

MEMORANDUM

To: Jared Jerome
Town of Yucca Valley

From: Trevor Briggs, P.E.
Pranesh Tarikere, P.E.

Date: June 2, 2020

Subject: *Yucca Valley Dominos Traffic Circulation Study*

This traffic circulation study has been prepared to evaluate the project-related traffic impacts associated with the proposed Dominos restaurant project, which would be located within the northwest quadrant of the Twentynine Palms Highway (State Route 62) and Balsa Avenue in the Town of Yucca Valley.

PROJECT OVERVIEW

The project proposes to construct a Dominos restaurant and other fast-food restaurant uses, totaling approximately 5,000 square feet. The project site is located within the northwest quadrant of the Twentynine Palms Highway (State Route 62) and Balsa Avenue intersection as a stand-alone building within an existing shopping center. Regional vehicular access to the site is provided by the State Route 62 (SR-62). The communities of Joshua Tree and Morongo Valley are located east and west of the project site. A project vicinity map is provided on **Figure 1**. Access to the site would be provided via an existing driveway located approximately 500 feet west of Balsa Avenue (Project Driveway). The project driveway does not allow left-turn-out movements. A project site plan is provided on **Figure 2**.

ANALYSIS SCENARIOS AND METHODOLOGY

Analysis Scenarios

This traffic analysis will provide an evaluation of typical weekday morning and evening peak hour operations for the following scenarios:

- Existing Conditions
- Existing Plus Project
- Near-Term (2021) (Project Opening Year) Without Project
- Near-Term (2021) With Project

The following study intersection is evaluated in this analysis:

1. Twentynine Palms Highway at Project Driveway

Lane configuration for the study intersection is included in Figure 1 (previously mentioned).

Analysis Methodology

Intersection operation is evaluated using the Highway Capacity Manual (HCM) 6th Edition delay methodology. The procedure for intersection analysis determines the average total delay, expressed in seconds of delay per vehicle. Synchro 10 software was used to determine delay for the worst-case movement at the study intersection.

The following chart identifies each Level of Service category, and the corresponding intersection delay values for unsignalized intersections.

Level of Service and Delay Ranges	
Level of Service (LOS)	Delay (average seconds / vehicle)
	Unsignalized Intersections
A	< 10.0
B	> 10.0 to < 15.0
C	> 15.0 to < 25.0
D	> 25.0 to < 35.0
E	> 35.0 to < 50.0
F	> 50.0

Twentynine Palms Highway is a Caltrans facility. The Caltrans *Guide for the Preparation of Traffic Impact Studies* (December 2002), states that “Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” (see Appendix “C-3”) on State highway facilities”.

Trip Generation

The trip generation rates for “Fast-Food Restaurant without Drive-Thru” was based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition (2017). Conservatively, pass-by reductions were not applied to the project trip generation. Trip generation rates and the resulting project trips are summarized on **Table 1**. Review of this table indicates that the proposed project is forecasted to generate 1,558 daily trips and 113 morning peak hour trips and 128 evening peak hour trips on a typical weekday.

Analysis Volumes

Average Daily Traffic (ADT) counts on the segment of Twentynine Palms Highway between Joshua Lane and Airway Avenue were used to develop existing peak hour traffic volumes along Twentynine Palms Highway at the study intersection. Existing Driveway volumes were estimated by calculating the approximate square footage of the existing shopping center adjacent to the project and using ITE trip generation rates to determine peak hour volumes entering and exiting the shopping center. It was assumed that 15% of shopping center traffic uses the Project Driveway.

A growth rate of 2% per year was applied to Existing Conditions traffic volumes to develop Near-Term (2021) volumes. Existing and Near-Term (2021) Base volumes are shown in Figure 3.

Trip Distribution and Assignment

Trip distribution assumptions for the project were developed based on current traffic patterns observed at the study intersections. For the purposes of this analysis, 30% of the Project trips were assumed to use the existing Project Driveway. Trip distribution assumptions are shown on **Figure 4**. Existing Plus Project and Near-Term (2021) Plus Project traffic volumes are shown in **Figure 5**.

Intersection Level of Service

Intersection Level of Service analysis results are shown on **Table 2**. Below is a summary of the results.

#1 – Twentynine Palms Highway (SR-62) at Project Driveway

- The intersection would operate at an acceptable LOS (LOS D or better) during weekday AM and PM peak hours under all project scenarios.

Synchro reports are included as an attachment to this memorandum.

Site Access and Circulation

Access to the proposed project site would be provided via any one of six existing driveways that serve the adjacent shopping center. The Project Driveway allows eastbound left-turn-in access and restricts egress movement to right-turn-out only.

CONCLUSION/RECOMMENDATION

The study intersection is projected to operate acceptably under all study conditions and under existing lane configuration.

Attachments:

Figure 1 – Project Location Map and Study Intersection Lane Configuration

Figure 2 – Project Site Plan

Figure 3 – Existing and Near-Term (2021) Base Traffic Volumes

Figure 4 – Project Trip Distribution and Project Trip Assignment

Figure 5 – Existing Plus Project and Near-Term (2021) Plus Project Traffic Volumes

Table 1 – Project Trip Generation

Table 2 – Intersection Level of Service Summary

Synchro 10 Reports

Figure 1 - Project Location Map and Study Intersection Lane Configuration



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Figure 2 - Project Site Plan

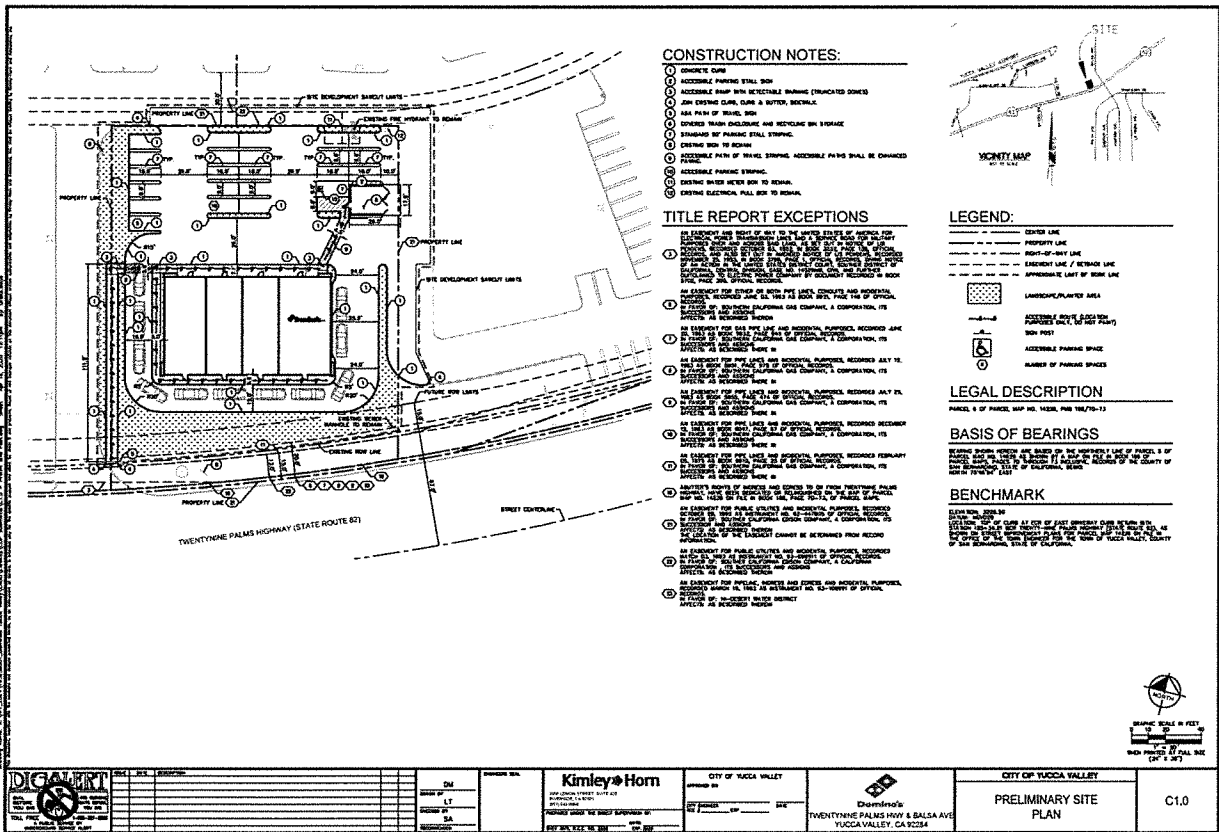


Figure 3 - Existing and Near-Term (2021) Base Traffic Volumes

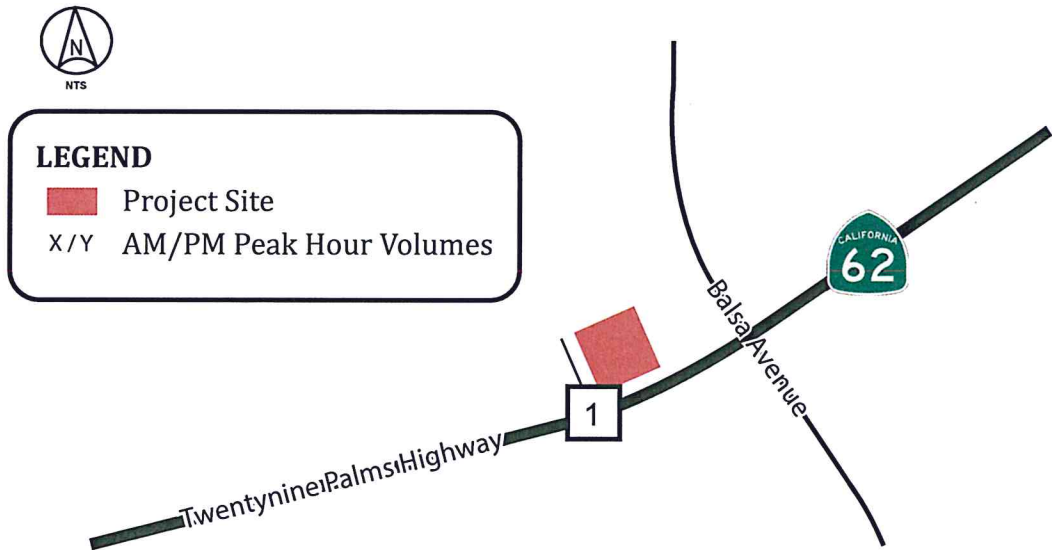
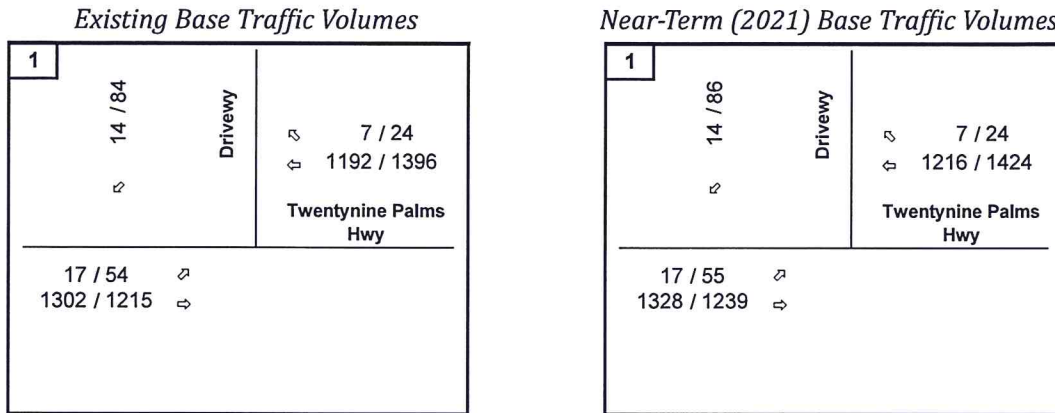


Figure 4 - Project Trip Distribution and Project Trip Assignment

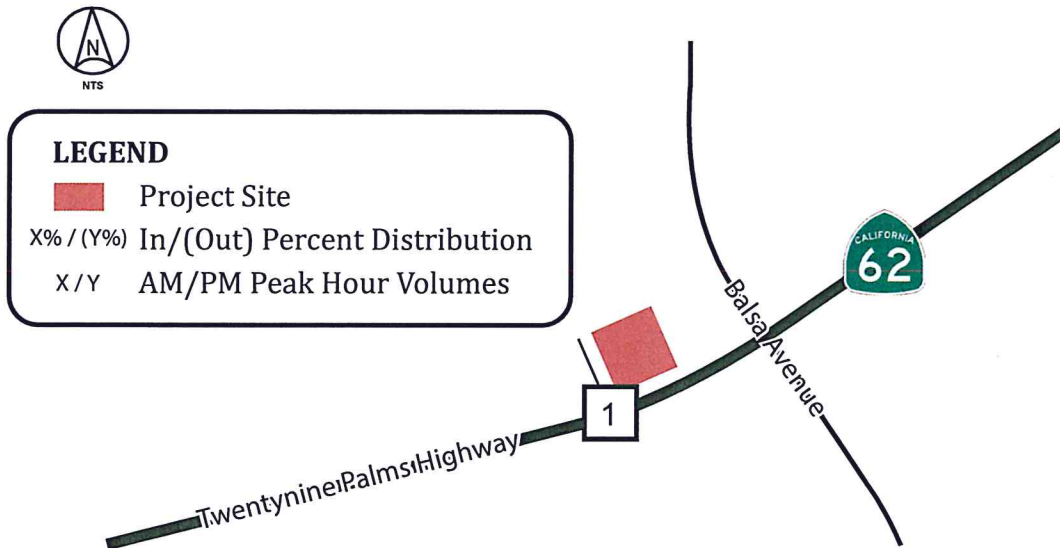
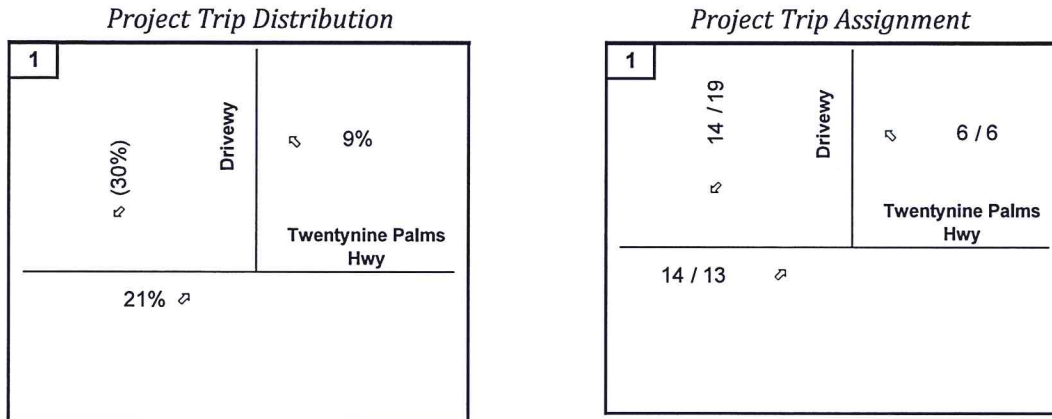


Figure 5 - Existing Plus Project and Near-Term (2021) Plus Project Traffic Volumes

Existing Plus Project Traffic Volumes

1	28 / 103	Driveway	↘ 13 / 30
↙	↕ 1192 / 1396		↕
			Twentynine Palms Hwy
31 / 67 ↘			
1302 / 1215 ↕			

Near-Term (2021) Plus Project Traffic Volumes

1	28 / 105	Driveway	↘ 13 / 30
↙	↕ 1216 / 1424		↕
			Twentynine Palms Hwy
31 / 68 ↘			
1328 / 1239 ↕			

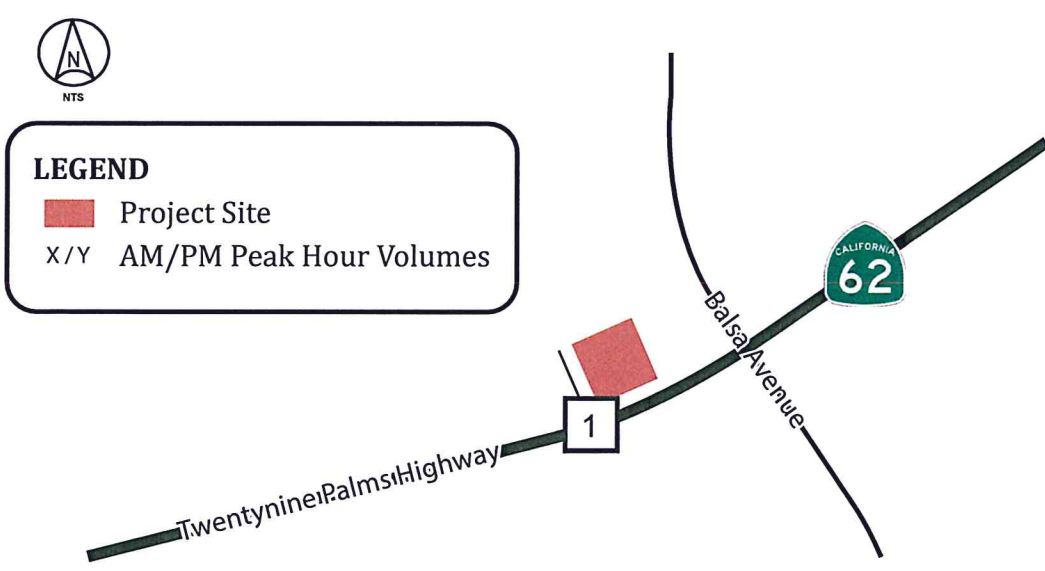


TABLE 1
SUMMARY OF PROJECT TRIP GENERATION
YUCCA VALLEY DOMINOS TRAFFIC CIRCULATION STUDY

Land Use	ITE Code	Unit	Trip Generation Rates ¹						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Fast-Food Restaurant w/o Drive-thru	933	KSF	346.230	15.060	10.040	25.10	14.170	14.170	28.34

Land Use	Quantity	Unit	Trip Generation Estimates						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Fast-Food Restaurant w/o Drive-thru	5.000	KSF	1,731	75	50	125	71	71	142
<i>Internal Capture w/ Existing Shopping Center (10%)</i>			-173	-8	-5	-13	-7	-7	-14
Total Project Trips			1,558	68	45	113	64	64	128

¹ Source: Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition

TABLE 2
SUMMARY OF INTERSECTION OPERATION
YUCCA VALLEY DOMINOS TRAFFIC CIRCULATION STUDY

Int. #	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
Existing Baseline						
1	Driveway at Twentynine Palms Hwy	U	18.9	C	28.4	D
Existing Plus Project						
1	Driveway at Twentynine Palms Hwy	U	19.8	C	31.0	D
Near Term (Year 2021) Baseline						
1	Driveway at Twentynine Palms Hwy	U	19.3	C	29.6	D
Near Term (Year 2021) Plus Project						
1	Driveway at Twentynine Palms Hwy	U	20.4	C	32.6	D
Notes: - Delay values are based on the methodology outlined in the Highway Capacity Manual, 6th Edition. - Delay refers to the worst-case movement for the entire intersection, measured in seconds per vehicle. - U = Unsignalized						

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Existing AM

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑↑	↑↑↔			↔
Traffic Vol, veh/h	17	1302	1192	7	0	14
Future Vol, veh/h	17	1302	1192	7	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	18	1415	1296	8	0	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1304	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	3.92
Pot Cap-1 Maneuver	278	-	352
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	278	-	352
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	278	-	-	-	352
HCM Lane V/C Ratio	0.066	-	-	-	0.043
HCM Control Delay (s)	18.9	-	-	-	15.7
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Existing PM

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑↑			↗
Traffic Vol, veh/h	54	1215	1396	24	0	84
Future Vol, veh/h	54	1215	1396	24	0	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	59	1321	1517	26	0	91

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1543	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	7.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	3.92
Pot Cap-1 Maneuver	212	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	212	-	294
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	22.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	212	-	-	-	294
HCM Lane V/C Ratio	0.277	-	-	-	0.311
HCM Control Delay (s)	28.4	-	-	-	22.7
HCM Lane LOS	D	-	-	-	C
HCM 95th %tile Q(veh)	1.1	-	-	-	1.3

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Existing Plus Project AM

Intersection

Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑↑			↗
Traffic Vol, veh/h	31	1302	1192	13	0	28
Future Vol, veh/h	31	1302	1192	13	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	34	1415	1296	14	0	30

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1310	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	277	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	277	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	277	-	-	-	350
HCM Lane V/C Ratio	0.122	-	-	-	0.087
HCM Control Delay (s)	19.8	-	-	-	16.3
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	0.3

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Existing Plus Project PM

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑↑			↗
Traffic Vol, veh/h	67	1215	1396	30	0	103
Future Vol, veh/h	67	1215	1396	30	0	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	73	1321	1517	33	0	112

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	1550	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	210	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	210	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	1.6	0	24.8
HCM LOS			C

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	210	-	-	-	292
HCM Lane V/C Ratio	0.347	-	-	-	0.383
HCM Control Delay (s)	31	-	-	-	24.8
HCM Lane LOS	D	-	-	-	C
HCM 95th %tile Q(veh)	1.5	-	-	-	1.7

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Near Term (2021) AM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑↑			↗
Traffic Vol, veh/h	17	1328	1216	7	0	14
Future Vol, veh/h	17	1328	1216	7	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	18	1443	1322	8	0	15

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1330	0	-	0	- 665
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	5.34	-	-	-	- 7.14
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	-	- 3.92
Pot Cap-1 Maneuver	270	-	-	-	0 345
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	270	-	-	-	- 345
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	270	-	-	-	345
HCM Lane V/C Ratio	0.068	-	-	-	0.044
HCM Control Delay (s)	19.3	-	-	-	15.9
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1

HCM 6th TWSC
 1: Twentynine Palms Hwy & Driveway

Near Term (2021) PM

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑↑			↗
Traffic Vol, veh/h	55	1239	1424	24	0	86
Future Vol, veh/h	55	1239	1424	24	0	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	60	1347	1548	26	0	93

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1574	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	205	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	205	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	23.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	205	-	-	-	287
HCM Lane V/C Ratio	0.292	-	-	-	0.326
HCM Control Delay (s)	29.6	-	-	-	23.5
HCM Lane LOS	D	-	-	-	C
HCM 95th %tile Q(veh)	1.2	-	-	-	1.4

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Near Term (2021) Plus Project AM

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑↑	↑↑↑			↔
Traffic Vol, veh/h	31	1328	1216	13	0	28
Future Vol, veh/h	31	1328	1216	13	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	34	1443	1322	14	0	30

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	1336	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	268	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	268	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	0.5	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	268	-	-	-	344
HCM Lane V/C Ratio	0.126	-	-	-	0.088
HCM Control Delay (s)	20.4	-	-	-	16.5
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	0.3

HCM 6th TWSC
1: Twentynine Palms Hwy & Driveway

Near Term (2021) Plus Project PM

Intersection

Int Delay, s/veh 1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑↑			↗
Traffic Vol, veh/h	68	1239	1424	30	0	105
Future Vol, veh/h	68	1239	1424	30	0	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	-	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	74	1347	1548	33	0	114

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1581	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	5.34	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	3.12	-	-
Pot Cap-1 Maneuver	203	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	203	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	25.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	203	-	-	-	285
HCM Lane V/C Ratio	0.364	-	-	-	0.4
HCM Control Delay (s)	32.6	-	-	-	25.8
HCM Lane LOS	D	-	-	-	D
HCM 95th %tile Q(veh)	1.6	-	-	-	1.8