



# Appendix C

## Traffic Technical Memorandums: Reversible Lane Analysis and Alternative Intersection Analyses

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## Technical Memorandum

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*From: CDM Smith*

*Date: July 22, 2020*

*Subject: US 278 – Reversible Lane Analysis*

### Introduction

In the US 278 Phase I Traffic Report, a cursory analysis was performed for a reversible lane scenario. The original analysis showed that adding one reversible lane would yield satisfactory segment levels of service for the peak direction; however, the detail and complexity of operating a reversible lane precluded it from being selected as the recommended alternative for the corridor. As part of the original analysis, it was assumed that the six-lane Jenkins Island Superstreet was in place, thus the only viable location for a reversible lane was from the Bluffton Interchange to Blue Heron Point Road. Per SCDOT directive, the Jenkins Island Superstreet should not be assumed for the future analysis of the US 278 corridor. This technical memorandum provides supplemental research and detailed analysis for the reversible lane alternative between the Bluffton Parkway interchange and Squire Pope Road.

Roadways with high directionality during peak hours are good candidates for reversible lanes. Reversible lanes add peak direction capacity by borrowing lane capacity from the off-peak direction. As discussed in the Traffic Report, the 2045 No Build segment level of service is expected to be F in both peak directions under the two-lane in each direction condition; thus, at least one additional lane is needed to achieve an acceptable segment level of service. The analysis presented in this memorandum assumes that one reversible lane would be constructed in the existing median adjacent to the eastbound lanes.

### Geometry Concerns

#### *Left Turns*

The primary purpose of implementing a reversible lane is to increase capacity on the mainline, which can make it difficult to provide mid-block left turns. One of the major concerns on this corridor is that high volumes on US 278 cause delays for the side road traffic entering the mainline. The reversible lane alternative would likely exacerbate this issue. Figures 1-4 show how the left turns would be accommodated during both the AM and PM peak periods.

In the AM peak hour, there will be three lanes in the eastbound direction. Due to the presence of the 42'-wide grass median, eastbound left turn lanes could be provided at the Gateway Drive/Crosstree



Drive intersection and the Jenkins Road intersection. The westbound direction will have two through lanes and left turn lanes could be provided at the Blue Heron Point Road and Gateway Drive/Crosstree Drive intersections.

Figure 1 - Reversible Lane Concept - AM Peak Hour



Figure 2 - Reversible Lane Concept - AM Peak Hour



During the PM peak hour, the inside eastbound lane would become a westbound through lane. A moveable barrier would be needed to separate the eastbound and westbound lanes, as shown in red in



Figure 3 and Figure 4. The barrier would need to have openings at Blue Heron Point Road, Gateway Drive/Crosstree Drive, and Jenkins Road to allow for turning movements to and from these side streets. There would not be an opportunity to provide dedicated left turn lanes in the PM peak hour, which will cause delays for the through movements in the same direction. All eastbound left turns would need to be made from the inside through lane. All westbound left turns would need to be made from the reversible lane. The entrances to the turn lanes provided in the AM peak period should be barricaded to prevent any confusion.

Figure 3 - Reversible Lane Concept - PM Peak Hour



Figure 4 - Reversible Lane Concept - PM Peak Hour



An alternative option would be to prohibit left turns along Jenkins Island; however, U-turn locations or a parallel side street network would need to be provided to ensure sufficient access to the residences and the RV resort.

#### *Transition Areas*

The reversible lane alternative will need to provide two transition zones: one just east of the Bluffton Parkway interchange and one east of Jenkins Island. In order to minimize the access impacts between Jenkins Island and Squire Pope Road, it would be recommended to position the eastern transition area where the existing two way left turn lane currently begins.

In the PM period, all westbound vehicles needing to make a left turn anywhere on Jenkins Island will need to use the reversible lane. Signage should be provided at the eastern transition area to ensure these vehicles use the appropriate lanes.

### **Capacity Analysis**

The following presents the capacity analysis for the section of US 278 where a reversible lane could be implemented (from the Bluffton Parkway interchange to Squire Pope Road).

#### *Intersection Capacity*

- 2045 No Build

In the 2045 No Build condition, the intersections within the segment of US 278 from Bluffton Parkway to Squire Pope Road are expected to fail. This is due to the heavy through volumes along US 278 and the difficulty associated with finding adequate gaps to either enter the roadway from side streets or turn left off the mainline onto the side streets. Table 1 provides the intersection summary for the 2045 No Build condition.

Table 1 – 2045 No Build Intersection Level of Service Summary

Intersection	AM			PM		
	Movement	LOS	Delay	Movement	LOS	Delay
Pinckney Wildlife Refuge	NBL	F	315.6	SBL	F	+
Blue Heron Point Road	NEL	F	315.6	NWL	F	63.1
Gateway Drive/Crosstree Drive	NBL	F	+	NBL	F	+
Jenkins Road	SBL	F	+	SBL	F	+

+ Results are producing unreasonably long delays that are often greater than 360 seconds, but the values are not shown due to software limitations.

- 2045 Reversible Lane

The 2045 Reversible Lane scenario shows that the intersections within the reversible lane segment of US 278 will continue to fail. This is because the reversible lane favors mainline traffic and the underlying issues with the side street delays are not addressed. Table 2 provides the intersection summary for the 2045 Reversible Lane condition.

Table 2 – 2045 Reversible Lane Intersection Level of Service Summary

Intersection						
	Movement	LOS	Delay	Movement	LOS	Delay
Pinckney Wildlife Refuge	WBL	F	+	EBL	F	+
Blue Heron Point Road	NWL	F	+	NEL	F	+
Gateway Drive/Crosstree Drive	WBL	F	+	SBL	F	245.7
Jenkins Road	SBL	F	+	EBL	F	+

+ Results are producing unreasonably long delays that are often greater than 360 seconds, but the values are not shown due to software limitations.

#### - 2045 Build without Reversible Lane

The 2045 Build scenario proposes a ramp condition at the Pinckney Wildlife Refuge intersection that provides acceleration lanes for the traffic entering US 278. The Build condition also recommends a signalized intersection at Gateway Drive/Crosstree Drive that accommodates all traffic on Jenkins Island. A connector road is proposed from Hog Island to Jenkins Road that will service the island. As seen in Table 3, the intersections in the Build condition are expected to operate at LOS D or better.

Table 3 – 2045 Build Intersection Level of Service Summary

Intersection	AM			PM		
	Movement	LOS	Delay	Movement	LOS	Delay
Pinckney Wildlife Refuge*	EB off-ramp	C	N/A	WB off-ramp	D	N/A
Blue Heron Point Road	N/A	N/A	N/A	N/A	N/A	N/A
Gateway Drive/Crosstree Drive	Overall	C	21.5	Overall	C	34.1
Jenkins Road	N/A	N/A	N/A	N/A	N/A	N/A

+ Results are producing unreasonably long delays that are often greater than 360 seconds, but the values are not shown due to software limitations.

\*Intersection analyzed as interchange ramp condition with HCS software

### Segment Capacity

#### - 2045 No Build

If no changes are made to the corridor, the segment operation is expected to worsen to LOS F in the peak directions (eastbound during the AM and westbound during the PM).

Table 4 – 2045 No Build Segment Level of Service Summary

Intersection	AM		PM	
	East	West	East	West
Bluffton Parkway to Pinckney	F	C	E	F
Pinckney to Blue Heron Point Road	F	C	D	F
Blue Heron Point Road to Squire Pope Road	F	C	E	F

- 2045 Reversible Lane

As expected, in the reversible lane scenario the peak direction levels of service will improve due to the additional lane. The non-peak direction levels of service will remain the same as the No Build scenario. Table 5 provides the segment level of service summary.

Table 5 – 2045 Reversible Lane Segment Level of Service Summary

Intersection	AM		PM	
	East	West	East	West
Bluffton Parkway to Pinckney	D	C	E	D
Pinckney to Blue Heron Point Road	D	C	D	D
Blue Heron Point Road to Squire Pope Road	D	C	E	E

- 2045 Build without Reversible Lane

In the 2045 Build condition, three lanes are proposed in each direction. Table 6 shows that the segment levels of service for the Build condition are expected to be LOS D or better in the section of US 278 without signalized intersections.

Table 6 – 2045 Build Segment Level of Service Summary

Intersection				
	East	West	East	West
Bluffton Parkway to Pinckney	D	B	C	D
Pinckney to Blue Heron Point Road	D	B	C	D
Blue Heron Point Road to Squire Pope Road*	N/A	N/A	N/A	N/A

\* Due to the introduction of a signal on Jenkins Island in the Build condition, segment level of service is not available for this segment

## Safety Considerations

The current configuration of US 278 along Jenkins Island is the safest condition for two-way traffic. There is a 42'-foot grass median that separates the eastbound and westbound lanes. The median narrows down to approximately 16-feet at the Skull Creek bridge and transitions to a two way left turn lane east of Jenkins Island. There are dedicated left- and right-turn lanes at the majority of the side roads on Jenkins Island, which allow turning vehicles a place to slow down to make their turning maneuver without disrupting traffic flow in the through lanes.

The reversible lane would introduce a contraflow lane that would need to have a barrier between the eastbound and westbound lanes during the PM peak period. Additionally, the dedicated left turn lanes would not function during the PM peak period. Vehicles needing to make a left turn on Jenkins Island would have to do so from a shared left/through lane. This configuration is susceptible to an increase in rear end crashes. During the PM period, the barrier should be positioned to ensure adequate sight distance for left turns. The wide median presents challenges for left turns from the side streets during the PM period because there is separation between the westbound lanes.



## Access Considerations

As mentioned above, the reversible lane alternative is conducive to increasing the throughput capacity during the peak periods; however, it can make mid-block left turn maneuvers more difficult and less safe. Due to the difficulty of making left turns off the mainline, implementing a reversible lane may hinder future economic development along the corridor because of decreased accessibility.

## Aesthetics

Throughout this corridor study process, the design team has received feedback from stakeholders that they want the corridor to remain attractive and scenic. Reversible lanes, though simple concepts, require detailed operational considerations in order to work effectively and safely. Overhead signs are needed throughout the length of the reversible lane to ensure drivers use the correct lanes and reduce the risk of wrong way crashes. These signs must be frequent enough for drivers to see at all times. The contraflow lane will require a moveable barrier to separate the eastbound and westbound traffic. Barriers will also be needed to close off access to the left turn lanes during the PM period. Below are photos of reversible lanes in use around the world. Generally reversible lanes are provided on undivided roadways so there are few examples similar to the US 278 corridor.



Reversible Lane in Beijing



Chesapeake Bay Bridge



M25 Reversible Lane in London



Transition Zone for Reversible Lane





Reversible Lane in Utah



Oahu Zipper

### Summary and Recommendation

The daily directionality along US 278 makes this corridor a candidate for a reversible lane, thereby reducing the need to widen by one lane; however, there are other considerations that make this an undesirable alternative. Below is a summary of the reasons that the reversible lane alternative should not be considered for US 278.

- One of the major issues along US 278 is the difficulty for vehicles on the side roads to access the mainline under unsignalized conditions. The reversible lane does not improve the accessibility or safety of these movements. The intersection capacity analysis shows that all the intersections will operate at LOS F.
- The segment capacity will only improve in the peak direction. The off-peak direction will remain the same as the No Build condition, which is LOS E in some locations.
- The lack of dedicated left turn lanes in the PM period is an unsafe condition for drivers. When the left turns share the through lane, it not only causes delays for the through lane but increases the chances for rear end crashes.
- The reversible lane will require a moveable barrier to separate the eastbound and westbound traffic in the PM period. This barrier could detract from the beauty of the corridor and pose a hinderance to sight distance. The transportation agency would need to move the barrier twice a day every day, which is a large maintenance expense.
- Overhead signs are required to ensure drivers are aware of the reversible lane and which lanes are in use. These overhead signs can be overbearing and detract from the scenic environment.
- Future economic development might be hindered by the presence of a reversible lane due to decreased accessibility.
- There is a general safety concern for unfamiliar drivers traversing a reversible lane road segment.

# APPENDIX A

## Synchro Reports

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↗	↘	↰	↗	↘		↕			↕	
Traffic Vol, veh/h	10	4130	10	10	2040	10	10	10	10	10	10	10
Future Vol, veh/h	10	4130	10	10	2040	10	10	10	10	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	100	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	4489	11	11	2217	11	11	11	11	11	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2228	0	0	4500	0	0	5647	6761	2245	4511	6761	1109
Stage 1	-	-	-	-	-	-	4511	4511	-	2239	2239	-
Stage 2	-	-	-	-	-	-	1136	2250	-	2272	4522	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	230	-	-	27	-	-	0	0	34	0	0	204
Stage 1	-	-	-	-	-	-	~1	~4	-	43	78	-
Stage 2	-	-	-	-	-	-	215	77	-	41	~4	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	230	-	-	27	-	-	0	0	34	0	0	204
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	0	-	0	0	-
Stage 1	-	-	-	-	-	-	~1	~4	-	41	46	-
Stage 2	-	-	-	-	-	-	92	46	-	-	~4	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1	\$ 315.6	26
HCM LOS			F	D





Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	34	230	-	-	27	-	-	204
HCM Lane V/C Ratio	0.959	0.047	-	-	0.403	-	-	0.16
HCM Control Delay (s)	\$ 315.6	21.4	-	-	209.4	-	-	26
HCM Lane LOS	F	C	-	-	F	-	-	D
HCM 95th %tile Q(veh)	3.4	0.1	-	-	1.2	-	-	0.6

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon











Intersection						
Int Delay, s/veh	1.8					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↑	↑↑	↑	
Traffic Vol, veh/h	4140	10	10	2050	10	20
Future Vol, veh/h	4140	10	10	2050	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	4	2	2
Mvmt Flow	4500	11	11	2228	11	22
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	4511	0	5636	2250
Stage 1	-	-	-	-	4500	-
Stage 2	-	-	-	-	1136	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	27	-	0	34
Stage 1	-	-	-	-	~ 3	-
Stage 2	-	-	-	-	268	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	27	-	0	34
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	~ 2	-
Stage 2	-	-	-	-	268	-
Approach	SE	NW		NE		
HCM Control Delay, s	0	1		\$ 315.6		
HCM LOS	F					
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	34	27	-	-	-	
HCM Lane V/C Ratio	0.959	0.403	-	-	-	
HCM Control Delay (s)	\$ 315.6	209.4	-	-	-	
HCM Lane LOS	F	F	-	-	-	
HCM 95th %tile Q(veh)	3.4	1.2	-	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗	↖		↗			↗
Traffic Vol, veh/h	0	4110	50	50	2040	10	10	0	30	0	0	10
Future Vol, veh/h	0	4110	50	50	2040	10	10	0	30	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	150	250	-	150	0	-	40	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	100	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4467	54	54	2217	10	11	0	33	0	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	4467	0	0	5684	-	-	-	-	1109
Stage 1	-	-	-	-	-	-	4467	-	-	-	-	-
Stage 2	-	-	-	-	-	-	1217	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	7.54	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	~ 28	-	-	0	0	0	0	0	204
Stage 1	0	-	-	-	-	-	~ 1	0	0	0	0	-
Stage 2	0	-	-	-	-	-	192	0	0	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	~ 28	-	-	-	-	-	-	-	204
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	~ 1	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			17.7						23.6		
HCM LOS							-			C		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-		-	-	~ 28	-	-	204				
HCM Lane V/C Ratio	-		-	-	1.941	-	-	0.053				
HCM Control Delay (s)	-		0	-	\$ 741.7	-	-	23.6				
HCM Lane LOS	-		A	-	F	-	-	C				
HCM 95th %tile Q(veh)	-		-	-	6.5	-	-	0.2				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Intersection						
Int Delay, s/veh	24.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	4110	2090	30	10	10
Future Vol, veh/h	30	4110	2090	30	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	4467	2272	33	11	11
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	2305	0	-	0	4589	1153
Stage 1	-	-	-	-	2289	-
Stage 2	-	-	-	-	2300	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	215	-	-	-	~ 1	191
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	62	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	215	-	-	-	~ 1	191
Mov Cap-2 Maneuver	-	-	-	-	~ 1	-
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	62	-
Approach	EB	WB	SB			
HCM Control Delay, s	0.2	0	\$ 7731.8			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	215	-	-	-	2	
HCM Lane V/C Ratio	0.152	-	-	-	10.87	
HCM Control Delay (s)	24.7	-	-	-	\$ 7731.8	
HCM Lane LOS	C	-	-	-	F	
HCM 95th %tile Q(veh)	0.5	-	-	-	4.3	
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						



Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	3040	10	10	4330	10	10	10	10	10	10	10
Future Vol, veh/h	10	3040	10	10	4330	10	10	10	10	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	100	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	3304	11	11	4707	11	11	11	11	11	11	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4718	0	0	3315	0	0	5707	8066	1652	6409	8066	2354
Stage 1	-	-	-	-	-	-	3326	3326	-	4729	4729	-
Stage 2	-	-	-	-	-	-	2381	4740	-	1680	3337	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	22	-	-	84	-	-	0	0	87	0	0	28
Stage 1	-	-	-	-	-	-	~ 8	20	-	~ 1	~ 3	-
Stage 2	-	-	-	-	-	-	35	~ 3	-	98	20	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	22	-	-	84	-	-	0	0	87	0	0	28
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	0	-	0	0	-
Stage 1	-	-	-	-	-	-	~ 4	~ 10	-	~ 1	~ 3	-
Stage 2	-	-	-	-	-	-	-	~ 3	-	-	~ 10	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.1			69.3			\$ 432.8		
HCM LOS							F			F		





Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	87	22	-	-	84	-	-	28
HCM Lane V/C Ratio	0.375	0.494	-	-	0.129	-	-	1.165
HCM Control Delay (s)	69.3	276.9	-	-	54.1	-	-	\$ 432.8
HCM Lane LOS	F	F	-	-	F	-	-	F
HCM 95th %tile Q(veh)	1.5	1.4	-	-	0.4	-	-	3.8









Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon					

Intersection						
Int Delay, s/veh	0.3					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑	↓	↑↑	↓	
Traffic Vol, veh/h	3030	30	20	4340	10	10
Future Vol, veh/h	3030	30	20	4340	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	4	2	2
Mvmt Flow	3293	33	22	4717	11	11
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	3326	0	5696	1647
Stage 1	-	-	-	-	3293	-
Stage 2	-	-	-	-	2403	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	83	-	0	88
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	54	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	83	-	0	88
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	12	-
Stage 2	-	-	-	-	54	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.3		58.8	
HCM LOS					F	
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	88	83	-	-	-	
HCM Lane V/C Ratio	0.247	0.262	-	-	-	
HCM Control Delay (s)	58.8	63.1	-	-	-	
HCM Lane LOS	F	F	-	-	-	
HCM 95th %tile Q(veh)	0.9	0.9	-	-	-	

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑	↗	↖		↗			↗
Traffic Vol, veh/h	0	3000	40	50	4320	10	30	0	60	0	0	10
Future Vol, veh/h	0	3000	40	50	4320	10	30	0	60	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	150	250	-	150	0	-	40	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3261	43	54	4696	11	33	0	65	0	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	3261	0	0	5717	-	-	-	-	2348
Stage 1	-	-	-	-	-	-	3261	-	-	-	-	-
Stage 2	-	-	-	-	-	-	2456	-	-	-	-	-
Critical Hdwy	-	-	-	4.14	-	-	7.54	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.52	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	89	-	-	0	0	0	0	0	29
Stage 1	0	-	-	-	-	-	~ 9	0	0	0	0	-
Stage 2	0	-	-	-	-	-	~ 31	0	0	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	89	-	-	0	-	-	-	-	29
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	-	-	-	-	-
Stage 1	-	-	-	-	-	-	~ 9	-	-	-	-	-
Stage 2	-	-	-	-	-	-	~ 8	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.1						190.3		
HCM LOS							-			F		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)		-	-	-	-	89	-	-	29			
HCM Lane V/C Ratio		-	-	-	-	0.611	-	-	0.375			
HCM Control Delay (s)		-	0	-	-	94.9	-	-	190.3			
HCM Lane LOS		-	A	-	-	F	-	-	F			
HCM 95th %tile Q(veh)		-	-	-	-	2.8	-	-	1.2			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		







Intersection						
Int Delay, s/veh	10.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	3050	4340	50	30	40
Future Vol, veh/h	10	3050	4340	50	30	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3315	4717	54	33	43
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	4771	0	-	0	6424	2386
Stage 1	-	-	-	-	4744	-
Stage 2	-	-	-	-	1680	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	21	-	-	-	0	~ 27
Stage 1	-	-	-	-	~ 2	-
Stage 2	-	-	-	-	136	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	21	-	-	-	0	~ 27
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	~ 1	-
Stage 2	-	-	-	-	136	-
Approach	EB	WB		SB		
HCM Control Delay, s	1	0		\$ 1127.4		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	21	-	-	-	27	
HCM Lane V/C Ratio	0.518	-	-	-	2.818	
HCM Control Delay (s)	295.3	-	-	-	\$ 1127.4	
HCM Lane LOS	F	-	-	-	F	
HCM 95th %tile Q(veh)	1.5	-	-	-	9.2	
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						









Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	4130	10	10	2040	10	10	10	10	10	10	10
Future Vol, veh/h	10	4130	10	10	2040	10	10	10	10	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	100	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	4489	11	11	2217	11	11	11	11	11	11	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2228	0	0	4500	0	0	5647	6761	2245	4062	6761	1109
Stage 1	-	-	-	-	-	-	4511	4511	-	2239	2239	-
Stage 2	-	-	-	-	-	-	1136	2250	-	1823	4522	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	6.54	7.14	6.99	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.74	5.54	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	4.02	3.92	3.67	4.02	3.32
Pot Cap-1 Maneuver	230	-	-	~ 6	-	-	0	0	29	~ 2	0	204
Stage 1	-	-	-	-	-	-	0	~ 4	-	43	78	-
Stage 2	-	-	-	-	-	-	210	77	-	71	~ 4	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	230	-	-	~ 6	-	-	-	0	29	-	0	204
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	0	~ 4	-	41	0	-
Stage 2	-	-	-	-	-	-	-	0	-	-	~ 4	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			7.3								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	230	-	-	~ 6	-	-	-				
HCM Lane V/C Ratio	-	0.047	-	-	1.812	-	-	-				
HCM Control Delay (s)	-	21.4	-		\$ 1510.4	-	-	-				
HCM Lane LOS	-	C	-	-	F	-	-	-				
HCM 95th %tile Q(veh)	-	0.1	-	-	2.3	-	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Intersection						
Int Delay, s/veh	4.5					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑↑	↑	↑	↑↑	↑↑	
Traffic Vol, veh/h	4140	10	10	2050	10	20
Future Vol, veh/h	4140	10	10	2050	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	4	2	2
Mvmt Flow	4500	11	11	2228	11	22
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	4511	0	5636	2250
Stage 1	-	-	-	-	4500	-
Stage 2	-	-	-	-	1136	-
Critical Hdwy	-	-	5.34	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	3.12	-	3.67	3.92
Pot Cap-1 Maneuver	-	-	~ 6	-	0	28
Stage 1	-	-	-	-	~ 1	-
Stage 2	-	-	-	-	262	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	~ 6	-	0	28
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	262	-
Approach	SE	NW		NE		
HCM Control Delay, s	0	7.3		\$ 432.8		
HCM LOS	F					
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	28	~ 6	-	-	-	
HCM Lane V/C Ratio	1.165	1.812	-	-	-	
HCM Control Delay (s)	\$ 432.8	\$ 1510.4	-	-	-	
HCM Lane LOS	F	F	-	-	-	
HCM 95th %tile Q(veh)	3.8	2.3	-	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Intersection												
Int Delay, s/veh	38.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑	↱	↰		↱			↱
Traffic Vol, veh/h	0	4110	50	50	2040	10	10	0	30	0	0	10
Future Vol, veh/h	0	4110	50	50	2040	10	10	0	30	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	200	-	150	250	-	150	0	-	40	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	100	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4467	54	54	2217	10	11	0	33	0	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2227	0	0	4467	0	0	5684	-	2234	-	-	1109
Stage 1	-	-	-	-	-	-	4467	-	-	-	-	-
Stage 2	-	-	-	-	-	-	1217	-	-	-	-	-
Critical Hdwy	4.14	-	-	5.34	-	-	6.99	-	7.14	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	3.12	-	-	3.67	-	3.92	-	-	3.32
Pot Cap-1 Maneuver	230	-	-	~ 6	-	-	0	0	~ 29	0	0	204
Stage 1	-	-	-	-	-	-	~ 1	0	-	0	0	-
Stage 2	-	-	-	-	-	-	188	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	230	-	-	~ 6	-	-	-	-	~ 29	-	-	204
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	~ 1	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			114.6						23.6		
HCM LOS							-			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	-		29	230	-	-	~ 6	-	-	204		
HCM Lane V/C Ratio	-		1.124	-	-	-	9.058	-	-	0.053		
HCM Control Delay (s)	-\$		409.3	0	-	\$	4812.4	-	-	23.6		
HCM Lane LOS	-		F	A	-	-	F	-	-	C		
HCM 95th %tile Q(veh)	-		3.7	0	-	-	8.5	-	-	0.2		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

Intersection						
Int Delay, s/veh	7.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	4110	2090	30	10	10
Future Vol, veh/h	30	4110	2090	30	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	4467	2272	33	11	11
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	2305	0	-	0	4142	1153
Stage 1	-	-	-	-	2289	-
Stage 2	-	-	-	-	1853	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	215	-	-	-	~ 3	191
Stage 1	-	-	-	-	62	-
Stage 2	-	-	-	-	97	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	215	-	-	-	~ 3	191
Mov Cap-2 Maneuver	-	-	-	-	~ 3	-
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	97	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		\$ 2347		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	215	-	-	-	-	6
HCM Lane V/C Ratio	0.152	-	-	-	-	3.623
HCM Control Delay (s)	24.7	-	-	-	-	\$ 2347
HCM Lane LOS	C	-	-	-	-	F
HCM 95th %tile Q(veh)	0.5	-	-	-	-	4
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						



Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	3040	10	10	4330	10	10	10	10	10	10	10
Future Vol, veh/h	10	3040	10	10	4330	10	10	10	10	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	100	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	3304	11	11	4707	11	11	11	11	11	11	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4718	0	0	3315	0	0	5236	8066	1652	6409	8066	2354
Stage 1	-	-	-	-	-	-	3326	3326	-	4729	4729	-
Stage 2	-	-	-	-	-	-	1910	4740	-	1680	3337	-
Critical Hdwy	5.34	-	-	4.14	-	-	6.99	6.54	6.94	6.99	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Follow-up Hdwy	3.12	-	-	2.22	-	-	3.67	4.02	3.32	3.67	4.02	3.92
Pot Cap-1 Maneuver	~ 4	-	-	84	-	-	0	0	87	0	0	24
Stage 1	-	-	-	-	-	-	~ 8	20	-	0	~ 3	-
Stage 2	-	-	-	-	-	-	62	~ 3	-	97	20	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	~ 4	-	-	84	-	-	-	0	87	-	0	24
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	~ 8	0	-	0	~ 3	-
Stage 2	-	-	-	-	-	-	-	~ 3	-	-	0	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.9			0.1								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	~ 4	-	-	84	-	-	-				
HCM Lane V/C Ratio	-	2.717	-	-	0.129	-	-	-				
HCM Control Delay (s)		\$ 2409.4	-	-	54.1	-	-	-				
HCM Lane LOS	-	F	-	-	F	-	-	-				
HCM 95th %tile Q(veh)	-	2.5	-	-	0.4	-	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Intersection						
Int Delay, s/veh	21					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑	↑		↑↑↑	↑	
Traffic Vol, veh/h	3030	30	20	4340	10	10
Future Vol, veh/h	3030	30	20	4340	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	4	2	2
Mvmt Flow	3293	33	22	4717	11	11
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	3326	0	5224	1647
Stage 1	-	-	-	-	3293	-
Stage 2	-	-	-	-	1931	-
Critical Hdwy	-	-	4.14	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	-	-	2.22	-	3.67	3.32
Pot Cap-1 Maneuver	-	-	83	-	~ 1	88
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	88	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	83	-	~ 1	88
Mov Cap-2 Maneuver	-	-	-	-	~ 1	-
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	88	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.3		\$ 7731.8	
HCM LOS					F	
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	2	83	-	-	-	
HCM Lane V/C Ratio	10.87	0.262	-	-	-	
HCM Control Delay (s)	\$ 7731.8	63.1	0	-	-	
HCM Lane LOS	F	F	A	-	-	
HCM 95th %tile Q(veh)	4.3	0.9	-	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon



























Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗		↕↕↕	↗	↘		↗			↗
Traffic Vol, veh/h	0	3000	40	50	4320	10	30	0	60	0	0	10
Future Vol, veh/h	0	3000	40	50	4320	10	30	0	60	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	150	-	-	150	0	-	40	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3261	43	54	4696	11	33	0	65	0	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4707	0	0	3261	0	0	5247	-	1631	-	-	2348
Stage 1	-	-	-	-	-	-	3261	-	-	-	-	-
Stage 2	-	-	-	-	-	-	1986	-	-	-	-	-
Critical Hdwy	5.34	-	-	4.14	-	-	6.99	-	6.94	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	2.22	-	-	3.67	-	3.32	-	-	3.92
Pot Cap-1 Maneuver	4	-	-	89	-	-	0	0	90	0	0	24
Stage 1	-	-	-	-	-	-	~ 9	0	-	0	0	-
Stage 2	-	-	-	-	-	-	56	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	4	-	-	89	-	-	0	-	90	-	-	24
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	-	-	-	-	-
Stage 1	-	-	-	-	-	-	~ 9	-	-	-	-	-
Stage 2	-	-	-	-	-	-	~ 31	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.1						245.7		
HCM LOS							-			F		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	-	90	4	-	-	89	-	-	24			
HCM Lane V/C Ratio	-	0.725	-	-	-	0.611	-	-	0.453			
HCM Control Delay (s)	-	113	0	-	-	94.9	0	-	245.7			
HCM Lane LOS	-	F	A	-	-	F	A	-	F			
HCM 95th %tile Q(veh)	-	3.6	0	-	-	2.8	-	-	1.4			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Intersection						
Int Delay, s/veh	501.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑↑		↑	
Traffic Vol, veh/h	10	3050	4340	50	30	40
Future Vol, veh/h	10	3050	4340	50	30	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3315	4717	54	33	43
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	4771	0	-	0	6424	2386
Stage 1	-	-	-	-	4744	-
Stage 2	-	-	-	-	1680	-
Critical Hdwy	5.34	-	-	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	3.12	-	-	-	3.67	3.92
Pot Cap-1 Maneuver	~ 4	-	-	-	0	~ 23
Stage 1	-	-	-	-	~ 1	-
Stage 2	-	-	-	-	134	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 4	-	-	-	0	~ 23
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	134	-
Approach	EB	WB	SB			
HCM Control Delay, \$ 1200.8		0	\$ 1389.9			
HCM LOS			F			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	~ 4	-	-	-	23	
HCM Lane V/C Ratio	2.717	-	-	-	3.308	
HCM Control Delay (s)	\$ 2409.8	\$ 1196.8	-	-	\$ 1389.9	
HCM Lane LOS	F	F	-	-	F	
HCM 95th %tile Q(veh)	2.5	-	-	-	9.6	
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						

# HCM 6th Signalized Intersection Summary

## 7: Crosstree Drive/Gateway Dr & US 278

06/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	40	4060	50	50	2020	20	10	0	30	30	0	30
Future Volume (veh/h)	40	4060	50	50	2020	20	10	0	30	30	0	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	4413	0	54	2196	0	11	0	0	33	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	4364		70	4376		65	1		86	1	
Arrive On Green	0.04	0.85	0.00	0.04	0.86	0.00	0.01	0.00	0.00	0.02	0.00	0.00
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1781	1870	0	1781	1870	0
Grp Volume(v), veh/h	43	4413	0	54	2196	0	11	0	0	33	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1781	1870	0	1781	1870	0
Q Serve(g_s), s	3.9	140.0	0.0	4.9	17.7	0.0	1.0	0.0	0.0	3.0	0.0	0.0
Cycle Q Clear(g_c), s	3.9	140.0	0.0	4.9	17.7	0.0	1.0	0.0	0.0	3.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	65	4364		70	4376		65	1		86	1	
V/C Ratio(X)	0.66	1.01		0.78	0.50		0.17	0.00		0.38	0.00	
Avail Cap(c_a), veh/h	108	4364		76	4376		98	114		98	114	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	77.9	11.9	0.0	78.0	2.9	0.0	80.3	0.0	0.0	79.4	0.0	0.0
Incr Delay (d2), s/veh	10.7	16.4	0.0	35.9	0.1	0.0	1.2	0.0	0.0	2.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	35.0	0.0	2.9	3.6	0.0	0.5	0.0	0.0	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.6	28.3	0.0	113.9	3.0	0.0	81.5	0.0	0.0	82.2	0.0	0.0
LnGrp LOS	F	F		F	A		F	A		F	A	
Approach Vol, veh/h		4456	A		2250	A		11	A		33	A
Approach Delay, s/veh		28.9			5.7			81.5			82.2	
Approach LOS		C			A			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	144.5	6.5	1.9	10.5	144.9	8.4	0.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.0	140.0	5.0	10.0	9.9	137.1	5.0	10.0				
Max Q Clear Time (g_c+l1), s	6.9	142.0	3.0	0.0	5.9	19.7	5.0	0.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	35.4	0.0	0.0				

### Intersection Summary

HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

### Notes



























Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



# HCM 6th Signalized Intersection Summary

## 7: Crosstree Drive/Gateway Dr & US 278

06/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	40	2980	40	50	4260	30	30	0	60	40	0	60
Future Volume (veh/h)	40	2980	40	50	4260	30	30	0	60	40	0	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	3239	0	54	4630	0	33	0	0	43	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	4297		70	4309		103	1		109	1	
Arrive On Green	0.04	0.84	0.00	0.04	0.84	0.00	0.03	0.00	0.00	0.04	0.00	0.00
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	1781	1870	0	1781	1870	0
Grp Volume(v), veh/h	43	3239	0	54	4630	0	33	0	0	43	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1781	1870	0	1781	1870	0
Q Serve(g_s), s	3.9	44.9	0.0	4.9	138.0	0.0	3.0	0.0	0.0	3.9	0.0	0.0
Cycle Q Clear(g_c), s	3.9	44.9	0.0	4.9	138.0	0.0	3.0	0.0	0.0	3.9	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	65	4297		70	4309		103	1		109	1	
V/C Ratio(X)	0.66	0.75		0.77	1.07		0.32	0.00		0.39	0.00	
Avail Cap(c_a), veh/h	76	4297		131	4309		120	114		120	114	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	77.7	5.6	0.0	77.8	12.8	0.0	77.8	0.0	0.0	77.6	0.0	0.0
Incr Delay (d2), s/veh	15.2	0.8	0.0	16.5	38.7	0.0	1.8	0.0	0.0	2.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	10.4	0.0	2.5	46.1	0.0	1.4	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.9	6.4	0.0	94.4	51.5	0.0	79.5	0.0	0.0	79.9	0.0	0.0
LnGrp LOS	F	A		F	F		E	A		E	A	
Approach Vol, veh/h		3282	A		4684	A		33	A		43	A
Approach Delay, s/veh		7.5			52.0			79.5			79.9	
Approach LOS		A			D			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	142.1	9.9	0.6	10.5	142.5	10.5	0.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.0	133.0	7.0	10.0	7.0	138.0	7.0	10.0				
Max Q Clear Time (g_c+I1), s	6.9	46.9	5.0	0.0	5.9	140.0	5.9	0.0				
Green Ext Time (p_c), s	0.0	70.5	0.0	0.0	0.0	0.0	0.0	0.0				

### Intersection Summary

HCM 6th Ctrl Delay	34.1
HCM 6th LOS	C

### Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

## APPENDIX B

### HCS Analysis Reports

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2344
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.23

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	-
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	-
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2255	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.63
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2344
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.23

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	-
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	-
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2255	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.63
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Blue Heron to Squire Pope		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2344
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.23

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	-
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	-
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2255	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.58
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D



# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	45.0
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	25.9
Median Type Adjustment (fM)	-	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.28
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	23.3
Median Type Adjustment (fM)	-	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.28
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Blue Heron to Squire Pope		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	45.0
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	25.9
Median Type Adjustment (fM)	-	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.23
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1728
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.91

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	43.8
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	39.5
Median Type Adjustment (fM)	-	Level of Service (LOS)	E
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1663	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.48
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	55.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1728
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2100
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2100
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.82

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	53.2
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	32.5
Median Type Adjustment (fM)	-	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1663	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.48
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C



# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3080	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1740
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.92

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	43.7
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	39.8
Median Type Adjustment (fM)	-	Level of Service (LOS)	E
Access Point Density Adjustment (fA)	-		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1674	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.43
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2458
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.29

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	42.2
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	45.0
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2364	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.66
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	55.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2458
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2100
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2100
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.17

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	46.7
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	45.0
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2364	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.66
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 No Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	-
Lane Width, ft	-	Left-Side Lateral Clearance (LCR), ft	-
Median Type	-	Total Lateral Clearance (TLC), ft	-
Access Point Density, pts/mi	-	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4390	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	2480
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.31

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	-	Average Speed (S), mi/h	42.2
Total Lateral Clearance Adj. (fLLC)	-	Density (D ), pc/mi/ln	45.0
Median Type Adjustment (fM)	-	Level of Service (LOS)	F
Access Point Density Adjustment (fA)	-		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	2386	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.61
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1563
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	31.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1504	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.43
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	23.3
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Blue Heron to Squire Pope		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1563
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	31.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1504	Effective Speed Factor (St)	4.42
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C



# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	23.3
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.79
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.28
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1563
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	31.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1504	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.47
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Blue Heron to Squire Pope		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1164
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.61

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	45.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	25.9
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1120	Effective Speed Factor (St)	4.42
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.17
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1152
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	23.0
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1109	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	55.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1728
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2100
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2100
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.82

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.2
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	32.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1663	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.52
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	2	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	45.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3080	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1740
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.92

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	43.7
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	39.8
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	E
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1674	Effective Speed Factor (St)	4.42
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.37
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1638
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.82

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.1
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	33.4
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1576	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.49
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C



# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	60.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1638
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2200
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2200
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.74

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	27.8
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1576	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.49
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Reversible Lane
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	45.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4390	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1653
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	1900
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.87

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	44.3
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	37.3
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	E
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1591	Effective Speed Factor (St)	4.42
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.35
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1563
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	31.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1504	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.47
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	4150	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1563
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	31.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1504	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.47
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	776
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.39

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	15.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	B
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	746	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.12
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	55.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	2060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	776
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2100
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2100
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.37

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	55.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	14.1
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	B
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	746	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.12
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1152
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	50.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	23.0
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1109	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C



# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 1 Geometric Data

Direction 1	EB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	60.0

## Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 1 Demand and Capacity

Volume(V) veh/h	3060	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1152
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2200
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2200
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.52

## Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	60.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	19.2
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	C
Access Point Density Adjustment (fA)	0.0		

## Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1109	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Bluffton to Pinckney		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	50.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	50.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1638
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2000
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2000
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.82

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	49.1
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	33.4
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1576	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.49
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C

# HCS7 Multilane Highway Report

## Project Information

Analyst	CDM Smith	Date	7/20/2020
Agency		Analysis Year	2045 Build
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Pinckney to Blue Heron		

## Direction 2 Geometric Data

Direction 2	WB		
Number of Lanes (N), ln	3	Terrain Type	Rolling
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	0.0	Free-Flow Speed (FFS), mi/h	60.0

## Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

## Direction 2 Demand and Capacity

Volume(V) veh/h	4350	Heavy Vehicle Adjustment Factor (fHV)	0.962
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	1638
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2200
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2200
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.74

## Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	27.8
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	D
Access Point Density Adjustment (fA)	0.0		

## Direction 2 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	1576	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicycle LOS Score (BLOS)	3.49
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	C



## Technical Memorandum

*To: Craig Winn, PE  
Project Manager  
South Carolina Department of Transportation*

*From: CDM Smith*

*Date: July 17, 2020 – Revised January 19, 2021*

*Subject: US 278 – Alternative Intersection Analysis between Squire Pope Road and Wild Horse Road/Spanish Wells Road*

### Introduction

The Town of Hilton Head has requested additional intersection analysis to improve the traffic operations at the Squire Pope Road and Wild Horse Road/ Spanish Wells Road intersections with US 278. This technical memorandum details the various alternatives that were chosen for analysis and the resulting performance metrics that led to the recommended alternative for this segment of US 278.

### Initial Traffic Report Findings

In the original Traffic Report – “Phase I Traffic Report” submitted in March 2020, the long list of potential US 278 corridor alignment alternatives were narrowed down to six “Reasonable Alternatives” that would be advanced based on predefined criteria. Since that report was submitted, Reasonable Alternative 4A has been chosen as the preferred alternative for the US 278 alignment and was used as the basis for the analysis in this Technical Memorandum. Reasonable Alternative 4A is described below:

- Symmetrical widening from Moss Creek Drive to end of Bluffton Parkway ramps
- Six lanes parallel alignment on new location and to the south of existing from beginning of Mackay Creek Bridge to end of Skull Creek Bridge
- Hold the south curb line and widen to the north from Jenkins Island to Squire Pope Road
- Widen symmetrically from Squire Pope Road to end of project at Spanish Wells Road
- New interchange at Pinckney Island
- Bridge across Pinckney Island – one six-lane bridge across Mackay Creek, Pinckney Island, and Skull Creek
- New local road with a bridge connecting Hog Island to Jenkins Road on the north side of US 278

As part of the traffic analysis in the “Phase I Traffic Report”, all the major intersections with US 278 were analyzed under the 2045 Build Condition and it was assumed that the only intersection improvements were additional turn lanes and/or signal timing adjustments. The Superstreet along Jenkins Island was also assumed to be in place and was not altered. The following table summarizes the intersection levels of service (LOS) for Reasonable Alternative 4A. The LOS was determined using the Synchro software.

Table 1 – Initial Intersection Recommendations Level of Service Summary

Intersection		AM			PM		
		Movement	LOS	Delay	Movement	LOS	Delay
Moss Creek Rd		Overall	C	24.6	Overall	C	29.5
Salt Marsh Dr*		WBL	F	127.5	SBR	F	+
Fording Island Rd*		NBL	F	+	NBL	F	+
Pinckney Wildlife Refuge**		EB Off-Ramp	C	N/A	WB Off-Ramp	D	N/A
Jenkins Island Superstreet	Crosstree Dr/Gateway Dr	Overall	E	60.0	Overall	D	35.8
	Jenkins Rd*	SBR	D	31.2	SBR	F	+
	Jenkins Island U-Turn	Overall	A	2.6	Overall	B	15.9
Squire Pope Rd		Overall	D	51.5	Overall	E	71.9
Wild Horse Rd/Spanish Wells Rd		Overall	C	31.8	Overall	E	76.2

+ Results are producing unreasonably long delays that are often greater than 360 seconds, but the values are not shown due to software limitations.

\*\* Intersection analyzed as interchange ramp condition with HCS software

\* Unsignalized intersection – the movement with the most severe LOS is shown

As seen in Table 1, the performances of Squire Pope Road and Wild Horse Road/Spanish Wells Road are expected to be LOS E in the PM peak hour, which is below the acceptable LOS D standard. The intent of this initial intersection configuration was to minimize the geometric impacts to the side roads and to tie into the existing geometry at the Spanish Wells Road intersection (see Figure 1 for the original proposed lane geometry). However, because of this degradation in level of service for these two intersections, even under a Build condition, the Town of Hilton Head requested that additional analysis be performed for the corridor between Squire Pope Road and Spanish Wells Road. This report details the methodology used to narrow down several possible intersection configurations to one recommended alternative between Squire Pope Road and Spanish Wells Road.

Figure 1 - Initial Intersection Recommendations for Squire Pope Road and Spanish Wells Road





Long List of Intersection Alternatives Identified

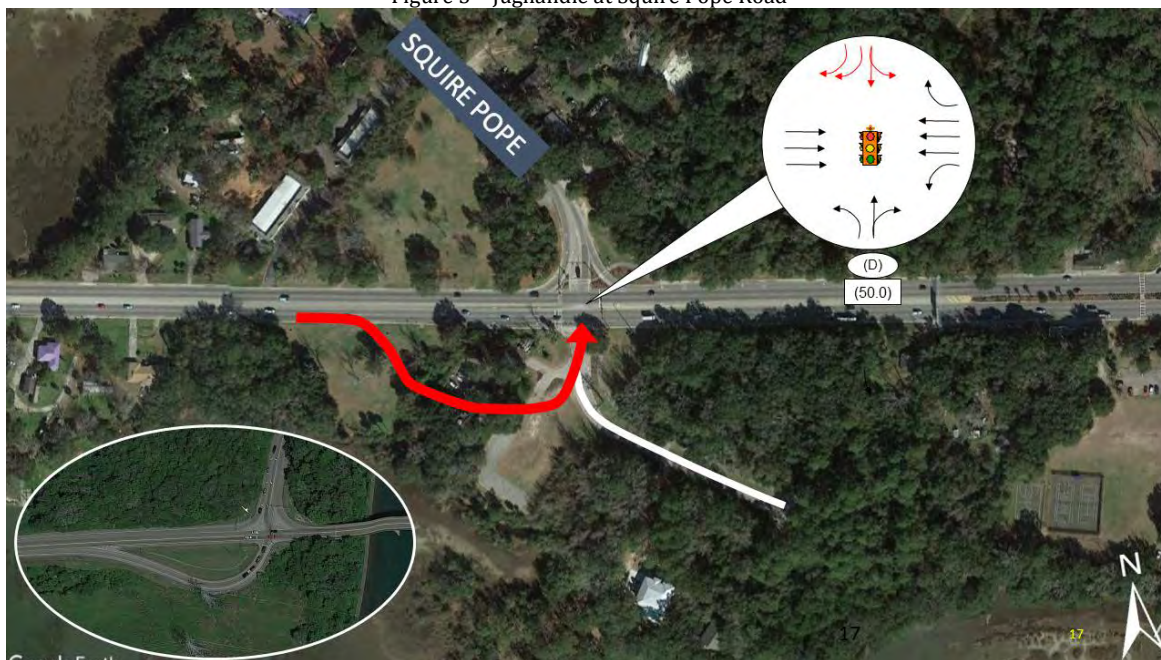
The traffic team brainstormed with SCDOT to come up with various alternative intersection designs that would meet the needs of the corridor between Squire Pope Road and Spanish Wells Road. As shown in Figure 2 below, the critical lane movements at Squire Pope Road are the eastbound left turn and the southbound right turn. At the Spanish Wells Road intersection, the critical movements are the eastbound right turn and the northbound left turn. In order to achieve an acceptable level of service for the overall intersection, these high-volume movements need to be prioritized. The intersection alternatives that were identified for the initial round of review all provide special consideration for the critical movements that a normal four-phase signal operation does not.

Figure 2 – Projected 2045 Traffic Volumes for Squire Pope Road and Spanish Wells Road



### 1 – Jughandle at Squire Pope Road

Figure 3 – Jughandle at Squire Pope Road



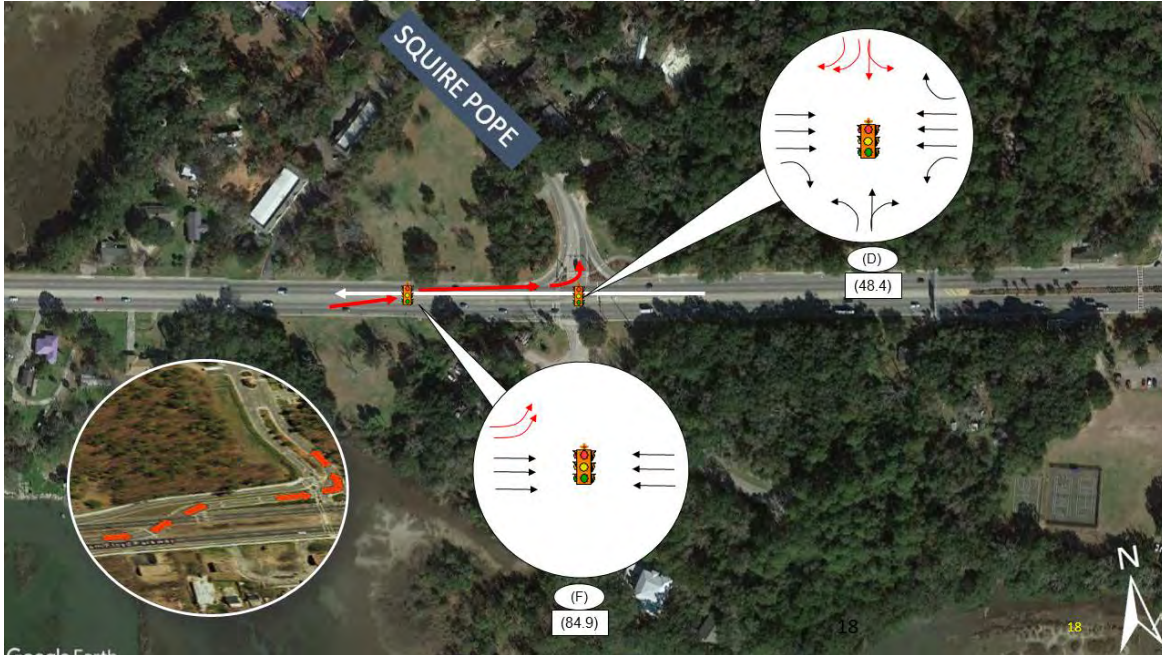
Intersection Alternative 1 is a jughandle at the intersection of Squire Pope Road. This alternative would allow eastbound left turning vehicles to exit US 278 on the right side and loop around to the signal via Chamberlain Drive. They would then proceed northbound onto Squire Pope Road as the northbound through movement. Figure 3 shows what the lane configurations would be and that the level of service for the intersection is D. The detailed Synchro report is available in Appendix A.

- Advantages:
  - Removes the eastbound left turn phase from the signal cycle
  - Improves operations for the overall signal
  - Increases safety by eliminating a left turn movement across three lanes
- Disadvantages:
  - Requires right-of-way acquisition to accommodate the jughandle
  - Driver expectancy is compromised by forcing left turning vehicles to use the right lane



## 2 – Displaced Left Turn at Squire Pope Road

Figure 4 – Displaced Left Turn at Squire Pope Road

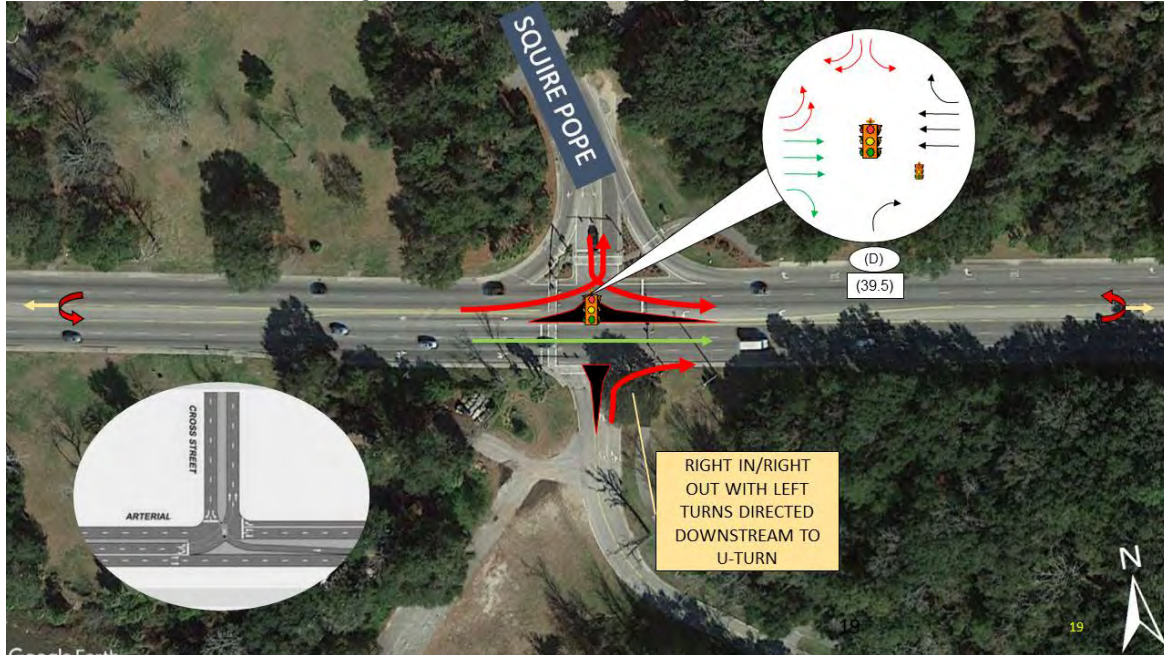


Intersection Alternative 2 is a displaced left turn at the intersection of Squire Pope Road. This alternative would allow eastbound left turning vehicles to crossover opposing traffic before the Squire Pope Road intersection. This allows eastbound left turn movements to operate simultaneously with westbound traffic at the Squire Pope Road intersection. The green time that would have been used for the eastbound left turn movement can be allocated to other phases of the signal. Figure 4 shows what the lane configurations would be and that the level of service for the Squire Pope Road intersection is D; however, the crossover intersection west of Squire Pope Road would operate at LOS F. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Removes the eastbound left turn phase from the main signal cycle
  - Increases safety by eliminating a left turn movement across three lanes
  - Typically used for high opposing through movements
- Disadvantages:
  - Requires right-of-way acquisition to the north to accommodate the crossover
  - Potential for wrong-way travel
  - Potential conflicts with the westbound right turns
  - Requires an additional signal for the crossover

### 3 – Continuous Green T at Squire Pope Road

Figure 5 – Continuous Green-T at Squire Pope Road



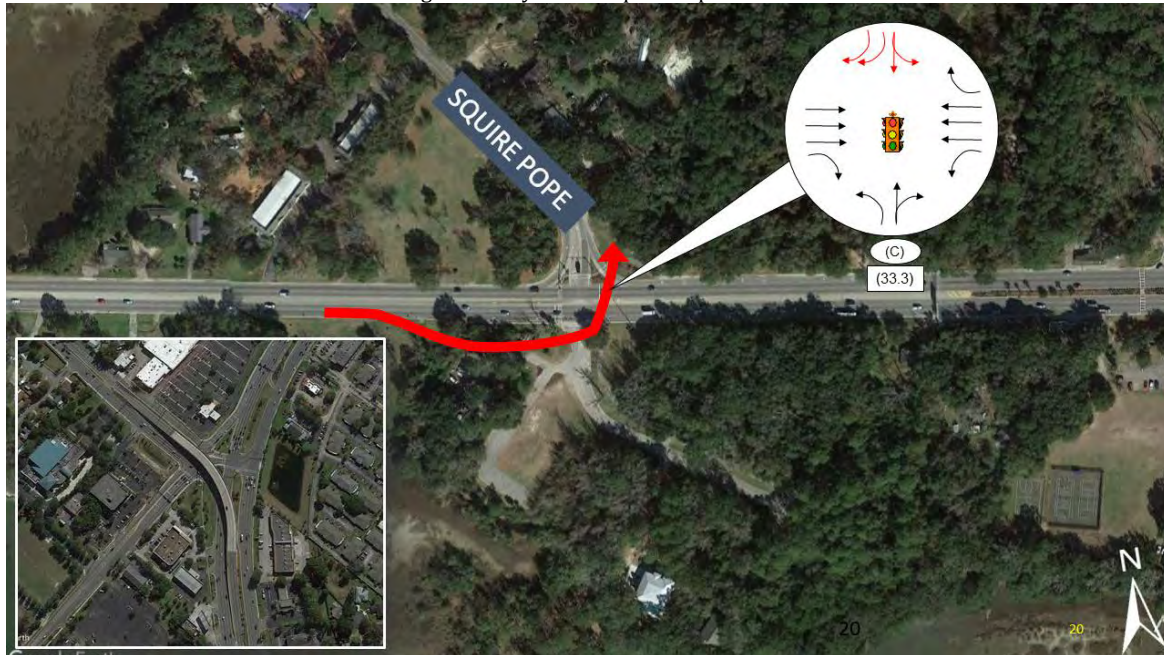
Intersection Alternative 3 is a continuous green-T intersection at Squire Pope Road. This alternative would essentially remove the southern leg (Chamberlain Drive) from the signal phasing. Eastbound through volumes on US 278 would always have a green signal. Left turns to and from Chamberlain Drive would need to make a U-turn somewhere along US 278. Figure 5 shows what the lane configurations would be and that the level of service for the intersection is D. The detailed Synchro report is available in Appendix A.

- Advantages:
  - Removes the northbound phasing from the signal cycle
  - Increases safety by reducing the overall number of conflict points
  - Eastbound US 278 is free-flow
- Disadvantages:
  - Requires significant right-of-way acquisition
  - Creates an unsignalized right-in/right-out condition for Chamberlain Drive
  - Would cause long delays for Chamberlain Drive right turns onto US 278
  - Long distance to U-turn opportunities at Spanish Wells Road and Jenkins Road



#### 4 – Flyover at Squire Pope Road

Figure 6 – Flyover at Squire Pope Road



Intersection Alternative 4 is a flyover for the eastbound left turns at the intersection of Squire Pope Road. This alternative proposes a structure that would allow left turns to use a ramp and merge onto Squire Pope Road. Figure 6 shows what the lane configurations would be and that the level of service for the intersection is C. The detailed Synchro report is available in Appendix A.

- Advantages:
  - Grade separated for eastbound left turn
  - Free-flow travel for eastbound left turn to Squire Pope Road
  - Removes the eastbound left turn phase from the signal cycle
- Disadvantages:
  - Requires significant right-of-way acquisition
  - High construction cost for structure
  - Elevated structure would obstruct the scenic view

### 5 – Detour Northbound Left at Spanish Wells Road

Figure 7 – Restrict Northbound Left Turns from Spanish Wells Road onto US 278



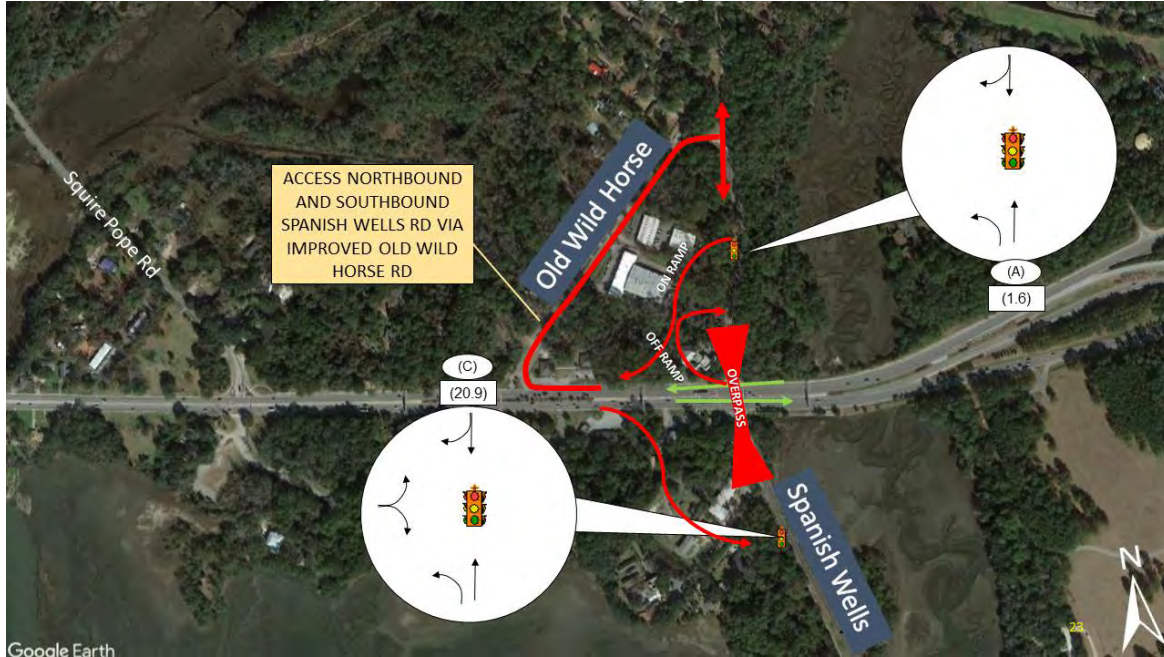
Intersection Alternative 5 consists of restricting the northbound left turn movement at the intersection of Spanish Wells Road. Vehicles on Spanish Wells Road bound for westbound US 278 would need to either travel south on Spanish Wells Road to the Cross Island Parkway on-ramp at Marshland Road or turn right onto US 278 and make a U-turn at the intersection of Gumtree Road. Figure 7 shows the diverted traffic pattern. The impacted intersections are outside of the study area; therefore, detailed intersection analysis was not performed for Gumtree Road or the on-ramp at Marshland Drive.

- Advantages:
  - Removes the northbound left turn phase from the signal cycle
  - Increases safety by eliminating a left turn movement
  - Low cost
- Disadvantages:
  - Long detours
  - Will require special wayfinding signage for detours
  - Adds vehicles to the Cross Island Parkway off-ramp at US 278, potentially worsening the weaving movements near the Spanish Wells Road intersection



#### 6 – Half Diamond Interchange at Spanish Wells Road

Figure 8 – Half Diamond Interchange at Spanish Wells Road

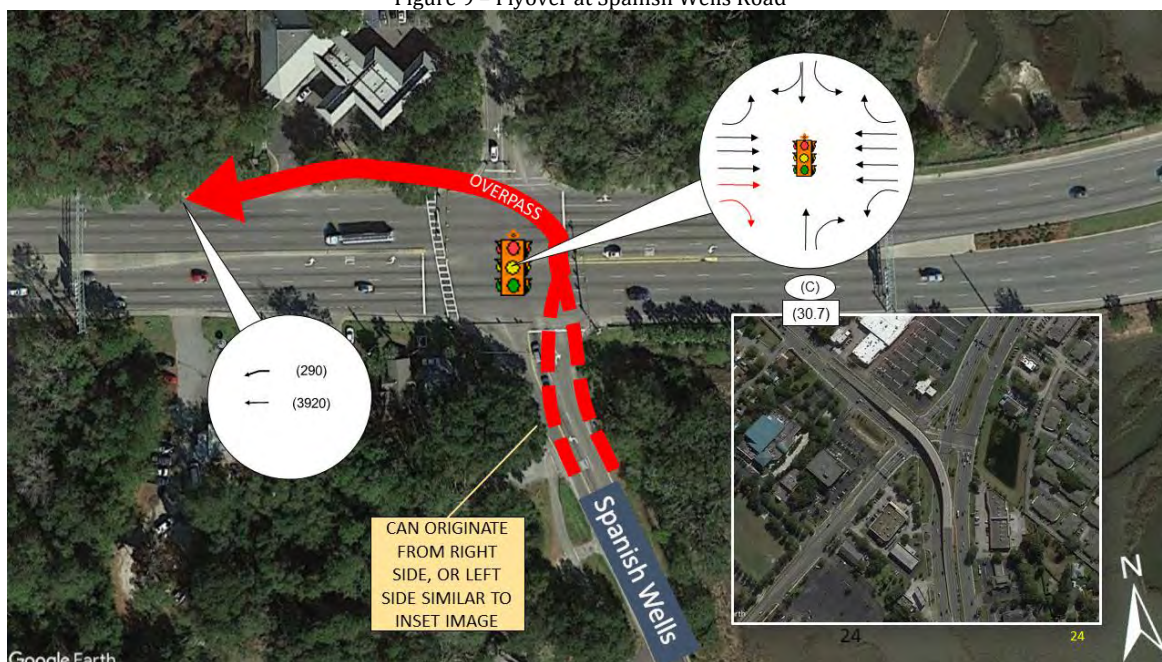


Intersection Alternative 6 is a half diamond interchange at the intersection of Spanish Wells Road. Eastbound traffic on US 278 would use an off-ramp to access Spanish Wells Road southbound or Wild Horse Road northbound. Westbound traffic on US 278 would use an off-ramp to access Spanish Wells Road southbound and use Old Wild Horse Road to access Wild Horse Road north of US 278. Two on-ramps would be provided for access to either eastbound or westbound US 278. Figure 8 shows what the lane configurations would be and that the level of service for the ramp intersections are C and A. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Provides grade separation for all movements at intersection
  - Provides free-flow for US 278
- Disadvantages:
  - Creates a weaving condition for vehicles using the westbound on-ramp and vehicles turning right onto Old Wild Horse Road
  - Old Wild Horse Road would need to accommodate westbound traffic bound for Wild Horse Road northbound
  - High construction cost for structure
  - Elevated structure would obstruct the scenic view

## 7 – Flyover at Spanish Wells Road

Figure 9 – Flyover at Spanish Wells Road



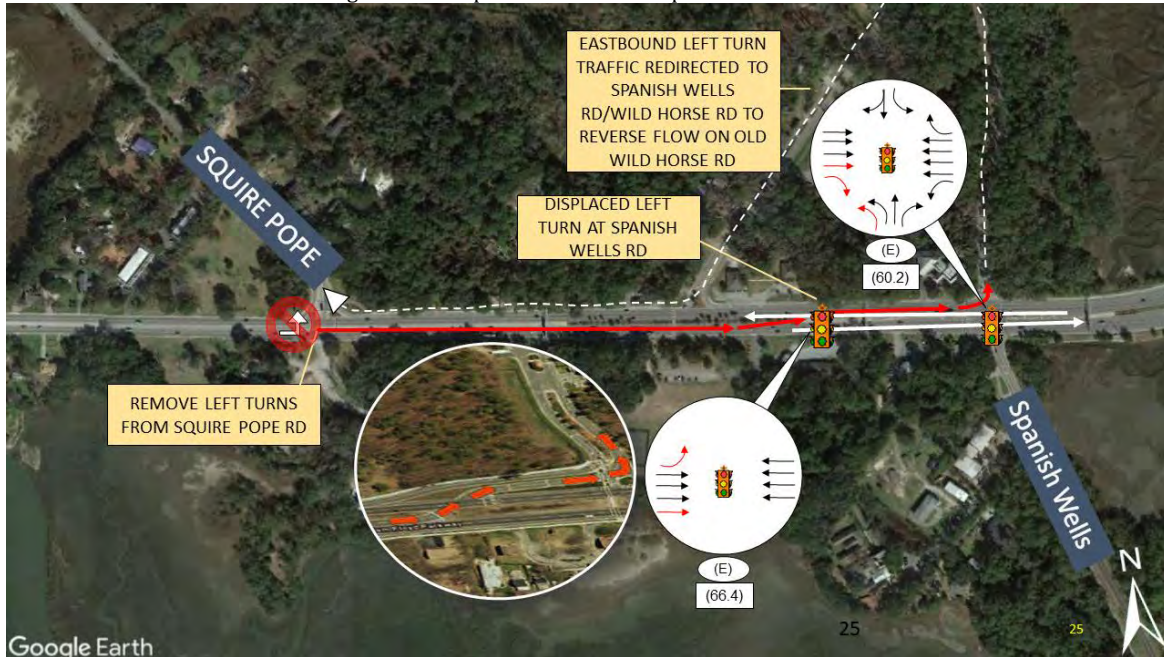
Intersection Alternative 7 is a flyover for the northbound left turns at the intersection of Spanish Wells Road. This alternative proposes a structure that would allow left turns to use a ramp and merge onto westbound US 278. Figure 9 shows what the lane configurations would be and that the level of service for the intersection is C. The detailed Synchro report is available in Appendix A.

- Advantages:
  - Grade separated for northbound left turn
  - Free-flow travel for northbound left turn onto US 278
  - Removes the northbound left turn phase from the signal cycle
- Disadvantages:
  - Requires significant right-of-way acquisition
  - High construction cost for structure
  - Elevated structure would obstruct the scenic view



### 8 – Displaced Left at Spanish Wells Road

Figure 10 – Displaced Left Turn at Spanish Wells Road

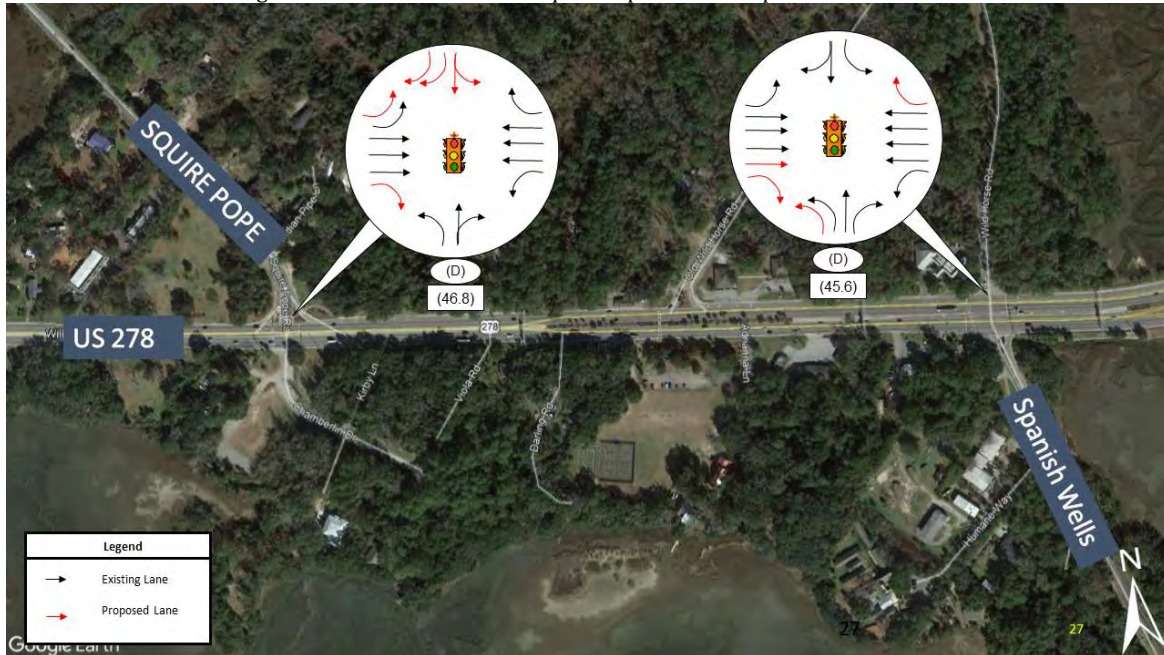


Intersection Alternative 8 is a displaced left turn at the intersection of Spanish Wells Road. This alternative would displace the eastbound left turns from Squire Pope Road and Spanish Wells Road and allow those vehicles to crossover opposing traffic before the Spanish Wells Road intersection. This allows eastbound left turn movements to operate simultaneously with westbound traffic at the Spanish Wells Road intersection. The green time that would have been used for the eastbound left turn movement can be allocated to other phases of the signal. Vehicles bound for Squire Pope Road would need to detour via Wild Horse Road. Figure 10 shows what the lane configurations would be and that the level of service for the Squire Pope Road intersection is E and the crossover intersection level of service would be E. The detailed Synchro reports are available in Appendix A.

- **Advantages:**
  - Removes the eastbound left turn phase from the signal cycle
  - Increases safety by eliminating a left turn movement across three lanes
  - Typically used for high opposing through movements
- **Disadvantages:**
  - Requires right-of-way acquisition to the north to accommodate the crossover
  - Requires eastbound left turns to Squire Pope Road to detour using Wild Horse Road
  - Potential for wrong-way travel
  - Potential conflicts with the westbound right turns
  - Requires an additional signal for the crossover

*9 – Maximize Lanes at Squire Pope Road and Spanish Wells Road*

Figure 11 – Maximize Lanes at Squire Pope Road and Spanish Wells Road



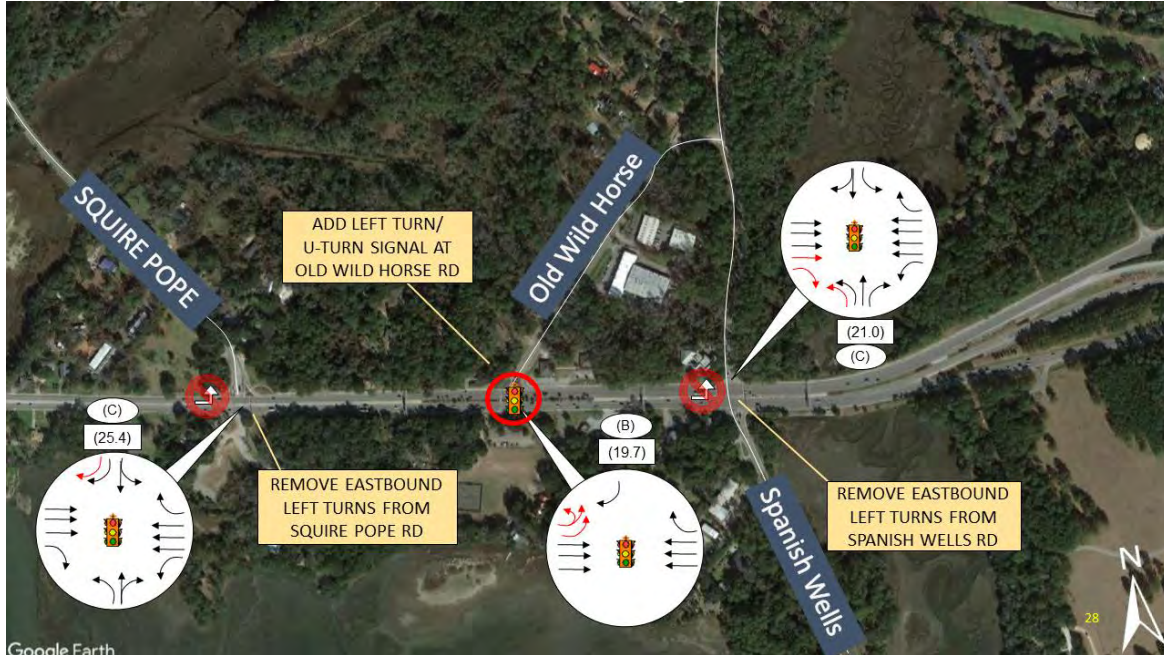
Intersection Alternative 9 proposes to maximize the turn lanes at both the Squire Pope Road intersection and the Spanish Wells Road intersection in order to achieve LOS D or better. Figure 11 shows what the lane configurations would be and that the level of service for each intersection is D. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Low cost
  - Achieves LOS D at both intersections
- Disadvantages:
  - Increases side-road footprint without much benefit in level of service
  - Adds a protective left turn phase to the Spanish Wells Road signal for the dual northbound lefts.



*10 – Consolidate Lefts from Squire Pope Road and Spanish Wells Road to Old Wild Horse*

Figure 12 – Consolidate Eastbound Left Turns to Old Wild Horse Road

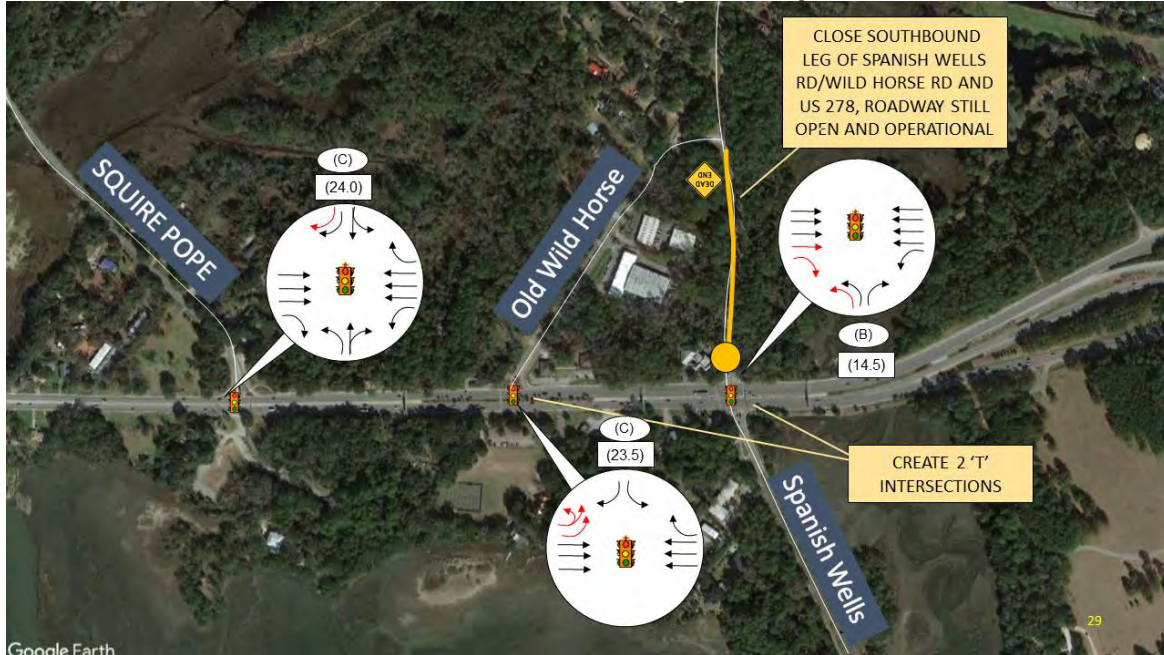


Intersection Alternative 10 proposes to consolidate all eastbound left turns from Squire Pope Road and Spanish Wells Road to a signal at Old Wild Horse Road. This alternative would remove a signal phase from both existing signalized intersections and introduce a new T-intersection at Old Wild Horse Road. Eastbound vehicles bound for Squire Pope Road can either make a U-turn at Old Wild Horse Road or follow Old Wild Horse Road to Wild Horse Road. Figure 12 shows what the lane configurations would be and that the level of service for the intersections would be C or better. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Removes the eastbound left turn phase from the signal cycle at Squire Pope Road and Spanish Wells Road
  - Low cost
  - Increases safety by eliminating a left turn movement across three lanes
  - Consolidates left turns to one location
- Disadvantages:
  - Requires an additional signal
  - Would require wayfinding signage for unfamiliar drivers
  - Old Wild Horse Road may need to be upgraded to accommodate the increase in traffic volumes

*11 – Two T-Intersections at Old Wild Horse and Spanish Wells Road*

Figure 13 – Two T-Intersections at Old Wild Horse Road and Spanish Wells Road



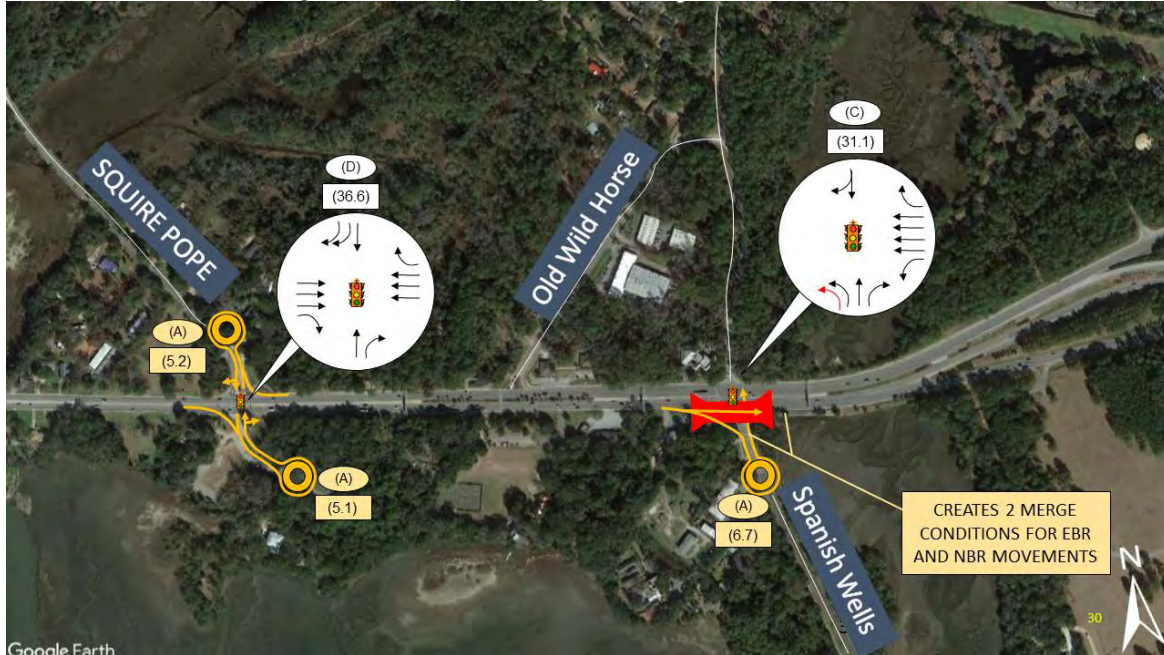
Intersection Alternative 11 proposes to consolidate the eastbound left turns from Squire Pope Road and Spanish Wells Road to a signal at Old Wild Horse Road. It also proposes to close direct access from Wild Horse Road to US 278, which would remove the southbound phase from the signal. Vehicles traveling south on Wild Horse Road bound for US 278 or Spanish Wells Road would need to use Old Wild Horse Road. Figure 13 shows what the lane configurations would be and that the level of service for the intersections would be C or better. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Removes a phase from the signal cycle at each intersection
  - Improves operations the signals between Squire Pope Road and Spanish Wells Road
  - Coordinates signals at three adjacent intersections
- Disadvantages:
  - Adds an additional signal
  - Requires indirect movements and circuitous travel for several movements
  - Old Wild Horse Road may need to be upgraded to accommodate the increase in traffic volumes



## 12 – Roundabouts with Underpass at Spanish Wells Road

Figure 14 – Underpass at Spanish Wells Road with Roundabouts

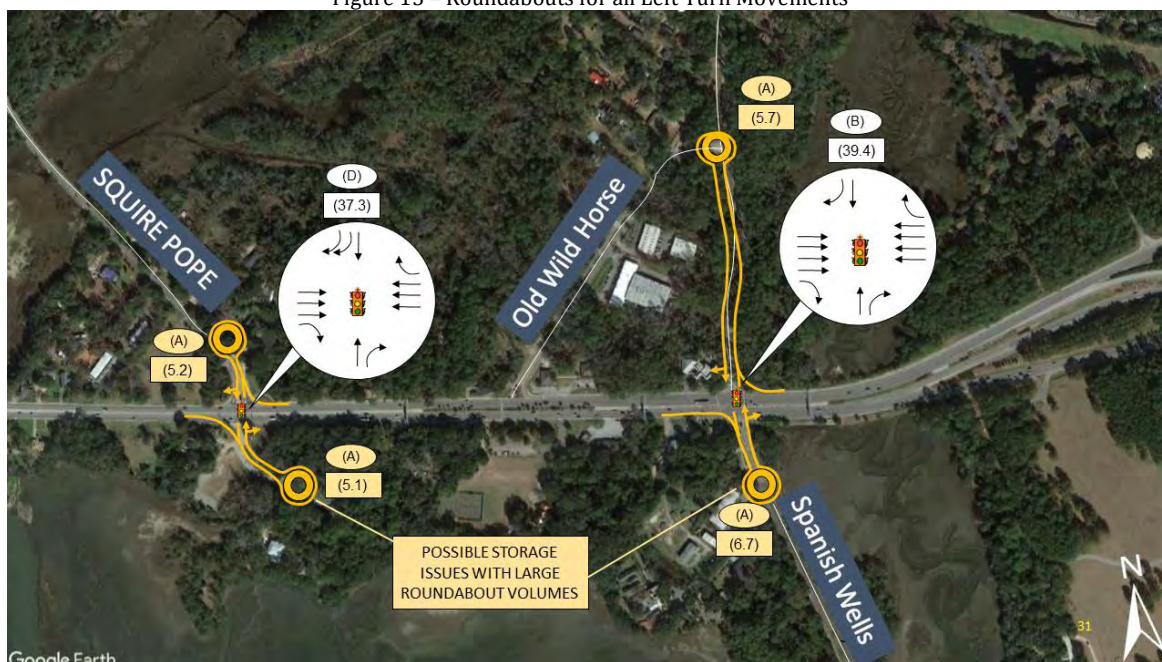


Intersection Alternative 12 proposes the eastbound lanes of US 278 be elevated over the Spanish Wells Road intersection. An off-ramp would be provided for vehicles bound for Wild Horse Road north of US 278 and Spanish Wells Road south of US 278. The northbound vehicles would navigate through a roundabout after exiting US 278 to get to Wild Horse Road. All US 278 left turn movements at the Squire Pope Road intersection would make right turns at the intersection and then be accommodated via two roundabouts north and south of US 278 to become through movements along the side streets. Figure 14 shows what the lane configurations would be and that the level of service for the signalized intersections would be D or better. The roundabouts are expected to operate at LOS A. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Removes the eastbound left turn phase from the signal cycle
  - Increases safety by reducing conflict points
  - Eliminates left turns across opposing traffic
- Disadvantages:
  - High construction cost for structure
  - Increased travel times due to indirect movements
  - Difficult merge conditions at Spanish Wells Road intersection due to proximity to Cross Island Parkway on-ramp

### 13 – Roundabouts for Left Turn Movements

Figure 15 – Roundabouts for all Left Turn Movements



Intersection Alternative 13 proposes to eliminate the left turns at the Squire Pope Road intersection and Spanish Wells Road intersection. All left turn movements at the signalized intersections would be accommodated via two roundabouts north and south of US 278. Figure 15 shows what the lane configurations would be and that the level of service for the signalized intersections would be D or better. The roundabouts are expected to operate at LOS A. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Removes the left turn phases from the signal cycle
  - Increases safety by eliminating all left turn movements
- Disadvantages:
  - Requires right-of-way acquisition to construct roundabouts
  - Increased travel times due to indirect movements



#### 14 – Elevated Viaduct

Figure 16 – Elevated Viaduct



Intersection Alternative 14 is an elevated viaduct that would connect the Cross Island Parkway to west of Squire Pope Road. This alternative would allow traffic bound for the Cross Island Parkway to bypass the local traffic and avoid delay at the signalized intersections. Figure 16 shows what the lane configurations would be and that the level of service for the intersections would be D. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Adds capacity without changing US 278 footprint
  - Provides a controlled access facility for through traffic
  - Separates local traffic from through traffic
- Disadvantages:
  - Minimal level of service improvement
  - High construction cost for structure
  - Elevated structure would obstruct the scenic view

Each of the intersection alternatives were compared to the others based on five (5) criteria: Level of Service; New Travel Pattern; ROW Acquisition; Cost; and View Obstructions.

- Level of Service: The resulting levels of service for Squire Pope Road, Old Wild Horse Road (where applicable), and Spanish Wells Road.
- New Travel Pattern: Given a score of high (red), medium (yellow), or low (green) based on the need for any deviation from the current travel patterns.
- Right-of-Way (ROW) Acquisition: Given a score of high (red), medium (yellow), or low (green) based on the estimated amount of ROW needed to construct the alternative.
- Cost: Given a score of high (red), medium (yellow), or low (green) based on the estimated cost to construct the alternative.
- View Obstructions: Given a score of high (red) or low (green) based on whether the alternative would include an elevated structure that would obstruct the scenic view.

Figure 17 shows the summary table for the intersection alternatives and how each alternative scored. After discussion with SCDOT and the consultant's traffic team, it was determined that four alternatives (**bold** in Figure 17) would be advanced for an additional screening analysis. These alternatives were the Jughandle at Squire Pope Road, Flyover at Squire Pope Road, Maximize Lanes at both intersections, and consolidating left turns at a signal at Old Wild Horse Road.

Figure 17 – Summary Table of Long List of Intersection Alternatives

	Alternative	Level of Service			New Travel Pattern	ROW Acquisition	Cost	View Obstructions	Advanced?
		Squire Pope	Old Wild Horse	Spanish Wells					
Squire Pope	<b>1 – Jughandle</b>	D	-	D	Yellow	Yellow	Yellow	Green	Yes
	2 – Displaced Left	F/D	-	D	Green	Red	Yellow	Green	No
	3 – Continuous Green T	D	-	D	Yellow	Red	Yellow	Green	No
	<b>4 – Flyover</b>	C	-	D	Green	Red	Red	Red	Yes
Spanish Wells	5 – Restricted NB Lefts	D	-	-	Red	Green	Green	Green	No
	6 – Half Diamond Interchange	D	-	C/A	Green	Red	Red	Red	No
	7 – Flyover	D	-	C	Green	Red	Red	Red	No
	8 – Displaced Left	D	-	E/E	Green	Red	Yellow	Green	No
Multiple Intersections	<b>9 – Maximize Lanes</b>	D	-	D	Green	Yellow	Green	Green	Yes
	<b>10 – Signal at Old Wild Horse</b>	C	<b>B</b>	C	Yellow	Green	Green	Green	Yes
	11 – Two T-Intersections	C	C	B	Yellow	Yellow	Yellow	Green	No
	12 – Roundabouts and Overpass	D	-	C	Yellow	Red	Red	Red	No
	13 – Roundabouts for Left Turn Movements	D	-	B	Yellow	Red	Red	Green	No
	14 – Viaduct	D	-	D	Yellow	Green	Red	Red	No



### Short List of Preferred Intersection Concepts

For the four shortlisted intersection concepts, additional analysis and SimTraffic simulation were performed to determine the final lane configurations and levels of service for the system of intersections between Squire Pope Road and Spanish Wells Road. The queueing analysis provided from the simulation showed areas where the geometry could be fine-tuned to better serve traffic. From this analysis, conceptual layouts were also developed to show the potential footprint for the preferred intersections. The following provide more detail of the preferred intersection concepts and the travel time results from the simulation.

#### 1 – Jughandle at Squire Pope Road

Figure 18 – Jughandle at Squire Pope Road Intersection Concept



Figure 18 shows the anticipated layout for the Jughandle at Squire Pope Road. As seen in the concept drawing, this alternative would require a large amount of right-of-way acquisition in the southwestern quadrant of the intersection. In Table 2 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 25 mph in the eastbound and 34 mph in the westbound during the AM peak hour. During the PM peak hour, the speeds are anticipated to be 18 mph in the eastbound and 23 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 2 - SimTraffic Measures of Effectiveness Summary

Jughandle at Squire Pope Road							
Eastbound	AM	Travel Time (s)	61.1	Westbound	AM	Travel Time (s)	44
		Arterial Speed (mph)	25			Arterial Speed (mph)	34
		Delay (s)	28			Delay (s)	10.7
	PM	Travel Time (s)	85.6		PM	Travel Time (s)	66.2
		Arterial Speed (mph)	18			Arterial Speed (mph)	23
		Delay (s)	52.7			Delay (s)	32.7

#### 4 – Flyover at Squire Pope Road

Figure 19 – Flyover at Squire Pope Road Intersection Concept



Figure 19 shows the anticipated layout for the Flyover at Squire Pope Road. As seen in the concept drawing, this alternative would require a large amount of right-of-way acquisition in the southwestern, southeastern, and northeastern quadrants of the intersection. In Table 3 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 19 mph in the eastbound and 26 mph in the westbound during the AM peak hour. During the PM peak hour, the speeds are anticipated to be 36 mph in the eastbound and 24 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 3 - SimTraffic Measures of Effectiveness Summary

Flyover at Squire Pope Road							
Eastbound	AM	Travel Time (s)	80.5	Westbound	AM	Travel Time (s)	42
		Arterial Speed (mph)	19			Arterial Speed (mph)	36
		Delay (s)	46.9			Delay (s)	8.8
	PM	Travel Time (s)	57.4		PM	Travel Time (s)	63.3
		Arterial Speed (mph)	26			Arterial Speed (mph)	24
		Delay (s)	24.1			Delay (s)	30



*9 – Maximize Lanes at Squire Pope Road and Spanish Wells Road*

Figure 20 – Maximize Lanes at Squire Pope Road Intersection Concept



Figure 21 – Maximize Lanes at Spanish Wells Road Intersection Concept

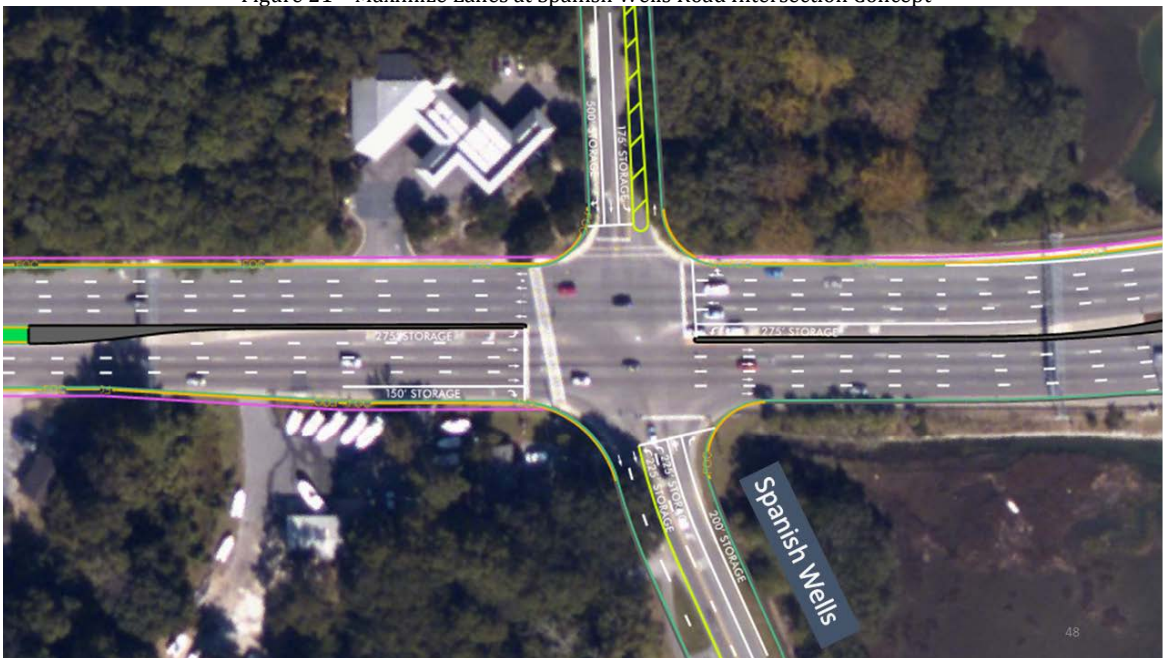


Figure 20 and Figure 21 show the anticipated layout for the maximum lane scenario at Squire Pope Road and Spanish Wells Road, respectively. This alternative allows all turning movements at both intersections, which result in Level of Service D or better. In Table 4 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 21 mph in the eastbound and 24 mph in the westbound during the AM peak hour. During the PM peak hour, the

speeds are anticipated to be 32 mph in the eastbound and 20 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 4 - SimTraffic Measures of Effectiveness Summary

Maximize Lanes at Squire Pope Road and Spanish Wells Road							
Eastbound	AM	Travel Time (s)	72.1	Westbound	AM	Travel Time (s)	46.9
		Arterial Speed (mph)	21			Arterial Speed (mph)	32
		Delay (s)	39.2			Delay (s)	13.9
	PM	Travel Time (s)	63.5		PM	Travel Time (s)	76.5
		Arterial Speed (mph)	24			Arterial Speed (mph)	20
		Delay (s)	30.3			Delay (s)	43.2

#### 10 – Consolidate Lefts from Squire Pope Road to Old Wild Horse

Figure 22 – Old Wild Horse Road Signal Intersection Concept



Figure 22 shows the anticipated layout for the signal at Old Wild Horse Road. As seen in the concept drawing, the dual left turn lanes from Squire Pope Road will shift to the intersection of Old Wild Horse Road. The inside left turn lane will allow U-turns to access Squire Pope Road. In Table 5 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 14 mph in the eastbound and 23 mph in the westbound during the AM peak hour. During the PM peak hour, the speeds are anticipated to be 29 mph in the eastbound and 15 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 5 - SimTraffic Measures of Effectiveness Summary

Signal at Old Wild Horse Road							
Eastbound	AM	Travel Time (s)	105.1	Westbound	AM	Travel Time (s)	52.3
		Arterial Speed (mph)	14			Arterial Speed (mph)	29
		Delay (s)	69.4			Delay (s)	18.7
	PM	Travel Time (s)	66.2		PM	Travel Time (s)	102.9
		Arterial Speed (mph)	23			Arterial Speed (mph)	15
		Delay (s)	33.1			Delay (s)	69.5



**10A – Consolidate Lefts from Squire Pope Road and Spanish Wells Road to Old Wild Horse**

Figure 23 – Old Wild Horse Road Signal (A) Intersection Concept



During discussions with SCDOT about the Old Wild Horse Road signal concept, additional scenarios were brought up that might enhance this alternative. Figure 23 shows the anticipated layout for the scenario in which the westbound left turns from Spanish Wells Road are relocated to the Old Wild Horse Road signal. In Table 6 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 23 mph in the eastbound and 27 mph in the westbound during the AM peak hour. During the PM peak hour, the speeds are anticipated to be 34 mph in the eastbound and 16 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 6 - SimTraffic Measures of Effectiveness Summary

Signal at Old Wild Horse Road							
Eastbound	AM	Travel Time (s)	66.8	Westbound	AM	Travel Time (s)	44.2
		Arterial Speed (mph)	23			Arterial Speed (mph)	34
		Delay (s)	33.7			Delay (s)	10.5
	PM	Travel Time (s)	55.2		PM	Travel Time (s)	94.3
		Arterial Speed (mph)	27			Arterial Speed (mph)	16
		Delay (s)	21.7			Delay (s)	60.8

**10B – Consolidate Lefts from Squire Pope Road and Spanish Wells Road to Old Wild Horse**

Figure 24 – Old Wild Horse Road Signal (B) Intersection Concept



Figure 24 shows the anticipated layout for the scenario in which the westbound left turns from Spanish Wells Road are relocated to the Old Wild Horse Road signal and Old Wild Horse Road is converted to one-way northbound. In Table 7 below, the SimTraffic results are summarized for the section of US 278 between Squire Pope Road and Spanish Wells Road. It is anticipated that this intersection alternative will experience an arterial speed of 24 mph in the eastbound and 26 mph in the westbound during the AM peak hour. During the PM peak hour, the speeds are anticipated to be 34 mph in the eastbound and 22 mph in the westbound. The detailed SimTraffic reports are available in Appendix B.

Table 7 - SimTraffic Measures of Effectiveness Summary

Signal at Old Wild Horse Road							
Eastbound	AM	Travel Time (s)	63.1	Westbound	AM	Travel Time (s)	45.1
		Arterial Speed (mph)	24		AM	Arterial Speed (mph)	34
		Delay (s)	30			Delay (s)	11.5
	PM	Travel Time (s)	58.4		PM	Travel Time (s)	68.4
		Arterial Speed (mph)	26			Arterial Speed (mph)	22
		Delay (s)	24.9			Delay (s)	34.9

The SimTraffic summary for all of the preferred alternatives is provided in Table 8. Each alternative was ranked subject to the same peak hour and direction of travel and given a score relative to the highest performing alternative (higher speed, lower delay). Based on the combined ranking of arterial speed and delay, the alternatives were compared to one another, which resulted in the following order of alternatives from best to worst:

- Flyover at Squire Pope Road
- Old Wild Horse Road Signal (B) – left turns from Spanish Wells Road and one-way Old Wild Horse Road
- Old Wild Horse Road Signal (A) – left turns from Spanish Wells Road
- Jughandle at Squire Pope Road
- Maximize Lanes
- Old Wild Horse Road Signal

Table 8 - SimTraffic Measures of Effectiveness Summary – All Preferred Alternatives

		SimTraffic						LOS		
		EB Travel Time (s)	EB Speed (mph)	EB Delay (s)	WB Travel Time (s)	WB Speed (mph)	WB Delay (s)	Squire Pope	Old Wild Horse	Spanish Wells
Jughandle	AM	61.1	25	28.0	44.0	34	10.7	D	N/A	D
	PM	85.6	18	52.7	66.2	23	32.7	D	N/A	D
Flyover	AM	80.5	19	46.9	42.0	36	8.8	D	N/A	D
	PM	57.4	26	24.1	63.3	24	30.0	C	N/A	D
Maximize Lanes	AM	72.1	21	39.2	46.9	32	13.9	B	N/A	D
	PM	63.5	24	30.3	76.5	20	43.2	D	N/A	D
OWH Signal	AM	105.1	14	69.4	52.3	29	18.7	D	A	D
	PM	66.2	23	33.1	102.9	15	69.5	D	D	C
OWH Signal (A)	AM	66.8	23	33.7	44.2	34	10.5	C	B	C
	PM	55.2	27	21.7	94.3	16	60.8	B	D	C
OWH Signal (B)	AM	63.1	24	30.0	45.1	34	11.5	C	A	B
	PM	58.4	26	24.9	68.4	22	34.9	B	C	C

After further consideration of the right-of-way impacts and costs to construct the Flyover and Jughandle, these alternatives were removed from contention. Additionally, only the highest-ranking version of the Old Wild Horse Road Signal alternative was advanced. The remaining two alternatives were Old Wild Horse Road Signal (B) and Maximize Lanes.

Table 8 shows that the Old Wild Horse Road Signal (B) alternative performs better in both the eastbound and westbound directions in the AM and PM peak hours. The Old Wild Horse Road Signal (B) alternative results in some circuitous travel due to the consolidation of left turns at the Old Wild Horse Road intersection, which could present challenges relative to wayfinding and driver expectancy. However, despite these challenges, the operational analysis shows that it produces better levels of service during both peak hours. The Old Wild Horse Road Signal (B) also results in a smaller footprint at the Spanish Wells Road intersection.

### Final Recommended Alternative and Geometry

The recommended intersection alternative for the segment of the corridor between Squire Pope Road and Spanish Wells Road is the Old Wild Horse Road Signal (B). This alternative proposes to consolidate eastbound left turn volumes from Squire Pope Road and Spanish Wells Road to a signalized intersection at Old Wild Horse Road. Restricting US 278 eastbound left turns onto Squire Pope Road will eliminate a protected phase from the signal cycle while also reducing the overall footprint of this intersection to reduce the impacts to adjacent properties.

The westbound left turn volumes from the Spanish Wells Road intersection will now operate as a U-turn at the new Old Wild Horse Road signal. Old Wild Horse Road will be converted to a one-way facility northbound to ensure that only the U-turns and through movements have phasing at the signal.

A final Synchro analysis was performed on the recommended alternative to ensure that the intersection geometries provide the least amount of impacts while providing an acceptable level of service. The dual southbound right turn was removed from the Squire Pope Road intersection and replaced with a single free-flow right with an acceleration lane onto US 278. Table 9 summarizes the level of service for the recommended alternative. The detailed Synchro reports are available in Appendix A.

Table 9 – Final Recommended Alternative Level of Service Summary

Intersection	AM			PM		
	Movement	LOS	Delay	Movement	LOS	Delay
Squire Pope Rd	Overall	C	24.9	Overall	B	15.8
Old Wild Horse Road	Overall	B	10.0	Overall	D	35.8
Wild Horse Rd/Spanish Wells Rd	Overall	A	9.9	Overall	C	29.2

Although this alternative reluctantly succumbs to the need for an additional traffic signal, this configuration attempts to consolidate more traffic at a single traffic signal in contrast to dispersing traffic among several traffic signals. This area of US 278 has a different character than other areas of the corridor and serve a unique land use composition, consequently there is a greater need to disrupt US 278 flow and provide reasonable access to and from the side streets. The compromise is to provide reasonable access to land use, but to minimize the interruption of flow on US 278, all while proving the safest facility possible.

The following graphics (Figures 25-27) detail the intersection geometries for the recommended alternative.



Figure 25 – Old Wild Horse Road Signal (B) – Squire Pope Road Intersection Concept



Figure 26 – Old Wild Horse Road Signal (B) – Old Wild Horse Road Intersection Concept

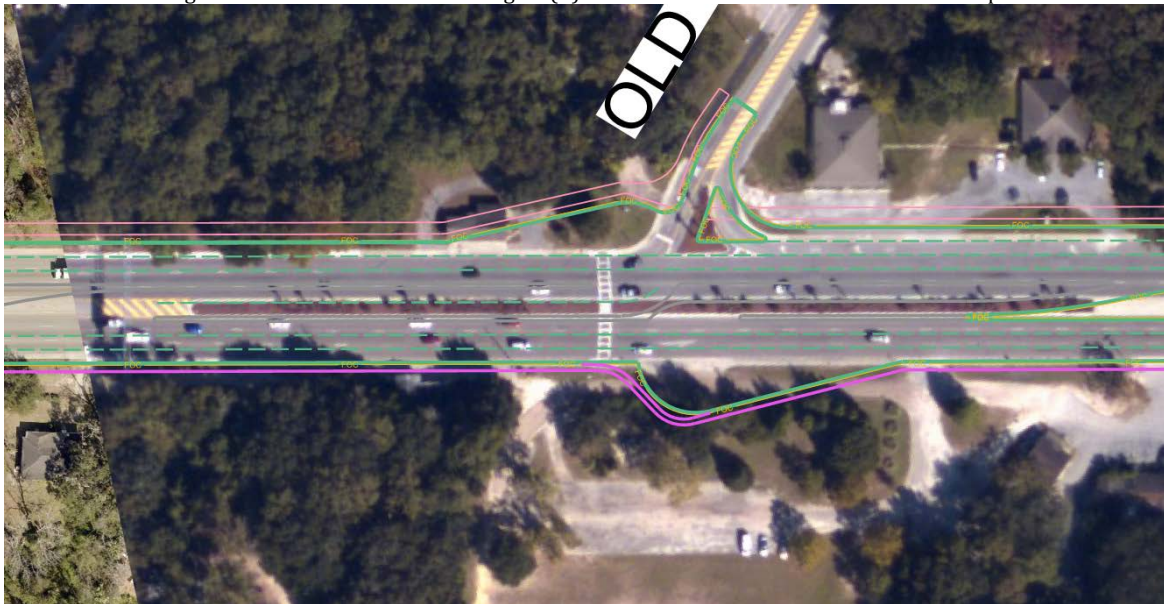
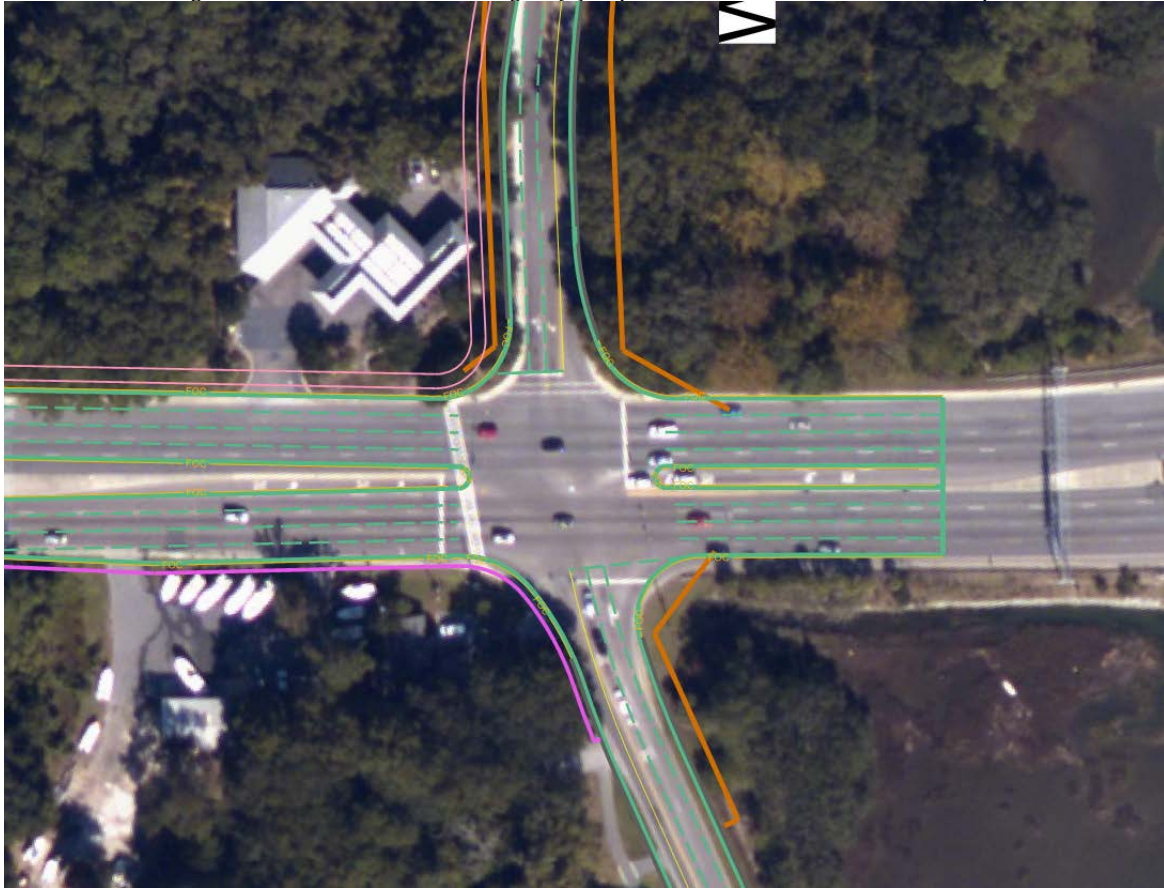


Figure 27 – Old Wild Horse Road Signal (B) – Spanish Wells Road Intersection Concept





## APPENDIX A


### Synchro Reports

1 – Jughandle at Squire Pope Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/09/2020

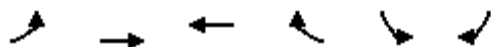
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↔	↑↑↑	↔	↔	↔			↔	↔
Traffic Volume (vph)	0	2790	0	10	4060	110	10	280	10	60	10	320
Future Volume (vph)	0	2790	0	10	4060	110	10	280	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4		3.9	3.4	3.4	3.3	3.3			3.3	3.3
Lane Util. Factor		0.91		1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00		1.00	1.00	0.85	1.00	0.99			1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085		1770	5085	1583	1770	1853			1786	2787
Flt Permitted		1.00		0.03	1.00	1.00	0.65	1.00			0.20	1.00
Satd. Flow (perm)		5085		54	5085	1583	1206	1853			366	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3033	0	11	4413	120	11	304	11	65	11	348
RTOR Reduction (vph)	0	0	0	0	0	15	0	1	0	0	0	14
Lane Group Flow (vph)	0	3033	0	11	4413	105	11	314	0	0	76	334
Turn Type		NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases		2			6			8		7	4	
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)		134.9		134.9	134.9	134.9	33.4	33.4			33.4	33.4
Effective Green, g (s)		137.4		136.9	137.4	137.4	35.9	35.9			35.9	35.9
Actuated g/C Ratio		0.76		0.76	0.76	0.76	0.20	0.20			0.20	0.20
Clearance Time (s)		5.9		5.9	5.9	5.9	5.8	5.8			5.8	5.8
Vehicle Extension (s)		4.0		4.0	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		3881		41	3881	1208	240	369			72	555
v/s Ratio Prot		0.60			c0.87			0.17				
v/s Ratio Perm				0.20		0.07	0.01				c0.21	0.12
v/c Ratio		0.78		0.27	1.14	0.09	0.05	0.85			1.06	0.60
Uniform Delay, d1		12.5		6.5	21.3	5.4	58.2	69.5			72.0	65.5
Progression Factor		1.00		0.12	0.36	0.07	1.00	1.00			1.00	1.00
Incremental Delay, d2		1.6		1.4	62.0	0.0	0.0	16.4			122.2	1.3
Delay (s)		14.1		2.2	69.7	0.4	58.2	85.9			194.2	66.8
Level of Service		B		A	E	A	E	F			F	E
Approach Delay (s)		14.1			67.7			84.9			89.6	
Approach LOS		B			E			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			50.0									
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			180.0									
Intersection Capacity Utilization			115.0%									
Analysis Period (min)			15									
c Critical Lane Group												

2 – Displaced Left Turn at Squire Pope Road

# HCM Signalized Intersection Capacity Analysis

## 37: US 278 & Crossover

04/11/2020




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←	↑↑↑	←←←			
Traffic Volume (vph)	230	2850	4390	0	0	0
Future Volume (vph)	230	2850	4390	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.9	5.9			
Lane Util. Factor	0.97	0.91	0.91			
Frt	1.00	1.00	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3433	5085	5085			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3433	5085	5085			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	3098	4772	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	250	3098	4772	0	0	0
Turn Type	Prot	NA	NA			
Protected Phases	5	2	6			
Permitted Phases						
Actuated Green, G (s)	7.5	97.7	92.1			
Effective Green, g (s)	7.5	97.7	92.1			
Actuated g/C Ratio	0.06	0.79	0.74			
Clearance Time (s)	4.5	5.9	5.9			
Vehicle Extension (s)	3.0	4.0	4.0			
Lane Grp Cap (vph)	206	3993	3764			
v/s Ratio Prot	c0.07	0.61	c0.94			
v/s Ratio Perm						
v/c Ratio	1.21	0.78	1.27			
Uniform Delay, d1	58.5	7.3	16.2			
Progression Factor	1.00	1.00	0.50			
Incremental Delay, d2	132.2	1.5	120.7			
Delay (s)	190.7	8.9	128.7			
Level of Service	F	A	F			
Approach Delay (s)		22.4	128.7		0.0	
Approach LOS		C	F		A	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			84.9	HCM 2000 Level of Service		F
HCM 2000 Volume to Capacity ratio			1.21			
Actuated Cycle Length (s)			124.4	Sum of lost time (s)		20.5
Intersection Capacity Utilization			100.0%	ICU Level of Service		G
Analysis Period (min)			15			
c Critical Lane Group						

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑			↑	↑↑
Traffic Volume (vph)	0	2790	60	10	4060	110	10	50	10	60	10	320
Future Volume (vph)	0	2790	60	10	4060	110	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9	3.6	3.4	3.4	2.0	2.0			2.0	2.0
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.54	1.00			0.62	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583	1006	1815			1146	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3033	65	11	4413	120	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	14	0	0	20	0	5	0	0	0	17
Lane Group Flow (vph)	0	3033	51	11	4413	100	11	60	0	0	76	331
Turn Type		NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	custom
Protected Phases		2		1	6			8		7	4	5
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)		97.7	97.7	0.8	92.1	92.1	9.9	9.9			9.9	17.4
Effective Green, g (s)		100.2	97.7	2.8	94.6	94.6	12.4	12.4			12.4	22.4
Actuated g/C Ratio		0.81	0.79	0.02	0.76	0.76	0.10	0.10			0.10	0.18
Clearance Time (s)		5.9	5.9	5.6	5.9	5.9	4.5	4.5			4.5	4.5
Vehicle Extension (s)		4.0	4.0	1.5	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		4095	1243	39	3866	1203	100	180			114	546
v/s Ratio Prot		0.60		0.01	c0.87			0.03				c0.05
v/s Ratio Perm			0.03			0.06	0.01				c0.07	0.07
v/c Ratio		0.74	0.04	0.28	1.14	0.08	0.11	0.33			0.67	0.61
Uniform Delay, d1		5.8	3.0	59.8	14.9	3.8	51.0	52.1			54.0	46.9
Progression Factor		0.09	0.03	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		0.8	0.0	1.4	67.2	0.1	0.5	1.1			13.8	1.9
Delay (s)		1.3	0.1	61.3	82.1	3.9	51.5	53.2			67.8	48.8
Level of Service		A	A	E	F	A	D	D			E	D
Approach Delay (s)		1.3			80.0			53.0			52.2	
Approach LOS		A			F			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			48.4									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			124.4									Sum of lost time (s) 11.0
Intersection Capacity Utilization			103.8%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

### 3 – Continuous Green T at Squire Pope Road



# HCM 6th Signalized Intersection Summary

## 10: US 278 & Squire Pope Rd

04/11/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←←		←←←	←	←	←←
Traffic Volume (veh/h)	230	0	4080	160	60	330
Future Volume (veh/h)	230	0	4080	160	60	330
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	0	1870	1870	1870	1870
Adj Flow Rate, veh/h	250	0	4435	0	65	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	2	2
Cap, veh/h	297	0	4262		110	
Arrive On Green	0.05	0.00	0.83	0.00	0.06	0.00
Sat Flow, veh/h	3456	250	5274	1585	1781	2790
Grp Volume(v), veh/h	250	81.5	4435	0	65	0
Grp Sat Flow(s),veh/h/ln	1728	F	1702	1585	1781	1395
Q Serve(g_s), s	7.0		108.5	0.0	4.6	0.0
Cycle Q Clear(g_c), s	7.0		108.5	0.0	4.6	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	297		4262		110	
V/C Ratio(X)	0.84		1.04		0.59	
Avail Cap(c_a), veh/h	297		4262		110	
HCM Platoon Ratio	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00		1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	62.3		10.7	0.0	59.4	0.0
Incr Delay (d2), s/veh	19.2		25.9	0.0	8.3	0.0
Initial Q Delay(d3),s/veh	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9		30.9	0.0	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.5		36.7	0.0	67.7	0.0
LnGrp LOS	F		F		E	
Approach Vol, veh/h			4435	A	65	A
Approach Delay, s/veh			36.7		67.7	
Approach LOS			D		E	
Timer - Assigned Phs				4	5	6
Phs Duration (G+Y+Rc), s				10.0	9.5	110.5
Change Period (Y+Rc), s				4.5	4.5	4.5
Max Green Setting (Gmax), s				5.5	5.0	106.0
Max Q Clear Time (g_c+I1), s				6.6	9.0	110.5
Green Ext Time (p_c), s				0.0	0.0	0.0
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			39.5			
HCM 6th LOS			D			

### Notes













Unsignalized Delay for [EBT, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

#### 4 – Flyover at Squire Pope Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/10/2020





												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑			↑	↑↑
Traffic Volume (vph)	0	2790	60	10	4060	110	10	50	10	60	10	320
Future Volume (vph)	0	2790	60	10	4060	110	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9	3.6	3.4	3.4	3.3	3.3			3.3	3.2
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.56	1.00			0.60	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583	1042	1815			1126	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3033	65	11	4413	120	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	13	0	0	17	0	4	0	0	0	46
Lane Group Flow (vph)	0	3033	52	11	4413	103	11	61	0	0	76	302
Turn Type		NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	custom
Protected Phases		2		1	6			8		7	4	5
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)		145.3	145.3	1.6	142.4	142.4	15.8	15.8			15.8	20.2
Effective Green, g (s)		147.8	145.3	3.6	144.9	144.9	18.3	18.3			18.3	25.2
Actuated g/C Ratio		0.82	0.81	0.02	0.81	0.81	0.10	0.10			0.10	0.14
Clearance Time (s)		5.9	5.9	5.6	5.9	5.9	5.8	5.8			5.8	5.7
Vehicle Extension (s)		4.0	4.0	1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		4175	1277	35	4093	1274	105	184			114	390
v/s Ratio Prot		c0.60		0.01	c0.87			0.03				c0.03
v/s Ratio Perm			0.03			0.07	0.01				0.07	0.08
v/c Ratio		0.73	0.04	0.31	1.08	0.08	0.10	0.33			0.67	0.78
Uniform Delay, d1		7.1	3.5	87.0	17.5	3.7	73.4	75.2			77.9	74.7
Progression Factor		1.00	1.00	0.91	0.59	0.06	1.00	1.00			1.00	1.00
Incremental Delay, d2		1.1	0.1	0.2	35.7	0.0	0.2	0.4			10.8	8.5
Delay (s)		8.3	3.5	79.5	46.1	0.2	73.6	75.6			88.7	83.2
Level of Service		A	A	E	D	A	E	E			F	F
Approach Delay (s)		8.2			45.0			75.3			84.2	
Approach LOS		A			D			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			33.3									
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			180.0									
Intersection Capacity Utilization			105.5%									
Analysis Period (min)			15									
c Critical Lane Group												

## 6 – Half Diamond Interchange at Spanish Wells Road

# HCM 6th Signalized Intersection Summary

## 39: Spanish Wells Rd/Wild Horse Rd & US 278 WB on Ramp

04/10/2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	260	220	320	50
Future Volume (veh/h)	0	0	260	220	320	50
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)			1.00			1.00
Parking Bus, Adj			1.00	1.00	1.00	1.00
Work Zone On Approach			No	No		
Adj Sat Flow, veh/h/ln			1870	1870	1870	1870
Adj Flow Rate, veh/h			283	239	348	54
Peak Hour Factor			0.92	0.92	0.92	0.92
Percent Heavy Veh, %			2	2	2	2
Cap, veh/h			954	1717	1180	183
Arrive On Green			0.15	1.00	0.75	0.75
Sat Flow, veh/h			1781	1870	1581	245
Grp Volume(v), veh/h			283	239	0	402
Grp Sat Flow(s),veh/h/ln			1781	1870	0	1826
Q Serve(g_s), s			1.4	0.0	0.0	3.9
Cycle Q Clear(g_c), s			1.4	0.0	0.0	3.9
Prop In Lane			1.00			0.13
Lane Grp Cap(c), veh/h			954	1717	0	1364
V/C Ratio(X)			0.30	0.14	0.00	0.29
Avail Cap(c_a), veh/h			1297	1717	0	1364
HCM Platoon Ratio			1.67	1.67	1.00	1.00
Upstream Filter(I)			0.81	0.81	0.00	1.00
Uniform Delay (d), s/veh			0.9	0.0	0.0	2.3
Incr Delay (d2), s/veh			0.1	0.1	0.0	0.6
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			0.0	0.1	0.0	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			1.0	0.1	0.0	2.8
LnGrp LOS			A	A	A	A
Approach Vol, veh/h				522	402	
Approach Delay, s/veh				0.6	2.8	
Approach LOS				A	A	
Timer - Assigned Phs		2			5	6
Phs Duration (G+Y+Rc), s		55.0			9.4	45.6
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		50.5			15.5	30.5
Max Q Clear Time (g_c+I1), s		2.0			3.4	5.9
Green Ext Time (p_c), s		1.5			0.7	2.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			1.6			
HCM 6th LOS			A			

# HCM 6th Signalized Intersection Summary

## 40: Spanish Wells Rd & US 278 EB on/off ramp

04/10/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	
Traffic Volume (veh/h)	120	260	140	360	260	60
Future Volume (veh/h)	120	260	140	360	260	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	283	152	391	283	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	147	320	503	1032	492	113
Arrive On Green	0.28	0.28	0.14	0.55	0.22	0.22
Sat Flow, veh/h	516	1123	1781	1870	1472	338
Grp Volume(v), veh/h	414	0	152	391	0	348
Grp Sat Flow(s), veh/h/ln	1642	0	1781	1870	0	1810
Q Serve(g_s), s	13.3	0.0	0.0	6.5	0.0	9.4
Cycle Q Clear(g_c), s	13.3	0.0	0.0	6.5	0.0	9.4
Prop In Lane	0.31	0.68	1.00			0.19
Lane Grp Cap(c), veh/h	468	0	503	1032	0	605
V/C Ratio(X)	0.88	0.00	0.30	0.38	0.00	0.57
Avail Cap(c_a), veh/h	538	0	503	1032	0	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.96
Uniform Delay (d), s/veh	18.8	0.0	17.6	7.0	0.0	17.9
Incr Delay (d2), s/veh	14.7	0.0	0.3	1.1	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	1.5	2.3	0.0	4.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.5	0.0	17.9	8.1	0.0	21.6
LnGrp LOS	C	A	B	A	A	C
Approach Vol, veh/h	414			543	348	
Approach Delay, s/veh	33.5			10.8	21.6	
Approach LOS	C			B	C	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		34.8		20.2	11.9	22.9
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		28.0		18.0	5.1	18.4
Max Q Clear Time (g_c+I1), s		8.5		15.3	2.0	11.4
Green Ext Time (p_c), s		2.3		0.4	0.1	1.2

### Intersection Summary

HCM 6th Ctrl Delay	20.9
HCM 6th LOS	C

### Notes

User approved volume balancing among the lanes for turning movement.
























## 7 – Flyover at Spanish Wells Road



# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells & US 278

04/10/2020













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	2480	260	160	3870	170	0	100	140	60	100	50
Future Volume (veh/h)	120	2480	260	160	3870	170	0	100	140	60	100	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	2696	283	174	4207	185	0	109	152	65	109	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	150	4259	1049	194	4400	1084	0	131	111	104	146	72
Arrive On Green	0.17	1.00	1.00	0.11	0.68	0.68	0.00	0.07	0.07	0.03	0.12	0.12
Sat Flow, veh/h	1781	6434	1585	1781	6434	1585	0	1870	1585	1781	1180	585
Grp Volume(v), veh/h	130	2696	283	174	4207	185	0	109	152	65	0	163
Grp Sat Flow(s), veh/h/ln	1781	1609	1585	1781	1609	1585	0	1870	1585	1781	0	1765
Q Serve(g_s), s	12.8	0.0	0.0	17.4	107.5	5.4	0.0	10.4	12.6	5.1	0.0	16.1
Cycle Q Clear(g_c), s	12.8	0.0	0.0	17.4	107.5	5.4	0.0	10.4	12.6	5.1	0.0	16.1
Prop In Lane	1.00		1.00	1.00		1.00	0.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	150	4259	1049	194	4400	1084	0	131	111	104	0	218
V/C Ratio(X)	0.86	0.63	0.27	0.90	0.96	0.17	0.00	0.83	1.37	0.62	0.00	0.75
Avail Cap(c_a), veh/h	150	4259	1049	282	4400	1084	0	131	111	104	0	218
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	73.8	0.0	0.0	79.2	26.0	5.3	0.0	82.7	83.7	76.4	0.0	76.2
Incr Delay (d2), s/veh	37.3	0.7	0.6	21.7	6.7	0.3	0.0	34.6	213.3	10.9	0.0	13.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	0.2	0.2	9.1	39.3	11.5	0.0	6.3	17.3	0.8	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	111.0	0.7	0.6	100.8	32.6	5.6	0.0	117.2	297.0	87.4	0.0	89.6
LnGrp LOS	F	A	A	F	C	A	A	F	F	F	A	F
Approach Vol, veh/h		3109			4566			261			228	
Approach Delay, s/veh		5.3			34.1			221.9			88.9	
Approach LOS		A			C			F			F	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.4	126.0		28.6	22.0	129.4	9.6	19.0				
Change Period (Y+Rc), s	* 5.8	* 6.8		6.4	* 6.8	* 6.3	4.5	6.4				
Max Green Setting (Gmax), s	* 29	* 1.1E2		22.2	* 15	* 1.2E2	5.1	12.6				
Max Q Clear Time (g_c+I1), s	19.4	2.0		18.1	14.8	109.5	7.1	14.6				
Green Ext Time (p_c), s	0.3	66.9		0.3	0.0	13.6	0.0	0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				30.7								
HCM 6th LOS				C								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

8 – Displaced Left at Spanish Wells Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

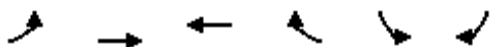
04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑			↑	↑↑
Traffic Volume (vph)	0	3020	60	10	4060	340	10	50	10	60	10	320
Future Volume (vph)	0	3020	60	10	4060	340	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9	3.6	3.4	3.4	3.3	3.3			3.3	3.2
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.56	1.00			0.60	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583	1042	1815			1126	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3283	65	11	4413	370	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	13	0	0	49	0	4	0	0	0	46
Lane Group Flow (vph)	0	3283	52	11	4413	321	11	61	0	0	76	302
Turn Type		NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	custom
Protected Phases		2		1	6			8		7	4	5
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)		145.3	145.3	1.6	142.4	142.4	15.8	15.8			15.8	20.2
Effective Green, g (s)		147.8	145.3	3.6	144.9	144.9	18.3	18.3			18.3	25.2
Actuated g/C Ratio		0.82	0.81	0.02	0.81	0.81	0.10	0.10			0.10	0.14
Clearance Time (s)		5.9	5.9	5.6	5.9	5.9	5.8	5.8			5.8	5.7
Vehicle Extension (s)		4.0	4.0	1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		4175	1277	35	4093	1274	105	184			114	390
v/s Ratio Prot		c0.65		0.01	c0.87			0.03				c0.03
v/s Ratio Perm			0.03			0.20	0.01				0.07	0.08
v/c Ratio		0.79	0.04	0.31	1.08	0.25	0.10	0.33			0.67	0.78
Uniform Delay, d1		8.1	3.5	87.0	17.5	4.3	73.4	75.2			77.9	74.7
Progression Factor		1.00	1.00	0.98	0.96	0.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		1.6	0.1	0.2	35.7	0.0	0.2	0.4			10.8	8.5
Delay (s)		9.7	3.5	85.2	52.5	0.0	73.6	75.6			88.7	83.2
Level of Service		A	A	F	D	A	E	E			F	F
Approach Delay (s)		9.6			48.5			75.3			84.2	
Approach LOS		A			D			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			35.4									
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			180.0									
Intersection Capacity Utilization			105.5%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

39: US 278

04/11/2020















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	350	2740	4180	0	0	0
Future Volume (vph)	350	2740	4180	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	1.00	0.86	0.86			
Frt	1.00	1.00	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	1770	6408	6408			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	1770	6408	6408			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	380	2978	4543	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	380	2978	4543	0	0	0
Turn Type	Prot	NA	NA			
Protected Phases	5	2	6			
Permitted Phases						
Actuated Green, G (s)	31.5	116.2	108.5			
Effective Green, g (s)	31.5	116.2	108.5			
Actuated g/C Ratio	0.18	0.65	0.60			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	309	4136	3862			
v/s Ratio Prot	c0.21	0.46	c0.71			
v/s Ratio Perm						
v/c Ratio	1.23	0.72	1.18			
Uniform Delay, d1	74.2	21.1	35.8			
Progression Factor	0.91	0.70	0.28			
Incremental Delay, d2	120.1	0.7	79.6			
Delay (s)	187.9	15.5	89.6			
Level of Service	F	B	F			
Approach Delay (s)		35.0	89.6	0.0		
Approach LOS		C	F	A		
<b>Intersection Summary</b>						
HCM 2000 Control Delay			66.4	HCM 2000 Level of Service		E
HCM 2000 Volume to Capacity ratio			1.05			
Actuated Cycle Length (s)			180.0	Sum of lost time (s)		21.2
Intersection Capacity Utilization			87.5%	ICU Level of Service		E
Analysis Period (min)			15			
c Critical Lane Group						

# HCM Signalized Intersection Capacity Analysis

## 12: Spanish Wells & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↗	↑↑↑	↗	↗↗	↑	↗	↗	↗	↗
Traffic Volume (vph)	0	2480	260	160	3870	170	260	100	140	60	100	50
Future Volume (vph)	0	2480	260	160	3870	170	260	100	140	60	100	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	5.8	4.5	4.5	4.5	6.4	6.4	4.5	6.4	
Lane Util. Factor		0.86	1.00	1.00	0.86	1.00	0.97	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		6408	1583	1770	6408	1583	3433	1863	1583	1770	1770	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.26	1.00	1.00	0.59	1.00	
Satd. Flow (perm)		6408	1583	1770	6408	1583	957	1863	1583	1104	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2696	283	174	4207	185	283	109	152	65	109	54
RTOR Reduction (vph)	0	0	73	0	0	33	0	0	139	0	10	0
Lane Group Flow (vph)	0	2696	210	174	4207	152	283	109	13	65	153	0
Turn Type		NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Actuated Green, G (s)		116.2	116.2	22.5	108.5	108.5	22.6	15.1	15.1	17.6	12.6	
Effective Green, g (s)		116.2	116.2	22.5	108.5	108.5	22.6	15.1	15.1	17.6	12.6	
Actuated g/C Ratio		0.65	0.65	0.12	0.60	0.60	0.13	0.08	0.08	0.10	0.07	
Clearance Time (s)		4.5	4.5	5.8	4.5	4.5	4.5	6.4	6.4	4.5	6.4	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		4136	1021	221	3862	954	223	156	132	126	123	
v/s Ratio Prot		c0.42		0.10	c0.66		c0.05	0.06		0.01	0.09	
v/s Ratio Perm			0.13			0.10	c0.11		0.01	0.04		
v/c Ratio		0.65	0.21	0.79	1.09	0.16	1.27	0.70	0.10	0.52	1.24	
Uniform Delay, d1		19.5	13.0	76.4	35.8	15.7	77.2	80.2	76.2	76.4	83.7	
Progression Factor		0.14	0.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6	0.3	16.7	45.2	0.4	151.5	12.8	0.3	3.5	160.0	
Delay (s)		3.3	0.6	93.2	81.0	16.1	228.7	93.0	76.5	80.0	243.7	
Level of Service		A	A	F	F	B	F	F	E	E	F	
Approach Delay (s)		3.1			78.8			159.0			197.0	
Approach LOS		A			E			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			60.2			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			180.0			Sum of lost time (s)			21.2			
Intersection Capacity Utilization			84.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

























9 – Maximize Lanes at Squire Pope Road and Spanish Wells Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

























04/09/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	2790	60	10	4060	110	10	50	10	60	10	320
Future Volume (vph)	230	2790	60	10	4060	110	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.7	3.4	5.9	3.6	3.4	3.4	3.3	3.3			3.3	3.2
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.56	1.00			0.60	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1042	1815			1126	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	3033	65	11	4413	120	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	13	0	0	20	0	4	0	0	0	44
Lane Group Flow (vph)	250	3033	52	11	4413	100	11	61	0	0	76	304
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			8		7	4	5
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	11.1	145.3	145.3	1.6	135.7	135.7	15.8	15.8			15.8	26.9
Effective Green, g (s)	13.1	147.8	145.3	3.6	138.2	138.2	18.3	18.3			18.3	31.9
Actuated g/C Ratio	0.07	0.82	0.81	0.02	0.77	0.77	0.10	0.10			0.10	0.18
Clearance Time (s)	5.7	5.9	5.9	5.6	5.9	5.9	5.8	5.8			5.8	5.7
Vehicle Extension (s)	2.0	4.0	4.0	1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	249	4175	1277	35	3904	1215	105	184			114	493
v/s Ratio Prot	c0.07	0.60		0.01	c0.87			0.03				0.05
v/s Ratio Perm			0.03			0.06	0.01				c0.07	0.06
v/c Ratio	1.00	0.73	0.04	0.31	1.13	0.08	0.10	0.33			0.67	0.62
Uniform Delay, d1	83.5	7.1	3.5	87.0	20.9	5.2	73.4	75.2			77.9	68.4
Progression Factor	1.00	1.00	1.00	0.85	0.37	0.04	1.00	1.00			1.00	1.00
Incremental Delay, d2	58.1	1.1	0.1	0.2	59.0	0.0	0.2	0.4			10.8	1.6
Delay (s)	141.5	8.3	3.5	74.2	66.7	0.2	73.6	75.6			88.7	70.0
Level of Service	F	A	A	E	E	A	E	E			F	E
Approach Delay (s)		18.1			65.0			75.3			73.4	
Approach LOS		B			E			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			46.8			HCM 2000 Level of Service		D				
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			180.0			Sum of lost time (s)		13.5				
Intersection Capacity Utilization			105.5%			ICU Level of Service		G				
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 12: Spanish Wells & US 278

04/09/2020













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	2480	260	160	3870	170	260	100	140	60	100	50
Future Volume (vph)	120	2480	260	160	3870	170	260	100	140	60	100	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.3	6.3	5.8	6.3	6.3	4.5	6.4	6.4	4.5	6.4	
Lane Util. Factor	1.00	0.86	1.00	1.00	0.86	1.00	0.97	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	6408	1583	1770	6408	1583	3433	1863	1583	1770	1770	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.21	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	1770	6408	1583	1770	6408	1583	757	1863	1583	1265	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	2696	283	174	4207	185	283	109	152	65	109	54
RTOR Reduction (vph)	0	0	73	0	0	33	0	0	136	0	10	0
Lane Group Flow (vph)	130	2696	210	174	4207	152	283	109	16	65	153	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Actuated Green, G (s)	13.7	108.9	108.9	22.5	116.7	116.7	29.4	19.1	19.1	21.8	15.3	
Effective Green, g (s)	13.7	108.9	108.9	22.5	116.7	116.7	29.4	19.1	19.1	21.8	15.3	
Actuated g/C Ratio	0.08	0.61	0.61	0.12	0.65	0.65	0.16	0.11	0.11	0.12	0.09	
Clearance Time (s)	6.8	6.3	6.3	5.8	6.3	6.3	4.5	6.4	6.4	4.5	6.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	134	3876	957	221	4154	1026	276	197	167	171	150	
v/s Ratio Prot	c0.07	0.42		0.10	c0.66		c0.06	0.06		0.01	0.09	
v/s Ratio Perm			0.13			0.10	c0.11		0.01	0.03		
v/c Ratio	0.97	0.70	0.22	0.79	1.01	0.15	1.03	0.55	0.10	0.38	1.02	
Uniform Delay, d1	82.9	24.2	16.2	76.4	31.6	12.3	72.0	76.4	72.7	72.2	82.3	
Progression Factor	0.93	0.76	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	55.9	0.7	0.4	16.7	17.2	0.3	60.9	3.3	0.3	1.4	78.7	
Delay (s)	133.0	19.2	11.2	93.2	48.9	12.6	132.8	79.7	72.9	73.6	161.1	
Level of Service	F	B	B	F	D	B	F	E	E	E	F	
Approach Delay (s)		23.3			49.1			105.4			136.1	
Approach LOS		C			D			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			45.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			180.0				Sum of lost time (s)			24.0		
Intersection Capacity Utilization			98.5%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

10 – Consolidate Lefts from Squire Pope Road and  
Spanish Wells Road to Old Wild Horse Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

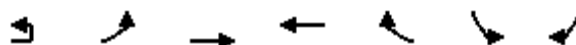
04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑			↑	↑↑
Traffic Volume (vph)	0	3020	60	10	4060	225	10	50	10	60	10	320
Future Volume (vph)	0	3020	60	10	4060	225	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9	3.6	3.4	3.4	3.3	3.3			3.3	3.3
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted		1.00	1.00	0.03	1.00	1.00	0.58	1.00			0.62	1.00
Satd. Flow (perm)		5085	1583	53	5085	1583	1087	1815			1162	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3283	65	11	4413	245	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	14	0	0	35	0	4	0	0	0	49
Lane Group Flow (vph)	0	3283	51	11	4413	210	11	61	0	0	76	299
Turn Type		NA	Perm	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases		2		1	6			8		7	4	
Permitted Phases			2	6		6	8			4		4
Actuated Green, G (s)		134.5	134.5	141.7	141.7	141.7	16.6	16.6			16.6	16.6
Effective Green, g (s)		137.0	134.5	143.7	144.2	144.2	19.1	19.1			19.1	19.1
Actuated g/C Ratio		0.81	0.79	0.85	0.85	0.85	0.11	0.11			0.11	0.11
Clearance Time (s)		5.9	5.9	5.6	5.9	5.9	5.8	5.8			5.8	5.8
Vehicle Extension (s)		4.0	4.0	1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		4097	1252	81	4313	1342	122	203			130	313
v/s Ratio Prot		0.65		0.00	c0.87			0.03				
v/s Ratio Perm			0.03	0.11		0.13	0.01				0.07	c0.11
v/c Ratio		0.80	0.04	0.14	1.02	0.16	0.09	0.30			0.58	0.96
Uniform Delay, d1		9.0	3.8	16.7	12.9	2.3	67.7	69.3			71.7	75.0
Progression Factor		1.00	1.00	0.13	1.21	0.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		1.7	0.1	0.1	13.8	0.1	0.1	0.3			4.3	38.5
Delay (s)		10.8	3.9	2.3	29.4	0.1	67.8	69.6			75.9	113.6
Level of Service		B	A	A	C	A	E	E			E	F
Approach Delay (s)		10.6			27.8			69.3			106.8	
Approach LOS		B			C			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			25.4									
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			170.0									
Intersection Capacity Utilization			105.5%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 16: US 278 & Old Wild Horse Rd

04/11/2020















Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	115	235	2740	4160	20	0	20
Future Volume (vph)	115	235	2740	4160	20	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5		4.5
Lane Util. Factor		0.97	0.86	0.86	1.00		1.00
Frt		1.00	1.00	1.00	0.85		0.86
Flt Protected		0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)		3433	6408	6408	1583		1611
Flt Permitted		0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)		3433	6408	6408	1583		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	255	2978	4522	22	0	22
RTOR Reduction (vph)	0	0	0	0	4	0	22
Lane Group Flow (vph)	0	380	2978	4522	18	0	0
Turn Type	Prot	Prot	NA	NA	Perm		Perm
Protected Phases	5	5	2	6			
Permitted Phases					6		8
Actuated Green, G (s)		35.7	157.4	117.2	117.2		3.6
Effective Green, g (s)		35.7	157.4	117.2	117.2		3.6
Actuated g/C Ratio		0.21	0.93	0.69	0.69		0.02
Clearance Time (s)		4.5	4.5	4.5	4.5		4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		720	5933	4417	1091		34
v/s Ratio Prot		0.11	c0.46	c0.71			
v/s Ratio Perm					0.01		c0.00
v/c Ratio		0.53	0.50	1.02	0.02		0.01
Uniform Delay, d1		59.7	0.9	26.4	8.3		81.5
Progression Factor		1.00	0.96	0.47	0.74		1.00
Incremental Delay, d2		1.7	0.2	15.7	0.0		0.2
Delay (s)		61.3	1.0	28.2	6.1		81.6
Level of Service		E	A	C	A		F
Approach Delay (s)			7.8	28.1		81.6	
Approach LOS			A	C		F	
<b>Intersection Summary</b>							
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.89				
Actuated Cycle Length (s)			170.0		Sum of lost time (s)		13.5
Intersection Capacity Utilization			85.7%		ICU Level of Service		E
Analysis Period (min)			15				
c Critical Lane Group							



# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells & US 278

04/11/2020






























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↗	↑↑↑	↗	↗↗	↑	↗	↗	↗	↗
Traffic Volume (veh/h)	0	2480	260	160	3870	170	260	100	140	60	100	50
Future Volume (veh/h)	0	2480	260	160	3870	170	260	100	140	60	100	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	2696	283	174	4207	185	283	109	152	65	109	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3754	925	195	4679	1153	349	250	212	199	123	61
Arrive On Green	0.00	1.00	1.00	0.11	0.73	0.73	0.07	0.13	0.13	0.04	0.10	0.10
Sat Flow, veh/h	0	6696	1585	1781	6434	1585	3456	1870	1585	1781	1180	585
Grp Volume(v), veh/h	0	2696	283	174	4207	185	283	109	152	65	0	163
Grp Sat Flow(s),veh/h/ln	0	1609	1585	1781	1609	1585	1728	1870	1585	1781	0	1765
Q Serve(g_s), s	0.0	0.0	0.0	16.4	87.6	6.1	11.5	9.1	15.6	5.5	0.0	15.5
Cycle Q Clear(g_c), s	0.0	0.0	0.0	16.4	87.6	6.1	11.5	9.1	15.6	5.5	0.0	15.5
Prop In Lane	0.00		1.00	1.00		1.00	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	0	3754	925	195	4679	1153	349	250	212	199	0	183
V/C Ratio(X)	0.00	0.72	0.31	0.89	0.90	0.16	0.81	0.44	0.72	0.33	0.00	0.89
Avail Cap(c_a), veh/h	0	3754	925	281	4679	1153	349	273	231	199	0	205
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	74.7	18.3	7.2	63.9	67.7	70.5	65.1	0.0	75.2
Incr Delay (d2), s/veh	0.0	1.1	0.7	21.2	3.2	0.3	13.5	1.2	9.2	0.9	0.0	32.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.2	8.6	29.4	2.2	6.1	4.5	6.9	2.6	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.1	0.7	95.8	21.5	7.5	77.4	68.9	79.8	66.0	0.0	107.7
LnGrp LOS	A	A	A	F	C	A	E	E	E	E	A	F
Approach Vol, veh/h		2979			4566			544			228	
Approach Delay, s/veh		1.0			23.7			76.4			95.8	
Approach LOS		A			C			E			F	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	24.4	105.5	16.0	24.1		129.9	10.9	29.2				
Change Period (Y+Rc), s	* 5.8	* 6.3	4.5	6.4		* 6.3	4.5	6.4				
Max Green Setting (Gmax), s	* 27	* 89	11.5	19.7		* 1.2E2	6.4	24.8				
Max Q Clear Time (g_c+I1), s	18.4	2.0	13.5	17.5		89.6	7.5	17.6				
Green Ext Time (p_c), s	0.3	58.3	0.0	0.2		31.9	0.0	0.6				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				21.0								
HCM 6th LOS				C								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

11 – Two T-Intersections at Old Wild Horse Road and Spanish Wells Road

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

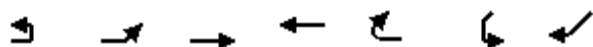
04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	  
Traffic Volume (vph)	0	3020	60	10	4060	225	10	50	10	60	10	320
Future Volume (vph)	0	3020	60	10	4060	225	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9	3.6	3.4	3.4	3.3	3.3			3.3	3.3
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00	1.00	1.00			1.00	0.88
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583	1770	1815			1786	2787
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.57	1.00			0.61	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583	1066	1815			1143	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3283	65	11	4413	245	11	54	11	65	11	348
RTOR Reduction (vph)	0	0	13	0	0	33	0	4	0	0	0	46
Lane Group Flow (vph)	0	3283	52	11	4413	212	11	61	0	0	76	302
Turn Type		NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases		2		1	6			8		7	4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)		143.9	143.9	1.6	151.1	151.1	17.2	17.2			17.2	17.2
Effective Green, g (s)		146.4	143.9	3.6	153.6	153.6	19.7	19.7			19.7	19.7
Actuated g/C Ratio		0.81	0.80	0.02	0.85	0.85	0.11	0.11			0.11	0.11
Clearance Time (s)		5.9	5.9	5.6	5.9	5.9	5.8	5.8			5.8	5.8
Vehicle Extension (s)		4.0	4.0	1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		4135	1265	35	4339	1350	116	198			125	305
v/s Ratio Prot		0.65		0.01	c0.87			0.03				
v/s Ratio Perm			0.03			0.13	0.01				0.07	c0.11
v/c Ratio		0.79	0.04	0.31	1.02	0.16	0.09	0.31			0.61	0.99
Uniform Delay, d1		8.9	3.7	87.0	13.2	2.2	72.1	73.9			76.5	80.0
Progression Factor		0.72	0.41	1.12	1.18	0.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		1.2	0.0	0.5	11.9	0.1	0.1	0.3			5.6	47.9
Delay (s)		7.6	1.6	97.8	27.6	0.1	72.3	74.2			82.1	128.0
Level of Service		A	A	F	C	A	E	E			F	F
Approach Delay (s)		7.5			26.3			73.9			119.8	
Approach LOS		A			C			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			24.0									
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			180.0									
Intersection Capacity Utilization			105.5%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 16: US 278 & Old Wild Horse Rd

04/11/2020



Movement	EBU	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations							
Traffic Volume (vph)	115	235	2740	4110	290	160	70
Future Volume (vph)	115	235	2740	4110	290	160	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		0.97	0.86	0.86	1.00	1.00	1.00
Frt		1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	6408	6408	1583	1770	1583
Flt Permitted		0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3433	6408	6408	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	255	2978	4467	315	174	76
RTOR Reduction (vph)	0	0	0	0	92	0	34
Lane Group Flow (vph)	0	380	2978	4467	223	174	42
Turn Type	Prot	Prot	NA	NA	Perm	Prot	Perm
Protected Phases	5	5	2	6		4	
Permitted Phases					6		4
Actuated Green, G (s)		20.9	152.3	126.9	126.9	18.7	18.7
Effective Green, g (s)		20.9	152.3	126.9	126.9	18.7	18.7
Actuated g/C Ratio		0.12	0.85	0.71	0.71	0.10	0.10
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		398	5421	4517	1116	183	164
v/s Ratio Prot		c0.11	0.46	c0.70		c0.10	
v/s Ratio Perm					0.14		0.03
v/c Ratio		0.95	0.55	0.99	0.20	0.95	0.26
Uniform Delay, d1		79.1	4.0	25.9	9.1	80.2	74.2
Progression Factor		1.10	0.75	0.72	0.18	1.00	1.00
Incremental Delay, d2		24.5	0.2	7.3	0.2	54.7	3.7
Delay (s)		111.1	3.2	25.8	1.9	134.9	78.0
Level of Service		F	A	C	A	F	E
Approach Delay (s)			15.4	24.3		117.6	
Approach LOS			B	C		F	
<b>Intersection Summary</b>							
HCM 2000 Control Delay			23.5		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.98				
Actuated Cycle Length (s)			180.0		Sum of lost time (s)		13.5
Intersection Capacity Utilization			89.7%		ICU Level of Service		E
Analysis Period (min)			15				
c Critical Lane Group							

# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells & US 278

04/11/2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↑	↑	↘	↑↑↑↑	↘	↑
Traffic Volume (veh/h)	2540	360	160	4040	360	140
Future Volume (veh/h)	2540	360	160	4040	360	140
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2761	391	174	4391	391	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4307	1061	194	5217	447	205
Arrive On Green	1.00	1.00	0.11	0.81	0.13	0.13
Sat Flow, veh/h	6696	1585	1781	6696	3456	1585
Grp Volume(v), veh/h	2761	391	174	4391	391	152
Grp Sat Flow(s),veh/h/ln	1609	1585	1781	1609	1728	1585
Q Serve(g_s), s	0.0	0.0	17.4	73.2	20.0	16.6
Cycle Q Clear(g_c), s	0.0	0.0	17.4	73.2	20.0	16.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	4307	1061	194	5217	447	205
V/C Ratio(X)	0.64	0.37	0.90	0.84	0.88	0.74
Avail Cap(c_a), veh/h	4307	1061	282	5217	566	260
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	79.2	10.1	76.9	75.5
Incr Delay (d2), s/veh	0.6	0.8	21.7	1.8	12.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	9.1	21.1	9.7	7.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.6	0.8	100.8	11.9	89.0	83.7
LnGrp LOS	A	A	F	B	F	F
Approach Vol, veh/h	3152			4565	543	
Approach Delay, s/veh	0.6			15.3	87.5	
Approach LOS	A			B	F	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	25.4	126.8			152.2	27.8
Change Period (Y+Rc), s	* 5.8	* 6.3			* 6.3	4.5
Max Green Setting (Gmax), s	* 29	* 1.1E2			* 1.4E2	29.5
Max Q Clear Time (g_c+I1), s	19.4	2.0			75.2	22.0
Green Ext Time (p_c), s	0.3	70.0			64.1	1.3
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.5			
HCM 6th LOS			B			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						


## 12 – Roundabouts with Underpass at Spanish Wells Road



# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑	↑		↑	↑		↑	↑↑
Traffic Volume (vph)	0	2790	290	0	4060	120	0	290	70	0	80	330
Future Volume (vph)	0	2790	290	0	4060	120	0	290	70	0	80	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9		3.4	3.4		3.3	5.8		3.3	3.3
Lane Util. Factor		0.91	1.00		0.91	1.00		1.00	1.00		1.00	0.88
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		5085	1583		5085	1583		1863	1583		1863	2787
Flt Permitted		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		5085	1583		5085	1583		1863	1583		1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3033	315	0	4413	130	0	315	76	0	87	359
RTOR Reduction (vph)	0	0	45	0	0	15	0	0	17	0	0	17
Lane Group Flow (vph)	0	3033	270	0	4413	115	0	315	59	0	87	342
Turn Type		NA	Prot		NA	Prot		NA	Prot		NA	Prot
Protected Phases		2	2		6	6		8	8		8	8
Permitted Phases												
Actuated Green, G (s)		125.5	125.5		125.5	125.5		22.8	22.8		22.8	22.8
Effective Green, g (s)		128.0	125.5		128.0	128.0		25.3	22.8		25.3	25.3
Actuated g/C Ratio		0.80	0.78		0.80	0.80		0.16	0.14		0.16	0.16
Clearance Time (s)		5.9	5.9		5.9	5.9		5.8	5.8		5.8	5.8
Vehicle Extension (s)		4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		4068	1241		4068	1266		294	225		294	440
v/s Ratio Prot		0.60	0.17		c0.87	0.07		c0.17	0.04		0.05	0.12
v/s Ratio Perm												
v/c Ratio		0.75	0.22		1.08	0.09		1.07	0.26		0.30	0.78
Uniform Delay, d1		7.9	4.5		16.0	3.5		67.3	61.1		59.5	64.6
Progression Factor		1.00	1.00		0.47	0.04		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.3	0.4		40.1	0.0		72.7	0.2		0.2	7.7
Delay (s)		9.2	4.9		47.5	0.2		140.1	61.3		59.7	72.4
Level of Service		A	A		D	A		F	E		E	E
Approach Delay (s)		8.8			46.1			124.8			69.9	
Approach LOS		A			D			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		36.6			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		160.0			Sum of lost time (s)			11.7				
Intersection Capacity Utilization		100.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												




















Intersection			
Intersection Delay, s/veh	5.2		
Intersection LOS	A		
Approach	EB	NB	SB
Entry Lanes	0	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	0	446	424
Demand Flow Rate, veh/h	0	454	432
Vehicles Circulating, veh/h	454	0	22
Vehicles Exiting, veh/h	0	454	432
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	0.0	5.1	5.4
Approach LOS	-	A	A
Lane	Left	Right	Left
Designated Moves	L	TR	T
Assumed Moves	L	TR	T
RT Channelized			
Lane Util	0.048	0.952	1.000
Follow-Up Headway, s	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.328
Entry Flow, veh/h	22	432	432
Cap Entry Lane, veh/h	1350	1420	1394
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	22	424	424
Cap Entry, veh/h	1323	1392	1366
V/C Ratio	0.016	0.304	0.310
Control Delay, s/veh	2.8	5.2	5.4
LOS	A	A	A
95th %tile Queue, veh	0	1	1

<b>Intersection</b>			
Intersection Delay, s/veh	5.1		
Intersection LOS	A		
<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	76	0	402
Demand Flow Rate, veh/h	78	0	410
Vehicles Circulating, veh/h	321	410	0
Vehicles Exiting, veh/h	89	0	399
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.4	0.0	5.3
Approach LOS	A	-	A
<b>Lane</b>	<b>Left</b>	<b>Left</b>	<b>Left</b>
Designated Moves	R	T	L
Assumed Moves	R	T	L
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	78	0	410
Cap Entry Lane, veh/h	995	908	1380
Entry HV Adj Factor	0.974	1.000	0.980
Flow Entry, veh/h	76	0	402
Cap Entry, veh/h	969	908	1352
V/C Ratio	0.078	0.000	0.297
Control Delay, s/veh	4.4	4.0	5.3
LOS	A	A	A
95th %tile Queue, veh	0	0	1

# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	3870	170	260	220	200	0	160	50
Future Volume (veh/h)	0	0	0	160	3870	170	260	220	200	0	160	50
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No				No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	1870	0	1870	1870
Adj Flow Rate, veh/h				174	4207	185	283	239	0	0	174	54
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	2	2	2	2	2	0	2	2
Cap, veh/h				1252	4524	1114	337	428		0	185	57
Arrive On Green				0.70	0.70	0.70	0.07	0.23	0.00	0.00	0.14	0.14
Sat Flow, veh/h				1781	6434	1585	3456	1870	1585	0	1369	425
Grp Volume(v), veh/h				174	4207	185	283	239	0	0	0	228
Grp Sat Flow(s),veh/h/ln				1781	1609	1585	1728	1870	1585	0	0	1794
Q Serve(g_s), s				5.1	89.7	6.3	10.5	18.1	0.0	0.0	0.0	20.2
Cycle Q Clear(g_c), s				5.1	89.7	6.3	10.5	18.1	0.0	0.0	0.0	20.2
Prop In Lane				1.00		1.00	1.00		1.00	0.00		0.24
Lane Grp Cap(c), veh/h				1252	4524	1114	337	428		0	0	242
V/C Ratio(X)				0.14	0.93	0.17	0.84	0.56		0.00	0.00	0.94
Avail Cap(c_a), veh/h				1252	4524	1114	337	428		0	0	242
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				7.8	20.4	8.0	56.8	54.6	0.0	0.0	0.0	68.6
Incr Delay (d2), s/veh				0.1	4.2	0.1	17.0	1.6	0.0	0.0	0.0	41.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.9	30.6	10.7	5.7	8.8	0.0	0.0	0.0	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				7.9	24.5	8.1	73.8	56.2	0.0	0.0	0.0	110.5
LnGrp LOS				A	C	A	E	E		A	A	F
Approach Vol, veh/h					4566			522	A		228	
Approach Delay, s/veh					23.2			65.7			110.5	
Approach LOS					C			E			F	
Timer - Assigned Phs				4		6	7	8				
Phs Duration (G+Y+Rc), s				43.0		117.0	15.0	28.0				
Change Period (Y+Rc), s				6.4		4.5	4.5	6.4				
Max Green Setting (Gmax), s				36.6		112.5	10.5	21.6				
Max Q Clear Time (g_c+I1), s				20.1		91.7	12.5	22.2				
Green Ext Time (p_c), s				1.2		20.7	0.0	0.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				31.1								
HCM 6th LOS				C								
<b>Notes</b>												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

<b>Intersection</b>			
Intersection Delay, s/veh	6.7		
Intersection LOS	A		
<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
Entry Lanes	0	1	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	0	543	761
Demand Flow Rate, veh/h	0	554	776
Vehicles Circulating, veh/h	754	200	0
Vehicles Exiting, veh/h	0	576	754
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.0	5.7
Approach LOS	-	A	A
<b>Lane</b>	<b>Left</b>	<b>Left</b>	<b>Right</b>
Designated Moves	T	L	TR
Assumed Moves	T	L	TR
RT Channelized			
Lane Util	1.000	0.258	0.742
Follow-Up Headway, s	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328
Entry Flow, veh/h	554	200	576
Cap Entry Lane, veh/h	1198	1350	1420
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	543	196	565
Cap Entry, veh/h	1175	1323	1392
V/C Ratio	0.462	0.148	0.406
Control Delay, s/veh	8.0	3.9	6.4
LOS	A	A	A
95th %tile Queue, veh	3	1	2


## 13 – Roundabouts for Left Turn Movements



# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑	↑		↑	↑		↑	↑↑
Traffic Volume (vph)	0	2790	290	0	4060	120	0	290	70	0	80	330
Future Volume (vph)	0	2790	290	0	4060	120	0	290	70	0	80	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.4	5.9		3.4	3.4		3.3	5.8		3.3	3.3
Lane Util. Factor		0.91	1.00		0.91	1.00		1.00	1.00		1.00	0.88
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		5085	1583		5085	1583		1863	1583		1863	2787
Flt Permitted		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		5085	1583		5085	1583		1863	1583		1863	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3033	315	0	4413	130	0	315	76	0	87	359
RTOR Reduction (vph)	0	0	42	0	0	15	0	0	16	0	0	16
Lane Group Flow (vph)	0	3033	273	0	4413	115	0	315	60	0	87	343
Turn Type		NA	Prot		NA	Prot		NA	Prot		NA	Prot
Protected Phases		2	2		6	6		8	8		8	8
Permitted Phases												
Actuated Green, G (s)		133.9	133.9		133.9	133.9		24.4	24.4		24.4	24.4
Effective Green, g (s)		136.4	133.9		136.4	136.4		26.9	24.4		26.9	26.9
Actuated g/C Ratio		0.80	0.79		0.80	0.80		0.16	0.14		0.16	0.16
Clearance Time (s)		5.9	5.9		5.9	5.9		5.8	5.8		5.8	5.8
Vehicle Extension (s)		4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		4079	1246		4079	1270		294	227		294	441
v/s Ratio Prot		0.60	0.17		c0.87	0.07		c0.17	0.04		0.05	0.12
v/s Ratio Perm												
v/c Ratio		0.74	0.22		1.08	0.09		1.07	0.26		0.30	0.78
Uniform Delay, d1		8.2	4.6		16.8	3.6		71.5	64.8		63.2	68.7
Progression Factor		1.00	1.00		0.58	0.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.3	0.4		38.3	0.0		72.7	0.2		0.2	7.7
Delay (s)		9.5	5.0		48.0	0.0		144.3	65.0		63.4	76.4
Level of Service		A	A		D	A		F	E		E	E
Approach Delay (s)		9.1			46.6			128.9			73.8	
Approach LOS		A			D			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		37.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		1.11										
Actuated Cycle Length (s)		170.0			Sum of lost time (s)			11.7				
Intersection Capacity Utilization		100.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												













<b>Intersection</b>			
Intersection Delay, s/veh	5.2		
Intersection LOS	A		
<b>Approach</b>	<b>EB</b>	<b>NB</b>	<b>SB</b>
Entry Lanes	0	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	0	446	424
Demand Flow Rate, veh/h	0	454	432
Vehicles Circulating, veh/h	454	0	22
Vehicles Exiting, veh/h	0	454	432
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	0.0	5.1	5.4
Approach LOS	-	A	A
<b>Lane</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>
Designated Moves	L	TR	T
Assumed Moves	L	TR	T
RT Channelized			
Lane Util	0.048	0.952	1.000
Follow-Up Headway, s	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.328
Entry Flow, veh/h	22	432	432
Cap Entry Lane, veh/h	1350	1420	1394
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	22	424	424
Cap Entry, veh/h	1323	1392	1366
V/C Ratio	0.016	0.304	0.310
Control Delay, s/veh	2.8	5.2	5.4
LOS	A	A	A
95th %tile Queue, veh	0	1	1

Intersection			
Intersection Delay, s/veh	5.1		
Intersection LOS	A		
Approach	WB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	76	0	402
Demand Flow Rate, veh/h	78	0	410
Vehicles Circulating, veh/h	321	410	0
Vehicles Exiting, veh/h	89	0	399
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.4	0.0	5.3
Approach LOS	A	-	A
Lane	Left	Left	Left
Designated Moves	R	T	L
Assumed Moves	R	T	L
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	78	0	410
Cap Entry Lane, veh/h	995	908	1380
Entry HV Adj Factor	0.974	1.000	0.980
Flow Entry, veh/h	76	0	402
Cap Entry, veh/h	969	908	1352
V/C Ratio	0.078	0.000	0.297
Control Delay, s/veh	4.4	4.0	5.3
LOS	A	A	A
95th %tile Queue, veh	0	0	1

# HCM Signalized Intersection Capacity Analysis

## 12: Spanish Wells/Wild Horse Rd & US 278

04/11/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗		↑↑↑	↗		↑	↗		↑	↗
Traffic Volume (vph)	0	2480	380	0	3870	330	0	480	200	0	320	310
Future Volume (vph)	0	2480	380	0	3870	330	0	480	200	0	320	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		6.3	6.3		6.4	6.4		6.4	6.4
Lane Util. Factor		0.86	1.00		0.86	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		6408	1583		6408	1583		1863	1583		1863	1583
Flt Permitted		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		6408	1583		6408	1583		1863	1583		1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2696	413	0	4207	359	0	522	217	0	348	337
RTOR Reduction (vph)	0	0	70	0	0	30	0	0	15	0	0	15
Lane Group Flow (vph)	0	2696	343	0	4207	329	0	522	202	0	348	322
Turn Type		NA	Prot		NA	Prot		NA	Prot		NA	Prot
Protected Phases		2	2		6	6		8	8		8	8
Permitted Phases												
Actuated Green, G (s)		112.5	112.5		110.7	110.7		46.6	46.6		46.6	46.6
Effective Green, g (s)		112.5	112.5		110.7	110.7		46.6	46.6		46.6	46.6
Actuated g/C Ratio		0.66	0.66		0.65	0.65		0.27	0.27		0.27	0.27
Clearance Time (s)		4.5	4.5		6.3	6.3		6.4	6.4		6.4	6.4
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		4240	1047		4172	1030		510	433		510	433
v/s Ratio Prot		0.42	0.22		c0.66	0.21		c0.28	0.13		0.19	0.20
v/s Ratio Perm												
v/c Ratio		0.64	0.33		1.01	0.32		1.02	0.47		0.68	0.74
Uniform Delay, d1		16.8	12.4		29.6	13.1		61.7	51.3		55.1	56.2
Progression Factor		1.00	1.08		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.6		16.0	0.8		46.0	0.8		3.8	6.8
Delay (s)		17.2	14.0		45.7	13.9		107.7	52.1		58.8	63.0
Level of Service		B	B		D	B		F	D		E	E
Approach Delay (s)		16.8			43.2			91.4			60.9	
Approach LOS		B			D			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			39.4									
HCM 2000 Level of Service												D
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			170.0									
Sum of lost time (s)												12.7
Intersection Capacity Utilization			91.9%									
ICU Level of Service												F
Analysis Period (min)			15									
c Critical Lane Group												

Intersection				
Intersection Delay, s/veh	5.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	0	0	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	0	0	881	228
Demand Flow Rate, veh/h	0	0	898	233
Vehicles Circulating, veh/h	699	898	0	466
Vehicles Exiting, veh/h	0	0	699	432
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	0.0	5.6	6.3
Approach LOS	-	-	A	A
Lane	Left	Right	Left	
Designated Moves	L	TR	T	
Assumed Moves	L	TR	T	
RT Channelized				
Lane Util	0.519	0.481	1.000	
Follow-Up Headway, s	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.328	
Entry Flow, veh/h	466	432	233	
Cap Entry Lane, veh/h	1350	1420	956	
Entry HV Adj Factor	0.980	0.980	0.980	
Flow Entry, veh/h	457	424	228	
Cap Entry, veh/h	1323	1392	937	
V/C Ratio	0.345	0.304	0.244	
Control Delay, s/veh	5.9	5.2	6.3	
LOS	A	A	A	
95th %tile Queue, veh	2	1	1	

<b>Intersection</b>			
Intersection Delay, s/veh	6.7		
Intersection LOS	A		
<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
Entry Lanes	0	1	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	0	543	761
Demand Flow Rate, veh/h	0	554	776
Vehicles Circulating, veh/h	754	200	0
Vehicles Exiting, veh/h	0	576	754
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.0	5.7
Approach LOS	-	A	A
<b>Lane</b>	<b>Left</b>	<b>Left</b>	<b>Right</b>
Designated Moves	T	L	TR
Assumed Moves	T	L	TR
RT Channelized			
Lane Util	1.000	0.258	0.742
Follow-Up Headway, s	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328
Entry Flow, veh/h	554	200	576
Cap Entry Lane, veh/h	1198	1350	1420
Entry HV Adj Factor	0.980	0.980	0.980
Flow Entry, veh/h	543	196	565
Cap Entry, veh/h	1175	1323	1392
V/C Ratio	0.462	0.148	0.406
Control Delay, s/veh	8.0	3.9	6.4
LOS	A	A	A
95th %tile Queue, veh	3	1	2

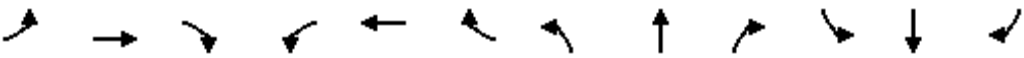











## 14 – Elevated Viaduct

# HCM Signalized Intersection Capacity Analysis

## 10: Chamberlin Dr/Squire Pope Rd & US 278

04/13/2020






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	1953	60	10	2842	110	10	50	10	60	10	320
Future Volume (vph)	230	1953	60	10	2842	110	10	50	10	60	10	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.7	3.4		3.6	3.4	3.4	3.3	3.3			3.3	3.2
Lane Util. Factor	0.97	0.91		1.00	0.95	1.00	1.00	1.00			1.00	0.88
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	3433	5063		1770	3539	1583	1770	1815			1786	2787
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.56	1.00			0.60	1.00
Satd. Flow (perm)	3433	5063		1770	3539	1583	1042	1815			1126	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	2123	65	11	3089	120	11	54	11	65	11	348
RTOR Reduction (vph)	0	2	0	0	0	20	0	4	0	0	0	44
Lane Group Flow (vph)	250	2186	0	11	3089	100	11	61	0	0	76	304
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			8		7	4	5
Permitted Phases						6	8			4		4
Actuated Green, G (s)	11.1	145.3		1.6	135.7	135.7	15.8	15.8			15.8	26.9
Effective Green, g (s)	13.1	147.8		3.6	138.2	138.2	18.3	18.3			18.3	31.9
Actuated g/C Ratio	0.07	0.82		0.02	0.77	0.77	0.10	0.10			0.10	0.18
Clearance Time (s)	5.7	5.9		5.6	5.9	5.9	5.8	5.8			5.8	5.7
Vehicle Extension (s)	2.0	4.0		1.5	4.0	4.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	249	4157		35	2717	1215	105	184			114	493
v/s Ratio Prot	c0.07	0.43		0.01	c0.87			0.03				0.05
v/s Ratio Perm						0.06	0.01				c0.07	0.06
v/c Ratio	1.00	0.53		0.31	1.14	0.08	0.10	0.33			0.67	0.62
Uniform Delay, d1	83.5	5.1		87.0	20.9	5.2	73.4	75.2			77.9	68.4
Progression Factor	1.00	1.00		0.90	0.64	0.04	1.00	1.00			1.00	1.00
Incremental Delay, d2	58.1	0.5		0.5	63.0	0.0	0.2	0.4			10.8	1.6
Delay (s)	141.5	5.5		78.8	76.3	0.2	73.6	75.6			88.7	70.0
Level of Service	F	A		E	E	A	E	E			F	E
Approach Delay (s)		19.5			73.5			75.3			73.4	
Approach LOS		B			E			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			52.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			180.0			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			105.6%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells & US 278

04/13/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1643	260	160	2652	170	260	100	140	60	100	50
Future Volume (veh/h)	120	1643	260	160	2652	170	260	100	140	60	100	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	1786	283	174	2883	185	283	109	152	65	109	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	3064	485	194	2922	907	273	133	185	137	102	51
Arrive On Green	0.15	1.00	1.00	0.11	0.57	0.57	0.13	0.19	0.19	0.03	0.09	0.09
Sat Flow, veh/h	1781	5641	894	1781	5106	1585	1781	707	986	1781	1180	585
Grp Volume(v), veh/h	130	1528	541	174	2883	185	283	0	261	65	0	163
Grp Sat Flow(s),veh/h/ln	1781	1609	1710	1781	1702	1585	1781	0	1693	1781	0	1765
Q Serve(g_s), s	13.0	0.0	0.0	17.4	99.9	8.0	23.5	0.0	26.6	5.3	0.0	15.6
Cycle Q Clear(g_c), s	13.0	0.0	0.0	17.4	99.9	8.0	23.5	0.0	26.6	5.3	0.0	15.6
Prop In Lane	1.00		0.52	1.00		1.00	1.00		0.58	1.00		0.33
Lane Grp Cap(c), veh/h	138	2621	928	194	2922	907	273	0	318	137	0	153
V/C Ratio(X)	0.95	0.58	0.58	0.90	0.99	0.20	1.04	0.00	0.82	0.47	0.00	1.07
Avail Cap(c_a), veh/h	138	2621	928	282	2922	907	273	0	318	137	0	153
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	75.7	0.0	0.0	79.2	37.8	11.7	65.0	0.0	70.2	74.2	0.0	82.2
Incr Delay (d2), s/veh	60.0	1.0	2.7	21.7	13.8	0.5	64.8	0.0	15.6	2.5	0.0	91.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.2	0.7	9.1	43.1	3.1	16.4	0.0	13.0	0.4	0.0	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	135.7	1.0	2.7	100.8	51.6	12.2	129.8	0.0	85.8	76.7	0.0	173.5
LnGrp LOS	F	A	A	F	D	B	F	A	F	E	A	F
Approach Vol, veh/h	2199			3242			544			228		
Approach Delay, s/veh	9.3			52.0			108.7			145.9		
Approach LOS	A			D			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.4	104.6	28.0	22.0	20.7	109.3	9.8	40.2				
Change Period (Y+Rc), s	* 5.8	* 6.8	4.5	6.4	* 6.8	* 6.3	4.5	6.4				
Max Green Setting (Gmax), s	* 29	* 89	23.5	15.6	* 14	* 1E2	5.3	33.8				
Max Q Clear Time (g_c+I1), s	19.4	2.0	25.5	17.6	15.0	101.9	7.3	28.6				
Green Ext Time (p_c), s	0.3	26.9	0.0	0.0	0.0	1.1	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay	45.3											
HCM 6th LOS	D											
Notes												













**Final Recommended Alternative**

10B – Consolidate Lefts from Squire Pope Road and  
Spanish Wells Road to Old Wild Horse Road

# HCM 6th Signalized Intersection Summary

## 10: Chamberlin Dr/Squire Pope Rd & US 278

01/11/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑		↑	↑	↑
Traffic Volume (veh/h)	0	4105	15	10	1800	200	10	10	10	50	10	310
Future Volume (veh/h)	0	4105	15	10	1800	200	10	10	10	50	10	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	4462	16	11	1957	0	11	11	11	54	11	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	4346	1327	41	4534		137	64	64	127	140	
Arrive On Green	0.00	0.85	0.84	0.05	1.00	0.00	0.07	0.07	0.06	0.07	0.07	0.00
Sat Flow, veh/h	0	5274	1585	1781	5106	1585	1404	858	858	1390	1870	1585
Grp Volume(v), veh/h	0	4462	16	11	1957	0	11	0	22	54	11	0
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1702	1585	1404	0	1716	1390	1870	1585
Q Serve(g_s), s	0.0	153.2	0.3	1.1	0.0	0.0	1.3	0.0	2.2	6.8	1.0	0.0
Cycle Q Clear(g_c), s	0.0	153.2	0.3	1.1	0.0	0.0	2.3	0.0	2.2	9.0	1.0	0.0
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	0	4346	1327	41	4534		137	0	128	127	140	
V/C Ratio(X)	0.00	1.03	0.01	0.27	0.43		0.08	0.00	0.17	0.42	0.08	
Avail Cap(c_a), veh/h	0	4346	1327	69	4534		248	0	264	237	288	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.86	0.86	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	13.4	2.4	84.4	0.0	0.0	78.6	0.0	78.6	82.3	77.5	0.0
Incr Delay (d2), s/veh	0.0	21.0	0.0	3.0	0.3	0.0	0.1	0.0	0.2	0.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	46.3	0.1	0.5	0.1	0.0	0.5	0.0	1.0	2.5	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	34.4	2.4	87.4	0.3	0.0	78.7	0.0	78.9	83.1	77.6	0.0
LnGrp LOS	A	F	A	F	A		E	A	E	F	E	
Approach Vol, veh/h		4478			1968	A		33			65	A
Approach Delay, s/veh		34.3			0.7			78.8			82.2	
Approach LOS		C			A			E			F	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	156.6		16.8		163.2		16.8				
Change Period (Y+Rc), s	4.5	5.9		* 5.8		5.9		* 5.8				
Max Green Setting (Gmax), s	5.0	133.6		* 25		143.1		* 25				
Max Q Clear Time (g_c+I1), s	3.1	155.2		11.0		2.0		4.3				
Green Ext Time (p_c), s	0.0	0.0		0.0		131.2		0.0				

### Intersection Summary

HCM 6th Ctrl Delay	24.9
HCM 6th LOS	C

### Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM Signalized Intersection Capacity Analysis

## 16: US 278 & Old Wild Horse Rd

01/11/2021




Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↑↑↑	↔	↑↑↑	↔		
Traffic Volume (vph)	140	215	3810	80	1870	20	0	0
Future Volume (vph)	140	215	3810	80	1870	20	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5		
Lane Util. Factor		0.97	0.91	1.00	0.91	1.00		
Frt		1.00	1.00	1.00	1.00	0.85		
Flt Protected		0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)		3433	5085	1770	5085	1583		
Flt Permitted		0.95	1.00	0.95	1.00	1.00		
Satd. Flow (perm)		3433	5085	1770	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	234	4141	87	2033	22	0	0
RTOR Reduction (vph)	0	0	0	0	0	4	0	0
Lane Group Flow (vph)	0	386	4141	87	2033	18	0	0
Turn Type	Prot	Prot	NA	Prot	NA	Perm		
Protected Phases	5	5	2	1	6			
Permitted Phases			2			6		
Actuated Green, G (s)		27.5	158.6	12.4	143.5	143.5		
Effective Green, g (s)		27.5	158.6	12.4	143.5	143.5		
Actuated g/C Ratio		0.15	0.88	0.07	0.80	0.80		
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		524	4480	121	4053	1262		
v/s Ratio Prot		c0.11	c0.81	0.05	0.40			
v/s Ratio Perm						0.01		
v/c Ratio		0.74	0.92	0.72	0.50	0.01		
Uniform Delay, d1		72.8	6.9	82.1	6.2	3.7		
Progression Factor		0.96	0.63	1.00	0.85	0.81		
Incremental Delay, d2		0.5	0.4	16.7	0.4	0.0		
Delay (s)		70.1	4.8	99.1	5.6	3.0		
Level of Service		E	A	F	A	A		
Approach Delay (s)			10.4		9.4		0.0	
Approach LOS			B		A		A	
<b>Intersection Summary</b>								
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio			0.92					
Actuated Cycle Length (s)			180.0		Sum of lost time (s)		9.0	
Intersection Capacity Utilization			86.1%		ICU Level of Service		E	
Analysis Period (min)			15					
c Critical Lane Group								



# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells/Wild Horse Road & US 278













01/11/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑		↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	0	3570	320	0	1720	80	210	60	170	100	60	40
Future Volume (veh/h)	0	3570	320	0	1720	80	210	60	170	100	60	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1856	1856	0	1841	1841	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	3880	348	0	1870	87	228	65	0	109	65	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	3	0	4	4	2	2	2	2	2	2
Cap, veh/h	0	4219	1454	0	5202	242	231	211		176	104	88
Arrive On Green	0.00	1.00	1.00	0.00	0.83	0.83	0.09	0.11	0.00	0.03	0.06	0.06
Sat Flow, veh/h	0	5233	1572	0	6505	291	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	0	3880	348	0	1422	535	228	65	0	109	65	43
Grp Sat Flow(s),veh/h/ln	0	1689	1572	0	1583	1788	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.0	12.9	12.9	16.5	5.7	0.0	6.2	6.1	4.7
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	12.9	12.9	16.5	5.7	0.0	6.2	6.1	4.7
Prop In Lane	0.00		1.00	0.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	4219	1454	0	3955	1489	231	211		176	104	88
V/C Ratio(X)	0.00	0.92	0.24	0.00	0.36	0.36	0.99	0.31		0.62	0.63	0.49
Avail Cap(c_a), veh/h	0	4219	1454	0	3955	1489	231	211		176	104	88
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.27	0.27	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	3.6	3.6	75.3	73.4	0.0	79.7	83.2	82.5
Incr Delay (d2), s/veh	0.0	1.3	0.1	0.0	0.3	0.7	55.4	0.8	0.0	6.5	11.2	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	0.0	3.3	4.0	6.0	2.8	0.0	5.3	3.3	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.1	0.0	3.8	4.3	130.7	74.2	0.0	86.2	94.4	86.7
LnGrp LOS	A	A	A	A	A	A	F	E		F	F	F
Approach Vol, veh/h		4228			1957			293	A		217	
Approach Delay, s/veh		1.2			4.0			118.1			88.8	
Approach LOS		A			A			F			F	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		156.6	21.0	16.4		156.6	10.7	26.7				
Change Period (Y+Rc), s		* 6.3	4.5	* 6.4		* 6.3	4.5	6.4				
Max Green Setting (Gmax), s		* 1.4E2	16.5	* 10		* 1.4E2	6.2	19.9				
Max Q Clear Time (g_c+I1), s		2.0	18.5	8.1		14.9	8.2	7.7				
Green Ext Time (p_c), s		128.7	0.0	0.1		24.2	0.0	0.1				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			9.9									
HCM 6th LOS			A									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

# HCM 6th Signalized Intersection Summary

## 10: Chamberlin Dr/Squire Pope Rd & US 278

01/11/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑	↑		↑	↑	↑
Traffic Volume (veh/h)	0	3020	60	10	4060	225	10	50	10	60	10	320
Future Volume (veh/h)	0	3020	60	10	4060	225	10	50	10	60	10	320
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	3283	65	11	4413	0	11	54	11	65	11	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3714	1126	163	4314		196	166	34	151	206	
Arrive On Green	0.00	0.73	0.71	0.18	1.00	0.00	0.11	0.11	0.09	0.11	0.11	0.00
Sat Flow, veh/h	0	5274	1585	1781	5106	1585	1404	1508	307	1337	1870	1585
Grp Volume(v), veh/h	0	3283	65	11	4413	0	11	0	65	65	11	0
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1702	1585	1404	0	1815	1337	1870	1585
Q Serve(g_s), s	0.0	73.7	1.9	0.8	126.7	0.0	1.1	0.0	5.0	7.1	0.8	0.0
Cycle Q Clear(g_c), s	0.0	73.7	1.9	0.8	126.7	0.0	1.8	0.0	5.0	12.0	0.8	0.0
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	0	3714	1126	163	4314		196	0	200	151	206	
V/C Ratio(X)	0.00	0.88	0.06	0.07	1.02		0.06	0.00	0.32	0.43	0.05	
Avail Cap(c_a), veh/h	0	3714	1126	163	4314		262	0	287	215	296	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.09	0.09	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	15.6	6.5	56.0	0.0	0.0	60.5	0.0	61.8	67.1	59.7	0.0
Incr Delay (d2), s/veh	0.0	3.5	0.1	0.0	11.8	0.0	0.0	0.0	0.3	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	25.1	0.6	0.3	4.7	0.0	0.4	0.0	2.3	2.4	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	19.1	6.6	56.0	11.8	0.0	60.6	0.0	62.1	67.8	59.7	0.0
LnGrp LOS	A	B	A	E	F		E	A	E	E	E	
Approach Vol, veh/h		3348			4424	A		76			76	A
Approach Delay, s/veh		18.8			11.9			61.9			66.7	
Approach LOS		B			B			E			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	17.6	112.5		19.9		130.1		19.9				
Change Period (Y+Rc), s	5.9	* 5.9		* 5.8		5.9		* 5.8				
Max Green Setting (Gmax), s	6.0	* 1.1E2		* 21		117.1		* 21				
Max Q Clear Time (g_c+I1), s	2.8	75.7		14.0		128.7		7.0				
Green Ext Time (p_c), s	0.0	30.9		0.0		0.0		0.1				

### Intersection Summary

HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

### Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM Signalized Intersection Capacity Analysis

## 16: US 278 & Old Wild Horse Rd

01/11/2021

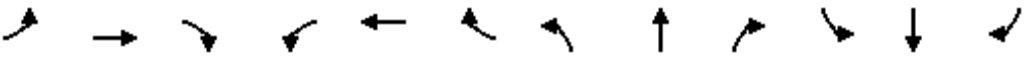


Movement	EBU	EBL	EBT	WBU	WBT	WBR	SWL	SWR
Lane Configurations								
Traffic Volume (vph)	115	235	2740	160	4180	20	0	0
Future Volume (vph)	115	235	2740	160	4180	20	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5		
Lane Util. Factor		0.97	0.91	1.00	0.91	1.00		
Frt		1.00	1.00	1.00	1.00	0.85		
Flt Protected		0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)		3433	5085	1770	5085	1583		
Flt Permitted		0.95	1.00	0.95	1.00	1.00		
Satd. Flow (perm)		3433	5085	1770	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	255	2978	174	4543	22	0	0
RTOR Reduction (vph)	0	0	0	0	0	3	0	0
Lane Group Flow (vph)	0	380	2978	174	4543	19	0	0
Turn Type	Prot	Prot	NA	Prot	NA	Perm		
Protected Phases	5	5	2	1	6			
Permitted Phases						6		
Actuated Green, G (s)		18.0	116.8	24.2	123.0	123.0		
Effective Green, g (s)		18.0	116.8	24.2	123.0	123.0		
Actuated g/C Ratio		0.12	0.78	0.16	0.82	0.82		
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		411	3959	285	4169	1298		
v/s Ratio Prot		c0.11	0.59	0.10	c0.89			
v/s Ratio Perm						0.01		
v/c Ratio		0.92	0.75	0.61	1.09	0.01		
Uniform Delay, d1		65.3	8.9	58.5	13.5	2.5		
Progression Factor		0.82	0.79	0.97	0.72	0.00		
Incremental Delay, d2		18.5	0.7	0.4	40.8	0.0		
Delay (s)		72.4	7.8	56.9	50.5	0.0		
Level of Service		E	A	E	D	A		
Approach Delay (s)			15.1		50.5		0.0	
Approach LOS			B		D		A	
<b>Intersection Summary</b>								
HCM 2000 Control Delay			35.8		HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio			1.07					
Actuated Cycle Length (s)			150.0		Sum of lost time (s)		9.0	
Intersection Capacity Utilization			98.2%		ICU Level of Service		F	
Analysis Period (min)			15					
c Critical Lane Group								

# HCM 6th Signalized Intersection Summary

## 12: Spanish Wells/Wild Horse Road & US 278

01/11/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑		↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	0	2480	420	0	4030	170	260	100	140	60	100	70
Future Volume (veh/h)	0	2480	420	0	4030	170	260	100	140	60	100	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	2696	457	0	4380	185	283	109	0	65	109	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	0	3530	1296	0	4413	183	285	289		205	127	108
Arrive On Green	0.00	1.00	1.00	0.00	0.69	0.69	0.13	0.15	0.00	0.04	0.07	0.07
Sat Flow, veh/h	0	5274	1585	0	6646	264	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	0	2696	457	0	3290	1275	283	109	0	65	109	76
Grp Sat Flow(s),veh/h/ln	0	1702	1585	0	1609	1823	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.0	99.2	103.7	18.9	7.8	0.0	5.1	8.7	7.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	99.2	103.7	18.9	7.8	0.0	5.1	8.7	7.0
Prop In Lane	0.00		1.00	0.00		0.15	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	3530	1296	0	3336	1260	285	289		205	127	108
V/C Ratio(X)	0.00	0.76	0.35	0.00	0.99	1.01	0.99	0.38		0.32	0.86	0.71
Avail Cap(c_a), veh/h	0	3530	1296	0	3336	1260	285	289		205	127	108
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.59	0.59	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	22.5	23.2	57.8	56.9	0.0	62.0	69.2	68.4
Incr Delay (d2), s/veh	0.0	1.0	0.4	0.0	12.7	28.3	51.5	0.8	0.0	0.9	40.4	18.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.2	0.0	36.0	48.0	5.7	3.8	0.0	2.4	5.6	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.0	0.4	0.0	35.1	51.5	109.3	57.7	0.0	62.9	109.6	87.2
LnGrp LOS	A	A	A	A	D	F	F	E		E	F	F
Approach Vol, veh/h		3153			4565			392	A		250	
Approach Delay, s/veh		0.9			39.7			94.9			90.7	
Approach LOS		A			D			F			F	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		110.0	23.4	16.6		110.0	10.4	29.6				
Change Period (Y+Rc), s		* 6.3	4.5	6.4		* 6.3	4.5	6.4				
Max Green Setting (Gmax), s		* 1E2	18.9	10.2		* 1E2	5.9	23.2				
Max Q Clear Time (g_c+I1), s		2.0	20.9	10.7		105.7	7.1	9.8				
Green Ext Time (p_c), s		67.7	0.0	0.0		0.0	0.0	0.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			29.2									
HCM 6th LOS			C									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

## APPENDIX B

SimTraffic Reports

1 – Jughandle at Squire Pope Road



## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7972	7785	7924	7962	7699	7871
Vehs Exited	7346	7727	7413	7563	7426	7496
Starting Vehs	1411	1330	1373	1147	1340	1317
Ending Vehs	2037	1388	1884	1546	1613	1693
Denied Entry Before	235	1	42	262	38	115
Denied Entry After	190	52	50	146	69	101
Travel Distance (mi)	37617	38226	37802	38381	37725	37950
Travel Time (hr)	1920.7	1352.0	1576.3	1551.2	1506.5	1581.3
Total Delay (hr)	1104.8	522.0	755.5	718.0	688.1	757.7
Total Stops	25339	12776	20647	15049	19774	18717
Fuel Used (gal)	1371.1	1279.7	1298.6	1324.5	1290.8	1312.9

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7972	7785	7924	7962	7699	7871
Vehs Exited	7346	7727	7413	7563	7426	7496
Starting Vehs	1411	1330	1373	1147	1340	1317
Ending Vehs	2037	1388	1884	1546	1613	1693
Denied Entry Before	235	1	42	262	38	115
Denied Entry After	190	52	50	146	69	101
Travel Distance (mi)	37617	38226	37802	38381	37725	37950
Travel Time (hr)	1920.7	1352.0	1576.3	1551.2	1506.5	1581.3
Total Delay (hr)	1104.8	522.0	755.5	718.0	688.1	757.7
Total Stops	25339	12776	20647	15049	19774	18717
Fuel Used (gal)	1371.1	1279.7	1298.6	1324.5	1290.8	1312.9

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.6
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	3.6	0.0	3.1	0.9	3.0	0.3
Total Delay (hr)	10.5	0.3	3.4	0.1	0.6	21.8	0.5	1.2	0.2	0.6	39.2
Total Del/Veh (s)	10.7	86.7	6.6	4.3	313.3	293.2	265.1	80.6	68.1	7.3	23.0
Stop/Veh	0.21	1.00	0.15	0.00	2.00	1.28	1.29	0.94	0.78	0.34	0.25
Travel Dist (mi)	214.8	2.4	430.1	12.9	0.5	17.0	0.5	19.1	3.3	112.6	813.1
Travel Time (hr)	15.4	0.3	13.1	0.4	0.6	22.8	0.5	1.8	0.3	4.0	59.1
Avg Speed (mph)	14	7	33	32	1	1	1	11	13	30	14
Fuel Used (gal)	8.9	0.1	12.2	0.3	0.2	5.7	0.1	0.8	0.1	3.0	31.3
Fuel Eff. (mpg)	24.2	21.7	35.4	46.6	3.1	3.0	3.6	24.9	28.6	37.7	26.0
Vehicles Entered	3517	11	1831	59	7	251	7	52	9	313	6057
Vehicles Exited	3520	10	1834	59	7	248	7	52	9	313	6059
Hourly Exit Rate	3520	10	1834	59	7	248	7	52	9	313	6059
Input Volume	3830	10	1800	60	10	286	10	50	10	310	6376
% of Volume	92	100	102	98	70	87	70	104	90	101	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	1	1

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.7	1.8	0.0	0.0	0.0
Total Delay (hr)	2.4	14.9	0.7	4.2	9.1	0.3	6.6	1.5	0.6	3.3	1.8	0.2
Total Del/Veh (s)	101.2	16.3	11.9	166.8	18.8	11.4	105.8	86.8	12.3	112.5	94.9	43.8
Stop/Veh	1.03	0.20	0.19	1.01	0.27	0.28	1.02	0.90	0.84	1.05	0.93	0.95
Travel Dist (mi)	14.3	568.7	38.8	150.5	3075.5	140.6	101.0	28.4	81.5	8.8	5.6	1.6
Travel Time (hr)	2.9	27.6	1.9	7.7	78.1	3.5	10.2	2.5	3.6	3.7	2.0	0.3
Avg Speed (mph)	5	21	20	20	39	40	10	11	23	2	3	5
Fuel Used (gal)	1.0	21.8	1.2	4.7	78.8	3.6	4.3	1.1	2.4	1.0	0.5	0.1
Fuel Eff. (mpg)	14.9	26.1	33.0	32.1	39.0	38.5	23.3	25.1	34.4	8.7	10.6	17.5
Vehicles Entered	82	3274	223	81	1673	78	212	60	172	101	64	18
Vehicles Exited	83	3267	222	79	1671	75	212	57	172	102	65	19
Hourly Exit Rate	83	3267	222	79	1671	75	212	57	172	102	65	19
Input Volume	80	3570	240	80	1640	80	210	60	170	100	60	20
% of Volume	104	92	92	99	102	94	101	95	101	102	108	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.1
Total Delay (hr)	45.7
Total Del/Veh (s)	26.7
Stop/Veh	0.32
Travel Dist (mi)	4215.3
Travel Time (hr)	143.9
Avg Speed (mph)	29
Fuel Used (gal)	120.5
Fuel Eff. (mpg)	35.0
Vehicles Entered	6038
Vehicles Exited	6024
Hourly Exit Rate	6024
Input Volume	6310
% of Volume	95
Denied Entry Before	0
Denied Entry After	0

16: US 278 & Old Wild Horse Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	11.5	2.0	0.0	0.1	13.5
Total Del/Veh (s)	11.5	3.8	2.8	14.5	8.8
Stop/Veh	0.01	0.00	0.00	1.00	0.01
Travel Dist (mi)	855.2	341.0	3.4	7.6	1207.2
Travel Time (hr)	30.7	10.0	0.1	0.3	41.2
Avg Speed (mph)	28	34	29	22	29
Fuel Used (gal)	34.6	14.5	0.1	0.2	49.4
Fuel Eff. (mpg)	24.7	23.6	31.4	35.0	24.4
Vehicles Entered	3578	1882	19	20	5499
Vehicles Exited	3578	1881	20	20	5499
Hourly Exit Rate	3578	1881	20	20	5499
Input Volume	3890	1850	20	20	5780
% of Volume	92	102	100	100	95
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

37: Jughandle & US 278 Performance by movement

Movement	EBT	EBR	WBT	All
Denied Delay (hr)	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Delay (hr)	42.3	10.4	2.7	55.4
Total Del/Veh (s)	42.1	134.1	4.6	33.0
Stop/Veh	0.38	0.62	0.08	0.29
Travel Dist (mi)	1252.3	94.9	143.4	1490.6
Travel Time (hr)	70.5	12.9	6.4	89.7
Avg Speed (mph)	18	7	23	17
Fuel Used (gal)	44.4	4.6	8.2	57.2
Fuel Eff. (mpg)	28.2	20.6	17.6	26.1
Vehicles Entered	3574	276	2154	6004
Vehicles Exited	3518	262	2154	5934
Hourly Exit Rate	3518	262	2154	5934
Input Volume	3831	290	2120	6241
% of Volume	92	90	102	95
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

#### 40: Chamberlin Dr & Jughandle Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Delay (hr)	8.8	0.6	0.4	0.0	9.8
Total Del/Veh (s)	130.1	146.0	39.5	1.4	112.8
Stop/Veh	0.48	0.47	0.56	0.00	0.46
Travel Dist (mi)	15.1	0.9	11.4	1.5	28.9
Travel Time (hr)	9.4	0.7	0.8	0.1	10.9
Avg Speed (mph)	2	1	15	23	3
Fuel Used (gal)	2.5	0.2	0.4	0.1	3.1
Fuel Eff. (mpg)	6.1	5.6	28.9	17.3	9.3
Vehicles Entered	238	15	34	19	306
Vehicles Exited	232	14	33	19	298
Hourly Exit Rate	232	14	33	19	298
Input Volume	275	15	30	20	340
% of Volume	84	93	110	95	88
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

#### Total Zone Performance

Denied Delay (hr)	0.9
Denied Del/Veh (s)	1.2
Total Delay (hr)	212.3
Total Del/Veh (s)	1170.6
Stop/Veh	9.20
Travel Dist (mi)	16294.3
Travel Time (hr)	583.5
Avg Speed (mph)	28
Fuel Used (gal)	517.7
Fuel Eff. (mpg)	31.5
Vehicles Entered	2703
Vehicles Exited	2
Hourly Exit Rate	2
Input Volume	37217
% of Volume	0
Denied Entry Before	0
Denied Entry After	1

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Jughandle	37	42.1	70.1	0.4	18
Chamberlin Dr	10	10.7	15.6	0.1	14
Old Wild Horse	16	11.7	30.9	0.2	28
Spanish Wells	12	16.3	30.2	0.2	21
	42	15.1	156.6	1.8	42
Total		95.8	303.4	2.7	32

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	42	0.5	5.7	0.1	44
Wild Horse Road	12	18.8	161.0	1.8	41
Old Wild Horse	16	4.1	18.6	0.2	35
Squire Pope Rd	10	6.6	25.4	0.2	34
Jughandle	37	1.6	7.0	0.1	32
	38	2.2	30.4	0.4	42
Total		33.9	248.1	2.7	40



Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	T	T	T	L	T	T	T	L	T	TR	L	T
Maximum Queue (ft)	296	301	300	62	176	197	202	98	317	338	153	47
Average Queue (ft)	226	237	233	10	76	88	99	12	288	290	53	8
95th Queue (ft)	332	335	343	35	149	163	172	54	357	363	112	32
Link Distance (ft)	274	274	274		1174	1174	1174		303	303		1933
Upstream Blk Time (%)	4	5	5						56	51		
Queuing Penalty (veh)	48	59	69						86	78		
Storage Bay Dist (ft)				100				75			200	
Storage Blk Time (%)					3				92		0	
Queuing Penalty (veh)					0				9		0	

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	161	150
Average Queue (ft)	68	24
95th Queue (ft)	143	90
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	250
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	TR	L	L
Maximum Queue (ft)	221	410	488	487	275	211	259	261	270	208	209	228
Average Queue (ft)	95	165	195	221	67	117	123	142	154	82	125	144
95th Queue (ft)	180	370	424	441	242	217	248	247	259	189	194	208
Link Distance (ft)		856	856	856			9638	9638	9638	9638		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200				250	200					500	500
Storage Blk Time (%)	2	6		7	0	9	0					
Queuing Penalty (veh)	23	5		18	1	39	0					

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (ft)	161	144	215	243	105
Average Queue (ft)	68	62	120	63	50
95th Queue (ft)	141	110	213	191	97
Link Distance (ft)	2516			405	405
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500	200		
Storage Blk Time (%)			9	0	
Queuing Penalty (veh)			3	0	

Intersection: 16: US 278 & Old Wild Horse

Movement	EB	SB
Directions Served	T	R
Maximum Queue (ft)	151	55
Average Queue (ft)	5	15
95th Queue (ft)	106	43
Link Distance (ft)	1174	1993
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: Jughandle & US 278

Movement	EB	EB	EB	EB	B38	B38	B38	WB
Directions Served	T	T	T	R	T	T	T	T
Maximum Queue (ft)	1220	1235	1246	251	592	608	600	9
Average Queue (ft)	545	600	627	145	142	159	163	0
95th Queue (ft)	1731	1823	1837	394	779	855	862	6
Link Distance (ft)	1814	1814	1814		1480	1480	1480	274
Upstream Blk Time (%)	3	9	12		0	0	1	
Queuing Penalty (veh)	38	122	171		2	6	9	
Storage Bay Dist (ft)				300				
Storage Blk Time (%)			5	25				
Queuing Penalty (veh)			15	314				

Intersection: 40: Chamberlin Dr & Jughandle

Movement	EB	B39	NB
Directions Served	LR	T	T
Maximum Queue (ft)	349	295	69
Average Queue (ft)	252	213	24
95th Queue (ft)	495	486	66
Link Distance (ft)	284	290	1771
Upstream Blk Time (%)	57	48	
Queuing Penalty (veh)	166	139	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 1419
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## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9757	9598	9549	9649	9595	9626
Vehs Exited	9005	9069	8942	9067	8961	9011
Starting Vehs	2033	1988	2169	2095	2049	2064
Ending Vehs	2785	2517	2776	2677	2683	2684
Denied Entry Before	0	3	1	1	0	0
Denied Entry After	51	14	36	24	33	31
Travel Distance (mi)	44366	43833	43614	44022	43749	43917
Travel Time (hr)	2465.3	2276.1	2399.9	2405.3	2375.8	2384.5
Total Delay (hr)	1500.8	1321.4	1451.1	1448.3	1424.2	1429.1
Total Stops	20883	19650	20118	19394	19366	19878
Fuel Used (gal)	1683.8	1625.0	1646.4	1657.4	1642.7	1651.1

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9757	9598	9549	9649	9595	9626
Vehs Exited	9005	9069	8942	9067	8961	9011
Starting Vehs	2033	1988	2169	2095	2049	2064
Ending Vehs	2785	2517	2776	2677	2683	2684
Denied Entry Before	0	3	1	1	0	0
Denied Entry After	51	14	36	24	33	31
Travel Distance (mi)	44366	43833	43614	44022	43749	43917
Travel Time (hr)	2465.3	2276.1	2399.9	2405.3	2375.8	2384.5
Total Delay (hr)	1500.8	1321.4	1451.1	1448.3	1424.2	1429.1
Total Stops	20883	19650	20118	19394	19366	19878
Fuel Used (gal)	1683.8	1625.0	1646.4	1657.4	1642.7	1651.1

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.9	2.6	0.1
Total Delay (hr)	8.6	0.1	17.3	0.3	0.2	6.0	0.1	1.2	0.1	2.9	37.0
Total Del/Veh (s)	11.1	84.3	17.6	11.9	80.8	74.6	63.6	67.3	53.0	30.6	18.6
Stop/Veh	0.25	1.00	0.17	0.00	1.10	0.90	0.88	0.90	0.70	0.67	0.27
Travel Dist (mi)	170.5	1.4	825.0	20.3	0.7	19.0	0.5	21.4	3.7	119.2	1181.6
Travel Time (hr)	12.5	0.2	35.9	0.8	0.3	6.8	0.2	1.8	0.2	6.4	65.0
Avg Speed (mph)	14	8	23	24	3	3	3	12	15	19	18
Fuel Used (gal)	6.9	0.1	28.3	0.6	0.1	2.1	0.1	0.8	0.1	3.7	42.8
Fuel Eff. (mpg)	24.8	20.8	29.1	33.2	8.6	8.9	9.7	26.1	29.3	32.2	27.6
Vehicles Entered	2793	6	3497	91	10	283	7	58	10	331	7086
Vehicles Exited	2788	6	3505	92	10	279	8	61	10	329	7088
Hourly Exit Rate	2788	6	3505	92	10	279	8	61	10	329	7088
Input Volume	2790	10	4060	110	10	280	10	60	10	320	7660
% of Volume	100	60	86	84	100	100	80	102	100	103	93
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.8	1.7	0.0	0.0	0.0
Total Delay (hr)	6.1	29.9	2.4	37.4	931.5	42.4	7.5	2.1	0.4	1.0	2.5	0.7
Total Del/Veh (s)	165.0	42.4	31.2	687.5	723.8	737.1	98.2	71.5	10.0	62.0	87.5	50.8
Stop/Veh	1.52	0.75	0.74	2.61	1.71	1.45	1.02	0.85	0.72	0.91	0.95	1.00
Travel Dist (mi)	21.4	430.9	46.5	268.3	6299.1	280.8	128.7	49.9	67.8	5.0	9.1	4.3
Travel Time (hr)	6.7	39.6	3.8	43.6	1072.7	48.9	12.1	3.8	2.9	1.2	2.8	0.9
Avg Speed (mph)	3	11	12	6	6	6	11	13	24	4	3	5
Fuel Used (gal)	1.9	19.2	1.7	14.8	354.1	15.9	5.3	1.9	2.0	0.4	0.8	0.3
Fuel Eff. (mpg)	11.1	22.4	27.0	18.2	17.8	17.6	24.2	26.8	34.7	14.2	11.7	16.8
Vehicles Entered	123	2485	268	159	3845	171	269	105	143	57	104	49
Vehicles Exited	127	2470	267	148	3276	143	270	103	142	56	103	49
Hourly Exit Rate	127	2470	267	148	3276	143	270	103	142	56	103	49
Input Volume	120	2480	260	160	3870	170	260	100	140	60	100	50
% of Volume	106	100	103	92	85	84	104	103	101	93	103	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.1
Total Delay (hr)	1063.8
Total Del/Veh (s)	439.4
Stop/Veh	1.35
Travel Dist (mi)	7611.8
Travel Time (hr)	1238.9
Avg Speed (mph)	6
Fuel Used (gal)	418.1
Fuel Eff. (mpg)	18.2
Vehicles Entered	7778
Vehicles Exited	7154
Hourly Exit Rate	7154
Input Volume	7770
% of Volume	92
Denied Entry Before	0
Denied Entry After	0

16: US 278 & Old Wild Horse Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	8.1	14.4	0.0	0.4	23.0
Total Del/Veh (s)	10.2	14.5	6.3	66.1	12.7
Stop/Veh	0.04	0.12	0.00	0.96	0.09
Travel Dist (mi)	684.6	646.4	2.6	8.4	1342.0
Travel Time (hr)	23.6	29.4	0.1	0.7	53.9
Avg Speed (mph)	29	22	25	12	25
Fuel Used (gal)	25.5	34.1	0.1	0.3	60.0
Fuel Eff. (mpg)	26.9	19.0	21.2	25.6	22.4
Vehicles Entered	2856	3580	15	22	6473
Vehicles Exited	2876	3572	15	23	6486
Hourly Exit Rate	2876	3572	15	23	6486
Input Volume	2860	4160	20	20	7060
% of Volume	101	86	75	115	92
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

37: Jughandle & US 278 Performance by movement

Movement	EBT	EBR	WBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Delay (hr)	7.1	1.0	7.3	15.4
Total Del/Veh (s)	9.1	11.8	6.8	7.9
Stop/Veh	0.05	0.00	0.02	0.03
Travel Dist (mi)	986.9	104.3	257.6	1348.9
Travel Time (hr)	29.3	3.7	13.5	46.5
Avg Speed (mph)	34	28	19	29
Fuel Used (gal)	26.6	2.6	14.6	43.8
Fuel Eff. (mpg)	37.1	39.9	17.7	30.8
Vehicles Entered	2793	299	3845	6937
Vehicles Exited	2793	300	3850	6943
Hourly Exit Rate	2793	300	3850	6943
Input Volume	2790	290	4391	7471
% of Volume	100	103	88	93
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0



#### 40: Chamberlin Dr & Jughandle Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Delay (hr)	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)	2.4	1.2	0.4	1.8	1.8
Stop/Veh	0.07	0.03	0.00	0.00	0.05
Travel Dist (mi)	14.8	4.4	23.0	1.3	43.5
Travel Time (hr)	0.7	0.2	0.8	0.1	1.8
Avg Speed (mph)	20	20	29	23	24
Fuel Used (gal)	0.4	0.1	0.7	0.1	1.2
Fuel Eff. (mpg)	42.0	48.8	35.2	16.6	37.1
Vehicles Entered	231	69	69	16	385
Vehicles Exited	231	69	68	16	384
Hourly Exit Rate	231	69	68	16	384
Input Volume	230	60	70	20	380
% of Volume	100	115	97	80	101
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

#### Total Zone Performance

Denied Delay (hr)	0.8
Denied Del/Veh (s)	0.5
Total Delay (hr)	1164.6
Total Del/Veh (s)	2205.4
Stop/Veh	7.63
Travel Dist (mi)	19003.5
Travel Time (hr)	1598.1
Avg Speed (mph)	12
Fuel Used (gal)	798.8
Fuel Eff. (mpg)	23.8
Vehicles Entered	5194
Vehicles Exited	2
Hourly Exit Rate	2
Input Volume	44981
% of Volume	0
Denied Entry Before	0
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Jughandle	37	9.1	37.4	0.4	34
Chamberlin Dr	10	11.1	16.0	0.1	14
Old Wild Horse	16	10.3	29.5	0.2	29
Spanish Wells	12	42.4	56.1	0.2	12
	42	14.7	157.4	1.8	42
Total		87.6	296.4	2.7	32

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	42	1.4	6.6	0.1	38
Wild Horse Road	12	723.8	833.5	1.8	8
Old Wild Horse	16	15.2	29.8	0.2	22
Squire Pope Rd	10	17.5	36.4	0.2	24
Jughandle	37	3.9	9.3	0.1	24
	38	7.4	35.5	0.4	36
Total		769.3	951.1	2.7	10

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	T	T	T	L	T	T	T	L	T	TR	L	T
Maximum Queue (ft)	297	305	308	67	276	342	333	69	268	251	141	99
Average Queue (ft)	181	205	225	7	154	165	179	9	142	141	57	11
95th Queue (ft)	339	360	369	37	266	298	305	40	232	225	113	60
Link Distance (ft)	274	274	274		1174	1174	1174		303	303		1933
Upstream Blk Time (%)	2	3	5						0	0		
Queuing Penalty (veh)	19	29	48						0	0		
Storage Bay Dist (ft)				100				75			200	
Storage Blk Time (%)					17		0		44			
Queuing Penalty (veh)					2		0		4			

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	257	246
Average Queue (ft)	150	125
95th Queue (ft)	230	229
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	250
Storage Blk Time (%)	0	0
Queuing Penalty (veh)	0	0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B42	B42
Directions Served	L	T	T	T	R	L	T	T	T	TR	T	T
Maximum Queue (ft)	225	834	858	853	275	225	9513	9473	9433	9382	183	150
Average Queue (ft)	177	541	587	612	189	161	7338	7352	7356	7347	8	6
95th Queue (ft)	276	882	927	949	385	263	9634	9614	9571	9512	86	70
Link Distance (ft)		856	856	856			9637	9637	9637	9637	328	328
Upstream Blk Time (%)		1	1	1			3	2	1	0	1	0
Queuing Penalty (veh)		5	8	13			0	0	0	0	0	0
Storage Bay Dist (ft)	200				250	200						
Storage Blk Time (%)	24	21		27	0	10	35					
Queuing Penalty (veh)	195	25		69	1	92	56					

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	B42	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	L	L	T	R	L	T	TR
Maximum Queue (ft)	91	243	269	208	128	133	141	168
Average Queue (ft)	3	144	162	101	48	49	67	85
95th Queue (ft)	46	237	252	182	90	104	118	146
Link Distance (ft)	328			2516			405	405
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		500	500		500	200		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 16: US 278 & Old Wild Horse

Movement	EB	EB	EB	WB	WB	WB	WB	SB
Directions Served	T	T	T	T	T	T	R	R
Maximum Queue (ft)	188	229	235	870	880	866	492	80
Average Queue (ft)	13	19	25	123	218	137	16	25
95th Queue (ft)	105	132	145	603	815	645	206	61
Link Distance (ft)	1174	1174	1174	856	856	856	856	1993
Upstream Blk Time (%)				0	0	0		
Queuing Penalty (veh)				1	2	3		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 37: Jughandle & US 278

Movement	EB	EB	EB	EB
Directions Served	T	T	T	R
Maximum Queue (ft)	225	252	250	128
Average Queue (ft)	26	41	53	4
95th Queue (ft)	122	157	177	65
Link Distance (ft)	1814	1814	1814	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				300
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 40: Chamberlin Dr & Jughandle

Movement	EB
Directions Served	LR
Maximum Queue (ft)	58
Average Queue (ft)	16
95th Queue (ft)	48
Link Distance (ft)	284
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 576
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#### 4 – Flyover at Squire Pope Road

## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8039	7921	7658	7881	7918	7884
Vehs Exited	7695	7713	7700	7750	7734	7720
Starting Vehs	1031	1267	1277	1249	1324	1227
Ending Vehs	1375	1475	1235	1380	1508	1393
Denied Entry Before	292	34	2	0	48	74
Denied Entry After	220	1	170	24	91	100
Travel Distance (mi)	38512	38285	37509	38407	38159	38174
Travel Time (hr)	1492.5	1384.7	1399.3	1320.4	1503.9	1420.1
Total Delay (hr)	656.7	551.7	584.1	485.1	673.4	590.2
Total Stops	11046	16325	16800	13390	17194	14949
Fuel Used (gal)	1330.8	1294.0	1265.0	1277.0	1306.2	1294.6

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	8039	7921	7658	7881	7918	7884
Vehs Exited	7695	7713	7700	7750	7734	7720
Starting Vehs	1031	1267	1277	1249	1324	1227
Ending Vehs	1375	1475	1235	1380	1508	1393
Denied Entry Before	292	34	2	0	48	74
Denied Entry After	220	1	170	24	91	100
Travel Distance (mi)	38512	38285	37509	38407	38159	38174
Travel Time (hr)	1492.5	1384.7	1399.3	1320.4	1503.9	1420.1
Total Delay (hr)	656.7	551.7	584.1	485.1	673.4	590.2
Total Stops	11046	16325	16800	13390	17194	14949
Fuel Used (gal)	1330.8	1294.0	1265.0	1277.0	1306.2	1294.6



10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.1	0.0	0.0	0.0	0.0
Total Delay (hr)	9.5	0.0	0.2	2.1	0.1	0.3	0.2	0.3	1.2	0.2	0.3	14.5
Total Del/Veh (s)	9.2	5.9	92.1	4.2	3.5	84.8	84.8	69.8	92.4	80.7	4.0	8.6
Stop/Veh	0.15	0.08	1.00	0.09	0.00	1.00	0.88	0.86	0.96	0.91	0.18	0.15
Travel Dist (mi)	414.2	1.3	2.2	419.8	14.5	5.8	4.1	7.0	6.4	1.4	37.8	914.7
Travel Time (hr)	18.8	0.1	0.3	11.5	0.5	0.5	0.3	0.5	1.4	0.3	1.5	35.7
Avg Speed (mph)	22	20	8	36	32	13	13	14	4	5	25	26
Fuel Used (gal)	13.2	0.0	0.1	11.9	0.3	0.2	0.2	0.2	0.4	0.1	0.7	27.5
Fuel Eff. (mpg)	31.3	33.0	21.7	35.4	45.3	25.2	26.1	28.2	14.8	17.4	51.8	33.3
Vehicles Entered	3697	12	9	1800	65	11	8	13	47	11	307	5980
Vehicles Exited	3700	12	9	1800	65	11	8	14	47	11	307	5984
Hourly Exit Rate	3700	12	9	1800	65	11	8	14	47	11	307	5984
Input Volume	3830	15	10	1800	60	10	10	10	50	10	310	6115
% of Volume	97	80	90	100	108	110	80	140	94	110	99	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells Rd/Wild Horse Rd & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.3	0.8	0.0	0.0	0.0	2.0	0.8	2.1	0.0	0.0	0.0
Total Delay (hr)	2.1	32.8	1.5	3.1	10.0	0.3	5.8	1.2	0.8	2.6	1.5	0.2
Total Del/Veh (s)	90.8	33.6	23.9	127.2	20.9	12.6	96.6	77.6	16.4	88.1	80.4	32.6
Stop/Veh	0.96	0.48	0.52	1.01	0.31	0.29	0.97	0.84	0.88	0.94	0.87	0.92
Travel Dist (mi)	13.7	609.0	39.7	149.6	3049.1	152.3	108.5	28.2	91.6	9.0	5.7	2.0
Travel Time (hr)	2.5	46.8	2.8	6.6	79.0	3.9	8.6	1.9	3.2	3.0	1.6	0.3
Avg Speed (mph)	6	13	14	23	39	39	13	15	30	3	3	7
Fuel Used (gal)	0.9	25.9	1.5	4.6	84.1	4.2	4.0	0.9	2.3	0.8	0.4	0.1
Fuel Eff. (mpg)	14.6	23.6	26.4	32.4	36.3	36.4	27.4	30.7	39.2	11.3	13.6	24.3
Vehicles Entered	78	3491	227	82	1654	81	205	53	173	101	64	23
Vehicles Exited	79	3484	225	82	1645	82	204	54	172	101	64	23
Hourly Exit Rate	79	3484	225	82	1645	82	204	54	172	101	64	23
Input Volume	80	3608	240	80	1640	80	210	60	170	100	60	20
% of Volume	99	97	94	102	100	102	97	90	101	101	107	115
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells Rd/Wild Horse Rd & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.6
Denied Del/Veh (s)	0.3
Total Delay (hr)	62.0
Total Del/Veh (s)	35.0
Stop/Veh	0.49
Travel Dist (mi)	4258.3
Travel Time (hr)	160.1
Avg Speed (mph)	27
Fuel Used (gal)	129.7
Fuel Eff. (mpg)	32.8
Vehicles Entered	6232
Vehicles Exited	6215
Hourly Exit Rate	6215
Input Volume	6348
% of Volume	98
Denied Entry Before	0
Denied Entry After	0

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	13.8	2.3	0.0	0.1	16.2
Total Del/Veh (s)	13.2	4.3	2.9	14.5	10.2
Stop/Veh	0.04	0.00	0.00	1.00	0.03
Travel Dist (mi)	894.6	339.9	3.2	7.3	1244.9
Travel Time (hr)	34.0	10.3	0.1	0.3	44.7
Avg Speed (mph)	26	33	29	21	28
Fuel Used (gal)	31.3	14.9	0.1	0.2	46.6
Fuel Eff. (mpg)	28.5	22.7	33.3	34.0	26.7
Vehicles Entered	3762	1885	18	20	5685
Vehicles Exited	3757	1887	18	19	5681
Hourly Exit Rate	3757	1887	18	19	5681
Input Volume	3890	1883	20	20	5813
% of Volume	97	100	90	95	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

40: Squire Pope Rd & Flyover Performance by movement

Movement	WBR	NBT	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.3	0.2
Total Delay (hr)	0.2	0.1	0.1	0.3
Total Del/Veh (s)	2.1	3.8	0.7	1.6
Stop/Veh	0.00	0.00	0.00	0.00
Travel Dist (mi)	32.3	10.6	105.3	148.1
Travel Time (hr)	1.4	0.5	2.8	4.6
Avg Speed (mph)	24	20	39	32
Fuel Used (gal)	0.7	0.5	2.8	4.0
Fuel Eff. (mpg)	45.2	20.0	38.0	36.9
Vehicles Entered	262	73	364	699
Vehicles Exited	263	73	365	701
Hourly Exit Rate	263	73	365	701
Input Volume	275	70	370	715
% of Volume	96	104	99	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

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Total Zone Performance

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Denied Delay (hr)	0.7
Denied Del/Veh (s)	0.9
Total Delay (hr)	128.4
Total Del/Veh (s)	845.1
Stop/Veh	7.68
Travel Dist (mi)	15352.6
Travel Time (hr)	476.9
Avg Speed (mph)	32
Fuel Used (gal)	477.1
Fuel Eff. (mpg)	32.2
Vehicles Entered	2738
Vehicles Exited	68
Hourly Exit Rate	68
Input Volume	30871
% of Volume	0
Denied Entry Before	0
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	9.2	18.1	0.1	23
Old Wild Horse Rd	16	13.3	32.5	0.2	26
Spanish Wells Rd	12	33.6	48.0	0.2	14
	27	28.1	170.0	1.9	39
Total		84.2	268.6	2.4	32

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	27	0.2	7.9	0.1	31
Wild Horse Rd	12	20.9	165.0	1.9	40
Old Wild Horse Rd	16	4.7	19.2	0.2	34
Squire Pope Rd	10	4.1	22.8	0.2	37
Total		30.0	214.8	2.3	39

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	321	360	413	16	40	130	143	135	52	81	131	42
Average Queue (ft)	159	181	221	1	9	42	48	61	14	23	49	12
95th Queue (ft)	276	306	340	8	32	101	115	122	42	63	111	37
Link Distance (ft)	524	524	524			1165	1165	1165		2772		682
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			9			0						
Queuing Penalty (veh)			1			0						

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	129	126
Average Queue (ft)	9	9
95th Queue (ft)	64	63
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Spanish Wells Rd/Wild Horse Rd & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	TR	L	L
Maximum Queue (ft)	338	767	804	801	350	200	256	273	279	230	204	210
Average Queue (ft)	109	463	485	510	202	103	141	163	179	109	115	131
95th Queue (ft)	311	815	842	864	468	188	238	261	282	229	189	202
Link Distance (ft)		869	869	869			9701	9701	9701	9701		
Upstream Blk Time (%)		0	0	0								
Queuing Penalty (veh)		3	4	6								
Storage Bay Dist (ft)	500				250	500					500	500
Storage Blk Time (%)		7		22								
Queuing Penalty (veh)		5		52								

Intersection: 12: Spanish Wells Rd/Wild Horse Rd & US 278

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (ft)	140	146	205	116	107
Average Queue (ft)	58	64	110	43	46
95th Queue (ft)	116	115	184	85	95
Link Distance (ft)	2799			416	416
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500	200		
Storage Blk Time (%)			2	0	
Queuing Penalty (veh)			0	0	

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	WB	SB
Directions Served	T	T	T	T	R
Maximum Queue (ft)	91	98	148	179	51
Average Queue (ft)	13	19	29	6	17
95th Queue (ft)	88	121	164	126	43
Link Distance (ft)	1165	1165	1165	869	1948
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					



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Intersection: 40: Squire Pope Rd & Flyover

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Movement	WB
Directions Served	R
Maximum Queue (ft)	21
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	625
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

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Zone Summary

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Zone wide Queuing Penalty: 73
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## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9493	9607	9676	9590	9596	9589
Vehs Exited	9156	9063	9066	9078	9066	9085
Starting Vehs	2011	1870	1843	1887	1718	1859
Ending Vehs	2348	2414	2453	2399	2248	2367
Denied Entry Before	1	2	3	1	0	0
Denied Entry After	16	49	48	18	23	30
Travel Distance (mi)	43993	43857	44019	43786	44047	43940
Travel Time (hr)	2223.0	2154.7	2179.2	2160.2	2032.3	2149.9
Total Delay (hr)	1266.5	1203.6	1221.7	1208.0	1074.8	1194.9
Total Stops	18293	18208	18466	18213	18365	18306
Fuel Used (gal)	1612.1	1603.6	1605.7	1591.1	1577.1	1597.9

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9493	9607	9676	9590	9596	9589
Vehs Exited	9156	9063	9066	9078	9066	9085
Starting Vehs	2011	1870	1843	1887	1718	1859
Ending Vehs	2348	2414	2453	2399	2248	2367
Denied Entry Before	1	2	3	1	0	0
Denied Entry After	16	49	48	18	23	30
Travel Distance (mi)	43993	43857	44019	43786	44047	43940
Travel Time (hr)	2223.0	2154.7	2179.2	2160.2	2032.3	2149.9
Total Delay (hr)	1266.5	1203.6	1221.7	1208.0	1074.8	1194.9
Total Stops	18293	18208	18466	18213	18365	18306
Fuel Used (gal)	1612.1	1603.6	1605.7	1591.1	1577.1	1597.9

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	1.5	0.1	0.2	0.0	0.0	0.0	0.0
Total Delay (hr)	5.1	0.1	0.3	14.7	0.3	0.2	1.1	0.1	2.1	0.2	6.7	30.9
Total Del/Veh (s)	6.7	3.6	94.3	14.5	10.7	68.3	74.3	53.3	115.0	52.6	75.7	15.7
Stop/Veh	0.14	0.15	1.10	0.18	0.00	0.90	0.89	0.90	0.98	0.77	0.85	0.21
Travel Dist (mi)	314.1	6.9	2.4	854.7	20.7	5.2	27.5	5.0	8.9	1.7	41.4	1288.4
Travel Time (hr)	12.2	0.3	0.3	33.9	0.8	0.4	2.1	0.3	2.4	0.2	8.0	60.9
Avg Speed (mph)	26	23	7	25	25	14	13	15	4	7	5	21
Fuel Used (gal)	9.3	0.2	0.1	27.4	0.6	0.2	1.0	0.2	0.7	0.1	2.3	42.1
Fuel Eff. (mpg)	33.6	41.9	19.8	31.2	35.1	28.3	26.8	29.0	12.6	21.0	17.8	30.6
HC Emissions (g)	96	2	0	293	6	1	6	1	3	1	8	417
CO Emissions (g)	3035	48	21	10297	235	22	143	21	129	34	368	14352
NOx Emissions (g)	398	6	2	1131	21	2	20	2	8	4	25	1619
Vehicles Entered	2751	60	10	3601	93	10	55	10	65	13	315	6983
Vehicles Exited	2760	60	10	3609	94	10	54	10	64	13	315	6999
Hourly Exit Rate	2760	60	10	3609	94	10	54	10	64	13	315	6999
Input Volume	2790	60	10	4060	110	10	50	10	60	11	320	7491
% of Volume	99	100	100	89	85	100	108	100	107	118	98	93
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

## 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.7	1.6	0.0	0.0	0.0
Total Delay (hr)	6.0	12.9	0.8	26.9	716.6	33.4	7.9	2.4	0.4	2.2	11.6	4.4
Total Del/Veh (s)	171.6	18.9	10.5	509.6	575.0	584.4	99.0	81.8	10.7	139.8	387.8	298.9
Stop/Veh	1.19	0.34	0.34	2.47	1.86	1.51	1.05	0.89	0.88	1.07	0.88	0.77
Travel Dist (mi)	21.4	425.5	44.6	257.4	6187.5	278.7	131.8	48.7	69.0	4.7	8.3	4.0
Travel Time (hr)	6.6	22.4	2.1	32.8	855.3	40.0	12.5	4.0	2.9	2.4	11.9	4.6
Avg Speed (mph)	3	19	21	8	7	7	11	12	24	2	1	1
Fuel Used (gal)	1.9	14.4	1.2	12.5	309.2	14.1	5.4	1.9	2.0	0.6	2.9	1.1
Fuel Eff. (mpg)	11.3	29.6	36.6	20.6	20.0	19.7	24.2	25.8	34.8	7.3	2.9	3.6
HC Emissions (g)	9	137	13	82	1656	83	32	9	22	1	10	3
CO Emissions (g)	347	4778	408	2632	52304	2456	752	216	430	65	271	93
NOx Emissions (g)	23	528	43	245	4989	236	84	24	60	4	12	4
Vehicles Entered	123	2445	256	162	3879	174	268	99	141	55	96	45
Vehicles Exited	122	2445	257	142	3393	154	269	99	141	53	94	48
Hourly Exit Rate	122	2445	257	142	3393	154	269	99	141	53	94	48
Input Volume	120	2480	260	160	3870	170	260	100	140	60	100	50
% of Volume	102	99	99	89	88	91	103	99	101	88	94	96
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

## 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.1
Total Delay (hr)	825.5
Total Del/Veh (s)	351.0
Stop/Veh	1.29
Travel Dist (mi)	7481.5
Travel Time (hr)	997.6
Avg Speed (mph)	8
Fuel Used (gal)	367.3
Fuel Eff. (mpg)	20.4
HC Emissions (g)	2054
CO Emissions (g)	64753
NOx Emissions (g)	6252
Vehicles Entered	7743
Vehicles Exited	7217
Hourly Exit Rate	7217
Input Volume	7770
% of Volume	93
Denied Entry Before	0
Denied Entry After	0

16: US 278 & Old Wild Horse Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	4.0	14.8	0.0	0.4	19.2
Total Del/Veh (s)	5.1	14.4	5.8	68.0	10.5
Stop/Veh	0.00	0.13	0.00	0.95	0.08
Travel Dist (mi)	678.9	669.7	3.5	4.6	1356.6
Travel Time (hr)	19.3	30.3	0.1	0.5	50.3
Avg Speed (mph)	35	22	26	9	27
Fuel Used (gal)	22.7	36.9	0.2	0.2	60.0
Fuel Eff. (mpg)	29.9	18.1	21.1	21.9	22.6
HC Emissions (g)	276	433	2	1	711
CO Emissions (g)	10734	18658	135	24	29550
NOx Emissions (g)	1129	1740	6	2	2877
Vehicles Entered	2834	3690	20	18	6562
Vehicles Exited	2824	3687	20	18	6549
Hourly Exit Rate	2824	3687	20	18	6549
Input Volume	2860	4160	20	20	7060
% of Volume	99	89	100	90	93
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

39: Squire Pope Rd & Flyover Performance by movement

Movement	WBR	NBT	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Delay (hr)	0.1	0.2	0.0	0.4
Total Del/Veh (s)	2.3	5.2	0.3	1.9
Stop/Veh	0.00	0.05	0.00	0.01
Travel Dist (mi)	27.5	22.1	46.1	95.7
Travel Time (hr)	1.2	1.1	1.2	3.4
Avg Speed (mph)	24	20	38	28
Fuel Used (gal)	0.6	1.1	1.1	2.8
Fuel Eff. (mpg)	46.6	20.9	40.4	34.3
HC Emissions (g)	6	11	10	27
CO Emissions (g)	92	407	196	696
NOx Emissions (g)	15	40	48	102
Vehicles Entered	230	147	392	769
Vehicles Exited	231	149	392	772
Hourly Exit Rate	231	149	392	772
Input Volume	230	160	390	780
% of Volume	100	93	101	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

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Total Zone Performance

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Denied Delay (hr)	0.5
Denied Del/Veh (s)	0.3
Total Delay (hr)	895.8
Total Del/Veh (s)	2087.4
Stop/Veh	8.35
Travel Dist (mi)	17272.8
Travel Time (hr)	1288.8
Avg Speed (mph)	13
Fuel Used (gal)	680.4
Fuel Eff. (mpg)	25.4
HC Emissions (g)	5772
CO Emissions (g)	194168
NOx Emissions (g)	22117
Vehicles Entered	4815
Vehicles Exited	2
Hourly Exit Rate	2
Input Volume	37451
% of Volume	0
Denied Entry Before	0
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	6.7	15.8	0.1	27
Old Wild Horse	16	5.2	24.5	0.2	35
Spanish Wells	12	18.9	32.9	0.2	20
	41	13.4	147.6	1.7	42
Total		44.2	220.8	2.3	37

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	41	0.5	8.0	0.1	44
Wild Horse Road	12	575.0	686.2	1.7	9
Old Wild Horse	16	15.5	30.0	0.2	21
Squire Pope Rd	10	14.5	33.3	0.2	26
Total		605.5	757.6	2.3	11



Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	280	296	320	206	146	306	312	317	46	126	180	78
Average Queue (ft)	88	113	136	14	18	166	158	186	9	54	81	13
95th Queue (ft)	227	254	295	88	75	320	311	347	32	111	157	50
Link Distance (ft)	542	542	542			1199	1199	1199		2632		697
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			6			9					1	
Queuing Penalty (veh)			3			1					3	

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	308	303
Average Queue (ft)	192	187
95th Queue (ft)	321	320
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	TR	L	L
Maximum Queue (ft)	349	565	586	633	350	600	7681	7673	7687	7683	269	288
Average Queue (ft)	194	251	264	282	93	379	5686	5722	5747	5765	146	168
95th Queue (ft)	369	451	466	496	307	762	7650	7677	7674	7679	238	256
Link Distance (ft)		858	858	858			9088	9088	9088	9088		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500				250	500					500	500
Storage Blk Time (%)		1		10			36					
Queuing Penalty (veh)		1		26			58					

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	NB	NB	SB	SB	SB	B42
Directions Served	T	R	L	T	TR	T
Maximum Queue (ft)	206	99	238	337	343	185
Average Queue (ft)	105	49	101	220	229	74
95th Queue (ft)	179	83	265	467	455	320
Link Distance (ft)	2584			405	405	4610
Upstream Blk Time (%)				18	16	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (ft)		500	200			
Storage Blk Time (%)				37		
Queuing Penalty (veh)				22		

Intersection: 16: US 278 & Old Wild Horse

Movement	WB	WB	WB	WB	SB
Directions Served	T	T	T	R	R
Maximum Queue (ft)	862	883	894	497	73
Average Queue (ft)	114	240	142	22	21
95th Queue (ft)	582	857	655	245	57
Link Distance (ft)	858	858	858	858	1337
Upstream Blk Time (%)	0	0	0	0	
Queuing Penalty (veh)	1	2	3	0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

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Intersection: 39: Squire Pope Rd & Flyover

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Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

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Zone Summary

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Zone wide Queuing Penalty: 121

9 – Maximize Lanes at Squire Pope Road and Spanish Wells Road

### Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7830	7898	7925	7947	7621	7843
Vehs Exited	7700	7747	7688	7694	7528	7673
Starting Vehs	1403	1342	1242	1303	1380	1330
Ending Vehs	1533	1493	1479	1556	1473	1501
Denied Entry Before	11	47	93	18	9	35
Denied Entry After	78	34	129	26	211	94
Travel Distance (mi)	37856	38351	38218	38547	36970	37988
Travel Time (hr)	1516.3	1490.1	1535.1	1449.2	1534.4	1505.0
Total Delay (hr)	695.0	657.2	705.8	610.7	731.1	680.0
Total Stops	19301	18669	17090	18463	18606	18426
Fuel Used (gal)	1299.0	1308.0	1312.4	1298.7	1282.7	1300.2

### Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

### Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7830	7898	7925	7947	7621	7843
Vehs Exited	7700	7747	7688	7694	7528	7673
Starting Vehs	1403	1342	1242	1303	1380	1330
Ending Vehs	1533	1493	1479	1556	1473	1501
Denied Entry Before	11	47	93	18	9	35
Denied Entry After	78	34	129	26	211	94
Travel Distance (mi)	37856	38351	38218	38547	36970	37988
Travel Time (hr)	1516.3	1490.1	1535.1	1449.2	1534.4	1505.0
Total Delay (hr)	695.0	657.2	705.8	610.7	731.1	680.0
Total Stops	19301	18669	17090	18463	18606	18426
Fuel Used (gal)	1299.0	1308.0	1312.4	1298.7	1282.7	1300.2

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.1	2.1	0.7	2.1
Total Delay (hr)	5.5	15.5	0.1	0.2	4.8	0.1	0.2	0.3	0.2	2.0	0.2	0.5
Total Del/Veh (s)	76.0	15.0	20.4	66.7	9.8	4.6	88.1	83.3	63.6	141.8	66.0	5.2
Stop/Veh	0.89	0.12	0.17	1.10	0.23	0.00	1.00	0.92	1.00	1.00	0.92	0.20
Travel Dist (mi)	106.2	1520.2	5.1	2.4	409.3	11.8	5.3	6.2	5.7	24.4	5.6	152.6
Travel Time (hr)	8.2	49.6	0.2	0.2	14.0	0.4	0.4	0.5	0.4	2.7	0.4	4.8
Avg Speed (mph)	13	31	26	10	29	31	13	13	15	9	16	33
Fuel Used (gal)	4.0	44.5	0.1	0.1	11.7	0.3	0.2	0.2	0.2	1.1	0.2	3.9
Fuel Eff. (mpg)	26.5	34.1	38.0	25.4	35.1	44.7	26.0	26.4	27.7	22.1	29.8	39.4
Vehicles Entered	257	3659	12	10	1765	55	10	12	11	50	11	315
Vehicles Exited	251	3675	12	10	1774	55	10	12	11	49	11	316
Hourly Exit Rate	251	3675	12	10	1774	55	10	12	11	49	11	316
Input Volume	275	3831	15	10	1800	60	10	10	10	50	10	310
% of Volume	91	96	80	100	99	92	100	120	110	98	110	102
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.1
Total Delay (hr)	29.5
Total Del/Veh (s)	17.0
Stop/Veh	0.20
Travel Dist (mi)	2255.0
Travel Time (hr)	81.8
Avg Speed (mph)	28
Fuel Used (gal)	66.5
Fuel Eff. (mpg)	33.9
Vehicles Entered	6167
Vehicles Exited	6186
Hourly Exit Rate	6186
Input Volume	6391
% of Volume	97
Denied Entry Before	0
Denied Entry After	0

12: Spanish Wells Rd/Wild Horse Rd & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.4	0.0	0.0	0.0	2.0	0.7	2.0	0.0	0.0	0.0
Total Delay (hr)	1.9	28.1	1.5	6.0	9.1	0.2	24.7	2.1	3.2	3.1	1.6	0.0
Total Del/Veh (s)	85.2	28.8	23.1	231.4	19.1	10.8	408.7	128.7	65.0	103.4	94.8	4.1
Stop/Veh	0.98	0.43	0.49	1.04	0.29	0.29	1.33	1.12	1.17	0.98	0.98	0.95
Travel Dist (mi)	13.8	609.6	40.0	153.1	2994.3	144.9	103.5	30.5	90.7	9.6	5.2	1.7
Travel Time (hr)	2.3	41.9	2.7	9.6	76.7	3.6	27.4	2.8	5.5	3.4	1.7	0.1
Avg Speed (mph)	6	15	15	16	39	40	4	11	17	3	3	20
Fuel Used (gal)	0.9	24.1	1.4	5.3	82.2	4.0	8.2	1.2	3.0	0.9	0.4	0.0
Fuel Eff. (mpg)	15.8	25.3	28.1	28.7	36.4	36.3	12.6	25.3	30.7	10.3	12.1	36.4
Vehicles Entered	78	3460	225	83	1628	78	196	58	173	108	59	20
Vehicles Exited	78	3445	224	86	1636	79	191	55	169	106	58	20
Hourly Exit Rate	78	3445	224	86	1636	79	191	55	169	106	58	20
Input Volume	80	3608	240	80	1640	80	210	60	170	100	60	20
% of Volume	98	95	93	108	100	99	91	92	99	106	97	100
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	1	0	0	0	0	0

12: Spanish Wells Rd/Wild Horse Rd & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.2
Total Delay (hr)	81.5
Total Del/Veh (s)	46.3
Stop/Veh	0.49
Travel Dist (mi)	4196.9
Travel Time (hr)	177.8
Avg Speed (mph)	24
Fuel Used (gal)	131.7
Fuel Eff. (mpg)	31.9
Vehicles Entered	6166
Vehicles Exited	6147
Hourly Exit Rate	6147
Input Volume	6348
% of Volume	97
Denied Entry Before	0
Denied Entry After	1



16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	10.7	2.0	0.0	0.1	12.9
Total Del/Veh (s)	10.3	3.9	3.1	14.7	8.2
Stop/Veh	0.01	0.00	0.00	1.00	0.01
Travel Dist (mi)	874.5	333.1	3.4	12.4	1223.3
Travel Time (hr)	30.5	9.8	0.1	0.5	41.0
Avg Speed (mph)	29	34	29	23	30
Fuel Used (gal)	30.0	14.4	0.1	0.4	44.8
Fuel Eff. (mpg)	29.2	23.1	31.4	35.0	27.3
Vehicles Entered	3735	1856	20	24	5635
Vehicles Exited	3732	1836	19	24	5611
Hourly Exit Rate	3732	1836	19	24	5611
Input Volume	3890	1883	20	20	5813
% of Volume	96	98	95	120	97
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.6
Denied Del/Veh (s)	2.2
Total Delay (hr)	124.0
Total Del/Veh (s)	1209.5
Stop/Veh	11.96
Travel Dist (mi)	7675.2
Travel Time (hr)	300.5
Avg Speed (mph)	26
Fuel Used (gal)	243.1
Fuel Eff. (mpg)	31.6
Vehicles Entered	922
Vehicles Exited	62
Hourly Exit Rate	62
Input Volume	18552
% of Volume	0
Denied Entry Before	0
Denied Entry After	1

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	15.0	48.1	0.4	31
Old Wild Horse Rd	16	10.4	29.1	0.2	29
Spanish Wells Rd	12	28.8	43.0	0.2	15
Total		54.2	120.3	0.8	25

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Wild Horse Rd	12	19.1	161.2	1.8	41
Old Wild Horse Rd	16	4.2	18.6	0.2	35
Squire Pope Rd	10	9.7	28.3	0.2	30
Total		33.1	208.2	2.3	39

Queuing and Blocking Report  
2045 AM Alt 9 - Maximized Lanes

06/17/2020

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T	R	L	T	T	T	L	TR
Maximum Queue (ft)	199	202	277	294	322	46	79	217	246	241	55	73
Average Queue (ft)	110	128	90	114	149	2	12	114	127	135	13	25
95th Queue (ft)	173	186	225	255	298	26	46	211	236	239	41	61
Link Distance (ft)			2125	2125	2125			1162	1162	1162		2765
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500				150	100				250	
Storage Blk Time (%)					5			8				
Queuing Penalty (veh)					1			1				

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB	SB	SB
Directions Served	L	T	R	R
Maximum Queue (ft)	150	60	104	142
Average Queue (ft)	73	14	36	35
95th Queue (ft)	149	43	92	101
Link Distance (ft)		2588		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200		500	500
Storage Blk Time (%)	0			
Queuing Penalty (veh)	1			

Intersection: 12: Spanish Wells Rd/Wild Horse Rd & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	TR	L	L
Maximum Queue (ft)	419	716	737	736	275	304	225	249	282	240	387	396
Average Queue (ft)	88	367	406	425	126	167	111	134	152	85	285	304
95th Queue (ft)	241	671	716	732	329	308	205	233	258	189	544	553
Link Distance (ft)		870	870	870			9656	9656	9656	9656		
Upstream Blk Time (%)		0	0	0								
Queuing Penalty (veh)		0	1	1								
Storage Bay Dist (ft)	500				250	500					500	500
Storage Blk Time (%)		3		17	0						3	15
Queuing Penalty (veh)		3		41	1						7	34

Intersection: 12: Spanish Wells Rd/Wild Horse Rd & US 278

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	R
Maximum Queue (ft)	564	204	210	246	34
Average Queue (ft)	309	64	118	79	13
95th Queue (ft)	1249	142	207	183	36
Link Distance (ft)	2796			416	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500	200		500
Storage Blk Time (%)	0		4		
Queuing Penalty (veh)	0		4		

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	50	67	59	56
Average Queue (ft)	2	3	3	18
95th Queue (ft)	29	31	40	43
Link Distance (ft)	1162	1162	1162	2727
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 94

## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9710	9711	9462	9485	9637	9599
Vehs Exited	9050	9064	8973	9090	8824	9001
Starting Vehs	1927	2089	1963	2083	1849	1981
Ending Vehs	2587	2736	2452	2478	2662	2585
Denied Entry Before	0	1	0	0	4	1
Denied Entry After	23	80	48	17	22	38
Travel Distance (mi)	44201	44467	43802	43828	43217	43903
Travel Time (hr)	2287.1	2464.0	2220.4	2310.5	2239.6	2304.3
Total Delay (hr)	1326.2	1499.3	1269.2	1356.6	1298.3	1349.9
Total Stops	18759	19396	18892	19531	18894	19096
Fuel Used (gal)	1635.9	1679.1	1613.4	1631.1	1597.6	1631.4

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9710	9711	9462	9485	9637	9599
Vehs Exited	9050	9064	8973	9090	8824	9001
Starting Vehs	1927	2089	1963	2083	1849	1981
Ending Vehs	2587	2736	2452	2478	2662	2585
Denied Entry Before	0	1	0	0	4	1
Denied Entry After	23	80	48	17	22	38
Travel Distance (mi)	44201	44467	43802	43828	43217	43903
Travel Time (hr)	2287.1	2464.0	2220.4	2310.5	2239.6	2304.3
Total Delay (hr)	1326.2	1499.3	1269.2	1356.6	1298.3	1349.9
Total Stops	18759	19396	18892	19531	18894	19096
Fuel Used (gal)	1635.9	1679.1	1613.4	1631.1	1597.6	1631.4

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.2	0.2	2.5	0.5	2.6
Total Delay (hr)	5.7	11.1	0.2	0.3	27.1	0.4	0.2	1.1	0.1	2.0	0.2	2.5
Total Del/Veh (s)	86.4	14.1	14.6	95.7	27.5	14.7	67.5	72.8	53.8	123.6	66.8	28.1
Stop/Veh	0.97	0.20	0.21	1.20	0.28	0.01	0.80	0.89	1.00	0.98	0.67	0.61
Travel Dist (mi)	95.7	1164.6	24.0	2.3	823.0	20.4	4.9	24.9	4.5	20.6	3.1	112.3
Travel Time (hr)	8.1	37.3	0.9	0.3	45.7	0.9	0.4	1.9	0.3	2.6	0.2	5.8
Avg Speed (mph)	12	31	28	7	18	22	14	13	15	8	13	20
Fuel Used (gal)	3.7	32.6	0.6	0.1	28.1	0.6	0.2	0.9	0.2	1.0	0.1	3.3
Fuel Eff. (mpg)	26.1	35.7	38.9	19.6	29.3	31.4	27.4	26.5	28.9	20.9	27.0	34.3
Vehicles Entered	230	2800	58	10	3505	93	10	50	9	56	8	308
Vehicles Exited	231	2804	57	10	3498	93	10	50	9	55	8	310
Hourly Exit Rate	231	2804	57	10	3498	93	10	50	9	55	8	310
Input Volume	230	2790	60	10	4060	110	10	50	10	60	10	320
% of Volume	100	101	95	100	86	85	100	100	90	92	80	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.1
Total Delay (hr)	50.9
Total Del/Veh (s)	25.3
Stop/Veh	0.29
Travel Dist (mi)	2300.4
Travel Time (hr)	104.3
Avg Speed (mph)	22
Fuel Used (gal)	71.4
Fuel Eff. (mpg)	32.2
Vehicles Entered	7137
Vehicles Exited	7135
Hourly Exit Rate	7135
Input Volume	7720
% of Volume	92
Denied Entry Before	0
Denied Entry After	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.7	1.7	0.0	0.0	0.0
Total Delay (hr)	5.0	16.6	1.1	30.1	854.7	38.2	6.8	2.2	0.4	1.2	4.6	0.1
Total Del/Veh (s)	140.2	24.0	15.1	606.2	672.5	671.1	93.4	77.8	10.7	73.4	162.8	7.3
Stop/Veh	1.10	0.44	0.50	2.44	1.77	1.49	0.96	0.86	0.88	0.97	1.08	0.94
Travel Dist (mi)	21.0	435.2	45.1	254.3	6400.7	280.0	120.0	46.8	70.7	5.0	8.2	4.2
Travel Time (hr)	5.6	26.4	2.5	36.0	998.4	44.7	11.0	3.8	3.0	1.4	4.8	0.3
Avg Speed (mph)	4	16	18	7	6	6	11	13	24	4	2	15
Fuel Used (gal)	1.6	15.3	1.3	13.1	341.5	15.0	4.9	1.8	2.0	0.4	1.2	0.1
Fuel Eff. (mpg)	12.8	28.4	34.3	19.4	18.7	18.6	24.5	26.0	35.1	12.3	6.6	36.9
Vehicles Entered	121	2492	258	152	3866	169	245	95	143	58	94	48
Vehicles Exited	119	2488	257	134	3320	144	244	95	144	57	93	48
Hourly Exit Rate	119	2488	257	134	3320	144	244	95	144	57	93	48
Input Volume	120	2480	260	160	3870	170	260	100	140	60	100	50
% of Volume	99	100	99	84	86	85	94	95	103	95	93	96
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.1
Total Delay (hr)	961.0
Total Del/Veh (s)	404.1
Stop/Veh	1.27
Travel Dist (mi)	7691.2
Travel Time (hr)	1137.9
Avg Speed (mph)	7
Fuel Used (gal)	398.4
Fuel Eff. (mpg)	19.3
Vehicles Entered	7741
Vehicles Exited	7143
Hourly Exit Rate	7143
Input Volume	7770
% of Volume	92
Denied Entry Before	0
Denied Entry After	0



16: US 278 & Old Wild Horse Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	4.9	15.5	0.0	0.3	20.8
Total Del/Veh (s)	6.2	15.3	5.6	68.6	11.4
Stop/Veh	0.00	0.14	0.00	1.00	0.08
Travel Dist (mi)	682.1	651.2	3.5	4.2	1341.1
Travel Time (hr)	20.4	30.5	0.1	0.5	51.5
Avg Speed (mph)	33	21	26	9	26
Fuel Used (gal)	25.1	33.5	0.2	0.2	59.0
Fuel Eff. (mpg)	27.2	19.4	22.2	22.5	22.7
Vehicles Entered	2867	3592	20	17	6496
Vehicles Exited	2871	3592	20	17	6500
Hourly Exit Rate	2871	3592	20	17	6500
Input Volume	2860	4160	20	20	7060
% of Volume	100	86	100	85	92
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.5
Denied Del/Veh (s)	1.8
Total Delay (hr)	1032.7
Total Del/Veh (s)	2357.4
Stop/Veh	8.58
Travel Dist (mi)	11332.6
Travel Time (hr)	1293.8
Avg Speed (mph)	9
Fuel Used (gal)	528.7
Fuel Eff. (mpg)	21.4
Vehicles Entered	941
Vehicles Exited	0
Hourly Exit Rate	0
Input Volume	22550
% of Volume	0
Denied Entry Before	0
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	14.1	47.4	0.4	32
Old Wild Horse	16	6.3	25.4	0.2	34
Spanish Wells	12	24.0	38.1	0.2	17
Total		44.4	110.9	0.8	27

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Wild Horse Road	12	672.5	785.6	1.8	8
Old Wild Horse	16	15.8	30.3	0.2	21
Squire Pope Rd	10	27.4	46.2	0.2	19
Total		715.8	862.1	2.3	9

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	T	R	L	T	T	T	R	L
Maximum Queue (ft)	215	223	296	318	360	160	142	443	506	489	99	54
Average Queue (ft)	115	131	110	126	151	16	17	230	258	282	3	10
95th Queue (ft)	199	205	262	294	336	108	78	451	503	511	69	35
Link Distance (ft)			2125	2125	2125			1177	1177	1177		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500				150	100				400	250
Storage Blk Time (%)					9			24		2		
Queuing Penalty (veh)					5			2		3		

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	NB	SB	SB	SB	SB
Directions Served	TR	L	T	R	R
Maximum Queue (ft)	145	171	51	232	227
Average Queue (ft)	64	76	7	149	122
95th Queue (ft)	124	152	32	220	222
Link Distance (ft)	2618		1958		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		200		500	500
Storage Blk Time (%)		1			
Queuing Penalty (veh)		4			

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	B39	B39
Directions Served	L	T	T	T	R	L	T	T	T	TR	T	T
Maximum Queue (ft)	369	631	687	693	350	600	8882	8909	8901	8844	72	69
Average Queue (ft)	163	323	343	365	152	343	6698	6734	6738	6740	7	5
95th Queue (ft)	300	557	589	614	402	739	8993	8994	9008	8974	87	69
Link Distance (ft)		858	858	858			9638	9638	9638	9638	328	328
Upstream Blk Time (%)							2	1	1	1	1	1
Queuing Penalty (veh)							0	0	0	0	0	0
Storage Bay Dist (ft)	500				250	500						
Storage Blk Time (%)		2		17			38					
Queuing Penalty (veh)		2		43			60					

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	B39	B39	NB	NB	NB	NB	SB	SB	SB
Directions Served	T	T	L	L	T	R	L	T	R
Maximum Queue (ft)	69	69	222	239	202	107	200	266	67
Average Queue (ft)	4	2	133	152	101	51	67	151	29
95th Queue (ft)	59	48	206	219	176	86	159	275	56
Link Distance (ft)	328	328			2587			405	405
Upstream Blk Time (%)	0	0							
Queuing Penalty (veh)	0	0							
Storage Bay Dist (ft)			500	500		500	200		
Storage Blk Time (%)								17	
Queuing Penalty (veh)								10	

Intersection: 16: US 278 & Old Wild Horse

Movement	EB	EB	WB	WB	WB	SB
Directions Served	T	T	T	T	T	R
Maximum Queue (ft)	232	470	890	885	881	74
Average Queue (ft)	8	16	115	171	149	19
95th Queue (ft)	164	238	587	717	678	54
Link Distance (ft)	1177	1177	858	858	858	1337
Upstream Blk Time (%)	0	0	0	0	0	
Queuing Penalty (veh)	0	0	2	2	3	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 137

10 – Consolidate Lefts from Squire Pope Road and  
Spanish Wells Road to Old Wild Horse Road

## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7780	8053	7899	7900	8008	7927
Vehs Exited	7613	7807	7634	7543	7789	7678
Starting Vehs	1328	1389	1390	1224	1332	1329
Ending Vehs	1495	1635	1655	1581	1551	1577
Denied Entry Before	40	168	17	143	245	121
Denied Entry After	16	63	11	174	102	72
Travel Distance (mi)	37938	38198	37273	37090	38389	37778
Travel Time (hr)	1450.7	1653.0	1560.8	1560.5	1623.9	1569.8
Total Delay (hr)	553.9	750.4	680.2	684.9	719.9	677.9
Total Stops	17768	18864	19095	13154	17463	17269
Fuel Used (gal)	1294.6	1342.6	1290.2	1295.4	1347.1	1314.0

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7780	8053	7899	7900	8008	7927
Vehs Exited	7613	7807	7634	7543	7789	7678
Starting Vehs	1328	1389	1390	1224	1332	1329
Ending Vehs	1495	1635	1655	1581	1551	1577
Denied Entry Before	40	168	17	143	245	121
Denied Entry After	16	63	11	174	102	72
Travel Distance (mi)	37938	38198	37273	37090	38389	37778
Travel Time (hr)	1450.7	1653.0	1560.8	1560.5	1623.9	1569.8
Total Delay (hr)	553.9	750.4	680.2	684.9	719.9	677.9
Total Stops	17768	18864	19095	13154	17463	17269
Fuel Used (gal)	1294.6	1342.6	1290.2	1295.4	1347.1	1314.0

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	2.9	0.1	0.2	3.1	0.8	3.0	0.2
Total Delay (hr)	21.8	0.1	0.9	4.1	0.4	0.2	0.2	0.2	1.3	0.2	0.7	29.9
Total Del/Veh (s)	19.9	21.9	281.0	8.1	7.2	77.8	74.3	85.7	85.0	77.5	7.6	16.9
Stop/Veh	0.19	0.20	0.91	0.16	0.00	0.90	0.88	0.89	0.91	0.75	0.33	0.19
Travel Dist (mi)	1613.3	6.1	2.2	432.3	41.8	2.6	2.4	2.4	17.5	2.6	106.6	2229.8
Travel Time (hr)	58.0	0.3	0.9	14.0	1.5	0.3	0.2	0.3	1.8	0.2	3.9	81.5
Avg Speed (mph)	28	24	2	31	28	9	10	8	10	11	29	27
Fuel Used (gal)	46.8	0.2	0.3	15.3	1.3	0.1	0.1	0.1	0.8	0.1	2.7	67.8
Fuel Eff. (mpg)	34.4	37.3	8.5	28.3	33.4	20.8	22.0	20.9	23.3	25.3	38.8	32.9
Vehicles Entered	3887	15	9	1804	186	9	8	8	50	7	313	6296
Vehicles Exited	3881	15	10	1799	185	10	8	9	50	8	313	6288
Hourly Exit Rate	3881	15	10	1799	185	10	8	9	50	8	313	6288
Input Volume	4105	15	10	1800	200	10	10	10	50	10	310	6530
% of Volume	95	100	100	100	92	100	80	90	100	80	101	96
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	2.8	0.5	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	3.7
Denied Del/Veh (s)	3.0	7.9	0.0	0.0	0.0	3.3	0.9	3.2	0.0	0.0	0.0	2.2
Total Delay (hr)	43.1	2.4	3.1	6.6	0.2	6.7	1.4	3.1	2.5	1.5	0.2	70.8
Total Del/Veh (s)	45.1	37.0	129.5	14.0	10.0	107.0	79.1	61.3	88.2	80.4	30.2	41.0
Stop/Veh	0.63	0.63	0.93	0.18	0.22	1.11	0.86	0.86	0.97	0.88	0.95	0.54
Travel Dist (mi)	585.2	40.1	136.1	3003.9	160.6	66.6	19.4	54.7	8.8	5.6	1.8	4082.8
Travel Time (hr)	59.1	4.2	6.2	74.5	4.0	8.6	1.9	4.7	2.9	1.6	0.2	167.9
Avg Speed (mph)	10	11	22	40	41	8	10	12	3	3	7	25
Fuel Used (gal)	27.1	1.8	4.2	82.5	4.5	3.3	0.8	2.1	0.8	0.4	0.1	127.7
Fuel Eff. (mpg)	21.6	22.0	32.4	36.4	35.8	20.0	24.4	25.7	11.2	13.4	25.8	32.0
Vehicles Entered	3399	231	74	1630	87	212	62	174	100	64	20	6053
Vehicles Exited	3399	230	77	1632	86	215	63	176	99	65	20	6062
Hourly Exit Rate	3399	230	77	1632	86	215	63	176	99	65	20	6062
Input Volume	3608	240	80	1640	80	210	60	170	100	60	20	6268
% of Volume	94	96	96	100	108	102	105	104	99	108	100	97
Denied Entry Before	1	0	0	0	0	0	0	0	0	0	0	1
Denied Entry After	4	1	0	0	0	0	0	0	0	0	0	5



16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	2.9	4.6	24.4	5.0	0.0	0.5	37.5
Total Del/Veh (s)	80.0	78.8	24.1	9.6	2.4	93.1	22.8
Stop/Veh	0.92	0.88	0.23	0.20	0.00	0.95	0.26
Travel Dist (mi)	30.5	49.0	859.7	329.8	4.0	6.2	1279.2
Travel Time (hr)	3.8	5.9	43.8	12.8	0.1	0.8	67.2
Avg Speed (mph)	8	8	20	26	29	8	19
Fuel Used (gal)	1.7	2.7	32.0	12.9	0.1	0.3	49.7
Fuel Eff. (mpg)	17.5	18.3	26.9	25.6	35.4	20.9	25.8
Vehicles Entered	128	204	3607	1881	24	20	5864
Vehicles Exited	127	206	3595	1883	24	21	5856
Hourly Exit Rate	127	206	3595	1883	24	21	5856
Input Volume	140	215	3810	1883	20	20	6088
% of Volume	91	96	94	100	120	105	96
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	4.0
Denied Del/Veh (s)	5.3
Total Delay (hr)	180.3
Total Del/Veh (s)	915.5
Stop/Veh	9.03
Travel Dist (mi)	16430.8
Travel Time (hr)	631.5
Avg Speed (mph)	26
Fuel Used (gal)	522.2
Fuel Eff. (mpg)	31.5
Vehicles Entered	2727
Vehicles Exited	69
Hourly Exit Rate	69
Input Volume	30766
% of Volume	0
Denied Entry Before	1
Denied Entry After	5

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	19.9	53.1	0.4	28
Old Wild Horse Rd	16	24.3	43.3	0.2	20
Spanish Wells	12	45.1	61.8	0.2	11
	39	29.8	236.7	1.8	28
Total		119.1	394.8	2.7	25

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.2	7.8	0.1	31
Wild Horse Road	12	14.0	157.0	1.8	42
Old Wild Horse Rd	16	10.6	24.6	0.2	26
Squire Pope Rd	10	8.1	27.7	0.2	31
	38	4.4	37.8	0.4	40
Total		37.4	255.0	2.7	39

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	360	412	416	109	99	210	205	205	61	60	146	47
Average Queue (ft)	133	158	185	5	21	63	63	73	14	20	58	9
95th Queue (ft)	381	451	495	51	73	166	161	177	43	50	118	32
Link Distance (ft)	2129	2129	2129			1186	1186	1186		1514		1838
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			8	0	4	2						
Queuing Penalty (veh)			1	0	24	0						

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	179	146
Average Queue (ft)	70	26
95th Queue (ft)	145	97
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	T	T	T	TR	L	L	T
Maximum Queue (ft)	812	838	860	275	224	173	204	240	117	217	269	127
Average Queue (ft)	620	638	659	139	101	62	95	118	20	126	160	59
95th Queue (ft)	966	972	981	352	210	148	185	213	74	214	237	114
Link Distance (ft)	842	842	842			9664	9664	9664	9664			1646
Upstream Blk Time (%)	2	3	3									
Queuing Penalty (veh)	28	34	44									
Storage Bay Dist (ft)				250	500					500	500	
Storage Blk Time (%)			26	0								
Queuing Penalty (veh)			62	1								

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	NB	SB	SB	SB
Directions Served	R	L	T	TR
Maximum Queue (ft)	285	216	141	106
Average Queue (ft)	152	100	43	39
95th Queue (ft)	252	187	102	84
Link Distance (ft)			405	405
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	500	200		
Storage Blk Time (%)		3		
Queuing Penalty (veh)		1		

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	SB
Directions Served	UL	L	T	T	T	T	T	T	R
Maximum Queue (ft)	266	304	375	481	387	224	246	265	78
Average Queue (ft)	157	165	134	175	193	92	112	118	24
95th Queue (ft)	245	326	577	693	722	210	236	244	63
Link Distance (ft)			1186	1186	1186	842	842	842	1606
Upstream Blk Time (%)			0	0	0				
Queuing Penalty (veh)			0	0	0				
Storage Bay Dist (ft)	500	500							
Storage Blk Time (%)		0	1						
Queuing Penalty (veh)		0	4						

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Intersection: 39: Bend

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Movement	EB	EB
Directions Served	T	T
Maximum Queue (ft)	1941	1890
Average Queue (ft)	65	63
95th Queue (ft)	1368	1332
Link Distance (ft)	9664	9664
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Zone Summary

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Zone wide Queuing Penalty: 202
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## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9511	9505	9575	9642	9633	9573
Vehs Exited	9061	9110	9199	9282	9169	9162
Starting Vehs	1763	1809	1751	1918	1932	1829
Ending Vehs	2213	2204	2127	2278	2396	2242
Denied Entry Before	1	3	0	4	2	2
Denied Entry After	15	37	19	52	23	27
Travel Distance (mi)	44677	44748	45446	45702	44864	45087
Travel Time (hr)	1956.6	2042.6	1924.6	2055.7	2127.0	2021.3
Total Delay (hr)	987.0	1073.5	939.3	1064.9	1152.7	1043.5
Total Stops	21507	21453	22015	22602	22709	22058
Fuel Used (gal)	1588.3	1613.3	1609.0	1640.8	1631.0	1616.5

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9511	9505	9575	9642	9633	9573
Vehs Exited	9061	9110	9199	9282	9169	9162
Starting Vehs	1763	1809	1751	1918	1932	1829
Ending Vehs	2213	2204	2127	2278	2396	2242
Denied Entry Before	1	3	0	4	2	2
Denied Entry After	15	37	19	52	23	27
Travel Distance (mi)	44677	44748	45446	45702	44864	45087
Travel Time (hr)	1956.6	2042.6	1924.6	2055.7	2127.0	2021.3
Total Delay (hr)	987.0	1073.5	939.3	1064.9	1152.7	1043.5
Total Stops	21507	21453	22015	22602	22709	22058
Fuel Used (gal)	1588.3	1613.3	1609.0	1640.8	1631.0	1616.5

### 10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	3.5	0.1	0.2	2.8	1.1	3.0	0.2
Total Delay (hr)	7.3	0.2	0.3	23.5	1.1	0.2	0.9	0.2	1.4	0.2	8.7	43.9
Total Del/Veh (s)	8.6	10.3	106.1	22.5	20.6	72.0	73.2	64.3	89.0	77.5	98.0	21.0
Stop/Veh	0.07	0.11	1.22	0.23	0.04	0.90	0.89	0.90	0.97	0.88	0.89	0.20
Travel Dist (mi)	1243.6	25.5	2.2	890.8	43.7	2.8	12.5	2.7	20.4	3.0	110.4	2357.4
Travel Time (hr)	35.2	0.8	0.3	43.7	2.3	0.3	1.3	0.3	2.0	0.2	11.9	98.5
Avg Speed (mph)	35	30	7	20	19	9	9	10	10	12	9	24
Fuel Used (gal)	35.5	0.6	0.1	42.0	1.8	0.1	0.6	0.1	0.9	0.1	4.7	86.7
Fuel Eff. (mpg)	35.0	39.5	15.5	21.2	24.9	20.6	22.0	22.0	22.9	27.2	23.3	27.2
Vehicles Entered	3002	62	9	3715	195	10	45	10	56	8	310	7422
Vehicles Exited	3001	62	9	3719	194	10	45	10	57	8	307	7422
Hourly Exit Rate	3001	62	9	3719	194	10	45	10	57	8	307	7422
Input Volume	3021	60	10	4061	225	10	50	10	60	10	320	7837
% of Volume	99	103	90	92	86	100	90	100	95	80	96	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	1	1
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

### 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	1.8	0.7	1.7	0.0	0.0	0.0	0.1
Total Delay (hr)	19.9	1.2	17.9	503.7	20.2	25.9	3.3	1.2	1.1	2.4	0.9	597.6
Total Del/Veh (s)	28.3	16.9	366.4	417.2	386.7	329.6	111.6	30.7	66.1	89.3	66.7	261.9
Stop/Veh	0.44	0.52	2.55	2.06	2.12	1.43	1.07	0.90	0.97	0.97	0.96	1.45
Travel Dist (mi)	430.4	42.9	279.7	6803.1	298.1	121.4	49.4	63.1	5.2	8.4	4.3	8106.1
Travel Time (hr)	29.6	2.5	24.3	656.4	27.1	30.2	5.0	3.5	1.3	2.7	1.1	783.6
Avg Speed (mph)	15	17	11	10	11	4	10	19	4	3	4	10
Fuel Used (gal)	15.9	1.3	11.4	287.6	12.5	9.4	2.1	2.0	0.4	0.7	0.3	343.5
Fuel Eff. (mpg)	27.0	34.2	24.6	23.7	23.9	13.0	23.1	31.5	13.6	11.5	14.2	23.6
Vehicles Entered	2474	247	159	3854	170	259	104	135	59	96	50	7607
Vehicles Exited	2473	246	142	3501	153	258	104	131	59	96	50	7213
Hourly Exit Rate	2473	246	142	3501	153	258	104	131	59	96	50	7213
Input Volume	2480	260	160	3870	170	260	100	140	60	100	50	7650
% of Volume	100	95	89	90	90	99	104	94	98	96	100	94
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	2.4	4.8	3.6	50.9	0.0	0.4	62.1
Total Del/Veh (s)	78.0	72.7	4.8	47.4	3.5	83.9	32.0
Stop/Veh	0.94	0.92	0.00	0.66	0.00	0.95	0.42
Travel Dist (mi)	25.8	56.3	650.3	677.7	2.7	7.2	1420.0
Travel Time (hr)	3.1	6.3	18.3	66.6	0.1	0.7	95.1
Avg Speed (mph)	8	9	36	10	29	10	15
Fuel Used (gal)	1.3	2.7	21.3	32.4	0.1	0.3	58.1
Fuel Eff. (mpg)	19.8	21.2	30.5	20.9	27.1	23.7	24.4
Vehicles Entered	108	236	2725	3792	16	19	6896
Vehicles Exited	109	235	2722	3789	16	18	6889
Hourly Exit Rate	109	235	2722	3789	16	18	6889
Input Volume	115	235	2741	4160	20	20	7291
% of Volume	95	100	99	91	80	90	94
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.8
Denied Del/Veh (s)	0.5
Total Delay (hr)	734.2
Total Del/Veh (s)	652.3
Stop/Veh	4.04
Travel Dist (mi)	19802.8
Travel Time (hr)	1184.4
Avg Speed (mph)	17
Fuel Used (gal)	737.8
Fuel Eff. (mpg)	26.8
Vehicles Entered	5141
Vehicles Exited	2658
Hourly Exit Rate	2658
Input Volume	39808
% of Volume	7
Denied Entry Before	1
Denied Entry After	0



Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	8.6	41.5	0.4	36
Old Wild Horse Rd	16	4.8	24.1	0.2	36
Spanish Wells	12	28.3	42.1	0.2	15
	39	14.6	156.8	1.8	42
Total		56.3	264.6	2.7	36

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.7	5.9	0.1	42
Wild Horse Road	12	417.2	543.7	1.8	12
Old Wild Horse Rd	16	46.9	61.0	0.2	11
Squire Pope Rd	10	22.6	41.9	0.2	20
	38	9.7	43.0	0.4	35
Total		497.2	695.6	2.7	14

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	202	263	307	147	57	1166	1020	1091	56	119	154	215
Average Queue (ft)	47	70	86	9	9	297	298	265	10	54	62	26
95th Queue (ft)	141	186	225	61	34	713	748	547	38	109	129	188
Link Distance (ft)	2129	2129	2129			1188	1188	1188		1459		1914
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						1	1					
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			3	0		12						
Queuing Penalty (veh)			2	0		1						

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	400	394
Average Queue (ft)	222	201
95th Queue (ft)	376	378
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)	1	1
Queuing Penalty (veh)	1	1

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	T	T	T	TR	L	L	T
Maximum Queue (ft)	610	645	667	275	525	5658	5703	5722	5746	453	452	660
Average Queue (ft)	365	409	433	153	288	4237	4291	4322	4339	329	349	297
95th Queue (ft)	595	631	661	357	619	5965	6018	6047	6088	557	570	1016
Link Distance (ft)	844	844	844			9633	9633	9633	9633			2493
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				250	500					500	500	
Storage Blk Time (%)			24	0	0	25				3	12	0
Queuing Penalty (veh)			61	1	0	40				6	29	0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	NB	SB	SB	SB
Directions Served	R	L	T	TR
Maximum Queue (ft)	188	140	133	157
Average Queue (ft)	47	54	64	82
95th Queue (ft)	123	110	115	143
Link Distance (ft)			405	405
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	500	200		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	WB	WB	WB	WB	SB
Directions Served	UL	L	T	T	T	R	R
Maximum Queue (ft)	299	282	830	870	851	126	78
Average Queue (ft)	179	172	615	652	657	4	20
95th Queue (ft)	271	254	794	841	827	89	55
Link Distance (ft)			844	844	844	844	2000
Upstream Blk Time (%)			0	0	0		
Queuing Penalty (veh)			1	2	1		
Storage Bay Dist (ft)	500	500					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 147

10A – Consolidate Lefts from Squire Pope Road and  
Spanish Wells Road to Old Wild Horse Road

## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7829	7804	7920	7729	7949	7843
Vehs Exited	7774	7670	7691	7822	7727	7737
Starting Vehs	1340	1280	1164	1382	1314	1291
Ending Vehs	1395	1414	1393	1289	1536	1403
Denied Entry Before	15	0	238	11	180	89
Denied Entry After	9	180	178	99	32	98
Travel Distance (mi)	37862	37520	38112	37969	37181	37729
Travel Time (hr)	1355.7	1425.5	1543.9	1366.2	1485.1	1435.3
Total Delay (hr)	458.6	538.9	643.0	463.9	604.6	541.8
Total Stops	12097	11517	12173	11278	13068	12023
Fuel Used (gal)	1273.1	1275.6	1327.9	1272.0	1282.6	1286.3

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7829	7804	7920	7729	7949	7843
Vehs Exited	7774	7670	7691	7822	7727	7737
Starting Vehs	1340	1280	1164	1382	1314	1291
Ending Vehs	1395	1414	1393	1289	1536	1403
Denied Entry Before	15	0	238	11	180	89
Denied Entry After	9	180	178	99	32	98
Travel Distance (mi)	37862	37520	38112	37969	37181	37729
Travel Time (hr)	1355.7	1425.5	1543.9	1366.2	1485.1	1435.3
Total Delay (hr)	458.6	538.9	643.0	463.9	604.6	541.8
Total Stops	12097	11517	12173	11278	13068	12023
Fuel Used (gal)	1273.1	1275.6	1327.9	1272.0	1282.6	1286.3

### 10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	3.6	0.1	0.1	3.1	0.7	3.0	0.2
Total Delay (hr)	21.0	0.1	0.3	2.6	0.4	0.3	0.2	0.3	1.3	0.2	1.0	27.5
Total Del/Veh (s)	18.9	21.5	133.8	5.1	6.2	77.4	74.6	83.6	96.8	74.7	11.2	15.4
Stop/Veh	0.15	0.14	1.00	0.08	0.00	0.92	0.80	0.91	0.91	0.78	0.38	0.15
Travel Dist (mi)	1633.3	5.6	2.1	431.2	45.7	3.2	2.6	3.0	15.6	3.1	106.7	2252.3
Travel Time (hr)	57.6	0.2	0.4	12.5	1.6	0.4	0.3	0.4	1.7	0.3	4.2	79.6
Avg Speed (mph)	28	24	5	35	29	9	9	8	9	12	27	28
Fuel Used (gal)	48.4	0.2	0.1	15.2	1.3	0.2	0.1	0.1	0.7	0.1	2.9	69.3
Fuel Eff. (mpg)	33.7	36.3	15.2	28.4	34.9	20.3	21.8	20.8	22.2	26.4	37.4	32.5
Vehicles Entered	3934	13	9	1799	203	11	9	10	45	9	313	6355
Vehicles Exited	3942	14	8	1795	203	11	10	11	45	9	312	6360
Hourly Exit Rate	3942	14	8	1795	203	11	10	11	45	9	312	6360
Input Volume	4105	15	10	1800	200	10	10	10	50	10	310	6530
% of Volume	96	93	80	100	102	110	100	110	90	90	101	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	1	1
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

### 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.4
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	3.3	1.0	3.2	0.0	0.0	0.0	0.2
Total Delay (hr)	18.4	1.2	8.0	0.3	5.5	1.3	3.3	2.2	1.3	0.1	41.7
Total Del/Veh (s)	18.9	13.7	15.8	9.8	96.8	74.9	69.9	79.0	77.3	21.9	23.6
Stop/Veh	0.22	0.18	0.22	0.21	1.04	0.87	0.87	1.02	0.90	0.91	0.29
Travel Dist (mi)	597.5	54.7	3195.3	170.2	62.4	18.8	53.4	8.9	5.3	1.9	4168.4
Travel Time (hr)	32.1	3.0	80.3	4.2	7.3	1.7	4.9	2.5	1.4	0.2	137.6
Avg Speed (mph)	19	19	40	41	9	11	11	3	4	9	30
Fuel Used (gal)	22.3	1.8	88.4	4.8	2.9	0.7	2.2	0.7	0.4	0.1	124.3
Fuel Eff. (mpg)	26.8	29.8	36.1	35.8	21.2	25.2	24.8	12.4	14.5	30.5	33.5
Vehicles Entered	3472	315	1731	93	200	60	171	101	61	22	6226
Vehicles Exited	3474	314	1742	92	199	60	171	99	61	22	6234
Hourly Exit Rate	3474	314	1742	92	199	60	171	99	61	22	6234
Input Volume	3609	320	1720	80	210	60	170	100	60	20	6349
% of Volume	96	98	101	115	95	100	101	99	102	110	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	3.3	5.0	15.3	2.2	3.8	0.0	0.5	30.1
Total Del/Veh (s)	88.5	87.1	14.9	99.0	7.2	2.7	84.4	17.8
Stop/Veh	0.95	0.94	0.07	0.96	0.13	0.00	0.95	0.16
Travel Dist (mi)	31.7	48.4	875.0	14.1	332.8	3.3	6.1	1311.6
Travel Time (hr)	4.2	6.3	35.0	2.7	11.6	0.1	0.7	60.6
Avg Speed (mph)	8	8	25	5	29	29	9	22
Fuel Used (gal)	1.9	2.8	33.9	1.0	12.8	0.1	0.3	52.7
Fuel Eff. (mpg)	16.9	17.2	25.8	14.7	26.0	33.9	21.4	24.9
Vehicles Entered	133	202	3664	80	1893	20	20	6012
Vehicles Exited	132	203	3666	79	1894	20	20	6014
Hourly Exit Rate	132	203	3666	79	1894	20	20	6014
Input Volume	140	215	3810	80	1884	20	20	6169
% of Volume	94	94	96	99	101	100	100	97
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.8
Denied Del/Veh (s)	1.0
Total Delay (hr)	141.1
Total Del/Veh (s)	805.3
Stop/Veh	6.35
Travel Dist (mi)	16727.3
Travel Time (hr)	597.7
Avg Speed (mph)	28
Fuel Used (gal)	524.6
Fuel Eff. (mpg)	31.9
Vehicles Entered	2742
Vehicles Exited	72
Hourly Exit Rate	72
Input Volume	30928
% of Volume	0
Denied Entry Before	1
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	18.9	51.9	0.4	29
Old Wild Horse Rd	16	14.8	33.9	0.2	25
Spanish Wells	12	18.9	32.9	0.2	20
	39	29.3	238.8	1.8	28
Total		81.9	357.4	2.7	27

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.2	7.8	0.1	31
Wild Horse Road	12	15.8	158.4	1.8	42
Old Wild Horse Rd	16	5.4	19.4	0.2	33
Squire Pope Rd	10	5.1	24.8	0.2	35
	38	3.1	36.5	0.4	41
Total		29.6	246.9	2.7	40



Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	B38	WB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	T	R	T	L	T	T	T	L	TR	L
Maximum Queue (ft)	296	310	363	175	10	37	123	122	96	57	79	123
Average Queue (ft)	119	133	168	7	0	8	33	28	36	14	23	55
95th Queue (ft)	269	289	341	63	7	29	93	86	88	45	60	113
Link Distance (ft)	2129	2129	2129		1480		1186	1186	1186		1514	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150		100				250		200
Storage Blk Time (%)			8	0			0					
Queuing Penalty (veh)			1	0			0					

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB	SB
Directions Served	T	R	R
Maximum Queue (ft)	47	182	172
Average Queue (ft)	9	94	40
95th Queue (ft)	34	177	131
Link Distance (ft)	1838		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		500	500
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	T	T	T	R	T	T	T	TR	L	L	T	R
Maximum Queue (ft)	379	435	434	275	202	203	245	156	213	245	134	265
Average Queue (ft)	211	237	252	87	78	94	122	21	107	143	58	152
95th Queue (ft)	400	437	423	278	183	206	244	90	195	219	114	254
Link Distance (ft)	842	842	842		9662	9662	9662	9662			1646	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				250					500	500		500
Storage Blk Time (%)			8	0								
Queuing Penalty (veh)			25	1								

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	192	129	102
Average Queue (ft)	96	37	39
95th Queue (ft)	169	88	86
Link Distance (ft)		405	405
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200		
Storage Blk Time (%)	1		
Queuing Penalty (veh)	0		

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	SB
Directions Served	UL	L	T	T	T	U	T	T	T	R
Maximum Queue (ft)	298	295	362	382	224	184	149	164	171	72
Average Queue (ft)	186	166	56	78	78	97	71	88	94	25
95th Queue (ft)	271	257	236	268	199	165	147	167	175	62
Link Distance (ft)			1186	1186	1186		842	842	842	1606
Upstream Blk Time (%)			0	0						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (ft)	500	500				500				
Storage Blk Time (%)										
Queuing Penalty (veh)										

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Intersection: 39: Bend

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Movement	EB	EB
Directions Served	T	T
Maximum Queue (ft)	1925	1920
Average Queue (ft)	64	64
95th Queue (ft)	1356	1353
Link Distance (ft)	9662	9662
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Zone Summary

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Zone wide Queuing Penalty: 28

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## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9586	9399	9354	9457	9465	9449
Vehs Exited	9179	9182	9102	9087	9163	9143
Starting Vehs	1882	1756	1819	1943	1860	1856
Ending Vehs	2289	1973	2071	2313	2162	2160
Denied Entry Before	1	1	44	73	2	24
Denied Entry After	98	126	236	252	146	170
Travel Distance (mi)	45041	45452	44553	44850	45037	44987
Travel Time (hr)	2123.5	1909.2	2092.0	2294.6	2105.8	2105.0
Total Delay (hr)	1146.6	925.1	1125.7	1320.1	1128.2	1129.1
Total Stops	22066	20215	20946	21817	21379	21282
Fuel Used (gal)	1640.6	1611.0	1618.5	1664.7	1636.5	1634.3

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9586	9399	9354	9457	9465	9449
Vehs Exited	9179	9182	9102	9087	9163	9143
Starting Vehs	1882	1756	1819	1943	1860	1856
Ending Vehs	2289	1973	2071	2313	2162	2160
Denied Entry Before	1	1	44	73	2	24
Denied Entry After	98	126	236	252	146	170
Travel Distance (mi)	45041	45452	44553	44850	45037	44987
Travel Time (hr)	2123.5	1909.2	2092.0	2294.6	2105.8	2105.0
Total Delay (hr)	1146.6	925.1	1125.7	1320.1	1128.2	1129.1
Total Stops	22066	20215	20946	21817	21379	21282
Fuel Used (gal)	1640.6	1611.0	1618.5	1664.7	1636.5	1634.3

### 10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	3.5	0.2	0.1	2.9	0.8	3.0	0.2
Total Delay (hr)	8.3	0.2	0.2	24.2	1.2	0.2	1.0	0.2	1.9	0.2	12.3	50.0
Total Del/Veh (s)	9.9	12.0	111.7	23.1	20.9	72.5	74.2	74.5	105.2	66.6	135.9	23.8
Stop/Veh	0.08	0.11	1.12	0.23	0.03	0.80	0.88	1.00	1.02	0.80	0.92	0.21
Travel Dist (mi)	1238.6	22.7	1.8	894.8	47.6	2.5	13.4	3.1	22.6	3.4	112.8	2363.3
Travel Time (hr)	36.2	0.8	0.3	44.5	2.5	0.3	1.5	0.3	2.5	0.3	15.6	104.7
Avg Speed (mph)	34	29	6	20	19	9	9	9	9	13	7	23
Fuel Used (gal)	35.9	0.6	0.1	41.3	1.9	0.1	0.6	0.1	1.1	0.1	5.6	87.5
Fuel Eff. (mpg)	34.5	38.3	14.6	21.7	25.2	20.0	21.3	20.8	21.4	26.3	20.0	27.0
Vehicles Entered	2989	55	7	3728	211	9	49	11	62	10	317	7448
Vehicles Exited	2984	55	8	3729	212	9	48	11	63	9	320	7448
Hourly Exit Rate	2984	55	8	3729	212	9	48	11	63	9	320	7448
Input Volume	3021	60	10	4061	225	10	50	10	60	10	320	7837
% of Volume	99	92	80	92	94	90	96	110	105	90	100	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	1	1
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												243

### 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	42.9	17.5	25.0	0.0	0.0	0.0	85.4
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	576.3	577.6	612.4	0.0	0.0	0.0	39.4
Total Delay (hr)	6.6	0.8	443.9	20.5	67.0	18.9	22.0	1.2	2.9	1.2	584.9
Total Del/Veh (s)	9.7	7.1	353.4	380.4	934.9	716.2	608.2	70.3	100.7	79.1	254.1
Stop/Veh	0.19	0.11	2.03	1.20	1.73	1.38	1.38	0.93	0.97	0.96	1.32
Travel Dist (mi)	426.1	71.4	7207.3	301.1	91.9	36.1	48.9	5.1	8.9	4.4	8201.3
Travel Time (hr)	16.5	3.1	605.5	27.5	113.1	37.6	48.7	1.3	3.2	1.4	857.9
Avg Speed (mph)	26	23	12	11	1	2	2	4	3	3	11
Fuel Used (gal)	16.8	2.2	287.0	12.3	27.5	9.3	12.0	0.4	0.9	0.4	368.7
Fuel Eff. (mpg)	25.3	33.2	25.1	24.5	3.3	3.9	4.1	12.9	10.3	12.0	22.2
Vehicles Entered	2445	410	4049	170	196	78	107	58	103	51	7667
Vehicles Exited	2448	410	3736	157	192	79	102	59	103	52	7338
Hourly Exit Rate	2448	410	3736	157	192	79	102	59	103	52	7338
Input Volume	2480	420	4030	170	260	100	140	60	100	50	7810
% of Volume	99	98	93	92	74	79	73	98	103	104	94
Denied Entry Before	0	0	0	0	12	5	6	0	0	0	23
Denied Entry After	0	0	0	0	72	31	40	0	0	0	143
Density (ft/veh)	69										

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (hr)	2.3	4.7	9.0	3.1	41.1	0.0	0.6	60.8
Total Del/Veh (s)	71.9	72.7	11.9	76.2	38.2	5.4	96.8	30.7
Stop/Veh	0.91	0.93	0.19	0.93	0.55	0.00	0.95	0.43
Travel Dist (mi)	27.5	55.3	647.2	26.1	681.0	3.2	8.0	1448.2
Travel Time (hr)	3.1	6.2	23.7	3.9	56.7	0.1	0.9	94.6
Avg Speed (mph)	9	9	27	7	12	26	9	15
Fuel Used (gal)	1.3	2.6	23.3	1.8	32.1	0.2	0.4	61.7
Fuel Eff. (mpg)	20.4	20.9	27.8	14.7	21.2	19.4	21.7	23.5
Vehicles Entered	115	231	2711	146	3816	19	21	7059
Vehicles Exited	115	231	2710	146	3812	19	20	7053
Hourly Exit Rate	115	231	2710	146	3812	19	20	7053
Input Volume	115	235	2741	160	4161	20	20	7452
% of Volume	100	98	99	91	92	95	100	95
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0
Density (ft/veh)	136							

Total Zone Performance

Denied Delay (hr)	86.0
Denied Del/Veh (s)	59.2
Total Delay (hr)	723.9
Total Del/Veh (s)	659.6
Stop/Veh	3.95
Travel Dist (mi)	19836.4
Travel Time (hr)	1259.9
Avg Speed (mph)	17
Fuel Used (gal)	757.5
Fuel Eff. (mpg)	26.2
Vehicles Entered	5084
Vehicles Exited	2613
Hourly Exit Rate	2613
Input Volume	40129
% of Volume	7
Denied Entry Before	24
Denied Entry After	143
Density (ft/veh)	122

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	9.9	42.9	0.4	35
Old Wild Horse Rd	16	12.0	31.1	0.2	28
Spanish Wells	12	9.7	24.1	0.2	27
	39	9.8	151.9	1.8	44
Total		41.4	250.0	2.7	38

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.7	6.0	0.1	42
Wild Horse Road	12	353.4	482.1	1.8	14
Old Wild Horse Rd	16	37.6	51.8	0.2	12
Squire Pope Rd	10	23.2	42.5	0.2	20
	38	10.5	43.8	0.4	34
Total		425.3	626.1	2.7	16

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	226	253	293	81	53	1152	1102	853	59	124	176	417
Average Queue (ft)	51	75	98	5	8	277	296	259	10	58	71	82
95th Queue (ft)	149	187	228	38	33	629	748	542	38	112	143	411
Link Distance (ft)	2129	2129	2129			1188	1188	1188		1459		1914
Upstream Blk Time (%)						0	0	0				
Queuing Penalty (veh)						0	1	0				
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			3	0		12					1	0
Queuing Penalty (veh)			2	0		1					3	1

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	433	403
Average Queue (ft)	268	247
95th Queue (ft)	477	465
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)	5	2
Queuing Penalty (veh)	3	2



Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	T	T	T	R	T	T	T	TR	L	L	T	R
Maximum Queue (ft)	236	279	276	124	4782	4838	4842	4864	512	525	2543	448
Average Queue (ft)	96	119	155	27	3470	3528	3565	3594	452	520	2502	71
95th Queue (ft)	237	274	292	89	5142	5198	5226	5249	664	537	2650	256
Link Distance (ft)	843	843	843		9622	9622	9622	9622			2501	
Upstream Blk Time (%)											91	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)				250					500	500		500
Storage Blk Time (%)			0	0					8	83	3	0
Queuing Penalty (veh)			2	0					19	200	12	0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	134	166	194
Average Queue (ft)	56	73	96
95th Queue (ft)	111	139	164
Link Distance (ft)		399	399
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200		
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	SB
Directions Served	UL	L	T	T	T	U	T	T	T	R
Maximum Queue (ft)	320	292	324	356	384	406	874	882	864	95
Average Queue (ft)	178	174	144	183	211	168	446	497	471	25
95th Queue (ft)	275	261	306	344	387	336	769	824	758	69
Link Distance (ft)			1188	1188	1188	843	843	843	843	2000
Upstream Blk Time (%)						0	0	0	0	
Queuing Penalty (veh)						0	3	3	1	
Storage Bay Dist (ft)	500	500								
Storage Blk Time (%)										
Queuing Penalty (veh)										

Zone Summary

Zone wide Queuing Penalty: 254

10B – Consolidate Lefts from Squire Pope Road and  
Spanish Wells Road to Old Wild Horse Road

## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7899	7990	7744	7916	7859	7878
Vehs Exited	7784	7712	7629	7858	7717	7740
Starting Vehs	1485	1330	1414	1450	1340	1396
Ending Vehs	1600	1608	1529	1508	1482	1547
Denied Entry Before	3	78	12	10	1	20
Denied Entry After	126	19	55	11	50	51
Travel Distance (mi)	38174	38211	37416	38196	37863	37972
Travel Time (hr)	1592.9	1507.2	1508.6	1450.0	1388.9	1489.5
Total Delay (hr)	690.3	606.8	622.0	545.8	493.6	591.7
Total Stops	18184	16371	18210	16305	12152	16243
Fuel Used (gal)	1328.3	1313.8	1285.4	1296.0	1279.6	1300.6

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7899	7990	7744	7916	7859	7878
Vehs Exited	7784	7712	7629	7858	7717	7740
Starting Vehs	1485	1330	1414	1450	1340	1396
Ending Vehs	1600	1608	1529	1508	1482	1547
Denied Entry Before	3	78	12	10	1	20
Denied Entry After	126	19	55	11	50	51
Travel Distance (mi)	38174	38211	37416	38196	37863	37972
Travel Time (hr)	1592.9	1507.2	1508.6	1450.0	1388.9	1489.5
Total Delay (hr)	690.3	606.8	622.0	545.8	493.6	591.7
Total Stops	18184	16371	18210	16305	12152	16243
Fuel Used (gal)	1328.3	1313.8	1285.4	1296.0	1279.6	1300.6

10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	3.2	0.1	0.2	3.1	0.8	3.0	0.2
Total Delay (hr)	19.6	0.1	0.6	2.4	0.3	0.2	0.3	0.2	1.3	0.2	0.8	25.9
Total Del/Veh (s)	17.6	20.9	173.6	4.8	5.6	86.3	79.2	77.6	91.2	68.4	9.1	14.5
Stop/Veh	0.14	0.15	0.92	0.08	0.00	0.86	0.83	0.91	0.94	0.82	0.35	0.14
Travel Dist (mi)	1639.1	5.3	2.7	427.4	43.0	1.9	3.3	3.2	17.3	3.8	107.4	2254.4
Travel Time (hr)	56.3	0.2	0.7	12.2	1.4	0.2	0.4	0.4	1.8	0.3	4.0	78.0
Avg Speed (mph)	29	25	4	35	30	8	9	9	10	12	28	29
Fuel Used (gal)	48.1	0.1	0.2	14.5	1.2	0.1	0.2	0.1	0.8	0.1	2.8	68.2
Fuel Eff. (mpg)	34.1	37.6	13.7	29.5	37.4	19.4	21.7	21.8	23.1	28.0	38.3	33.1
Vehicles Entered	3947	12	11	1783	191	7	11	11	50	11	315	6349
Vehicles Exited	3957	13	11	1782	192	7	11	11	50	11	314	6359
Hourly Exit Rate	3957	13	11	1782	192	7	11	11	50	11	314	6359
Input Volume	4105	15	10	1800	200	10	10	10	50	10	310	6530
% of Volume	96	87	110	99	96	70	110	110	100	110	101	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.4
Denied Del/Veh (s)	0.0	0.3	0.0	0.0	3.2	0.9	3.3	0.0	0.0	0.0	0.2
Total Delay (hr)	17.2	1.1	7.7	0.2	6.6	1.3	3.7	2.2	2.5	0.1	42.6
Total Del/Veh (s)	17.5	13.0	15.3	8.7	110.9	76.4	77.4	81.1	161.6	10.2	24.0
Stop/Veh	0.22	0.14	0.20	0.23	1.16	0.86	0.88	1.02	1.00	0.95	0.29
Travel Dist (mi)	601.8	52.6	3162.8	151.4	65.7	19.7	53.4	8.4	4.7	3.5	4123.9
Travel Time (hr)	30.9	2.8	79.3	3.7	8.4	1.8	5.3	2.5	2.6	0.2	137.6
Avg Speed (mph)	19	19	40	41	8	11	10	3	2	14	30
Fuel Used (gal)	20.8	1.7	87.1	4.2	3.2	0.8	2.2	0.7	0.6	0.1	121.6
Fuel Eff. (mpg)	28.9	30.5	36.3	36.2	20.2	25.4	23.8	12.2	7.5	41.3	33.9
Vehicles Entered	3493	303	1712	80	210	63	171	96	54	40	6222
Vehicles Exited	3498	304	1715	84	208	63	170	95	53	40	6230
Hourly Exit Rate	3498	304	1715	84	208	63	170	95	53	40	6230
Input Volume	3609	320	1720	80	210	60	170	100	60	40	6369
% of Volume	97	95	100	105	99	105	100	95	88	100	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBU	WBT	WBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	3.3	5.2	13.0	2.3	3.3	0.0	27.1
Total Del/Veh (s)	89.7	87.1	12.6	101.4	6.3	2.9	16.1
Stop/Veh	0.96	0.95	0.05	0.94	0.14	0.00	0.14
Travel Dist (mi)	31.6	50.6	883.5	13.8	330.5	3.9	1313.9
Travel Time (hr)	4.2	6.5	32.8	2.7	11.1	0.1	57.6
Avg Speed (mph)	7	8	27	5	30	29	23
Fuel Used (gal)	1.9	2.9	34.1	1.0	13.2	0.1	53.2
Fuel Eff. (mpg)	16.8	17.4	25.9	14.2	25.0	31.7	24.7
Vehicles Entered	132	211	3675	78	1893	23	6012
Vehicles Exited	131	211	3679	80	1890	23	6014
Hourly Exit Rate	131	211	3679	80	1890	23	6014
Input Volume	140	215	3810	80	1905	20	6170
% of Volume	94	98	97	100	99	115	97
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.8
Denied Del/Veh (s)	1.0
Total Delay (hr)	139.5
Total Del/Veh (s)	758.6
Stop/Veh	5.93
Travel Dist (mi)	16714.0
Travel Time (hr)	596.0
Avg Speed (mph)	28
Fuel Used (gal)	523.8
Fuel Eff. (mpg)	31.9
Vehicles Entered	2709
Vehicles Exited	73
Hourly Exit Rate	73
Input Volume	30949
% of Volume	0
Denied Entry Before	0
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	17.6	50.5	0.4	30
Old Wild Horse Rd	16	12.5	31.7	0.2	27
Spanish Wells	12	17.5	31.4	0.2	21
	39	31.4	240.6	1.8	28
Total		79.0	354.3	2.7	27

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.2	7.8	0.1	31
Wild Horse Road	12	15.3	157.6	1.8	42
Old Wild Horse Rd	16	6.7	20.7	0.2	31
Squire Pope Rd	10	4.8	24.4	0.2	35
	38	3.1	36.4	0.4	41
Total		30.1	247.0	2.7	40

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	252	287	287	73	63	97	102	109	40	74	121	51
Average Queue (ft)	133	155	178	4	15	37	36	49	8	25	55	11
95th Queue (ft)	229	257	287	44	51	86	86	99	30	63	113	38
Link Distance (ft)	2129	2129	2129			1194	1194	1194		1514		1838
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			7		3	0						
Queuing Penalty (veh)			1		17	0						

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	176	140
Average Queue (ft)	78	27
95th Queue (ft)	160	100
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	T	T	T	R	T	T	T	TR	L	T	R	L
Maximum Queue (ft)	410	443	442	275	175	231	254	149	423	228	341	194
Average Queue (ft)	223	238	234	73	99	122	139	28	243	62	158	94
95th Queue (ft)	349	368	371	249	164	193	219	97	388	153	277	167
Link Distance (ft)	847	847	847		9682	9682	9682	9682		1645		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				250					500		500	200
Storage Blk Time (%)			4	0					1			0
Queuing Penalty (veh)			13	1					3			0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	181	62
Average Queue (ft)	81	21
95th Queue (ft)	175	47
Link Distance (ft)	405	405
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	3	
Queuing Penalty (veh)	3	

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB
Directions Served	UL	L	T	T	T	U	T	T	T	R
Maximum Queue (ft)	310	262	141	166	184	229	164	195	178	11
Average Queue (ft)	196	177	34	62	57	102	63	77	70	0
95th Queue (ft)	291	250	104	153	145	190	154	181	168	8
Link Distance (ft)			1194	1194	1194		847	847	847	847
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	500	500				500				
Storage Blk Time (%)										
Queuing Penalty (veh)										



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Intersection: 39: Bend

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Movement	EB	EB	EB
Directions Served	T	T	T
Maximum Queue (ft)	2741	3789	1886
Average Queue (ft)	91	126	63
95th Queue (ft)	1487	1919	1323
Link Distance (ft)	9682	9682	9682
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

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Zone Summary

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Zone wide Queuing Penalty: 37

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## Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:00	6:00	6:00	6:00	6:00	6:00
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	120	120	120	120	120	120
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9586	9624	9566	9601	9661	9606
Vehs Exited	9099	9140	9165	9180	9124	9143
Starting Vehs	1916	1840	1939	1890	1865	1888
Ending Vehs	2403	2324	2340	2311	2402	2355
Denied Entry Before	0	1	2	1	2	1
Denied Entry After	17	11	43	46	31	29
Travel Distance (mi)	45148	45458	45401	45690	45459	45431
Travel Time (hr)	2171.7	2114.6	2135.7	2105.4	2198.9	2145.3
Total Delay (hr)	1191.8	1127.0	1147.9	1113.5	1211.5	1158.3
Total Stops	20485	20641	20797	20592	20531	20613
Fuel Used (gal)	1637.7	1642.9	1636.2	1636.5	1650.0	1640.7

## Interval #0 Information Seeding

Start Time	6:00
End Time	7:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	9586	9624	9566	9601	9661	9606
Vehs Exited	9099	9140	9165	9180	9124	9143
Starting Vehs	1916	1840	1939	1890	1865	1888
Ending Vehs	2403	2324	2340	2311	2402	2355
Denied Entry Before	0	1	2	1	2	1
Denied Entry After	17	11	43	46	31	29
Travel Distance (mi)	45148	45458	45401	45690	45459	45431
Travel Time (hr)	2171.7	2114.6	2135.7	2105.4	2198.9	2145.3
Total Delay (hr)	1191.8	1127.0	1147.9	1113.5	1211.5	1158.3
Total Stops	20485	20641	20797	20592	20531	20613
Fuel Used (gal)	1637.7	1642.9	1636.2	1636.5	1650.0	1640.7

### 10: Chamberlin Dr/Squire Pope Rd & US 278 Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	2.8	0.2	0.2	3.1	0.8	3.0	0.2
Total Delay (hr)	9.9	0.2	0.2	15.6	0.8	0.2	1.1	0.2	1.5	0.2	8.6	38.5
Total Del/Veh (s)	11.6	13.6	90.6	15.1	14.5	77.3	77.2	58.0	92.2	75.4	94.9	18.4
Stop/Veh	0.16	0.24	1.00	0.13	0.01	0.89	0.91	0.83	0.97	0.89	0.88	0.19
Travel Dist (mi)	1259.7	25.5	1.9	882.2	44.3	2.5	14.4	3.3	20.5	3.3	113.8	2371.4
Travel Time (hr)	38.2	0.9	0.3	35.6	2.0	0.3	1.6	0.3	2.1	0.3	12.0	93.4
Avg Speed (mph)	33	28	7	25	23	9	9	11	10	12	10	25
Fuel Used (gal)	36.6	0.7	0.1	37.1	1.5	0.1	0.7	0.1	0.9	0.1	4.8	82.9
Fuel Eff. (mpg)	34.4	37.8	17.5	23.8	28.7	20.3	20.8	23.8	22.7	26.0	23.7	28.6
Vehicles Entered	3037	61	8	3679	196	9	52	12	57	9	321	7441
Vehicles Exited	3042	62	7	3675	197	9	52	12	56	9	314	7435
Hourly Exit Rate	3042	62	7	3675	197	9	52	12	56	9	314	7435
Input Volume	3021	60	10	4060	225	10	50	10	60	10	320	7836
% of Volume	101	103	70	91	88	90	104	120	93	90	98	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	1	1
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

### 12: Spanish Wells/Wild Horse Road & US 278 Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.8	0.7	1.8	0.0	0.0	0.0	0.1
Total Delay (hr)	11.1	1.1	655.5	28.0	7.0	2.0	0.3	4.6	13.3	3.4	726.4
Total Del/Veh (s)	16.1	8.9	511.4	531.4	92.8	67.1	8.1	275.4	479.9	153.9	308.1
Stop/Veh	0.28	0.17	2.05	1.32	1.09	0.82	0.78	1.53	1.11	1.18	1.33
Travel Dist (mi)	429.3	74.5	6889.3	279.8	125.2	50.6	66.6	4.6	7.5	6.4	7933.8
Travel Time (hr)	21.0	3.5	810.0	34.6	11.5	3.8	2.7	4.8	13.6	3.7	909.0
Avg Speed (mph)	20	22	9	8	11	14	25	1	1	2	9
Fuel Used (gal)	15.6	2.1	319.8	13.2	5.0	1.9	1.9	1.2	3.3	1.0	365.1
Fuel Eff. (mpg)	27.5	35.7	21.5	21.2	24.8	27.3	35.5	3.8	2.3	6.3	21.7
Vehicles Entered	2467	427	4012	165	265	106	142	55	86	74	7799
Vehicles Exited	2471	427	3575	146	264	106	139	53	88	75	7344
Hourly Exit Rate	2471	427	3575	146	264	106	139	53	88	75	7344
Input Volume	2480	420	4030	170	260	100	140	60	100	70	7830
% of Volume	100	102	89	86	102	106	99	88	88	107	94
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0

16: US 278 & Old Wild Horse Rd Performance by movement

Movement	EBU	EBL	EBT	WBU	WBT	WBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	2.5	4.4	6.7	7.3	21.6	0.0	42.6
Total Del/Veh (s)	71.7	68.4	8.7	185.9	20.5	5.2	21.6
Stop/Veh	0.90	0.89	0.15	0.96	0.30	0.00	0.28
Travel Dist (mi)	29.6	55.0	663.9	24.3	668.7	2.9	1444.5
Travel Time (hr)	3.3	5.9	21.7	8.0	37.1	0.1	76.3
Avg Speed (mph)	9	9	31	3	18	26	19
Fuel Used (gal)	1.5	2.6	23.3	2.6	33.1	0.1	63.2
Fuel Eff. (mpg)	20.3	21.4	28.5	9.3	20.2	20.0	22.8
Vehicles Entered	123	229	2758	137	3761	17	7025
Vehicles Exited	124	232	2761	134	3760	17	7028
Hourly Exit Rate	124	232	2761	134	3760	17	7028
Input Volume	115	235	2741	160	4180	20	7451
% of Volume	108	99	101	84	90	85	94
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Zone Performance

Denied Delay (hr)	0.8
Denied Del/Veh (s)	0.5
Total Delay (hr)	836.0
Total Del/Veh (s)	719.5
Stop/Veh	3.52
Travel Dist (mi)	20256.9
Travel Time (hr)	1297.1
Avg Speed (mph)	16
Fuel Used (gal)	762.5
Fuel Eff. (mpg)	26.6
Vehicles Entered	5152
Vehicles Exited	2655
Hourly Exit Rate	2655
Input Volume	40147
% of Volume	7
Denied Entry Before	1
Denied Entry After	0

Arterial Level of Service: EB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Chamberlin Dr	10	11.6	44.6	0.4	33
Old Wild Horse Rd	16	8.8	28.0	0.2	31
Spanish Wells	12	16.1	30.4	0.2	21
	39	12.5	153.9	1.8	43
Total		48.9	257.0	2.7	37

Arterial Level of Service: WB US 278

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	39	0.8	13.4	0.2	44
Wild Horse Road	12	511.4	632.0	1.8	10
Old Wild Horse Rd	16	19.8	33.9	0.2	19
Squire Pope Rd	10	15.1	34.5	0.2	25
	38	8.6	41.8	0.4	36
Total		555.8	755.6	2.8	13

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	T	T	T	R	L	T	T	T	L	TR	L	T
Maximum Queue (ft)	336	373	395	148	55	226	225	244	39	162	153	169
Average Queue (ft)	98	116	144	23	8	106	104	116	12	68	66	30
95th Queue (ft)	262	300	348	113	32	238	237	261	36	136	126	203
Link Distance (ft)	2129	2129	2129			1198	1198	1198		1459		1914
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				150	100				250		200	
Storage Blk Time (%)			8	0		11						
Queuing Penalty (veh)			5	0		1						

Intersection: 10: Chamberlin Dr/Squire Pope Rd & US 278

Movement	SB	SB
Directions Served	R	R
Maximum Queue (ft)	338	321
Average Queue (ft)	230	215
95th Queue (ft)	373	359
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	500
Storage Blk Time (%)	0	0
Queuing Penalty (veh)	0	0

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	T	T	T	R	T	T	T	TR	L	T	R	L
Maximum Queue (ft)	333	373	377	275	6750	6784	6800	6826	461	202	86	225
Average Queue (ft)	196	217	227	94	5037	5090	5129	5154	272	96	46	140
95th Queue (ft)	314	334	343	279	6720	6782	6811	6829	451	174	78	294
Link Distance (ft)	848	848	848		9565	9565	9565	9565		2498		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				250					1000		500	200
Storage Blk Time (%)			7	0								1
Queuing Penalty (veh)			28	1								2

Intersection: 12: Spanish Wells/Wild Horse Road & US 278

Movement	SB	SB	B40
Directions Served	T	R	T
Maximum Queue (ft)	488	325	834
Average Queue (ft)	434	195	428
95th Queue (ft)	569	426	965
Link Distance (ft)	399		4617
Upstream Blk Time (%)	71		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)		300	
Storage Blk Time (%)	88	0	
Queuing Penalty (veh)	115	0	

Intersection: 16: US 278 & Old Wild Horse Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB
Directions Served	UL	L	T	T	T	U	T	T	T
Maximum Queue (ft)	322	297	240	252	256	634	890	893	852
Average Queue (ft)	173	166	96	118	128	249	355	382	290
95th Queue (ft)	287	265	228	246	254	513	819	834	620
Link Distance (ft)			1198	1198	1198	848	848	848	848
Upstream Blk Time (%)						0	0	0	0
Queuing Penalty (veh)						0	4	3	1
Storage Bay Dist (ft)	500	500							
Storage Blk Time (%)									
Queuing Penalty (veh)									

Zone Summary

Zone wide Queuing Penalty: 160



## Technical Memorandum

*To: Craig Winn, PE  
Project Manager  
South Carolina Department of Transportation*

*From: CDM Smith*

*Date: July 17, 2020 – Revised January 29, 2021*

*Subject: US 278 – Alternative Intersection Analysis Along Jenkins Island*

### Introduction

The US 278 “Phase I Traffic Report”, submitted in March 2020, assumed that the Jenkins Island Superstreet concept would be in place before the corridor improvements were implemented and thus only minor modifications were made to this concept in that report. The South Carolina Department of Transportation (SCDOT) has provided a new directive that the Superstreet should not be assumed. This technical memorandum provides additional intersection analysis along Jenkins Island that would replace the Superstreet concept, specifically the intersections of Gateway Drive/Crosstree Drive and Jenkins Road.

### Jenkins Island Superstreet Design

In July 2019, CDM Smith provided SCDOT a technical memorandum, “US 278 Jenkins Island Superstreet Design” discussing the failing levels of service for the unsignalized right turn movements onto US 278. The Superstreet design was developed as a means to aid drivers trying to make a left turn from the side roads onto US 278 because the opposing through volumes on US 278 make it difficult to make this maneuver; in 2045 it will be even more difficult for right turning vehicles onto US 278. The memorandum also discussed the concern with adding two new U-turn signals on Jenkins Island that could unnecessarily disrupt US 278 traffic flow.

### Intersection Alternatives Analysis

In the “Phase I Traffic Report”, the long list of potential US 278 corridor alignment alternatives were narrowed down to six “Reasonable Alternatives” that would be advanced based on predefined criteria. Since that report was submitted in March 2020, Reasonable Alternative 4A was selected as the preferred alternative for the US 278 corridor. This alternative proposes a new bridge alignment to the south of the existing bridge, which would tie into Jenkins Island where Blue Heron Point Road exists. In order for vehicles to access Hog Island, a new connector road will need to be constructed north of US 278 that will connect Hog Island to Jenkins Road.

The traffic team brainstormed with SCDOT to come up with various alternative intersection designs that would meet the needs of the corridor. All the alternatives were analyzed using Synchro and SimTraffic to calculate the levels of service (LOS) and other measures of effectiveness (MOEs). The alternative intersection concepts are described below.



**1 – Right In/Right Out at Gateway Drive/Crosstree Drive and Jenkins Road**

Concept 1 consists of a right in/right out at both the Gateway Drive/Crosstree Drive and Jenkins Road intersections. This concept does not allow left turn lanes onto or from US 278. In order to provide access to the north and south of US 278, a new connector road is needed. The proposed location of this connector road ties into the existing back gate of the Windmill Harbour neighborhood and links to the new connector road to Hog Island. As discussed in the Superstreet memorandum, the high through volumes on US 278 cause extreme delays for side road movements; therefore, the right turn movements onto US 278 should have acceleration lanes. It should be noted that the acceleration lane analysis provides a best-case scenario in which vehicles entering the highway will accelerate to the speed of the vehicles in the adjacent lanes and merge successfully. In reality, occasionally acceleration lanes are not used properly and can become ineffective due to vehicles stopping and waiting for a gap in traffic.

Figure 1 – Right In/Right Out at Gateway Drive/Crosstree Drive and Jenkins Road

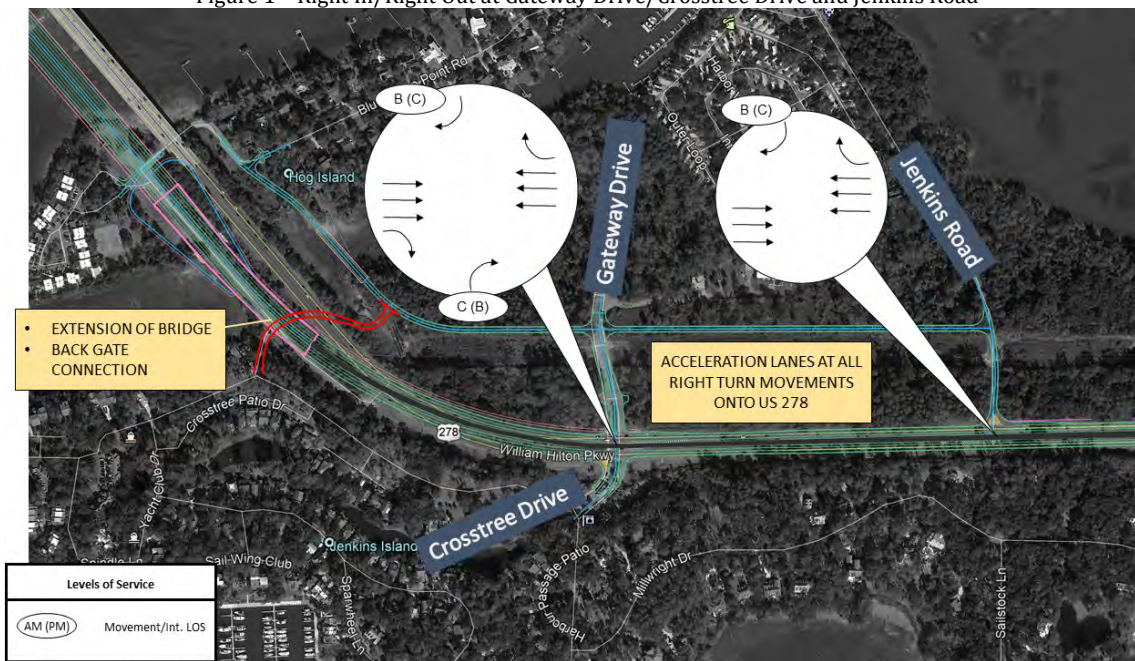


Figure 1 shows the lane configurations for the two intersections and the corresponding levels of service. The intersections in Concept 1 are expected to operate at LOS C or better. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - All right turn movements onto US 278 operate at LOS C or better
  - No left turns onto or from US 278
  - No signals
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - New road connection eliminates the gated access to Windmill Harbour
  - Increased cost of extending bridge over back gate connection
  - All intersections of the interconnecting roads would need to accommodate RV's turning

## 2 – Right In/Right Out at Gateway Drive/Crosstree Drive and Left In at Jenkins Road

Concept 2 consists of a right in/right out at the Gateway Drive/Crosstree Drive intersection and a left in only at the Jenkins Road intersection. This concept does not allow left turns onto US 278. In order to provide access to the north and south of US 278, a new connector road is needed. The right turn movements onto US 278 should have acceleration lanes.

Figure 2 – Right In/Right Out at Gateway Drive/Crosstree Drive and Left In at Jenkins Road

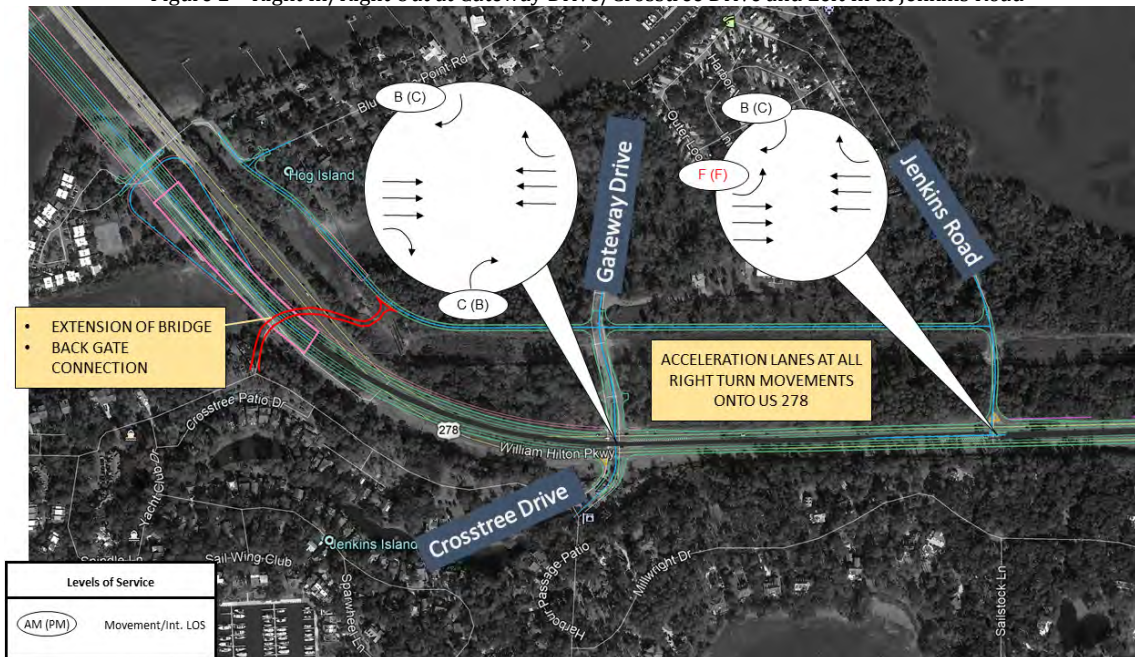


Figure 2 shows the lane configurations for the two intersections and the corresponding levels of service. The intersections in Concept 2 are expected to operate at LOS C or better, with the exception of the eastbound left turn at Jenkins Road. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - All right turn movements onto US 278 operate at LOS C or better
  - No left turns onto US 278 from side roads
  - No signals
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - New road connection eliminates the gated access to Windmill Harbour
  - Increased cost of extending bridge over back gate connection
  - Left turns from US 278 at Jenkins Road operate at LOS F
  - All intersections of the interconnecting roads would need to accommodate RV's turning



### 3 – Right In/Right Out with Left In at Gateway Drive/Crosstree Drive and Jenkins Road (No Left Out)

Concept 3 consists of a right in/right out with left in at both the Gateway Drive/Crosstree Drive and Jenkins Road intersections. This concept does not allow left turns onto US 278. In order to provide access to the north and south of US 278, a new connector road is needed. The right turn movements onto US 278 should have acceleration lanes.

Figure 3 – Right In/Right Out with Left In at Gateway Drive/Crosstree Drive and Jenkins Road

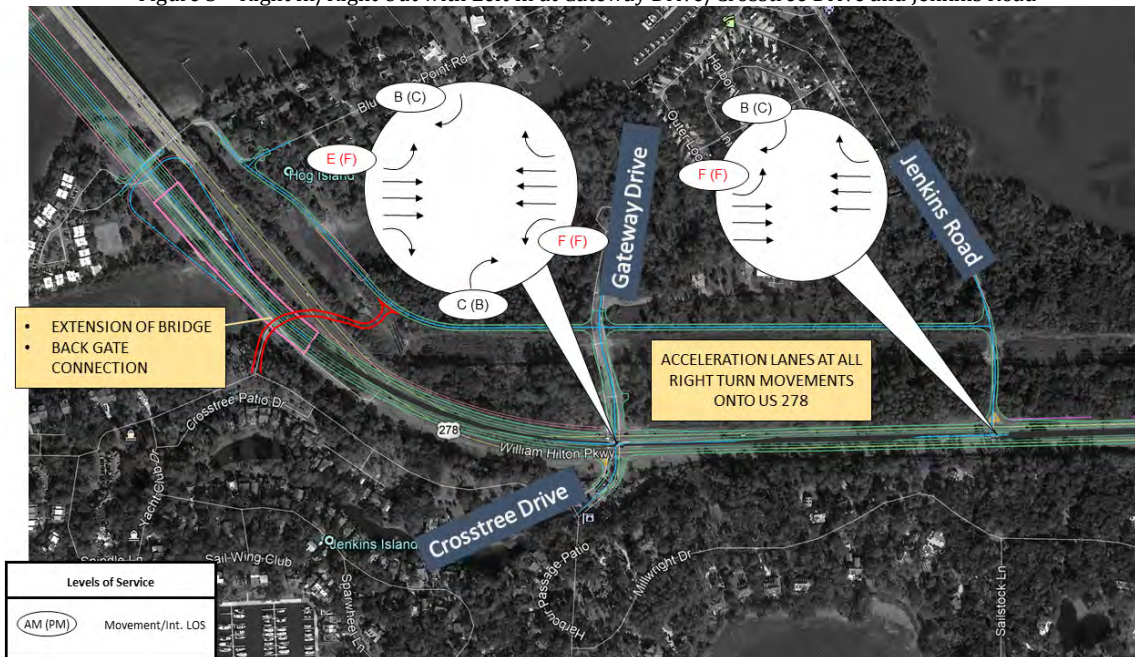


Figure 3 shows the lane configurations for the two intersections and the corresponding levels of service. The right turns at the intersections in Concept 3 are expected to operate at LOS C or better. The left turns from US 278 are expected to operate at LOS F. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - All right turn movements onto US 278 operate at LOS C or better
  - No left turns onto US 278 from side roads
  - No signals
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - New road connection eliminates the gated access to Windmill Harbour
  - Increased cost of extending bridge over back gate connection
  - Left turns from US 278 operate at LOS F
  - All intersections of the interconnecting roads would need to accommodate RV's turning

#### 4 – Superstreet

Concept 4 proposes a revised version of the superstreet configuration. This concept does not allow left turns onto or from US 278. U-turn signals are provided west of Gateway Drive/Crosstree Drive and east of Jenkins Road. The right turn movements onto US 278 should have acceleration lanes, with exception of the southbound right from Gateway Drive. Vehicles traveling southbound on Gateway Drive bound for eastbound US 278 will have a difficult merge condition due to the proximity of the U-turn signal to the Gateway Drive/Crosstree Drive intersection.

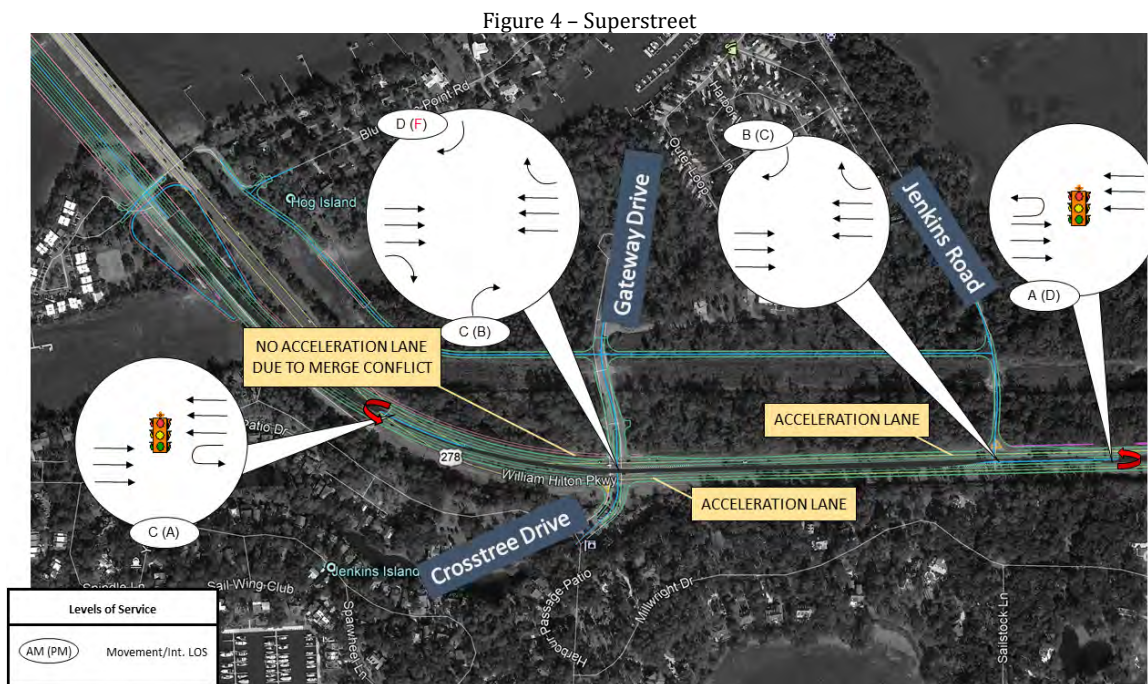


Figure 4 shows the lane configurations for the four intersections and the corresponding levels of service. All the movements are expected to operate at LOS D or better with exception of the southbound right from Gateway Drive, which is anticipated to be LOS F because an acceleration lane is not provided. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - U-turn signals operate at LOS D or better
  - All right turn movements onto US 278 with an acceleration lane operate at LOS C or better
  - No left turns onto or from US 278
  - No need for connector road to the Windmill Harbour back gate
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - For vehicles traveling southbound on Gateway Drive bound for eastbound US 278, this option presents a difficult merge condition to access the U-turn signal due to the proximity to the Gateway Drive/Crosstree Drive intersection
  - Adds two signals to US 278



### 5 – Full Access Signal at Gateway Drive/Crosstree Drive and Right In/Right Out at Jenkins Road

Concept 5 consists of a full access signal at Gateway Drive/Crosstree Drive and a right in/right out at Jenkins Road. The right turn movement onto US 278 at Jenkins Road was assumed to have an acceleration lane.

Figure 5 – Full Access Signal at Gateway Drive/Crosstree Drive and Right In/Right Out at Jenkins Road



Figure 5 shows the lane configurations for the two intersections and the corresponding levels of service. The southbound right turn from Jenkins Road and the signalized intersection are expected to operate at LOS D or better. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Signal will operate at LOS D or better
  - Right turn movement onto US 278 at Jenkins Road operates at LOS C or better
  - No need for connector road to the Windmill Harbour back gate
  - Small footprint at the Gateway Drive/Crosstree Drive intersection
- Disadvantages:
  - Volumes as-is do not meet the signal warrant. The threshold for side road volumes is 100 vehicles per hour and the 2045 volumes are 70 vehicles per hour.
  - Acceleration lane adds to the footprint of US 278
  - Adds a signal to US 278

**5A – Full Access Signal at Gateway Drive/Crosstree Drive and Right In Only at Jenkins Road**

Concept 5A consists of a full access signal at Gateway Drive/Crosstree Drive and a right in only at Jenkins Road. A median will restrict lefts onto or from US 278 at Jenkins Road. This concept was developed in an attempt to reduce the footprint of the US 278 widening by eliminating the need for an acceleration lane at Jenkins Road. It also consolidates all traffic entering US 278 at one signalized location.

Figure 6 – Full Access Signal at Gateway Drive/Crosstree Drive and Right In Only at Jenkins Road

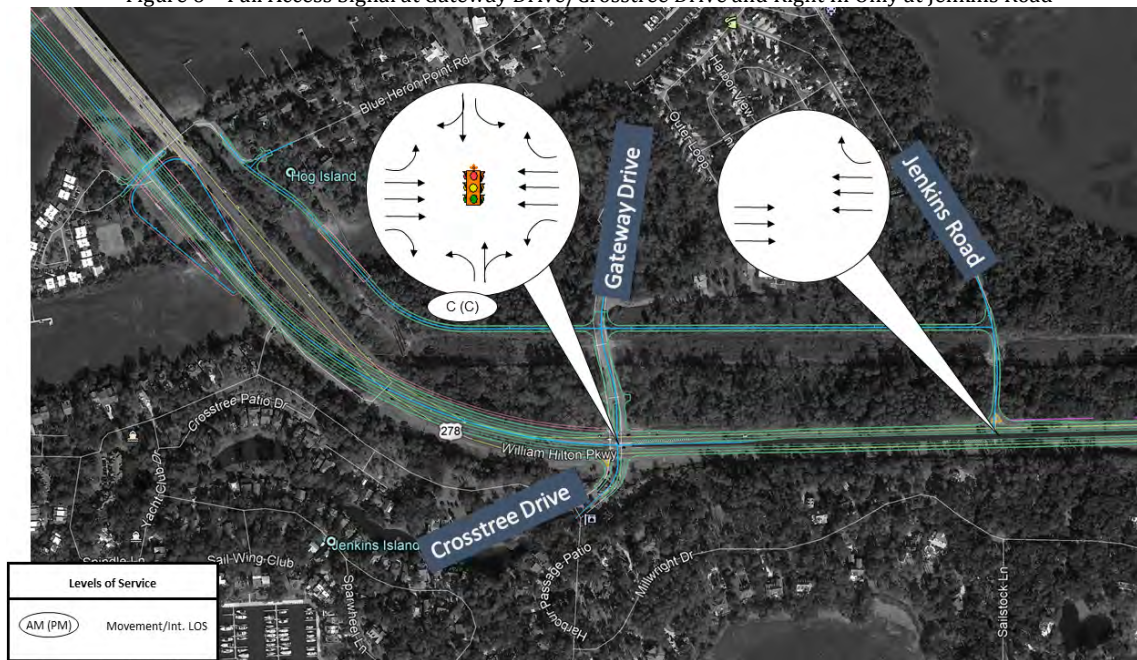


Figure 6 shows the lane configurations for the two intersections and the corresponding levels of service. The signalized intersection is expected to operate at LOS C in both peak periods. The detailed Synchro reports are available in Appendix A.

- Advantages:
  - Signal will operate at LOS C
  - Adding the southbound right volumes from Jenkins Road to Gateway Drive/Crosstree Drive allows the volumes to meet the signal warrant in 2045
  - No need for connector road to the Windmill Harbour back gate
  - Small footprint at the Gateway Drive/Crosstree Drive intersection
  - No potential ineffective acceleration lanes
- Disadvantages:
  - All Jenkins Road outbound traffic is diverted to Gateway Drive
  - Adds a signal to US 278

### **Viable Alternatives – SuperStreet & Full Access Signal at Gateway Drive/Crosstree Drive**

The three options presented above that propose connecting the back gate of the Windmill Harbour neighborhood to the new connection from Hog Island to Jenkins Road were removed from consideration because of the property impacts and disruptions that would be caused to the residential streets. These three alternatives would require the local roadways to be designed for RVs and vehicles towing boats who are bound for the Hilton Head Harbor RV Resort and Marina. The presence of the new back gate connection road would also require the US 278 bridge to be extended in order to span over the roadway, resulting in extra structure costs. Additionally, the Windmill Harbour neighborhood would no longer be a gated community. The remainder of this section focuses on Alternatives 4 (SuperStreet) and 5 (signalized single intersection) and how they compare to one another.

#### Signal Warrant Analysis

Signal warrant analyses were performed for the two viable alternatives using the guidelines laid out in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The following Warrants were checked to determine whether a signal would meet the requirements for installation in the opening year, 2025:

- Warrant 1 – Eight Hour Vehicular Volume
- Warrant 2 – Four Hour Vehicular Volume
- Warrant 3 – Peak Hour Vehicular Volume
- Warrant 8 – Roadway Network

The SuperStreet U-turn signals were analyzed assuming the U-turns as the opposing movement. According to the analysis, the proposed signal west of Gateway Drive/Crosstree Drive will not meet Warrants 1 or 2 in the opening year, 2025. The analysis shows that this signal would meet the Peak Hour Warrant in the opening year. The proposed signal east of Jenkins Road does not meet Warrants 1-3 for the 2025 analysis.

According to the analysis, the full access signal will not meet Warrants 1-3 in the opening year, even if no right turn reduction factor is applied. The warrant analysis worksheets are provided in Appendix B.

Although not commonly utilized, Warrant 8 was checked because this segment of US 278 meets its criteria. Regarding Warrant 8, the MUTCD states: “installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network”. The criteria for Warrant 8 are described below:

*Criteria 1: The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:*

- A. The intersection has a total existing, or immediately projected entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during and average weekday; or*
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).*

Although weekend volumes were not collected as part of this study, CDM Smith reviewed Station 35 of SCDOT's Traffic and Polling and Analysis System (TPAS) on Saturday February 1, 2020. That station is on US 278 just east of Jenkins Road. The polling data on that Saturday indicates that traffic exceeds

Criteria 1B for over 12 hours from 7:00 AM to 11:00 PM. The Station 35 traffic data is provided in Appendix B.

*Criteria 2: A major route as used in this signal warrant shall have at least one of the following characteristics:*

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.*
- B. It includes rural or suburban highways outside, entering, or traversing a city.*
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.*

Part A is met because US 278 is the only through route between the Bluffton area and Hilton Head Island. Part C is met because US 278 is listed as a Tier 1 roadway in the South Carolina Strategic Corridors Plan.

In terms of US 278 traffic volumes and road characteristics, either the Superstreet or the full-access intersection at Gateway Drive/Crosstree Drive meets the Warrant 8 criteria. since it is based on the total entering volumes on a weekend, which are far greater than 1,000 vehicles per hour, and because US 278 is the principal roadway for through traffic flow. In other words, Warrant 8, Criteria 1B and Criteria 2A and 2C are satisfied. However, in the spirit of Warrant 8's intent to concentrate and organize traffic, signalizing the single intersection is preferred over signalizing two U-turn intersections. It is understood that this warrant is not commonly used to justify a signal; therefore, the remainder of this report provides additional justification for considering a signalized intersection.



## Other Factors to Consider for Signal Installation

Based on the Signal Warrant analysis (Warrants 1-3), neither the SuperStreet with signalized U-turns nor the Full Access Signal would be approved according to SCDOT's standards. The following provides other factors that should be considered to determine what configuration will best meet the needs of the corridor along Jenkins Island.

### SimTraffic Analysis

Both of the alternatives were analyzed using SimTraffic to estimate the total travel time through the Jenkins Island segment of the corridor. The results of the analysis are summarized in the table below and the SimTraffic reports are provided in Appendix C. The SimTraffic analysis shows that the two alternatives provide comparable operations in the PM peak hour for the same segment of US 278.

Superstreet							
Eastbound	PM	Travel Time (s)	196.0	Westbound	PM	Travel Time (s)	241.3
		Arterial Speed (mph)	42			Arterial Speed (mph)	34
		Delay (s)	35.7			Delay (s)	81.2
Full Access Intersection							
Eastbound	PM	Travel Time (s)	208.1	Westbound	PM	Travel Time (s)	238.9
		Arterial Speed (mph)	40			Arterial Speed (mph)	35
		Delay (s)	48.5			Delay (s)	79.2

### Queue Analysis

SimTraffic was also used to compare the queuing that is expected to occur, assuming that both alternatives would be signalized. The SuperStreet U-turn 95<sup>th</sup> percentile queues and the corresponding movements at the full access signal are shown in the table below. The SimTraffic reports are available in Appendix C. The queue analysis shows that the two alternatives are expected to experience comparable queues due to the signalization on Jenkins Island.

Alternative	EB turn length (ft)	WB turn length (ft)
SuperStreet	102	108
Full Access Signal	98	88

### Pedestrian Access

Non-motorized facilities are also being constructed as part of the US 278 widening project. In order for pedestrians and bicyclists to safely cross US 278 along Jenkins Island, a signalized crossing would need to be installed at some location. The SuperStreet U-turn signals would not create a safe crossing because one approach of US 278 would be free-flow. The full access signal would provide the safest alternative for pedestrians. It should be noted that the signalized intersection was analyzed with a pedestrian phase and although more time was given to the minor roads, the level of service was not impacted.

### **Safety & Gap Acceptance**

According to the crash history near the existing Gateway Drive/Crosstree Drive intersection, there have been 23 total crashes within the past 5 years. Of these crashes, 16 occurred during daylight and 7 occurred at night; 7 involved injuries and 16 were property damage only. Eight of the crashes at the intersection were angle crashes, which does not meet the 5 per year threshold required to satisfy the Crash Warrant. It should be noted that the existing intersection configuration does not allow all movements. There are currently fewer conflict points than a typical four-legged intersection because Gateway Drive is right-in/right-out only on the north side of US 278. If a full-access intersection is to be installed here, it is recommended that it be signalized to prevent severe angle crashes from occurring in the future.

A major safety issue along Jenkins Island is the shear volume of traffic. The volumes along US 278 make it difficult for traffic turning from the side roads to get onto the main road, resulting in significantly long delays as evidenced in the Synchro analysis performed for the “Phase I Traffic Report”. When drivers must wait a long time to find a gap, they often get impatient and enter the roadway when there are unacceptable gaps. This will also be true for unsignalized U-turn movements. In order to reduce the delays for the right turns from the side roads, acceleration lanes will be necessary for any unsignalized intersection configuration, resulting in a larger footprint.

In the SuperStreet alternative, there is only roughly 1,000 feet for a southbound vehicle wanting to turn left to get up to speed in the acceleration lane and cross three lanes of US 278 to make the U-turn. The full access signalized intersection would not require acceleration lanes since the signal would provide the necessary gaps to enter US 278.

### **Speed Reduction**

According to the public comments received during the public engagement process for the original SuperStreet project done by HDR, speed was a common complaint. The existing speed limit along US 278 varies throughout the project limits. Across the bridge, the speed limit is 55 mph and decreases to 50 mph at Blue Heron Point Road; however, vehicles coming off of the bridge likely don't reduce their speed to 50 mph by the time they reach the Gateway Drive/Crosstree Drive intersection due to the grade coming off the bridge. As part of the widening project, the speed limit will be reduced to 45 mph, which should help control the speed limit. Other traffic calming measures should also be considered such as pedestrian-scale lighting and landscaping to help drivers naturally slow down through this area. Although signals should not be used as a traffic calming device, a signal along Jenkins Island could also provide a mechanism for cars to slow down, especially since the next signalized intersection at Squire Pope Road is over a mile away.

### **Additional Alternatives**

It is understood that SCDOT will not approve the installation of a signal without the location meeting the MUTCD Warrants. Therefore, two additional configurations have been analyzed in Synchro for the 2045 condition as possible unsignalized alternatives for Jenkins Island and are described below:

#### **A – Revised SuperStreet- No Signals and Gateway Drive Traffic Redirected to Jenkins Road**

All southbound traffic from Gateway Drive would use the new connection from Hog Island to Jenkins Road and turn right from Jenkins Road. An acceleration lane will be provided at Jenkins Road and the

westbound U-turn would be located approximately 2,500 feet downstream to allow enough distance for vehicles headed eastbound to safely cross three lanes of US 278. The northbound approach and eastbound U-turn location would be the same as in the proposed SuperStreet alternative above. The advantages and disadvantages of this layout are described below. The Synchro reports for the unsignalized U-turns are available in Appendix D.

Movement	LOS	Delay (s)	v/c
U-turn (West)	E	36.0	0.464
U-turn (East)	F	99.9	0.725

- Advantages:
  - All right turn movements onto US 278 operate at LOS C or better
  - No left turns onto or from US 278
  - No need for connector road to the Windmill Harbour back gate
  - Distance between Jenkins Road to the westbound U-turn location is adequate for southbound vehicles headed eastbound to weave
  - No signals
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - Residents of Hog Island will have to deviate over 1 mile to travel eastbound on US 278
  - Does not provide a safe pedestrian crossing opportunity
  - Non-signalized U-turns will be subject to delays due to the high through volumes on US 278. In 2045, the western U-turn will operate at LOS E with delays of 36 seconds per vehicle and the eastern U-turn will operate at LOS F with delays of 99.9 seconds per vehicle.

Although this alternative is expected to operate sufficiently based on the Synchro analysis, Synchro does not take into account some human behavior factors. As mentioned previously, there is an issue with speeding along Jenkins Island, especially in the eastbound direction coming off of the bridge where the speed limit is currently 55 mph. This speeding issue is evidenced by the flashing warning signs approaching the Gateway Drive/Crosstree Drive intersection. The proposed alignment has a lower design speed than existing; however, the unimpeded nature of US 278 between the Bluffton Parkway ramps and the Gateway Drive/Crosstree Drive intersection inherently allows for speeding.

Additionally, the Synchro software does not take into account the geometry of the roadway, specifically that a vehicle would need to make a U-turn across three lanes of opposing traffic. It is already difficult to find an acceptable gap on the existing 4-lane roadway, the 6-lane roadway will only exacerbate the problem. It is common practice to provide protected-only phasing for left turn movements across three lanes of opposing traffic; thus, it would be contradictory to allow unprotected U-turn movements in a SuperStreet configuration. The U-turn maneuver cannot be equated to a left turn because the turning vehicle is not only crossing three lanes of traffic and then exiting the roadway, they must clear three lanes while accelerating up to speed of the mainline traffic.

Finally, in order for this configuration to remove the short weaving section between Gateway Drive and the westbound U-turn, at least 2,500 feet is needed between the U-turn and the southbound right-turn volumes, which would be at the Jenkins Road intersection. In order to prevent any vehicles departing Gateway Drive from making the U-turn, either a channelizing island needs to be installed approximately 1,000 feet back to Gateway Drive, Gateway Drive needs to be converted to a right-in only, or the access to US 278 from Gateway Drive will need to be closed.

#### **B – Restricted Crossing U-Turn (RCUT)**

This configuration will be very similar to the SuperStreet alternative with the exception that left turns from US 278 to Gateway Drive and Crosstree Drive will be allowed. The eastbound and westbound U-turn locations will be the same as in the SuperStreet alternative. The advantages and disadvantages of this layout are described below. The Synchro reports are available in Appendix D.

Intersection	Movement	LOS	Delay (s)	v/c
U-turn (West)	WB U	D	26.4	0.206
Gateway Dr/ Crosstree Dr	EB L	F	>300	8.152
	WB L	F	>300	2.09
U-turn (East)	EB U	F	61.6	0.414

- Advantages:
  - All right turn movements onto US 278 operate at LOS C or better
  - No left turns onto US 278 from side roads
  - No signals
- Disadvantages:
  - Acceleration lanes add to the footprint of US 278
  - Does not provide a safe pedestrian crossing opportunity
  - Left turns from US 278 operate at LOS F
  - Non-signalized U-turns will be subject to delays due to the high through volumes on US 278. In 2045, the western U-turn will operate at LOS D with delays of 26.4 seconds per vehicle and the eastern U-turn will operate at LOS F with delays of 61.6 seconds per vehicle.

The issues mentioned for the revised SuperStreet also apply to the RCUT alternative. Additionally, the unprotected left turn movements are expected to operate very poorly.

### **Final Recommended Alternative and Geometry**

As evident from the signal warrant analysis, the segment of US 278 along Jenkins Island does not meet Warrants 1-3 due to the relatively low side road volumes. Neither the Superstreet nor the full access intersection alternative is expected to meet Warrants 1, 2, or 3 with existing or future buildout (2045) volumes because this area is an isolated island that is almost completely developed; therefore, the future growth for these movements is limited. Other characteristics of this segment, such as the large through volumes and the geometric constraints between the end of the bridge and the Gateway Drive/Crosstree Drive intersection, justify looking at other factors aside from Warrants 1, 2, or 3.

It should be noted that this segment of US 278 is unique because it spans a small island with residential development on either side. The side street traffic volumes are not expected to grow significantly in the future because the island is almost completely developed. The relatively low volumes from the side streets preclude a signal from meeting Warrants 1, 2, or 3, even though the through volumes on the mainline are very high, which is why Warrant 8 was considered.

It is recommended that SCDOT, as a part of the reconstruction of US 278, construct a conventional signalized intersection at Gateway Drive/Crosstree Drive because Warrant 8 is met and for other reasons such as safety, speed reduction, and potential pedestrian connections.

As outlined in this memo, the signalized SuperStreet and full access intersection alternatives are expected to operate comparably according to the Synchro and SimTraffic analyses. Providing signalization in either alternative will provide a safer opportunity to cross three lanes of opposing traffic. Introducing a signal on Jenkins Island will also help to control speeding by creating a constraint where there would otherwise be three miles of uninterrupted flow between the Bluffton Parkway ramps and the Squire Pope Road intersection.

The major differences between the SuperStreet and the full access intersection are the number of signals required, the circuitous travel required for the SuperStreet, the spirit and intent of Warrant 8, and the ability to introduce a pedestrian crossing at the full access intersection. The SuperStreet will require two new signals; whereas, the full access intersection will allow all movements for the island at one signalized intersection. Moreover, the Superstreet necessitates unsignalized and unprotected right turn movements from the minor street approaches, whereas the full access intersection provides signal protection for those movements. If it is expected that future pedestrian activity will warrant a pedestrian crossing somewhere along Jenkins Island, the full access signalized intersection at Gateway Drive/Crosstree Drive should be selected because it is the only alternative that simultaneously stops eastbound and westbound traffic on US 278. The full access signal also reduces the amount of circuitous travel that would be required by the residents on Jenkins Island.

It is recommended that the full access signalized intersection should be implemented at the Gateway Drive/Crosstree Drive intersection with US 278. This option best meets the interest of the residents on Jenkins Island as well as the drivers passing through Jenkins Island. It will provide the safest solution for motorists and non-motorized users crossing the six-lane divided highway.