Development of Effective Strategies to Alleviate Traffic Congestion for the Barrier Islands

Final Report

Prepared for

Longboat Key Town Commission

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DISCLAIMER

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Longboat Key Town Commission

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EXECUTIVE SUMMARY

The town of Longboat Key is a barrier island community located on the west coast of Florida. The northern portion of Longboat Key is in Manatee County connecting Bradenton Beach, Holmes Beach and Anna Maria in the Anna Maria Island. The southern portion of Longboat Key Island is in Sarasota County connecting St. Armand's Key, Lido Key and Bird Key. The Gulf of Mexico Drive (SR 789) is the only major thoroughfare for the traffic on Longboat Key and it runs north-south through the island

Specifically, St. Armand's Circle is located near the southern end of Longboat Key. SR 789 forms the north and east legs of the circle and carries the traffic traveling between the barrier islands and southern mainland (Sarasota) as shown in Figure A (a). Near the northern end of Longboat Key, Cortez Road runs east-west between the islands and northern mainland (Bradenton), and connects with SR 789 near Bradenton Beach as shown in Figure A (b). Significant traffic congestion was encountered in these two areas.

(a) St. Armand's Circle **(b)** Gulf Drive & Cortez Road

Figure A St Armand's Circle and Gulf Drive & Cortez Road (Source: Google Maps)

This study focuses on the development of effective strategies to alleviate traffic congestion for residents and tourists of barrier islands who encounter significant delays when traveling throughout the barrier islands and the mainland. The recommended strategies for alleviating traffic congestion for the barrier islands were developed through field observations, literature view, comprehensive data collection, and detailed traffic simulation analysis. The major findings and recommendations are stated as follows:

1. The areas with significant traffic congestion for studied barrier islands were identified as St. Armand's Circle in the south and the area near the intersection of Gulf Drive and Cortez Road in the north, and verified with field observations.

2. The major causes of traffic congestion at the St. Armand's Circle were: (1) Heavy traffic volume during peak hours and tourist seasons, (2) Heavy pedestrian and parking activities at St. Armand's Circle, (3) Inexperienced motorists driving around a traffic circle or traffic roundabout, and (4) Lack of clear striping and signage at some locations in St. Armand's Circle. The major causes of traffic congestion for the area near the intersection of Gulf Drive and Cortez Road were: (1) Heavy traffic volume during peak hours and tourist seasons, (2) Impact from the operations of Cortez Drawbridge, and (3) Inadequate capacity at the mini-roundabout on Gulf Drive at Bridge Street.

3. The major recommended strategy to alleviate traffic congestion at St. Armand's Circle is to establish North Adams Drive and Madison Drive as an alternate route to encourage some traffic to bypass St. Armand's Circle as shown in Figure B. The dash lines in Figure B represent the proposed alternate route. A traffic signal installation at the intersection of Adams Drive and John Ringling Boulevard, which is currently warranted, is required to ensure the effectiveness of the proposed alternate route.

   This study indicated that based on the results from traffic simulations among three potential different cases of using the proposed alternate route to bypass St. Armand's Circle, the average delay per vehicle was reduced by more than 30 percent and overall travel time reduction in the studied network was about 17 percent as shown in Figure C. This proposed strategy not only significantly reduces the average delay and travel time for an individual motorist but it also improves safety for both pedestrians and motorists.

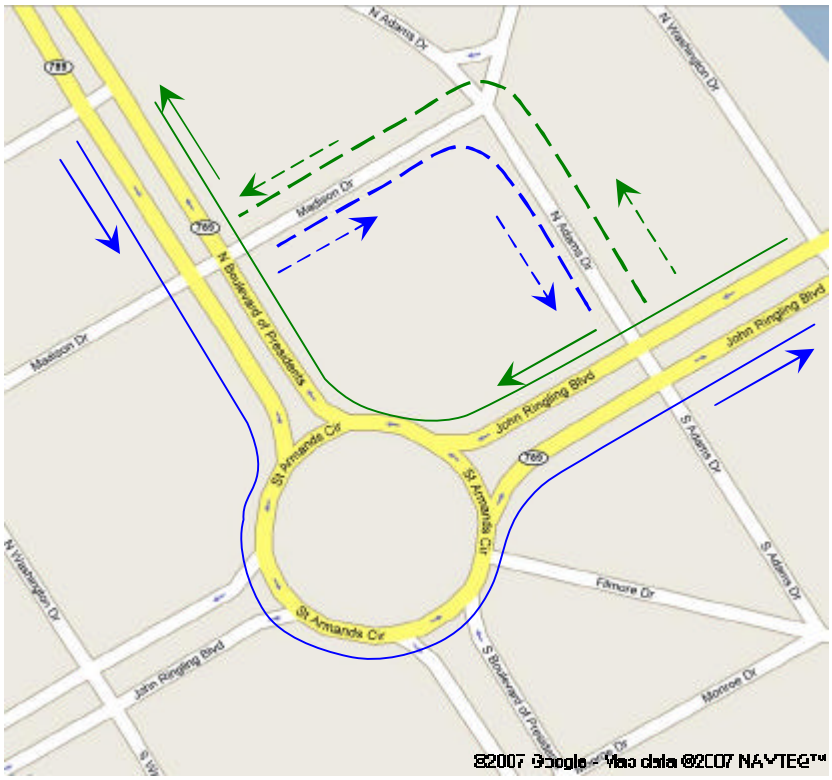


Figure B Alternate routes that can be used for bypassing the circle (Source: Google Maps)

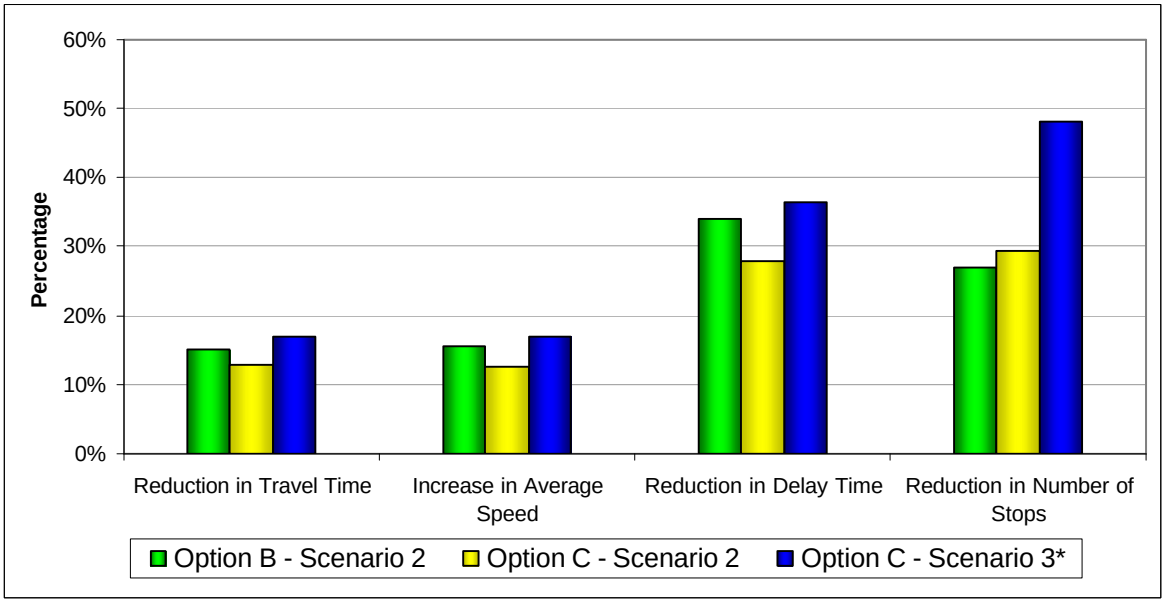


Figure C Reduction in travel time and delay at St. Armand's Circle

4. Two major recommended strategies from this study to alleviate traffic congestion in the area near the Gulf Drive and Cortez Road intersection are to (1) increase the northbound capacity of the mini-roundabout on the Gulf Drive at Bridge Street, and (2) reduce the frequency of Cortez Drawbridge opening during peak hours of a tourist season. Since the United States Coast Guard has already revised the schedule for operation of the drawbridge and reduced the frequency of its operation during the tourist season, the second recommended strategy has been implemented. The first recommended strategy can be carried out by two potential alternatives.

   - **Alternative 1**: Add an additional lane on the south leg of the mini-roundabout, and extend it up to the intersection of Gulf Drive and Cortez Road where the outside lane becomes a right-turn only lane as shown in Figure D. The proposed Alternative 1 is able to preserve the mini-roundabout setting but may require some right-of-way acquisition and/or roadway realignment. (Alternative 1 is Option 2 in Figure E)

   - **Alternative 2** Remove the existing mini-roundabout at the Gulf Drive and Bridge Street intersection, and operate it as a two-way stop sign controlled intersection with stop signs placed on the approaches of Bridge Street. A 150 to 200 left turn bay should be provided on the north leg of the intersection so that vehicles turning left will not obstruct the through traffic. Traffic signal is not warranted at this location under the current traffic conditions. (Alternative 2 is Option 3 in Figure E):

5. This study indicates that both proposed alternatives for the area near the Gulf Drive and Cortez Road intersection can reduce overall travel time by at least 26 percent, average vehicle delay by at least 60% as shown in Figure E, which is a significant reduction of traffic congestion in this area. The travel time for northbound traffic on Gulf Drive can be reduced more than four minutes per vehicle during PM peak hours of a tourist season. Most of the northbound queue at the mini-roundabout can be eliminated.

6. Other congestion management strategies including advanced traffic signal control, transportation demand management, congestion pricing, water taxi services, and effective utilization of transit buses could be considered in the future to further improve the travel quality for residents and tourists of the barrier islands.

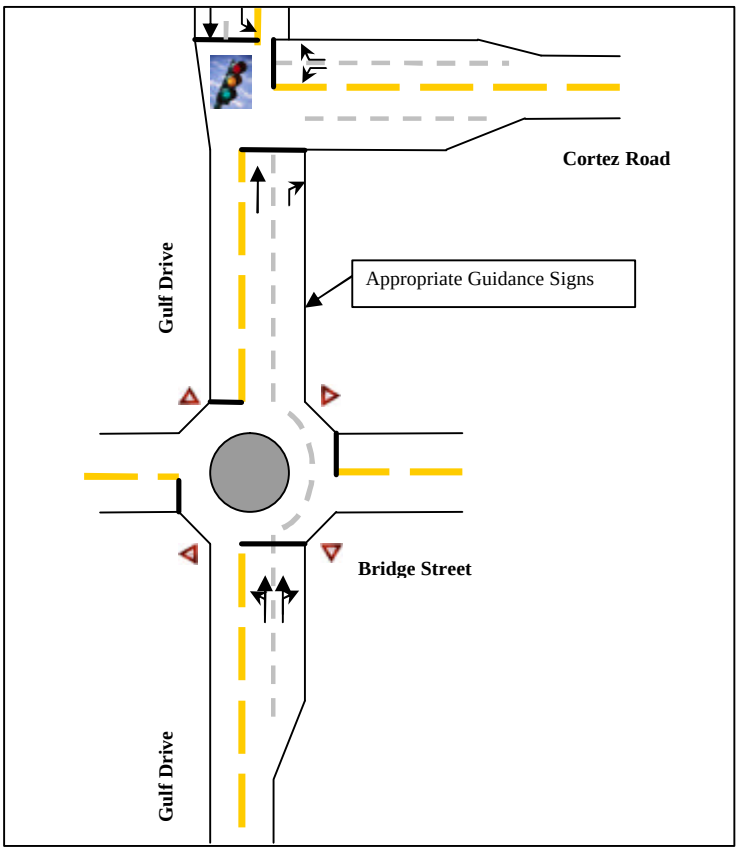


Figure D Schematic sketch for one of the options for alleviating congestion

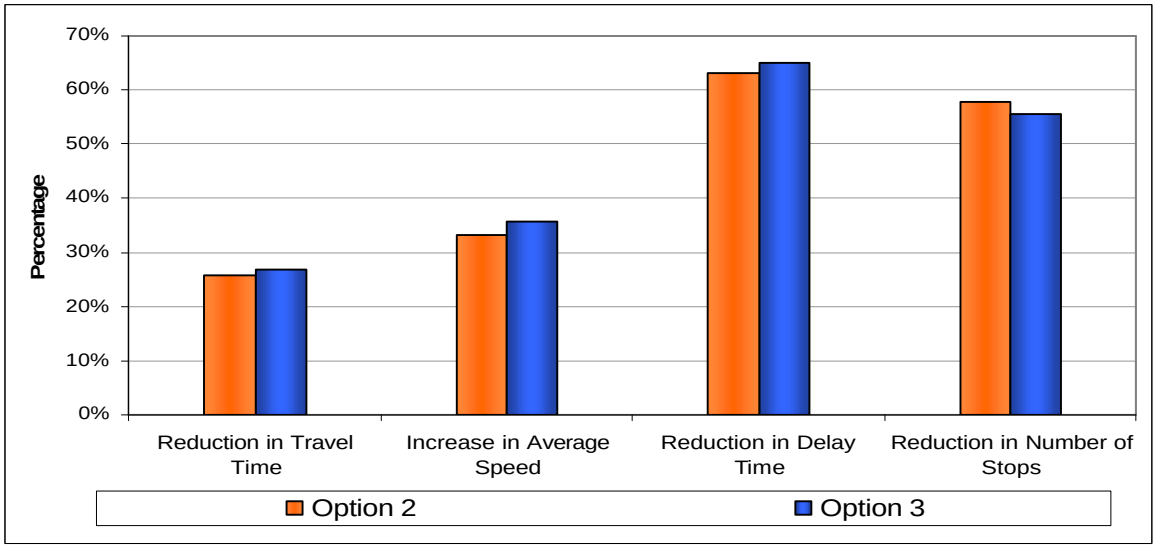


Figure E Reduction in travel time & delay near intersection of Gulf Drive and Cortez Road

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The town of Longboat Key is a barrier island community located on the west coast of Florida. The northern portion of Longboat Key is in Manatee County connecting Bradenton Beach, Holmes Beach and Anna Maria in the Anna Maria Island. The southern portion of Longboat Key Island is in Sarasota County connecting St. Armand's Key, Lido Key and Bird Key. The island is surrounded by the Gulf of Mexico on the west and Sarasota Bay on the east. The population of Longboat Key increases from 8,000 residents to 20,000 residents during peak tourist seasons.

The Gulf of Mexico Drive (SR 789) is the only major thoroughfare for the traffic on Longboat Key and it runs north-south through the island (See Figure 1). The Cortez Drawbridge in the north and the John Ringling Bridge in the south, link the barrier islands to the mainland providing access to major regional facilities, including Interstate 75, US 41 and US 301. These regional facilities provide access to Bradenton and Tampa to the north and Sarasota, Fort Myers and Naples to the south. Traffic disruptions caused by drawbridge operations and the increases in the number of residents and tourists creates traffic congestion.

Specifically, St. Armand's Circle is located near the southern end of Longboat Key (Figure 2a). SR 789 forms the north and east legs of the circle and carries the traffic traveling between the barrier islands and southern mainland (Sarasota). Near the northern end of Longboat Key, Cortez Road runs east-west between the islands and northern mainland (Bradenton), and connects with SR 789 near Bradenton Beach (Figure 2b). Traffic at these locations gets congested during peak hours of travel of a tourist season, which causes excessive delays for motorists using SR 789.

This study focuses on the development of effective strategies to alleviate traffic congestion for the barrier islands especially for residents and visitors of Longboat Key who encounter traffic delays when traveling throughout the island of Longboat Key, the mainland and other barrier islands.

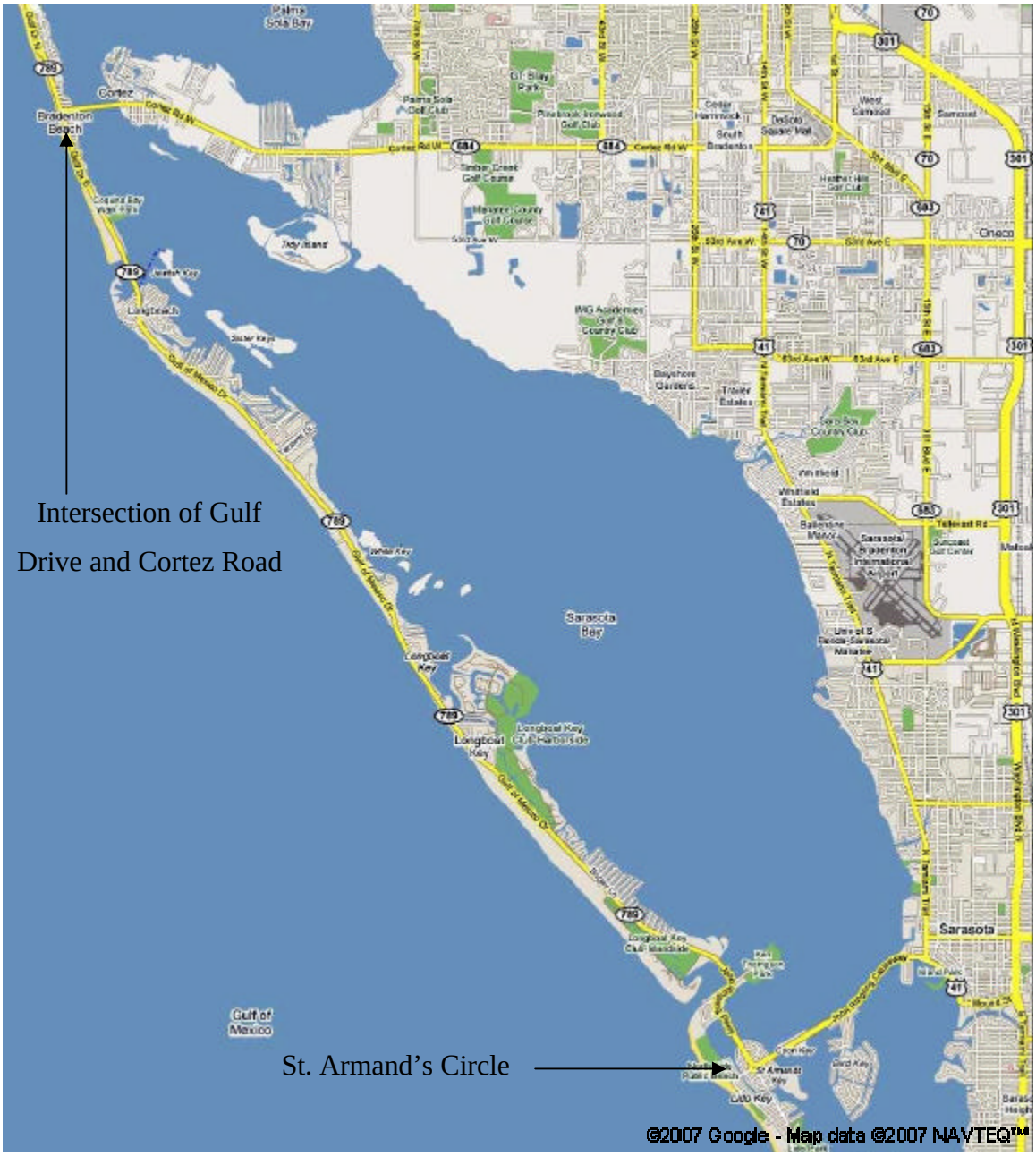
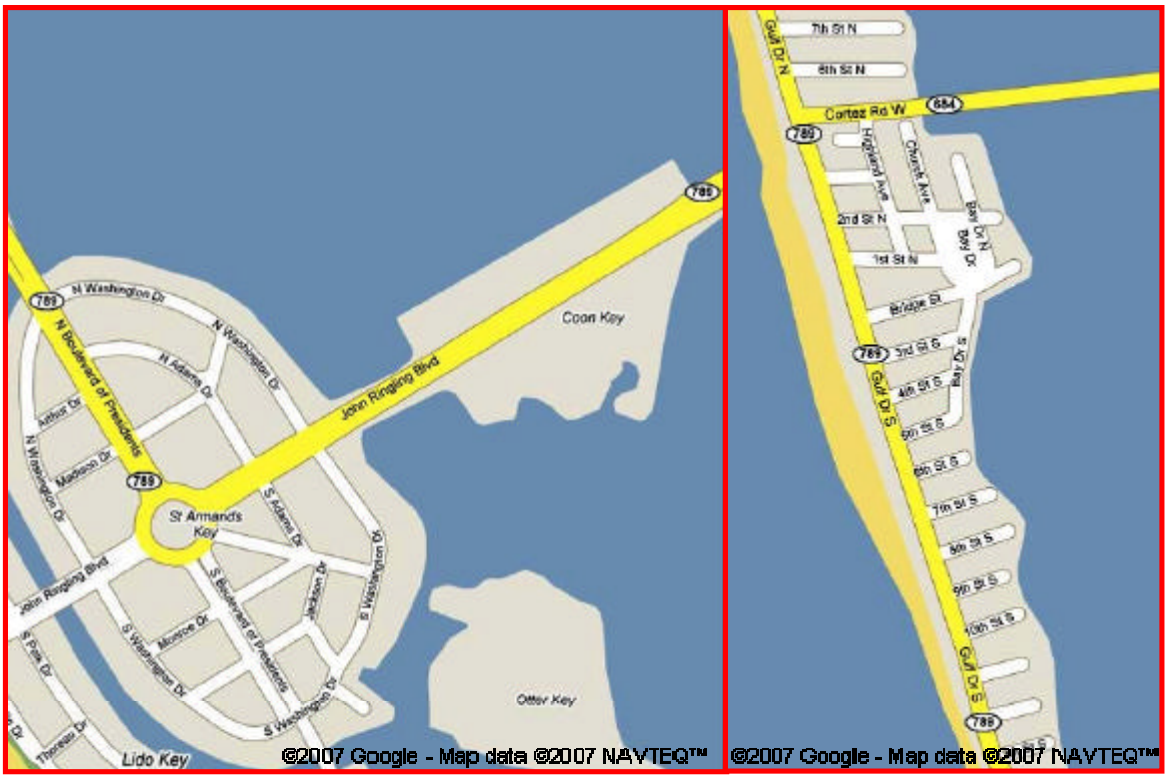


Figure 1 Longboat Key and neighboring islands (Source: Google Maps)



(a) St. Armand's Circle **(b)** Gulf Drive & Cortez Road

Figure 2 View of St Armand's Circle and Gulf Drive & Cortez Road (Source: Google Maps)

BACKGROUND AND CONGESTION ISSUES

Tampa Bay Engineering conducted a study, "Traffic Patterns between Longboat Key and the Mainland" in 1991 and found that "relatively few trips that have origin or destination on Longboat Key also have the other end of the trip on the barrier island." The study recommended construction of new bridges to provide alternative routes for motorists traveling between the mainland and the barrier island. However, with the current roadway alignment, it would mean that the majority of the traffic between Longboat Key and the mainland would use SR 789 and either Cortez Road or John Ringling Boulevard. As a result, areas near the intersection of Gulf Drive (SR 789) and Cortez Road as well as St. Armand's Circle (intersection of SR 789 and John Ringling Boulevard), are encountering very high levels of congestion during peak periods of travel leading to excessive delays for motorists.

The traffic near St. Armand's Circle and at the intersection of SR 789 and Cortez Road gets congested during tourist season due to increases in traffic demand and other site specific situations. The causes of congestion at these locations were discussed during the project kick-off meeting with Longboat Key officials. These causes were further investigated through field visits and literature review. Figure 3 is an extract from Longboat Key New website (www.lbknews.com) dated January 20, 2005. The report states that the officials of the Longboat Key and the City of Sarasota recognize that traffic congestion is a joint problem resulting from a combination of increased traffic, driver's confusion in negotiating the traffic circle, coupled with inadequate pavement markings.

St Armands Traffic a Problem for Tourists, Residents

Bryan Russell
Contributing Writer

As we enter the peak of Longboat Key's tourist season, traffic congestion is becoming a serious problem, particularly on St. Armands Circle. The Circle, a shopping and dining destination for tourists and residents alike, is prone to traffic and parking problems during this time of the year. Cars struggle to park along the streets of the circle and pedestrians swinging shopping bags can be seen scurrying across the streets.

This year, local law enforcement is targeting specific driving infractions to make the area safer for shoppers and sight-seers, as well as automobiles. "During the season, we increase selective traffic enforcement on St. Armands Circle," said Lieutenant Bill Wall, South District commander of the City of Sarasota police. "We've traditionally had a problem with speeders, so we are targeting them, as well as motorists who fails to yield to pedestrians," Wall said.

While law enforcement officials are doing everything they can to try to limit traffic congestion in the St. Armands area, city officials, both of Longboat Key and Sarasota, have also discussed ways to take care of the traffic problem. In an informal meeting two weeks ago the issue was among those raised at an informal meeting of representatives from the two cities.

Some of the items discussed that pertained to the traffic problem were whether to deputize officers to oversee the flow of traffic during peak congestion times in the Circle, or to possibly have a volunteer to monitor the traffic. A blinking stoplight on Ken Thompson Parkway that was causing confusion among motorists was also discussed. The two cities are trying to work together to tackle the problem. "We all know it is a joint problem, so we need to work jointly together and try to solve it," said Sarasota City Commissioner Lou Ann Palmer.

Businesses in the Circle are also being affected, both positively and negatively, by increased traffic during the season. Alison Albee, a 20-year Longboat resident who works at the Artisan shop on St. Armands Circle, said, "With the street being located right near the office, I definitely see an increase in all of the traffic."

Her colleague, Janet Merryman echoed her sentiments and also added her opinion on a different issue. "There's no place for our employees to park," Merryman said. "It's an ongoing problem that must be addressed."

Kate Lew, an employee at Mark, Fore, and Strike, said that some of the sign markings on the Circle made it too confusing to navigate for visitors. "It seems like they should be able to mark the circle more clearly. No one yields. I think it's an issue of people not knowing how to manipulate the circle," Lew said.

Traffic congestion on St. Armands Circle and across the Key during the tourist season has always been a problem, but disgruntled tourists and confused tourists should both find comfort in the fact that many people are working toward a more permanent solution.

Figure 3 Extract from Longboat Key News

On the north side of Longboat Key, traffic delays result from frequent operation of the Cortez Drawbridge as well as other site specific reasons which were investigated in this study. In year

1993, SR 789 Task Force submitted a report to the Manatee County Board of County Commissioners, which identified that the traffic "borders on a range on which small increases in traffic flow may cause substantial increases in approach delay, and hence, decrease in speed." It also states that a segment of SR 789 "which historically has presented a traffic congestion problem for users can be found between 1st Street North and 3rd Street, including Bridge Street." On June 1, 2005, Holmes Beach city officials, in cooperation with the cities of Anna Maria and Bradenton Beach and the Town of Longboat Key, requested that the Coast Guard review the existing regulations governing the operation of the Cortez and Anna Maria Bridges due to their concern that the current drawbridge regulations were not meeting the needs of vehicle traffic.

Data collection was performed to further understand the causes, patterns and levels of congestion near the St. Armand's Circle and the intersection of Gulf Drive and Cortez Road. The data was also used for evaluation of proposed strategies to alleviate traffic congestion.

DATA COLLECTION

Several field visits were conducted to collect traffic turning movement counts, roadway geometry data, signal timing information, duration of the drawbridge opening, pedestrian activity, parking maneuvers, queuing data, and travel time around St. Armand's Circle and the intersection of Gulf Drive and Cortez Road. The data was collected to gain an understanding of causes of congestion and to develop recommendations for mitigating traffic congestion. This data was also used to develop and calibrate traffic simulation models for evaluating proposed strategies for congestion mitigation.

Data collection near St. Armand's Circle

Data collection near St. Armand's Circle included collecting information at St. Armand's Circle, the intersection of Adam's Drive and John Ringling Boulevard (SR 789), the intersection of Madison Drive and North Boulevard of Presidents (SR 789) and the intersection of Adams Drive and Madison Drive (Figure 4).

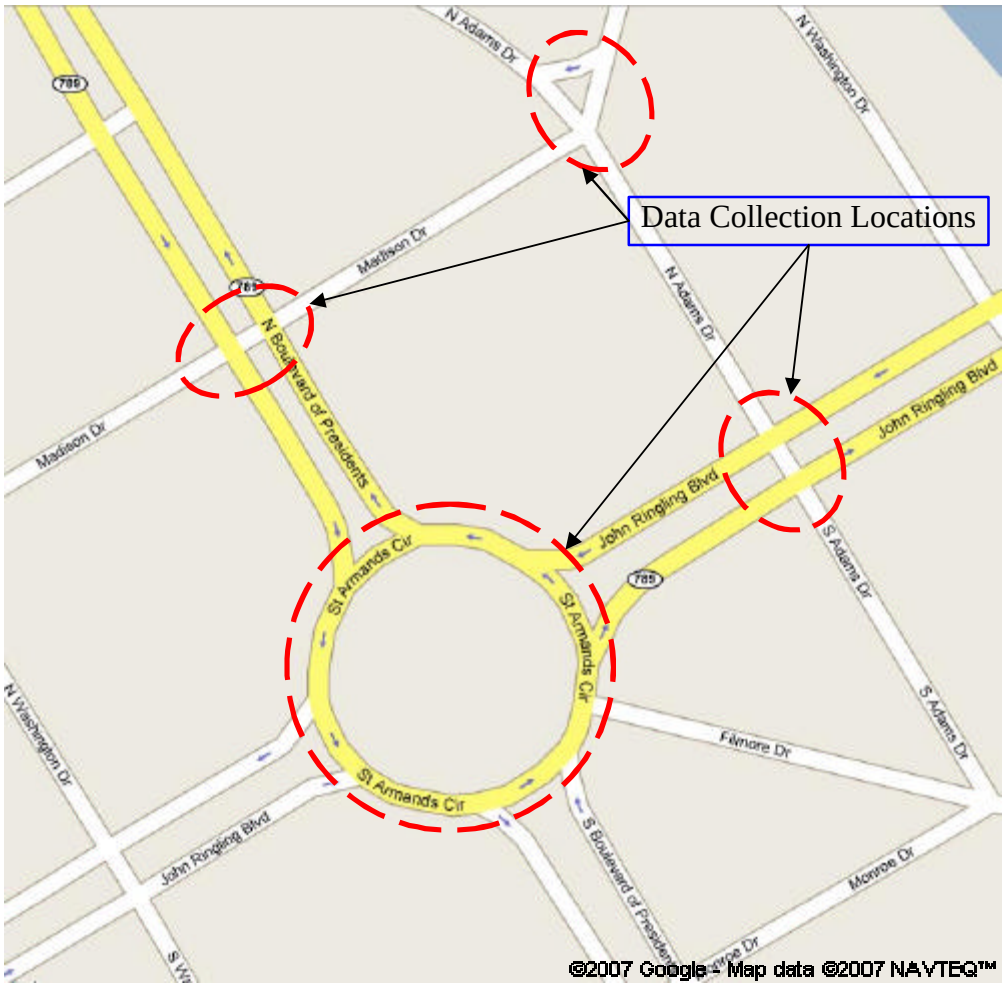


Figure 4 Data collection locations near St. Armand's Circle (Source: Google Maps)

Vehicle turning movement counts and pedestrian activity at the intersection of Adams Drive and John Ringling Boulevard (SR 789) and at the intersection of Madison Drive and North Boulevard of Presidents (SR 789) were counted using turning movement counters. Table 1 and Table 2 show the counts taken on March 9, 2007 at these intersections between 3:30 PM and 5:00 PM.

Table 1 Turning movement counts for John Ringling Boulevard and Adams Drive intersection

John Ringling and Adams Drive - All Vehicles and Pedestrians																				
Start Time	From North (SB)					From East (WB)					From South (NB)					From West (EB)				
	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds
3:30	25	1	1	23	9	244	24	203	17	8	23	21	1	1	42	274	3	267	3	8
3:45	50	5	1	44	8	254	21	216	17	2	19	19	0	0	11	288	4	282	2	2
4:00	27	1	0	26	16	253	21	212	20	4	38	36	1	1	16	257	1	253	3	5
4:15	32	1	0	31	13	255	27	211	17	3	28	28	0	0	8	266	1	261	4	5
4:30	40	2	2	36	10	267	31	217	19	2	16	15	1	0	20	287	2	283	2	8
4:45	36	1	1	34	13	239	21	203	15	13	27	24	2	1	19	268	0	261	8	4
Total	210	11	5	194	69	1512	145	1262	105	32	151	143	5	3	116	1641	12	1606	23	32

Table 2 Turning movement counts for North Boulevard of Presidents and Madison Drive intersection

North Boulevard of Presidents and Madison Drive - All Vehicles and Pedestrians																				
Start Time	From North (SB)					From East (WB)					From South (NB)					From West (EB)				
	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds	Total	Right	Thru	Left	Peds
3:30	233	4	209	20	14	32	28	2	2	21	141	6	130	5	5	13	7	6	0	20
3:45	230	0	217	13	0	21	16	4	1	21	157/	11	142	4	2	13	6	4	3	24
4:00	228	2	201	25	10	27	19	2	6	41	148	7	138	3	19	13	4	4	5	17
4:15	233	0	221	12	9	18	14	2	2	18	131	7	119	5	1	16	4	10	2	13
4:30	222	1	197	24	22	21	13	4	4	22	143	6	127	10	7	9	3	5	1	23
4:45	230	2	212	16	19	17	14	1	2	14	135	4	126	5	3	5	3	2	0	17
Total	1376	9	1257	110	74	136	104	15	17	137	855	41	782	32	37	69	27	31	11	114

However, collecting turning movement counts at the St. Armand's Circle was a challenge due to the large diameter of the circle, which makes it difficult to simultaneously track several vehicles around the circle. The turning movement at the circle was estimated by tracking vehicle license plates for automobiles entering and leaving the circle. The license plate information was aggregated for every five minutes. It was processed by matching the license plate of a vehicle entering at one location with the license plates of vehicles leaving the circle in the same or next consecutive time interval. Table 3 shows the information of the turning movement counts for the St. Armand's Circle collected on March 9, 2007 between 3:30 PM and 5:00 PM. This data shows that the majority of the traffic coming from the east goes north and vise-versa.

Table 3 Origin and destination of trips at St. Armand's Circle

Origin	**Destination**					Total
	To East	To North	To West	To South	Filmore Dr	
From East	147	683	389	57	6	1282
From North	1034	78	130	46	12	1300
From West	420	65	22	22	11	538
From South	89	37	11	10	0	147
Total	1689	862	552	134	29	

Pedestrian and parking activity data was collected at the St. Armand's Circle as shown in Table 4. According to the data in Table 4 there is a range of 150 to 200 pedestrians using the crosswalk on each side of the circle during a 3- minute period. Also there are approximately 20 parking maneuvers in each side of the circle during the same period.

Table 4 Pedestrian and parking activity at St. Armand's Circle

Observation Time	**Location**	**Number of Pedestrian**	**Number of Parking Maneuvers**
3:00 PM – 3:30 PM	North Side	222	19
3:30 PM – 4:00 PM	West Side	191	21
4:00 PM – 4:30 PM	South Side	204	23
4:30 PM –5:00 PM	East Side	158	15

Data collection near the intersection of Gulf Drive and Cortez Road

The data collection near the intersection of Gulf Drive (SR 789) and Cortez Road included the information at the intersection of Gulf Drive and Cortez Road, and the intersection of Gulf Drive and Bridge Street and the drawbridge on Cortez Road as depicted by Figure 5.

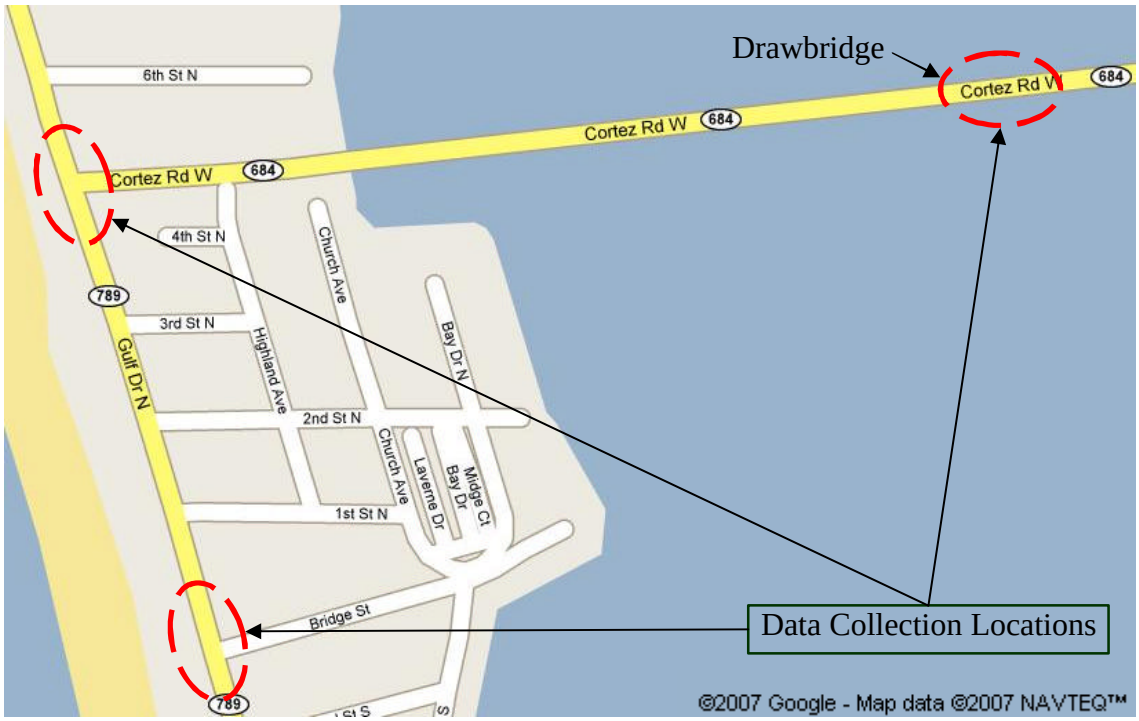


Figure 5 Data collection locations near Gulf Drive and Cortez Road intersection

(Source: Google Maps)

The start and end time of the drawbridge openings and their impact on traffic flow is shown in Table 5. The drawbridge was opened five times to allow vessels to pass under the bridge during the 150 minutes of data collection. On average the drawbridge operation stopped traffic flow for 4 to 4.5 minutes. However, the adverse impact caused by the operation of the drawbridge lasted for approximately 12 to 14 minutes after the lights of the drawbridge turned red, except for the first observation when the impact lasted for nearly 18 minutes.

Table 5 Drawbridge operation activity and its impact on Cortez Road intersection

Observations	1	2	3	4	5
Drawbridge light turns Red	3:29:00	3:59:01	4:28:06	5:2803	5:58:38
Drawbridge light turns Green	3:32:51	4:02:49	4:32:49	5:32:38	6:03:05
Int. of Gulf Dr and Cortez Rd Blocked	3:33:33	4:03:07	4:30:03	5:33:03	6:03:47
Int. of Gulf Dr and Cortez Rd is back to normal operation	3:51:19	4:13:12	4:40:11	5:39:50	-

Travel time data were collected to calibrate the simulation model as shown in Table 6. Travel time data were collected from one mile south of Bridge Street on Gulf Drive to one mile past the drawbridge on Cortez Road. The total length of the section for which travel time measurements were taken was 2.35 miles long. The travel time data shows that when the drawbridge was open for vessels, vehicular traffic took four to five minutes longer to travel the studied segment. Also the travel time for Direction 2, which was from island to mainland, was longer than the travel time from mainland to island.

Table 6 Travel time data near intersection of Gulf Drive and Cortez Road

Direction 1: Mainland to island (2.35 Miles)				
Location	Observation 1	Observation 2	Observation 3	Observation 4
1 mile East of Drawbridge	3:30:40	4:25:58	4:48:42	5:12:00
Draw Bridge	3:35:01	4:27:00	4:49:50	5:12:52
Gulf Dr & Cortez Rd Int.	3:37:38	4:27:48	4:50:44	5:13:47
Gulf Dr. & Bridge St. Int.	3:39:05	4:28:32	4:51:35	5:14:30
I mile South of Bridge St.	3:41:02	4:31:00	4:54:01	5:16:10
Total travel time	**10 min 2 sec**	**5min 2 sec**	**5 min 19 sec**	**4 min 10 sec**
Direction 2: Island to Mainland (2.35 Miles)				
Location	Observation 1	Observation 2	Observation 3	Observation 4
I mile South of Bridge St.	4:14:00	4:31:30	5:00:00	5:17:00
Gulf Dr. & Bridge St. Int.	4:20:27	4:42:55	5:08:10	5:21:02
Gulf Dr & Cortez Rd Int.	4:21:40	4:44:00	5:08:47	5:22:58
Draw Bridge	4:22:27	4:45:00	5:09:49	5:23:39
1 mile East of Drawbridge	4:24:30	4:47:50	5:11:10	5:24:40
Total travel time	**10 min 30 sec**	**6 min 20 sec**	**11 min 10 sec**	**7 min 40 sec**

Additionally, the data collection team observed a three mile long queue on Gulf Drive (SR 789) south of the mini-roundabout at Bridge Street. Capacity constraints at the mini-roundabout had a more significant impact on the long backup queue, while operation of the drawbridge had less impact on this queue. As there were several occasions of no or small queue or between the drawbridge at the mini-roundabout, but a continuous long queue was observed south of the mini-roundabout.

Turning movement counts were conducted at the mini-roundabout. The majority of the traffic from the south continuously headed north. From the north leg of the mini-roundabout approximately 13 percent of the traffic turned left and the rest headed south. From the east, two out of three vehicles turned right and the rest turned left. Very low traffic volume was observed from the west. The traffic on the south leg was heavily congested due to capacity constrains at the mini-roundabout. The queue from the drawbridge on Cortez Road reached the mini-roundabout on two occasions during the 150 minutes observation. Moderate pedestrian activity was observed in the east-west directions, where about 456 pedestrian were observed and an additional 120 pedestrians were observed going in the north-south directions.

Table 7 shows the turning movement counts for the intersection of Gulf Drive and Cortez Road. The turning movement data shows that half of the traffic coming from the north turns left and the rest head south. For the traffic approaching from the south two out of three vehicles turned right. About 46 percent of the vehicles approaching from east turned right. The signal timing information for the intersection of Gulf Drive (SR 789) and Cortez Road was obtained from Manatee County Public Works.

Table 7 Turning movement counts for the intersection of Gulf Drive and Cortez Road

Gulf Drive and Cortez Road - All Vehicles and Pedestrians												
Start Time	From North (SB)				From East (WB)				From South (NB)			
	Total	Thru	Left	Peds	Total	Right	Left	Peds	Total	Right	Thru	Peds
3:30	145	86	59	0	166	64	102	0	184	125	59	8
3:45	135	67	68	0	157	63	94	0	267	190	77	7
4:00	151	76	75	0	136	62	74	0	230	160	70	12
4:15	163	88	75	0	140	61	79	4	270	188	82	2
4:30	148	71	77	0	160	64	96	0	170	114	56	6
4:45	142	72	70	0	169	79	90	0	239	164	75	2
5:00	138	63	75	0	156	87	69	0	249	161	88	4
5:15	135	55	80	0	139	65	74	0	252	157	95	6
5:30	143	67	76	0	174	88	86	0	214	140	74	0
5:45	122	67	55	0	145	71	74	0	187	113	74	4
Total	1422	712	710	0	1542	704	838	4	2262	1512	750	51

CONGESTION AND PATTERN CAUSES

Major traffic congestion typically occurs during the afternoon hours of a tourist season at both ends of the Longboat Key Island, near the St. Armand's Circle in the south and near the intersection of Gulf Drive and Cortez Road intersection in the north. . There was no major congestion along the Gulf Drive (SR 789) of the Longboat Key itself. During the tourist season the same roadway carries local commuter traffic as well as the seasonal tourist vehicles. This increase in demand causes congestion and excessive delays for motorists, and the congestion is more pronounced in areas of tourist activity. Additionally, site specific conditions such as heavy pedestrian activity, roadway geometry at St. Armand's Circle and drawbridge operations near the intersection of Gulf Drive and Cortez Road further interrupt vehicular traffic and worsen congestion.

St. Armand's Circle

The probable causes of congestion at St. Armand's Circle were discussed during the project kick-off meeting. Field observations and literature reviews were conducted to validate the sources of congestion. The following are the primary causes of congestion in St. Armand's Circle:

1. **Higher traffic volume during the tourist season.** The number of residents in the Town of Longboat Key swells from 8,000 to 20,000 during tourist season. This increase has a significant impact on the traffic demand, whereas, the roadway capacity remains the same during the afternoon peak hours. Tourist traffic coupled with commuter traffic further increases congestion levels. Figure 6 (a) shows the heavy traffic observed during site visits.

2. **Inexperience of tourists when driving around a traffic circle.** St. Armand's Circle is a 5 legged traffic circle with an approximate diameter of 350 feet. Two of the legs have two approach lanes and the circle has two interior circulatory lanes. Many tourists who are visiting the area for the first time are not certain of when to change lanes to exit the circle and this disrupts the flow of traffic in the circle. Figure 6 (b) shows a motorist making a sharp lane change.

3. **Heavy pedestrian activity.** Field observations showed very heavy pedestrian activity in and around the circle. On average there were 1,500 pedestrians who used the crosswalk per hour during the period of data collection. Also, motorists are required by law to yield to pedestrians in the crosswalk. This interruption in traffic flow caused by pedestrian activity leads to significant delays. Also, pedestrians were observed standing near the crosswalk with no intentions to use the crosswalk. Motorists, however, often assumed that the pedestrians were going to use the crosswalk, so drivers unnecessarily yielded to the above-mentioned pedestrians, thus causing needless delays to vehicular traffic. Figure 7 (a) shows motorists yielding to pedestrians in the crosswalk.

4. **Motorists parking near the circle and obstructing traffic.** The presence of parking along and near the circle creates traffic interruptions in the lane adjacent to the parking area. Field observations were made to determine the number of parking maneuvers in the circle. It was found that 80 parking maneuvers were made per hour for the parking spots available near the circle, with some of the maneuvers taking as long as three to four minutes to complete.

5. **Motorists driving around the circle to a find parking spot.** According to Longboat Key officials, residents and tourists who visit attractions near the circle often drive around the circle several times searching for a parking spot, which increases circulatory flow and traffic congestion. Figure 7 (b) shows heavy traffic in the St. Armand's circle.

(a)

(b)

Figure 6 Field Observation at St. Armand's Circle showing heavy traffic

(a)

(b)

Figure 7 Field Observation at St. Armand's Circle showing pedestrian and traffic in the circle

6. **Inadequate striping.** The traffic circle has two interior circulatory lanes and only the outside lane can be used to enter or exit the circle, except when exiting the circle at John Ringling Boulevard heading towards Sarasota. At some locations if motorists are in the outside lane they have to exit the circle, and at other locations they can continue around the circle. These complex driving and parking situations, coupled with heavy pedestrian activity in the circle, creates confusion for motorists. This may lead to inappropriate driving maneuvers such as multiple lane-changes, thus further disrupting traffic. Figure 8 shows adequate striping on the east side of the circle for vehicles exiting the circle. However, there are no lane or channelization markings to assist vehicles entering the circle from the east, which accounts for approximately 40 percent of the circle's overall traffic.

Figure 8 Pavement marking observations at St. Armand's Circle (Source: Google Earth)

The increased afternoon traffic demand during a tourist season along with heavy pedestrian and parking activity creates traffic congestion in and around the St. Armand's Circle. Vehicles

approaching the circle from the east heading north and vice-versa, encounter heavy pedestrian activity at the circles four pedestrian crossings which causes significant delays for motorists on these approaches. Vehicles on these approaches constitute nearly 80 percent of the circle's traffic, while the majority of the motorists using these approaches are traveling between the island and mainland.

Intersection of Gulf Drive and Cortez Road

The causes of congestion near the intersection of Gulf Drive (SR 789) and Cortez Road were identified during the meeting with the Longboat Key officials and were validated by field observations. The following are the primary causes of congestion at and near the intersection of Gulf Drive and Cortez Road

1. **Higher traffic volume during the tourist season.** Bradenton Beach and several tourist destinations which are located south of the intersection experience traffic congestion during afternoon peak hours, as tourist traffic along with daily commuting traffic worsens the traffic congestion. Figure 9 shows heavy traffic on SR 789 during peak tourist season.

2. **Drawbridge on Cortez Road.** A drawbridge is located 2300 feet from the east leg of the intersection. The issue surrounding the drawbridge was raised by Holmes Beach city officials, in cooperation with the cities of Anna Maria and Bradenton Beach and the Town of Longboat Key. They requested that the Coast Guard review the existing regulations governing the operation of the Cortez and Anna Maria Bridges due to their concern that the current drawbridge regulations were not meeting vehicle traffic needs. The U.S. Coast Guard addressed this concern by issuing a public notice in February 2007, which reduced the frequency of the drawbridge operation during the tourist season effective February 21, 2007. Appendix-A includes the public notice issued by the Coast Guard with regard to the revised operation schedule of the drawbridge. Figure 10 (a) shows queue backup due to drawbridge operation.

(a)

(b)

Figure 9 Field Observation at Bridge Street and Gulf Drive intersection

(a)

(b)

Figure 10 Impact of drawbridge and mini-roundabout on traffic conditions

3. **Impact of mini-roundabout at Bridge Street.** Bridge Street intersects Gulf Drive (SR 789), 1200 feet south of the Gulf Drive and Cortez Road intersection. The traffic at this intersection is controlled by a mini-roundabout. The traffic on the approaches of this intersection yields to traffic in the mini-roundabout. The northbound approach, which experiences large traffic volumes during PM periods, encounters excessive delays caused by the left turn vehicles from the southbound approach as shown Figure 10 (b). Also, due to the small size of the mini-roundabout, the northbound through traffic unnecessarily yields to the southbound through traffic as drivers can not be certain whether the southbound vehicle will turn left or go through. This results in a stop-and-go traffic situation for northbound traffic and results in long delays and queues.

In February 2007 a site visit was conducted to understand the congestion pattern on the north side of the island and the impact from the mini-roundabout (Gulf Drive and Bridge Street) on traffic operations. During this 120-minute observation (3:30 PM to 5:30 PM), the Cortez Drawbridge only opened once for vessels to pass. The opening of the drawbridge did have a significant impact on the operation of the traffic signal at the intersection of Gulf Drive and Cortez Road. Additionally, peak northbound traffic making a right turn at this intersection encountered long delays. A continuous queue was observed starting at the drawbridge through the intersection and reaching the mini-roundabout

From the field observation, the traffic signal timing plan at the intersection was able to adequately handle the traffic on all approaches to relief the queue accumulated during the drawbridge opening. However, when the impact of the drawbridge opening diminished; long queues (about one mile) were constantly observed during most of the studied period on the south leg of the mini-roundabout as shown in Figure 11, even though there was no drawbridge activity for 60 minutes. On the other hand, large gaps were consistently observed between the Gulf Drive and Cortez Road signalized intersection and the mini-roundabout as shown in Figure 12. The observations indicated that the operation at the mini-roundabout is one of the major causes for the traffic backup on the north side of Longboat Key.

Figure 11 View from the mini-roundabout to its south during PM peak hours

Figure 12 View from the mini-roundabout to its north during PM peak hours

Due to the small diameter of the mini-roundabout and its surrounding environment (beach shops and restaurants), the northbound traffic was considerably slowed or stopped during peak hours for most southbound traffic entering the mini-roundabout, even if the traffic was going through. This caused a long queue buildup on the south leg of the traffic circle. In addition, the stops of transit and trolley buses on Gulf Drive near the Gulf Drive and Cortez Road signalized intersection also contributed to some traffic congestion during peak hours as shown in Figure 13.

Figure 13 Traffic back up during the stop of a trolley bus during PM peak hours

It is anticipated that if proper improvements can be made at the mini-roundabout location and the signal timing at the Gulf Drive and Cortez Road intersection can be further optimized, then the traffic congestion at the north side of Longboat Key can be alleviated.

Intersection of Gulf of Mexico Drive and Bay Isle Parkway

The traffic signal operation at Gulf of Mexico Drive and Bay Isle Parkway worked adequately for the majority of the time during field observations. There were only a few occasions when queues were observed at the intersection.

CONGESTION REMEDIATION STRATEGIES

A common cause of congestion at St. Armand's Circle and the intersection of Gulf Drive and Cortez Road is heavy traffic demand during peak hours of a tourist season. However, there are certain site specific reasons which also contribute to traffic congestion. Tourism is very beneficial for the economy and people of Town of Longboat Key and neighboring areas. Therefore, a better way to alleviate traffic congestion is to seek alternative routes, manage demand, add capacity and make efficient use of existing roadway facilities while addressing site specific causes for the congestion. The data collected during the field visits, along with input from Longboat Key officials and literature review were used to develop preliminary strategies for alleviating congestion. These remediation strategies were further analyzed and refined using a microscopic VISSIM traffic simulation model. The site specific recommendations are described in the subsequent subsections.

St. Armand's Circle

The field data collected at St. Armand's Circle showed that a large number of vehicles approaching from the east go north without stopping in the circle and vice-versa. The overview map of the St. Armand's Circle is shown in Figure 14. If some of this traffic demand can be moved to an alternative route to bypass the St. Armand's Circle, it would reduce the level of congestion in the St. Armand's circle. This would reduce the number of vehicles stopped by heavy pedestrian activity in the circle, lower the circle's traffic volume, and lead to safer conditions for pedestrians. Additional pavement markings and signage can be used to better guide motorists while negotiating the traffic circle. The following potential remediation strategies were identified:

- Placing signals at Madison Drive on the north leg and at Adams Drive on the east leg of St. Armand's Circle. This would provide an alternate route using North Adams Drive and Madison Drive for the by-pass traffic of the circle and reduce levels of congestion. Currently these two intersections are unsignalized. Therefore, most motorists may not be familiar with or prefer to use this bypass route, especially southbound motorists who have to make left turns at either of these two unsignalized intersections. However, placing signals at these two locations will provide a protected movement for these vehicles. Figure 15 shows the alternate route that can be used for bypassing the circle. The solid lines represent the current route

used by the vehicles. The dotted lines represent alternative routes that can be formed by placing traffic signals at these intersections. It is necessary to note that a traffic signal can only be installed when at least one of the traffic signal warrants is met and the installation is beneficial to the general public. The green lines represent routes for traffic approaching from east and going north, while the blue lines represent routes for traffic approaching from north and going east.

- Locations that require re-striping or additional striping to facilitate efficient movement of vehicles were identified near the north side of the circle. Additional pavement markings may be needed to channelize vehicles making left turns at these intersections if traffic signals are installed.

Figure 14 Bird's eye view of St. Armand's Circle (Source: Google Earth)

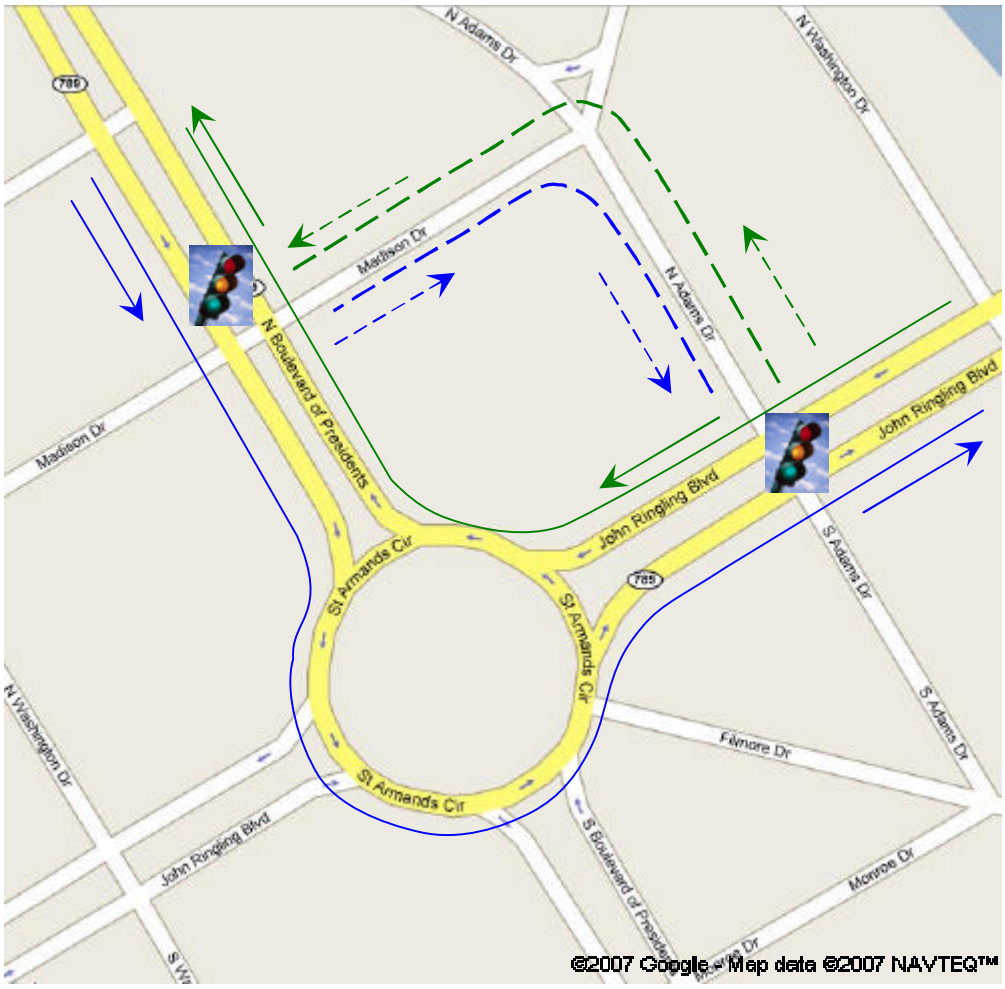


Figure 15 Alternate routes that can be used for bypassing the circle (Source: Google Maps)

The proposed strategy of signalizing the intersection at Adams Drive and John Ringling Boulevard and the intersection of Madison Drive and North Boulevard of Presidents would make these locations safer for pedestrians as they will have a protected right of way at these intersections. Also, field observations showed near miss incidents involving vehicles making left turns from Adams Drive from north onto John Ringling Boulevard. The signalization of the Adams Drive intersection will make it safer for the vehicles on minor approaches. There may be a need to remove some parking spots to increase the sight distance at the intersections if they are signalized. Further, additional signage may be required to inform and guide motorist about the alternate route.

The city of Sarasota has recently awarded a design build project for the beautification of the circle (Appendix B). These improvements are not traffic improvements and do not impact the findings of

this report. The improvement will enhance the channelization on the north side but pavement markings will still be required to guide motorists.

Intersection of Gulf Drive and Cortez Road

The United States Coast Guard responded to concerns of the officials of Longboat Key and the neighboring areas and reduced the number of times the drawbridge can be opened during an hour during the tourist season. Therefore, the recommendation for reducing the frequency of drawbridge operation was already implemented. The intersection of Bridge Street and Gulf Drive was another location causing significant delays for motorists. The mini-roundabout at this intersection was unable to handle the traffic demand with its current geometric configuration. There is a need to add capacity to the intersection, especially on the northbound approach, so that the mini-roundabout can handle the traffic demand. The following remediation strategies were identified:

- Add an additional approach lane on the south leg of the mini-roundabout of Gulf Drive and Bridge Street and extend it up to the intersection of Gulf Drive and Cortez Road where the outside lane becomes a right-turn only lane. This additional lane on Gulf Drive should begin upstream of the mini-roundabout and should be sufficient in length to allow vehicles to get into appropriate lanes. Further, signage can be added to inform motorists to choose appropriate lanes depending upon their destination as shown in Figure 16. Alternatively, the intersection can be converted into a two-way stop sign intersection by removing the mini-roundabout and installing stop signs on the approaches of Bridge Street and maintain one approach lane on each leg. A left turn bay should be provided on the approaches of Gulf Drive so that the vehicles turning left will not obstruct the through traffic.

- Additional striping or signage can be used to channelize traffic if an additional lane is added to the south leg of the mini-roundabout. Minor geometric improvements and realignment of the lanes will be required to achieve an appropriate approach to the mini-roundabout as recommended in the “Roundabout: An informational guide” published by the Federal Highway Administration.

The strategies to alleviate congestion at this location requires adding lanes to the intersection and mini-roundabout or changing the alignment of the roadway, which may necessitate acquiring additional right of way to add capacity.

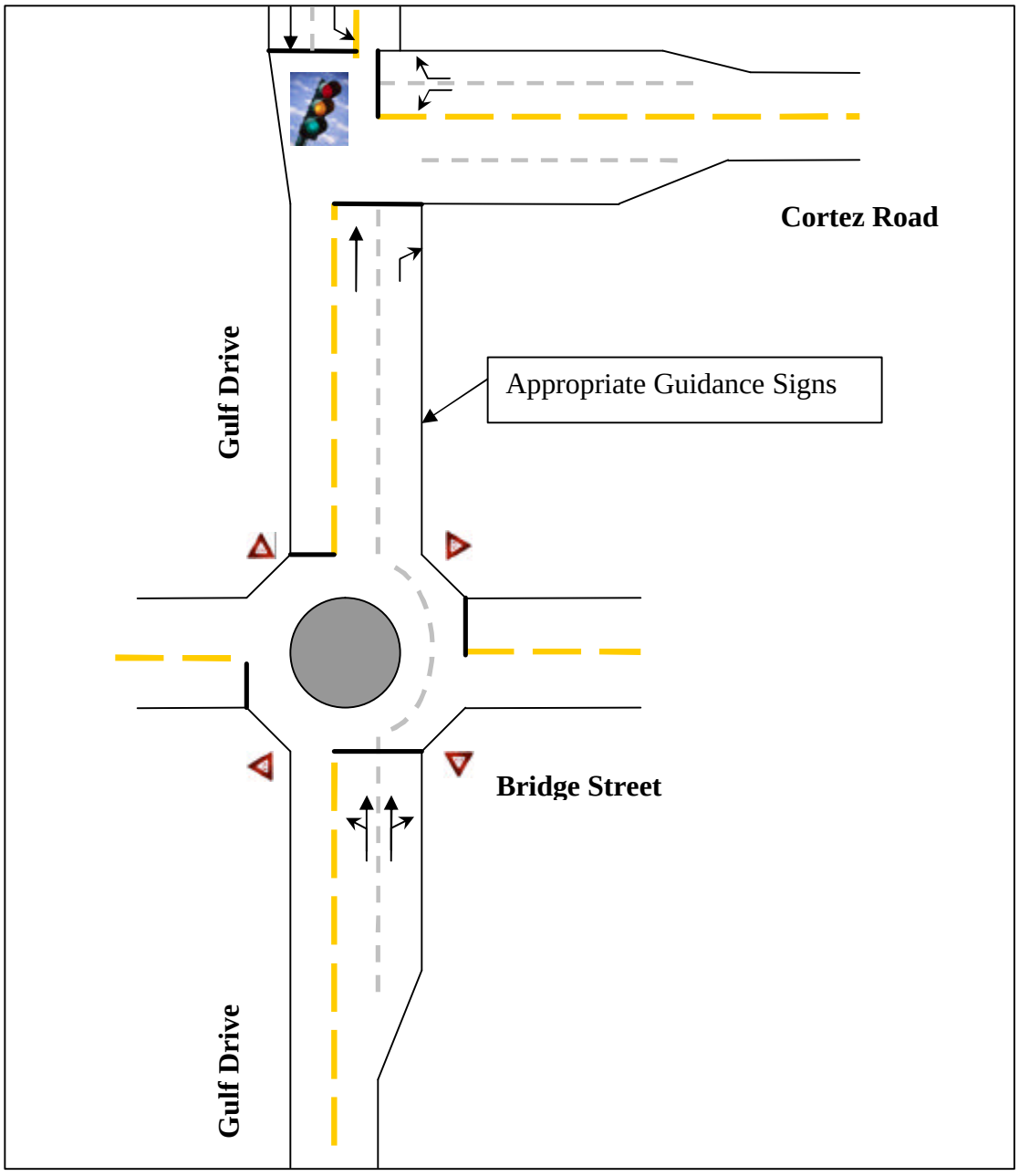


Figure 16 Schematic sketch for one of the options for alleviating congestion

Intersection of Gulf of Mexico Drive and Bay Isle Parkway

The signal timing at the intersection of Gulf of Mexico Drive and Bay Isle Parkway works well during most of the time. Fine tuning of the signal timing in the field will alleviate occasional traffic congestion at this signalized intersection.

Demand Management Strategies

This report focuses on site specific solutions to alleviate traffic congestion at St. Armand's Circle and near the intersection of Gulf Drive and Cortez Road. Travel demand strategies were also studied to offer the overall traffic demand management for further considerations. Demand Management Strategies such as water taxi and congestion pricing could also be considered as potential options to alleviate congestion. The study, "Water Taxi Feasibility Study, Final Report" was prepared by the Renaissance Planning Group and Art Anderson Associates for the Sarasota/Manatee Metropolitan Planning Organization (MPO). This study highlights the following challenges and areas of caution (5):

- A major area to consider is the current state of public transportation funding in the region. Both Manatee and Sarasota County transit systems have a history of uneven support, and rising costs against a relatively flat budget threaten the viability of current operations, particularly in Sarasota County.

- An investment in waterborne transportation may be viewed as a diversion of needed dollars from a transit system with real needs to meet the area's growing mobility problems.

- Furthermore, without relatively seamless connection to effective and available public transportation services, the water taxi initiative is likely to experience only marginal success and may evolve into a purely excursion-focused endeavor during the season or simply cease operations entirely as a public service.

The study lays down the concept for developing the water taxi systems. If the MPO pursues this option of transportation it will help alleviate congestion in the region but it will depend on the level of service provided by the water taxi service and the willingness of people to use it.

Congestion pricing with enhanced transit service can be used to alleviate congestion during peak periods. Congestion pricing, also known as value pricing, uses variable tolls during different times of the day to spread demand from peak periods to non-peak periods to make efficient use of the existing infrastructure. Enhanced transit service would provide alternatives for commuters to change modes and travel at the time of their choice, and this would reduce vehicle volume. However, the impact of congestion pricing on tourist traffic should be assessed before implementing this strategy. Another option to manage demand is to encourage employer based travel demand management strategies such as subsidies for transit passes, compressed workweeks and telecommuting. However, attractive transit service (such as express routes with small headway) with park-and-ride facilities is integral to any of these transportation demand management strategies.

ANALYSIS OF CONGESTION REMEDIATION STRATEGIES

The observations from site visits and data collected in the field were used in development of strategies to alleviate traffic congestion. Traffic simulation models provide an opportunity to compare the impact of the proposed strategies to alleviate traffic congestion with that under the existing traffic condition before implementing them. Traffic simulation software uses the field data to replicate the existing traffic conditions. These models are calibrated and validated through travel time data and queue data observed in the field. Once the model for existing traffic conditions is developed, it can be modified to simulate the congestion mitigation strategies. Microscopic simulation software VISSIM was used in this study to evaluate different proposed strategies.

St. Armand's Circle

The strategies to alleviate traffic congestion at St. Armand's Circle includes establishing an alternate route through Adams Drive and Madison Drive to bypass the traffic circle with installation of traffic signals at the intersection of Adams Drive and John Ringling Boulevard and the intersection of Madison Drive and North Boulevard of Presidents. Two traffic signal warrant studies were conducted to determine if these two sites meet signal warrants. According to Chapter 4C.01 of the Manual on Uniform Traffic Control Devices (MUTCD), standards for studies and factors for justifying traffic control signal is (6):

An engineering study of traffic conditions, pedestrian characteristics and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location. The investigation for the need of a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.
- **Warrant 3, Peak Hour.**
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- Warrant 6, Coordinated Signal System.
- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.

Warrant Analysis for peak hour traffic volume was conducted for the existing turning movement counts. Peak hour volumes at the intersections were calculated to conduct the signal warrant study. These volumes were plotted on Figure 4C-3, of the MUTCD as shown in Figure 17. According to the peak hour warrant, "The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes." Based on the turning movement volume during the peak hour, Point A and Point B in Figure 17 show the plot for the intersection of Adams Drive and John Ringling Boulevard and intersection of the Madison Drive and North Boulevard of Presidents, respectively.

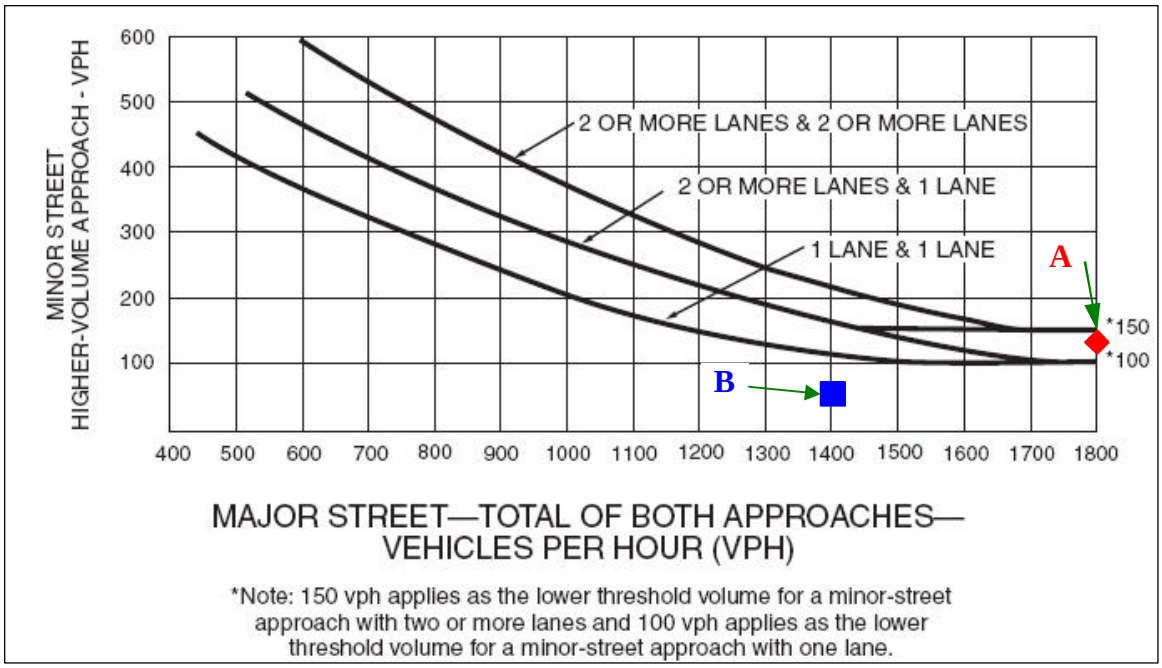


Figure 17 Traffic volumes plotted on figure 4C-3 of the MUTCD

Point A is above the corresponding line relevant to the existing number of lanes, whereas point B lies below the line corresponding to the existing number of lanes. Therefore, a traffic signal is warranted for the intersection of Adams Drive and John Ringling Boulevard, whereas it is not warranted at the intersection of Madison Drive and North Boulevard of Presidents for the existing traffic volumes. Therefore, to establish an alternate route bypassing the circle, a traffic signal can be placed at Adams Drive and John Ringling Boulevard intersection. The second traffic signal can be placed at a later date at the intersection of Madison Drive and North Boulevard of President when the left turn percentage from the north increases as more motorists use the by-pass. According to MUTCD the left turning vehicles can be treated as minor approach and the intersection of Madison Drive and North Boulevard of Presidents may meet the traffic signal warrant. As signal warrant is met only at one intersection, existing traffic conditions will be compared with different potential "options" of the proposed alternate route; the first with only one signal at Adams Drive and the second with signals at both intersections. Three options that were analyzed in this study are shown in Table 8. Option A, represents the existing traffic control; in Option B a signal is assumed to be installed at the intersection of Adams Drive and John Ringling Boulevard; and in Option C, signals

are assumed to be installed at the intersection of Adams Drive and John Ringling Boulevard as well as at the intersection of Madison Drive and North Boulevard of Presidents.

Table 8 Options analyzed for St. Armand's Circle

Parameters	Option A	Option B	Option C
Signal at Adams Drive and John Ringling Boulevard	No	Yes	Yes
Signal at Madison Drive and North Boulevard of Presidents	No	No	Yes

Further, it is difficult to predict the percentage of motorists who will use the alternate route once the traffic signals are in place. Therefore, a sensitivity analysis was conducted to estimate the impact for different percentage levels of motorist using the alternate route. Currently, 84 percent of the vehicles from the north go east and 54 percent of the vehicles from the east go north. Different "scenarios" assuming different percentage of vehicles using the proposed alternate route were evaluated for each of the options for signal placement and compared with the current traffic condition. Minor changes to roadway geometry were assumed to accommodate the changes in traffic demand. Table 9 shows the tabulation of scenarios with the geometric and volume parameters assumed for each scenario.

Table 9 Scenario analyzed for St. Armand's Circle

Parameters	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Percentage of Motorist Choosing Alternate Route	0%	30%	60%	80%
Additional right turn bay on East leg at Adams Drive Signal	No	Yes	Yes	Yes
Left lane on North leg at Madison Signal converted to left turn only	No	No	Yes	Yes

The scenarios differ mainly in the percentage of motorist choosing the alternate route. Some geometric changes were assumed with this change in the travel behavior, for example, adding a right turn lane on the east leg of the Adams Drive intersection when 30% or more motorists choose the alternate route. Similarly, the left lane on north leg of the Madison Drive Intersection was assumed to be converted to a left turn only lane when 60 percent of the motorists choose the alternate route. Some parking and bus stop location changes are required to accommodate these changes and increase the sight distance at these signals.

All combination of scenarios for diverted percentage and options for signal installation were analyzed but only those combinations that are practically feasible are presented in this report. Some of the combinations were ignored as vehicles will not continue to take a certain route with excessively delay when the other route has a much lower travel time. The four combinations of scenarios and options that are presented in the report are

- **Option A – Scenario 1**: This combination represents the existing traffic, geometric and traffic control conditions of the field.

- **Option B – Scenario 2**: Assumes 30 percent diversion of the traffic to the alternate route for the traffic from north going east and vice-versa. It also assumes a traffic signal at intersection of Adams Drive and John Ringling Boulevard.

- **Option C – Scenario 2**: Assumes 30 percent diversion of the traffic to the alternate route for the traffic from north going east and vice-versa. It also assumes signals at intersection of Adams Drive and John Ringling Boulevard and at the intersection of Madison Drive and North Boulevard of Presidents

- **Option C – Scenario 3***: Assumes 60 percent diversion of the traffic to the alternate route for the traffic from north headed east and vice-versa. It also assumes signals at intersection of Adams Drive and John Ringling Boulevard and at the intersection of Madison Drive and North Boulevard of Presidents. It is reasonable to assume that the intersection of Adams Drive and Madison Drive will be converted to a two-way stop sign controlled intersection with priority for the by-pass traffic due to heavy pass traffic volume.

Signal timing for all viable scenarios and options where a signal was assumed are shown in Appendix C. The microscopic simulation model takes the stochastic nature of the traffic demand in account; therefore, ten simulation runs were conducted with different random seed to simulate the variability of the traffic demand on a daily basis. Also, the model was simulated with the resolution of one-tenth-of-a-second and the simulation was done on a vehicle by vehicle basis. Travel time, total delay, stop delay, stops queue length and travel speed, averaged for the ten simulation runs, were used to measure the performance of the simulation network to compare the different options and scenarios. Analysis was conducted for the traffic observed between 3:30 PM and 5:00 PM.

Network Performance

The performance of the entire network was used to determine the impact of the strategies on the overall performance of the network. Table 10 shows the performance of the network for the four combinations of options and scenarios.

Table 10 Network performance for the proposed options at St. Armand's Circle

Performance Measure	Option A Scenario 1 (Existing)	Option B Scenario 2	Option C Scenario 2	Option C Scenario 3*
Total travel time [hr]	165.9	141.1	144.6	137.7
Average speed [mph]	10.9	12.6	12.3	12.7
Total delay time [hr]	67.0	44.2	48.3	42.5
Avg. delay time per vehicle [sec]	69.1	45.8	50.0	44.1
Total stopped delay [hr]	25.1	19.6	24.5	23.2
Avg. stopped delay per vehicle [sec]	25.9	20.3	25.4	24.1
Number of Stops	12,001.8	8,763.6	8,472.1	6226.9
Avg. number of stops per vehicles	3.4	2.5	2.4	1.8

The table shows that the performance of the network improved in all cases when compared with Option A – Scenario 1, which represents existing traffic condition. Delays and travel time reduced while the average network speed increased. Therefore, diverting 30 percent of traffic to the alternate route improves the overall network performance.

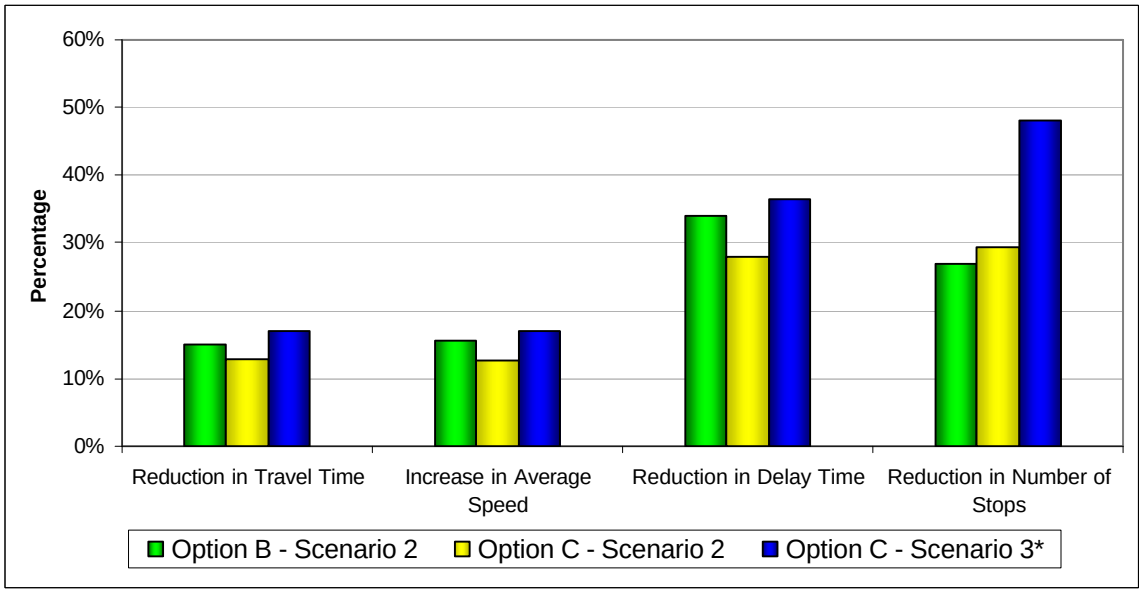


Figure 18 Reduction in travel time and delay at St. Armand's Circle

Figure 18 shows the improvement in travel time, delay and speed of the network when compared to the existing traffic condition. The average speed increased by more than ten percent in all the cases. Approximately 30 percent reduction in delay was achieved in all the alternatives when compared to existing traffic conditions. It can be concluded from the overall network performance that 30 to 60 percent diversion of the traffic to the alternative route will mitigate significant amount of congestion at St Armand Circle and for the entire network.

Average Delay

The average delay, average stop delays and average stops per vehicle were compared for all the vehicles entering St. Armand's Circle for different options. Figure 19 shows reduction in average delay achieved for all the cases when compared the existing traffic conditions at St. Armand's Circle.

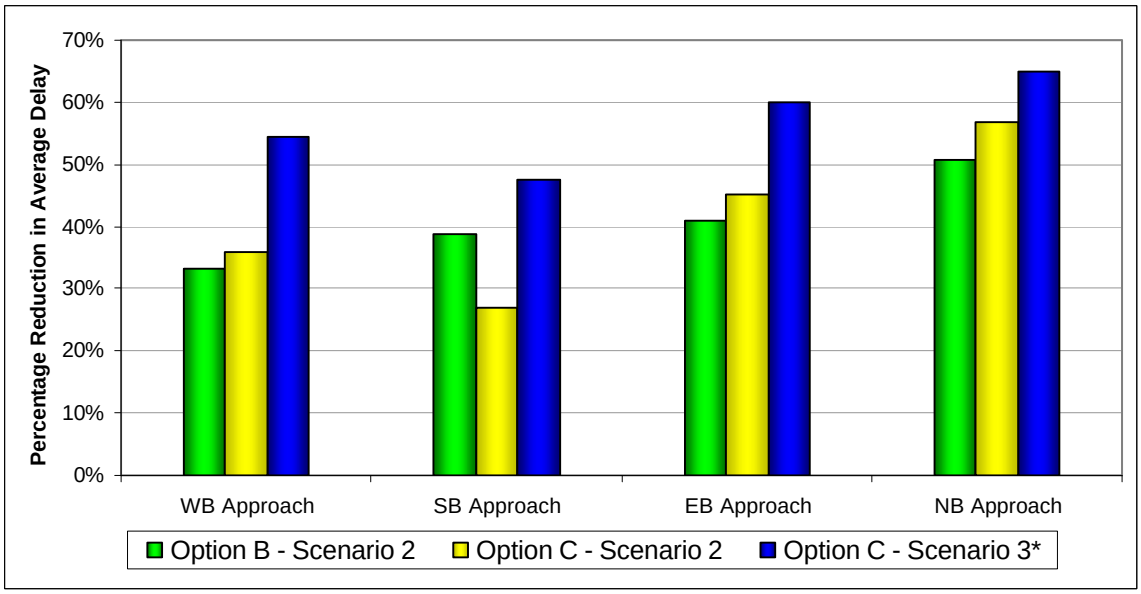


Figure 19 Reduction in delay at St. Armand's Circle

The figure shows a significant reduction in delay per vehicle on all approaches of the St. Armand's Circle. More than 30 percent reduction in average delay is achieved on all approaches in most of the cases. The delay at the intersection of Adams Drive and John Ringling Boulevard and the intersection of Madison Drive and North Boulevard of Presidents is shown in Table 11.

Table 11 Average delay in secs/vehicle at the intersection of Adams Drive and John Ringling Boulevard and the intersection of Madison Drive and North Boulevard of Presidents

Location	Approach	Option A Scenario 1 (Existing)	Option B Scenario 2	Option C Scenario 2	Option C Scenario 3*
Intersection of Adams Drive and John Ringling Boulevard	WB Approach	12.8	14.2	13.8	14.7
	SB Approach	79.8	32.2	42.3	29.6
	EB Approach	3.0	15.1	13.9	15.6
	NB Approach	11.9	8.1	8.1	6.9
Intersection of Madison Drive and North Boulevard of Presidents	WB Approach	14.5	16.1	14.8	8.3
	SB Approach	43.7	15.3	19.4	22.3
	EB Approach	28.2	30.3	15.9	15.7
	NB Approach	3.3	3.6	15.3	39.2

As shown in the table, there is no significant impact on the major directions of travel (East-West) at Adams Drive intersection, while reduction is observed on the southbound approach. At the intersection of Madison Drive there is no significant change in delay on westbound and eastbound approaches. However, there is a significant increase in the delay for the northbound direction, but at the same time there is a reduction in delay for the southbound direction. Therefore, the two intersections were able to handle the increase in traffic demand from the minor approaches without significant increase in delay.

Average Queue Lengths

Figure 20 shows the reduction in average queue lengths at the approaches of the St. Armand's Circle. There was 30 percent or more reduction in queue length in the cases of proposed improvements when compared to that under existing traffic condition.

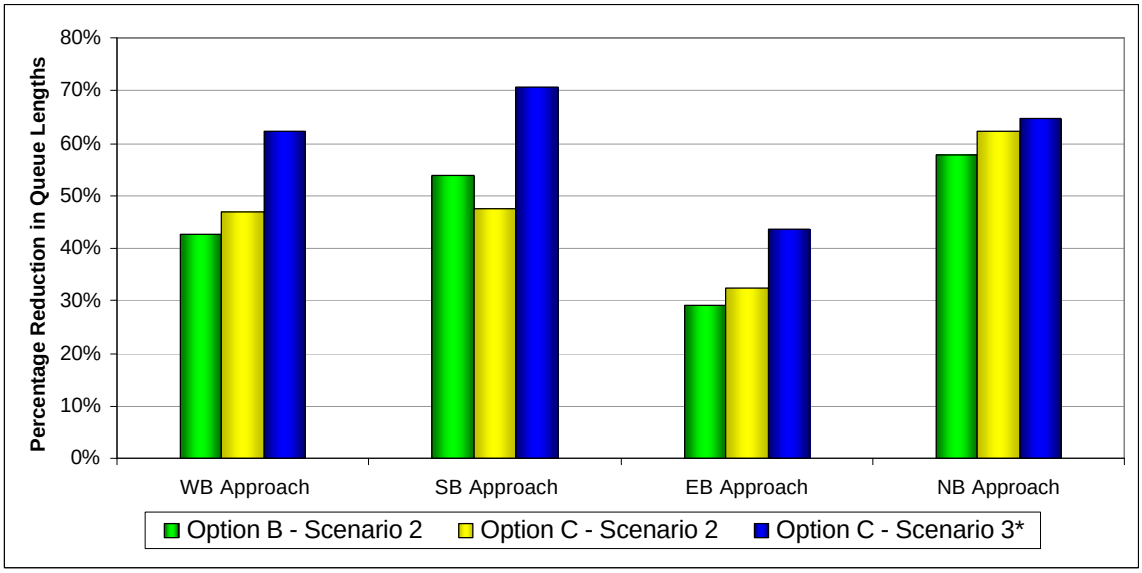


Figure 20 Reduction in average queue lengths (feet) at St. Armand's Circle

Travel Time Analysis

Travel time analysis was conducted for vehicles approaching from east and going north and vice-versa. This analysis was conducted to measure the reduction in delays at St. Armand's Circle for motorist traveling between the island and the mainland. Table 12 shows the travel time per vehicle and the percentage of reduction for the alternatives for vehicle entering the St. Armand's Circle area. The table shows significant reduction in travel time at St. Armand's Circle, especially for vehicles

approaching from north. The overall travel time reduction in the studied network was about 17 percent.

Table 12 Travel time and the percentage of reduction for the alternatives on the network

Direction of Travel	Option A Scenario 1 (Existing)	Option B Scenario 2		Option C Scenario 2		Option C Scenario 3*	
Approaching from East going North	120 secs	107 secs	11 %	112 secs	7 %	107 secs	11 %
Approaching from North going East	195 secs	152 secs	22 %	161 secs	17 %	148 secs	24 %

Summary of analysis of strategies at St. Armand's Circle

The analysis of St. Armand's Circle with different options and scenarios show that improvements at St. Armand's Circle can be achieved by diverting a portion of the traffic to the proposed alternate route. The traffic congestion has been alleviated by placing traffic signals at the intersection of Adams Drive and John Ringling Boulevard and diverting 30 percent of the traffic to the bypass route. This strategy has been further verified by diverting even 60 percent of traffic to alternate route with traffic signals at the intersection of Adams Drive and John Ringling Boulevard and the intersection of Madison Drive and North Boulevard of Presidents, and by converting the intersection of Adams Drive and Madison Drive into a two-way stop sign controlled intersection. In addition, adequate pavement markings should be placed at north side of the circle to guide motorists in appropriate lanes

Intersection of Gulf Drive and Cortez Road

The major cause of traffic congestion near the intersection of Gulf Drive and Cortez Road was the capacity constraints of the mini-roundabout at the intersection of Gulf Drive and Bridge Street which is 1,200 feet south of the Cortez Road intersection. The drawbridge on Cortez Road also has an impact on the operation of the intersection. However, the revised schedule for the operation of the drawbridge has reduced its impact on the Cortez Road intersection. The strategy to mitigate congestion in this region is to increase the capacity of the Bridge Street intersection, especially for the traffic on the south leg of the intersection.

The existing traffic conditions were simulated and calibrated in VISSIM traffic simulation software using queue length observations and travel time data. Analysis was conducted for the traffic observed between 3:30 PM and 6:00 PM. These existing conditions were compared to with two "options" identified to increase the capacity of the Bridge Street intersection. The first options, involves adding a lane on the south leg of the intersection of Gulf Drive and Bridge Street and extending it up to the intersection of Gulf Drive and Cortez Road where the outside lane becomes right-turn only lane. The additional lane starts 300 feet upstream of the Bridge Street intersection. This additional lane will add capacity to the northbound approach of the intersection. In the second option, the intersection is operated as a two-way stop sign controlled intersection with stop signs placed on the approaches of Bridge Street. A 200 feet left turn bay is provided on the north leg of the intersection so that vehicles turning left will not obstruct the through traffic. This change in intersection control will give priority to the traffic on the Gulf Drive going through which constitutes the majority of the traffic at this intersection. The delay for the southbound traffic turning left would increase and the delay for the northbound through traffic will decrease. The overall intersection delay will decrease as the majority of the traffic will have priority with the two-way stop control. The major difference between existing traffic conditions (Option 1) and the two other options for alleviating congestion are shown in Table 13.

Table 13 Roadway geometry for the proposed options near the intersection of Gulf Drive and Cortez Road

Parameters	Option 1 (Existing)	Option 2	Option 3
Type of Traffic Control at Bridge St.	Roundabout	Roundabout	Two-way Stop
Number of Lanes on NB approach at Bridge St.	One	Two	One
Left turn bay for traffic on NB and SB approaches at Bridge St.	No	No	Yes

The signal timing used for the traffic signal at the intersection of Gulf Drive and Cortez Road is shown in Appendix D. This signal timing remains the same for all the options. However, if the alternative options are implemented some fine tuning of the signal timing may be need as the

demand at the Cortez Road intersection will change due to additional capacity at Bridge Street intersection.

Network Performance

Table 14 shows the performance of the network for the three options evaluated using the simulation model. Option 2 and Option 3 showed significant reduction in the network travel time, speed, delay and other performance measures. Also, the performance of Option 2 and Option 3 was very similar.

Table 14 Network performance for the proposed options near the intersection of Gulf Drive and Cortez Road

Performance Measure	Option 1 (Existing)	Option 2	Option 3
Total travel time [hr]	633.3	470.8	462.5
Average speed [mph]	17.3	23.1	23.5
Total delay time [hr]	255.2	94.0	88.9
Average delay time per vehicle [sec]	156.2	58.3	55.2
Total stopped delay [hr]	54.7	52.6	53.0
Average stopped delay per vehicle [sec]	33.5	32.6	32.9
Number of Stops	9,220.9	3,885.4	4,095.0
Average number of stops per vehicles	1.6	0.7	0.7

Figure 21 shows the reduction in travel time, speed, delay time and number stops for Option 2 and Option 3 when compared to existing traffic conditions (Option 1) based on the results from traffic simulation. For Options 2 and 3, the average travel time was reduced at least 26 percent, and the average network speed increased nearly 35 percent. On average, a 60 percent reduction in delay was observed for every vehicle. These significant improvements further underscore the impact of capacity constraints on the mini-roundabout for traffic congestion.

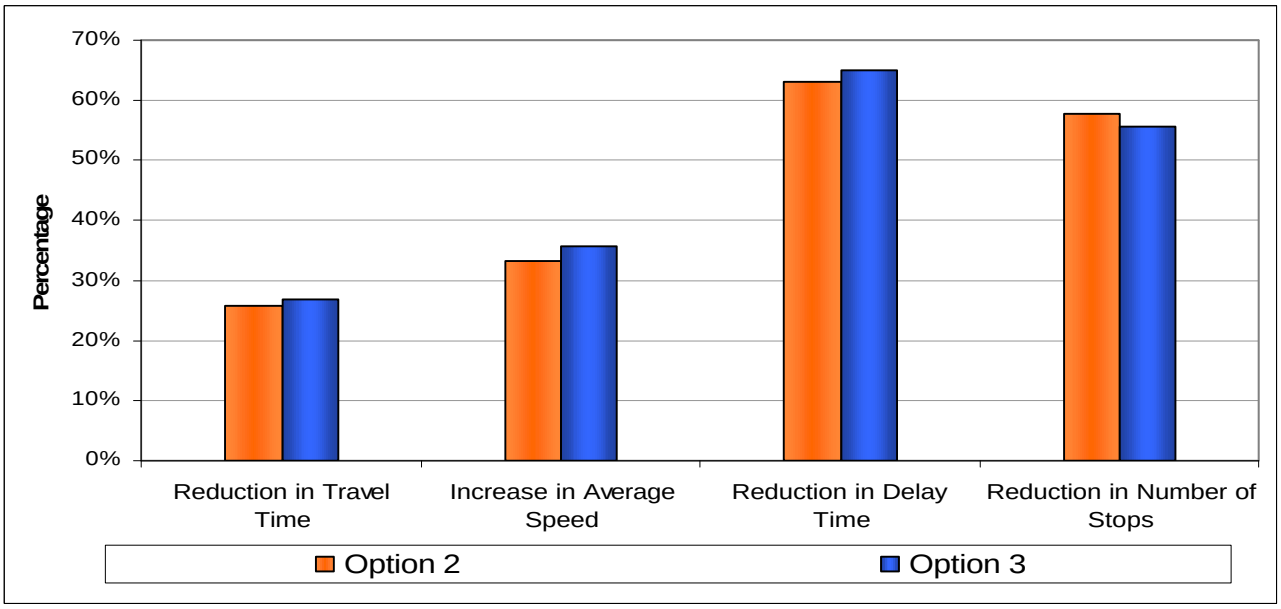


Figure 21 Reduction in travel time and delay near the intersection of Gulf Drive and Cortez Road

Average Delay

The performance of each portion of the network was measured by comparing approach delays at each intersection for every option. Figure 22 shows reduction in approach delay per vehicle at the Gulf Drive and Bridge Street mini-roundabout for the proposed alternatives. The northbound traffic at mini-roundabout showed a reduction of about 250 seconds per vehicle, which is more than 4 minutes per vehicle. The westbound traffic also showed modest reductions in delays in both alternatives while the delays on southbound approach remained unchanged. The east bound approach with very light traffic showed an increased in delay in Option 3.

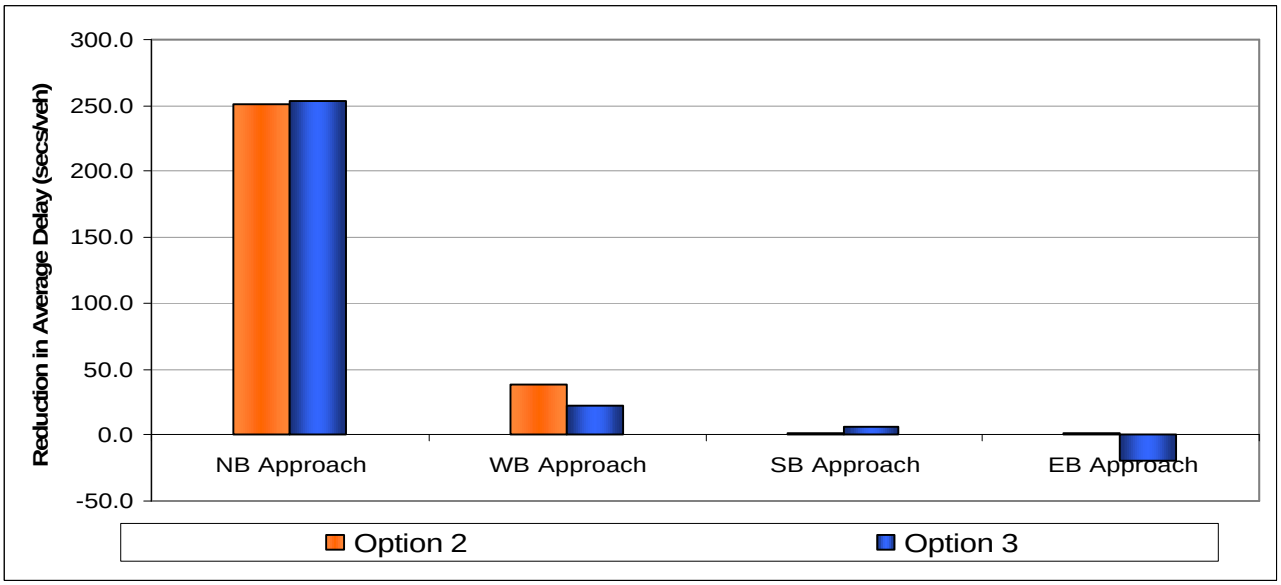


Figure 22 Reduction in delay at the mini-roundabout

The average delay per vehicle at the approaches of the Cortez Road intersection and at the drawbridge signal is shown in Table 15. The average delay for this intersection showed very little variation and the delay encountered by the vehicles at Cortez Road is not high considering the fact that the drawbridge operation also impacts the operation of the intersection.

Table 15 Average delay in secs/vehicle at the approaches of the Gulf Drive and Cortez Road intersection and at the drawbridge

Location	Approach	Option 1 (Existing)	Option 2	Option 3
Intersection of Cortez Road and Gulf Drive	NB Approach	16.5	20.5	19.2
	WB Approach	23.3	23.1	22.7
	SB Approach	19.0	21.4	19.8
Signal at Drawbridge	EB Approach	34.9	37.2	37.9
	WB Approach	30.4	30.4	30.4

Average Queue Lengths

Consistent with the findings of approach delay, the queue length for the northbound approach at the intersection of Bridge Street reduced significantly for alternatives when compared with the existing condition as shown in Table 16.

Table 16 Average queue lengths (feet) at the approaches of the proposed options near intersection of Gulf Drive and Cortez Road

Location	Approach	Option 1 (Existing)	Option 2	Option 3
Mini-roundabout of Bridge St. and Gulf Drive	NB Approach	2686.0	3.2	5.0
	WB Approach	17.4	2.0	4.1
	SB Approach	4.3	1.7	0.2
	EB Approach	0.8	0.7	1.4
Intersection of Cortez Road and Gulf Drive	NB Approach	16.5	20.5	19.2
	WB Approach	23.3	23.1	22.7
	SB Approach	19.0	21.4	19.8
Signal at Drawbridge	EB Approach	34.9	37.2	37.9
	WB Approach	30.4	30.4	30.4

The average queue at the Cortez Road intersection and the drawbridge did not change significantly for any of the alternatives. Some fine tuning of the signal timing at the Cortez Road might be required in the field to make the intersection more efficient.

Summary of analysis of strategies at intersection of Gulf Dr. and Cortez Rd.

The analysis of the proposed two alternatives and their comparisons with existing traffic conditions shows that significant improvements in traffic conditions were achieved by adding capacity to the Gulf Drive and Bridge Street intersection in the northbound direction and extending it to the Gulf Drive and Bridge Street intersection. Both alternatives seem to be equally effective in reducing congestion in the area. However, to implement these strategies some right-of-way may have to be acquired especially when adding a lane in Option 2. Pavement markings and signage may be required to channelize the traffic when an additional lane is added to the mini-roundabout in Option 2.

CONCLUSIONS AND RECOMMENDATIONS

The recommended strategies for alleviating traffic congestion for the barrier islands were developed through field observations, literature view, comprehensive data collection, and detailed traffic simulation analysis. The major findings and recommendations of this study are stated as follows:

1. The areas with significant traffic congestion for studied barrier islands were identified as St. Armand's Circle in the south and the area near the intersection of Gulf Drive and Cortez Road in the north. The traffic congestion at these two locations significantly affects the quality of travel for residents and tourists between the barrier islands and mainland.

2. Based on closely field observations and data analysis, the major causes of traffic congestion at the St. Armand's Circle were: (1) Heavy traffic volume during peak hours and tourist seasons, (2) Heavy pedestrian and parking activities at St. Armand's Circle, (3) Inexperienced motorists driving around a traffic circle or traffic roundabout, and (4) Lack of clear striping and signage at some locations in St. Armand's Circle. The major causes of traffic congestion for the area near the intersection of Gulf Drive and Cortez Road were: (1) Heavy traffic volume during peak hours and tourist seasons, (2) Impact from the operations of Cortez Drawbridge, and (3) Inadequate capacity at the mini-roundabout on Gulf Drive at Bridge Street.

3. The major recommended strategy to alleviate traffic congestion at St. Armand's Circle is to use North Adams Drive and Madison Drive as an alternate route to encourage some traffic to bypass St. Armand's Circle. A traffic signal installation at the intersection of Adams Drive and John Ringling Boulevard, which is currently warranted, is required to ensure the effectiveness of the proposed alternate route. The installation of a traffic signal at the Madison Drive and North Boulevard of Presidents intersection is recommended once it is warranted. The diversion of 30% to 40% of total traffic through the St. Armand Circle without businesses to the proposed alternate route will likely to result in the best overall network performance. However, commercial vehicles and trucks should be discouraged to use the proposed route.

4. Based on the results from traffic simulations among three potential alternatives of using the proposed alternate route to bypass St. Armand's Circle, the average delay per vehicle was reduced by more than 30 percent and reduction of overall travel time in the studied network was about 17 percent. The overall reduction of travel time from John Ringling Boulevard (east side) to North Boulevard of Presidents (north side) of the St. Armand's Circle was about 10 percent. The overall reduction of travel time from the north side to east side of the St. Armand's Circle was about 21 percent. This proposed strategy not only significantly reduces the average delay and travel time for an individual motorist but it also improves safety for both pedestrians and motorists.

5. Two major recommended strategies from this study to alleviate traffic congestion in the area near the Gulf Drive and Cortez Road intersection are to (1) increase the northbound capacity of the mini-roundabout on the Gulf Drive at Bridge Street, and (2) reduce the frequency of Cortez Drawbridge opening during peak hours of a tourist season. Since the United States Coast Guard has already revised the schedule for operation of the drawbridge and reduced the frequency of its operation during the tourist season, the second recommended strategy has been implemented. The first recommended strategy can be carried out by two potential alternatives.

    - **Alternative 1**: Add an additional lane on the south leg of the Gulf Drive and Bridge Street mini-roundabout, and extend it up to the intersection of Gulf Drive and Cortez Road where the outside lane becomes a right-turn only lane. The additional lane starts 300 feet upstream of the mini-roundabout. This additional lane will add significant capacity to the northbound approach of the mini-roundabout. The proposed Alternative 1 is able to preserve the mini-roundabout setting but may require some right-of-way acquisition and/or roadway realignment.

    - **Alternative 2**: Remove the existing mini-roundabout at the Gulf Drive and Bridge Street intersection, and operate it as a two-way stop sign controlled intersection with stop signs placed on the approaches of Bridge Street. A 150 to 200 left turn bay should be provided on the north leg of the intersection so that vehicles turning left

will not obstruct the through traffic. Traffic signal is not warranted at this location under the current traffic conditions.

6. This study indicates that both proposed alternatives for the area near the Gulf Drive and Cortez Road intersection can reduce overall travel time by at least 26 percent, average vehicle delay by at least 60%, which is a significant reduction of traffic congestion in this area. The travel time for northbound traffic on Gulf Drive can be reduced more than four minutes per vehicle during PM peak hours of a tourist season. Most of the northbound queue at the mini-roundabout can be eliminated.

7. Other congestion management strategies including advanced traffic signal control, transportation demand management, congestion pricing, water taxi services, and effective utilization of transit buses could be considered in the future to further improve the travel quality for residents and tourists of the barrier islands.

REFERENCES

1. "Traffic Patterns between Longboat Key and the Mainland", 1992, prepared by Tampa Bay Engineering, Inc., prepared for Town of Longboat Key.

2. Russell, B., "St Armands Traffic a Problem for Tourists, Residents", January 20, 2005, Longboat Key News, pg 3.

3. Bartles, M., et al, "S.R. 789 Corridor Study",June 1994 , prepared by SR 789 Task Force prepared for Manatee County Board of County Commission.

4. Robinson, B.W., et al, "Roundabouts: An informational Guide", June 2000, prepared for Federal Highway Administration, pg 145.

5. "Water Taxi Feasibility Study: Final Report", April 2005, prepared by Renaissance Planning Group and Art Anderson Associates, prepared for Sarasota and Manatee Metropolitan Planning Organization, pg 1.

6. Manual on Uniform Traffic Control Devices, 2003 Edition, published by Federal Highway Administration, Chapter 4, pg 4B-1 to 4C9

APPENDIX A

Notice of Revised Operation Schedule for Drawbridges

U.S. Department of Homeland Security

United States Coast Guard

Commander
Seventh Coast Guard District

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Miami, Florida 33131
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Phone: (305) 415-6744
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Email: Michael.b.lieberum@uscg.mil

16591/2252/2919

January 23, 2007

Public Notice (02-07)

The Coast Guard is changing the operating regulations governing the Cortez (SR 684) Bridge and the Anna Maria (SR 64) (Manatee Avenue West) Bridge across the Gulf Intracoastal Waterway, miles 87.4 and 89.2 in Anna Maria, Manatee County, Florida. This rule will require the drawbridges to open on signal, except during daytime hours when the bridge will be on a 30-minute schedule during the winter months and a 20-minute schedule for all other months.

DEPARTMENT OF HOMELAND SECURITY

Coast Guard

33 CFR Part 117

[CGD07-05-097]
RIN 1625-AA09

Drawbridge Operation Regulation; Gulf Intracoastal Waterway, Anna Maria, FL

AGENCY: Coast Guard, DHS.

ACTION: Final rule.

SUMMARY: The Coast Guard is changing the operating regulations governing the Cortez (SR 684) Bridge and the Anna Maria (SR 64) (Manatee Avenue West) Bridge across the Gulf Intracoastal Waterway, miles 87.4 and 89.2 in Anna Maria, Manatee County, Florida. This rule will require the drawbridges to open on signal, except during daytime hours when the bridge will be on a 30-minute schedule during the winter months and a 20-minute schedule for all other months.

DATES: This rule is effective February 21, 2007.

ADDRESSES: Comments and material received from the public, as well as documents indicated in this preamble as being available in the docket, are part of dockets (CGD07-05-097) and (Public Meeting CGD07-06-012) and are available for inspection or copying at Commander (dpb), Seventh Coast Guard District, 909 SE. 1st Avenue, Room 432, Miami, Florida 33131-3050 between 8 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Michael Lieberum, Seventh Coast Guard District, Bridge Branch, telephone number 305-415-6744.

SUPPLEMENTARY INFORMATION:

Regulatory Information

On August 16, 2005, we published a notice of proposed rulemaking (NPRM) entitled ``Drawbridge Operation Regulations; Gulf Intracoastal Waterway, Anna Maria, FL'' in the Federal Register (70 FR 48091). We received 28 comments on the proposed rule. On January 31, 2006, we published an announcement of a public meeting entitled ``Announcement of Public Meeting Regarding the Proposed Drawbridge Schedule Change for the Anna Maria and Cortez Drawbridge, Anna Maria, FL,'' in the Federal Register (71 FR 5033). The public meeting was held on March 29, 2006 at Holmes Beach City Hall, 5801 Marina Drive, Holmes Beach, Florida.

On November 8, 2006, as a result of the previous comments received, we published a supplemental notice of proposed rulemaking (SNPRM) entitled ``Drawbridge Operation Regulations; Gulf Intracoastal Waterway, Anna Maria, FL'' in the Federal Register (71 FR 65443). We received two comments on this proposed rule; one in favor of the proposed schedule and one against the new schedule.

Background and Purpose

The existing regulations of the Cortez (SR 684) Bridge, mile 87.4, and Anna Maria (SR 64) Bridge, mile 89.2 at Anna Maria, published in 33 CFR 117.287(d)(1) and (2) require the draw to open on signal, except that from 7

a.m. to 6 p.m., the draw need open only on the hour, twenty minutes past the hour and forty minutes past the hour if vessels are present.

On June 1, 2005, the City officials of Holmes Beach in cooperation with the cities of Anna Maria and Bradenton Beach and the Town of Longboat Key requested that the Coast Guard review the existing regulations governing the operation of the Cortez and Anna Maria (Manatee Avenue West) bridges. The review was requested by city officials because they believed the current drawbridge regulations were not meeting the needs of vehicle traffic.

This rule is necessary to assist the local community in determining additional corrective action that may be needed to alleviate the severe vehicle traffic congestion on Anna Maria Island during the winter season.

Discussion of Comments and Changes

The Coast Guard received 45 responses to the initial Notice of Proposed Rulemaking and at the Public Meeting convened on March 29, 2006. The responses were supplied by 30 written comments and 15 oral comments and several persons provided more than one comment per letter or verbally. These responses consisted of 11 form letters in favor of the proposal, six additional comments also in favor of the proposal, seven comments against the morning and afternoon curfew hours, six comments against the nighttime closures, two comments requesting staggered hours between the two bridges rather than both opening on the same schedule, six comments requesting changes in the winter season only and nine comments against the proposed 30-minute schedules. Two comments suggested that there should be no regulations on these bridges and that the bridges should open on demand.

Additionally, the Coast Guard received two responses to the supplemental notice of proposed rulemaking (SNPRM). One response was in favor of both drawbridges being placed on the same 30 minute schedule and one comment was against placing both drawbridges on the same 30 minute schedule.

The Coast Guard thoroughly examined and considered all the comments and made adjustments to the final rule. These bridges will remain on the 20-minute opening schedule from 6 a.m. to 7 p.m. during the day and both will operate on the 30-minute schedule from 6 a.m. to 7 p.m. during the winter season from January 15 through May 15.

The Coast Guard considered placing these bridges on a staggered schedule. However, this schedule would be impracticable as only a limited number of vessels traveling at a high rate of speed would be able to make the next scheduled bridge opening.

Regulatory Evaluation

This rule is not a ``significant regulatory action'' under section 3(f) of Executive Order 12866, Regulatory Planning and Review, and does not require an assessment of potential costs and benefits under section 6(a)(3) of that Order. The Office of Management and Budget has not reviewed it under that Order.

Small Entities

Under the Regulatory Flexibility Act (5 U.S.C. 601-612), we have considered whether this rule would have a significant economic impact on a substantial number of small entities. The term ``small entities'' comprises small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

The Coast Guard certifies under 5 U.S.C. 605(b) that this rule will not have a significant economic impact on a substantial number of small entities. This proposed rule would affect the following entities, some of which may be small entities: The owners or operators of vessels needed to transit the Intracoastal Waterway in the vicinity of the Cortez and Anna Maria bridges, persons intending to drive over the bridges, and nearby business owners. The revision to the openings schedule would not have a significant impact on a substantial number of small entities. Vehicle traffic and small business owners in the area might benefit from the improved traffic flow that regularly scheduled openings will offer this area. Although bridge openings will be less frequent, vessel traffic will still be able to transit the Intracoastal Waterway in the vicinity of the Cortez and Anna Maria bridges pursuant to the revised opening schedule.

Assistance for Small Entities

Under section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104-121), we offered to assist small entities in understanding the rule so that they could better evaluate its effects on them and participate in the rulemaking process.

Small businesses may send comments on the actions of Federal employees who enforce, or otherwise determine compliance with, Federal regulations to the Small Business and Agriculture Regulatory Enforcement Ombudsman and the Regional Small Business Regulatory Fairness Boards. The Ombudsman evaluates these actions annually and rates each agency's responsiveness to small business. If you wish to comment on actions by employees of the Coast Guard, call 1-888-REG-FAIR (1-888-734-3247). The Coast Guard will not retaliate against small entities that question or complain about the rule or any policy or action of the Coast Guard.

Collection of Information

This rule calls for no new collection of information under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501-3520).

Federalism

A rule has implications for federalism under Executive Order 13132, Federalism, if it has a substantial direct effect on State or local governments and would either preempt State law or impose a substantial direct cost of compliance on them. We have analyzed this rule under that Order and have determined that it does not have implications for federalism.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531-1538) requires Federal agencies to assess the effects of their discretionary regulatory actions. In particular, the Act addresses actions that may result in the expenditure by a State, local, or tribal government, in the aggregate, or by the private sector of $100,000,000 or more in any one year. Though this rule will not result in such an expenditure, we do discuss the effects of this rule elsewhere in this preamble.

Taking of Private Property

This rule will not effect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

Civil Justice Reform

This rule meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

Protection of Children

We have analyzed this rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This rule is not an economically significant rule and would not create an environmental risk to health or risk to safety that might disproportionately affect children.

Indian Tribal Governments

This rule does not have tribal implications under Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, because it does not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

Energy Effects

We have analyzed this rule under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. We have determined that it is not a ``significant energy action'' under that order because it is not a ``significant regulatory action'' under Executive Order 12866 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The Administrator of the Office of Information and Regulatory Affairs has not designated it as a significant energy action. Therefore, it does not require a Statement of Energy Effects under Executive Order 13211.

Technical Standards

The National Technology Transfer and Advancement Act (NTTAA) (15 U.S.C. 272 note) directs agencies to use voluntary consensus standards in their regulatory activities unless the agency provides Congress, through the Office of Management and Budget, with an explanation of why using these standards would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., specifications of materials, performance, design, or operation; test methods; sampling procedures; and related management systems practices) that are developed or adopted by voluntary consensus standards bodies.

This rule does not use technical standards. Therefore, we did not consider the use of voluntary consensus standards.

Environment

We have analyzed this rule under Commandant Instruction M16475.lD, and Department of Homeland Security Management Directive 5100.1, which guides the Coast Guard in complying with the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321-4370f), and have concluded that there are no factors in this case that would limit the use of a categorical exclusion under section 2.B.2 of the Instruction. Therefore, this rule is categorically excluded, under figure 2-1, paragraph (32)(e) of the Instruction, from further environmental documentation. Under figure 2-1, paragraph (32)(e--, of the Instruction, an ``Environmental Analysis Check List'' and a ``Categorical Exclusion Determination'' are not required for this rule.

List of Subjects in 33 CFR Part 117

Bridges.

For the reasons discussed in the preamble, the Coast Guard amends 33 CFR part 117 as follows:

PART 117--DRAWBRIDGE OPERATION REGULATIONS

1. The authority citation for part 117 continues to read as follows:

Authority: 33 U.S.C. 499; Department of Homeland Security Delegation No. 0170.1; 33 CFR 1.05-1(g); section 117.255 also issued under the authority of Pub. L. 102-587, 106 Stat. 5039.

2. Revise Sec. 117.287(d)(1) and (2) to read as follows:

Sec. 117.287 Gulf Intracoastal Waterway.

* * * * *

(d)(1) Cortez (SR 684) Bridge, mile 87.4. The draw shall open on signal, except that from 6 a.m. to 7 p.m., the draw need only open on the hour, 20 minutes after the hour, and 40 minutes after the hour. From January 15 to May 15, from 6 a.m. to 7 p.m., the draw need only open on the hour and half hour.

(2) Anna Maria (SR 64) (Manatee Avenue West) Bridge, mile 89.2. The draw shall open on signal, except that from 6 a.m. to 7 p.m., the draw need only open on the hour, 20 minutes after the hour, and 40 minutes after the hour. From January 15 to May 15, from 6 a.m. to 7 p.m., the draw need only open on the hour and half hour.

* * * * *

Dated: January 5, 2007.

D.W. Kunkel,

Rear Admiral, U.S. Coast Guard, Commander, Seventh Coast Guard District.

[FR Doc. E7-832 Filed 1-19-07; 8:45 am]

BILLING CODE 4910-15-P

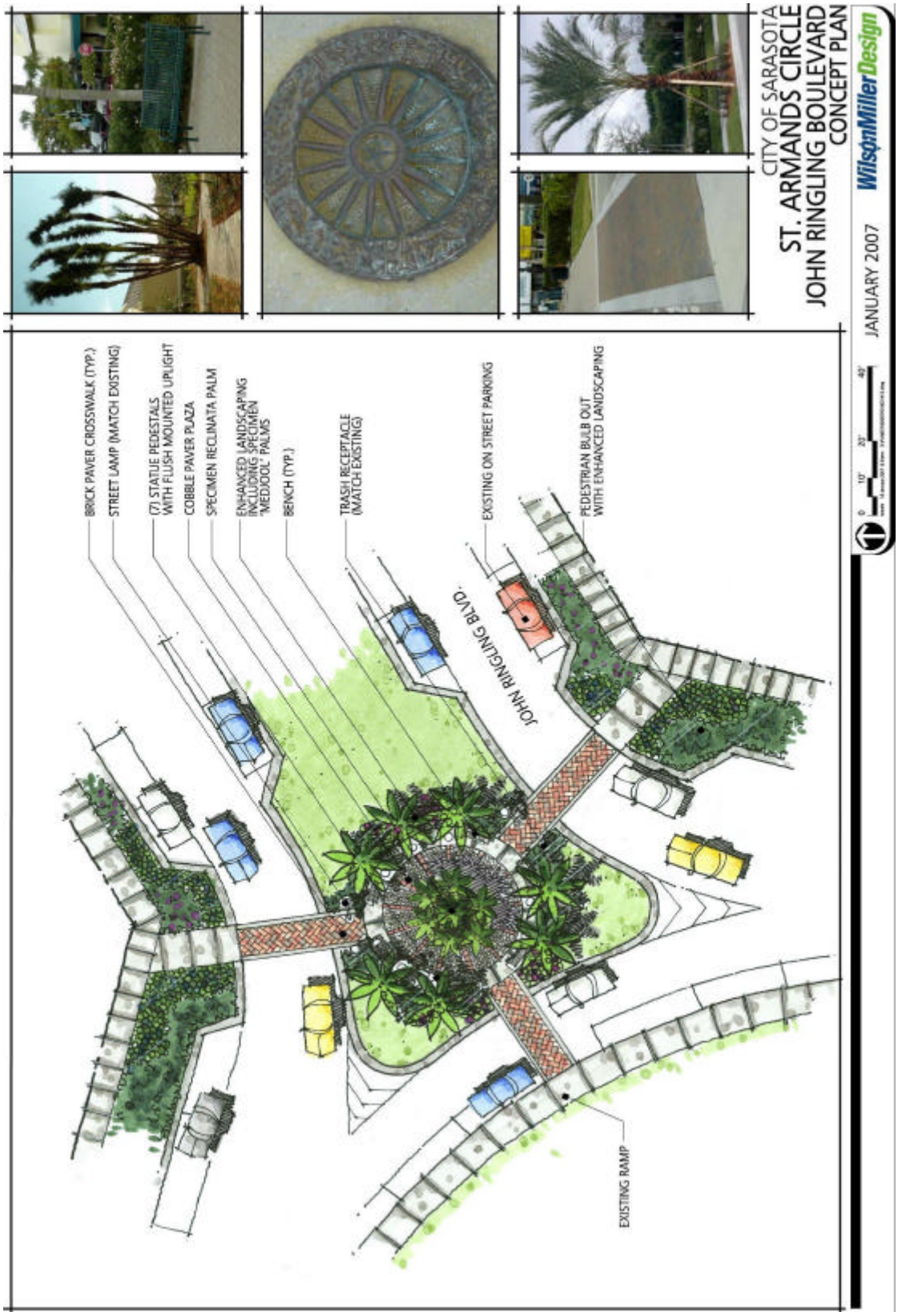
APPENDIX B

Information for Beautification of St. Armand's Circle


CITY OF SARASOTA
ST. ARMANDS CIRCLE
N. BOULEVARD OF THE PRESIDENTS
EXISTING CONDITIONS
JANUARY 2007
WilsonMillerDesign
BOULEVARD OF THE PRESIDENTS


CITY OF SARASOTA
ST. ARMANDS CIRCLE
N. BOULEVARD OF THE PRESIDENTS
CONCEPT PLAN
JANUARY 2007
WilsonMillerDesign
EXISTING CANARY ISLAND DATE PALMS TO REMAIN
CONCRETE PAVER PLAZA
RELOCATED STATUE WITH FLUSH MOUNTED UPLIGHTS
STREET LAMP (MATCH EXISTING
BRICK PAVER CROSS WALK
TRASH RECEPTACLE (MATCH EXISTING)
BENCH (TYP.)
ENHANCED LANDSCAPING
PEDESTRIAN BULB OUT WITH ENHANCED LANDSCAPING
EXISTING ON STREET PARKING
N. BOULEVARD OF PRESIDENTS


CITY OF SARASOTA
ST. ARMANDS CIRCLE
JOHN RINGLING BOULEVARD
EXISTING CONDITIONS
JANUARY 2007
WilsonMillerDesign
JOHN RINGLING BLVD


CITY OF SARASOTA
ST. ARMANDS CIRCLE
JOHN RINGLING BOULEVARD
CONCEPT PLAN
JANUARY 2007
WilsonMillerDesign
BRICK PAVER CROSSWALK (TYP.)
STREET LAMP (MATCH EXISTING)
(7) STATUE PEDESTALS WITH FLUSH MOUNTED UPLIGHT
COBBLE PAVER PLAZA
SPECIMEN RECLINATA PALM
ENHANCED LANDSCAPING INCLUDING SPECIMEN "MEDJOOL" PALMS
BENCH (TYP.)
TRASH RECEPTACLE (MATCH EXISTING)
EXISTING ON STREET PARKING
PEDESTRIAN BULB OUT WITH ENHANCED LANDSCAPING
JOHN RINGLING BLVD.
EXISTING RAMP

APPENDIX C

Signal Timings for Signal at Adams Drive in Studied Cases

Signal Timing for Signal at Adams Drive in Option B – Scenario 2

Signal Group Info.

	Add Phase 1	2	Del Phase 3	4				
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	0	2	0	4	0	6	0	8
Amber	0	6	0	5	0	6	0	5
Red Clearance	0	2	0	2	0	2	0	2
Ped Signal Group	101	102	103	104	105	106	107	108
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	7	0	34	0	7	0	34
Ped Clearance	0	30	0	15	0	30	0	15
Protected/Permitted								

Overlaps – More: SG 9, SG 10, SG 11, SG 12, SG 13, SG 14, SG 15, SG 16

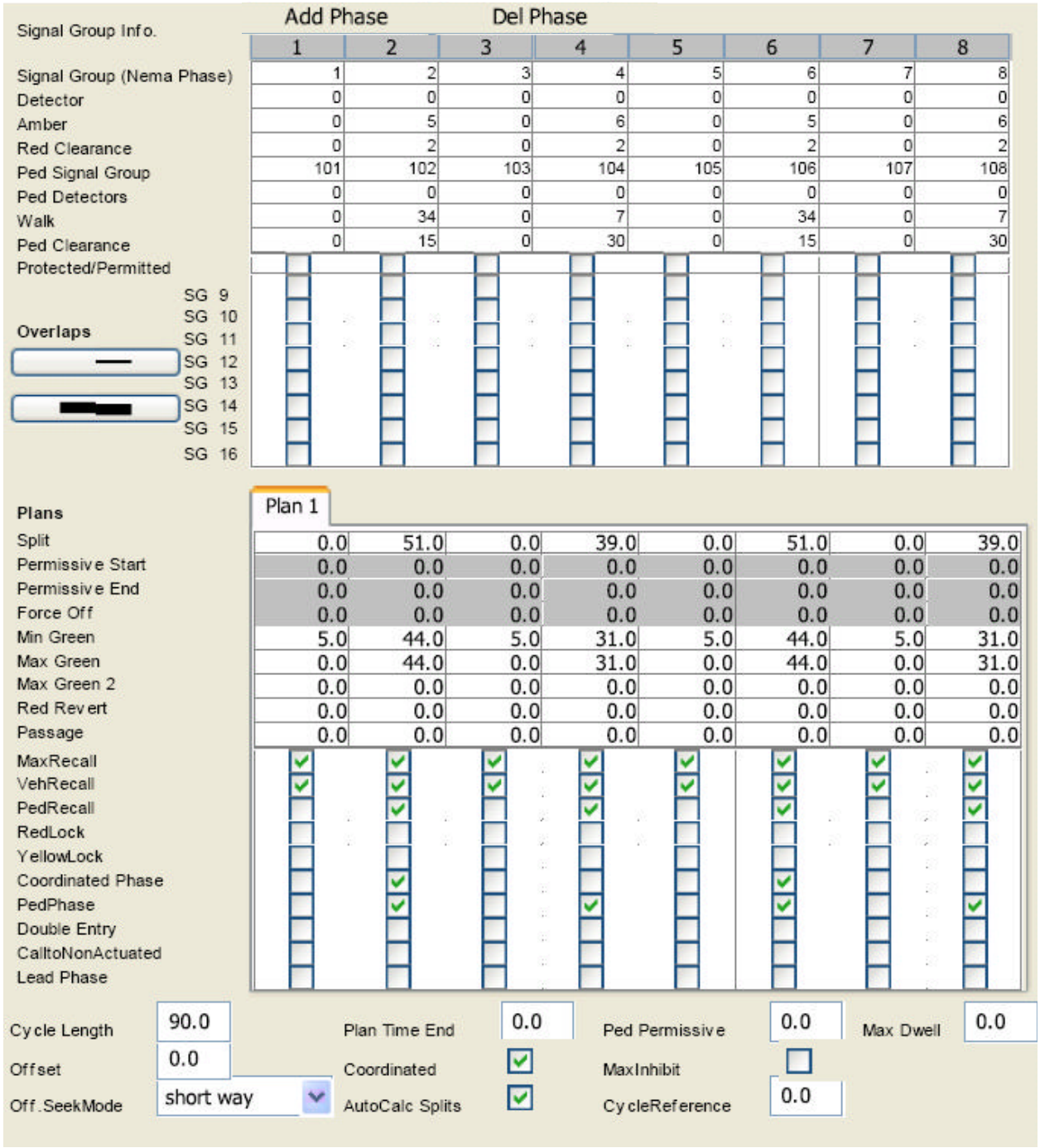
Plans — Plan 1

Split	0.0	39.0	0.0	51.0	0.0	39.0	0.0	51.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	31.0	5.0	44.0	5.0	31.0	5.0	44.0
Max Green	0.0	31.0	0.0	44.0	0.0	31.0	0.0	44.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

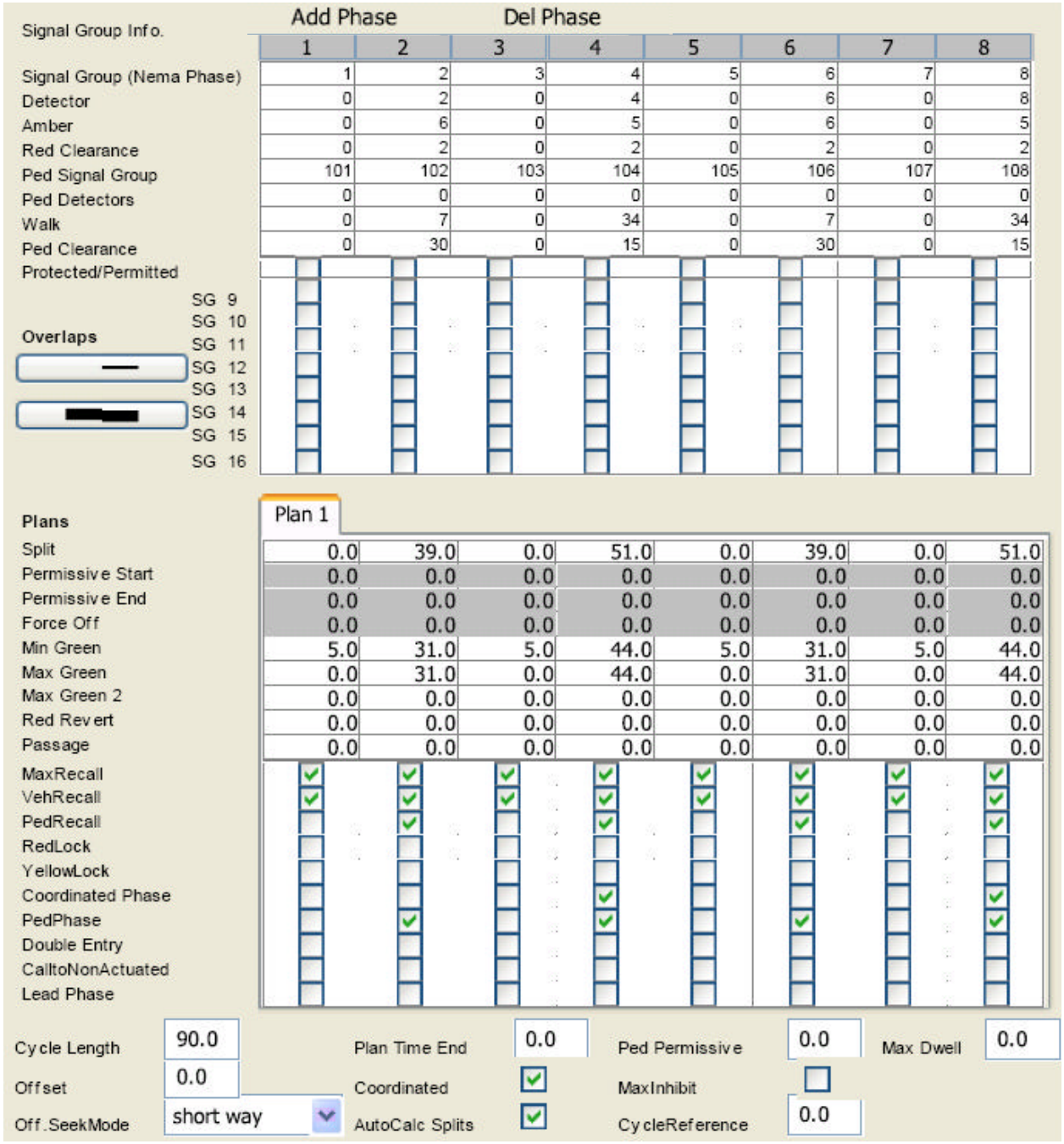
MaxRecall
VehRecall
PedRecall
RedLock
YellowLock
Coordinated Phase
PedPhase
Double Entry
CalltoNonActuated
Lead Phase

Cycle Length	90.0	Plan Time End	0.0	Ped Permissive	0.0	Max Dwell	0.0
Offset	0.0	Coordinated		MaxInhibit			
Off.SeekMode	short way	AutoCalc Splits		CycleReference	0.0		

Signal Timing for Signal at Madison Drive in Option C – Scenario 2



Signal Timing for Signal at Adams Drive in Option C – Scenario 2



Signal Group Info.

	Add Phase 1	2	3	4	5	6	7	Del Phase 8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	0	2	0	4	0	6	0	8
Amber	0	6	0	5	0	6	0	5
Red Clearance	0	2	0	2	0	2	0	2
Ped Signal Group	101	102	103	104	105	106	107	108
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	7	0	34	0	7	0	34
Ped Clearance	0	30	0	15	0	30	0	15
Protected/Permitted								

Overlaps: SG 9, SG 10, SG 11, SG 12, SG 13, SG 14, SG 15, SG 16

Plans — Plan 1

Split	0.0	39.0	0.0	51.0	0.0	39.0	0.0	51.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	31.0	5.0	44.0	5.0	31.0	5.0	44.0
Max Green	0.0	31.0	0.0	44.0	0.0	31.0	0.0	44.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MaxRecall	✓	✓	✓	✓	✓	✓	✓	✓
VehRecall	✓	✓	✓	✓	✓	✓	✓	✓
PedRecall		✓		✓		✓		✓
RedLock								
YellowLock								
Coordinated Phase				✓				✓
PedPhase		✓		✓		✓		✓
Double Entry								
CalltoNonActuated								
Lead Phase								

Cycle Length	90.0	Plan Time End	0.0	Ped Permissive	0.0	Max Dwell	0.0
Offset	0.0	Coordinated	✓	MaxInhibit	☐		
Off.SeekMode	short way	AutoCalc Splits	✓	CycleReference	0.0		

Signal Timing for Signal at Madison Drive in Option C – Scenario 3*

Signal Group Info.

	Add Phase 1	2	3	4	Del Phase 5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	0	0	0	0	0	0	0	0
Amber	5	5	0	6	0	5	0	6
Red Clearance	0	2	0	2	0	2	0	2
Ped Signal Group	101	102	103	104	105	106	107	108
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	6	0	7	0	6	0	7
Ped Clearance	0	15	0	30	0	15	0	30
Protected/Permitted	✓							

Overlaps

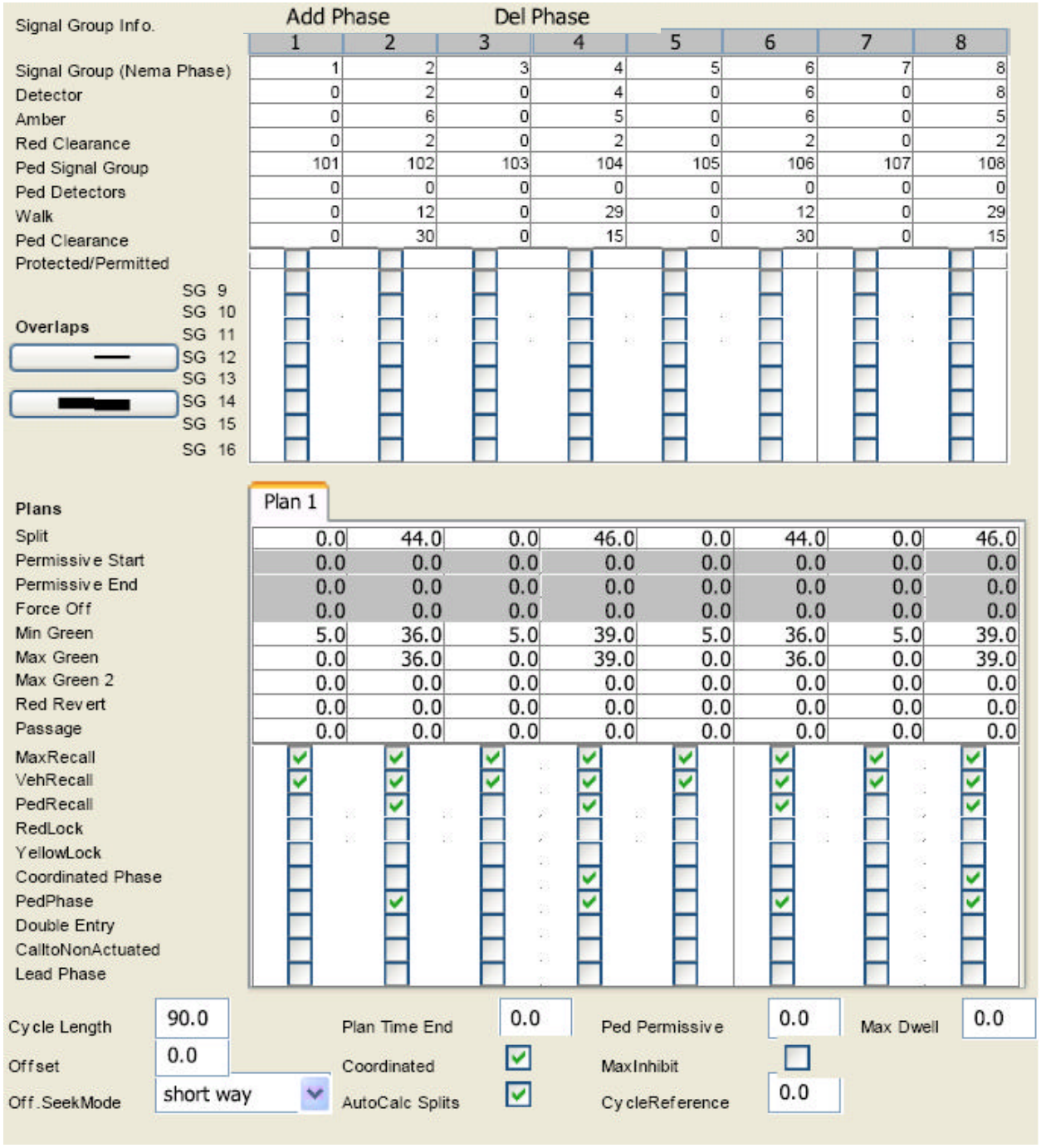
SG 9
SG 10
SG 11
SG 12
SG 13
SG 14
SG 15
SG 16

Plans — Plan 1

	1	2	3	4	5	6	7	8
Split	28.0	51.0	0.0	39.0	0.0	23.0	0.0	39.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	23.0	44.0	5.0	31.0	5.0	16.0	5.0	31.0
Max Green	23.0	44.0	0.0	31.0	0.0	16.0	0.0	31.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MaxRecall	✓	✓	✓	✓	✓	✓	✓	✓
VehRecall	✓	✓	✓	✓	✓	✓	✓	✓
PedRecall		✓		✓		✓		✓
RedLock								
YellowLock								
Coordinated Phase		✓				✓		
PedPhase		✓		✓		✓		✓
Double Entry								
CalltoNonActuated								
Lead Phase								

Cycle Length	90.0	Plan Time End	0.0	Ped Permissive	0.0	Max Dwell	0.0
Offset	0.0	Coordinated	✓	MaxInhibit			
Off.SeekMode	short way	AutoCalc Splits	✓	CycleReference	0.0		

Signal Timing for Signal at Adams Drive in Option C – Scenario 3*



Signal Group Info.	Add Phase / Del Phase 1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	0	2	0	4	0	6	0	8
Amber	0	6	0	5	0	6	0	5
Red Clearance	0	2	0	2	0	2	0	2
Ped Signal Group	101	102	103	104	105	106	107	108
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	12	0	29	0	12	0	29
Ped Clearance	0	30	0	15	0	30	0	15
Protected/Permitted								

Overlaps: SG 9, SG 10, SG 11, SG 12, SG 13, SG 14, SG 15, SG 16

Plans — Plan 1

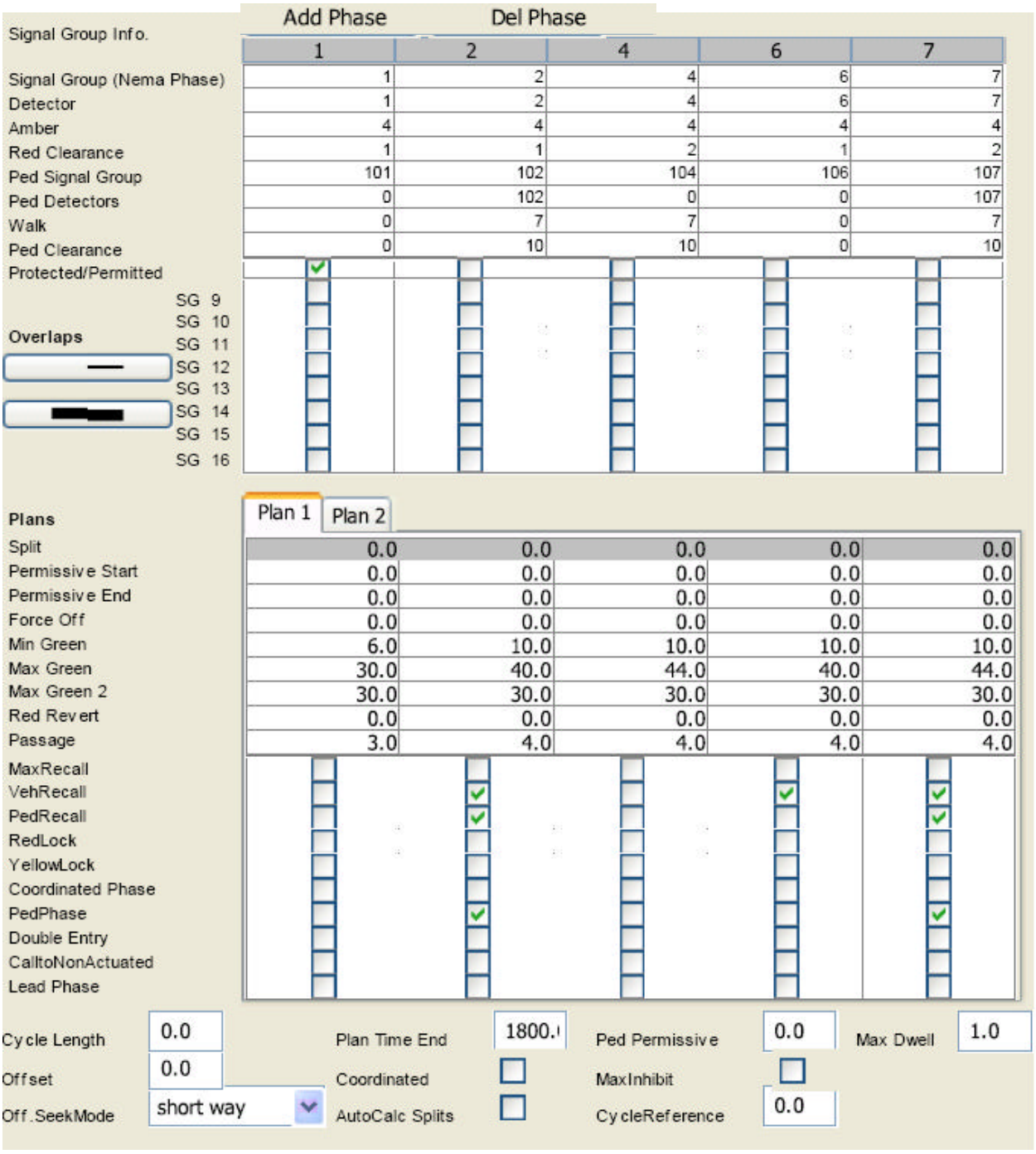
Split	0.0	44.0	0.0	46.0	0.0	44.0	0.0	46.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	36.0	5.0	39.0	5.0	36.0	5.0	39.0
Max Green	0.0	36.0	0.0	39.0	0.0	36.0	0.0	39.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MaxRecall	✓	✓	✓	✓	✓	✓	✓	✓
VehRecall	✓	✓	✓	✓	✓	✓	✓	✓
PedRecall		✓		✓		✓		✓
RedLock								
YellowLock								
Coordinated Phase				✓				✓
PedPhase		✓		✓		✓		✓
Double Entry								
CalltoNonActuated								
Lead Phase								

Cycle Length	90.0	Plan Time End	0.0	Ped Permissive	0.0	Max Dwell	0.0
Offset	0.0	Coordinated	✓	MaxInhibit	☐		
Off.SeekMode	short way	AutoCalc Splits	✓	CycleReference	0.0		

APPENDIX D

Signal Timing plan used at the Gulf Dr and Cortez Rd Intersection

Signal Timing for Signal at Gulf Drive and Cortez Road



Signal Group Info.

	Add Phase 1	2	4	6	Del Phase 7
Signal Group (Nema Phase)	1	2	4	6	7
Detector	1	2	4	6	7
Amber	4	4	4	4	4
Red Clearance	1	1	2	1	2
Ped Signal Group	101	102	104	106	107
Ped Detectors	0	102	0	0	107
Walk	0	7	7	0	7
Ped Clearance	0	10	10	0	10
Protected/Permitted	✓				

Overlaps: SG 9, SG 10, SG 11, SG 12, SG 13, SG 14, SG 15, SG 16

Plans: Plan 1 | Plan 2

Split	0.0	0.0	0.0	0.0	0.0
Permissive Start	0.0	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0
Min Green	6.0	10.0	10.0	10.0	10.0
Max Green	30.0	40.0	44.0	40.0	44.0
Max Green 2	30.0	30.0	30.0	30.0	30.0
Red Revert	0.0	0.0	0.0	0.0	0.0
Passage	3.0	4.0	4.0	4.0	4.0
MaxRecall					
VehRecall		✓		✓	✓
PedRecall		✓			✓
RedLock					
YellowLock					
Coordinated Phase					
PedPhase		✓			✓
Double Entry					
CalltoNonActuated					
Lead Phase					

Cycle Length	0.0	Plan Time End	1800.0	Ped Permissive	0.0
Offset	0.0	Coordinated	☐	MaxInhibit	☐
Off.SeekMode	short way	AutoCalc Splits	☐	CycleReference	0.0

Max Dwell: 1.0