

Stockton Maverik Gas Station Access Analysis

Prepared for:



SITE DESIGN COLLABORATIVE

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Long Beach, CA 90802

Prepared by:



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EXECUTIVE SUMMARY

Purpose of the Report

The subject site has already been entitled for a gas service station as part of Phase 1 Airpark 599 project. The purpose of this Access Analysis report is to analyze the operation of the proposed project access points and bounding intersections under existing and opening year conditions. The project is proposing two access points that provide a physical transition between the subject site and fronting roadways. Access to the Project site will be provided via one (1) driveway with restricted access to right-out only vehicular movement on Arch Airport Road and one (1) proposed driveway with full access on Qantas Lane. The proposed driveways are designed to minimize impacts on traffic flow along the fronting roadways by providing a left turn lane at the Qantas lane driveway that allows the turning vehicle to exit the through lane, to decelerate, and to provide enough storage space for vehicles waiting to complete the turn safely into the property while not impeding through vehicular movements. The existing auxiliary lane along the property frontage on Arch Airport Road will facilitate vehicular movements exiting the site by providing a speed change area that permit vehicles to accelerate before merging with the through traffic flow.

Project Overview

The Project is proposing the construction of a service station with 5,982 square-foot convenience store, 22 fueling positions. The Project is located at the southeast corner of Arch Airport Road and Qantas Lane in the City of Stockton.

The project trip generation was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual (TGM)*, 11th Edition. It is estimated that the project will generate 1,902 daily trips, 168 AM peak hour trips and 148 PM peak hour trips. Project trip distribution and assignment were developed based on the land use characteristics of the proposed project and surrounding area and anticipated travel patterns to and from the project site. Project scenarios and study area intersections were then established to determine the potential operational deficiencies at the project access points and bounding intersections on the transportation network due to the construction of the Project.

Analysis Scenarios

- Existing Conditions (Year 2025)
- Opening Year 2027 (Existing + 2% Annual Ambient Growth) + Project Conditions

Study Area Intersections

1. SR-99 and Arch Airport Road
2. Qantas Lane and Arch Airport Road
3. Project Driveway and Arch Airport Road
4. Qantas Lane and Project Driveway



Analysis Results and Recommendations*Existing Conditions (Year 2025)*

All intersections are expected to operate at an acceptable LOS under Existing Conditions.

Opening Year 2027 Conditions

All intersections are expected to operate at an acceptable LOS under Opening Year 2027 Project Conditions.

Conclusion

This Access Analysis evaluated the potential deficiencies related to the Project proposed access points and bounding intersections. An access and intersection operation analyses were conducted under Existing Year 2025 and Opening Year 2027 Project conditions. Based on the analysis, it was determined that all study access points and intersections are expected to operate at satisfactory LOS D or better during the weekday AM and PM peak hours under all analyzed conditions. Although the approved City-County precise road plan shows Arch Airport Road between Quantas Lane and SR99 as having four-lanes plus an auxiliary lane for the eastbound direction, the approved and certified project plans and traffic study for the State Route 99/Arch Road Interchange Reconstruction Project validated that three-lanes plus an auxiliary lane eastbound direction is adequate for future traffic growth. The proposed Maverick Gas Station study agrees with the SR99/Arch Road Interchange study.



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1.0 PROJECT INTRODUCTION

The subject site has already been entitled for a gas service station as part of Phase 1 Airpark 599 project. The purpose of this Access Analysis report is to analyze the operation of the proposed project access points and bounding intersections under existing and opening year conditions. The project is proposing two access points that provide a physical transition between the subject site and fronting roadways. Access to the Project site will be provided via one (1) driveway with restricted access to right-out only vehicular movement on Arch Airport Road and one (1) proposed driveway with full access on Qantas Lane. The proposed driveways are designed to minimize impacts on traffic flow along the fronting roadways by providing left turn lane at the Qantas lane driveway that allows the turning vehicle to exit the through lane, to decelerate, and to provide enough storage space for vehicles waiting to complete the turn safely into the property while not impeding through vehicular movements. The existing auxiliary lane along the property frontage on Arch Airport Road will facilitate vehicular movements exiting the site by providing a speed change area that permit vehicles to accelerate before merging with the through traffic flow.

PROJECT DESCRIPTION

The Project is proposing the construction of a service station with 5,982 square-foot convenience store and 22 fueling positions. The Project is located at the southeast corner of Arch Airport Road and Qantas Lane in the City of Stockton.

Figure 1-1 shows the project site plan.

STUDY AREA

The study area for this project was developed consistent with the Guidelines, including all primary access points and signalized intersections adjacent to the project or integral to project trip distribution.

Figure 1-2 presents the study area that includes the following key intersections:

1. SR-99 and Arch Airport Road
2. Qantas Lane and Arch Airport Road
3. Project Driveway and Arch Airport Road
4. Qantas Lane and Project Driveway

Turning movement counts for one weekday during the morning and evening peak hours were conducted on January 30, 2025. The turning movement counts are included in **Appendix A**. These counts were utilized in Synchro 11 software to determine LOS at all study intersections. Year 2027 traffic volumes were developed by adding a 2% annual growth for two years to the existing counts which was added to the project volumes.

PROJECT TRIP GENERATION

Trip generation is a measure or forecast of the number of trips that begin or end at the project site. The traffic generated is a function of the extent and type of development proposed for the site. These trips will result in some traffic increases on the streets where they occur. Per the TIA Guidelines, trip generation for proposed uses must be calculated based on rates from the *Trip Generation Manual (TGM)*, 11th Edition, published by the Institute of Transportation Engineers (ITE). Project ITE average trip generation rates are presented in **Table 1-1**.



Table 1-1
Project Trip Generation Rate

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Convenience Store/Gas Station (5.5-10k)	VFP	945	15.80	15.80	31.60	13.45	13.45	26.90	345.75

¹ Trip Generation Source: Institute of Transportation Engineers, Trip Generation Manual, Eleventh Edition (2021).

² VFP = Vehicle Fueling Positions

Table 1-2 summarizes the calculated trip generation based on land use intensity associated with the Project. As shown, the Project is anticipated to generate approximately 1,902 new daily trips, 168 AM peak hour trips and 148 PM peak hour trips.

Table 1-2
Project Trip Generation Summary

Land Use ¹	Intensity	Units ²	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Convenience Store/Gas Station (5.5-10k)	22	VFP	348	348	696	296	296	592	7,607
Pass-by Reduction (76% - AM Peak Hour, 75% - PM Peak Hour & Daily) ³			264	264	528	222	222	444	5,705
Total			84	84	168	74	74	148	1,902

¹ Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

² VFP = Vehicle Fueling Positions

³ Pass-by reduction percentage is based on the ITE methodology per 2021 Pass-By Tables for ITE Trip Generation Appendices.

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution and assignment is the process of identifying the probable destinations, directions and traffic routes that project related traffic will affect. Once the proposed development's trips have been estimated, they are assigned to the study area network. For this development, the project trip distribution and assignment were developed in coordination with City staff based on the land use characteristics of the proposed project, surrounding land uses within the study area, and anticipated travel patterns to and from the project site.

Figure 1-2 shows the trip distribution and **Figure 1-3** shows the Project intersection turning movement volumes.

PROJECT ACCESS

Access to the Project site will be provided via one (1) driveway with restricted access to right-out only vehicular movement on Arch Airport Road and one (1) proposed driveway with full access on Qantas Lane.

ARCH AIRPORT ROADWAY CONFIGURATION

According to the *State Route 99 (SR-99)/Arch Road Interchange Reconstruction Project Traffic Forecast and Operation Analysis* (dated September 9, 1998), the roadway design for Arch Airport Road between SR-99 and Qantas Lane was revised from the original four-lane configuration shown in the precise roadway plan. The approved, certified, and constructed roadway configuration implemented as part



of the Arch Road Interchange Reconstruction Project includes three eastbound through lanes and an auxiliary lane connecting the recommended northbound free right-turn lane at the Arch Airport Road and Qantas Lane intersection to the SR-99 interchange.

For the purposes of this report, the roadway geometric configuration of Arch Airport Road, as established by the approved, certified and constructed SR-99 interchange project, has been reviewed and confirmed by City of Stockton staff for inclusion in the subject project. Excerpts from the *State Route 99 (SR-99)/Arch Road Interchange Reconstruction Project Traffic Forecast and Operation Analysis* are provided in **Appendix E**.

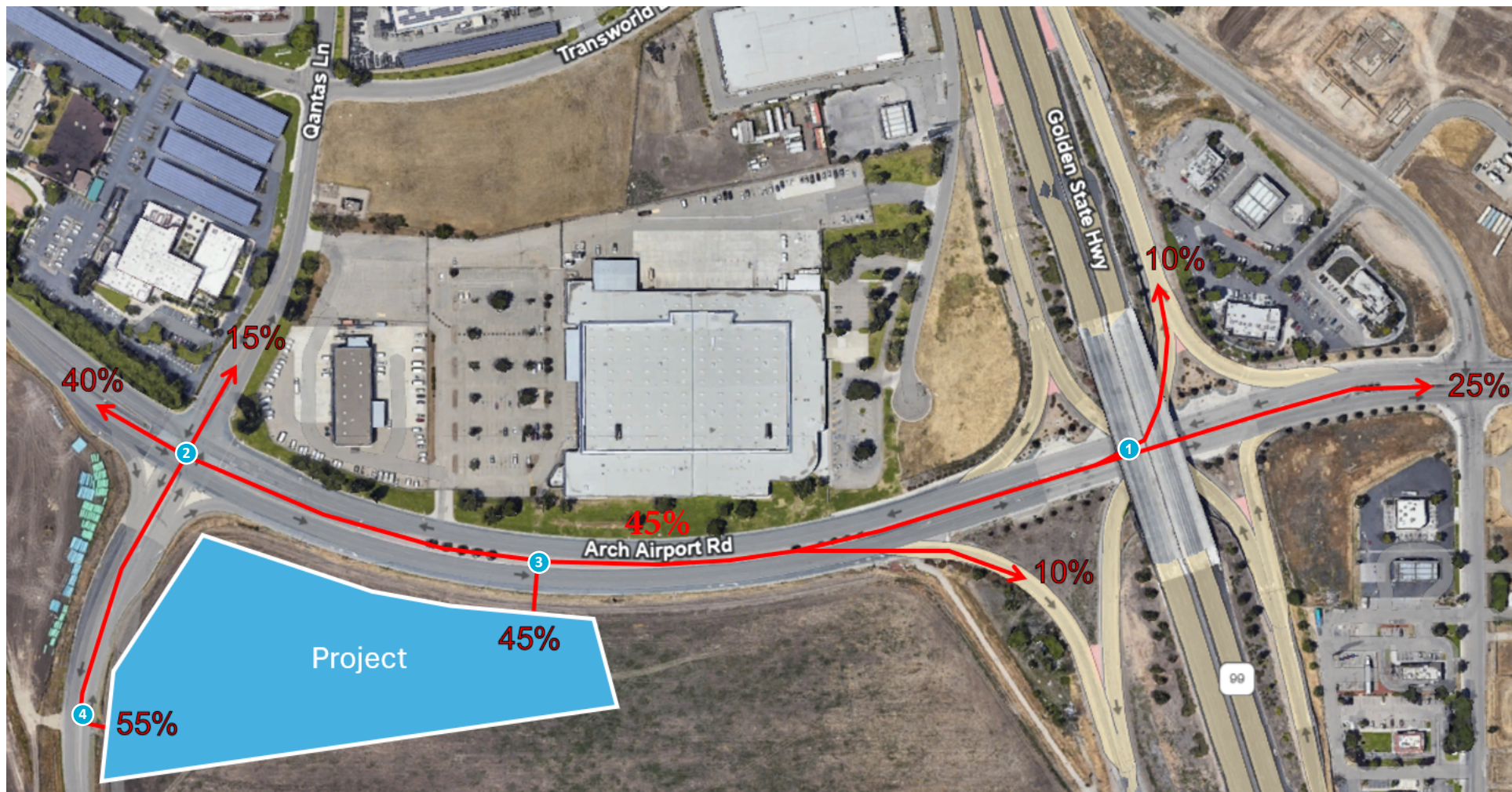
PARKING

The proposed development will provide on-site parking spaces consistent with City of Stockton minimum parking requirements.





Maverik Gas Station
Project Site Plan
Figure 1-1



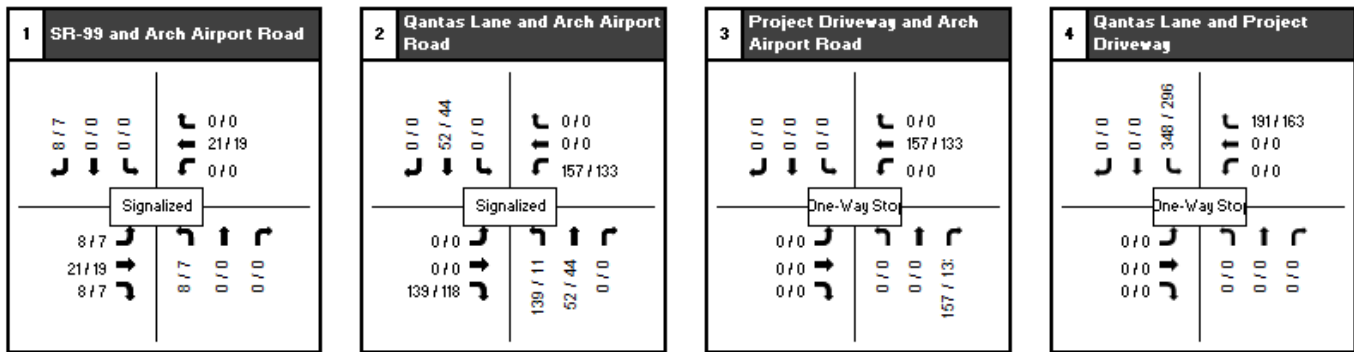
LEGEND

Intersections



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Maverick Gas Station
Project Study Area and Outbound Trip Distribution
Figure 1-2a

**LEGEND**

0/0 = (AM/PM) Peak Hour Volumes



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Maverik Gas Station
Project AM/PM Peak Hour Intersection Volumes
Figure 1-3

2.0 METHODOLOGIES

This section documents the methodologies and assumptions used to conduct the circulation impact analysis for the proposed project. This section contains the following background information:

- Study scenarios
- Study time periods
- Analysis methodologies

Refer to **Appendix A** for approved scoping agreement.

STUDY SCENARIOS

This report presents an analysis of the intersection operating conditions during the peak periods, which were selected in consultation with City staff for the following anticipated timeframe scenarios:

- Existing Conditions (Year 2025)
- Opening Year 2027 (Existing + 2% Annual Ambient Growth) + Project Conditions

STUDY TIME PERIODS

The Guidelines recommend the following peak hours for analysis:

- Weekday AM (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM (peak hour between 4:00 PM and 6:00 PM)

ANALYSIS METHODOLOGIES

Street system operating conditions are typically described in terms of “level of service.” Level of service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Level of service (LOS) ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion). **Table 2-1** describes generalized definitions of auto LOS A through F.

Table 2-1
Vehicular Level of Service Definitions

LOS	Characteristics
A	Primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Controlled delay at the boundary intersections is minimal. The travel speed exceeds 80% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.
B	Reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67% and 80% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.
C	Stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.
D	Less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.
E	Unstable operation and significant delay. Such operations may be due to some combination of adverse signal progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed, and the volume-to-capacity ratio is no greater than 1.0.
F	Flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed, or the volume-to-capacity ratio is greater than 1.0.

Source: Highway Capacity Manual 7th Edition, Transportation Research Board (2022)



Intersection Capacity Analysis

The analysis of peak hour intersection performance was conducted using the Synchro 10 software program, which uses methodologies defined in the Highway Capacity Manual 7th Edition (HCM) to calculate LOS. Level of service (LOS) for intersections is determined by control delay. Control delay is defined as the total elapsed time from when a vehicle stops at the end of a queue to the time the vehicle departs from the stop line. The total elapsed time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

Signalized Intersections

The HCM analysis methodology for evaluating signalized intersections is based on the “operational analysis” procedure. This technique uses 1,900 passenger cars per hour of green per lane (pcphpl) as the maximum saturation flow of a single lane at an intersection. Average control delay is calculated by taking a volume-weighted average of all the delays for all vehicles entering the intersection. **Table 2-2** summarizes the level of service criteria for signalized intersections.

Table 2-2
Signalized Intersection Level of Service HCM Operational Analysis Method

Average Control Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
≤10.0	<i>LOS A</i> occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
10.1 – 20.0	<i>LOS B</i> occurs when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with <i>LOS A</i> .
20.1 – 35.0	<i>LOS C</i> occurs when progression is favorable or the cycle length is moderate. Individual <i>cycle failures</i> (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
35.1 – 55.0	<i>LOS D</i> occurs when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
55.1 – 80.0	<i>LOS E</i> occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
>80.0	<i>LOS F</i> occurs when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual 7th Edition, Transportation Research Board (2022)

Side-street Stop-controlled (SSSC) Intersections

The HCM analysis methodology for evaluating side-street stop-controlled (SSSC) intersections is based on gap acceptance and conflicting traffic for vehicles stopped on minor-street approaches. The critical gap (minimum gap that would be acceptable) is defined as the minimum time interval in the major-street traffic stream that allows intersection entry for one minor-street vehicle. Average control delay and LOS for the “worst approach” are reported. Level of service is not defined for the entire intersection. **Table 2-3** summarizes the level of service criteria for unsignalized intersections.



Table 2-3
Level of Service Criteria for Stop Controlled Unsignalized Intersections

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10.0	A
10.1 – 15.0	B
15.1 – 25.0	C
25.1 – 35.0	D
35.1 – 50.0	E
>50.0	F

Source: Highway Capacity Manual 7th Edition, Transportation Research Board (2022)



3.0 EXISTING CONDITIONS (YEAR 2025)

This section documents the circulation system conditions within the study area of the project under the existing without and with project scenarios. The Existing Conditions (Year 2025) scenario is analyzed using existing volumes counts. This section also documents potential project related operational deficiencies on the existing local circulation networks. No network improvements are assumed under Existing Conditions scenarios.

ROADWAY NETWORK

The locally significant roadway located within the study area of the Project is discussed below.

Arch Airport Road is an east-west arterial that extends from SR-99 Interstate 5. The number of lanes on Arch Airport Road varies, with seven travel lanes including three through lanes in each direction and an eastbound auxiliary lane in the study area immediately west of SR-99 to Qantas Lane which transition to four travel lanes west of Qantas Lane. The posted speed limit on Arch Airport Road is 45 mph

Qantas Lane is a north-south local Street from Arch Airport Road in the area immediately west of SR-99. The north section is a three-lane roadway that transitions into two lane roadway to the north where the southern segment is also a three-lane roadway that transitions to two lanes extending beyond the project site to the south.

Figures 3-1 and 3-2 show the City of Stockton Roadway Classification and Bicycle Network Maps.

TRAFFIC VOLUMES

The intersection turning movement counts were conducted during the weekday morning peak period from 7:00 AM to 9:00 AM and during the weekday evening peak period from 4:00 PM to 6:00 PM on January 30, 2025. Traffic count data is provided in **Appendix A**.

ANALYSIS RESULTS

Table 3-1 shows Existing Conditions intersection operation analysis results. **Figure 3-3** shows Existing Conditions intersection turning movement volumes.



Table 3-1
Existing Conditions (Year 2025) Intersection Operation Analysis

Intersection	Traffic Control	Existing Without Project	
		Delay (a)	LOS (b)
AM/PM Peak			
1. SR-99 and Arch Airport Road	Signalized	11.8/12.7	B/B
2. Qantas Lane and Arch Airport Road	Signalized	14.5/12.2	B/B

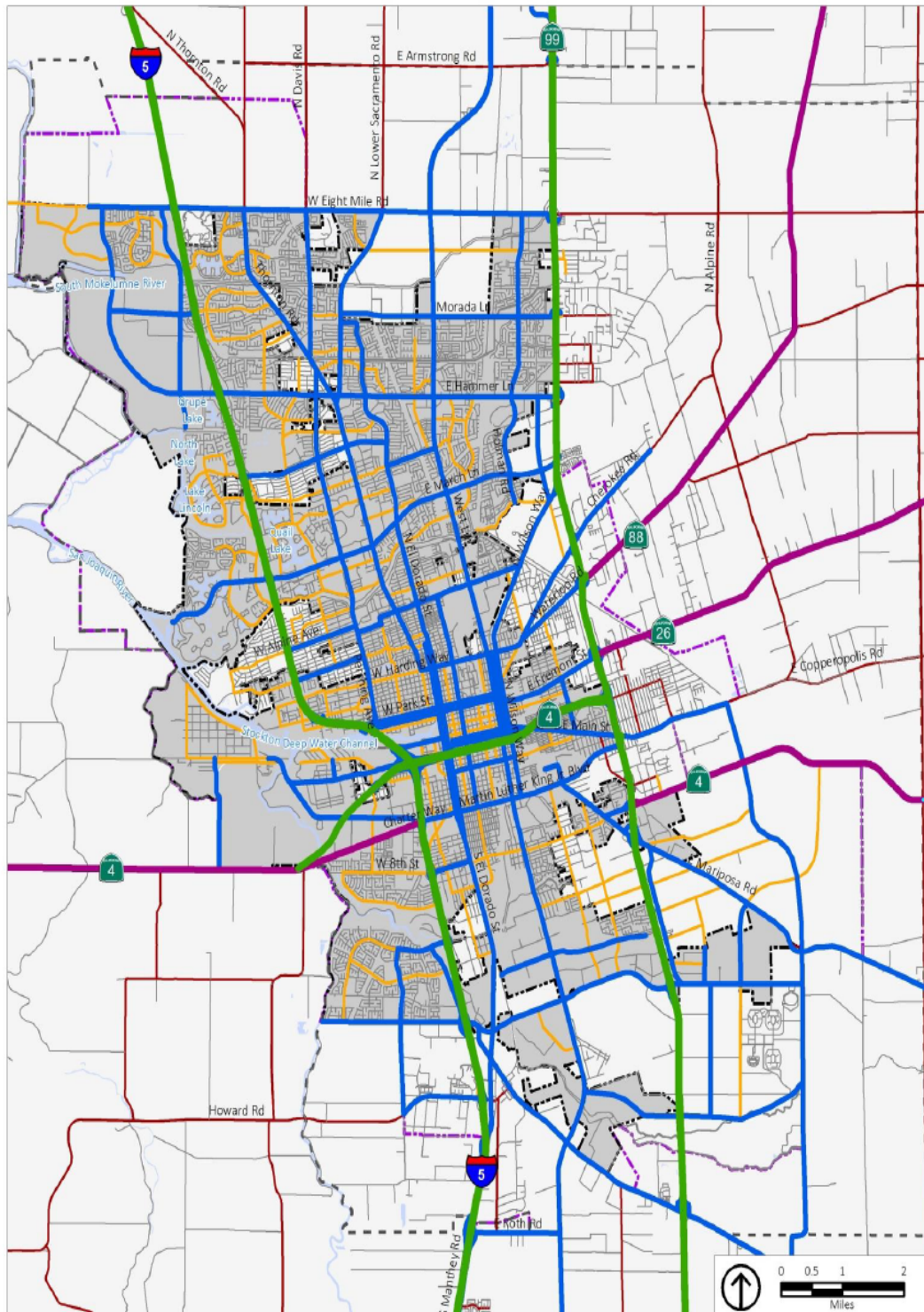
Notes:

(a) Delay refers to the average control delay for the entire intersection and control delay for the worst movement for SSSC intersections, measured in seconds per vehicle.

(b) LOS calculations are based on the methodology outlined in the Highway Capacity Manual 6th Edition and performed using Synchro 11

Per the analysis results shown in **Table 3-1**, all analyzed intersections are operating at an acceptable LOS under Existing Conditions. Existing Conditions peak hour analysis worksheets are provided in **Appendix B**.

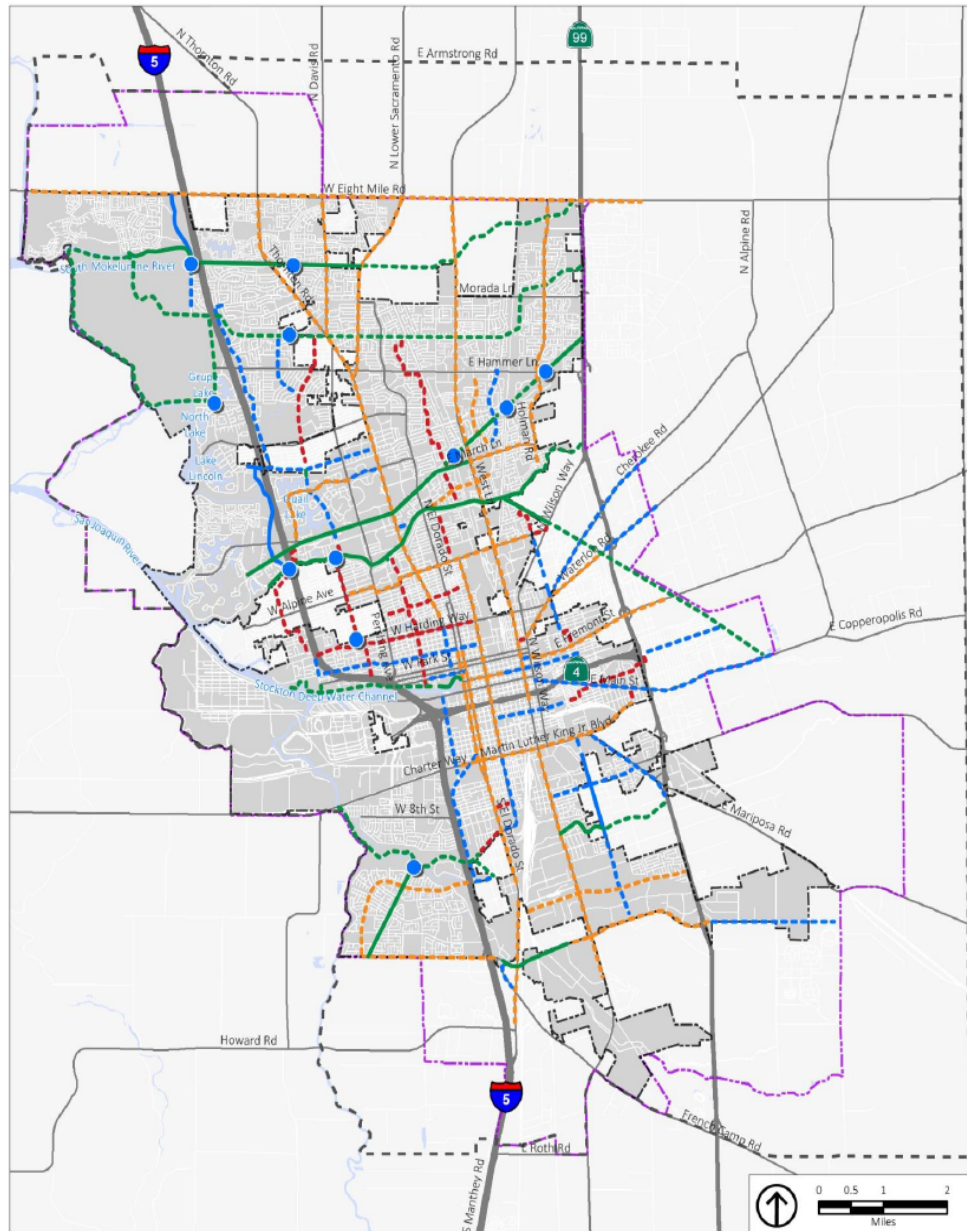




Source: City of Stockton; Fehr & Peers, 2016; PlaceWorks, 2017.

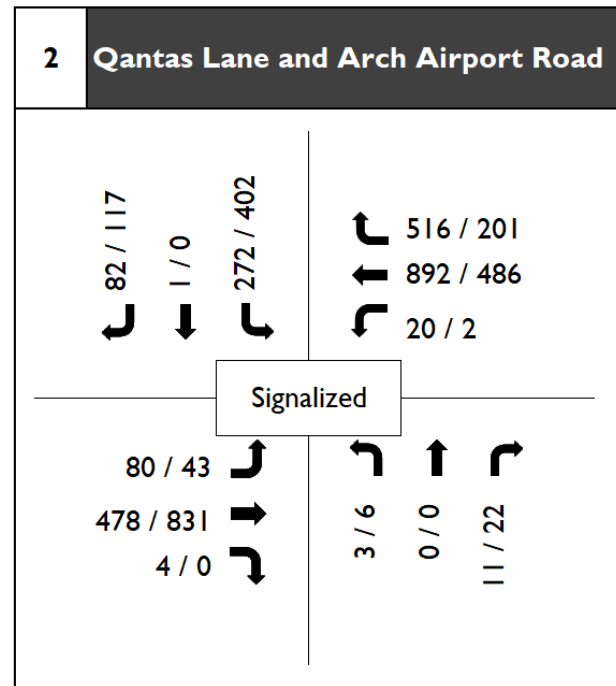
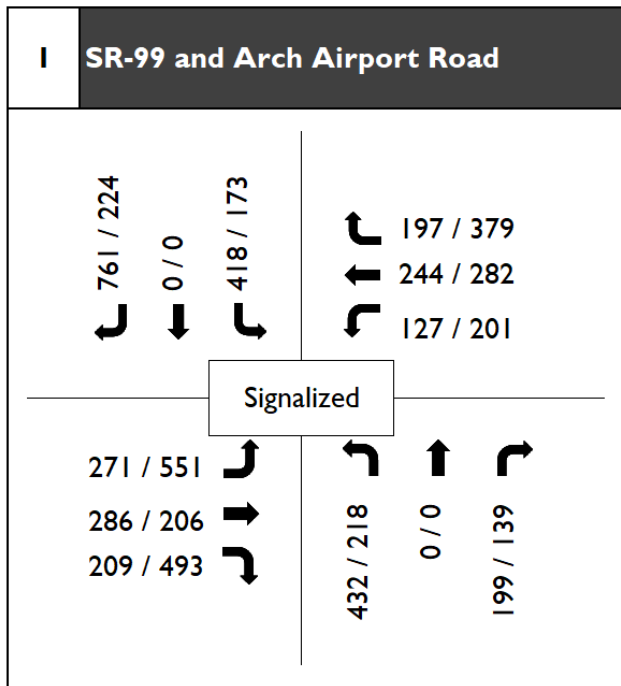
- Freeways
 Collectors
 City Limit
 Highways
  Rural Road
  Sphere of Influence
 Arterials
  Local Roads
  General Plan Planning Area

Existing and Planned Bicycle Network



Source: City of Stockton; Fehr & Peers, 2016; PlaceWorks, 2017.

- | | | |
|---------------------------------|--------------------------------|----------------------------|
| Existing Bicycle Network | Planned Bicycle Network | New Bridge |
| Class I (Bike Path) | Class I (Bike Path) | General Plan Planning Area |
| Class II (Bike Lane) | Class II (Bike Lane) | City Limit |
| | Class III (Bike Route) | Sphere of Influence |
| | Class IV (Separated Bikeway) | |

**LEGEND**

(AM/PM) Peak Hour Volumes



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Maverik Gas Station

Existing Peak Hour Intersection Volumes

Figure 3-3

4.0 OPENING YEAR 2027 CONDITIONS

This section documents the circulation system conditions within the study area of the project under Opening Year 2027 Project scenarios. The Opening Year Conditions traffic volumes were developed by applying a 2% growth for two years to the Existing counts. Project traffic volumes are then added to the Opening Year Project Conditions traffic volumes to develop Opening Year with Project Conditions traffic volumes. No network improvements are assumed under Opening Year Condition scenarios.

ANALYSIS RESULTS

Table 4-1 shows Opening Year 2027 Conditions intersection operation analysis results. **Figures 4-1** shows Opening Year 2027 with Project Conditions intersection turning movement volumes.

Table 4-1
Opening Year 2027 Conditions Intersection Operation Analysis

Intersection	Traffic Control	Opening Year (With Project)		Operational Deficiency?
		Delay (a)	LOS (b)	
AM/PM Peak				
1. SR-99 and Arch Airport Road	Signalized	12.1/12.9	B/B	N/N
2. Qantas Lane and Arch Airport Road	Signalized	25.2/18.1	C/B	N/N
3. Project Driveway and Arch Airport Road	One-Way Stop	11.1/9.5	B/A	N/N
4. Qantas Lane and Project Driveway	One-Way Stop	9.3/9.3	A/A	N/N

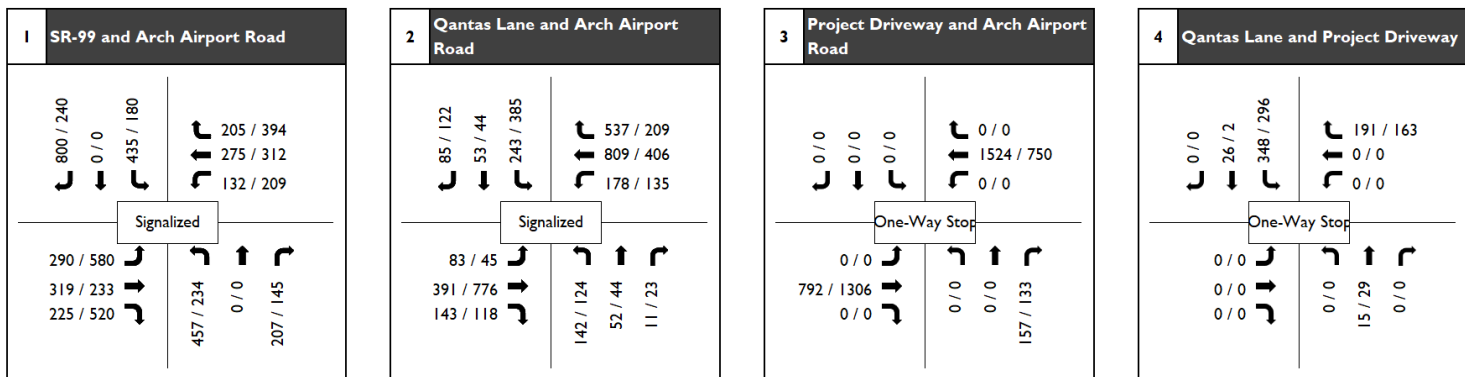
Per the analysis results shown in Table 4-1, all analyzed intersections are operating at an acceptable LOS under Opening Year Conditions. Opening Year Project Conditions peak hour analysis worksheets are provided in **Appendix C**.

Table 4-2
Opening Year 2027 Driveway Vehicular Queueing Analysis

Intersection	Movement	Stacking Distance (ft)	Queue (ft)		Excess Demand	
			AM	PM	AM	PM
4. Qantas Lane and Project Driveway	SBL	100	45	50	-	-

Per the analysis results shown in **Table 4-2**, the project access points will not experience vehicular excess demand. Queue worksheets are provided in **Appendix D**.



**LEGEND**

(AM/PM) Peak Hour Volumes



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Maverik Gas Station
Opening Year 2027 Peak Hour
Intersection Volumes
Figure 3-3

5.0 CONCLUSION

This Access Analysis evaluated the potential deficiencies related to the Project proposed access points and bounding intersections. An access and intersection operation analyses were conducted under Existing Year 2025 and Opening Year 2027 Project conditions. Based on the analysis, it was determined that all study access points and intersections are expected to operate at satisfactory LOS D or better during the weekday AM and PM peak hours under all analyzed conditions. Although the approved City-County precise road plan shows Arch Airport Road between Quantas Lane and SR99 as having four-lanes plus an auxiliary lane for the eastbound direction, the approved and certified project plans and traffic study for the State Route 99/Arch Road Interchange Reconstruction Project validated that three-lanes plus an auxiliary lane eastbound direction is adequate for future traffic growth. The proposed Maverick Gas Station study agrees with the SR99/Arch Road Interchange study.



APPENDIX A -
TRAFFIC VOLUME DATA

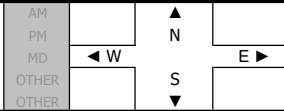


INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:
Thu, Jan 30, 25LOCATION:
NORTH & SOUTH:
EAST & WEST: Stockton
SR-99 Ramps
Arch Airport RdPROJECT #: SC5164
LOCATION #: 1
CONTROL: SIGNAL

NOTES:



	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	SR-99 Ramps			SR-99 Ramps			Arch Airport Rd			Arch Rd			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	2	X	1	2	X	1	2	2	1	2	2	1	

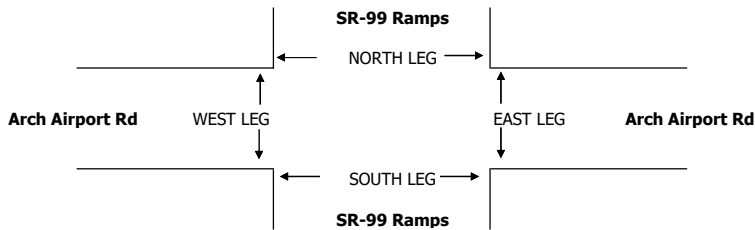
U-TURNS				
NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
2	1	0	0	3
0	0	1	0	1
1	2	0	0	3
0	1	0	0	1
1	0	0	0	1
0	3	1	0	4
4	8	2	0	14

AM	7:00 AM	65	0	52	86	0	109	20	75	39	34	53	39	572
	7:15 AM	109	0	60	134	0	155	29	54	50	29	41	37	698
	7:30 AM	94	0	50	102	0	141	50	74	56	34	44	51	696
	7:45 AM	144	0	69	133	0	221	38	84	43	30	77	41	880
	8:00 AM	100	0	53	94	0	232	83	83	46	22	34	56	803
	8:15 AM	94	0	27	89	0	167	100	45	64	41	89	49	765
	8:30 AM	66	0	25	63	0	115	71	64	58	34	61	62	619
	8:45 AM	72	0	30	74	0	99	64	44	44	24	35	42	528
	VOLUMES	744	0	366	775	0	1,239	455	523	400	248	434	377	5,575
	APPROACH %	67%	0%	33%	38%	0%	61%	33%	38%	29%	23%	41%	36%	
APP/DEPART		1,114	/	840	2,022	/	652	1,380	/	1,664	1,059	/	2,419	0
BEGIN PEAK HR		7:30 AM												
VOLUMES		432	0	199	418	0	761	271	286	209	127	244	197	3,152
APPROACH %		68%	0%	31%	35%	0%	64%	35%	37%	27%	22%	43%	35%	
PEAK HR FACTOR		0.744			0.835			0.904			0.793			0.894
APP/DEPART		634	/	472	1,183	/	339	767	/	903	568	/	1,438	0
PM	4:00 PM	46	0	37	35	0	55	143	31	150	63	75	106	741
	4:15 PM	49	0	32	44	0	50	129	72	96	42	43	76	633
	4:30 PM	67	0	40	45	0	58	157	60	140	55	74	127	823
	4:45 PM	56	0	30	49	0	61	122	43	107	41	90	70	669
	5:00 PM	54	0	32	37	0	46	144	58	124	42	48	69	654
	5:15 PM	53	0	45	58	0	40	109	57	87	47	50	90	636
	5:30 PM	47	0	42	57	0	37	73	75	72	46	92	116	657
	5:45 PM	55	0	36	72	0	40	64	69	64	65	68	75	608
	VOLUMES	427	0	294	397	0	387	941	465	840	401	540	729	5,438
	APPROACH %	59%	0%	41%	50%	0%	49%	42%	21%	37%	24%	32%	44%	
APP/DEPART		724	/	1,679	793	/	1,244	2,249	/	1,158	1,672	/	1,357	0
BEGIN PEAK HR		4:00 PM												
VOLUMES		218	0	139	173	0	224	551	206	493	201	282	379	2,877
APPROACH %		61%	0%	39%	43%	0%	55%	44%	16%	39%	23%	33%	44%	
PEAK HR FACTOR		0.823			0.902			0.874			0.843			0.870
APP/DEPART		359	/	937	404	/	696	1,251	/	519	863	/	725	0

3 4 1 0

0	2	0	0	2
0	2	0	1	3
2	1	1	0	4
0	2	0	0	2
0	1	1	0	2
0	1	0	0	1
0	0	1	1	2
1	0	0	0	1
3	9	3	2	17

2 7 1 1

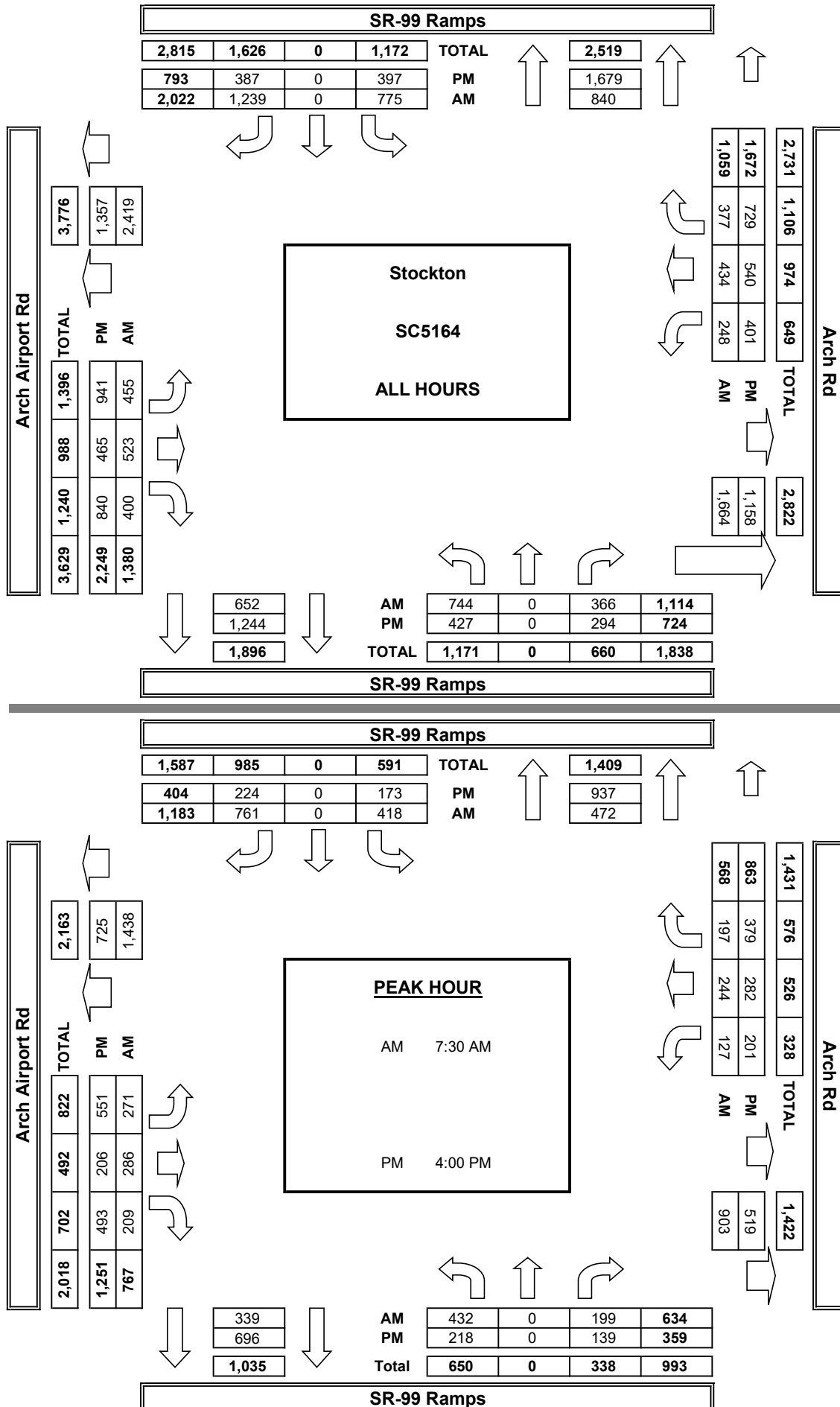


AM	7:00 AM	
	7:15 AM	
	7:30 AM	
	7:45 AM	
	8:00 AM	
	8:15 AM	
	8:30 AM	
	8:45 AM	
	TOTAL	
	BEGIN PEAK HR	
PM	4:00 PM	
	4:15 PM	
	4:30 PM	
	4:45 PM	
	5:00 PM	
	5:15 PM	
	5:30 PM	
	5:45 PM	
	TOTAL	
	BEGIN PEAK HR	

ALL PED + BIKE & SCOOTER				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
2	0	0	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	1	0	0	3
0	0	0	0	0
5	1	0	0	6
7:30 AM				
1	1	0	0	2
1	0	0	0	1
3	0	0	0	3
0	0	0	0	0
2	0	0	0	2
2	1	0	0	3
0	0	0	0	0
2	0	0	0	2
11	2	0	0	13
4:00 PM				

PEDESTRIAN CROSSINGS				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	0	0	0	2
0	0	0	0	0
4	0	0	0	4
2	0	0	0	2
1	0	0	0	1
0	0	0	0	0
3	0	0	0	3
0	0	0	0	0
0	0	0	0	0
2	1	0	0	3
0	0	0	0	0
2	0	0	0	2
8	1	0	0	9
4	0	0	0	4

BICYCLE & SCOOTER CROSSINGS				
NL	SL	EL	WL	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
1	1	0	0	2
0	1	0	0	1
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
2	0	0	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
3	1	0	0	4



US-99 SB On-Ramp
Stockton, CA

1/30/2025

Time	Total Queue
7:00 AM	0
7:05 AM	0
7:10 AM	0
7:15 AM	0
7:20 AM	0
7:25 AM	0
7:30 AM	0
7:35 AM	0
7:40 AM	0
7:45 AM	0
7:50 AM	0
7:55 AM	0
8:00 AM	0
8:05 AM	0
8:10 AM	0
8:15 AM	0
8:20 AM	0
8:25 AM	0
8:30 AM	0
8:35 AM	0
8:40 AM	0
8:45 AM	0
8:50 AM	0
8:55 AM	0

Prepared by AimTD LLC

cs@aimtd.com

714.253.7888

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

PROJECT #: SC5164
LOCATION #: 2
CONTROL: SIGNAL

AM		▲	
PM		N	
MD	◀ W		E ▶
OTHER		S	
OTHER		▼	

U-TURNS				
NB 0	SB 0	EB 0	WB 0	TTL

0	0	0	0	0
0	0	0	2	2
0	0	0	2	2
0	0	0	3	3
0	0	0	1	1
0	0	0	2	2
0	0	0	3	3
0	0	0	4	4
0	0	0	17	17

0	0	0	2	2
0	0	1	0	1
0	0	0	1	1
0	0	0	2	2
0	0	0	0	0
0	0	0	1	1
0	0	0	1	1
0	0	0	1	1
0	0	1	8	9

Arch Airport Rd

Qantas Ln

NORTH LEG

WEST LEG

EAST LEG

Qantas Ln

Arch Airport Rd

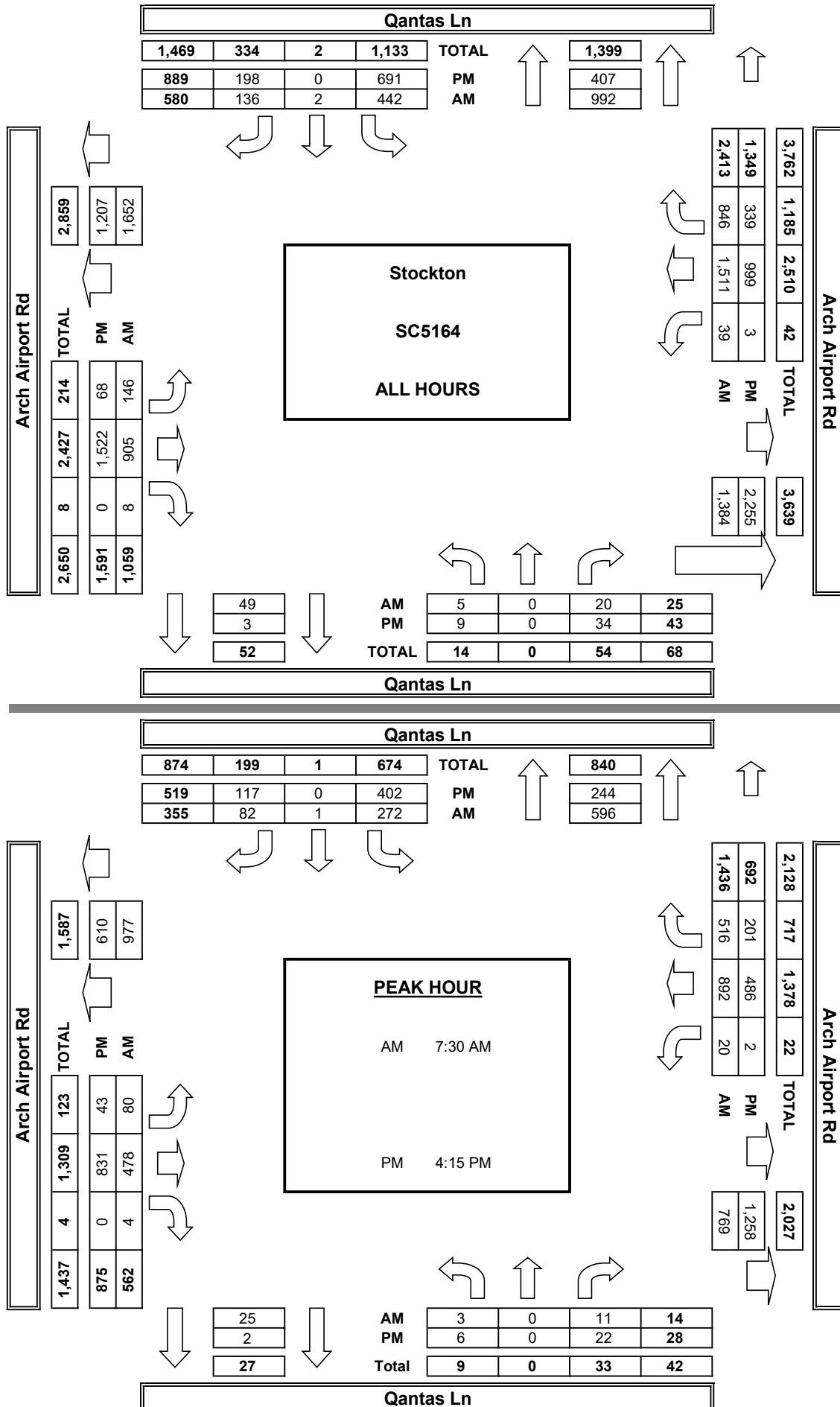
SOUTH LEG

ALL PED + BIKE & SCOOTER				
N LEG	S LEG	E LEG	W LEG	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	1	0	0	1
0	0	0	0	0
1	1	0	0	2
7:30 AM				
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
0	0	0	0	0
0	0	0	0	0
1	1	0	0	2
4:15 PM				

[illegible]

AimTD LLC
TURNING MOVEMENT COUNTS

ATTACHMENT B



APPENDIX B -

EXISTING CONDITIONS PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS



HCM 6th Signalized Intersection Summary

1: Arch Airport Road & SR-99

ATTACHMENT B
Maverik Gas Station

02/08/2025

																															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																			
Lane Configurations																															
Traffic Volume (veh/h)	271	286	209	127	244	197	432	0	199	418	0	761																			
Future Volume (veh/h)	271	286	209	127	244	197	432	0	199	418	0	761																			
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767																			
Adj Flow Rate, veh/h	304	321	0	143	274	0	485	0	0	470	0	0																			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89																			
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9																			
Cap, veh/h	488	832		358	699		1170	504		1170	504																				
Arrive On Green	0.15	0.25	0.00	0.11	0.21	0.00	0.29	0.00	0.00	0.29	0.00	0.00																			
Sat Flow, veh/h	3264	3357	1497	3264	3357	1497	2597	1767	0	2597	1767	0																			
Grp Volume(v), veh/h	304	321	0	143	274	0	485	0	0	470	0	0																			
Grp Sat Flow(s),veh/h/ln	1632	1678	1497	1632	1678	1497	1299	1767	0	1299	1767	0																			
Q Serve(g_s), s	2.9	2.7	0.0	1.4	2.4	0.0	5.5	0.0	0.0	5.3	0.0	0.0																			
Cycle Q Clear(g_c), s	2.9	2.7	0.0	1.4	2.4	0.0	5.5	0.0	0.0	5.3	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	488	832		358	699		1170	504		1170	504																				
V/C Ratio(X)	0.62	0.39		0.40	0.39		0.41	0.00		0.40	0.00																				
Avail Cap(c_a), veh/h	874	1198		485	799		5141	3205		5141	3205																				
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	13.4	10.5	0.0	13.9	11.5	0.0	10.6	0.0	0.0	10.5	0.0	0.0																			
Incr Delay (d2), s/veh	1.3	0.3	0.0	0.7	0.4	0.0	0.2	0.0	0.0	0.2	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	0.8	0.6	0.0	0.4	0.6	0.0	1.2	0.0	0.0	1.1	0.0	0.0																			
Unsig. Movement Delay, s/veh																															
LnGrp Delay(d),s/veh	14.7	10.8	0.0	14.7	11.8	0.0	10.8	0.0	0.0	10.7	0.0	0.0																			
LnGrp LOS	B	B		B	B		B	A		B	A																				
Approach Vol, veh/h	625			417			485			470																					
Approach Delay, s/veh	12.7			12.8			10.8			10.7																					
Approach LOS	B			B			B			B																					
Timer - Assigned Phs	2		3	4		6	7	8																							
Phs Duration (G+Y+Rc), s	13.6		7.7	12.3		13.6	9.0	11.0																							
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0	4.0	4.0																							
Max Green Setting (Gmax), s	61.0		5.0	12.0		61.0	9.0	8.0																							
Max Q Clear Time (g_c+l1), s	7.5		3.4	4.7		7.3	4.9	4.4																							
Green Ext Time (p_c), s	2.1		0.1	1.0		2.0	0.4	0.5																							
Intersection Summary																															
HCM 6th Ctrl Delay	11.8																														
HCM 6th LOS	B																														
Notes																															
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.																															

HCM 6th Signalized Intersection Summary 2: Qantas Lane & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
02/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	478	4	20	892	516	3	0	11	272	1	82
Future Volume (veh/h)	80	478	4	20	892	516	3	0	11	272	1	82
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	87	520	0	22	970	561	3	0	0	296	1	89
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, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	237	2346		87	1479	660	19	19		499	2	220
Arrive On Green	0.07	0.48	0.00	0.03	0.44	0.44	0.01	0.00	0.00	0.15	0.15	0.15
Sat Flow, veh/h	3291	4863	1510	3291	3385	1510	3291	3385	1510	3393	17	1495
Grp Volume(v), veh/h	87	520	0	22	970	561	3	0	0	296	0	90
Grp Sat Flow(s),veh/h/ln	1646	1621	1510	1646	1692	1510	1646	1692	1510	1697	0	1512
Q Serve(g_s), s	1.2	2.9	0.0	0.3	10.7	15.7	0.0	0.0	0.0	3.9	0.0	2.6
Cycle Q Clear(g_c), s	1.2	2.9	0.0	0.3	10.7	15.7	0.0	0.0	0.0	3.9	0.0	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Lane Grp Cap(c), veh/h	237	2346		87	1479	660	19	19		499	0	222
V/C Ratio(X)	0.37	0.22		0.25	0.66	0.85	0.16	0.00		0.59	0.00	0.40
Avail Cap(c_a), veh/h	348	2346		348	1574	702	557	572		646	0	288
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	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	7.1	0.0	22.6	10.5	11.9	23.4	0.0	0.0	18.9	0.0	18.3
Incr Delay (d2), s/veh	0.9	0.0	0.0	1.5	0.9	9.3	3.9	0.0	0.0	1.1	0.0	1.2
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	0.4	0.6	0.0	0.1	2.8	5.1	0.0	0.0	0.0	1.4	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	7.1	0.0	24.1	11.4	21.3	27.3	0.0	0.0	20.0	0.0	19.5
LnGrp LOS	C	A		C	B	C	C	A		B	A	B
Approach Vol, veh/h	607		1553				3		386			
Approach Delay, s/veh	9.3		15.2				27.3		19.9			
Approach LOS	A		B				C		B			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	4.3		5.3		26.8		11.0		7.4		24.7	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0		4.0			
Max Green Setting (Gmax), s	8.0		5.0		22.0		9.0		5.0		22.0	
Max Q Clear Time (g_c+I1), s	2.0		2.3		4.9		5.9		3.2		17.7	
Green Ext Time (p_c), s	0.0		0.0		2.9		0.5		0.0		2.9	
Intersection Summary												
HCM 6th Ctrl Delay	14.5											
HCM 6th LOS	B											
Notes												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th Signalized Intersection Summary

1: Arch Airport Road & SR-99

ATTACHMENT B
Maverik Gas Station

02/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	551	206	493	201	282	379	218	0	139	173	0	224
Future Volume (veh/h)	551	206	493	201	282	379	218	0	139	173	0	224
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	633	237	0	231	324	0	251	0	0	199	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	893	1154		411	659		907	343		907	343	
Arrive On Green	0.27	0.34	0.00	0.13	0.20	0.00	0.19	0.00	0.00	0.19	0.00	0.00
Sat Flow, veh/h	3264	3357	1497	3264	3357	1497	2597	1767	0	2597	1767	0
Grp Volume(v), veh/h	633	237	0	231	324	0	251	0	0	199	0	0
Grp Sat Flow(s),veh/h/ln	1632	1678	1497	1632	1678	1497	1299	1767	0	1299	1767	0
Q Serve(g_s), s	6.2	1.8	0.0	2.4	3.1	0.0	3.1	0.0	0.0	2.4	0.0	0.0
Cycle Q Clear(g_c), s	6.2	1.8	0.0	2.4	3.1	0.0	3.1	0.0	0.0	2.4	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	893	1154		411	659		907	343		907	343	
V/C Ratio(X)	0.71	0.21		0.56	0.49		0.28	0.00		0.22	0.00	
Avail Cap(c_a), veh/h	1464	2352		640	1505		1569	792		1569	792	
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	11.7	8.3	0.0	14.7	12.8	0.0	12.8	0.0	0.0	12.6	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.1	0.0	1.2	0.6	0.0	0.2	0.0	0.0	0.1	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	1.6	0.4	0.0	0.7	0.8	0.0	0.7	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	8.4	0.0	15.9	13.3	0.0	13.0	0.0	0.0	12.7	0.0	0.0
LnGrp LOS	B	A		B	B		B	A		B	A	
Approach Vol, veh/h	870			555			251			199		
Approach Delay, s/veh	11.5			14.4			13.0			12.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	10.9			8.5			16.3			10.9		
Change Period (Y+Rc), s	4.0			4.0			4.0			4.0		
Max Green Setting (Gmax), s	16.0			7.0			25.0			16.0		
Max Q Clear Time (g_c+I1), s	5.1			4.4			3.8			4.4		
Green Ext Time (p_c), s	0.7			0.2			1.3			0.5		
Intersection Summary												
HCM 6th Ctrl Delay	12.7											
HCM 6th LOS	B											

HCM 6th Signalized Intersection Summary

2: Qantas Lane & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
02/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 		 	 	
Traffic Volume (veh/h)	43	831	0	2	486	201	6	0	22	402	0	117
Future Volume (veh/h)	43	831	0	2	486	201	6	0	22	402	0	117
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	49	944	0	2	552	228	7	0	0	457	0	133
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	175	1560		9	915	408	43	44		761	0	338
Arrive On Green	0.05	0.32	0.00	0.00	0.27	0.27	0.01	0.00	0.00	0.23	0.00	0.23
Sat Flow, veh/h	3264	4823	1497	3264	3357	1497	3264	3357	1497	3365	0	1497
Grp Volume(v), veh/h	49	944	0	2	552	228	7	0	0	457	0	133
Grp Sat Flow(s),veh/h/ln	1632	1608	1497	1632	1678	1497	1632	1678	1497	1682	0	1497
Q Serve(g_s), s	0.5	6.1	0.0	0.0	5.3	4.8	0.1	0.0	0.0	4.5	0.0	2.8
Cycle Q Clear(g_c), s	0.5	6.1	0.0	0.0	5.3	4.8	0.1	0.0	0.0	4.5	0.0	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	175	1560		9	915	408	43	44		761	0	338
V/C Ratio(X)	0.28	0.61		0.22	0.60	0.56	0.16	0.00		0.60	0.00	0.39
Avail Cap(c_a), veh/h	443	2096		443	1459	651	621	638		1462	0	651
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	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	10.5	0.0	18.3	11.7	11.5	18.0	0.0	0.0	12.8	0.0	12.1
Incr Delay (d2), s/veh	0.9	0.4	0.0	12.0	0.6	1.2	1.8	0.0	0.0	0.8	0.0	0.7
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	0.2	1.4	0.0	0.0	1.4	1.2	0.0	0.0	0.0	1.4	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	10.9	0.0	30.3	12.3	12.7	19.7	0.0	0.0	13.5	0.0	12.8
LnGrp LOS	B	B		C	B	B	B	A		B	A	B
Approach Vol, veh/h	993		782				7		590			
Approach Delay, s/veh	11.2		12.5				19.7		13.4			
Approach LOS	B		B				B		B			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	4.5		4.1		15.9		12.3		6.0		14.0	
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0		4.0		4.0	
Max Green Setting (Gmax), s	7.0		5.0		16.0		16.0		5.0		16.0	
Max Q Clear Time (g_c+I1), s	2.1		2.0		8.1		6.5		2.5		7.3	
Green Ext Time (p_c), s	0.0		0.0		3.6		1.9		0.0		2.8	
Intersection Summary												
HCM 6th Ctrl Delay	12.2											
HCM 6th LOS	B											
Notes												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

APPENDIX C -

PROJECT COMPLETION YEAR 2027 CONDITIONS PEAK HOUR INTERSECTION ANALYSIS

WORKSHEETS



HCM 7th Signalized Intersection Summary
1: Arch Airport Road & SR-99

ATTACHMENT B
Maverik Gas Station
09/26/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	319	225	132	275	205	457	0	207	435	0	800
Future Volume (veh/h)	290	319	225	132	275	205	457	0	207	435	0	800
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	326	358	0	148	309	0	513	0	0	489	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	502	829		358	681		1185	522		1185	522	
Arrive On Green	0.15	0.25	0.00	0.11	0.20	0.00	0.30	0.00	0.00	0.30	0.00	0.00
Sat Flow, veh/h	3264	3357	1497	3264	3357	1497	2597	1767	0	2597	1767	0
Grp Volume(v), veh/h	326	358	0	148	309	0	513	0	0	489	0	0
Grp Sat Flow(s),veh/h/ln	1632	1678	1497	1632	1678	1497	1299	1767	0	1299	1767	0
Q Serve(g_s), s	3.2	3.1	0.0	1.5	2.8	0.0	6.0	0.0	0.0	5.6	0.0	0.0
Cycle Q Clear(g_c), s	3.2	3.1	0.0	1.5	2.8	0.0	6.0	0.0	0.0	5.6	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	502	829		358	681		1185	522		1185	522	
V/C Ratio(X)	0.65	0.43		0.41	0.45		0.43	0.00		0.41	0.00	
Avail Cap(c_a), veh/h	757	1070		473	778		5083	3173		5083	3173	
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	13.7	11.0	0.0	14.3	12.1	0.0	10.7	0.0	0.0	10.5	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.4	0.0	0.8	0.5	0.0	0.3	0.0	0.0	0.2	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	0.9	0.8	0.0	0.4	0.7	0.0	1.3	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.1	11.3	0.0	15.1	12.6	0.0	10.9	0.0	0.0	10.8	0.0	0.0
LnGrp LOS	B	B		B	B		B			B		
Approach Vol, veh/h	684			457			513			489		
Approach Delay, s/veh	13.1			13.4			10.9			10.8		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.2		7.8	12.5		14.2		9.3	11.0			
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0		4.0	4.0			
Max Green Setting (Gmax), s	62.0		5.0	11.0		62.0		8.0	8.0			
Max Q Clear Time (g_c+I1), s	8.0		3.5	5.1		7.6		5.2	4.8			
Green Ext Time (p_c), s	2.2		0.1	1.0		2.1		0.3	0.5			
Intersection Summary												
HCM 7th Control Delay, s/veh	12.1											
HCM 7th LOS	B											
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 7th Signalized Intersection Summary 2: Qantas Lane & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
09/26/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	 		 	 			 	
Traffic Volume (veh/h)	83	391	143	178	809	537	142	52	11	243	53	85
Future Volume (veh/h)	83	391	143	178	809	537	142	52	11	243	53	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	90	425	0	193	879	584	154	57	0	264	58	92
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, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	222	1806		295	1332	594	397	408		449	82	130
Arrive On Green	0.07	0.37	0.00	0.09	0.39	0.39	0.12	0.12	0.00	0.13	0.13	0.13
Sat Flow, veh/h	3291	4863	1510	3291	3385	1510	3291	3385	1510	3393	620	984
Grp Volume(v), veh/h	90	425	0	193	879	584	154	57	0	264	0	150
Grp Sat Flow(s),veh/h/ln	1646	1621	1510	1646	1692	1510	1646	1692	1510	1697	0	1604
Q Serve(g_s), s	1.5	3.4	0.0	3.2	11.9	21.4	2.4	0.8	0.0	4.1	0.0	5.0
Cycle Q Clear(g_c), s	1.5	3.4	0.0	3.2	11.9	21.4	2.4	0.8	0.0	4.1	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	222	1806		295	1332	594	397	408		449	0	212
V/C Ratio(X)	0.41	0.24		0.65	0.66	0.98	0.39	0.14		0.59	0.00	0.71
Avail Cap(c_a), veh/h	294	1806		412	1332	594	471	484		546	0	258
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	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	12.1	0.0	24.6	13.9	16.8	22.7	22.0	0.0	22.8	0.0	23.2
Incr Delay (d2), s/veh	1.2	0.1	0.0	2.5	1.2	32.4	0.6	0.2	0.0	1.2	0.0	6.7
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	0.5	1.0	0.0	1.2	3.7	10.9	0.9	0.3	0.0	1.6	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.2	12.2	0.0	27.1	15.1	49.2	23.3	22.1	0.0	24.0	0.0	29.9
LnGrp LOS	C	B		C	B	D	C	C		C		C
Approach Vol, veh/h	515				1656		211				414	
Approach Delay, s/veh	14.6				28.5		23.0				26.2	
Approach LOS	B				C		C				C	
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	10.7		9.0	24.8		11.4	7.8	26.0				
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s	8.0		7.0	20.0		9.0	5.0	22.0				
Max Q Clear Time (g_c+I1), s	4.4		5.2	5.4		7.0	3.5	23.4				
Green Ext Time (p_c), s	0.3		0.1	2.2		0.4	0.0	0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			25.2									
HCM 7th LOS			C									
Notes												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.												

Project Completion Year 2027
Timing Plan: AM Peak

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis 3: Project Driveway & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
09/26/2025

	→	↘	↙	←	↖	↗			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations	↑↑↑↑			↑↑↑↑		↗			
Traffic Volume (veh/h)	792	0	0	1524	0	157			
Future Volume (Veh/h)	792	0	0	1524	0	157			
Sign Control	Free			Free	Stop				
Grade	0%			0%	0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Hourly flow rate (vph)	861	0	0	1657	0	171			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None			None					
Median storage (veh)									
Upstream signal (ft)	379								
pX, platoon unblocked			1.00		1.00		1.00		
vC, conflicting volume			861		1413		215		
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol			859		1412		213		
tC, single (s)			4.3		7.0		7.1		
tC, 2 stage (s)									
tF (s)			2.3		3.6		3.4		
p0 queue free %			100		100		78		
cM capacity (veh/h)			740		122		773		
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	
Volume Total	215	215	215	215	552	552	552	171	
Volume Left	0	0	0	0	0	0	0	0	
Volume Right	0	0	0	0	0	0	0	171	
cSH	1700	1700	1700	1700	1700	1700	1700	773	
Volume to Capacity	0.13	0.13	0.13	0.13	0.32	0.32	0.32	0.22	
Queue Length 95th (ft)	0	0	0	0	0	0	0	21	
Control Delay (s/veh)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	
Lane LOS								B	
Approach Delay (s/veh)	0.0				0.0			11.0	
Approach LOS								B	
Intersection Summary									
Average Delay			0.7						
Intersection Capacity Utilization			32.8%		ICU Level of Service			A	
Analysis Period (min)			15						

HCM 7th TWSC
4: Qantas Lane & Project Driveway

ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection						
Int Delay, s/veh	7.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	191	15	0	348	26
Future Vol, veh/h	0	191	15	0	348	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	208	16	0	378	28
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	787	16	0	0	16	0
Stage 1	16	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Critical Hdwy	6.72	6.32	-	-	4.22	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.576	3.376	-	-	2.276	-
Pot Cap-1 Maneuver	334	1044	-	-	1560	-
Stage 1	990	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	253	1044	-	-	1560	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	990	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.3	0	7.49			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	1044	1560	-	
HCM Lane V/C Ratio	-	-	0.199	0.243	-	
HCM Ctrl Dly (s/v)	-	-	0	9.3	8	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	-	0.7	1	

HCM 7th Signalized Intersection Summary
1: Arch Airport Road & SR-99

ATTACHMENT B
Maverik Gas Station
09/26/2025

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	580	233	520	209	312	394	234	0	145	180	0	240												
Future Volume (veh/h)	580	233	520	209	312	394	234	0	145	180	0	240												
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0												
Lane Width 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												
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767												
Adj Flow Rate, veh/h	667	268	0	240	359	0	269	0	0	207	0	0												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87												
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9												
Cap, veh/h	923	1177		411	650		897	339		897	339													
Arrive On Green	0.28	0.35	0.00	0.13	0.19	0.00	0.19	0.00	0.00	0.19	0.00	0.00												
Sat Flow, veh/h	3264	3357	1497	3264	3357	1497	2597	1767	0	2597	1767	0												
Grp Volume(v), veh/h	667	268	0	240	359	0	269	0	0	207	0	0												
Grp Sat Flow(s),veh/h/ln	1632	1678	1497	1632	1678	1497	1299	1767	0	1299	1767	0												
Q Serve(g_s), s	6.7	2.0	0.0	2.5	3.5	0.0	3.4	0.0	0.0	2.5	0.0	0.0												
Cycle Q Clear(g_c), s	6.7	2.0	0.0	2.5	3.5	0.0	3.4	0.0	0.0	2.5	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	923	1177		411	650		897	339		897	339													
V/C Ratio(X)	0.72	0.23		0.58	0.55		0.30	0.00		0.23	0.00													
Avail Cap(c_a), veh/h	1444	2320		632	1485		1547	781		1547	781													
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	11.7	8.3	0.0	14.9	13.2	0.0	13.2	0.0	0.0	12.8	0.0	0.0												
Incr Delay (d2), s/veh	1.1	0.1	0.0	1.3	0.7	0.0	0.2	0.0	0.0	0.1	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	1.7	0.4	0.0	0.8	1.0	0.0	0.8	0.0	0.0	0.6	0.0	0.0												
Unsig. Movement Delay, s/veh																								
LnGrp Delay(d), s/veh	12.8	8.4	0.0	16.2	13.9	0.0	13.4	0.0	0.0	13.0	0.0	0.0												
LnGrp LOS	B	A		B	B		B			B														
Approach Vol, veh/h	935			599			269			207														
Approach Delay, s/veh	11.5			14.8			13.4			13.0														
Approach LOS	B			B			B			B														
Timer - Assigned Phs	2		3	4		6		7	8															
Phs Duration (G+Y+Rc), s	10.9		8.6	16.7		10.9		14.2	11.0															
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0		4.0	4.0															
Max Green Setting (Gmax), s	16.0		7.0	25.0		16.0		16.0	16.0															
Max Q Clear Time (g_c+l1), s	5.4		4.5	4.0		4.5		8.7	5.5															
Green Ext Time (p_c), s	0.7		0.2	1.4		0.6		1.6	1.5															
Intersection Summary																								
HCM 7th Control Delay, s/veh				12.9																				
HCM 7th LOS				B																				
Notes																								
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.																								

HCM 7th Signalized Intersection Summary 2: Qantas Lane & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
09/26/2025

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	45	776	118	135	406	209	124	44	23	385	44	122												
Future Volume (veh/h)	45	776	118	135	406	209	124	44	23	385	44	122												
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0												
Lane Width 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												
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	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767												
Adj Flow Rate, veh/h	51	882	0	153	461	238	141	50	0	438	50	139												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9												
Cap, veh/h	167	1202		294	966	431	435	448		664	81	226												
Arrive On Green	0.05	0.25	0.00	0.09	0.29	0.29	0.13	0.13	0.00	0.20	0.20	0.20												
Sat Flow, veh/h	3264	4823	1497	3264	3357	1497	3264	3357	1497	3365	413	1147												
Grp Volume(v), veh/h	51	882	0	153	461	238	141	50	0	438	0	189												
Grp Sat Flow(s),veh/h/ln	1632	1608	1497	1632	1678	1497	1632	1678	1497	1682	0	1560												
Q Serve(g_s), s	0.7	8.1	0.0	2.2	5.5	6.5	1.9	0.6	0.0	5.8	0.0	5.4												
Cycle Q Clear(g_c), s	0.7	8.1	0.0	2.2	5.5	6.5	1.9	0.6	0.0	5.8	0.0	5.4												
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.74												
Lane Grp Cap(c), veh/h	167	1202		294	966	431	435	448		664	0	308												
V/C Ratio(X)	0.30	0.73		0.52	0.48	0.55	0.32	0.11		0.66	0.00	0.61												
Avail Cap(c_a), veh/h	337	1393		337	970	433	674	693		1042	0	483												
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	1.00	1.00	1.00	0.00	1.00	0.00	1.00												
Uniform Delay (d), s/veh	22.2	16.7	0.0	21.1	14.2	14.6	19.0	18.5	0.0	17.9	0.0	17.8												
Incr Delay (d2), s/veh	1.0	1.7	0.0	1.4	0.4	1.5	0.4	0.1	0.0	1.1	0.0	2.0												
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	0.3	2.5	0.0	0.8	1.7	1.9	0.7	0.2	0.0	2.1	0.0	1.9												
Unsig. Movement Delay, s/veh																								
LnGrp Delay(d), s/veh	23.2	18.4	0.0	22.5	14.6	16.1	19.4	18.6	0.0	19.1	0.0	19.8												
LnGrp LOS	C	B		C	B	B	B	B		B		B												
Approach Vol, veh/h	933			852			191			627														
Approach Delay, s/veh	18.7			16.4			19.2			19.3														
Approach LOS	B			B			B			B														
Timer - Assigned Phs	2		3	4		6	7	8																
Phs Duration (G+Y+Rc), s	10.5		8.4	16.1		13.6	6.5	18.0																
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0	4.0	4.0																
Max Green Setting (Gmax), s	10.0		5.0	14.0		15.0	5.0	14.0																
Max Q Clear Time (g_c+I1), s	3.9		4.2	10.1		7.8	2.7	8.5																
Green Ext Time (p_c), s	0.4		0.0	1.9		1.7	0.0	1.8																
Intersection Summary																								
HCM 7th Control Delay, s/veh				18.1																				
HCM 7th LOS				B																				
Notes																								
User approved volume balancing among the lanes for turning movement.																								
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.																								

Project Completion Year 2027
Timing Plan: PM Peak

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis 3: Project Driveway & Arch Airport Road

ATTACHMENT B
Maverik Gas Station
09/26/2025

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑↑↑			↑↑↑↑		↑↑		
Traffic Volume (veh/h)	1306	0	0	750	0	133		
Future Volume (Veh/h)	1306	0	0	750	0	133		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Hourly flow rate (vph)	1484	0	0	852	0	151		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None		None					
Median storage veh)								
Upstream signal (ft)	379							
pX, platoon unblocked			0.90		0.90	0.90		
vC, conflicting volume			1484		1768	371		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol			955		1273	0		
tC, single (s)			4.3		7.0	7.1		
tC, 2 stage (s)								
tF (s)			2.3		3.6	3.4		
p0 queue free %			100		100	84		
cM capacity (veh/h)			603		134	951		
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1
Volume Total	371	371	371	371	284	284	284	151
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	151
cSH	1700	1700	1700	1700	1700	1700	1700	951
Volume to Capacity	0.22	0.22	0.22	0.22	0.17	0.17	0.17	0.16
Queue Length 95th (ft)	0	0	0	0	0	0	0	14
Control Delay (s/veh)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
Lane LOS								A
Approach Delay (s/veh)	0.0				0.0		9.5	
Approach LOS								A
Intersection Summary								
Average Delay			0.6					
Intersection Capacity Utilization			33.8%		ICU Level of Service			A
Analysis Period (min)			15					

HCM 7th TWSC
4: Qantas Lane & Project Driveway

ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection						
Int Delay, s/veh	7.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	163	29	0	296	2
Future Vol, veh/h	0	163	29	0	296	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	0	185	33	0	336	2
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	707	33	0	0	33	0
Stage 1	33	-	-	-	-	-
Stage 2	674	-	-	-	-	-
Critical Hdwy	6.735	6.335	-	-	4.235	-
Critical Hdwy Stg 1	5.535	-	-	-	-	-
Critical Hdwy Stg 2	5.935	-	-	-	-	-
Follow-up Hdwy	3.5855	3.3855	-	-	2.2855	-
Pot Cap-1 Maneuver	373	1019	-	-	1531	-
Stage 1	970	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	291	1019	-	-	1531	-
Mov Cap-2 Maneuver	291	-	-	-	-	-
Stage 1	970	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.32	0	7.96			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	1019	1531	-
HCM Lane V/C Ratio	-	-	-	0.182	0.22	-
HCM Ctrl Dly (s/v)	-	-	0	9.3	8	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0.7	0.8	-

APPENDIX D -
QUEUE ANALYSIS WORKSHEETS



Queuing and Blocking Report
Existing Year 2025

ATTACHMENT B
Maverik Gas Station
02/08/2025

Intersection: 1: Arch Airport Road & SR-99

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	122	136	112	114	72	100	148	126	133	84	144	182
Average Queue (ft)	54	68	48	58	9	10	69	56	56	13	61	105
95th Queue (ft)	97	111	90	99	46	53	121	108	103	56	122	160
Link Distance (ft)		1480	1480	1480	1480			609	609	609		1890
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350					220	220				330	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 1: Arch Airport Road & SR-99

Movement	NB	SB	SB	SB
Directions Served	TR	L	L	TR
Maximum Queue (ft)	115	1309	1306	555
Average Queue (ft)	25	1263	1283	555
95th Queue (ft)	82	1329	1318	556
Link Distance (ft)		1247	1247	
Upstream Blk Time (%)		30	95	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	600			495
Storage Blk Time (%)			1	92
Queuing Penalty (veh)			6	217

Queuing and Blocking Report
Existing Year 2025

ATTACHMENT B
Maverik Gas Station
02/08/2025

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	SB
Directions Served	L	L	T	T	T	L	L	T	T	R	L	L
Maximum Queue (ft)	59	83	85	82	61	17	54	132	147	149	28	140
Average Queue (ft)	11	31	20	17	10	1	13	62	83	76	3	47
95th Queue (ft)	37	70	55	54	37	8	37	110	129	120	16	97
Link Distance (ft)			1474	1474				300	300	300		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135	135			110	310	310				290	100
Storage Blk Time (%)		0	0	0								0
Queuing Penalty (veh)		0	0	0								1

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	SB	SB
Directions Served	LT	TR
Maximum Queue (ft)	182	92
Average Queue (ft)	82	35
95th Queue (ft)	142	73
Link Distance (ft)	719	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	4	0
Queuing Penalty (veh)	9	0

Queuing and Blocking Report
Existing Year 2025

ATTACHMENT B
Maverik Gas Station
02/08/2025

Intersection: 1: Arch Airport Road & SR-99

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	181	176	82	94	207	166	206	131	121	204	111	138
Average Queue (ft)	108	98	31	39	83	38	105	59	63	77	36	76
95th Queue (ft)	165	151	66	81	177	121	178	105	108	168	80	118
Link Distance (ft)		1480	1480	1480	1480			609	609	609		1890
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350					220	220				330	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 1: Arch Airport Road & SR-99

Movement	NB	SB	SB	SB
Directions Served	TR	L	L	TR
Maximum Queue (ft)	70	139	96	112
Average Queue (ft)	5	58	31	24
95th Queue (ft)	38	107	71	82
Link Distance (ft)		1247	1247	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	600			495
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
Existing Year 2025

ATTACHMENT B
Maverik Gas Station
02/08/2025

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	L	T	T	R	L	L	R
Maximum Queue (ft)	25	56	114	104	140	19	105	142	84	8	39	7
Average Queue (ft)	4	19	54	32	48	1	51	65	44	0	6	0
95th Queue (ft)	17	45	99	72	98	9	95	116	74	5	25	6
Link Distance (ft)			1474	1474			300	300	300			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135	135			110	310				290	290	170
Storage Blk Time (%)			0	0	0							
Queuing Penalty (veh)			0	0	1							

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	SB	SB	SB
Directions Served	L	LT	TR
Maximum Queue (ft)	124	172	88
Average Queue (ft)	56	86	39
95th Queue (ft)	106	141	74
Link Distance (ft)		719	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		100
Storage Blk Time (%)	1	3	0
Queuing Penalty (veh)	3	11	0

Queuing and Blocking Report
Project Completion Year 2027

ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection: 1: Arch Airport Road & SR-99

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	L	L	T	T	L	L	TR	L
Maximum Queue (ft)	113	127	100	113	63	136	122	138	134	175	102	163
Average Queue (ft)	53	60	44	53	5	62	57	51	62	100	21	91
95th Queue (ft)	98	105	83	93	31	108	103	100	110	151	75	141
Link Distance (ft)		1480	1480	1480			609	609		1890		1259
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350				220	220			330		600	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 1: Arch Airport Road & SR-99

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	142	19
Average Queue (ft)	61	1
95th Queue (ft)	112	16
Link Distance (ft)	1259	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	495	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Project Completion Year 2027

ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	T	R	L	L	T	T	R	L
Maximum Queue (ft)	55	94	118	106	68	10	183	132	224	206	221	89
Average Queue (ft)	11	33	41	33	19	0	89	22	104	118	102	21
95th Queue (ft)	37	73	86	76	49	6	162	101	174	182	171	61
Link Distance (ft)			1474	1474					305	305	305	
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	135	135			110	110	310	310				290
Storage Blk Time (%)		0	0	0	0							
Queuing Penalty (veh)		0	0	1	0							

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	L	LT	TR
Maximum Queue (ft)	112	40	68	166	201	131
Average Queue (ft)	58	6	24	50	104	41
95th Queue (ft)	97	27	58	112	170	89
Link Distance (ft)		498	498		719	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	290			100		100
Storage Blk Time (%)				0	10	0
Queuing Penalty (veh)				1	24	1

Intersection: 3: Project Driveway & Arch Airport Road

Movement	EB	WB	WB	WB	NB
Directions Served	T	T	T	T	R
Maximum Queue (ft)	4	3	65	122	108
Average Queue (ft)	0	0	12	13	48
95th Queue (ft)	3	2	50	70	81
Link Distance (ft)	305	1480	1480	1480	209
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Qantas Lane & Project Driveway

Movement	WB	SB
Directions Served	R	L
Maximum Queue (ft)	100	82
Average Queue (ft)	52	10
95th Queue (ft)	84	45
Link Distance (ft)	79	
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		100
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Network Summary

Network wide Queuing Penalty: 27

Queuing and Blocking Report
Project Completion Year 2027

ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection: 1: Arch Airport Road & SR-99

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	175	171	70	89	180	146	190	123	120	200	112	132
Average Queue (ft)	93	91	28	36	71	25	97	61	53	62	42	70
95th Queue (ft)	146	145	60	73	153	93	162	103	97	149	85	110
Link Distance (ft)		1480	1480	1480	1480				609	609	609	1890
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350					220	220				330	
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 1: Arch Airport Road & SR-99

Movement	NB	SB	SB	SB
Directions Served	TR	L	L	TR
Maximum Queue (ft)	48	120	83	131
Average Queue (ft)	4	57	28	18
95th Queue (ft)	29	98	62	75
Link Distance (ft)		1247	1247	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	600		495	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
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ATTACHMENT B
Maverik Gas Station
09/26/2025

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	EB	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	T	R	L	L	T	T	R	L
Maximum Queue (ft)	25	71	181	232	197	148	194	169	157	140	103	85
Average Queue (ft)	3	22	93	81	86	12	91	21	61	70	49	18
95th Queue (ft)	16	54	153	169	160	76	172	102	118	119	84	56
Link Distance (ft)			1474	1474					305	305	305	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135	135			110	110	310	310				290
Storage Blk Time (%)			2	1	4	0						
Queuing Penalty (veh)			1	5	10	0						

Intersection: 2: Qantas Lane & Arch Airport Road

Movement	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	L	LT	TR
Maximum Queue (ft)	111	43	60	187	228	148
Average Queue (ft)	55	7	20	72	119	45
95th Queue (ft)	97	28	50	148	192	98
Link Distance (ft)		498	498		719	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	290			100		100
Storage Blk Time (%)				1	12	0
Queuing Penalty (veh)				5	40	1

Intersection: 3: Project Driveway & Arch Airport Road

Movement	EB	NB
Directions Served	T	R
Maximum Queue (ft)	12	104
Average Queue (ft)	0	49
95th Queue (ft)	10	83
Link Distance (ft)	305	209
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Qantas Lane & Project Driveway

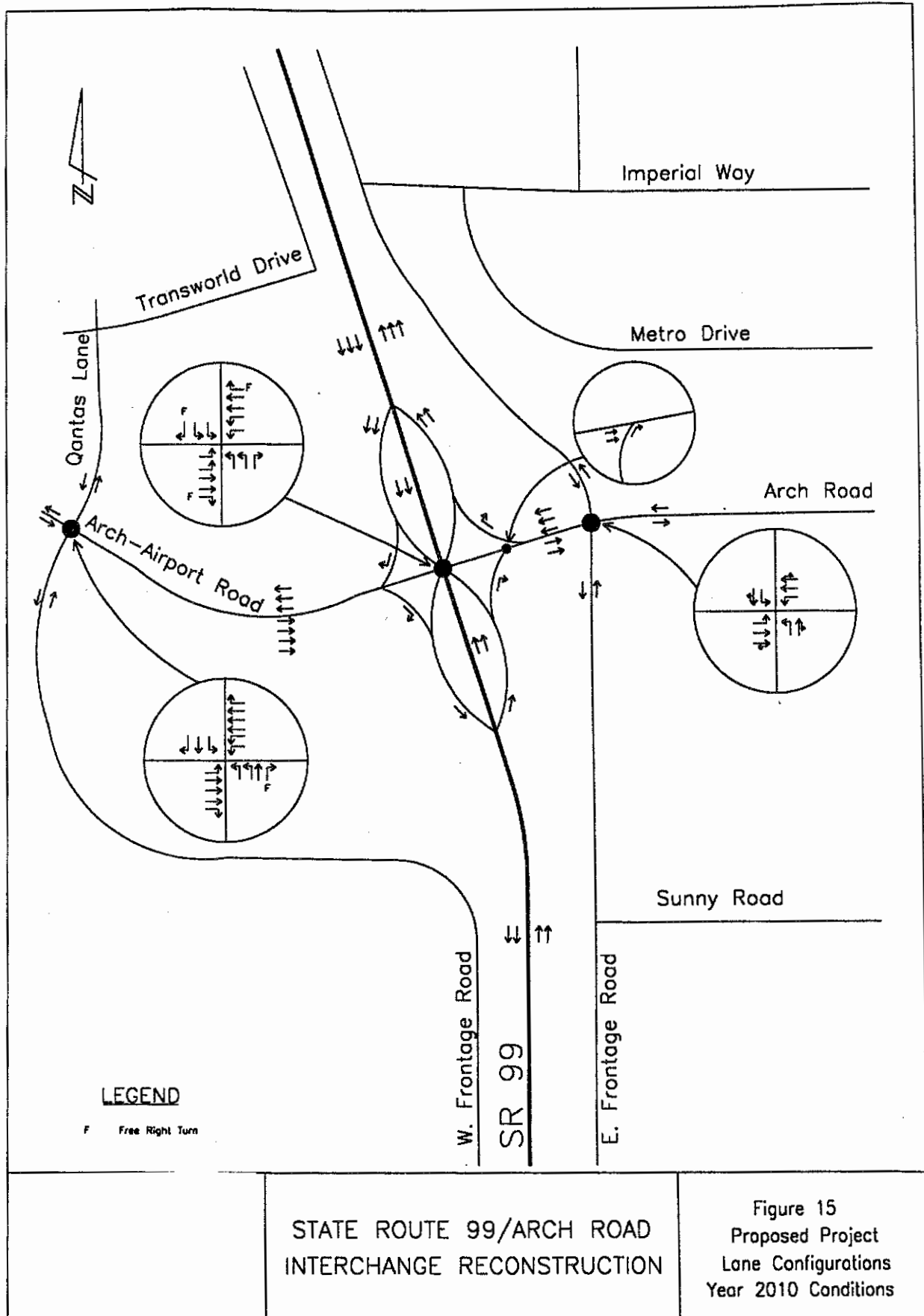
Movement	WB	SB
Directions Served	R	L
Maximum Queue (ft)	102	78
Average Queue (ft)	51	13
95th Queue (ft)	86	50
Link Distance (ft)	79	
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		100
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Network Summary

Network wide Queuing Penalty: 61

APPENDIX E -
EXCERPTS FROM STATE ROUTE 99 (SR-99)/ARCH ROAD INTERCHANGE
RECONSTRUCTION PROJECT





IV. LOCAL PLAN CONSISTENCY

Several planning efforts are underway in the region surrounding the Arch Road/SR-99 interchange. Primary among these plans are:

- Stockton Metropolitan Airport Master Plan
- Arch - Sperry Specific Road Plan

Considerable overlap among plans has occurred requiring each plan or program to recognize the consistency among plans with respect to the long term improvement requirements for the Arch Road/SR-99 interchange and intersections within the proposed project area. The following describes consistency of the Proposed Project with the ongoing planning efforts.

Stockton Metropolitan Airport Master Plan

Projected P.M. Peak traffic volumes and lane arrangements for the proposed project were compared with the "Revised 2015 Mitigated Project Circulation and Traffic Conditions", a document for the Stockton Metropolitan Airport Master Plan prepared by KASL Consulting Engineers. Figure 16 shows this comparison. As shown, link traffic volumes for the proposed project match closely with the link volumes for Master Plan document along the Arch Road between Qantas Lane and East Frontage Road. South of Qantas Lane, volumes forecasted for the Proposed Project are higher than those projected in the Master Plan, due to more intense land development around the airport rather than on Arch Road west of Qantas Lane.

The lane arrangements on Arch Road west of Qantas Lane reflect this difference. The Proposed Project recommends three eastbound through lanes along Arch Road at the intersection with Qantas Lane as compared to four eastbound through lanes proposed in the Master Plan. The Proposed project recommends a free right turn lane for the northbound traffic at this intersection to allow continuous movement for the northbound right turns, rather than two right turn lanes recommended in the Master Plan.

Arch-Sperry Specific Road Plan

Both the Proposed Project as well as Arch-Sperry Specific Road Plan recommends four lanes in each direction along Arch Road west of SR-99. At the intersection of Arch Road and Qantas Lane, minor variations in the lane arrangements exist. Three eastbound through-lanes on Arch Road are provided under the Proposed Project whereas four eastbound through-lanes are provided under the Arch-Sperry Specific Road Plan. However, the Proposed Project lane configuration are less than the ultimate plan proposed lanes for the Arch-Sperry Specific Road Plan. The Qantas Lane section shown in the Arch-Sperry Specific Road Plan is consistent with the Proposed Project road section.