Appendix D
Transportation Technical Memorandum

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FEHR PEERS

Final Technical Memorandum

Date: February 20, 2023

To: Gwen Owens, City of Vacaville

From: John Gard, Fehr & Peers

Subject: Project Access Evaluation for The Fields at Alamo Creek Project

SA23-0184

This memorandum documents our site access review of The Fields at Alamo Creek, which would be a 223-unit single-family subdivision situated south of Hawkins Road about one-half mile east of Leisure Town Road in the City of Vacaville. This memorandum is organized into the following sections:

- Project Overview
- Existing Conditions
- Project Travel Characteristics
- Project Access Review
- Vehicle Miles Traveled (VMT) Analysis

Project Overview

The proposed project would be situated on a 33.6-acre undeveloped parcel located south of Hawkins Road and approximately one-half mile east of Leisure Town Road in easterly Vacaville. **Figure 1** shows the project site plan (*The Field at Alamo Creek*, Phillippi Engineering, April 2022). This figure also shows that the project would be situated immediately east and north of the adopted Farm at Alamo Creek Specific Plan. The following describes the project's vehicular connections directly onto Hawkins Road and to this specific plan:

- Hawkins Road/Basin Way: This intersection would be situated in the easterly part of the project site approximately 330 feet east of Katleba Lane.
- Westerly Connections to the Farm at Alamo Creek Specific Plan: Bothell Way and Harrow Way would be public street connections between the project and this specific plan. Harrow Way would connect directly to Carroll Way, which is a planned two-lane, median-divided arterial street within the Farm at Alamo Creek Specific Plan that would extend between Elmira Road and Hawkins Road (see Figure 1).
- Southerly Connection to the Farm at Alamo Creek Specific Plan: Basin Way would extend to the project's south limits and connect to Camino Beltran, which is an east-west street that would extend to Carroll Way and Leisure Town Road.

The proposed street connectivity would allow project trips to utilize various streets within The Farm at Alamo Creek Specific Plan if desiring to travel to/from the south on Leisure Town Road and Elmira Road. Usage of these streets would be more likely to occur by residents of the south part of the project due to added travel time/distance required to access Hawkins Road. All streets within the project site would be 34 feet in width.

The area directly east of Basin Way would be designated as Open Space. Within that area would be a meandering walkway that would extend from Hawkins Road to Camino Beltran, featuring multiple connections to Basin Way. The southerly terminus of this walkway would connect with the planned multi-use path that would run along the north side of Camino Beltran (see Figure 6.3 of *The Farm at Alamo Creek Specific Plan* (2018)). City staff has indicated that the project will be conditioned to construct curb, gutter, sidewalk and off-site transitions along its frontage on Hawkins Road. The *Farm at Alamo Creek Specific Plan* (2018) shows a planned multi-use path that would run along the south side of Hawkins Road.

Existing Conditions

Hawkins Road begins at Leisure Town Road, extending easterly as a two-lane, undivided roadway with passing permitted in various sections. Although a posted speed limit is not present in this area, prevailing speeds are in the 45 to 55 miles per hour (mph) range. Adjacent land uses are primarily agricultural or rural residential.

Hawkins Road currently features stop-control on its approach to Leisure Town Road. With buildout of The Farm at Alamo Creek Specific Plan, the Hawkins Road approach will be realigned to intersect Leisure Town Road opposite Ulatis Drive, with traffic signal installed. A Class II bike lane (on-street with appropriate pavement markings and signage) is present in each direction of Hawkins Road from Leisure Town Road to Pitt School Road.

A hose tube count was placed on Hawkins Road for the 24-hour period of Thursday, January 12, 2023. This particular day consisted of dry weather (in a period otherwise having rain on a daily basis for nearly two weeks). On this day, the road carried 1,900 Average Daily Trips (ADT). The AM peak hour occurred from 7:45 – 8:45 AM, in which 140 vehicles were observed. The PM peak hour occurred from 4:15 – 5:15 PM, in which 160 vehicles were observed.

Project Travel Characteristics

This section presents the project's expected travel characteristics including the number of vehicle trips it would generate and the spatial distribution of those trips. Additionally, an evaluation is conducted to determine how many project trips would utilize the following two study intersections selected for analysis in the study (see Figure 1 for locations):

1. Hawkins Road/Carroll Way
2. Hawkins Road/Basin Way

Trip Generation

The *Trip Generation Manual, 11th Edition* (Institute of Transportation Engineers, 2021) was used to estimate the number of trips the proposed project would generate. **Table 1** show that the project would generate approximately 2,100 daily trips, with 155 during the AM peak hour and 210 during the PM peak hour.

Table 1: Project Trip Generation

Land Use	Quantity	ITE Code	Trip Generation[1]								
			Daily			AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Single-Family Residential	223 units	210	1,051	1,052	2,103	39	117	156	132	78	210

Notes: [1]Based on Institute of Transportation Engineers' *Trip Generation Manual, 11th Edition* (2021).
Source: Fehr & Peers, 2023.

Trip Distribution/Assignment

As part of *The Farm at Alamo Creek Specific Plan Draft EIR* (Dudek, 2018), a transportation impact study was prepared (*Transportation Impact Analysis Final Report for the Farm at Alamo Creek*, PRISM Engineering, 2018). That study included a set of expected trip distribution percentages for the residential uses in that project. Those percentages (shown in Table 9 of that report) were derived from the City of Vacaville travel demand model. Given the project's close geographic proximity to the specific plan, similar trip distribution patterns are expected. These percentages are shown in **Table 2**. The following key conclusions are drawn from these percenages:

- The majority (57%) of project trips will utilize Hawkins Road to access Leisure Town Road to the north (28%), Ulatis Drive (27%) to the west, or Hawkins Drive to the east (2%).
- Of the remaining 43% of project trips that are distributed to the south, most are expected to use Carroll Way, Elmira Road, and Camino Beltran, which are more direct routes than the alternative of using Hawkins Road to Leisure Town Road[1].

For project trips desiring to use Hawkins Road to travel to/from the west toward Leisure Town Road, they may either access it directly from Basin Way, or travel westerly through adjacent residential streets to reach Carroll Way. The expected use of each route will depend on the specific locations of residential within the project (i.e., greater use of Carroll Way for lots further to the west).

[1] Motorists traveling to/from the site via Carroll Way and Elmira Road will experience typically modest delays at roundabouts planned at Carroll Way/Camino Beltran and and Carroll Way/Elmira Road, but no other impedences.

Table 2: Project Trip Distribution Percentages

Direction	Percentage
To/from the north on Leisure Town Road (north of Hawkins Road)	28%
To/from the west on Ulatis Drive (west of Leisure Town Road)	27%
To/from the west on Elmira Road (west of Leisure Town Road)	22%
To/from the east on Hawkins Road (toward Lewis Road)	2%
To/from the east on Elmira Road (toward Lewis Road)	1%
To/from the south on Leisure Town Road (south of Elmira Road)	20%
Total	100%

Source: Fehr & Peers, 2023, derived from Table 9 of *Transportation Impact Analysis Final Report for the Farm at Alamo Creek*, PRISM Engineering, 2018.

Project Access Review

Traffic Forecasts

To develop cumulative year (2050) traffic forecasts at the two study intersections, the following steps were followed[2]:

- Step 1: *Estimate growth in background traffic between existing and cumulative conditions on Hawkins Road east of the project site.* The City's travel demand model projects a 43% increase in traffic.
- Step 2: *Identify specific neighborhoods within The Farm at Alamo Creek and the proposed project that would use each study intersection.* Four neighborhoods within the Farm at Alamo Creek were identified (see Appendix A). The project was disaggregated into three neighborhoods. For each neighborhood, the number of trips added to each study intersection was determined from the number of units, their trip generation, trip distribution percentages using Hawkins Road, and expected travel route.
- Step 3: *Estimate trips associated with planned residential north of Hawkins Road that would use each access.* The City's model assumes 350 single-family units in a TAZ opposite the project site. The trips generated by these units were assigned to the two study intersections using the same trip distribution percentages as assumed for the project.[3]

[2] Initially, the City's travel demand model was used for this task. However, the resulting forecasts were deemed unreasonable, as the model was not able to accurately reflect the degree to which individual residential areas would use Hawkins Road, Carroll Way, or other streets. So, the alternative approach described here was used.

[3] Figure TR-6 of the *City of Vacaville General Plan Transportation Element* (Updated March 2021) shows a conceptual extension of Carroll Way north of Hawkins Road, ultimately becoming a T-intersection with Leisure Town Road. Because this connection was not included in the City's travel demand model, the forecasts presented here do not assume such an extension.

Figure 2 displays the resulting cumulative plus project traffic forecasts at each study intersection. As shown, both intersections are assumed to have four legs. The Hawkins Road/Carroll Way intersection is assumed to be a single-lane roundabout consistent with the Specific Plan. The Hawkins Road/Basin Way intersection is assumed to consist of side-street stop control with the lane configurations shown.[4]

Traffic Operations

This study analyzes peak hour traffic conditions at the study intersections using Level of Service (LOS) as the primary measure of operational performance. LOS is a qualitative measure of traffic flow from the perspective of motorists and is an indication of the comfort associated with driving. Typical factors that affect LOS include speed, travel time, and traffic interruptions. Empirical LOS criteria and methods of calculation have been documented in the *Highway Capacity Manual, 7th Edition* (Transportation Research Board, 2022). LOS is a letter classification system, from A (representing free-flow traffic conditions) to F (oversaturated conditions where traffic demand exceeds capacity, resulting in long queues and delays).

Table 3 displays the existing average delay and level of service at the study intersections under cumulative plus project conditions. Technical calculations are included in the appendix. As shown, both intersections would operate at LOS A during each peak hour.

Table 3: Peak Hour Intersection Operations – Cumulative Plus Project Conditions

Intersection	Traffic Control	Delay[1]/LOS[2]	
		AM Peak Hour	PM Peak Hour
1. Hawkins Road / Carroll Way	Roundabout	5 / A	6 / A
2. Hawkins Road / Basin Way	Side-Street Stop	3 (12) / A (B)	2 (14) / A (B)

Notes:
[1]Delay is reported as seconds per vehicle. For roundabout, the average control delay is the weighted average of all movements. For side-street stop, the overall average delay/LOS is reported for the overall intersection and movement with highest delay (shown in parentheses).
[2] LOS represents level of service, calculated based on methodologies contained in the *Highway Capacity Manual, 7th Edition* (Transportation Research Board, 2022).
Source: Fehr & Peers, 2023.

[4] The project site plan showed what appears to be about a 100-foot eastbound right-turn lane on Hawkins Road approaching Basin Way. Accordingly, this lane was assumed for analysis purposes.

About 43% of project trips are expected to be distributed to/from the south toward Elmira Road. This represents about 950 ADT that would use various roadways within The Farm at Alamo Creek Specific Plan. Much of the traffic would use Carroll Way south of Camino Beltran. Given that this is planned as a two-lane, median-divided arterial, it would have adequate capacity to accommodate both specific plan trips and project trips.

Figure 2 indicates that the westbound left-turn lane movement on Hawkins Road at Basin Way would be 1 vehicle during the AM peak hour and 4 vehicles during the PM peak hour. When considering the amount of opposing traffic and following through traffic, this amount of left-turning traffic would not warrant a dedicated left-turn pocket. The need for an eastbound left turn lane will be evaluated at a future date in confjunction with a development application for the north side of Hawkins Road.

Vehicle Miles of Travel (VMT)

Senate Bill 743, which became effective statewide in 2020, eliminated auto delay, LOS, and other similar measures of vehicular capacity or traffic congestion as the basis for determining significant impacts within CEQA. SB 743 contained language directing the Governor's Office of Planning and Research (OPR) to update the CEQA Guidelines to include new criteria (e.g., metrics) for determining the significance of transportation impacts. OPR selected VMT as the transportation impact metric, producing the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (2018) to assist agencies with implementation.

This section presents the VMT evaluation conducted for the proposed project, referencing the *City of Vacaville General Plan Transportation Element and Energy Conservation Action Strategy Update Draft* Supplemental *EIR ("2021 Supplemental EIR") (Dudek, March 2021)*[5], which was certified by the City Council in September 2021. Impact TRA-1 in the *2021 Supplemental EIR* stated that implementation of the City's General Plan would generate average VMT per dwelling unit and per thousand square feet of non-residential space that exceeds the applicable significance thresholds, thereby causing a significant impact. The City selected a VMT threshold that is 15 percent below the City-wide average VMT per dwelling unit.

CEQA Guidelines Section 15183 (Projects Consistent with a Community Plan, General Plan, or Zoning) specifies that projects that are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. The *2021 Supplemental EIR* analyzed the impacts of all land use projects contemplated in the City's General

[5] https://www.ci.vacaville.ca.us/home/showpublisheddocument/17749/637514730055730000

Plan to determine their effect on VMT, which is the preferred metric for analyzing the transportation system per CEQA Guidelines 15064.3. Page 3.21-1 of the *2021 Supplemental EIR* states the following:

> "Future projects consistent with the General Plan will not require further VMT analysis pursuant to CEQA. However, those projects would be subject to Mitigation Measure TRA-1 unless it can be demonstrated that the project's specific land use type and location is in a "VMT efficient" location."

The project site is located within Traffic Analysis Zone (TAZ) 126 of the City's travel demand model. This TAZ extends southerly beyond the project limits, covering parts of the Farm at Alamo Creek Specific Plan. The 2050 version of the model contains 450 single-family units in this TAZ.

According to the Farm at Alamo Creek Specific Plan, a total of 768 dwelling units are planned. The project would add 223 units adjacent to it, resulting in a total of 991 units. The 7 TAZs (bounded by Hawkins Road, Leisure Town, Elmira Road, and Open Space to the east) that represent the specific plan and project site consist of 1,201 units. Thus, it is concluded that the project was considered in the VMT analysis contained in the General Plan as that analysis was based on the City's travel demand model.

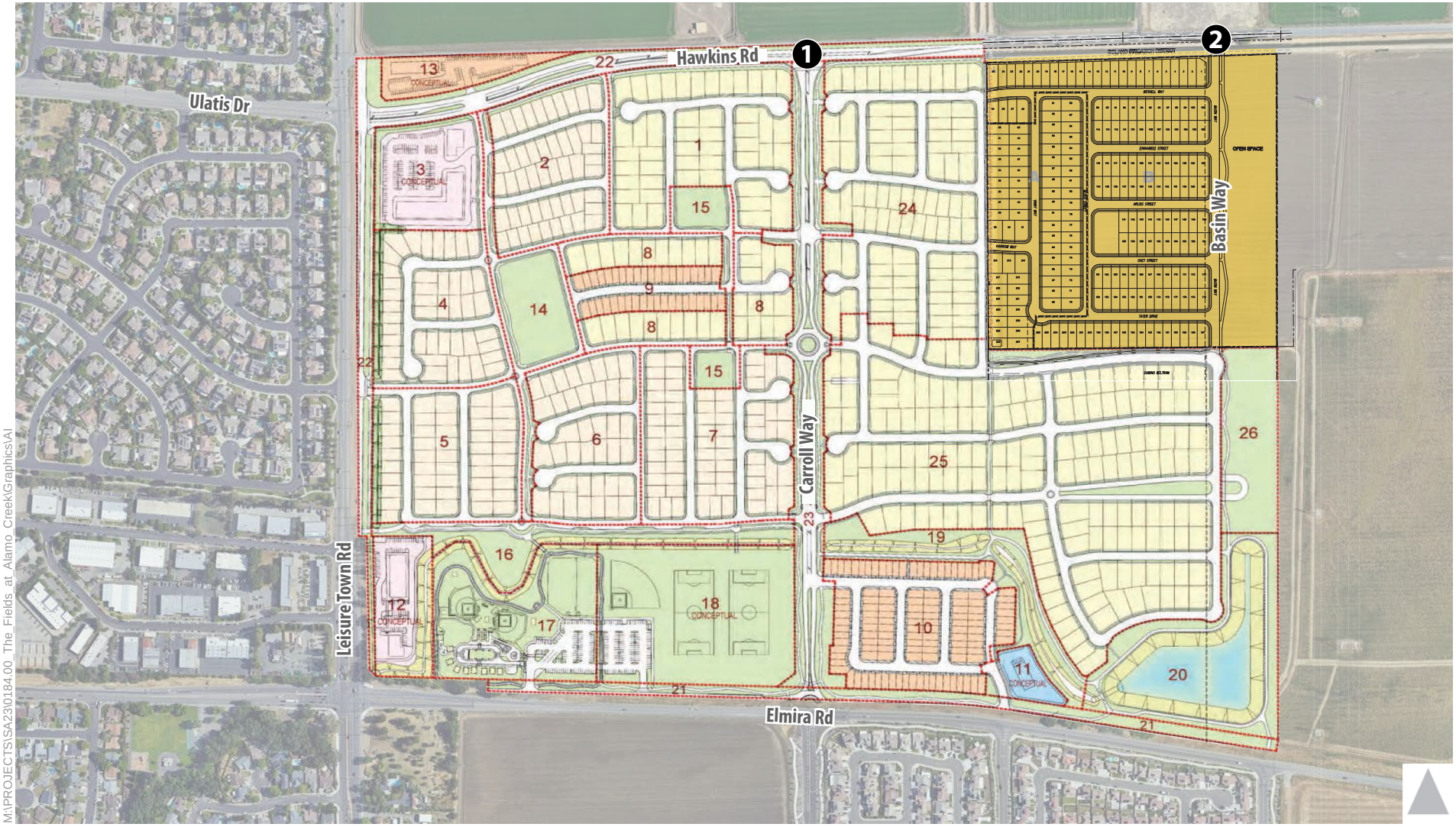
Table 3.1-9 of the *2021 Supplemental EIR* indicates that single-family has a citywide average of 76.5 VMT per unit under General Plan Buildout Minus Northeast Growth Area (2050) conditions. Appendix A contains a screening map showing the relative VMT efficiency of all TAZs within the City, which have at least 10 single-family units in them under cumulative conditions. As shown, the project's TAZ (represented by the fourth rectangle east of Leisure Town Road and south of Hawkins Road) is shown as yellow, which indicates a VMT per unit that is 0% to 5% above the citywide average. Thus, the project is not situated in a VMT efficient location. Accordingly, the project is subject to the applicable strategies in Mitigation Measure TRA-1 that would reduce project-generated VMT.

Mitigation Measure TRA-1 of the *2021 Supplemental EIR* identifies specific measures that would reduce VMT effects in a manner consistent with state guidance on VMT decrease. The following transportation demand management (TDM) strategies for residential uses were provided:

- improving access to transit
- increasing access to common goods and services, such as groceries, schools, and daycare
- incorporating affordable housing, including low-income housing, into residential and mixed-use development
- orienting the project toward transit, bicycle and pedestrian facilities
- improving pedestrian or bicycle networks, or transit service
- implementing traffic calming
- providing bicycle parking
- unbundling parking costs
- providing car-sharing, bike sharing, and ride-sharing programs

- providing transit subsidies or passes
- providing incentives or subsidies that increase the use of modes other than single-occupant vehicle
- increasing project density
- increasing the mix of uses within the project or within the project's surroundings
- increasing connectivity and/or intersection density on the project site

The project includes on-site traffic calming elements and is also providing a connection to a major multi-use path. Should additional TDM strategies be identified as applicable and feasible, their effectiveness at reducing project VMT could be estimated using data from the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (CAPCOA 2021).



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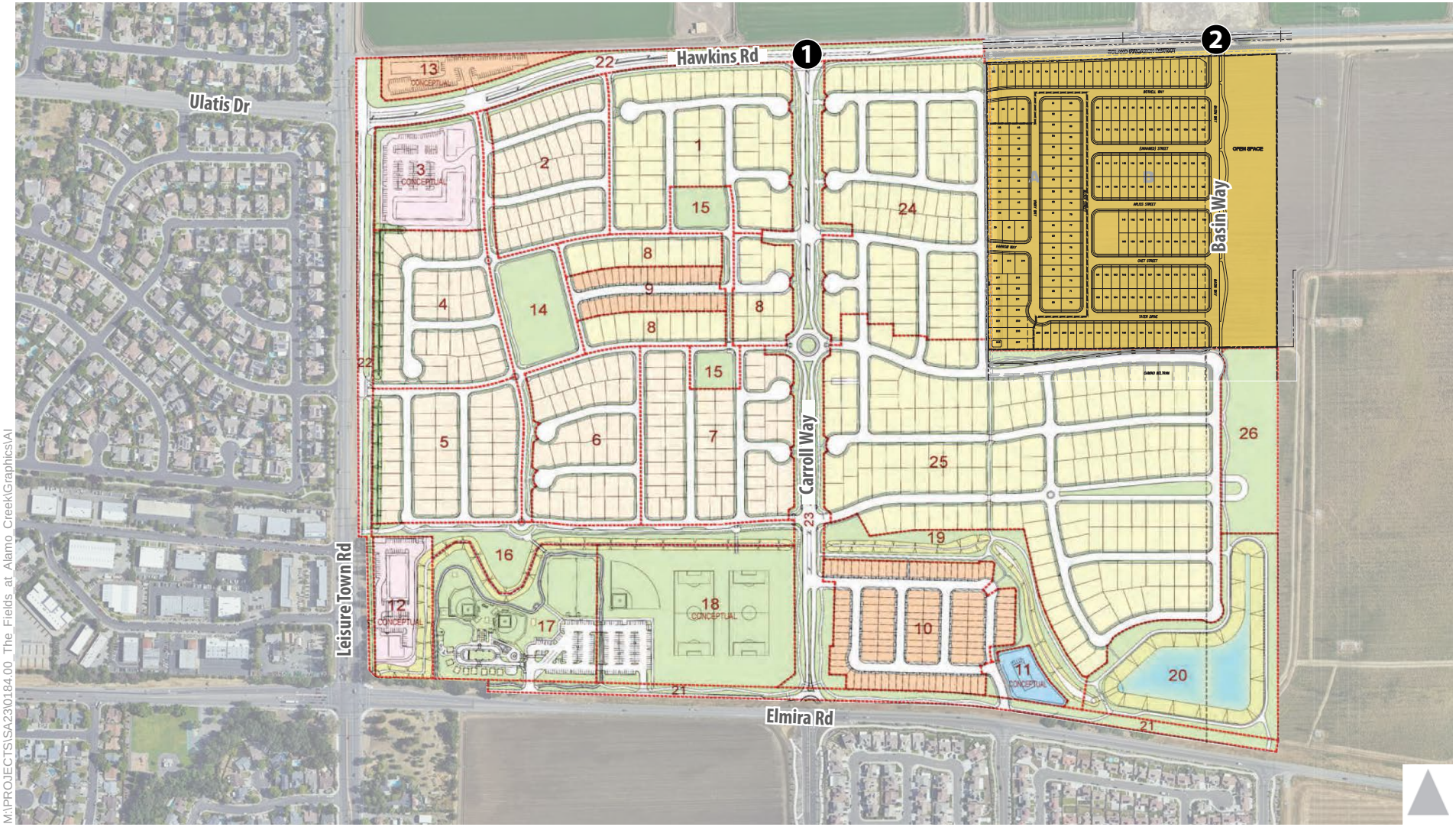
1 Study Intersection

Project Site

Figure 1

Project Site Plan



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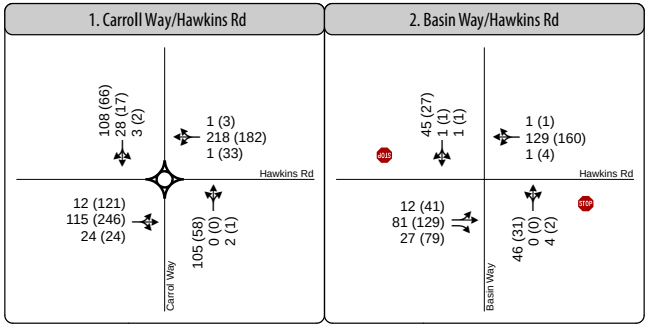
1 Study Intersection

Project Site



Turn Lane

AM (PM) Peak Hour Traffic Volume

Stop Sign

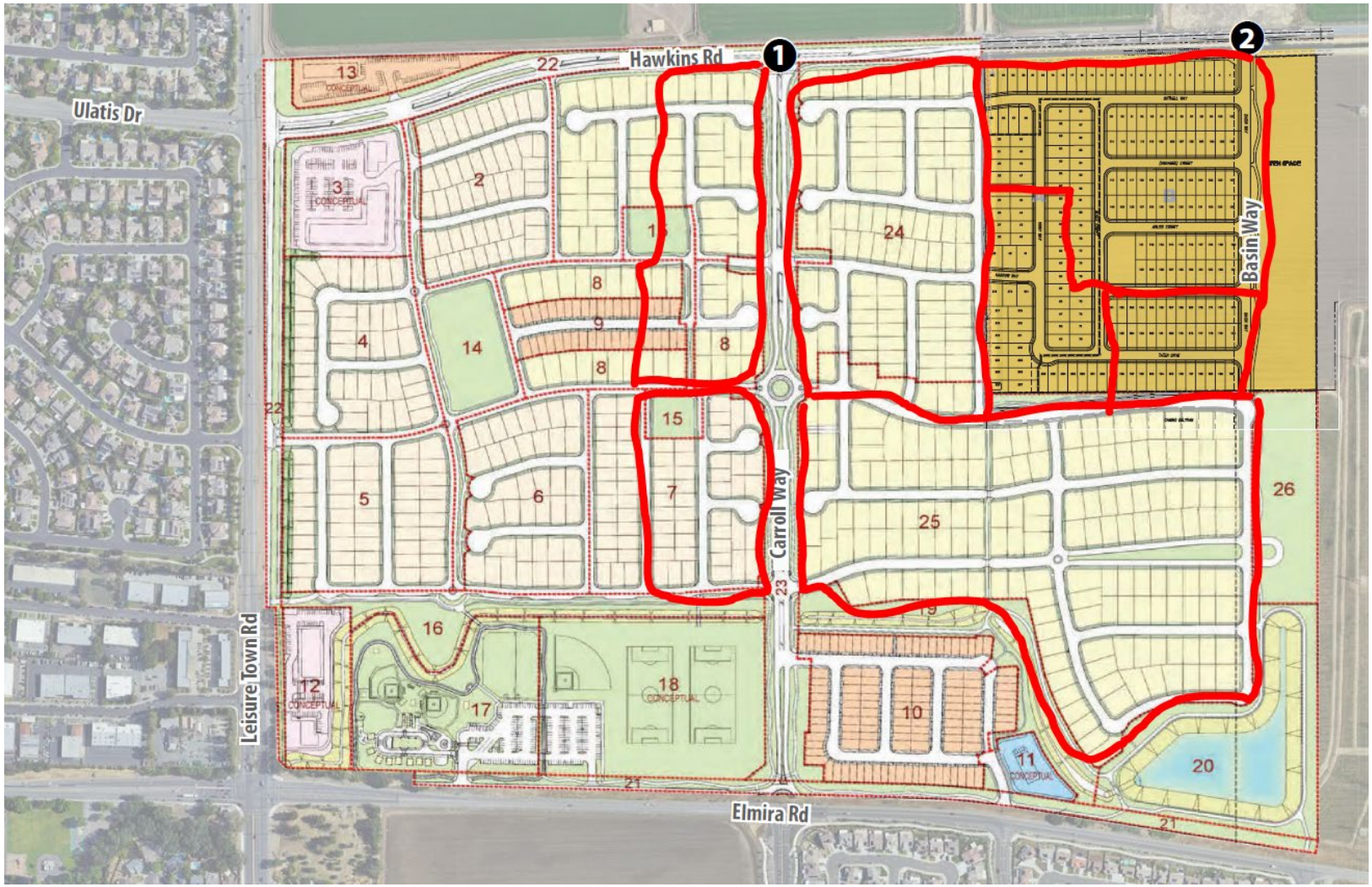
Figure 2

Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions

Appendix A – Technical Calculations and Supporting Data

7 Zones used for traffic assignments through study intersections 1 and 2.

Areas further to the west are not expected to use these intersections because other access points are closer.



Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	81	27	1	129	1	46	0	4	1	1	45
Future Vol, veh/h	12	81	27	1	129	1	46	0	4	1	1	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	101	34	1	161	1	58	0	5	1	1	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	162	0	0	135	0	0	323	295	101	315	329	162
Stage 1	-	-	-	-	-	-	131	131	-	164	164	-
Stage 2	-	-	-	-	-	-	192	164	-	151	165	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1417	-	-	1449	-	-	630	616	954	638	590	883
Stage 1	-	-	-	-	-	-	873	788	-	838	762	-
Stage 2	-	-	-	-	-	-	810	762	-	851	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1417	-	-	1449	-	-	583	609	954	629	583	883
Mov Cap-2 Maneuver	-	-	-	-	-	-	583	609	-	629	583	-
Stage 1	-	-	-	-	-	-	863	779	-	829	761	-
Stage 2	-	-	-	-	-	-	756	761	-	837	754	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.1	11.7	9.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	602	1417	-	-	1449	-	-	866
HCM Lane V/C Ratio	0.104	0.011	-	-	0.001	-	-	0.068
HCM Control Delay (s)	11.7	7.6	0	-	7.5	0	-	9.5
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	129	79	4	160	1	31	0	2	1	1	27
Future Vol, veh/h	41	129	79	4	160	1	31	0	2	1	1	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	161	99	5	200	1	39	0	3	1	1	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	201	0	0	260	0	0	491	474	161	525	573	201
Stage 1	-	-	-	-	-	-	263	263	-	211	211	-
Stage 2	-	-	-	-	-	-	228	211	-	314	362	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1371	-	-	1304	-	-	488	489	884	463	430	840
Stage 1	-	-	-	-	-	-	742	691	-	791	728	-
Stage 2	-	-	-	-	-	-	775	728	-	697	625	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1371	-	-	1304	-	-	450	466	884	445	409	840
Mov Cap-2 Maneuver	-	-	-	-	-	-	450	466	-	445	409	-
Stage 1	-	-	-	-	-	-	709	661	-	756	725	-
Stage 2	-	-	-	-	-	-	740	725	-	664	598	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	13.5	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	464	1371	-	-	1304	-	-	787
HCM Lane V/C Ratio	0.089	0.037	-	-	0.004	-	-	0.046
HCM Control Delay (s)	13.5	7.7	0	-	7.8	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.1

MOVEMENT SUMMARY

Site: 101 [AM_Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Carroll Way														
3	L2	105	3.0	131	3.0	0.119	4.2	LOS A	0.5	4.1	0.32	0.19	0.32	53.5
8	T1	1	0.0	1	0.0	0.119	4.1	LOS A	0.5	4.1	0.32	0.19	0.32	53.5
18	R2	2	3.0	3	3.0	0.119	4.2	LOS A	0.5	4.1	0.32	0.19	0.32	52.0
Approach		108	3.0	135	3.0	0.119	4.2	LOS A	0.5	4.1	0.32	0.19	0.32	53.4
East: Hawkins Rd														
1	L2	1	3.0	1	3.0	0.240	5.3	LOS A	1.2	9.3	0.35	0.21	0.35	56.9
6	T1	218	3.0	273	3.0	0.240	5.3	LOS A	1.2	9.3	0.35	0.21	0.35	56.9
16	R2	1	3.0	1	3.0	0.240	5.3	LOS A	1.2	9.3	0.35	0.21	0.35	55.3
Approach		220	3.0	275	3.0	0.240	5.3	LOS A	1.2	9.3	0.35	0.21	0.35	56.9
North: Carroll Way														
7	L2	3	3.0	4	3.0	0.198	6.1	LOS A	0.9	6.8	0.53	0.45	0.53	56.0
4	T1	28	3.0	35	3.0	0.198	6.1	LOS A	0.9	6.8	0.53	0.45	0.53	56.0
14	R2	108	3.0	135	3.0	0.198	6.1	LOS A	0.9	6.8	0.53	0.45	0.53	54.4
Approach		139	3.0	174	3.0	0.198	6.1	LOS A	0.9	6.8	0.53	0.45	0.53	54.7
West: Hawkins Rd														
5	L2	12	3.0	15	3.0	0.147	4.0	LOS A	0.7	5.4	0.15	0.05	0.15	57.7
2	T1	115	3.0	144	3.0	0.147	4.0	LOS A	0.7	5.4	0.15	0.05	0.15	57.6
12	R2	24	3.0	30	3.0	0.147	4.0	LOS A	0.7	5.4	0.15	0.05	0.15	56.0
Approach		151	3.0	189	3.0	0.147	4.0	LOS A	0.7	5.4	0.15	0.05	0.15	57.4
All Vehicles		618	3.0	773	3.0	0.240	5.0	LOS A	1.2	9.3	0.34	0.22	0.34	55.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM_Peak (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Carroll Way														
3	L2	58	3.0	73	3.0	0.091	5.3	LOS A	0.4	2.8	0.52	0.43	0.52	52.7
8	T1	1	0.0	1	0.0	0.091	5.1	LOS A	0.4	2.8	0.52	0.43	0.52	52.8
18	R2	1	3.0	1	3.0	0.091	5.3	LOS A	0.4	2.8	0.52	0.43	0.52	51.3
Approach		60	3.0	75	3.0	0.091	5.2	LOS A	0.4	2.8	0.52	0.43	0.52	52.7
East: Hawkins Rd														
1	L2	33	3.0	41	3.0	0.258	5.9	LOS A	1.3	9.8	0.43	0.31	0.43	55.8
6	T1	182	3.0	228	3.0	0.258	5.9	LOS A	1.3	9.8	0.43	0.31	0.43	55.7
16	R2	3	3.0	4	3.0	0.258	5.9	LOS A	1.3	9.8	0.43	0.31	0.43	54.2
Approach		218	3.0	273	3.0	0.258	5.9	LOS A	1.3	9.8	0.43	0.31	0.43	55.7
North: Carroll Way														
7	L2	2	3.0	3	3.0	0.113	4.9	LOS A	0.5	3.7	0.46	0.35	0.46	57.1
4	T1	17	3.0	21	3.0	0.113	4.9	LOS A	0.5	3.7	0.46	0.35	0.46	57.0
14	R2	66	3.0	82	3.0	0.113	4.9	LOS A	0.5	3.7	0.46	0.35	0.46	55.4
Approach		85	3.0	106	3.0	0.113	4.9	LOS A	0.5	3.7	0.46	0.35	0.46	55.7
West: Hawkins Rd														
5	L2	121	3.0	151	3.0	0.391	6.7	LOS A	2.4	19.0	0.27	0.12	0.27	54.4
2	T1	246	3.0	308	3.0	0.391	6.7	LOS A	2.4	19.0	0.27	0.12	0.27	54.4
12	R2	24	3.0	30	3.0	0.391	6.7	LOS A	2.4	19.0	0.27	0.12	0.27	52.9
Approach		391	3.0	489	3.0	0.391	6.7	LOS A	2.4	19.0	0.27	0.12	0.27	54.3
All Vehicles		754	3.0	942	3.0	0.391	6.1	LOS A	2.4	19.0	0.36	0.23	0.36	54.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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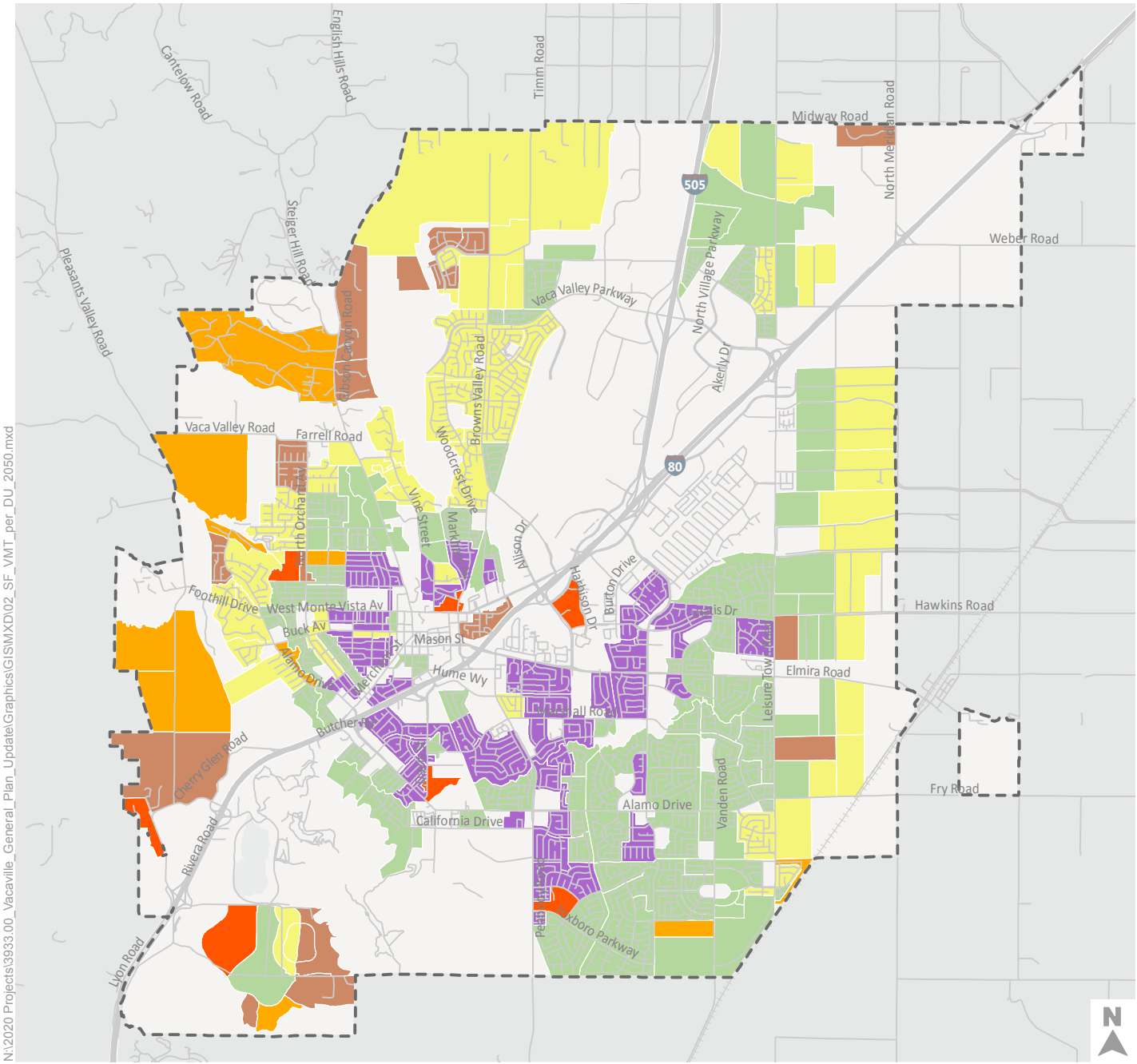

Figure 2

% Difference from Citywide Average Home-based VMT per DU (76.54)

- ≤ -15%
- -10% to -14.9%
- -5% to -9.9%
- 0% to -4.9%
- +5% to +0.1%
- +10% to +5.1%
- +20% to +10.1%
- > +20%

Urban Growth/Model Boundary

TAZs with <10 Single Family DU

All Traffic Analysis Zones (TAZs) with at least 10 dwelling units are allocated a color according to its relative VMT efficiency to the left. In many instances, a single TAZ may include multiple land uses, which means they show VMT efficiency on multiple figures. All VMT estimates are derived from the City of Vacaville travel demand model. VMT includes all home-based weekday daily travel (with trip lengths not truncated at political boundaries).

Home-based VMT per Single Family Dwelling Unit
Buildout Minus Northeast New Growth Area Scenario