

Figure 8: Project Truck Trip Distribution

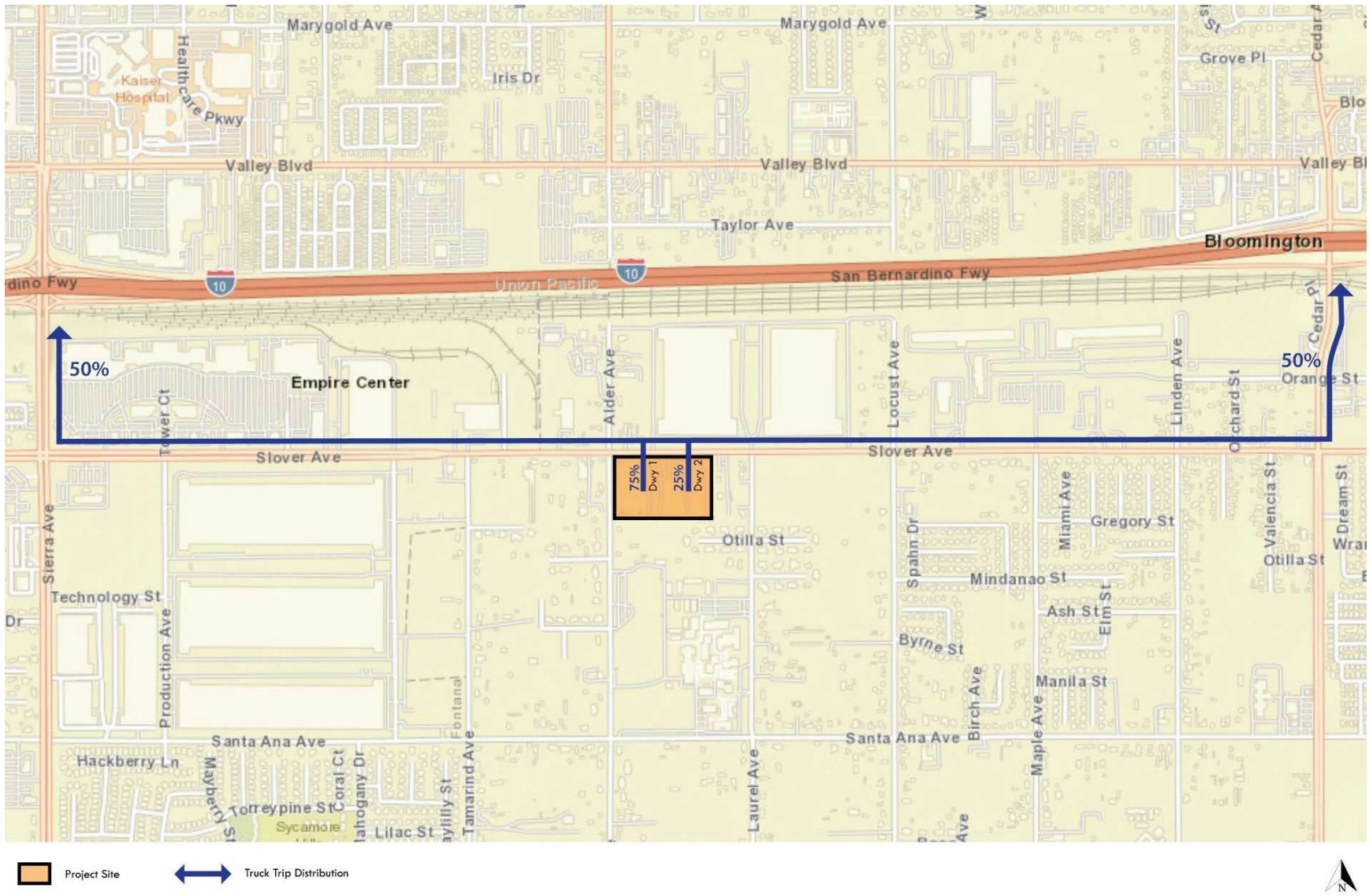
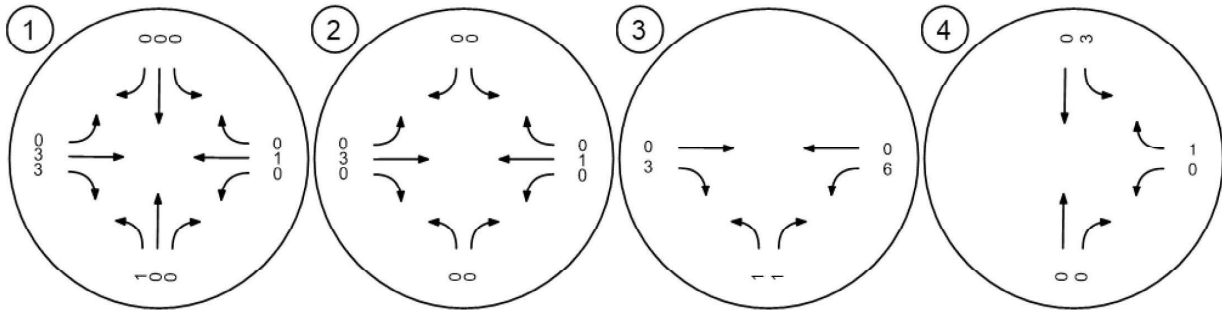
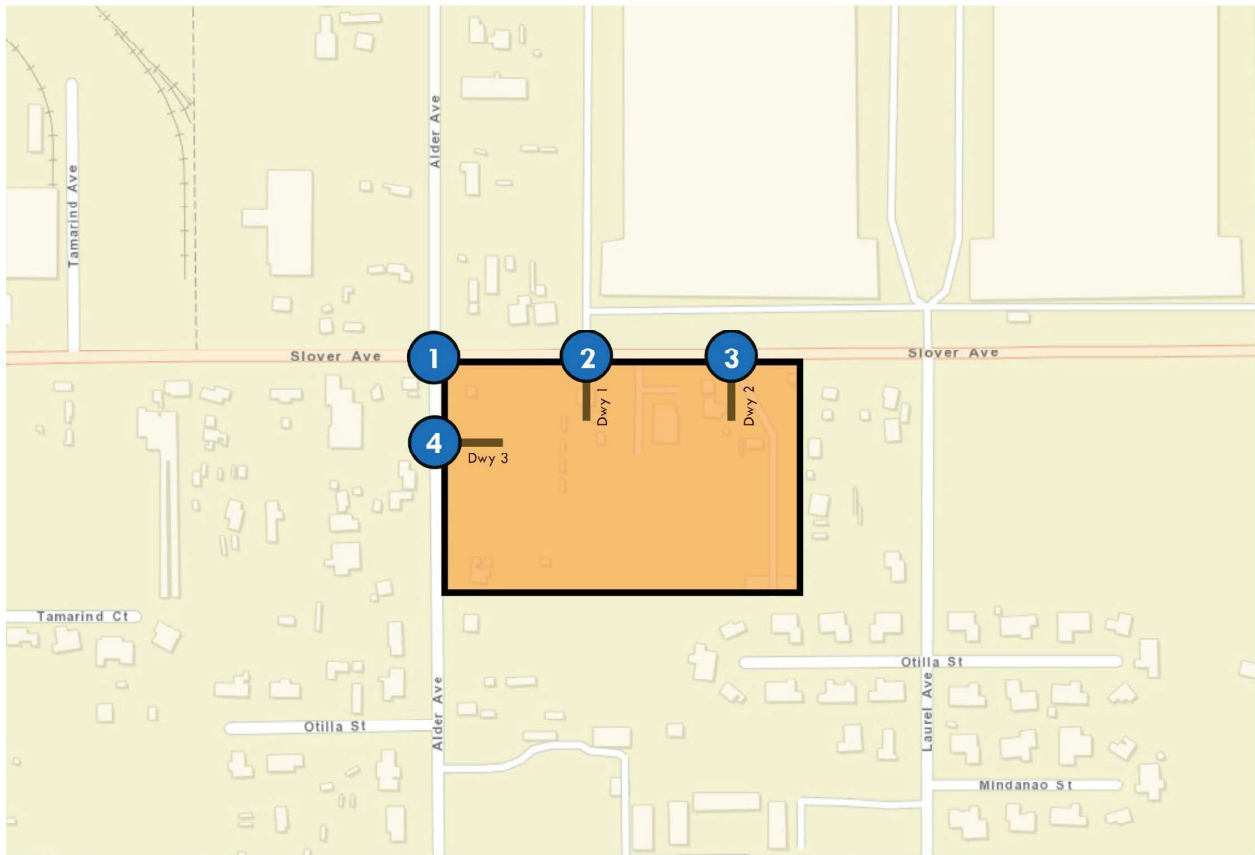
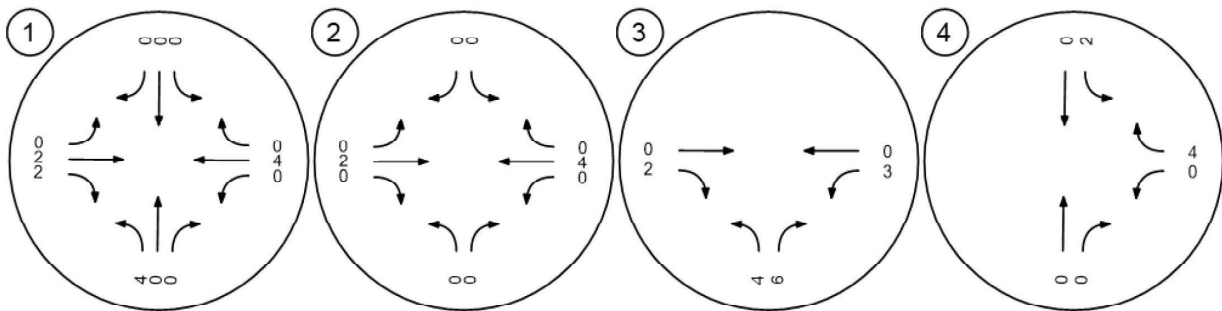


Figure 9: Project Passenger Vehicle Trip Assignment

AM Automobile Trip Assignment



PM Automobile Trip Assignment

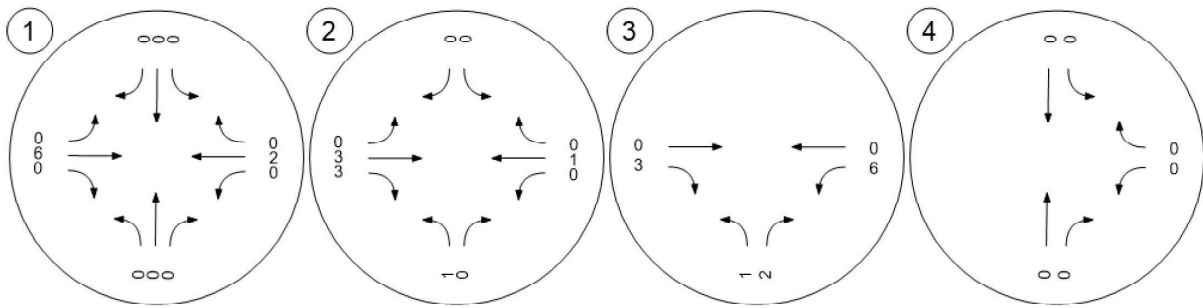


Project Site Study Intersection

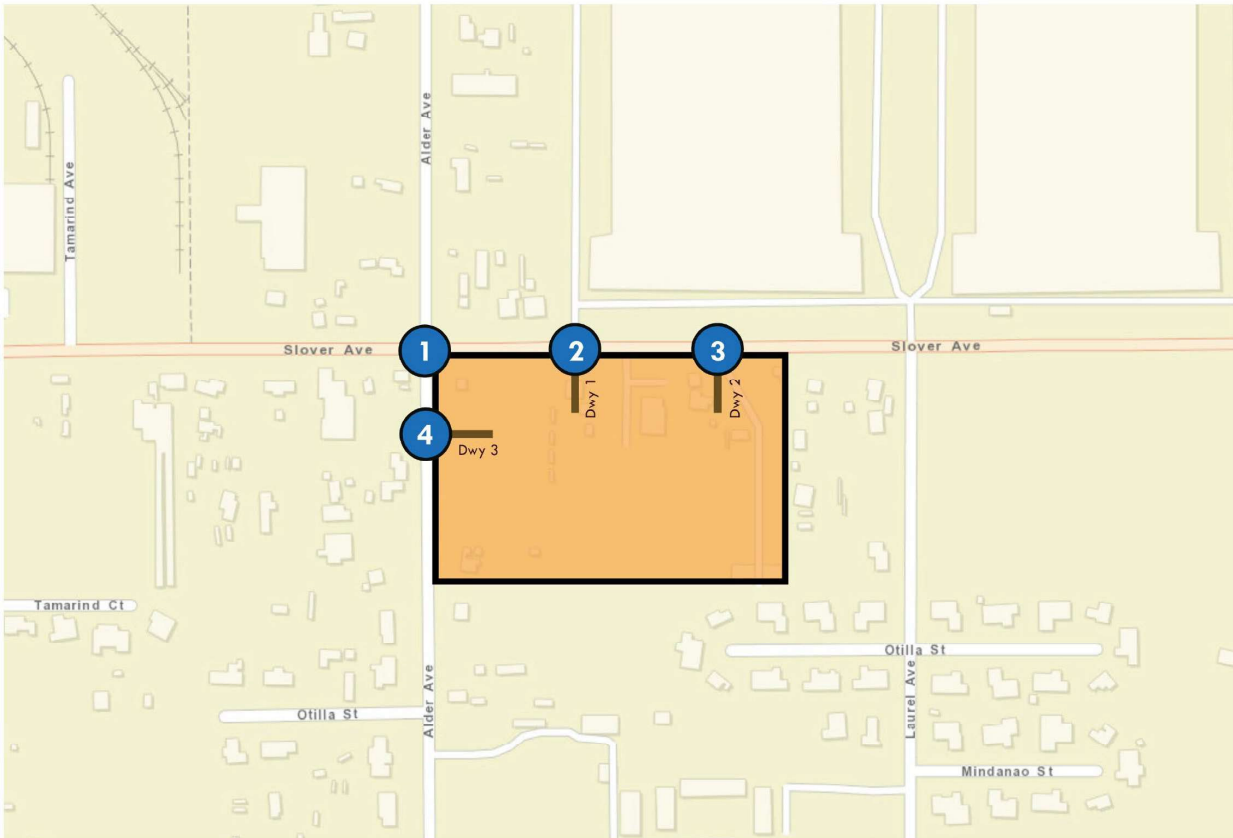
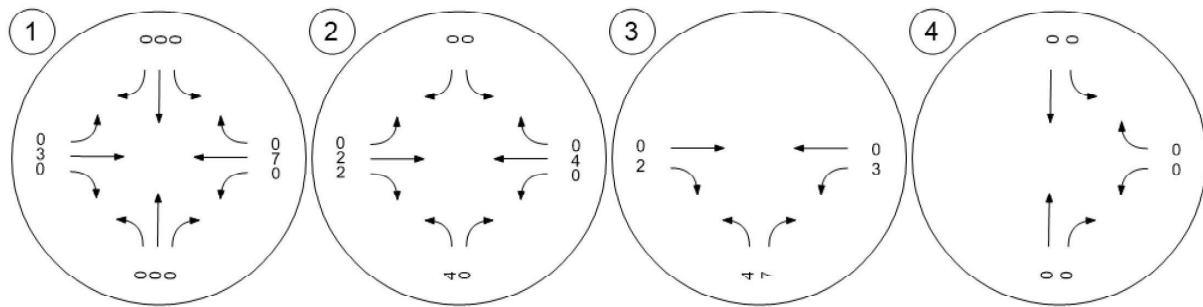


Figure 10: Project Truck Trip Assignment (PCE)

AM Truck Trip Assignment



PM Truck Trip Assignment



Project Site Study Intersection



5 PROJECT IMPACTS

5.1 Existing Plus Project Traffic Volumes and Intersection Operations

Existing plus Project traffic volumes were developed by adding the project passenger vehicle and truck trip assignment to the Existing baseline traffic volumes. The traffic volumes for this scenario are shown in Figure 11. Levels of Service at the study area intersections were determined using the HCM methodology, described previously in section 2.3. Table 6 shows the Opening Year plus Other Projects plus Project AM and PM peak hour levels of service at study intersections. All LOS calculations are provided in *Appendix C*. As shown in Table 6, all intersections would operate at satisfactory LOS during both AM and PM peak hours except for the intersection of Alder Ave/Slover Ave which would operate at an unsatisfactory LOS F during the AM and PM peak hours.

Table 6: Existing Plus Project AM and PM Peak Hour Level of Service

Intersection	Traffic Control	Existing				Existing Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
1. Alder Ave/Slover Ave	TWSC	513.5	F	73.0	F	550.4	F	77.1	F
2. Proj Dwy 1/Slover Ave	TWSC	-	-	-	-	13.4	B	21.4	C
3. Proj Dwy 2/Slover Ave	TWSC	-	-	-	-	12.7	B	18.8	C
4. Alder Ave/Proj Dwy 3	TWSC	-	-	-	-	9.5	A	8.6	A

 =Unsatisfactory Intersection Operation

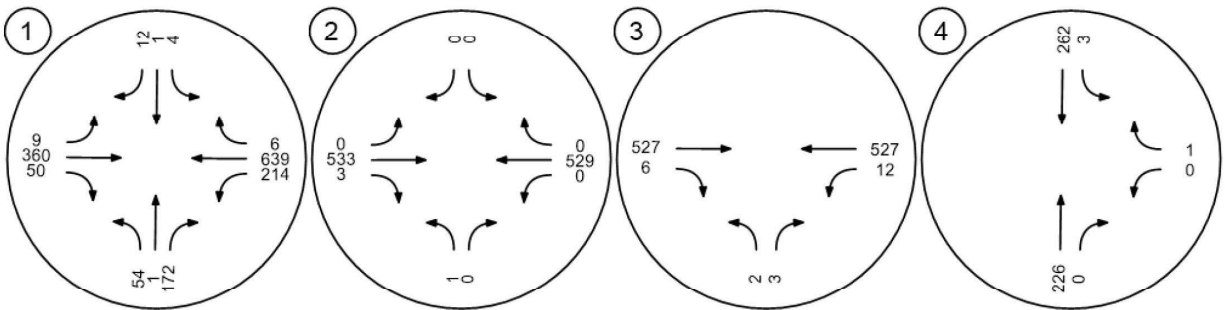
TWSC = Two-Way Stop Controlled

¹ Delay in Seconds

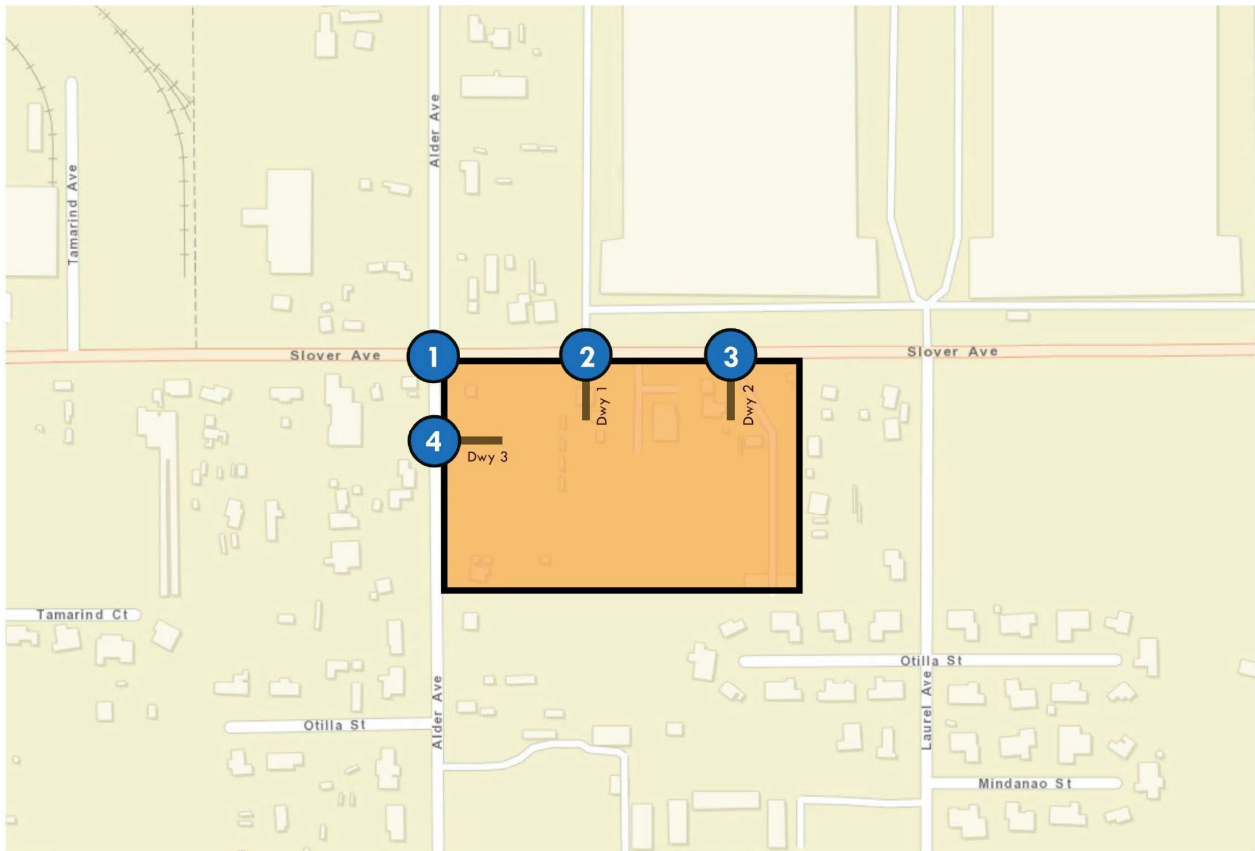
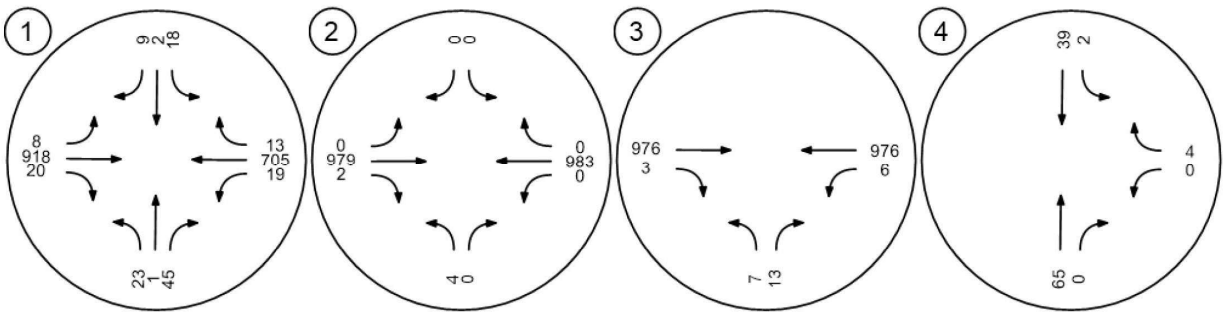
² Level of Service

Figure 11: Existing Plus Project AM and PM Peak Hour Volumes

Existing AM Plus Project Peak Hour Traffic Volumes



Existing PM Plus Project Peak Hour Traffic Volumes



Project Site Study Intersection




5.2 Opening Year Plus Project Traffic Volumes and Intersection Operations

Opening Year plus Project traffic volumes were determined by adding the project trips to baseline Opening Year traffic volumes. The Opening Year plus Project traffic volumes are shown in Figure 12. Levels of Service at the study area intersections were determined using the HCM methodology, described previously in section 2.3. Table 7 shows the Future Build-Out plus Project AM and PM peak hour levels of service at study intersections. All LOS calculations are provided in Appendix C. As shown in Table 7, all intersections would operate at satisfactory LOS during both AM and PM peak hours except for the intersection of Alder Ave/Slover Ave which would operate at an unsatisfactory LOS F during the AM and PM peak hours.

Mitigation for the impacted intersection is discussed in Section 7 Project Mitigation and Fair Share.

Table 7: Opening Year Plus Project AM and PM Peak Hour Level of Service

Intersection	Traffic Control	Opening Year				Opening Year Plus Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
1. Alder Ave/Slover Ave	TWSC	663.4	F	84.8	F	715.6	F	90.4	F
2. Proj Dwy 1/Slover Ave	TWSC	-	-	-	-	13.7	B	22.4	C
3. Proj Dwy 2/Slover Ave	TWSC	-	-	-	-	12.9	B	19.5	C
4. Alder Ave/Proj Dwy 3	TWSC	-	-	-	-	9.5	A	8.6	A

 =Unsatisfactory Intersection Operation

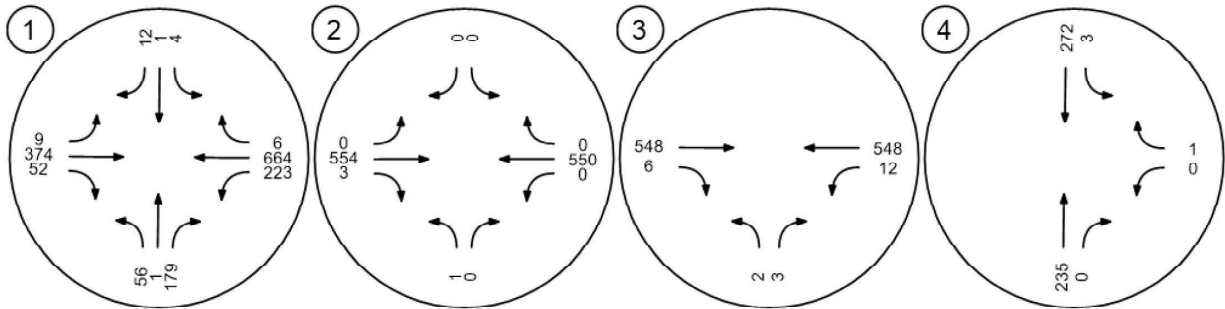
TWSC = Two-Way Stop Controlled

¹ Delay in Seconds

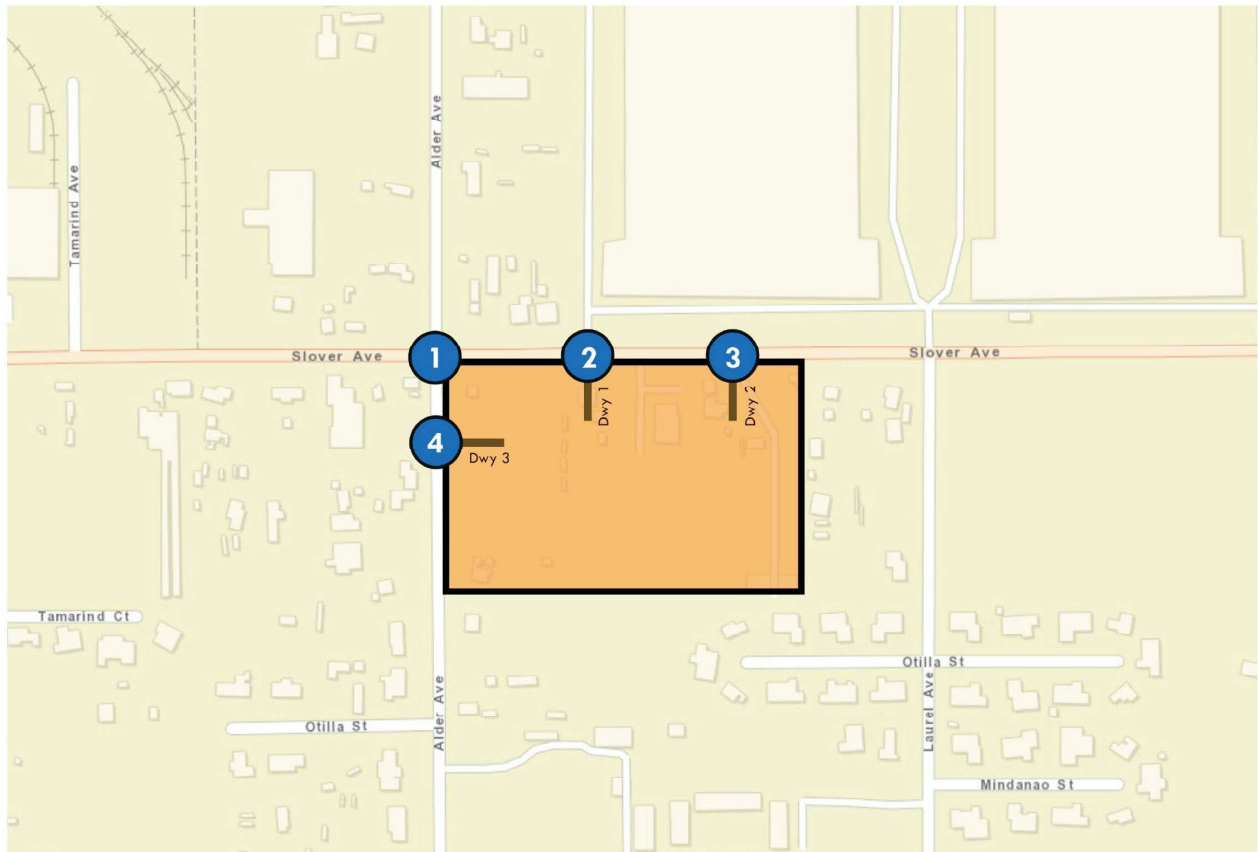
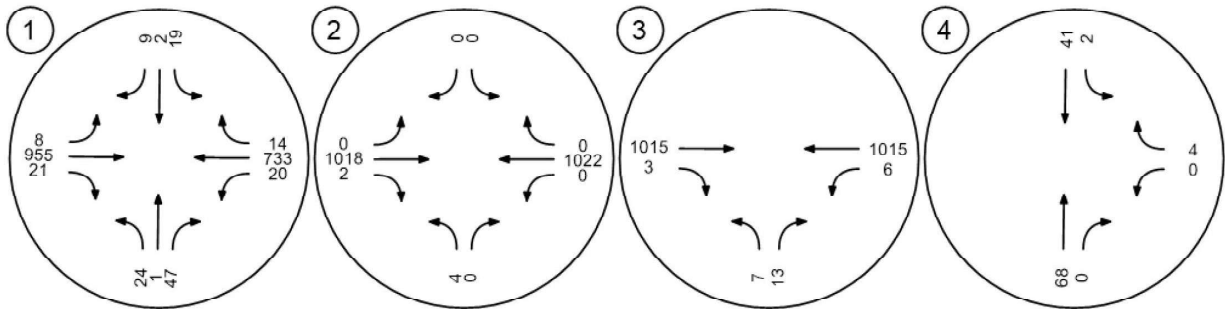
² Level of Service

Figure 12: Opening Year Plus Project Peak Hour Traffic Volumes

Opening Year AM Plus Project Peak Hour Traffic Volumes



Opening Year PM Plus Project Peak Hour Traffic Volumes



Project Site Study Intersection



6 RECOMMENDED IMPROVEMENTS AND WARRANT ANALYSIS

6.1 Recommended Improvements

Development of the proposed industrial building would result in unsatisfactory LOS at the intersection of Alder Ave/Slover Ave during both the Existing plus Project and Opening plus project conditions. It is recommended that a signal be added as a part of project improvements to the intersection for satisfactory intersection operations, and also to improve NB/SB turning movement safety at the intersection.

Table 8 shows the LOS at the intersection of Alder Ave/Slover Ave with the proposed improvements. As seen in Table 8, the intersection would operate at satisfactory LOS with the recommended improvements.

Table 8: Existing Plus Project and Opening Plus Project AM and PM Peak Hour Level of Service with Improvements

Scenario	Intersection	Without Improvements				With Improvements					
		Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay ¹	LOS ²	Delay ¹	LOS ²		Delay ¹	LOS ²	Delay ¹	LOS ²
Existing Plus Project	1. Alder Ave/Slover Ave	TWSC	550.4	F	77.1	F	Signal	30.98	C	29.9	C
Opening Plus Project	1. Alder Ave/Slover Ave	TWSC	715.6	F	90.4	F	Signal	30.67	C	29.6	C

¹ Delay in Seconds
² Level of Service

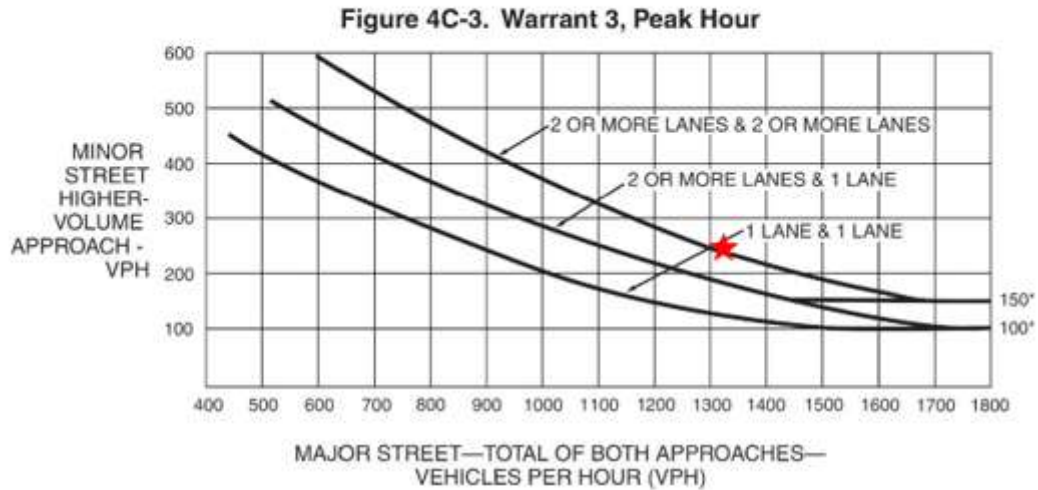
 =Unsatisfactory Intersection Operation
 TWSC = Two-Way Stop Controlled

6.2 Signal Warrant for Alder Avenue/Slover Avenue

The California Manual of Uniform Traffic Control Devices (CA MUTCD) 2014 Revision 6 (March 30, 2021) provides a total of eight types of signal warrant analyses to determine whether a traffic signal may be warranted at a given location. Warrant 3, Peak Hour was evaluated as count data is unavailable to evaluate the other 7 warrants. Section 4.C.04 of the CA MUTCD notes that “traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.” Intersection #1 Alder Ave/Slover Ave was analyzed to substantiate the proposed signal for mitigation. As shown in Figure 13, traffic volume at the intersection with the project would meet the signal warrant due to high volume of traffic during both AM and PM peak hours in the Opening plus Project conditions.

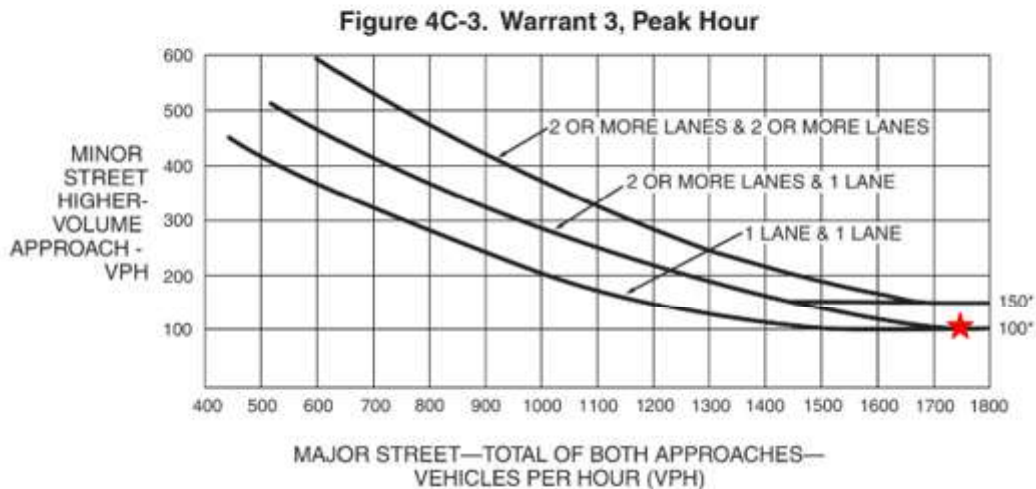
Figure 13: Alder Ave/Slover Ave Signal Warrant

Alder Ave/Slover Ave
 Opening AM Plus Project Peak Hour
 Minor Street Approach – 253 vehicles
 Major Street (Both Approaches) – 1,328 vehicles
 Meets Warrant - Yes



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Alder Ave/Slover Ave
 Opening PM Plus Project Peak Hour
 Minor Street Approach - 102 vehicles
 Major Street (Both Approaches) – 1,751 vehicles
 Meets Warrant - Yes



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

APPENDIX A – SCOPE OF WORK



SCOPE FOR TRAFFIC STUDY

Project Name:	Alder Avenue/Slover Avenue Industrial Project
----------------------	--

This Scope for Traffic Study acknowledges San Bernardino County Department of Public Works, Traffic Division requirements of traffic impact analysis for the project and is subject to change:

Project Address:	Southeast corner of Alder Avenue and Slover Avenue in Bloomington (See Figure 1 attached)		
Project Description:	Construction of a 259,481 square foot speculative high-cube warehouse with 38 dock doors. Access will be provided via two driveways on Slover Avenue and one driveway on Alder Avenue. The site plan is provided as Figure 2 (attached).		
City:	Unincorporated San Bernardino County		
Project Buildout Year:	2023	Ambient Growth Rate per Year:	2%
Closest Intersection (Xtn) to the Project			
Xtn N/S Street Name:	Alder Avenue		
Xtn E/W Street Name:	Slover Avenue		
Thomas Guide Pg+Grid:		County Supervisorial District:	5

	Engineer	Developer
Company:	EPD Solutions	Duke Realty
Name:	Meghan Macias	Nancy Shultz
Address:	2 Park Plaza, Suite 1120	200 Spectrum Center Dr, St 1600
City, State, Zip Code:	Irvine, CA, 92614	Irvine, CA 92618
Phone #:	(949) 794-1186	(949) 797-7000
Fax #:		
Email:	meghan@epdsolutions.com	

By: *Meghan Macias*

Reviewed By:

Print Name: Meghan Macias

Print Name:

Consultant/Developer's Representative

Date
12/23/21

Traffic Division Representative Date



SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

1. Traffic Distribution: Please insert or attach Figure(s) illustrating project trip distribution in percentages and volumes at the study intersections analyzed.

Please see the attached trip generation analysis. The project does not meet the County’s criteria of 100 peak hour trips or more for preparation of a TIA. However, the County has requested a study be provided due to concerns over the proximity to Bloomington High School and the fact that Slover Avenue is a Major Highway and Alder Avenue is a Secondary Highway. Please see the attached trip distribution figure.

2. Trip Credit: Exact amount of credit subject to approval by Traffic Division.

Transportation Demand Management (TDM)	Yes/no	No
Existing Active Land Use	Yes/no	No
Previous Land Use	Yes/no	No
Internal Trip Reduction	Yes/no	No
Pass-by Trip Reduction	Yes/no	No

3. Related Projects: Consultant should check with Planning in the San Bernardino County Department of Land Use Services and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to Traffic Division for review and approval before being incorporated in the study.

4. Freeway Analysis: The potential traffic impact on the following Freeway(s) must be considered.

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans’ freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans’ Guide for the Preparation of Traffic Impact Studies (December 2002) and can be obtained from http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using HCM procedures. Appendix A of the SANBAG CMP outlines allowable modifications to these procedures. The SANBAG CMP can be viewed online at: <https://www.gosbcta.com/plans-projects/plans-traffic-mitigation.html>



SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

5. Trip Generation

Trip Generation Rate(s) Source: ITE Trip Generation		I – Institute of Transportation Engineers; S – San Diego Traffic Generators; C – County; O – Other:					Edition:		10th		
Land Use Code	Land Use	Rate Based on	Qty	*AVTE vs	ADT	Weekday a.m. peak		Weekday p.m. peak		Weekend peak hour	
						In	Out	In	Out	In	Out
154	High Cube Transload and Short-Term Storage Warehouse	TSF	259.481		363	23	7	11	27		

Please see the attached trip generation memo.

* - Average Vehicle Trip Ends.
For ITE Land Uses provide number and name of Land Use. e.g. LU 210 – Single Family Detached Housing



SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

6. Study Intersections: At minimum, the study shall include the following intersections. The list is subject to change based on the determination of related projects, trip generation and distribution, and/or other sensitive intersections are identified based on study findings and/or concurrent development. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study.

Xtn #	% County	Thomas Guide Page+Grid	N/S + E/W Street Name	City	Signalized	CMP
1	100%		Alder Avenue/Slover Avenue	Unincorporated (Bloomington)	Yes/no	Yes/no
2	100%		Slover Avenue/Project Driveway 1	Unincorporated (Bloomington)	Yes/no	Yes/no
3	100%		Slover Avenue/Project Driveway 2	Unincorporated (Bloomington)	Yes/no	Yes/no
4	100%		Alder Avenue/Project Driveway 3	Unincorporated (Bloomington)	Yes/no	Yes/no
5					Yes/no	Yes/no
6					Yes/no	Yes/no
7					Yes/no	Yes/no
8					Yes/no	Yes/no
9					Yes/no	Yes/no
10					Yes/no	Yes/no

The County has requested a study be provided due to concerns over the proximity to Bloomington High School and the fact that Slover Avenue is a Major Highway and Alder Avenue is a Secondary Highway. Therefore, a focused study is proposed including the intersection of Alder Avenue/Slover Avenue along with the intersections of Slover Ave/Project Dwy 1, Slover Ave/Project Dwy 2 and Alder Ave/Project Dwy 3.

Cities to be consulted:



SCOPE FOR TRAFFIC STUDY

Project Name:	Alder Avenue/Slover Avenue Industrial Project
----------------------	---

7. Other:

Traffic counts may be conducted immediately per the following:
<ul style="list-style-type: none">• Must be taken on Tuesdays, Wednesdays or Thursdays.
<ul style="list-style-type: none">• Counts in “tourist” and/or along travel corridors shall have counts on Fridays and Sundays.
<ul style="list-style-type: none">• Must exclude holidays, and the first weekdays before and after the holiday.
<ul style="list-style-type: none">• Must be taken on days when local schools or colleges are in session.
<ul style="list-style-type: none">• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).
<ul style="list-style-type: none">• Traffic counts used for other traffic studies in the area shall NOT be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.
<ul style="list-style-type: none">• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.
<ul style="list-style-type: none">• For all proposed mitigation measures, a conceptual plan for the improvements shall be submitted to our Traffic Studies section for review and approval prior to the approval of the Traffic Impact Analysis. All proposed improvements shall be within the right-of-way.
<ul style="list-style-type: none">• For all cumulative mitigation measures, a cost estimate for the improvement shall be submitted.

This analysis must follow the most current Traffic Impact Study Guidelines for the County as stated in the County’s Road Planning and Design Standards.

VMT Screening: The project was compared to the VMT analysis screening criteria in the County’s Transportation Impact Study Guidelines. The project is located in a low VMT area and would there be considered to have a less than significant impact on VMT. The project would screen out of further analysis. Please see attached Trip Generation and VMT Screening Memo.

8. Fees

The County charges on an actual cost basis for review of traffic studies. An initial deposit of \$2000 is required at the time that the Traffic Impact study is a land use application is filed with the Department of Land Use Services. If the review costs exceed the initial deposit, the applicant will be expected to provide additional funds and the review will be suspended until the additional funds are deposited.



SCOPE FOR TRAFFIC STUDY

Project Name:	Alder Avenue/Slover Avenue Industrial Project
----------------------	---

9. Contact Information:

Please submit a final copy of this scope to the Traffic Division. Draft scopes may be sent electronically or by physical mail to the contact information below.

County of San Bernardino
Dept. of Public Works, Traffic Division
825 E. 3rd Street, Rm 115
San Bernardino, CA 92415-0835

Phone: 909-387-8186

Fax: 909-387-7809

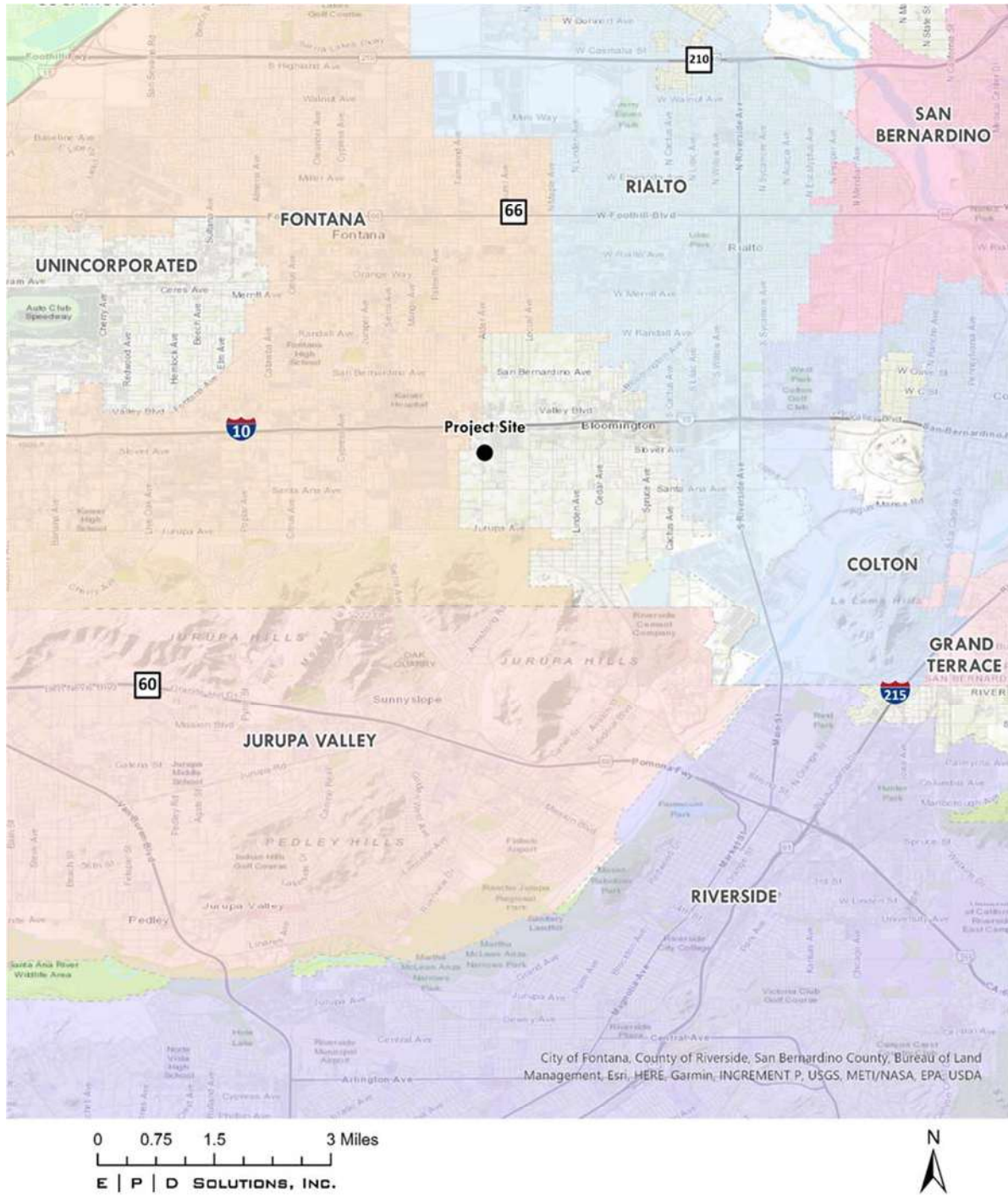
Email: Anthony.Pham@dpw.sbcounty.gov



SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

Figure 1: Project Location

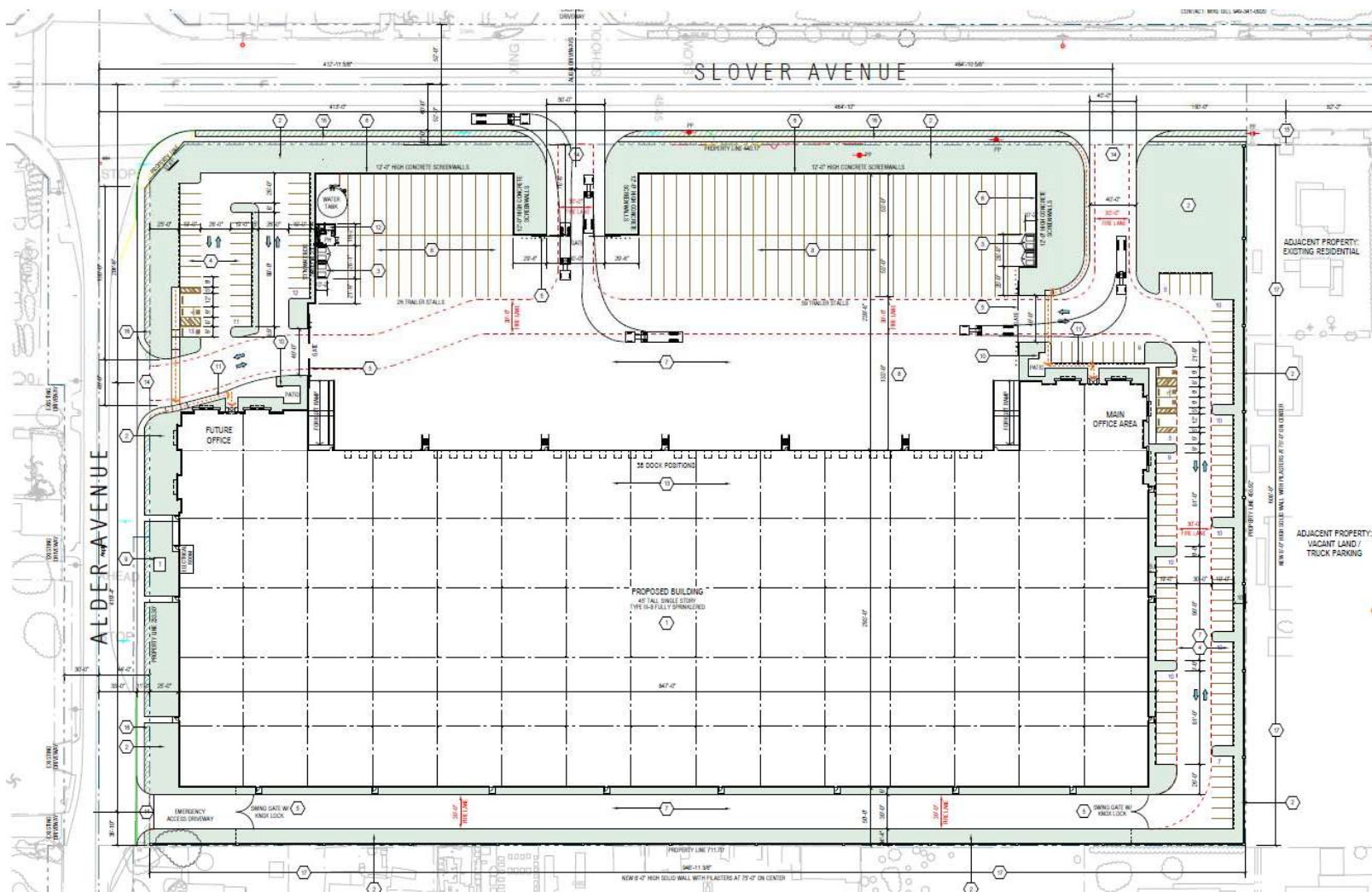




SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

Figure 2: Project Site Plan





SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

Figure 3: Project Study Area

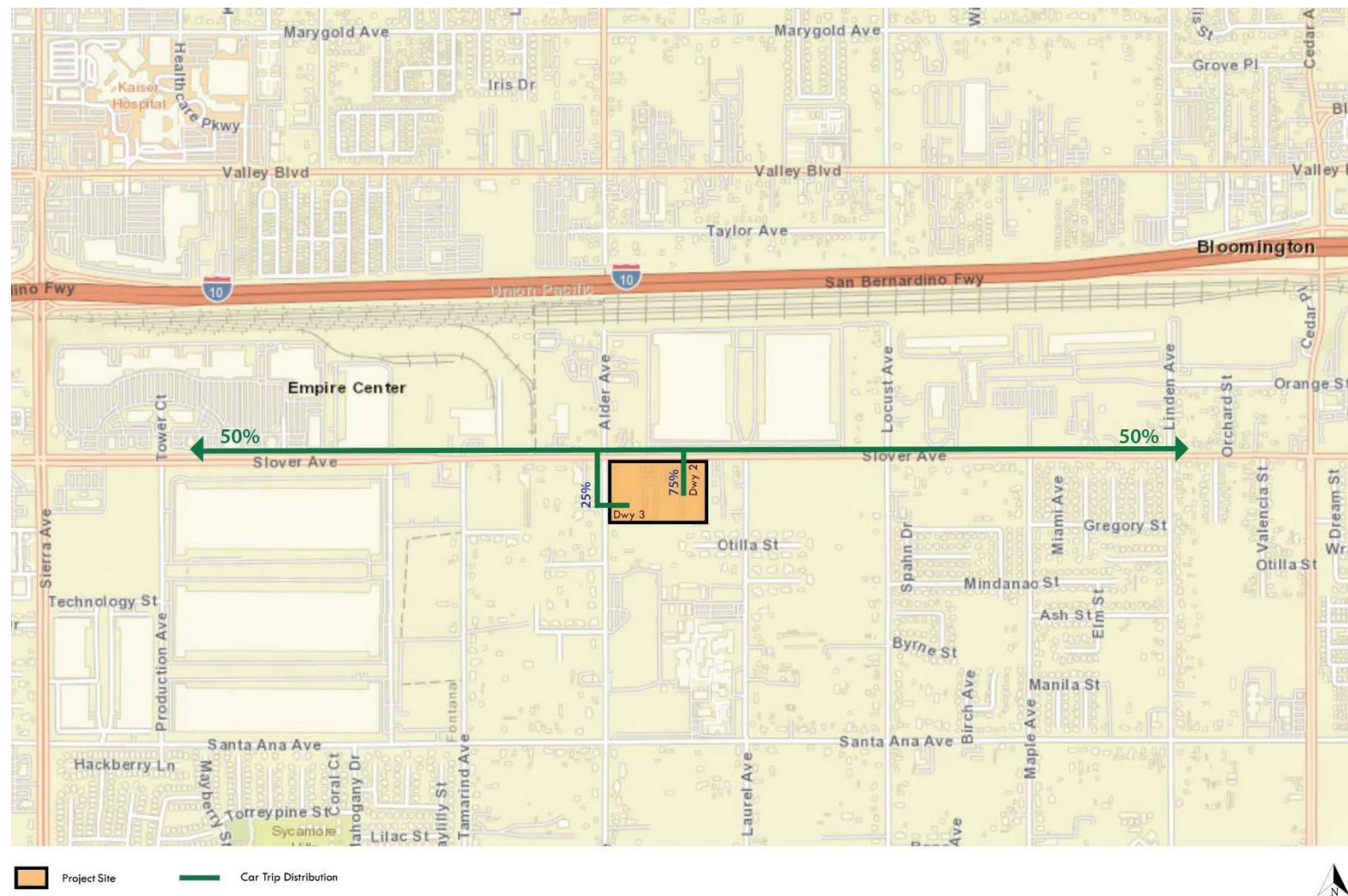




SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

Figure 4: Automobile Trip Distribution

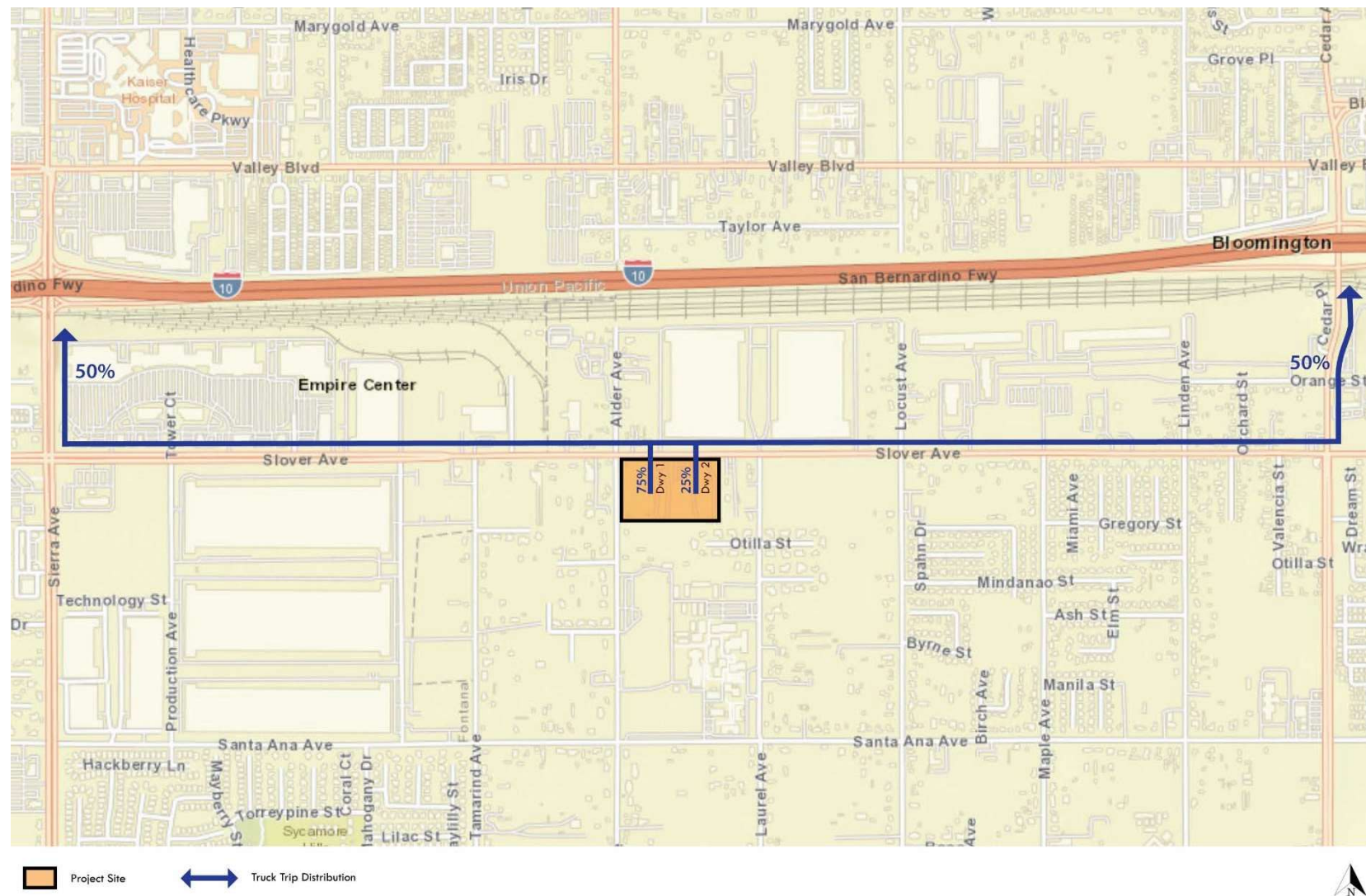




SCOPE FOR TRAFFIC STUDY

Project Name: Alder Avenue/Slover Avenue Industrial Project

Figure 5: Truck Trip Distribution



ENVIRONMENT | PLANNING | DEVELOPMENT SOLUTIONS, INC.

Date: November 18, 2021
Prepared by: Meghan Macias, TE
To: Norah Jaffan
Site: Alder Avenue/Slover Avenue Industrial Project
Subject: Trip Generation and Vehicle Miles Traveled (VMT) Screening Analysis

This technical memorandum evaluates the trip generation and need to prepare a traffic impact analysis (TIA) or vehicle miles traveled (VMT) analysis for the Alder Avenue/Slover Avenue Industrial project. The project is located on the southeast corner of Alder Avenue and Slover Avenue in unincorporated San Bernardino County. The project proposes to construct a 259,481 square foot speculative high-cube warehouse with 38 dock doors. Access will be provided via two driveways on Slover Avenue and one driveway on Alder Avenue. The project site is currently occupied by several small industrial businesses and at least two single family homes. The existing land use is not evaluated as part of this analysis. The project site plan is shown in Figure 1.

Project Trip Generation and TIA Screening

The project trip generation was prepared using trip rates for High Cube Transload and Short-Term Storage Warehouse from the Institute of Transportation Engineers (ITE) *Trip Generation*, 11th Edition (2021). The truck percentages were determined using data from the SCAQMD Warehouse Truck Trip Study, July 17, 2017. A Passenger Car Equivalent (PCE) factor was added to the truck trips to account for the larger vehicle size and increased roadway capacity utilized by large trucks. Table 1 presents the trip generation estimate for the proposed project.

As shown in Table 1, the project is forecast to generate 531 daily PCE trips including 30 PCE trips during the AM peak hour and 38 PCE trips during the PM peak hour. The County of San Bernardino Transportation Impact Study Guidelines indicates projects that generate 100 or more trips during any peak hour have the potential to create a traffic impact and would be required to prepare a Traffic Impact Assessment (TIA) using level of service (LOS). Based on the peak hour trip generation of 30 PCE trips during the AM peak hour and 38 PCE trips during the PM peak hour, the project should not be required to prepare a LOS TIA.

VMT Screening Analysis

Senate Bill (SB) 743 was signed by Governor Brown in 2013 and required the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to LOS for evaluating Transportation impacts. SB743 specified that the new criteria should promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks and a diversity of land uses. The bill also specified that delay-based level of service could no longer be considered an indicator of a significant impact on the environment. In response, Section 15064.3 was added to the CEQA Guidelines beginning January 1, 2019. Section 15064.3 - Determining the Significance of Transportation

Impacts states that Vehicle Miles Traveled (VMT) is the most appropriate measure of transportation impacts and provides lead agencies with the discretion to choose the most appropriate methodology and thresholds for evaluating VMT. Section 15064.3(c) states that the provisions of the section shall apply statewide beginning on July 1, 2020.

The San Bernardino County Transportation Impact Study Guidelines (July 19, 2019) provide VMT analysis methodology, impact thresholds and screening thresholds to determine if projects would require a vehicle miles traveled (VMT) analysis. The TIS Guidelines provide criteria for projects that would be considered to have a less-than significant impact on VMT and therefore could be screened out from further analysis. If a project meets one of the following criteria, then the VMT impact of the project is considered less-than significant and no further analysis of VMT would be required:

- The project serves the local community and thereby has the potential to reduce VMT.
- The project generates less than 110 daily vehicle trips.
- The project is located within a Transit Priority area.
- The project is located in a low VMT generating area.

The project would not be considered a local-serving use, as defined in the guidelines. Per the project trip generation shown in Table 1, the project would generate more than 110 daily trips. The project is also not located in a Transit Priority Area. Therefore, based on bullets 1-3, the project would not screen out of a VMT analysis.

To determine if the project is located in a low VMT generating area, the SBCTA VMT Screening Tool was utilized. The County's guidelines specify that a low-VMT generating area is an area where the VMT/employee is not greater than 4% below the existing VMT per employee for the unincorporated County. Using the VMT Screening Tool, the VMT/employee in the project zone is 16.3 which is 13.64% less than the unincorporated County VMT/employee of 18.9. The results from the screening tool are shown in Figure 2.

Because the project is located in a low VMT generating area, the project is presumed to have a less than significant impact on VMT and would not require further VMT analysis.

If you have any questions about this information, please contact me at (949) 794-1186 or meghan@epdsolutions.com.

Figure 1: Project Site Plan

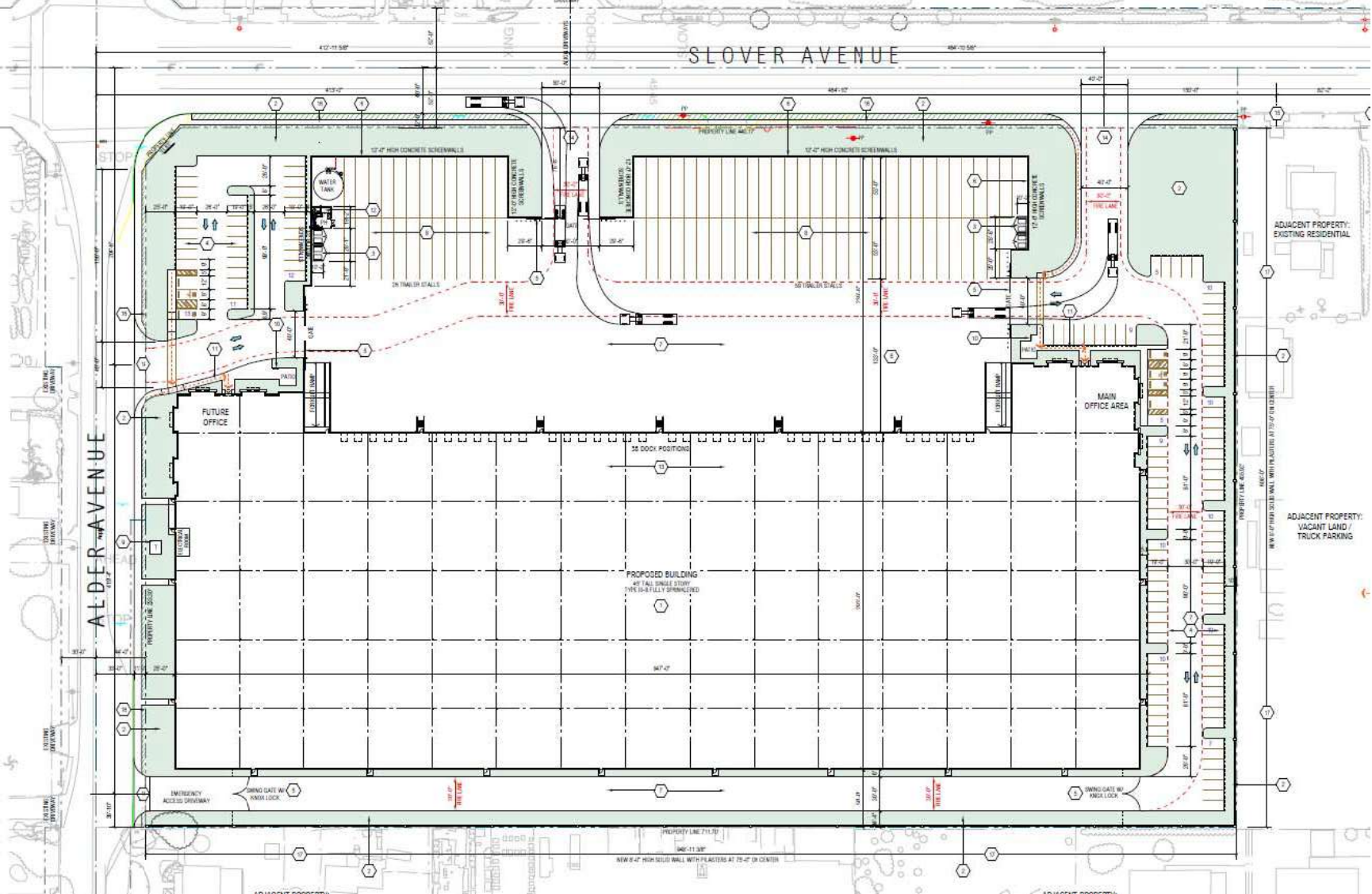


Table 1: Project Trip Generation

Land Use	Units	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
<u>Trip Rates</u>								
High Cube Transload and Short-Term Storage Warehouse ¹	TSF	1.40	0.06	0.02	0.08	0.03	0.07	0.10
<u>Total Vehicle Trip Generation</u>								
Harvill Avenue Warehouse	259,481 TSF	363	16	5	21	7	19	26
<u>Vehicle Mix</u>²		<u>Percent</u>						
Passenger Vehicles	69.00%	251	11	3	14	5	13	18
2-Axle Trucks	6.80%	25	1	0	1	0	1	2
3-Axle Trucks	5.50%	20	1	0	1	0	1	1
4+-Axle Trucks	18.70%	68	3	1	4	1	3	5
	100%	363	16	5	21	7	19	26
<u>PCE Trip Generation</u>³		<u>PCE Factor</u>						
Passenger Vehicles	1.0	251	11	3	14	5	13	18
2-Axle Trucks	1.5	37	2	0	2	1	2	3
3-Axle Trucks	2.0	40	2	1	2	1	2	3
4+-Axle Trucks	3.0	204	9	3	12	4	10	15
Total PCE Trip Generation		531	23	7	30	11	27	38

TSF = Thousand Square Feet

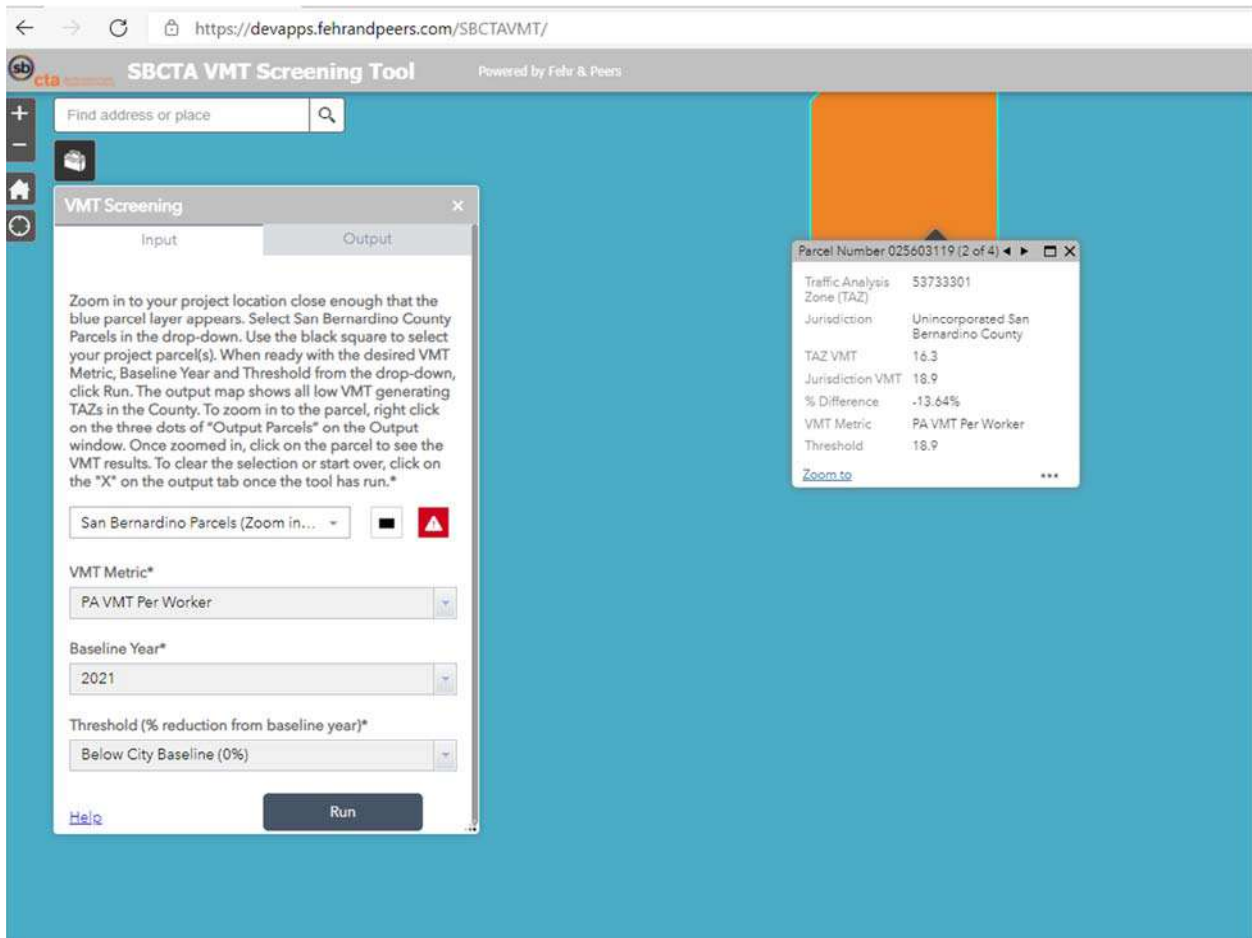
PCE = Passenger Car Equivalent

¹ Trip rates from the Institute of Transportation Engineers, *Trip Generation, 11th Edition, 2021*. Land Use Code 154 - High-Cube Transload and Short-Term Storage Warehouse.

² Vehicle Mix from the SCAQMD Warehouse Truck Trip Study. July 17, 2017.

³ Passenger Car Equivalent (PCE) factors from San Bernardino County CMP, Appendix B - Guidelines for CMP Traffic Impact Analysis Reports in San Bernardino County, 2016

Figure 2: Project VMT Screening



APPENDIX B – COUNT SHEETS

INTERSECTION TURNING MOVEMENT COUNTS

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

DATE:
10/7/21
THURSDAY

LOCATION:
NORTH & SOUTH:
EAST & WEST:

Bloomington
Alder
Slover

PROJECT #: SC
LOCATION #: 1
CONTROL: STOP N/S

PCE Adjusted	NOTES:								AM PM	MD	OTHER	OTHER	▲ N ▼ S	◀ W ▶ E
	Class	1	2	3	4	5	6							
	Factor	1	1.5	2	3	2	2							

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	Alder			Alder			Slover			Slover			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	1	2	0	1	2	0	

AM													TOTAL			
	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM	VOLUMES	APPROACH %	APP/DEPART	BEGIN PEAK HR		VOLUMES	APPROACH %	PEAK HR FACTOR
	11	10	28	4	10	5	3	0	71	26%	267	7:00 AM	53	23%	226	2,401
	31	93	33	15	8	10	4	1	196	73%	45		172	76%	16	2,401
	1	3	0	0	2	0	1	1	9	25%	36		4	24%	17	2,401
	1	0	0	0	0	0	0	1	1	3%	/		1	6%	/	2,401
	1	4	0	7	6	3	3	26	26	72%	318		12	71%	262	2,401
	3	132	88	55	66	80	82	58	647	90%	722		351	86%	406	2,401
	13	26	4	5	4	4	1	8	58	8%	852		47	12%	527	2,401
	53	113	25	23	23	7	10	259	1,091	19%	1,377		214	25%	856	2,401
	150	162	164	161	131	142	98	1,091	1,091	79%	/		636	74%	/	1,091
	1	1	2	2	10	3	4	28	28	2%	1,187		6	1%	701	2,401
	0.693							0.693								0.693
	0							0								0

PM													TOTAL			
	4:00 PM	4:15 PM	4:30 PM	4:45 PM	5:00 PM	5:15 PM	5:30 PM	5:45 PM	VOLUMES	APPROACH %	APP/DEPART	BEGIN PEAK HR		VOLUMES	APPROACH %	PEAK HR FACTOR
	4	7	5	6	4	4	5	39	31%	124	4:30 PM	19	29%	65	3,375	
	0	15	12	15	7	12	7	84	68%	47		45	69%	22	3,375	
	3	0	5	4	3	6	6	28	53%	53		18	64%	28	3,375	
	0	0	2	0	0	0	1	2	3%	/		2	5%	/	3,375	
	7	2	1	7	0	1	5	23	44%	94		9	30%	38	3,375	
	3	223	214	205	244	233	194	20	1,717	1%	1,778		8	1%	939	3,375
	7	6	6	4	2	6	7	41	97%	1,829		18	2%	976	3,375	
	16	173	178	161	159	204	148	52	1,344	4%	1,421		19	3%	725	3,375
	3	3	3	3	2	5	6	26	95%	1,406		13	2%	722	3,375	
	0.921							0.921							0.921	
	0							0							0	



APPENDIX C – LEVEL OF SERVICE CALCULATIONS

Vistro File: C:\...\Alder and Slover_Whyyyyy.vistro

Scenario 1 Existing AM

Report File: C:\...\Existing AM.pdf

3/21/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Alder Ave/Slover Ave	Two-way stop	HCM 6th Edition	NB Thru	0.044	513.5	F
2	Proj Dwy 1/Slover Ave	Two-way stop	HCM 6th Edition	WB Thru	0.004	0.0	A
3	Proj Dwy 2/Slover Ave	Two-way stop	HCM 6th Edition	WB Thru	0.004	0.0	A
4	Alder Ave/Proj Dwy 3	Two-way stop	HCM 6th Edition	SB Thru	0.003	0.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Alder Ave/Slover Ave

Control Type:	Two-way stop	Delay (sec / veh):	513.5
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.044

Intersection Setup

Name	Alder Ave			Alder Ave			Slover Ave			Slover Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	← →			← →			← → ←			← → ←		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	55.00	100.00	100.00	45.00	150.00	100.00	100.00	175.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Alder Ave			Alder Ave			Slover Ave			Slover Ave		
Base Volume Input [veh/h]	53	1	72	4	1	12	9	351	47	214	636	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	53	1	72	4	1	12	9	351	47	214	636	6
Peak Hour Factor	0.5490	0.5490	0.5490	0.6070	0.6070	0.6070	0.6420	0.6420	0.6420	0.7780	0.7780	0.7780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	0	33	2	0	5	4	137	18	69	204	2
Total Analysis Volume [veh/h]	97	2	131	7	2	20	14	547	73	275	817	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.67	0.04	0.18	0.18	0.05	0.03	0.02	0.01	0.00	0.28	0.01	0.00
d_M, Delay for Movement [s/veh]	496.82	513.50	11.01	121.11	115.78	11.23	9.50	0.00	0.00	10.17	0.00	0.00
Movement LOS	F	F	B	F	F	B	A	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	9.18	9.18	0.65	0.73	0.73	0.10	0.05	0.00	0.00	1.17	0.00	0.00
95th-Percentile Queue Length [ft/ln]	229.44	229.44	16.26	18.37	18.37	2.59	1.31	0.00	0.00	29.27	0.00	0.00
d_A, Approach Delay [s/veh]	220.26			44.96			0.21			2.54		
Approach LOS	F			E			A			A		
d_I, Intersection Delay [s/veh]	27.54											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Proj Dwy 1/Slover Ave

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Northbound			Southbound			Slover Ave Eastbound			Slover Ave Westbound		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	T			T			TT			TT		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	Northbound			Southbound			Slover Ave Eastbound			Slover Ave Westbound		
Base Volume Input [veh/h]	0	0	0	0	0	0	0	427	0	0	427	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	0	0	0	0	427	0	0	427	0
Peak Hour Factor	0.9500	1.0000	0.9500	0.9500	1.0000	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	0	0	0	0	112	0	0	112	0
Total Analysis Volume [veh/h]	0	0	0	0	0	0	0	449	0	0	449	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	Yes	Yes		
Number of Storage Spaces in Median	2	2	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	12.15	0.00	9.59	12.15	0.00	9.59	8.21	0.00	0.00	8.21	0.00	0.00
Movement LOS	B		A	B		A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.87			10.87			0.00			0.00		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	0.00											
Intersection LOS	A											

**Intersection Level Of Service Report
Intersection 3: Proj Dwy 2/Slover Ave**

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Northbound		Eastbound		Westbound	
Approach						
Lane Configuration	↔		↔		↔	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name	Northbound		Eastbound		Westbound	
Base Volume Input [veh/h]	0	0	427	0	0	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	427	0	0	427
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	112	0	0	112
Total Analysis Volume [veh/h]	0	0	449	0	0	449
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	Yes		
Number of Storage Spaces in Median	2	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.55	9.59	0.00	0.00	8.21	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.57		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 4: Alder Ave/Proj Dwy 3

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.003

Intersection Setup

Name	Alder Ave		Alder Ave		Westbound	
Approach	Northbound		Southbound			
Lane Configuration	↩		↪		↔	
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Alder Ave		Alder Ave		Westbound	
Base Volume Input [veh/h]	262	0	0	262	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	262	0	0	262	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	69	0	0	69	0	0
Total Analysis Volume [veh/h]	276	0	0	276	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	7.77	0.00	12.23	9.69
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		10.96	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Vistro File: C:\...\Alder and Slover_Whyyyyy.vistro

Scenario 1 Existing AM

Report File: C:\...\Existing AM.pdf

3/21/2022

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Alder Ave/Slover Ave	53	1	72	4	1	12	9	351	47	214	636	6	1406

ID	Intersection Name	Northbound		Southbound		Eastbound			Westbound			Total Volume
		Left	Right	Left	Right	Left	Thru	Right	Left	Thru	Right	
2	Proj Dwy 1/Slover Ave	0	0	0	0	0	427	0	0	427	0	854

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
3	Proj Dwy 2/Slover Ave	0	0	427	0	0	427	854

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
4	Alder Ave/Proj Dwy 3	262	0	0	262	0	0	524

Vistro File: C:\...\Alder and Slover_Whyyyyy.vistro

Scenario 2 Existing PM

Report File: C:\...\Existing PM.pdf

3/21/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Alder Ave/Slover Ave	Two-way stop	HCM 6th Edition	SB Thru	0.042	73.0	F
2	Proj Dwy 1/Slover Ave	Two-way stop	HCM 6th Edition	WB Thru	0.010	0.0	A
3	Proj Dwy 2/Slover Ave	Two-way stop	HCM 6th Edition	WB Thru	0.010	0.0	A
4	Alder Ave/Proj Dwy 3	Two-way stop	HCM 6th Edition	SB Left	0.026	7.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.