Appendix M

McElwain and Linnel
Traffic Impact Analysis
City of Murrieta, California

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TRAMES SOLUTIONS INC.

(0315-0001-03)

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1.0 INTRODUCTION AND SUMMARY

A. Purpose of the TIA and Study Objectives

The purpose of this traffic impact analysis (TIA) is to evaluate the traffic impact of the proposed McElwain and Linnel development. The project is to be developed with a 120 room hotel with an event center. The project is located north of Linnel Lane and east of McElwain Road in the City of Murrieta. Figure 1-A illustrates the site location and the traffic analysis study area.

Study objectives include the following:

Existing Traffic. Existing traffic was counted to determine current conditions. This constitutes the environmental setting for a CEQA analysis at the time that the hearing body reviews the project. Traffic count data shall be new or recent. In some cases, data up to one year old may be acceptable with the approval of the City of Murrieta Engineering Department. Any exception to this must be requested prior to approval of the scoping agreement

Existing + Ambient + Project (EAP 2021). Traffic conditions prior to the time that the proposed development is completed will be estimated by increasing the existing traffic counts by an appropriate growth rate (2%), projected to the year that the project is estimated to be completed (2021). This will be the basis for determining near-term no project-conditions.

Existing + Ambient + Project + Cumulative (EAPC 2021). Traffic generated by the proposed project shall be identified and added to the EAP traffic conditions. This scenario will be analyzed, and a determination made if improvements funded through an approved funding mechanism (TUMF, DIF, CFD, RBBD etc.) can accommodate the cumulative traffic at the target Level of Service (LOS) identified in the General Plan. If the “funded” improvements can provide the target LOS, payment into the fee program will be considered as cumulative mitigation through the conditions of approval. Other improvements needed beyond the “funded” improvements (such as localized improvements to non-TUMF facilities) should be identified as such.

FIGURE 1-A
STUDY AREA

LEGEND:

4 = EXISTING INTERSECTION ANALYSIS LOCATION

= FUTURE ROAD

N

B. Study Area

The project site is generally located north of Linnel Lane and east of McElwain Road in the City of Murrieta. Figure 1-A illustrates the site location and the traffic analysis study area. The study area is based on the approved scoping agreement included in Appendix A.

Study Area Intersections
1. McElwain Rd. / Linnel Lane
2. McElwain Rd. / Clinton Keith Rd.
3. Stepp Rd. / Linnel Lane.
4. Project Driveway / Linnel Lane

Roadway Segment Locations
1. Linnel Lane, east of McElwain
2. McElwain, south of Linnel Lane

C. Development Project Identification

1. Project Size and Description

The McElwain and Linnel Site is proposed to be developed with a 120 room hotel with an event center. The project is located north of Linnel Lane and east of McElwain Road in the City of Murrieta.

2. Existing Land Use

The project site is currently vacant. Adjacent uses include the following:

- North – Vacant
- South –Commercial Retail
- East – I-215 Freeway
- West – Vacant

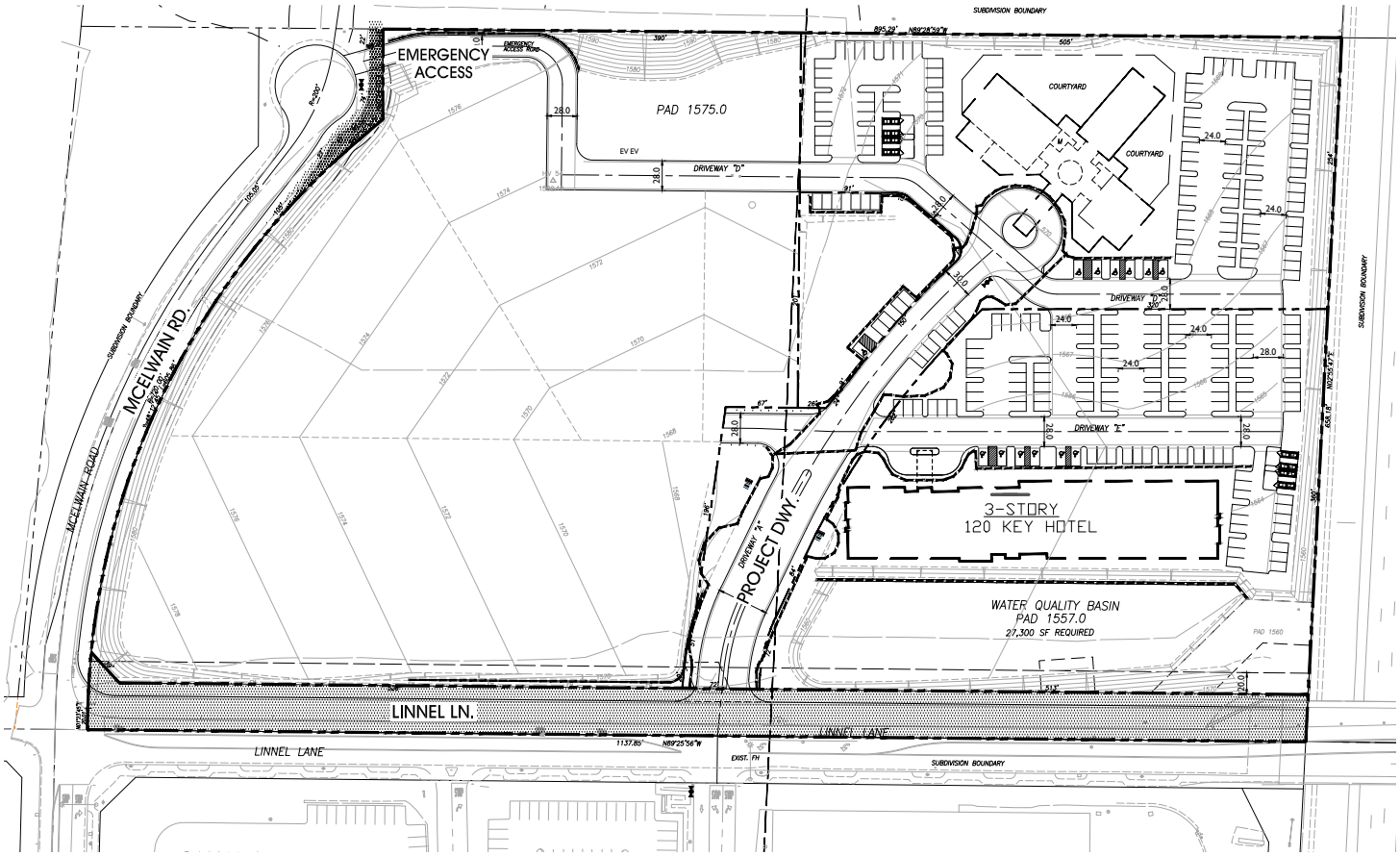
3. Proposed Land Use

The project will consist of a hotel with an event center.

4. Site Plan of Proposed Project

Figure 1-B illustrates the conceptual land use plan. As shown on Figure 1-B access to the project site is provided via Linnel Lane with an emergency access road provided to McElwain Road.

FIGURE 1-B
SITE PLAN



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5. Proposed Project Opening Year

The proposed project is anticipated to be completed in 2021. Future traffic analysis has been based upon a 2% annual background (ambient) growth along with traffic generated by other future developments in the surrounding area.

6. Proposed Project Phasing

The project is expected to be completed in a single phase. Therefore, traffic recommendations included in this report have not been separated into different development phases.

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2.0 TRAFFIC ANALYSIS METHODOLOGIES

Traffic operations are quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an infrastructure facility (intersection) representing progressively worsening traffic conditions. This section presents the LOS definition, LOS criteria and methodologies for the Intersection Operations.

A. Level of Service Definition

The definitions of Level of Service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A": Completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and by driver preferences. Maneuverability within the traffic stream is good. Minor disruptions to flow are easily absorbed without a change in travel speed.

- LOS "B": Free flow conditions, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS "A", but drivers have slightly less freedom to maneuver. Minor disruptions are still easily absorbed, although local deterioration in LOS will be more obvious.

- LOS "C": The influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles. Minor disruptions can cause serious local deterioration in service, and queues will form behind any significant traffic disruption.

- LOS "D": The ability to maneuver is restricted due to traffic congestion. Travel speed is reduced by the increasing volume. Only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.

- LOS "E": Operations at or near capacity, an unstable level. Vehicles are operating with the minimum spacing for maintaining uniform flow.

- LOS "F": Forced or breakdown flow. It occurs either when vehicles arrive at a rate greater than the rate at which they are discharged or when the forecast demand exceeds the computed capacity of a planned facility. Although operations at these points – and on sections immediately downstream – appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

B. Level of Service Criteria

The City of Murrieta has established Level of Service (LOS) “D” as the maximum allowable threshold for the intersection operations. Therefore, LOS “E” or “F” is considered unacceptable and requires improvements measures. For roadway segments, LOS C is deemed acceptable

C. Intersection Operations Analysis Methodology

Caltrans requires the use of the Transportation Research Board - Highway Capacity Manual (HCM). The HCM defines level of service as a qualitative measure, which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate Level of Service (LOS) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The Levels of Service results in this study are determined using the HCM methodology.

For signalized intersections, average total delay per vehicle for the overall intersection is used to determine level of service. The study area intersections which are stop sign controlled with stop control on the minor street only has been analyzed using the unsignalized intersection methodology of the HCM. For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. Using data collected describing the intersection configuration and traffic volumes at the study area locations; the level of service has been calculated. The level of service criteria for this type of intersection analysis is based on average total delay per vehicle for the worst minor street movement(s).

For all way stop (AWS) controlled intersections, the ability of vehicles to enter the intersection is not controlled by the occurrence of gaps in the flow of the main street. The AWS controlled intersections have been evaluated using the HCM methodology for this type of multi-way stop controlled intersection configuration. The level of service criteria for this type of intersection analysis is based on average total delay per vehicle.

The levels of service are defined for the various analysis methodologies as follows:

LEVEL OF SERVICE	AVERAGE TOTAL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	0 to 10.00	0 to 10.00
B	10.01 to 20.00	10.01 to 15.00
C	20.01 to 35.00	15.01 to 25.00
D	35.01 to 55.00	25.01 to 35.00
E	55.01 to 80.00	35.01 to 50.00
F	80.01 and up	50.01 and up

Levels of service at the study area intersections have been evaluated using the following HCM intersection analysis program: Synchro 10.0. Peak hour factors (PHF), where known from existing traffic counts, have been used to assess intersection operations.

D. Roadway Segment Analysis Methodology

Roadway Segment analysis has been evaluated based on the Link Volume Capacities/Level of Service for the City of Murrieta Roadways. Roadway segment analysis has been assessed based on average daily traffic (ADT) volumes shown in this report for each analysis scenario. For the purpose of this report, letter grades for each study area roadway segments have been assigned for each analysis scenario based on the following roadway segment capacities for each of the City of Murrieta roadway classifications are summarized below:

LEVEL OF SERVICE	V/C Ratio
A	0.00 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

Roadway segment analysis is suitable for planning purposes and not a precise measure of capacity. The ultimate capacity of a roadway is based upon several factors such as the relationships between peak hour and daily traffic volumes, intersection spacing, configuration, and control features, vehicle mix, and pedestrian/bicycle traffic. Furthermore,

where the roadway segment analysis indicates a deficiency (LOS “D” or worse unless this segment is within the zone where LOS “D” is allowed, per GP section 5.6 (CIR-1.3)) a review of the more detailed peak hour intersection analysis is typically undertaken. The intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically recommended if the peak hour intersection analysis indicates the need for additional through lanes.

3.0 AREA CONDITIONS

A. Study Area and Intersections

In general, the study area is based on the projects' trip generation and distribution assumptions. Intersections where the project is likely to add 50 or more peak hour trips have been included for analysis purposes. See Table 1-1, Section 1.B.

B. Area Roadway System

Figure 3-A identifies the existing roadway conditions for study area roadways. The existing intersection traffic controls and geometrics are identified.

The City of Murrieta Circulation Element and Roadway Cross-Sections are depicted on Figure 3-B.

C. Existing Traffic Volumes

Existing intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts made in February 2019. Existing AM and PM peak hour intersection turning movement volumes are shown on Figure 3-C.

Existing average daily traffic (ADT) volumes are also shown on Figure 3-C. For roadway segments where counts are not available, ADT volumes are estimated based on the following formula: PM Peak Hour Link Volume (Approach + Exit) x 12 = ADT Leg Volume.

The traffic count worksheets are included in Appendix "B".

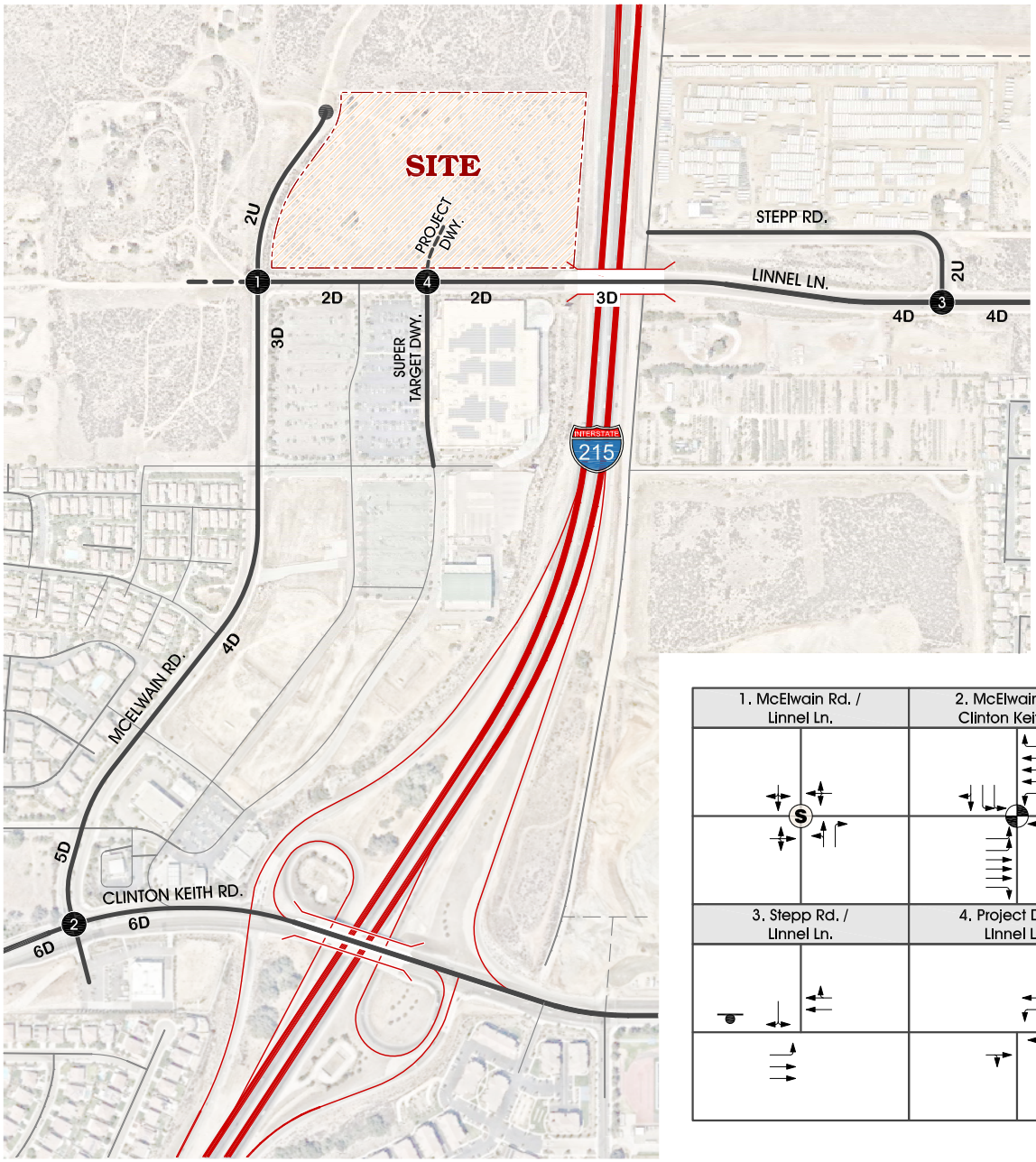
D. Existing Delay and Level of Service

The results of the existing conditions intersection analysis are summarized in Table 3-1. The existing condition operations analysis worksheets are provided in Appendix "C". As shown in Table 3-1, the study area intersections are currently operating at acceptable level of service (LOS "D" or better) during the peak hours with the existing geometry and traffic controls.

Table 3-2 provides a summary of the Existing conditions roadway segment capacity analysis. As shown on Table 3-2, the roadway segments are operating at acceptable levels of service (at or better than LOS "C" capacity thresholds) with existing geometry.

FIGURE 3-A

EXISTING TRAFFIC CONTROLS AND INTERSECTION GEOMETRICS



LEGEND:

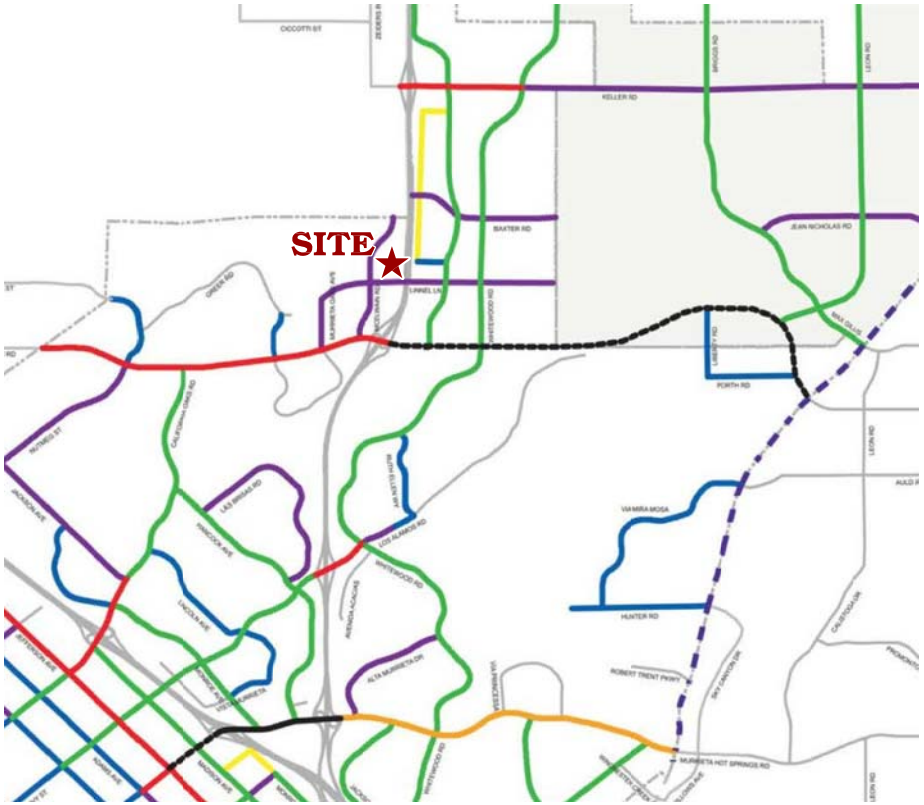
4 = INTERSECTION ID	4 = NUMBER OF LANES
= TRAFFIC SIGNAL	D = DIVIDED
S = ALL WAY STOP	U = UNDIVIDED
= STOP SIGN	
RT OVL = RIGHT TURN OVERLAP PHASE	
= FUTURE/DIRT ROAD	

N

FIGURE 3-B

CITY OF MURRIETA GENERAL PLAN 2035 CIRCULATION MAP AND TYPICAL STREET SECTIONS

CIRCULATION MAP



LEGEND

	* Curb to Curb / R/W		* Curb to Curb / R/W		
County of Riverside Expressway	110' / 184'	Major	76' / 100'	Selected Roadways Shown for Clarity	
Augmented Urban Arterial	126' / 150'	Secondary	64' / 88'	City of Murrieta Boundary	
Multi-Modal Transp. Corridor	86' / 134'	Industrial Collector	56' / 78'	Sphere of Influence	
Urban Arterial	110' / 134'	Collector	44' / 66'		
Arterial	86' / 110'				

TYPICAL STREET SECTIONS

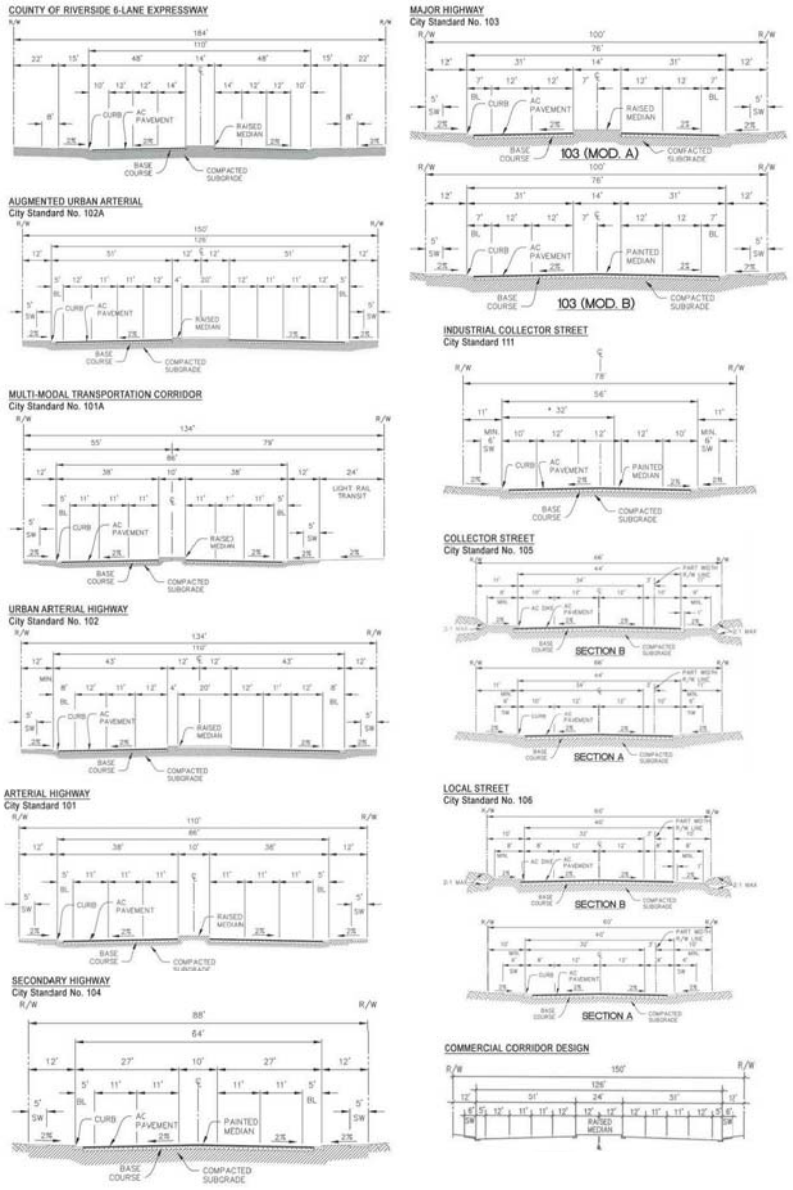
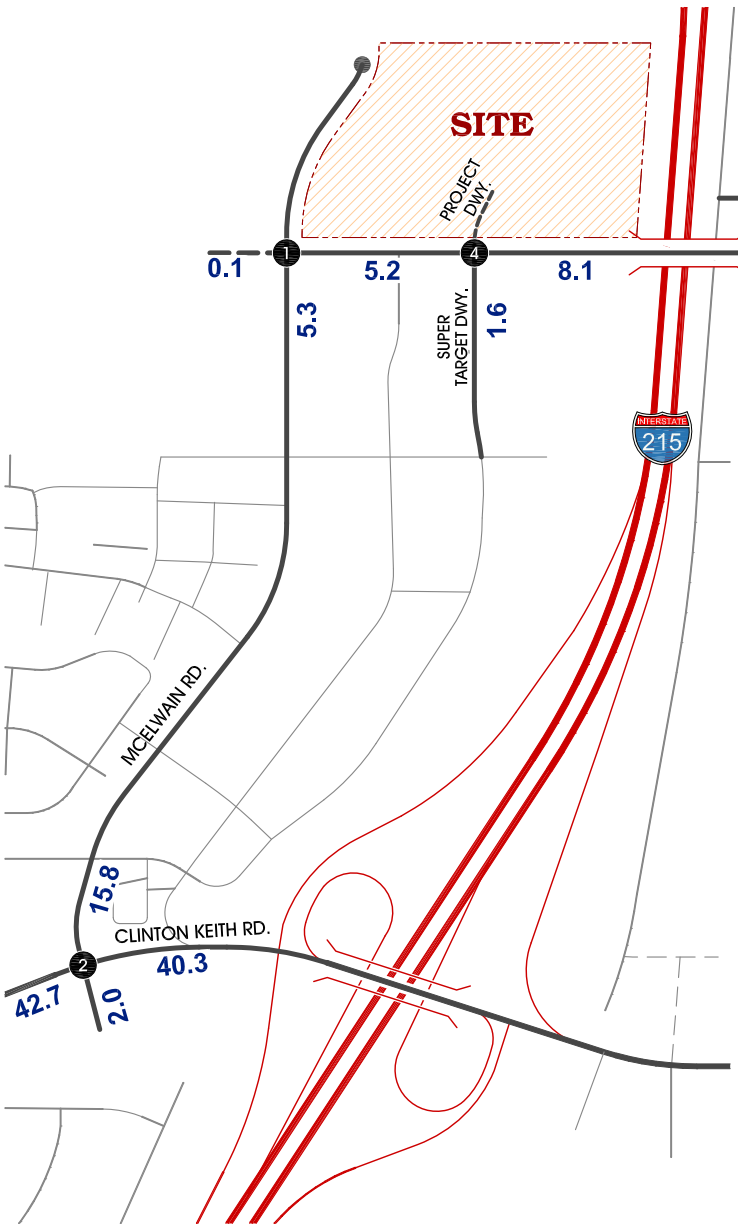


FIGURE 3-C
EXISTING (2019) TRAFFIC VOLUMES



AM PEAK HOUR

1. McElwain Rd. / Linnel Ln.		2. McElwain Rd. / Clinton Keith Rd.	
0 0 1	0 1 374	297 4 379	74 1101 17
0 0 3	0 0 207	236 1385 13	6 4 12
3. Stepp Rd. / Linnel Ln.		**4. Project Dwy. / Linnel Ln.**	
244 21	3 144		292 26
163 61		186 0	0 18

PM PEAK HOUR

1. McElwain Rd. / Linnel Ln.		2. McElwain Rd. / Clinton Keith Rd.	
0 1 0	0 2 207	299 14 350	190 1352 43
0 1 2	2 1 321	449 1395 32	34 13 30
3. Stepp Rd. / Linnel Ln.		**4. Project Dwy. / Linnel Ln.**	
165 25	14 82		195 51
258 146		354 0	5 76

LEGEND:

4 = INTERSECTION ID

10.0 = VEHICLES PER DAY (1000's)

N

TABLE 3-1

INTERSECTION ANALYSIS FOR EXISTING CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												Delay [3] (secs.)		Level of Service [3]	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	McElwain Rd. / Linnel Ln.	AWS	0.5	0.5	1	0	1!	0	0	1!	0	0	1!	0	11.7	10.1	B	B
2	McElwain Rd. / Clinton Keith Rd.	TS	1	1	0	2	1	0	2	3	1	1	3	1>	22.3	33.1	C	C
3	Stepp Rd. / Linnel Ln.	CSS	0	0	0	0	1!	0	1	2	0	0	2	0	11.3	11.7	B	B
4	Project Dwy. - Target Dwy. / Linnel Ln.	CSS	1	0	1	0	0	0	0	1	0	1	1	0	9.5	14.8	A	B

[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; > = Right Turn Overlap

[3] Delay and level of service calculated using the following analysis software: Synchro 10 Software

TABLE 3-2

ROADWAY SEGMENT ANALYSIS FOR EXISTING CONDITIONS

Roadway	Segment Limits	General Plan Roadway Classification	Through Travel Lanes[1]	Roadway Capacity and LOS Criteria[2] (Maximum 2-Way ADT)		Existing Conditions		
				LOS C	LOS E	ADT[4]	V/C[3]	LOS
Linnel Ln.	east of McElwain Rd.	Secondary	2	10,350 [4]	12,950 [4]	5,200	0.40	LOS C or better
McElwain Rd.	south of Linnel Ln.	Secondary	3	15,525 [4]	19,425 [4]	5,300	0.27	LOS C or better

[1] 1 = Existing number of through lanes

[2] Source: City of Murrieta Daily Roadway Capacity Values

[3] V/C = ADT / LOS E Roadway Capacity

[4] LOS capacity estimated based on a 4-Lane Secondary Roadway (LOS C = 20,700; LOS E = 25,900)

E. Transit Service

Riverside Transit Agency (RTA) Route 61 currently provide service to the roadways within the study area.

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4.0 PROJECTED FUTURE TRAFFIC

This section of the report quantifies the number of trips generated by the proposed project and other known developments in the area.

A. Project Traffic

1. Ambient Growth Rate

Some traffic volume increases on roadways can be attributed to vehicles originating outside of the study area. These types of trips either end up within the study area or pass-through onto an outside destination. Therefore, to account for these trips (termed "ambient growth"), a growth rate can be applied to existing traffic volumes.

A 2% ambient growth rate that has been used in this study to account for traffic not attributed to the project or other planned developments within the study area.

2. Project Trip Generation

Trip generation represents the amount of traffic which is attracted and produced by a development. The trip generation for the project is based upon the specific land use which has been planned for this development. For the purpose of this analysis, the following land use assumption is evaluated:

- 120 room hotel with an event center

Trip generation rates for the proposed development are shown in Table 4-1. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE) for the hotel use. The proposed event center is anticipated to be used mainly during the weekends to host weddings. During the weekdays, the event center can serve as a conference room for guests staying at the hotel.

The daily and peak hour trip generations for the proposed project are shown on Table 4-2. The proposed development is projected to generate a total of approximately 1,003 trip-ends per day with 57 vehicles per hour during the AM peak hour and 72 vehicles per hour during the PM peak hour.

3. Project Trip Distribution and Assignment

Trip distribution represents the directional orientation of traffic to and from the project site. The project's trip distribution patterns are based on the proximity of the specific uses to the surrounding trip attractors (employment bases, schools, recreation

TABLE 4-1

PROJECT TRIP GENERATION RATES[1]

LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR TRIP RATES						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
Hotel	310	120	RM	0.28	0.19	0.47	0.31	0.29	0.60	8.36

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 10th Edition, 2017.

[2] RM = Room

TABLE 4-2

TRIP GENERATION SUMMARY

LAND USE	ITE CODE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
Hotel	310	120	RM	34	23	57	37	35	72	1,003
TOTAL PROJECT TRIPS				34	23	57	37	35	72	1,003

[1] RM = Room

centers, etc.), and the regional freeway interchanges. The trip distribution pattern for the project is illustrated on Figure 4-A.

4. Other Trip Generation Factors

The project land uses are comprised mainly of primary traffic. Primary traffic refers to trips that are intending to go to the project as their primary destination. Therefore, no reduction has been assumed for pass-by traffic.

5. Project Peak Hour Turning Movement Traffic

The assignment of traffic from the site to the adjoining roadway system has been based upon the site's trip generation, trip distribution, proposed arterial highway and local street systems, which would be in place by the time of initial occupancy of the site. Based on the identified project traffic generation and distribution, Project AM/PM peak hour intersection traffic volumes and average daily traffic (ADT) volumes are shown on Figure 4-B.

B. Cumulative Traffic (Background)

1. Method of Projection

To assess Existing Plus Ambient Plus Project Plus Cumulative traffic conditions, project traffic is combined with existing traffic, area-wide growth and other future developments which are approved or being processed concurrently in the study area. Developments which are being processed concurrently in the study area have been provided by City staff.

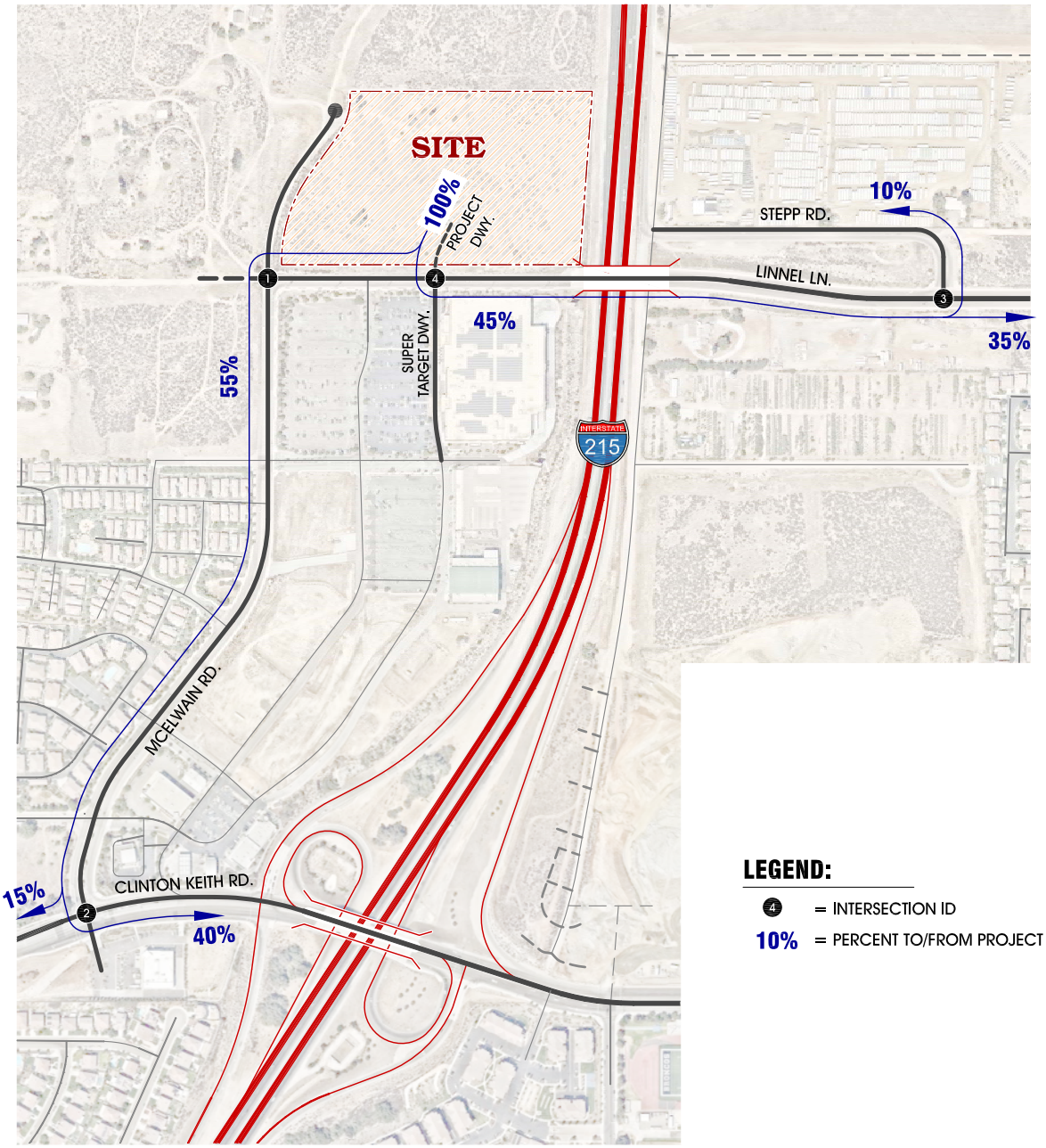
2. Other Approved or Proposed Development Projects

The cumulative developments have been included along with the land use associated with each project. The location of the cumulative projects provided by the City are shown on Figure 4-C.

3. Other Approved Projects Trip Generation

Table 4-3 presents the cumulative development land uses and trip generation summary. As presented in Table 4-3, the cumulative developments are projected to generate a total of approximately 47,551 trip-ends per day with 2,354 vehicles per hour during the AM peak hour and 4,306 vehicles per hour during the PM peak hour. Cumulative development information are provided in Appendix “D”.

FIGURE 4-A
PROJECT TRIP DISTRIBUTION



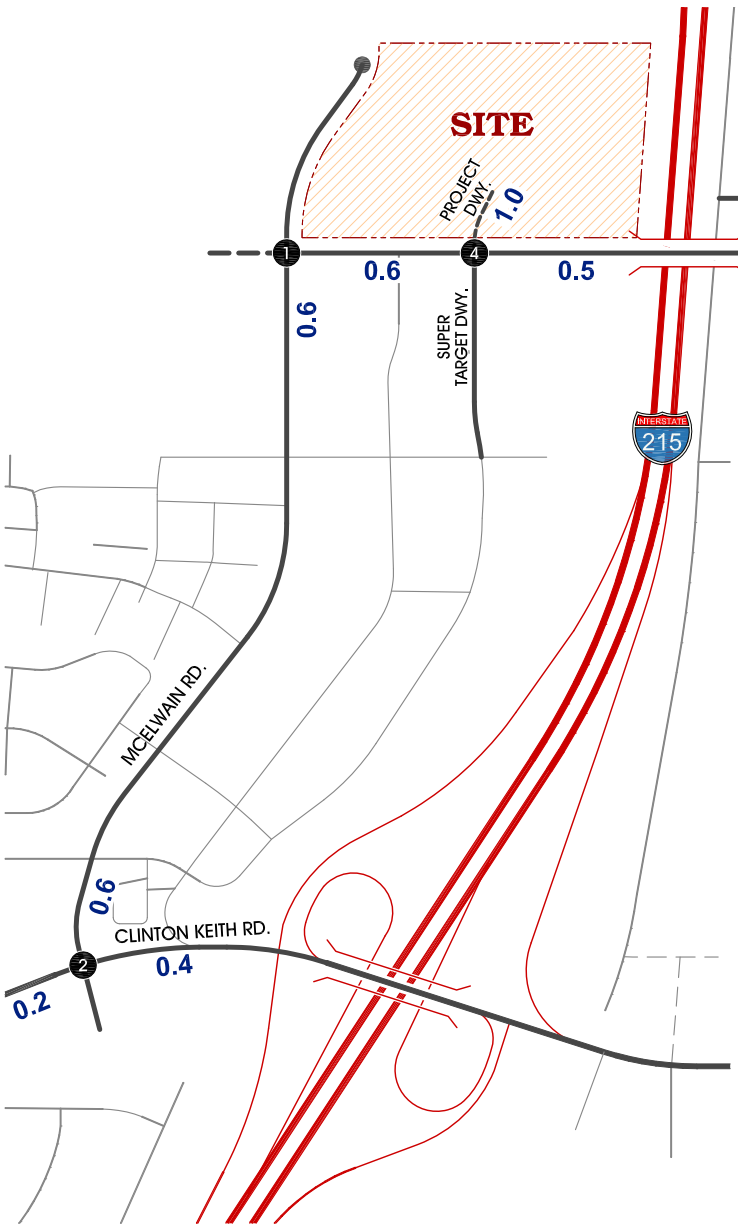
LEGEND:

4 = INTERSECTION ID

10% = PERCENT TO/FROM PROJECT

N

FIGURE 4-B
PROJECT ONLY TRAFFIC VOLUMES



AM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
0 0 0 ; 0 ← 0 ← 13	3 0 9 ; 14 ← 0 ← 0
0 → 0 → 0 ; 0 0 19	5 → 0 → 0 ; 0 0 0
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
3 0 ; 0 ← 12	13 0 10 ; 15 ← 0 ← 0
2 → 8 →	19 → 0 → 0 → ; 0 0 0

PM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
0 0 0 ; 0 ← 0 ← 19	5 0 14 ; 15 ← 0 ← 0
0 → 0 → 0 ; 0 0 20	6 → 0 → 0 ; 0 0 0
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
4 0 ; 0 ← 13	19 0 16 ; 17 ← 0 ← 0
4 → 12 →	20 → 0 → 0 → ; 0 0 0

LEGEND:

4 = INTERSECTION ID

10.0 = VEHICLES PER DAY (1000's)

N

FIGURE 4-C
CUMULATIVE DEVELOPMENTS LOCATION MAP

LEGEND:

4 = INTERSECTION ID

– – – – = DIRT ROAD / FUTURE ROADWAY

12 = CUMULATIVE DEVELOPMENT TAZ ID
(SEE TABLE 4-3 FOR REFERENCE)

N

TABLE 4-3

CUMULATIVE DEVELOPMENTS TRIP GENERATION SUMMARY

MAP ID	PROJECT NAME	LAND USE	QUANTITY [1]	PEAK HOUR						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
1	Mitchell Crossing (DP-2014-364, DP-2014-301)	Multi-Family	331 DU	33	136	169	132	73	205	2,201
		Specialty Retail	30 TSF	40	27	67	60	76	136	2,216
	Subtotal			73	163	236	192	149	341	4,417
2	Murrieta Senior Living (DP-2017-1333)	Assisted Living	87 Occ. Bed	10	5	15	13	12	25	360
		Congregate Care Facility	22 Occ. DU	1	1	2	2	2	4	47
	Subtotal			11	6	17	15	14	29	407
3	Clinton Keith Service Station (DP-2019-1846)	Super Convenience Market/Gas Station	12 VFP	168	168	336	138	138	276	2,766
		Pass-by (25%)		-42	-42	-84	-34	-34	-68	-691
	Subtotal			126	126	252	104	104	208	2,075
4	The Orchard (DP-003-161)	Shopping Center	186 TSF	108	67	175	340	368	708	7,022
		Pass-by (30%)		-26	-26	-52	-106	-106	-212	-2,106
	Subtotal			82	41	123	234	262	496	4,916
5	Curci (DP-2018-1691)	Mixed-Use	- -	171	140	311	198	197	395	4,433
6	Vineyard Shopping Center (DP-2012-3260)	Mixed-Use	- -	111	70	181	258	273	531	6,254
7	Costco (DP-2018-1652)	Mixed-Use	- -	180	148	328	531	584	1,115	12,667
8	Medowlark (DP-2018-1624)	Multifamily Housing (Low-Rise 1-2 floors)	83 DU	9	29	38	29	17	46	608
9	Healthsouth Rehabilitation Hospital (DP-2015-571)	Nursing Home	54.884 TSF	21	9	30	21	20	41	416
	Murrieta-Whitewood Skilled Nursing Facility (DP-2015-708)	Assisted Living	59 Occ. Bed	7	4	11	9	8	17	244
	Subtotal			28	13	41	30	28	58	660
10	Makena Hills (EA-2017-1315)	Medical-Dental Office	116.2 TSF	252	71	323	113	289	402	4,044
		Quality Restaurant	9.3 TSF	3	3	6	49	24	73	780
		Hotel	206 RM	58	39	97	64	60	124	1,722
	Subtotal			313	113	426	226	373	599	6,546
11	Physicians Hospital/ Loma Linda Hospital (CUP-007-2499)	Hospital	124 BEDS	118	46	164	58	118	176	1,605
12	Golden Cities (VTM 28532-3/DP-2016-1253)	Single Fam. Detached	69 DU	13	39	52	43	26	69	651
	Golden Cities (VTM 28532-4/DP-2016-1253)	Single Fam. Detached	126 DU	24	71	95	78	47	125	1,189
	Golden Cities (VTM 28532-5/DP-2016-1253)	Single Fam. Detached	119 DU	23	67	90	74	44	118	1,123
	Subtotal			60	177	237	195	117	312	2,963
Total Cumulative Projects Trip Generation				**1,282**	**1,072**	**2,354**	**2,070**	**2,236**	**4,306**	**47,551**

[1] TSF = Thousand Square Feet; DU = Dwelling Units; VFP = Vehicle Fueling Positions; Occ. Bed = Occupied Bed

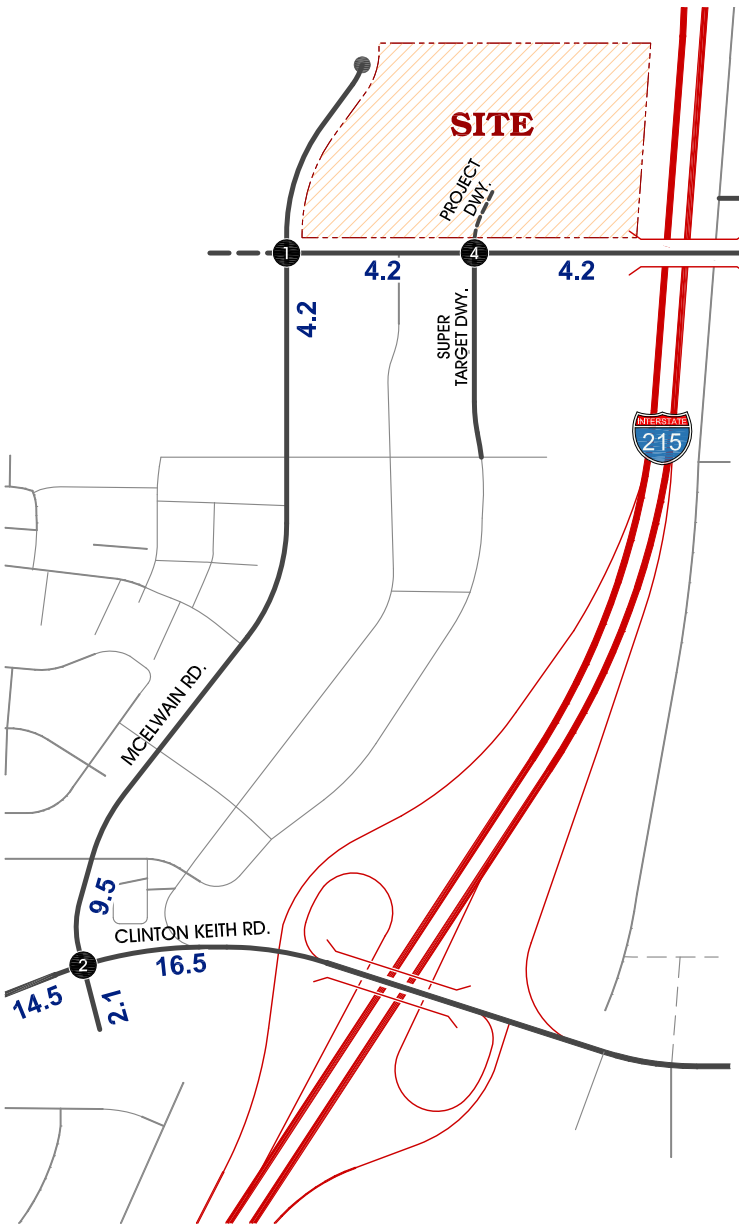
4. Total Background Peak Hour Turning Movement Volumes

Based on the identified trip distribution for the cumulative development on arterial highways throughout the study area, cumulative development only traffic volumes are shown on Figure 4-D.

Existing plus Ambient plus Project (E+A+P) (2021) traffic volumes are shown on Figure 4-E.

Existing Plus Ambient Plus Project Plus Cumulative (E+A+P+C) (2021) traffic volumes are shown on Figure 4-F.

FIGURE 4-D
CUMULATIVE DEVELOPMENTS ONLY TRAFFIC VOLUMES



AM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
0 0 0 ; 0 0 122	57 19 112 ; 160 159 44
0 0 0 ; 0 0 167	94 251 63 ; 63 19 44
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
0 0 ; 0 122	122 0
0 167	167 0 ; 0 0

PM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
0 0 0 ; 0 0 221	180 16 299 ; 262 441 36
0 0 0 ; 0 0 187	154 390 52 ; 52 16 36
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
0 0 ; 0 221	221 0
0 187	187 0 ; 0 0

LEGEND:

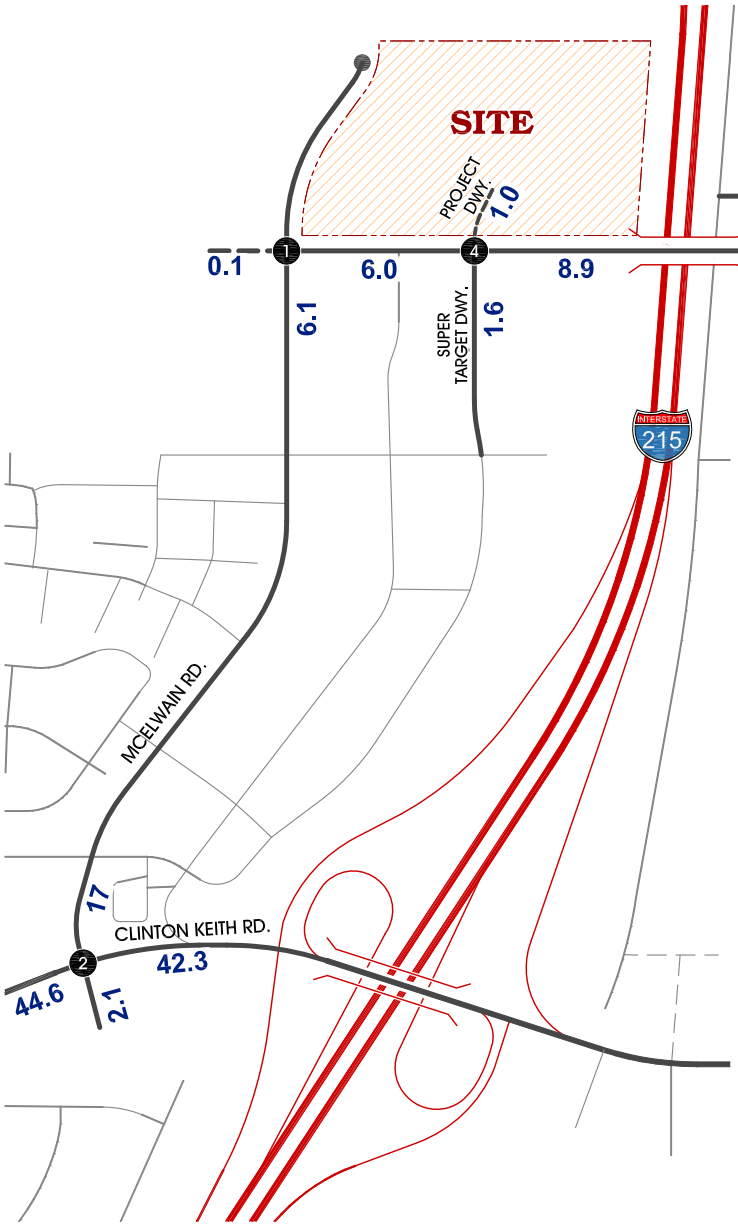
4 = INTERSECTION ID

10.0 = VEHICLES PER DAY (1000's)

N

FIGURE 4-E

EXISTING + AMBIENT + PROJECT (2021) TRAFFIC VOLUMES



AM PEAK HOUR

1. McElwain Rd. / Linnel Ln.		2. McElwain Rd. / Clinton Keith Rd.	
1 1 1	1 1 402	312 4 403	91 1145 18
1 1 3	1 1 234	250 1440 14	6 4 12
3. Stepp Rd. / Linnel Ln.		**4. Project Dwy. / Linnel Ln.**	
257 22	3 162	13 1 10	15 304 27
172 71		19 193 1	1 1 19

PM PEAK HOUR

1. McElwain Rd. / Linnel Ln.		2. McElwain Rd. / Clinton Keith Rd.	
1 1 1	1 2 234	316 15 378	213 1406 45
1 1 2	2 1 354	473 1451 33	35 14 31
3. Stepp Rd. / Linnel Ln.		**4. Project Dwy. / Linnel Ln.**	
176 26	15 98	19 1 16	17 203 53
272 164		20 368 1	5 1 79

LEGEND:

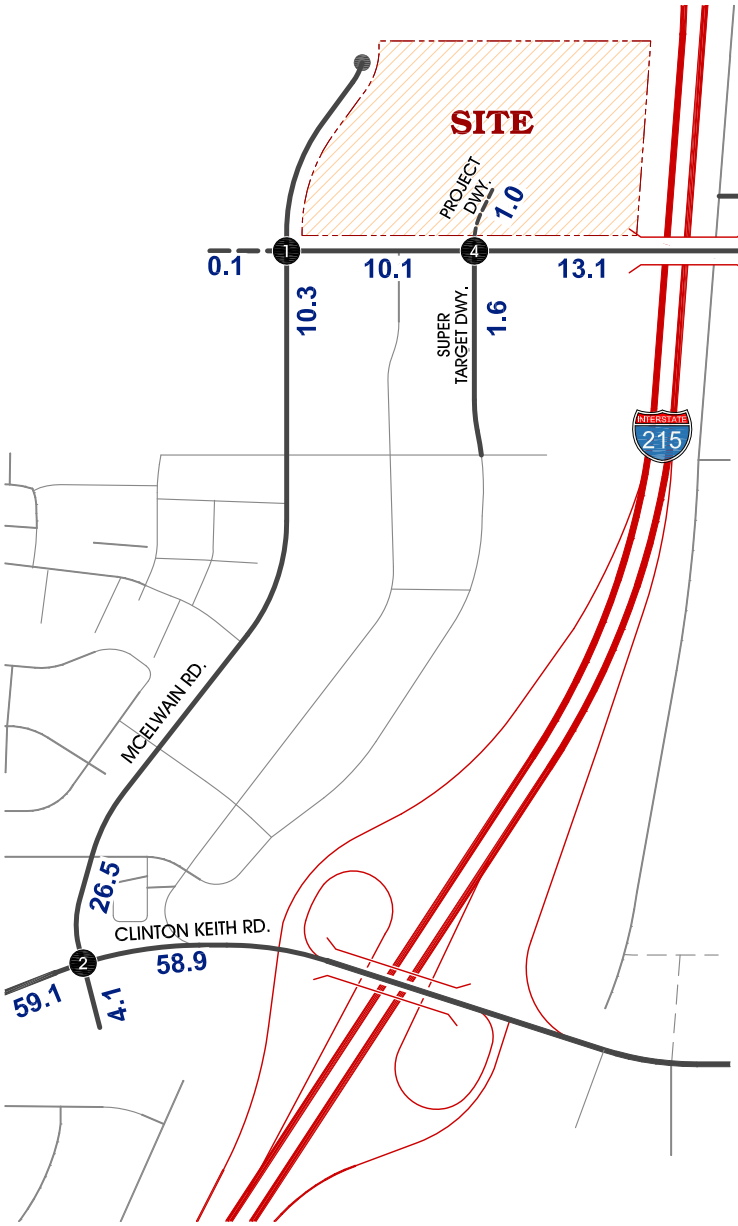
4 = INTERSECTION ID

10.0 = VEHICLES PER DAY (1000's)

N

FIGURE 4-F

EXISTING + AMBIENT + PROJECT + CUMULATIVE (2021) TRAFFIC VOLUMES



AM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
1 1 1 ; 1 1 524	369 23 515 ; 251 1304 62
1 1 3 ; 1 1 401	344 1691 77 ; 69 23 56
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
257 22 ; 3 284	13 1 10 ; 15 426 27
172 238	19 360 1 ; 1 1 19

PM PEAK HOUR

1. McElwain Rd. / Linnel Ln.	2. McElwain Rd. / Clinton Keith Rd.
1 1 1 ; 1 2 455	496 31 677 ; 475 1847 81
1 1 2 ; 2 1 541	627 1841 85 ; 87 30 67
3. Stepp Rd. / Linnel Ln.	**4. Project Dwy. / Linnel Ln.**
176 26 ; 15 319	19 1 16 ; 17 424 53
272 351	20 555 1 ; 5 1 79

LEGEND:

4 = INTERSECTION ID

10.0 = VEHICLES PER DAY (1000's)

N

5.0 TRAFFIC ANALYSIS

Peak hour intersection analysis has been performed at the study area intersections for each of the project scenarios and for projected future conditions. Improvements are recommended to satisfy the level of service requirements of the City of Murrieta and if the following impacts are identified:

1) When existing traffic conditions (Analysis Scenario 1) exceed the General Plan target LOS.

2) When project traffic, when added to existing traffic (Analysis Scenario 2), will deteriorate the LOS to below the target LOS, and impacts cannot be mitigated through project conditions of approval.

3) When cumulative traffic (Analysis Scenario 3) exceeds the target LOS, and impacts cannot be mitigated through existing infrastructure funding mechanisms.

A. Existing plus Ambient plus Project (E+A+P) (2021) Conditions

The results of the E+A+P (2021) conditions intersection analysis are summarized in Table 5-1. The E+A+P (2021) condition operations analysis worksheets are provided in Appendix "G".

For EAP conditions, the study area intersections are anticipated to operate at an acceptable level of service (LOS “D” or better) during the peak hours.

Table 5-2 provides a summary of the EAP (2021) conditions roadway segment capacity analysis. As shown on Table 5-2, the study area roadway segments are anticipated to continue to operate within LOS “C” capacity thresholds.

B. Existing Plus Ambient Plus Project Plus Cumulative (E+A+P+C) (2021) Conditions

The results of the E+A+P+C (2021) conditions intersection analysis are summarized in Table 5-3. The E+A+P+C (2021) condition operations analysis worksheets are provided in Appendix "M".

For EAPC conditions, the intersection of McElwain Road/Clinton Keith Road (#2) is anticipated to operate at an unacceptable level of service (LOS “E” or worse) during the peak hours, with existing lane configuration. As shown in Table 5-3, modifying the existing signal timing and cycle length is anticipated to provide acceptable LOS at this intersection.

Table 5-4 provides a summary of the EAPC (2021) conditions roadway segment capacity analysis. As shown on Table 5-4, the study area roadway segments are anticipated to continue to operate within LOS “C” capacity thresholds.

TABLE 5-1

INTERSECTION ANALYSIS FOR EXISTING PLUS AMBIENT PLUS PROJECT (2021) CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												Delay [3] (secs.)		Level of Service [3]	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	McElwain Rd. / Linnel Ln.	AWS	0.5	0.5	1	0	1!	0	0	1!	0	0	1!	0	12.7	10.9	B	B
2	McElwain Rd. / Clinton Keith Rd.	TS	1	1	0	2	1	0	2	3	1	1	3	1>	23.3	36.5	C	D
3	Stepp Rd. / Linnel Ln.	CSS	0	0	0	0	1!	0	1	2	0	0	2	0	11.7	12.3	B	B
4	Project Dwy. - Target Dwy. / Linnel Ln.	CSS	1	1	0	0	1!	0	1	1	0	1	1	0	15.6	18.6	C	C

[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; > = Right Turn Overlap; 1 = Lane Improvement (Project Access)

[3] Delay and level of service calculated using the following analysis software: Synchro 10 Software

TABLE 5-2

ROADWAY SEGMENT ANALYSIS FOR EXISTING PLUS AMBIENT PLUS PROJECT (2021) CONDITIONS

Roadway	Segment Limits	General Plan Roadway Classification	Through Travel Lanes[1]	Roadway Capacity and LOS Criteria[2] (Maximum 2-Way ADT)		EAP Conditions		
				LOS C	LOS E	ADT[4]	V/C[3]	LOS
Linnel Ln.	east of McElwain Rd.	Secondary	2	10,350 [4]	12,950 [4]	6,000	0.46	LOS C or better
McElwain Rd.	south of Linnel Ln.	Secondary	3	15,525 [4]	19,425 [4]	6,100	0.31	LOS C or better

[1] 1 = Existing number of through lanes

[2] Source: City of Murrieta Daily Roadway Capacity Values

[3] V/C = ADT / LOS E Roadway Capacity

[4] LOS capacity estimated based on a 4-Lane Secondary Roadway (LOS C = 20,700; LOS E = 25,900)

TABLE 5-3

INTERSECTION ANALYSIS FOR
EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (2021) CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												Delay [3] (secs.)		Level of Service [3]	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	McElwain Rd. / Linnel Ln.	AWS	0.5	0.5	1	0	1!	0	0	1!	0	0	1!	0	25.3	27.6	D	D
2	McElwain Rd. / Clinton Keith Rd.																	
	- With Existing Signal Timing	TS	1	1	0	2	1	0	2	3	1	1	3	1>	38.6	90.6	D	F
	- With Modified Signal Timing	TS	1	1	0	2	1	0	2	3	1	1	3	1>	38.9	54.8	D	D
3	Stepp Rd. / Linnel Ln.	CSS	0	0	0	0	1!	0	1	2	0	0	2	0	13.6	17.7	B	C
4	Project Dwy. - Target Dwy. / Linnel Ln.	CSS	1	1	0	0	1!	0	1	1	0	1	1	0	22.9	33.9	C	D

[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; > = Right Turn Overlap; 1 = Lane Improvement (Project Access)

[3] Delay and level of service calculated using the following analysis software: Synchro 10 Software

TABLE 5-4

ROADWAY SEGMENT ANALYSIS FOR EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (2021) CONDITIONS

Roadway	Segment Limits	General Plan Roadway Classification	Through Travel Lanes[1]	Roadway Capacity and LOS Criteria[2] (Maximum 2-Way ADT)		EAPC Conditions		
				LOS C	LOS E	ADT[4]	V/C[3]	LOS
Linnel Ln.	east of McElwain Rd.	Secondary	2	10,350 [4]	12,950 [4]	10,100	0.78	LOS C or better
McElwain Rd.	south of Linnel Ln.	Secondary	3	15,525 [4]	19,425 [4]	10,300	0.40	LOS C or better

[1] 1 = Existing number of through lanes

[2] Source: City of Murrieta Daily Roadway Capacity Values

[3] V/C = ADT / LOS E Roadway Capacity

[4] LOS capacity estimated based on a 4-Lane Secondary Roadway (LOS C = 20,700; LOS E = 25,900)

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6.0 FINDINGS AND RECOMMENDATIONS

This section of the report summarizes the project impacts for each scenario analyzed. Physical and funding recommendations are provided to address the project-related impacts. The scenarios evaluated include:

- **Existing Conditions**
- **Existing + Ambient + Project (2021)**
- **Existing + Ambient + Project + Cumulative (2021)**

A. Traffic Impacts and Level of Service Analysis

1. Existing Conditions

For Existing traffic conditions, the study area intersections and roadway segments, are currently operating at an acceptable level of service during the peak hours with the existing geometry and traffic controls.

2. Existing + Ambient + Project (2021) Conditions

For EAP traffic conditions, the study area intersections and roadway segments are operating at an acceptable level of service during the peak hours.

4. Existing Plus Ambient Plus Project Plus Cumulative (E+A+P+C) (2021) Conditions

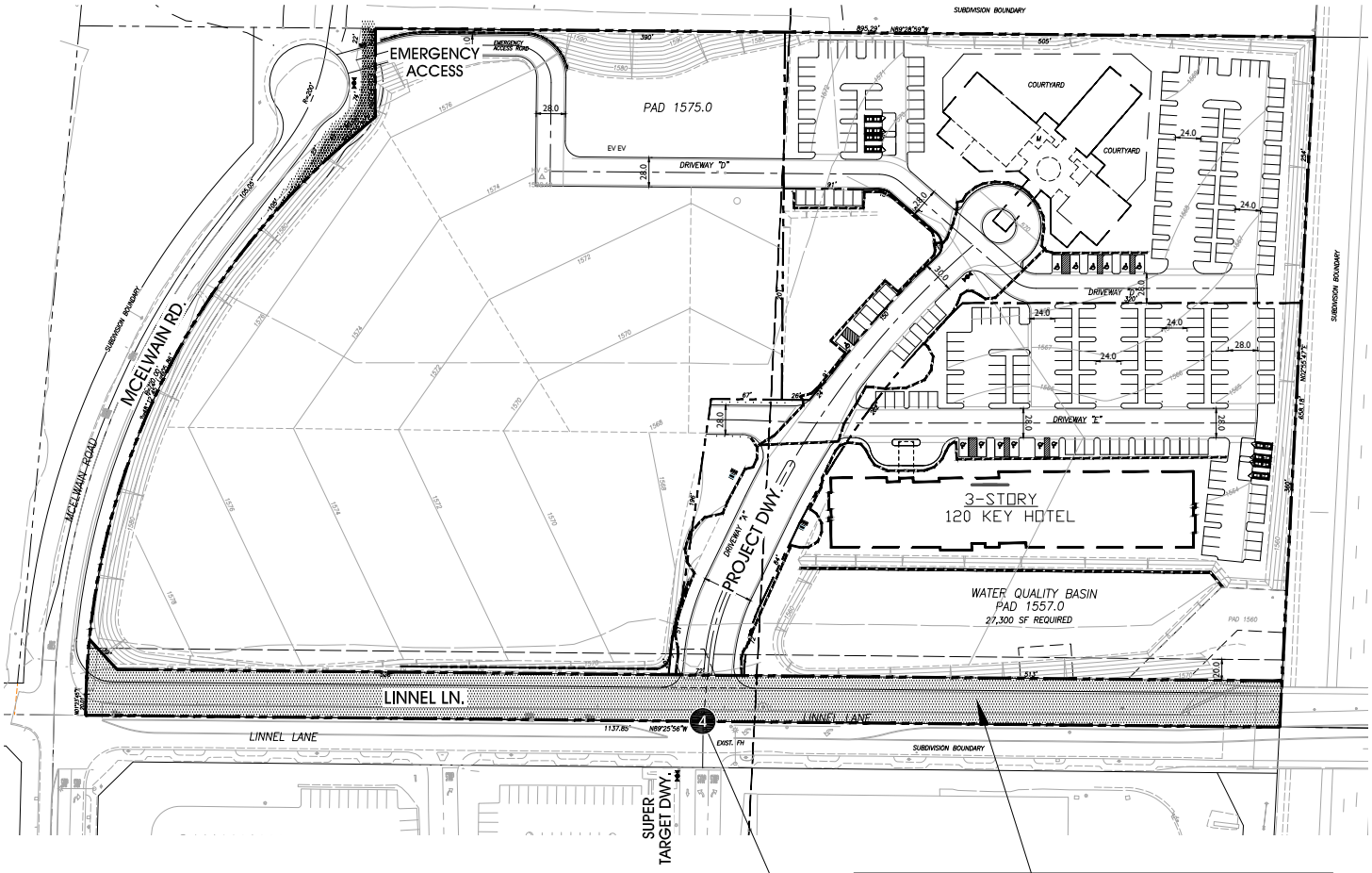
For EAPC conditions, the intersection McElwain Road/Clinton Keith Road (#1) is anticipated to operate at an unacceptable level of service (LOS "E" or worse) during the peak hours, with existing lane configuration. As shown in Table 5-3, modifying the existing signal timing and cycle length is anticipated to provide acceptable LOS at this intersection.

B. Circulation Recommendations

1. On-Site

Figure 6-A illustrates the on-site recommended roadway and intersection lane improvements. Construction of on-site improvements shall occur in conjunction with project development or as needed for project access purposes. The recommended on-site roadway improvements are described below.

FIGURE 6-A
ON-SITE CIRCULATION RECOMMENDATIONS

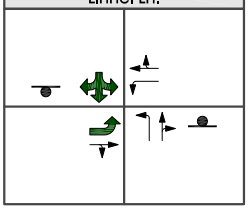


PROVIDE STOP SIGN CONTROL AT THE PROJECT DRIVEWAY.

ON-SITE TRAFFIC SIGNING AND STRIPING SHOULD BE IMPLEMENTED IN CONJUNCTION WITH DETAILED CONSTRUCTION PLANS FOR THE PROJECT.

VERIFY THAT MINIMUM SIGHT DISTANCE IS PROVIDED AT THE PROJECT ACCESS POINT.

4. Project Dwy. / Linnel Ln.



CONSTRUCT LINNEL LANE FROM THE PROJECT'S WESTERLY BOUNDARY TO THE PROJECT'S EASTERLY BOUNDARY AT ITS ULTIMATE HALF-SECTION WIDTH AS A SECONDARY ROADWAY (88-FOOT RIGHT-OF-WAY) IN CONJUNCTION WITH DEVELOPMENT.

LEGEND:

= STOP SIGN

= LANE IMPROVEMENT (PROJECT ACCESS)

N

- Construct Linnel Lane from the Project's westerly boundary to the Project's easterly boundary at its ultimate half-section width as a secondary roadway (88-foot right-of-way) in conjunction with development.
- Provide stop sign control at the Project driveway.
- On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.
- Verify that minimum sight distance is provided at the project access point.

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