESDAY
 DATE: 03/11/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ MARKET STREET
 GLYNN COUNTY, GEORGIA

Site Code : 77668844
 Start Date: 03/11/20
 File I.D. : 20159505
 Page : 1

PEDESTRIAN & BICYCLE

Date 03/11/20	MARKET STREET From North				SEA ISLAND ROAD From East				MARKET STREET From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	Left	Thru	Right	PEDS	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Analysis By Entire Intersection for the Period: 15:30 to 16:30 on 03/11/20

Peak start 15:30	15:30				15:30				15:30				15:30			
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pk total	0				0				0				0			
Highest	15:30				15:30				15:30				15:30			
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hi total	0				0				0				0			
PHF	.0				.0				.0				.0			

DAY: TUESDAY
 DATE: 03/10/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 FREDERICA ROAD @ SEA ISLAND ROAD
 GLYNN COUNTY, GEORGIA

Site Code : 77777777
 Start Date: 03/10/20
 File I.D. : 20159503
 Page : 1

AUTOMOBILES, COMMERCIAL VEHICLES

Date 03/10/20	FREDERICA ROAD From North				SEA ISLAND ROAD From East				FREDERICA ROAD From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
15:30	11	84	111	0	33	53	6	0	22	98	18	0	108	21	22	0	577
15:45	8	83	102	0	17	50	7	0	14	94	12	0	151	21	17	0	576
16:00	10	71	115	0	27	59	7	0	24	81	15	0	135	25	24	0	593
16:15	4	89	109	0	35	40	8	0	14	94	15	0	154	22	13	0	597
Hr Total	33	327	437	0	112	202	28	0	74	357	60	0	548	89	76	0	2343
16:30	5	74	112	0	21	40	7	0	21	100	17	0	155	24	19	0	595
16:45	3	93	126	0	20	33	5	0	20	114	18	0	163	33	24	0	652
17:00	4	97	127	0	19	58	6	0	23	115	19	0	126	39	28	0	661
17:15	4	97	139	0	32	55	7	0	37	120	20	0	137	31	19	0	698
Hr Total	16	361	504	0	92	186	25	0	101	449	74	0	581	127	90	0	2606
17:30	4	96	119	0	24	56	5	0	23	93	17	0	139	13	19	0	608
17:45	2	93	94	0	26	31	6	0	14	98	11	0	173	27	31	0	608
Hr Total	6	189	213	0	50	87	11	0	37	191	28	0	312	40	52	0	1216
TOTAL	55	877	1154	0	254	475	64	0	212	997	162	0	1441	256	218	0	6165

Peak Hour Analysis By Entire Intersection for the Period: 16:45 to 17:45 on 03/10/20

Peak start 16:45	16:45				16:45				16:45				16:45			
Volume	15	383	511	0	95	202	23	0	103	442	74	0	565	116	90	0
Percent	2%	42%	56%	0%	30%	63%	7%	0%	17%	71%	12%	0%	73%	15%	12%	0%
Pk total	909				320				619				771			
Highest	17:15				17:15				17:15				16:45			
Volume	4	97	139	0	32	55	7	0	37	120	20	0	163	33	24	0
Hi total	240				94				177				220			
PHF	.95				.85				.87				.88			

DAY: TUESDAY
 DATE: 03/10/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 FREDERICA ROAD @ SEA ISLAND ROAD
 GLYNN COUNTY, GEORGIA

Site Code : 77777777
 Start Date: 03/10/20
 File I.D. : 20159503
 Page : 1

AUTOMOBILES

Date 03/10/20	FREDERICA ROAD From North				SEA ISLAND ROAD From East				FREDERICA ROAD From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
15:30	11	84	111	0	33	53	6	0	22	88	18	0	108	21	22	0	577
15:45	8	83	102	0	17	50	7	0	14	94	12	0	151	21	17	0	576
16:00	10	71	115	0	27	59	7	0	24	81	15	0	139	25	24	0	593
16:15	4	89	109	0	35	40	8	0	14	94	15	0	154	22	13	0	597
Hr Total	33	327	437	0	112	202	28	0	74	357	60	0	548	89	76	0	2343
16:30	5	74	112	0	21	40	7	0	21	100	17	0	155	24	19	0	595
16:45	3	93	126	0	20	33	5	0	20	114	18	0	163	33	24	0	652
17:00	4	97	127	0	19	58	6	0	23	115	19	0	126	39	28	0	661
17:15	4	97	139	0	32	55	7	0	37	120	20	0	137	31	19	0	698
Hr Total	16	361	504	0	92	186	25	0	101	449	74	0	581	127	90	0	2606
17:30	4	96	119	0	24	56	5	0	23	93	17	0	139	13	19	0	608
17:45	2	93	94	0	26	31	6	0	14	98	11	0	173	27	33	0	608
Hr Total	6	189	213	0	50	87	11	0	37	191	28	0	312	40	52	0	1216
TOTAL	55	877	1154	0	254	475	64	0	212	997	162	0	1441	256	218	0	6165

Peak Hour Analysis By Entire Intersection for the Period: 16:45 to 17:45 on 03/10/20

Peak start 16:45	16:45				16:45				16:45				16:45			
Volume	15	383	511	0	95	202	23	0	103	442	74	0	565	116	90	0
Percent	2%	42%	56%	0%	30%	63%	7%	0%	17%	71%	12%	0%	73%	15%	12%	0%
Pk total	909				320				619				771			
Highest	17:15				17:15				17:15				16:45			
Volume	4	97	139	0	32	55	7	0	37	120	20	0	163	33	24	0
Hi total	240				94				177				220			
PHF	.95				.85				.87				.88			

JW BUCKHOLZ TRAFFIC ENGINEERING INC
MANUAL TURNING MOVEMENT COUNTS
FREDERICA ROAD @ SEA ISLAND ROAD
GLYNN COUNTY, GEORGIA

PEDESTRIAN & BICYCLE

Peak Hour Analysis By Entire Intersection for the Period: 16:45 to 17:45 on 03/10/20

Peak start 16:45																16:45				16:45			
Volume	0	0	0	0	0	0	0	11	0	0	0	1	0	0	0	0							
Percent	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	0%							
Pk total	0							11	1				0%	0%	0%	0%							
Highest	15:30							17:30	17:30				0										
Volume	0	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0							
Hi total	0							4	1				0										
PHF	.0							.69	.25				.0										

DAY: TUESDAY
 DATE: 03/10/20
 WEATHER: CLEAR & DRY
 BEGIN TIME (MILITARY): 15:30 Hrs

JW BUCKHOLZ TRAFFIC ENGINEERING INC
 MANUAL TURNING MOVEMENT COUNTS
 SEA ISLAND ROAD @ STABLE STREET
 GLYNN COUNTY, GEORGIA

Site Code : 66666666
 Start Date: 03/10/20
 File I.D. : 20159501
 Page : 1

AUTOMOBILES, COMMERCIAL VEHICLES

Date 03/10/20	STABLE STREET From North				SEA ISLAND ROAD From East				PARKING LOT From South				SEA ISLAND ROAD From West				Total
	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	Left	Thru	Right	Other	
15:30	0	0	3	0	0	0	4	0	0	0	21	0	0	0	8	0	36
15:45	0	0	0	0	0	0	1	0	0	0	18	0	0	0	3	0	22
16:00	0	0	2	0	0	0	5	0	0	0	16	0	0	0	6	0	29
16:15	0	0	0	0	0	0	3	0	0	0	27	0	0	0	2	0	32
Hr Total	0	0	5	0	0	0	13	0	0	0	82	0	0	0	19	0	119
16:30	0	0	0	0	0	0	4	0	0	0	21	0	0	0	9	0	34
16:45	0	0	1	0	0	0	3	0	0	0	21	0	0	0	8	0	33
17:00	0	0	2	0	0	0	4	0	0	0	19	0	0	0	7	0	32
17:15	0	0	0	0	0	0	3	0	0	0	13	0	0	0	2	0	18
Hr Total	0	0	3	0	0	0	14	0	0	0	74	0	0	0	26	0	117
17:30	0	0	0	0	0	0	5	0	0	0	14	0	0	0	3	0	22
17:45	0	0	1	0	0	0	1	0	0	0	43	0	0	0	6	0	51
Hr Total	0	0	1	0	0	0	6	0	0	0	57	0	0	0	9	0	73
TOTAL	0	0	9	0	0	0	33	0	0	0	213	0	0	0	54	0	309

Peak Hour Analysis By Entire Intersection for the Period: 16:15 to 16:30 on 03/10/20

Peak start 16:15	16:15				16:15				16:15				16:15			
Volume	0	0	3	0	0	0	14	0	0	0	88	0	0	0	26	0
Percent	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	100%	0%
Pk total	3				14				88				26			
Highest 17:00					16:30				16:15				16:30			
Volume	0	0	2	0	0	0	4	0	0	0	27	0	0	0	9	0
Hr total	2				4				27				9			
PHF	.38				.88				.81				.72			