November 13, 2024

Ms. Jessica Hankins, AICP
Yuba Planning Group, LLC
159 South Auburn Street
Grass Valley, CA 95945

DRAFT Transportation Impact Study for the Jada Windows Project

Dear Ms. Hankins;

As requested, W-Trans has prepared a transportation impact study for the Jada Windows Project proposed to be located on APNs 009-680-050 and -056 on Whispering Pines Lane in the City of Grass Valley. The purpose of this letter is to address the potential trip generation of the project, impacts to vehicle miles traveled, and effects of the project on traffic operations and queuing at two nearby intersections.

Project Description

The project as proposed includes the construction of a metal manufacturing building of 70,458 square feet to accommodate an expansion of the existing Jada Windows business at 179 Clydesdale Court. In addition to the building, the project would include the construction of 50 parking spaces accessed by a driveway on Whispering Pines Lane. The project proposal includes a future direct (off-street) connection between the project site and the existing Jada Windows facility. The 35 employees of the Jada Windows facility on Loma Rica Drive would be relocated to this new facility, with the Loma Rica Drive facility being converted to warehouse storage. The existing Jada Windows workforce across all facilities would be expected to remain the same after construction of the project, although to provide a more conservative analysis, growth in workforce to 42 employees at the new facility was assumed instead of maintaining the 35-staff count of the Loma Rica Drive facility.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021, for Manufacturing (ITE LU #140). While the rates for floor area are often applied, a review of the projections based on this independent variable indicated that the results are unrealistic based on the use and past experience in the existing location. It was determined that the rates based on employees as an independent variable are much more consistent with the proposed operation. To achieve the anticipated trip generation associated with 70,458 square feet of floor area, the proposed facility would need to be staffed by 130 to 170 employees, which well exceeds the 42 employees conservatively anticipated to be based in the proposed facility. Based on the application of these employee-based rates, the proposed project would be expected to generate an average of 105 trips per day, including 13 during each of the a.m. and p.m. peak hours. These results are summarized in Table 1.

Table 1 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Manufacturing	42 employees	2.51	105	0.32	13	10	3	0.31	13	5	8

It is noted that the ITE trip generation rates for the manufacturing land use include trips for all purposes for each of the sample sites in the database. This means that the data presented by ITE includes trips caused by employees arriving to or leaving from work, employees getting lunch or running mid-shift errands, customers/clients patronizing the site, delivery drivers and service vehicles stopping by, and any other trip in a vehicle captured

arriving at or leaving from each sample site. Therefore, even though the trip generation rates are presented on a per employee basis, they capture the trip generation of all site users and not just employees.

Trip Distribution

Project trips were distributed to the surrounding roadway network based on the relative ratios of existing movements at the study intersections of Idaho Maryland Road/Centennial Drive and Whispering Pines Lane/ Brunswick Road, which respectively form the west and east boundaries of the Centennial Drive-Whispering Pines Lane corridor and represent the only roadway connections between the corridor and greater study area. This distribution methodology was used because the proposed use would be similar to other existing uses on Whispering Pines Lane, including the existing Jada Windows facilities, so likely would have the same travel patterns. The majority of vehicles turning onto or out of the Centennial Drive-Whispering Pines Lane corridor were from or to Idaho Maryland Road west of Centennial Drive, representing about 60 percent of traffic. The remaining 40 percent of traffic turning onto or out of this corridor was split equally between Brunswick Road north and south of Whispering Pines Lane. The distribution assumptions used are shown in Table 2.

Table 2 – Trip Distribution Assumptions

Route	Percent
Idaho Maryland Rd West of Centennial Dr	60%
Brunswick Rd North of Whispering Pines Ln	20%
Brunswick Rd South of Whispering Pines Ln	20%
TOTAL	**100%**

Vehicle Miles Traveled

While the City of Grass Valley has not yet adopted thresholds of significance related to vehicle miles traveled (VMT), the Nevada County Transportation Commission (NCTC) has via *Senate Bill 743 Vehicle Miles Traveled Implementation*, Fehr & Peers, 2020. Per this document, a project that would generate fewer than 110 trips per day on average would be expected to have a less-than-significant impact on VMT and therefore would be screened from detailed study. As shown in Table 1, the project would be expected to generate an average of 105 trips per day; therefore, the project can be presumed to have a less-than-significant impact on VMT.

The NCTC document states that substantial evidence for the 110-trip threshold was not provided and as VMT is measured cumulatively, any addition may be considered significant. However, support for this threshold was provided in the *Technical Advisory on Evaluating Transportation Impacts in CEQA* from the California Office of Planning and Research (OPR), which established the statewide guiding principles for VMT analysis in 2018. In this document, OPR prescribes that projects that generate fewer than 110 trips per day may be presumed to have a less-than-significant impact, unless there is substantial evidence to the contrary. This language was then adopted by Caltrans in their *Transportation Impact Study Guide*, 2020, which is referenced by the NCTC document as forming the basis for NCTC's policy.

Given that the majority, if not entirety, of staff and related traffic for the new facility would be transferred from the existing facility on Loma Rica Drive, new vehicle-miles would be negligible and therefore there would not be substantial evidence for a significant impact to VMT. Further, the centralization of employees and facilities may even reduce VMT given that inter-facility trips would be reduced from over a mile each way in length to just a few hundred feet. The future off-street connection would further reduce VMT by shortening this distance and entirely eliminating inter-facility trips from the public right-of-way.

Finding – The proposed project would be presumed to have a less-than-significant VMT impact given its low trip generation.

Operational Analysis

Methodology

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using the "Two-Way Stop-Controlled" methodology published in the *Highway Capacity Manual* (HCM), *6th Edition*, Transportation Research Board, 2017. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in the average number of seconds per vehicle.

The "Two-Way Stop-Controlled" methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Average vehicle delay is computed for the intersection as a whole as well as the approach with the highest average delay and is then related to a Level of Service.

In *Design Standards,* City of Grass Valley, 2012, the City established that LOS D or better during peak hours is acceptable for intersection operations.

Operational Results

The Existing Conditions scenario provides an evaluation of current operations based on existing traffic volumes collected during the a.m. and p.m. peak periods on July 25, 2024. This condition does not include project-generated traffic volumes. Both study intersections operate acceptably during both peak hours at LOS D or better for the stop-controlled approaches and LOS A for overall operations. Under Existing plus Project Conditions, or upon the addition of project-related traffic to the existing volumes, the study intersections would be expected to continue operating acceptably. A summary of the LOS calculations is contained in Table 3 and copies of the calculations are enclosed.

Table 3 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

	Study Intersection ***Approach***	**Weekday AM Peak**				**Weekday PM Peak**			
		Existing		**Existing plus Project**		**Existing**		**Existing plus Project**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	Centennial Dr/Idaho Maryland Rd	1.7	A	1.7	A	3.2	A	3.3	A
	Northbound Centennial Dr	*11.4*	*B*	*11.4*	*B*	*12.9*	*A*	*13.0*	*A*
2.	Brunswick Rd/Whispering Pines Ln	3.7	A	3.8	A	2.3	A	2.5	A
	Eastbound Whispering Pines Ln	*26.3*	*D*	*27.0*	*D*	*22.9*	*C*	*23.2*	*C*

Note: Delay is measured in average seconds per vehicle; LOS = Level of Service

Finding – The study intersections are currently operating acceptably during the a.m. and p.m. peak hours and are expected to continue doing so under Existing plus Project volumes.

Queuing

Intersection Queuing

The City of Grass Valley does not prescribe thresholds of significance regarding queue lengths. However, an increase in queue length due to project traffic was considered a potentially significant impact if the increase would cause the queue to extend out of a dedicated turn lane into a through traffic lane, or the back of the queue into a visually restricted area, such as a blind corner.

Under each scenario, the projected 95th percentile queue lengths in dedicated turn pockets at the study intersections were calculated using the SIMTRAFFIC application of the Synchro software package. It was determined that traffic would not exceed the available storage area in any of the turn lanes for the scenarios assessed. The predicted queue lengths for these turn pockets are summarized in Table 4, and SIMTRAFFIC calculations are enclosed.

Table 4 – Maximum Queues in Dedicated Turn Lanes at Study Intersections

Study Intersection ***Movement***	Available Storage	Maximum Queues			
		AM Peak Hour		PM Peak Hour	
		E	E+P	E	E+P
1. Centennial Dr/Idaho Maryland Rd					
Eastbound Left Turn	200	10	13	NA	NA
Westbound Left Turn	150	18	21	24	18
Northbound Right Turn	50	20	19	23	22
2. Brunswick Rd/Whispering Pines Ln					
Eastbound Right Turn	100	22	22	23	23
Northbound Left Turn	230	39	42	37	36

Note: Maximum Queue based on the average of the maximum value from ten SIMTRAFFIC runs; all distances are measured in feet; E = existing conditions; E+P = existing plus project conditions; NA = distance not reported by SIMTRAFFIC due to low volumes

It should be noted that the queue lengths are shown to decrease in a few locations with the addition of project trips as compared to without-project conditions. This is attributed to the stochastic nature of the modeling wherein traffic is randomly seeded and the average of ten runs is reported, occasionally resulting in shorter queues with project traffic than without it. As the increase or decrease in average maximum queue lengths would be estimated to be four feet or shorter, functionally there would be no perceptible difference in queuing as a result of the project. As all stacking distances would be shorter than their respective turn pocket lengths, the project would have a less-than-significant impact on safety with respect to intersection queues.

Site Access Queuing

A sensitivity test was conducted for queuing at the project's driveway using the 95th percentile queue length to determine if there would be a potentially significant queuing impact resulting from project traffic using the existing westbound left-turn lane on Whispering Pines Lane to access the site. This turn pocket has 75 feet of

stacking capacity, so if the expected queue were to exceed that storage length, then that may indicate a queuing impact.

To consider the effect of through traffic on left turn queuing into the project driveway, *Queue Length Estimation at Two-Way STOP Controlled Intersection*, developed by the Oregon Department of Transportation (ODOT), was used. This resource contains a methodology to estimate queue lengths at two-way stop-controlled intersections using a mathematical model that considers vehicle volumes on every approach. It was determined that for project-generated trips to create a queue in excess of 75 feet, or three passenger vehicles, there would need to be over 1,360 eastbound through vehicles during the a.m. peak hour. This relatively high value is because the inbound traffic estimated to use the westbound left-turn lane into the project site during the a.m. peak hour totals four vehicles, so all four would need to arrive and wait in the turn lane in order for the back of queue to extend into the through lane.

If one of these four inbound vehicles was assumed to be a truck which would preclude a second vehicle stacking in the turn lane, about 317 eastbound through vehicles could be accommodated before the model returns a queue of two or more vehicles in the westbound left-turn lane. Considering the existing traffic volumes at the intersections of Centennial Drive/Idaho Maryland Road and Brunswick Road/Whispering Pines Lane indicate approximately 130 to 230 eastbound through vehicles on this corridor during the a.m. peak hour, it is unlikely that there would be sufficient volume to result in the westbound left-turn queue exceeding the existing stacking capacity.

The p.m. peak hour queuing was not calculated as there would only be two inbound vehicles turning left from westbound Whispering Pines Lane into the project during the entire hour. The likelihood of both vehicles arriving at the same time and one being a truck is considered negligible. Further, evening peak hour volumes are lower than during the morning, with only 90 to 120 eastbound vehicles recorded. The project as proposed is therefore expected to have a less-than-significant impact on queuing. Copies of the queuing calculations are enclosed.

Finding – The existing turn lane storage is adequate to accommodate anticipated queuing at all analyzed intersections and into the project site, so the impact would be less than significant.

Truck Turning

To determine if the project site had adequate space and geometry to accommodate the expected truck trips, a plan showing the expected paths truck drivers would take to enter, park, and leave the project site was provided by the applicant team and is enclosed. This truck turning plan was reviewed and it was determined that the project site would have geometry sufficient to enable trucks to route through the site and park at the proposed loading bays.

Finding – The project site would be expected to have adequate space for trucks to maneuver.

Conclusions

- The proposed project would be expected to generate an average of 105 trips daily, including 13 trips during each of the a.m. and p.m. peak hours.

- The project would have a less-than-significant impact in terms of vehicle miles traveled due to the low overall trip generation estimated for the project.

- All study intersections operate acceptably under existing volumes and would be expected to continue to do so upon the addition of project traffic.

- Existing turn lane storage capacities at the study intersections and the project driveway are adequate for the expected queueing resulting from the addition of project traffic to existing volumes, and thus the project would have a less-than-significant impact on queuing.

- There would be adequate space and geometry for trucks to enter, maneuver through the project site, park at the loading bays, and exit.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

Sincerely,

William Andrews, EIT
Assistant Engineer

Kevin Carstens, PE (Civil, Traffic)
Traffic Engineer

Dalene J. Whitlock, PE (Civil, Traffic), PTOE
Senior Principal

DJW/krc-wia/GVA009.L1

Enclosures: Level of Service Calculations, Intersection Queuing Calculations, Site Access Queuing Calculations, Truck Turning Plan

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	209	210	13	207	87	12
Future Vol, veh/h	209	210	13	207	87	12
Conflicting Peds, #/hr	0	1	2	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	0	0
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	246	247	15	244	102	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	495	0	522	250
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1069	-	515	789
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	772	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1067	-	507	786
Mov Cap-2 Maneuver	-	-	-	-	651	-
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	651	786	-	-	1067	-
HCM Lane V/C Ratio	0.157	0.018	-	-	0.014	-
HCM Control Delay (s)	11.6	9.7	-	-	8.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	52	58	466	371	75
Future Vol, veh/h	85	52	58	466	371	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	230	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	58	64	518	412	83

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1100	248	495	0	-	0
Stage 1	454	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	220	753	1067	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	207	753	1067	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.3	1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1067	-	207	753	-	-
HCM Lane V/C Ratio	0.06	-	0.456	0.077	-	-
HCM Control Delay (s)	8.6	-	36.2	10.2	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	0.2	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	237	80	14	266	166	19
Future Vol, veh/h	237	80	14	266	166	19
Conflicting Peds, #/hr	0	2	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	0	0
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	260	88	15	292	182	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	350	0	586	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	324	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1209	-	473	777
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1207	-	465	776
Mov Cap-2 Maneuver	-	-	-	-	620	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	620	776	-	-	1207	-
HCM Lane V/C Ratio	0.294	0.027	-	-	0.013	-
HCM Control Delay (s)	13.2	9.8	-	-	8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	63	51	28	530	525	26
Future Vol, veh/h	63	51	28	530	525	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	230	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	53	29	552	547	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1171	287	574	0	-	0
Stage 1	561	-	-	-	-	-
Stage 2	610	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	199	710	997	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	541	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	193	710	997	-	-	-
Mov Cap-2 Maneuver	193	-	-	-	-	-
Stage 1	520	-	-	-	-	-
Stage 2	541	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.9	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	997	-	193	710	-	-
HCM Lane V/C Ratio	0.029	-	0.34	0.075	-	-
HCM Control Delay (s)	8.7	-	33	10.5	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.4	0.2	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	209	216	13	207	89	12
Future Vol, veh/h	209	216	13	207	89	12
Conflicting Peds, #/hr	0	1	2	0	1	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	0	50
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	246	254	15	244	105	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	502	0	523	250
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	275	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1062	-	514	789
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1060	-	505	786
Mov Cap-2 Maneuver	-	-	-	-	649	-
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	759	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	649	786	-	-	1060	-
HCM Lane V/C Ratio	0.161	0.018	-	-	0.014	-
HCM Control Delay (s)	11.6	9.7	-	-	8.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	53	60	466	371	77
Future Vol, veh/h	86	53	60	466	371	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	230	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	59	67	518	412	86

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1107	249	498	0	-	0
Stage 1	455	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	218	752	1064	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	204	752	1064	-	-	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	517	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27	1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1064	-	204	752	-	-
HCM Lane V/C Ratio	0.063	-	0.468	0.078	-	-
HCM Control Delay (s)	8.6	-	37.3	10.2	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	0.3	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	237	83	14	266	171	19
Future Vol, veh/h	237	83	14	266	171	19
Conflicting Peds, #/hr	0	2	0	0	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	0	50
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	260	91	15	292	188	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	586	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	324	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1206	-	473	777
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1204	-	465	776
Mov Cap-2 Maneuver	-	-	-	-	620	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	620	776	-	-	1204	-
HCM Lane V/C Ratio	0.303	0.027	-	-	0.013	-
HCM Control Delay (s)	13.3	9.8	-	-	8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	53	29	530	525	27
Future Vol, veh/h	65	53	29	530	525	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	230	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	55	30	552	547	28

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1173	288	575	0	-	0
Stage 1	561	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	198	709	996	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	192	709	996	-	-	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	520	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.2	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	996	-	192	709	-	-
HCM Lane V/C Ratio	0.03	-	0.353	0.078	-	-
HCM Control Delay (s)	8.7	-	33.6	10.5	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.3	-	-

Intersection: 1: Centennial Drive & Idaho Maryland Road

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	22	31	46	18
Average Queue (ft)	1	3	26	6
95th Queue (ft)	10	18	44	20
Link Distance (ft)			719	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200	150		50
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 2: Brunswick Road & Whispering Pines Lane

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	82	34	31	22
Average Queue (ft)	30	11	17	1
95th Queue (ft)	60	22	39	7
Link Distance (ft)	1589			1071
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		100	230	
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Network Summary

Network wide Queuing Penalty: 0

Intersection: 1: Centennial Drive & Idaho Maryland Road

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	31	82	18
Average Queue (ft)	5	36	9
95th Queue (ft)	24	59	23
Link Distance (ft)		719	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		50
Storage Blk Time (%)		2	
Queuing Penalty (veh)		0	

Intersection: 2: Brunswick Road & Whispering Pines Lane

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	56	32	52
Average Queue (ft)	21	11	12
95th Queue (ft)	44	23	37
Link Distance (ft)	1589		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	230
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Intersection: 1: Centennial Drive & Idaho Maryland Road

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	22	31	46	18
Average Queue (ft)	2	4	26	6
95th Queue (ft)	13	21	44	19
Link Distance (ft)			719	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200	150		50
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 2: Brunswick Road & Whispering Pines Lane

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (ft)	82	33	53	22
Average Queue (ft)	29	11	18	1
95th Queue (ft)	60	22	42	7
Link Distance (ft)	1589			1071
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		100	230	
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Network Summary

Network wide Queuing Penalty: 0

Intersection: 1: Centennial Drive & Idaho Maryland Road

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	30	145	18
Average Queue (ft)	3	39	8
95th Queue (ft)	18	77	22
Link Distance (ft)		719	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		50
Storage Blk Time (%)		4	
Queuing Penalty (veh)		1	

Intersection: 2: Brunswick Road & Whispering Pines Lane

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	40	32	52
Average Queue (ft)	21	11	11
95th Queue (ft)	38	23	36
Link Distance (ft)	1589		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	230
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1

Queue Length Estimation at Two-Way STOP Controlled Intersection

Project Information

Analyst:	W-Trans	Agency/Co.:	Jada Windows
Analysis Time Period:	Max vol for 3 veh stacking	Project ID:	GVA009
Date Performed:	9/24/2024	Scenario:	AM Existing + Project
Jurisdiction:	City of Grass Valley		
Intersection:	NA		
East/West Street:	Whispering Pines Ln		
North/South Street:	Project Dwy		

Instructions

Step 1 Input Volumes on **Volumes** sheet

Lane Group Code :			
	MJL	1	Major street separate left turn lane / TWLT
	MNLTR	2	Minor street shared left, through and right lane
	MNLR	3	Minor street shared left, and right lane
	MNL	4	Minor street separate left turn lane
	MNR	5	Minor street separate right turn lane

Step 2 Calculate Input Parameters

Calculate Lane Group Volumes, % Heavy Vehicles, and Conflicting Volumes (2.0% default)

Identify the presence of an upstream signal within 1/4 mile on major approches (Signal, 0 default)

Identify the presence of a separate LT lane / TWLT on major street approaches (LT, 1 default)

Verify the input ranges to feed into the models (see QueueLengthsModels sheet)

Step 3 **Obtain** queue lengths in feet from **Results** column

Note: ***Round off queue lengths to the next highest 25 feet when reporting***

Input							Results
Approach	Lane Group, Code	Volume, veh/hr	% Heavy Vehicles	Conflicting Volume,veh/hr	Signal (0 or 1)	Left Turn Lane (0 or 1)	Queue Length Feet
NB	MNLTR	3	2.0%	2950	0	1	**50**
NB	MNLR	3	2.0%	1964	0	1	**50**
NB	MNL	2	2.0%	986	0	1	**75**
NB	MNR	1	2.0%	978	0	1	**25**
SB	MNLTR	0					
SB	MNLR	0					
SB	MNL	0					
SB	MNR	0					
EB	MJL	0					
WB	MJL	4	2.0%	981	0	1	**75**

Queue Length Estimation at Two-Way STOP Controlled Intersection

Project Information

Analyst:	W-Trans	Agency/Co.:	Jada Windows
Analysis Time Period:	Max vol for 1 veh stacking	Project ID:	GVA009
Date Performed:	9/24/2024	Scenario:	AM Existing + Project
Jurisdiction:	City of Grass Valley		
Intersection:	NA		
East/West Street:	Whispering Pines Ln		
North/South Street:	Project Dwy		

Instructions

Step 1 Input Volumes on **Volumes** sheet

Lane Group Code :			
	MJL	1	Major street separate left turn lane / TWLT
	MNLTR	2	Minor street shared left, through and right lane
	MNLR	3	Minor street shared left, and right lane
	MNL	4	Minor street separate left turn lane
	MNR	5	Minor street separate right turn lane

Step 2 Calculate Input Parameters

Calculate Lane Group Volumes, % Heavy Vehicles, and Conflicting Volumes (2.0% default)

Identify the presence of an upstream signal within 1/4 mile on major approches (Signal, 0 default)

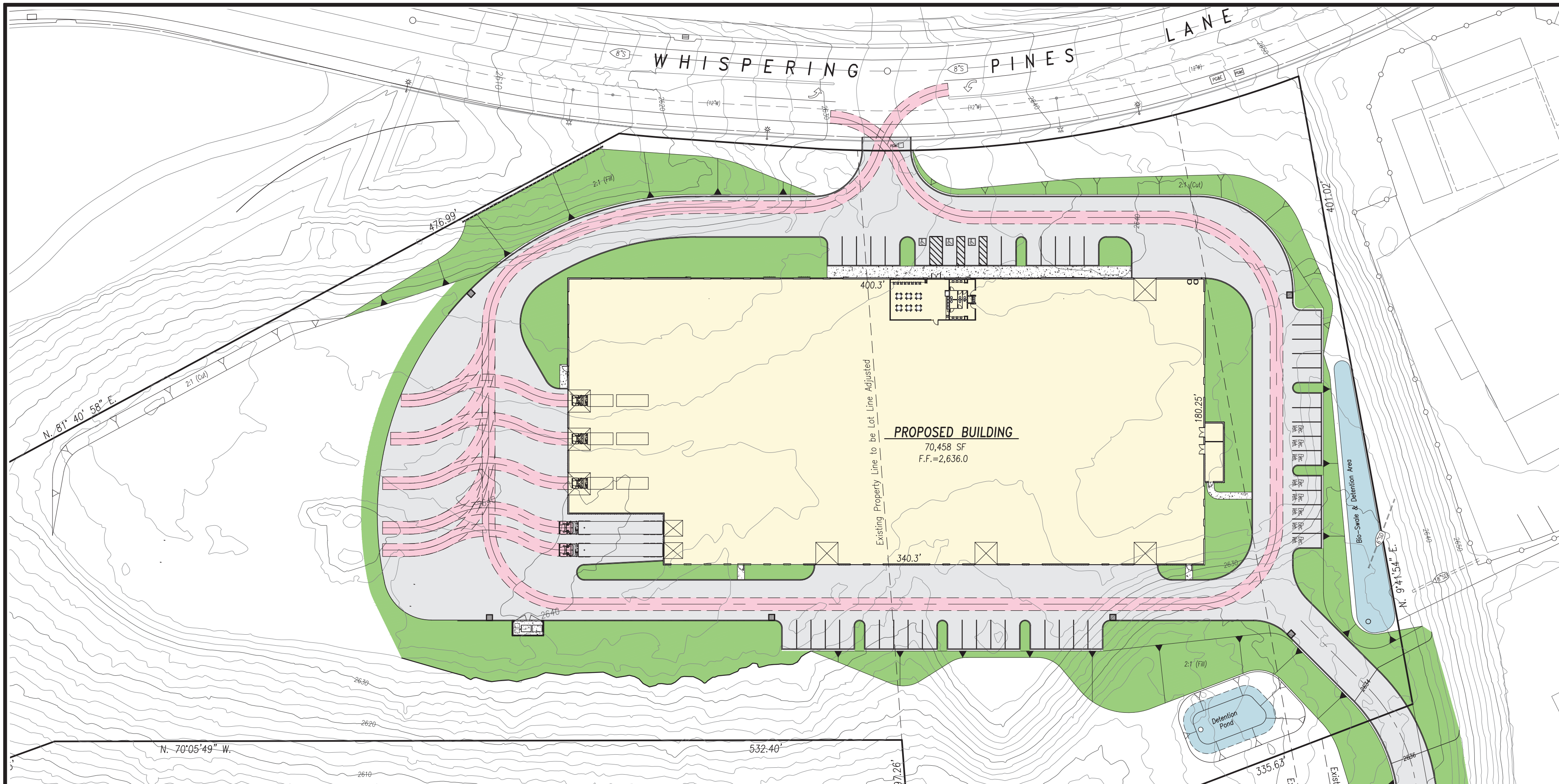
Identify the presence of a separate LT lane / TWLT on major street approaches (LT, 1 default)

Verify the input ranges to feed into the models (see QueueLengthsModels sheet)

Step 3 **Obtain** queue lengths in feet from **Results** column

Note: ***Round off queue lengths to the next highest 25 feet when reporting***

Input							Results
Approach	Lane Group, Code	Volume, veh/hr	% Heavy Vehicles	Conflicting Volume,veh/hr	Signal (0 or 1)	Left Turn Lane (0 or 1)	Queue Length Feet
NB	MNLTR	3	2.0%	976	0	1	**50**
NB	MNLR	3	2.0%	648	0	1	**50**
NB	MNL	2	2.0%	328	0	1	**50**
NB	MNR	1	2.0%	320	0	1	**25**
SB	MNLTR	0					
SB	MNLR	0					
SB	MNL	0					
SB	MNR	0					
EB	MJL	0					
WB	MJL	4	2.0%	323	0	1	**25**



ENGINEER OF WORK:

NELSON ENGINEERING
14028 CAMAS COURT
PENN VALLEY, CA 95946
(530) 432-4818
CONTACT PERSON: KEVIN J. NELSON, PE, PLS

OWNER/APPLICANT:

JADA BEYER
179 CLYDESDALE COURT
GRASS VALLEY, CA 95945
(530) 265-5354

ASSESSOR's PARCEL NUMBER:

009-680-050 & -056

LAND AREA:

TOTAL AREA = 7.74± Acres

FIRE PROTECTION:

CITY OF GRASS VALLEY FIRE DISTRICT

WATER:

NEVADA IRRIGATION DISTRICT

SEWER DISPOSAL:

CITY OF GRASS VALLEY

ELECTRICAL UTILITIES:

PACIFIC GAS & ELECTRIC

ZONING:

LIGHT INDUSTRIAL, M-1

LEGEND

- FLOW LINE
- PROPERTY LINE
- EXIST. EDGE OF PAVEMENT
- 12"SD — PROPOSED CULVERTS (AS CALLED OUT)
- PROPOSED PAVEMENT AREA
- PROPOSED CONCRETE AREA
- PROPOSED LANDSCAPE AREA
- PROPOSED 6" CONCRETE CURB
- 96.50-TC / 96.00-AC — PROPOSED FINISH TOP OF CURB ELEVATION / PROPOSED FINISH ASPHALT CONCRETE ELEVATION
- TRUCK TURNING MOVEMENTS (MIN. 50' RADIUS CENTERLINE)

SITE STATISTICS:

DESCRIPTION	SQUARE FOOTAGE	PERCENTAGE
BUILDING COVERAGE (Proposed)	70,458 s.f.	20.9%
PAVEMENT & CONCRETE AREA	77,438 s.f.	23.0%
LANDSCAPE AREA per Sec. 17.34		
INTERIOR PARKING	45,165 s.f.	13.4%
STREET BUFFER	8,200 s.f.	2.4%
NATURAL AREA/OPEN SPACE per Sec. 17.34	135,822 s.f.	40.3%
TOTALS:	337,083 s.f.	100.0%

PARKING:

	PROPOSED:
FULL SIZE PARKING STALLS	39
ELECTRIC VEHICLE (EV) PARKING STALLS	8
COMPACT PARKING STALLS	0
HANDICAP STALLS	3
TOTALS:	50

NO.	REVISIONS	DATE

DESIGNED: KJN
DRAWN: KJN
CHECKED BY: KJN
DATE: September 17, 2024
PROJECT No.: 21-242
DWG. NAME: 21-242 Site Plan-4.dwg

TRUCK-TURN EXHIBIT MAP FOR:

JADA WINDOWS

A.P.N. 009-680-050 & -056

COUNTY OF NEVADA, CALIFORNIA

NELSON ENGINEERING
Civil Engineering, Surveying & Land Planning
14028 Camas Court
Penn Valley, CA 95946
(530) 432-4818
www.nelsonengineer.com

REGISTERED PROFESSIONAL ENGINEER KEVIN J. NELSON No. 55101 Exp. 6-30-2022 CIVIL STATE OF CALIFORNIA
Draft Only Not for Construction