w-trans

January 6, 2014

Ms. Eileen Crane Domaine Carneros Winery 1240 Duhig Road Napa, CA 94559

Whitlock & Weinberger Transportation, Inc.

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Focused Traffic Impact Study for Domaine Carneros Winery

Dear Ms. Crane;

As requested, Whitlock & Weinberger Transportation, Inc. (W-Trans) has prepared a focused traffic analysis relative to the proposed modifications to the Use Permit for the Domaine Carneros Winery located at 1240 Duhig Road, southwest of the City of Napa in unincorporated Napa County. This study focuses on the traffic that would be generated by the proposed project on a typical weekday and its potential impact on adjacent roadways. The purpose of this is study is to provide a review of the Initial Study Checklist prepared by County Staff and determine if there is evidence to support staff's finding that the proposed project would have a less than significant impact related to transportation/traffic.

Existing Conditions

The Domaine Carneros Winery is located on the southwest corner of Duhig Road and State Route (SR) 12-121. Access to the site is taken via three driveways on Duhig Road. Based on the adjacent land uses and the nearby transportation network, it is expected that the vast majority of drivers would reach the site via SR 12-121. Therefore, SR 12-121, which is also identified as Carneros Highway, was the focus of this analysis. This route generally runs east-west and is a major regional route. Along the project frontage, the road has one travel lane in each direction plus paved shoulders.

The intersection of SR 12-121/Duhig Road is uncontrolled on the SR 12-121 approaches and is stop-controlled on the Duhig Road approach. There is a westbound left-turn lane on SR 12-121 to turn onto Duhig Road and a westbound acceleration lane is provided on SR 12-121 to allow drivers turning left onto SR 12-121 from Duhig Road to do so in two stages.

Project Description

The proposed use permit application would allow for increased visitation and special events, but would not modify allowable wine production. Currently the winery is permitted to host a daily average of 360 visitors. The permit modification would allow for the visitation to increase to 460 visitors on weekdays and 960 visitors on weekend days, an increase of 100 and 600 daily visitors, respectively. Additional marketing and special events would be allowed, but the maximum size of event attendance would not be increased. The winery is currently permitted to employ 30 people on a full-time basis and an additional 15 people on a part-time basis, which would be unchanged.

Trip Generation

The anticipated daily trip generation for the proposed project was estimated using rates established by the Napa County Conservation, Development and Planning Department and published in its Use Permit Application, 2011. The County's Winery Traffic Information/Trip Generation Sheet includes guidance on

converting daily trip generation into peak hour trip generation. This guidance includes quite conservative assumptions that 38 percent of visitor trips would occur during the weekday afternoon peak hour and 57 percent would occur during the weekend midday peak hour. Experience gained through preparing numerous traffic analyses for winery projects throughout the North Bay region indicates that visitor traffic is typically spread out over the course of the day, with a smaller percentage of traffic occurring doing peak periods than assumed by the County.

To quantify winery tasting room travel patterns, W-Trans collected data at a large tasting facility in Sonoma County for one week every month over the course of a year. These data were used to determine visitor trip variation both by time of time as well as seasonally. It was found that the majority of visits to a winery tasting room occur mid-day, with fewer visitors at the site near the opening or closing times of the tasting room. Based on the extensive data collected it was determined that, on average, 10 percent of daily visitor trips occur during the p.m. peak hour and 12 percent of visitor trips occur during the weekend midday peak hour. The winery tasting facility where this data was collected is similar to the Domaine Carneros facility in that they are both large tasting facilities that draw visitors regionally. For the purpose of this analysis, these peak hour percentages were applied to visitor trips only, with employee trips projected using assumptions published by the County of Napa. However, it is noted that the proposed use permit modification would not after employment levels; so, regardless of assumptions applied to the employee trip generation, it would not affect the project-related incremental increase in traffic.

It is furthermore noted that visitors to a winery tasting room are usually visiting multiple facilities in a single trip. Therefore, not all trips generated on the regional network by a winery tasting room are "new" but instead represent one of numerous destinations. However, for the sake of providing a conservative analysis, it is typically assumed that all traffic generated by a winery tasting room would be "new" trips on the network.

Applying the peak hour visitor percentages derived from data collected by W-Trans, it was determined that the proposed project would generate seven additional trips during the weekday p.m. peak period and 51 additional trips during the weekend midday peak hour. Since the County of Napa's Winery Traffic Information/Trip Generation Sheet does not include guidance on inbound versus outbound trips, it was assumed that about 75 percent of trips at the winery would be outbound during the weekday p.m. peak hour since most of the trips would be associated with employees and customers leaving at closure of the business. For the weekend midday peak hour, it was assumed that inbound and outbound trips would be evenly split. These results are summarized in Table 1 and the Trip Generation Sheets are enclosed for reference.

Table I
Trip Generation Summary

Scenario	Weekday		ekday ak Ho		Week Pe	end N ak Ho	-
	Trips	Trips	In	Out	Trips	In	Out
Existing Typical Operations	406	66	17	49	69	34	35
Proposed Typical Operations	483	73	19	54	120	60	60
Net Increase	77	7	2	5	51	26	25

The peak hour trip generation projections that would be calculated using the County's guidance are shown on the enclosed Trip Generation Sheets. For reference, the County's methodology indicates that the proposed project would be expected to generate 29 additional vehicle trips during the weekday p.m. peak hour and 245 additional trips during the weekend midday peak hour.

Access to the site would continue to be taken from Duhig Road, and it is expected that the vast majority of visitors would travel to the site via SR 12-121. Average annual daily traffic (AADT) volume data from 2012 for SR 12-121 was obtained from the California Department of Transportation (Caltrans) Traffic Data Branch through its online database and hourly traffic data was provided by Caltrans staff. Based on existing traffic volumes, it is expected that drivers traveling to/from the site would be traveling to/from the east and west evenly.

As summarized in Table 2 it was determined that the proposed project would increase daily and weekday p.m. peak hour traffic on SR 12-121 less than two-tenths of one percent. During the weekend midday peak, the proposed project would increase traffic by about one percent. These relatively small increases in traffic would be expected to result in an imperceptible impact on traffic operations on a typical weekday. In fact, typical daily and seasonal shifts in traffic volumes are much greater and result in a substantially larger change in traffic on SR 12-121 than implementation of the proposed project.

Table 2 SR 12-121 Added Traffic

Scenario	V	est of Dul	nig R d	E	ast of Duh	ig Rd
	Daily	PM Peak Hour	Weekend Midday Peak Hour	Daily	PM Peak Hour	Weekend Midday Peak Hour
Exiting Traffic Volumes	24,800	2,700	2,460	31,000	2,800	2,460
Project Added Traffic Volumes	39	4	26	38	3	25
Percentage Increase	0.16%	0.15%	1.06%	0.12%	0.11%	1.02%

Note: Existing traffic volumes were obtained from the Caltrans Traffic Data Branch

Special Events

The use permit modification would allow for the following special events:

- 2 events per year with a maximum attendance of 300 guests
- 2 events per month with a maximum attendance of 50 guests
- 8 events per month with a maximum attendance of 25 guests

Since special events would be infrequent, they would not represent typical daily operations, which is the focus of this analysis. However, the potential impact of events was analyzed from a qualitative point of view for informational purposes. The monthly events of 25 to 50 guests would represent a small increase in daily visitation and would therefore result in a relatively small potential for impacts on the adjacent segment of SR 12-121. The two annual events with a maximum attendance of 300 guests would represent a large portion of daily visitation. However, the site is currently allowed to host events of up to 300 guests, so this would be no change over existing conditions. To minimize the possibility of

impacts on SR 12-121, it may be beneficial to employ some or all of the following strategies during these large events:

- Begin and end the event outside of the peak hour
- Hold the event outside of normal tasting room operating hours
- Close the tasting room to the general public during the event

Additionally, it may be necessary to implement a parking management plan during the 300-person events.

Operational Analysis

Despite the relatively low amount of traffic that the project would add to SR 12-121, an operational analysis of the route was completed to quantify any impacts. The County of Napa, in its General Plan Policy CIR-16, establishes the following standards of significance for roadways within Napa County:

The County shall seek to maintain an adequate level of service on roads and at intersections as follows. The desired level of service shall be measured at peak hours on weekdays.

The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map.

SR 12-121 is classified as a "Rural Throughway (2 Lanes)" on the County's Circulation Map. Therefore, County policy limits widening of the road for the sake of increasing capacity.

If a facility operates deficiently at LOS E or F, the County has not established a threshold of significance for determining a project's impact. Therefore, the significance criteria applied in the in the Napa Pipe EIR (Napa County 2009) was used for this analysis. In this certified EIR, it was established that a project's impact would be considered less than significant unless it added more than 50 peak hour trips to a facility operating at these deficient levels of service.

Furthermore, since the study facility is a State Route, the Caltrans operational standards were also considered:

The level of service (LOS) for operating State highway facilities is based upon measures of effectiveness (MOEs)...Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE should be maintained.

Currently SR 12-121 operates at Level of Service (LOS) E during the p.m. peak hour, which is below the desired thresholds established by both the County and Caltrans. With the addition of project-generated traffic the route would continue to operate at LOS E. These results are summarized in Table 3 and calculations are attached for reference. Since the proposed project would add fewer than 50 peak hour vehicle trips to SR 12-121, the project's impact is less than significant. For reference purposes, if the County's peak hour trip generation rates were applied to this analysis, the project would still generate fewer than 50 new vehicle trips on SR 12-121 during the peak hour and would therefore still have a less than significant impact on the facility.

Table 3
SR 12-121 PM Peak Hour Roadway Operations

Scenario	We	st of Duh	ig Rd	Eas	t of Duhi	g Rd
Direction	LOS	v/c	PTSF	LOS	v/c	PTSF
Exiting Traffic Volumes						
Westbound	E	0.84	93.7	E	0.87	94.3
Eastbound	- E	0.84	93.7	E	0.87	94.3
Existing plus Project Traffic Volumes		•1		<u> </u>		
Westbound	E	0.84	93.8	E	0.87	94.5
Eastbound	E	0.84	93.7	E	0.87	94.5

Note: LOS = Level of Service; v/c = vehicle to capacity ratio; PTSF = Percent Time Spent Following

It was found that the calculated volume to capacity (v/c) ratio would not change with the addition of project-generated traffic; however, there would be a slight increase in the Percent Time Spent Following (PTSF). The v/c ratio and PTSF are the measures of effectiveness used by the County and Caltrans, respectively, when analyzing a two-lane road. While there would be a slight increase in the PTSF, the increase would be very small and drivers would not be expected to experience a perceptible difference in operations of SR 12-121. It is noted that considering the nature of SR 12-121, it would be necessary to widen the route in order to achieve LOS D or better operations. As previously stated, the County, in General Plan Policy CIR-16, has established that a roadway is exempt from the LOS D standard if attainment of this level of service would require widening of the roadway beyond what is shown in the County's Circulation Map. On this map, SR 12-121 has been identified a "Rural Throughway (2 Lanes)" in the vicinity of the project site.

Although weekend midday peak hour trip generation data is provided for informational purposes, since the County's standards of significance only apply to the weekday peak hour, no operational analysis was completed for the weekend peak hour.

Future Conditions

The County, in its General Plan, projects that SR 12-121 would continue to operate at a similar level of service under conditions projected for the 2030 horizon year. Therefore, it is expected that the project's impact to the route would remain negligible under future conditions. Furthermore, application of the 50-trip threshold as a standard of significance for analysis of future cumulative conditions indicates that since the project would generate fewer than 50 new vehicle trips during the p.m. peak hour, the project's impact under cumulative conditions would be less than significant.

Intersection Operations

The project site would continue to be accessed via driveways on Duhig Road, just south of SR 12-121, with the vast majority of Domaine Carneros employees and visitors traveling through the intersection of SR 12-121/Duhig Road to reach the site. This intersection is uncontrolled on the SR 12-121 approaches and is stop-controlled on the Duhig Road approach.

Caltrans has recently completed improvements to the intersection of SR 12-121/Duhig Road to provide a westbound left-turn lane on SR 12-121 to turn onto Duhig Road. Additionally, a westbound acceleration lane is provided on SR 12-121 to allow drivers turning left onto SR 12-121 from Duhig Road to do so in two stages. These improvements are beneficial to those traveling to and from the Domaine Carneros site as well as adjacent businesses and residences.

It is expected that the proposed use permit modification would result in approximately seven more vehicle trips at the SR 121-121/Duhig Road intersection and four more vehicle trips at the SR 12-121/Old Sonoma Road intersection during the p.m. peak hour. These small increases in traffic can reasonably be expected to result in an imperceptible change in operations at the intersections. Furthermore, the traffic that would be added to these intersections is less than the 50-trip threshold used as a standard of significance. Therefore, the project's impact to these intersections would be less than significant.

Conclusions

Based on the analysis performed, it is anticipated that the minor increase in traffic associated with the proposed change in the Use Permit will result in no perceptible change to operation of SR 12-121, and an overall less-than-significant impact on adjacent transportation facilities. This is consistent with the findings presented in the Initial Study.

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

TRO01552 Exp. 9/30/14

Sincerely,

Tony Henderson, PE PTOE

Traffic Engineer

Dalene J. Whitlook, PE, PTOE

Principal

Enclosure:

Trip Generation Forms

Peak Hour Trip Generation Calculations

Level of Service Calculations

DJW/tdh/NAX073.L1

Winery Traffic Information / Trip Generation Sheet Traffic during a Typical Weekday x 3.05 one-way trips per employee Number of FT employees: 30 92 _daily trips. Number of PT employees: 15 x 1.90 one-way trips per employee 29 _daily trips. Average number of weekday visitors: $\underline{360}$ / 2.6 visitors per vehicle x 2 one-way trips = 277 _daily trips. Gallons of production: 432,000 / 1,000 x .009 truck trips daily³ x 2 one-way trips 8 _daily trips. 406 Total _____daily trips. (Nº of FT employees) + (Nº of PT employees/2) + (sum of visitor and truck trips x .38) 143 PM peak trips. Traffic during a Typical Saturday Number of FT employees (on Saturdays): 30 x 3.05 one-way trips per employee = 92 ____daily trips. Number of PT employees (on Saturdays): 15 x 1.90 one-way trips per employee = 29 Average number of Saturday visitors: 360 / 2. 8 visitors per vehicle x 2 one-way trips = 257 daily trips. 378 **Total** __daily trips. 184 (No of FT employees) + (No of PT employees/2) + (visitor trips x .57) ____PM peak trips. Traffic during a Crush Saturday Number of FT employees (during crush): 30 x 3.05 one-way trips per employee = 92 daily trips. Number of PT employees (during crush): 15 x 1.90 one-way trips per employee = 29 _____daily trips. Average number of Saturday visitors: 360 / 2. 8 visitors per vehicle x 2 one-way trips = 257 _____ daily trips. Gallons of production: 432000 / 1,000 x .009 truck trips daily x 2 one-way trips _daily trips. Avg. annual tons of grape on-haul: _____/ 144 truck trips daily 4x 2 one-way trips 386 **Total** Largest Marketing Event- Additional Traffic Number of event staff (largest event): 40 x 2 one-way trips per staff person 80 trips. Number of visitors (largest event): 300 / 2.8 visitors per vehicle x 2 one-way trips 214 trips.

 4 Assumes 4 tons per trip / 36 crush days per year (see *Traffic Information Sheet Addendum* for reference).

Number of special event truck trips (largest event): ______ x 2 one-way trips

_trips.

³ Assumes 1.47 materials & supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see *Traffic Information Sheet Addendum* for reference).

Winery Traffic Information / Trip Generation Sheet

Traffic during a Typical Weekday			
Number of FT employees: 30 x 3.05 one-way trips per employee	=	92	daily trips.
Number of PT employees: 15 x 1.90 one-way trips per employee	=	29	daily trips.
Average number of weekday visitors: 460 / 2.6 visitors per vehicle x 2 one-way trips	=	354	daily trips.
Gallons of production: $432,000$ / 1,000 x .009 truck trips daily ³ x 2 one-way trips	=	8	daily trips.
Total	=	483	daily trips.
(№ of FT employees) + (№ of PT employees/2) + (sum of visitor and truck <u>trips</u> x .38)	=	172	PM peak trips.
Traffic during a Typical Saturday			
Number of FT employees (on Saturdays): 30 x 3.05 one-way trips per employee	=	92	daily trips.
Number of PT employees (on Saturdays): 15 x 1.90 one-way trips per employee	=	29	daily trips.
Average number of Saturday visitors: 960 /2. 8 visitors per vehicle x 2 one-way trips	=	686	daily trips.
Total	=	807	daily trips.
(Nº of FT employees) + (Nº of PT employees/2) + (visitor <u>trips</u> x .57)	=	429	PM peak trips.
Traffic during a Crush Saturday			
Number of FT employees (during crush): 40 x 3.05 one-way trips per employee	=	122	daily trips.
Number of PT employees (during crush): 25 x 1.90 one-way trips per employee	-	48	daily trips.
Average number of Saturday visitors: 960 / 2. 8 visitors per vehicle x 2 one-way trips	=	686	daily trips.
Gallons of production: 432000 / 1,000 x .009 truck trips daily x 2 one-way trips	=	8	daily trips.
Avg. annual tons of grape on-haul:/ 144 truck trips daily ⁴ x 2 one-way trips	=		daily trips.
Total	=	864	daily trips.
Largest Marketing Event- Additional Traffic			
Number of event staff (largest event): 40 x 2 one-way trips per staff person	=	80	trips.
Number of visitors (largest event): <u>300</u> / 2.8 visitors per vehicle x 2 one-way trips		214	trips.
Number of special event truck trips (largest event):x 2 one-way trips	=		trips.

³ Assumes 1.47 materials & supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see *Traffic Information* Sheet Addendum for reference).

Assumes 4 tons per trip / 36 crush days per year (see Traffic Information Sheet Addendum for reference).

Focused Traffic Impact Study for Domaine Carneros Winery Peak Hour Trip Generation Existing Conditions

<u>Weekday</u>

Full Time Employees - 1 trip per employee
Part Time Employees - 0.5 trip per employee
Visitors - 10% of daily visitor trips
Production
Total

Num of		Tr	ips	···
Empl/	Daily		PM Peak	
Visitor	Daily	Total	In	Out
30	92	30	8	22
15	29	8	2	6
360	277	28	7	21
	8	0	0	0
	406	66	17	49

Weekend

Full Time Employees - 1 trip per employee Part Time Employees - 0.5 trip per employee Visitors - 12% of daily visitor trips Total

Num of		Tr	ips	- N
Empl/	Daily	Mic	day Peak I	lour
Visitor	Daily	Total	In	Out
30	92	30	15	15
15	29	8	4	4
360	257	31	15	16
	378	69	34	35

Data Sources:

Daily trip generation: Napa County Winery Traffic Information/Trip Generation Sheet

Employee peak hour trip generation: Napa County Winery Traffic Information/Trip Generation Sheet Visitor peak hour trip generation: Data collected by W-Trans at a similar Sonoma County winery tasting room

Focused Traffic Impact Study for Domaine Carneros Winery Peak Hour Trip Generation Existing plus Project Conditions

Weekday

Full Time Employees - 1 trip per employee
Part Time Employees - 0.5 trip per employee
Visitors - 10% of daily visitor trips
Production
Total
Increase over existing

Num of		Tr	ips	
Empl/	Daily		PM Peak	
Visitor	Dally	Total	ln'	Out
30	92	30	8	22
15	29	8	2	6
460	354	35	9	26
	- 8	0	0	0
	483	73	19	54
	77	7	2	5

Weekend

Full Time Employees - 1 trip per employee
Part Time Employees - 0.5 trip per employee
Visitors - 12% of daily visitor trips
Total
Increase over existing

Num of	1	Tr	ips	
Empl/	Daily	Mic	lday Peak I	lour
Visitor	Daily	Total	In	Out
30	92	30	15	15
15	29	8	4	4
960	686	82	41	41
	807	120	60	60
	429	51	26	25

Data Sources:

Daily trip generation: Napa County Winery Traffic Information/Trip Generation Sheet

Employee peak hour trip generation: Napa County Winery Traffic Information/Trip Generation Sheet Visitor peak hour trip generation: Data collected by W-Trans at a similar Sonoma County winery tasting room

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adjustment factor¹, f_{g.ATS} (Exhibit 15-9)

r-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)

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g direction vol., V. direction vol., V_d

car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)

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beavy-verticle adjustment factor. f _{HVATS} =1/ (1+ P _T (E _T -1)+P _R (E _R -1))	1,000	1.000
Grade adjustment factor ¹ , ' _{6,ATS} (Exhibit 15-9)	1,00	1.80
Demand Sow rate ² , v _i (pch) v _i =V _i (PHE* I _a ATS * I _t VATS)	1421	1421
Free-Flow Speed from Flaid Measurement	Estimated Free-Flow Speed	Flow Speed
	Base free-flow speed*, BFFS	60.0 mith
	Adj. for lane and shoulder width, 4 f. (Exhibit 15-7)	0.0 mith
	Adj. for access points ⁴ , f _A (Exhibit 15-6)	1.3 mith
	Free-flow speed, FFS (FSS-BFFS-4, g-4,)	58.8 mith
8 (Exhibit 15-15) 6.9 mith	Average travel speed, ATS_FFS-0,00776(v_ATS + v_ATS) - fvATS Percent free flow speed, PFFS	***ATS - THATS 35.8 mith
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the second secon		
reprenger-car equivalents for NYS, Eq (Exhibit 15-16 of 15-19)	0,1	7:0
teavy-vehicle adjustment factor, $f_{HV}=1/\left(1+P_T(E_T^{-1})+P_R(E_{R^{-1}})\right)$	1.000	1,000
Grade adjustment factor ¹ , f _{g.pr.gc.} (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate?, v,(poth) v,=V,(PHFT,tyv,prss***,g,prss*)	1421	1421
Sea percent time-spent-following*, BPTSF_a(%)=100(1-e ^m d.)	88.4	
odi. for no-persoling zone, f _{ee prage} (Exhibit 15-21)	94	
arcent time-spent-following, PTSF (%)=BPTSF 41 repTSF *(Ne.ptSF 1 Ne.ptSF + Ne.ptSF)	7.66	7
evel of Sarvice and Other Performence Measures		
avel of service, LOS (Exhibit 15-3) olume to canachy mito, vie	3 780	
Capacity, C. A.713 (Equation 15-12) port	9071	
Capacity, C _{aprise} (Equation 15-13) poh	0071	9
wount Free-Flow Speed PFFS (Equation 15-11 - Class III only)	61.0	9
Sicycle Leval of Sarvice		
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h	1421.1	23
Effective width, Wv (Eq. 15-29) ft	24.00	Q
Effective speed factor, S ₁ (Eq. 15-30)	4.79	
Bloycle level of service scene, BLOS (Eq. 15-31)	4.17	
Skrycte level of service (Exhibit 15-4)	Q	
. Hob that by adjustment factor for level termin is 1,00 as level termin is one of the base conditions. For the purpose of grade adjustment, specific deways dis segments are treated as level	ns. For the purpose of grade adjustment, specific of	downgrade segments are beated as leve
2. If $v_i(v_i$ or v_o) ==1,700 pcch, terrainate analysis—the LOS is F. 3. For the analysis direction only and for v>200 vehth.		
For the amptais describen only Exhibit 15:20 previous coefficients a surd b for Equation 15:10. Use alternative Exhibit 55:14 if some functs operate at crawf speeds on a specific downigrade.		
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1421

1421

vehicle adjustment factor, $t_{NJ^{m}}$ I_{i} († + P_{i} (Er-1)+ P_{i} (Er-1)) adjustment factor i , $^{i}_{E}$ pr $_{SF}$ (Exhibit 15-16 or Ex 15-17)

percent time-apent-following 4 , BPTSF $_d(\%)$ =100(1- $e^{96}d^3$) and flow rate², v(pcft) v=V/(PHF*1_{HV,PTSF}* f_{g,PTSF})

for no-passing zone, (ne. PTSF (Exhibit 15-21)

rger-car equivalents for trucks, $E_{\gamma}({\rm Extribt}$ 15-18 or 15-19) equivalents for RVs, E_R (Exhibit 15-18 or 15-19)

Amhraia Direction (d) 1.0 1.00 1.000

93.7

is time-sparie following, PTSE (No-IEPTSE) of spring "Verrige" Verrige" Verrige "Verrige" in Springs) of Savietor and Other Purforments Measures
is service, LOS Galles 15-5).

vant Free-Flow Speed PFFS_e(Equation 15-11 - Class III only) ycle Level of Service if demand flow rate in outside lene, ν_{QL} (Eq. 15-24) vehill

ctive speed factor, S_f (Eq. 15:30) ythe level of service score, BLOS (Eq. 1) ytle level of service (Exhibit 15-4)

specity, C_{4,ATS} (Equation 15-12) pohtpecity, C_{4,PTSF} (Equation 15-13) poh

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vices that the adjustment factor for level terrain is 1.00 as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level

II (V₁, a v _v) >=1,700 pc/h, terminate analysis—the LOS is F. For the analysis described only and for v>200 vehh. For the analysis described on every Firsh E1520 provides coefficients a and to Equation 15-10. Use alternative Existic 15-14 if some fructs operate at crewl sy

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Directional

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Lancard (reference)	144 144	
mayer TDH gency or Company W-Trans	Highway / Direction of Travel From/To	SR 121-12 Eastbound East of Duhig Road
Period Period Rion: Domaine Cameros Winer	Jurisdiction Annitytis Year	Californs Existing piles Proj Conditions
Segment langton (1.5) And the segmen	Const Heymay Train Of Lone Train Structure Structu	Class II highway Class III highway Class
erage Travel Speed	As a standard of the Assay	
*sseanger-car equivalents for brucks, E. (Exhibit 15-11 or 15-12)	(D) LOCADON (D)	Opposing Direction (a)
azvenger-car equivalents for RVs, E. (Exhibit 15-11 or 15-13)	0,1	10
beavy-vehicle adjustment factor (Lov areal) (1+ P. (Ev-1)+P. (Eu-1))	0001	1000
Grade adjustment factor ¹ , 1 _{, ATR} (Exhibit 15-9)	963	8
meand these reads to fearth, town to proper to the	9007	
Frace-flow Speed from Field Massurement	ľ	14/5
	Base free-flow spaed* BFFS	SSO mith
tean speed of sample 3, Spy	Adj. for lane and shoulder width, 4 t. a (Exhibit 15-7)	
al demand flow rate, both directions, v	Adl. for access points ⁴ , f., (Exhibit 15-8)	
rea-flow speed, FFS=S _{PM} +0.00776(M ftv,ATS)	Free-flow speed, FFS (FSS=BFFS, L.4.)	
d), for no-passing zones, freATS (Exhibit 15-15) 0.8 mith	Average travel speed, ATS_aFFS-0.00776(v_ATS + v_ATS) - f_m ATS	
Anna Canal Colfesion	Percent free flow speed, PFFS	26.9 %
	Analysis Direction (d)	Opposing Direction (s)
sseenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.0	1.0
stronger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0
avy-vahicle adjustment factor, f _{tyv} =1/ (1+ P _T (E _T -1)+P _R (E _R -1))	1,000	1,000
Grade auflustment factor ¹ , f _{g. PTSS} (Exhibit 15-18 or Ex 15-17)	1.00	3.00
Describonal flow rate ² , v(pch) v=V/(PHFT _{tv, prgs} *f _a prgs ²	1476	1475
Sase percent time-spent-following*, BPTSF_(%)=100(1-e ^{m.} d.)		90.6
udt, for no-pussing zone, f _{ne pres} (Exhibit 15-21)		7.8
eroant time-spent-following, PTSF (%)=BPTSF of majorise 'Vajorise + Vajorise'		94.5
evel of Service and Other Performance Messives		
el of service, LOS (Exhibit 15.3) are to capacity ratio, wit		2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Sepecify, C _{d.ATS} (Equation 15-12) poin		1700
actly, C. mer (Equation 15-13) peh		1200
ercett Free-row opeed FTFO _d (Equation 15-11 - Class III only)		300
Advantage of the second discount of the secon		
THE COLORS OF THE IN DUSING INTO A COLORS IN THE TOTAL COLORS IN T		1475.8
flective width, Wv (Eq. 15.29) ft		24.00
Effective speed factor, S, (Eq. 15-30)		4.79
icycle level of service score, BLOS (Eq. 15-31)		4.18
icycle level of service (Exhibit 15-4)		a
John Mark the effections for the form in 177 or least tensor is a set of the hour set of the set of		
historia. Historia. 2. If V _I V _A or v _a) >=1,700 pc/h, terminate analysis—CG is F. 3. For the analysis disection only and for v>200 veh?h.	conditions. For the purpose of grade adjustment, up	pecific downgrade segments are treated as level
the antiques descend noted and a serie to for Equation 15-10. In this 15-20 provides coefficients a and to for Equation 15-10. so alternative Exhibit 15-14 if some trucks operate at crewin speeds on a specific downgrade		
Consider to Apple 1 to the sale of Product of Park to Product of P		

| Class | Mighway | Class | Mighway | Class | Mighway | Tenin | Class | Mighway | Class | Mighway | Tenin | Class | Class | Mighway | 55.0 mith 2.0 mith 1.3 mith 55.8 mith 30.1 mith 1.000 1476 0, 1,000 8 1476 errage travel speed, ATS_amFFS-0.00778(v_aATS + v_eATS) - f_{re}ATS 94.5 9 Vdf. for larve and shoulder width, *f_{1,6}(Exhibit 15-7) Vdf. for access points*f₁ (Exhibit 15-8) "ree-flow speed, FFS (FSS—BFFS_{4,8-4}), 9 55.9 479 HCS 2010TM Version 6.50 1475 1.00 1,000 000 1.0 1.00 i time-spanek-deliavida, PTSE_E (N)-BPTSE ^{af} n_{th}pres "V_epres TV_epres +V_epres" Service and Other Purformence Measures I service, LOS (Exibet 1-5) that the adjustment factor for level terrain is 1.00.as level terrain is one of the base Sheuker width R Larw wideh R Larw wideh R Sheuker width R O.B mith hicle adjustment factor, $f_{\rm HV,ATS}^{\rm mid}$ (1+ $P_{\rm T}$ (E_T-1)+ $P_{\rm R}$ (E_R-1)) r-car equivalents for trucks, E_T (Exhibit 15-11 er 15-12) sectoral domand flow rate in outside lene, v_{Q_i} (Eq. 15.24) velvit sche width, WV (Eq. 15.29) it which adjustment factor, $t_{\rm HV} = 1/\left(1 + P_{\rm T}(E_{\rm T}^{-1}) + P_{\rm R}(E_{\rm R}^{-1})\right)$ nt Free-Flow Speed PFFS (Equation 15-11 - Cless III only) nger-car equivalents for trucks, $E_{\gamma}(Exhibit~15-18~or~15-19)$ car equivalents for RVs, E_R (Exhibit 15-11 or 15-13) er-car equivalents for RVs, E_R (Exhibit 15-18 or 15-18) adjustment factor 1, f_{g, pr.SF} (Exhibit 15-16 or Ex 15-17) percent time-spent-following⁴, $\mathrm{BPTSF}_{g}(\%)$ =100(1- $\mathrm{e}^{\mathrm{sw}_{g}}$) ctional flow rate 2, v/(bc/h) v_i=V/(PHF" Y₁v, press 'g, press' and Bow rate², v_i(pcn) v=v_i((PHF⁻¹_{9ATS} ¹HvATS) Free-Flow Speed from Fleid Me ann speed of sample³, S_{rad} otal demand from rate, both directions, y tre-frow speed, FFS-85₇₂₄-0.00778(of f_{re/ATE}) Adj. for ne-passing zones, f_{re/ATE} (Exhibit 15-19) 1402whh 1402whh 6.0 12.0 adjustment factor¹, f_{g.ATS} (Exhibit 15-8) Segment length, L. ctty, Capres (Equation 15-13) porth city, C_{4,ATS} (Equation 15-12) poth fective speed factor, S_t (Eq. 15-30)

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	DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET	ËT
General Information	Site information	7 - 207 007 007
Agency I.Cr. Agency W.Trans Malana Andrew Ma		Write of Duhig Road
Analysis Time Pariod Pariod Pariot Hour	Arahysis Year	Existing plus Proj Conditions
Input Deta		
E Spanispress H		
Larra veletis R	Chass Michael	Class II Mohomy
1	Æ	
	angth mi	Up/down 0.95
A XMEN	evez Butesaq-ov	1001
	Spen Reith Arrest To Tricks and Dutaes, P.	
Opposing direction vol., V _a 1353veh/h Shoulder width ft 6.0	Access points m	San.
Lane Width ft 12.0 Segment Langth mi 1.0		
Average Traval Speed		
	Analysis Drection (d)	Opposing Direction (a)
rateeriget-dir equivalents for outcis, E _T (Exhibit 19-11.6)	0.7	1.0
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1,0	1.0
Heavy-vehicle adjustment factor, f _{tV,ATS} =1/ (1+ P ₇ (E _T -1)+P _R (E _R -1))	1,000	1.000
Grade adjustment factor ¹ , (_{gATS} (Exhibit 15-9)	1.00	1,00
Demand flow rate ² , v, (pcfh) v/n / (PHF* f _a ATS* fry ATS)	1422	1424
Free-Flow Speed from Field Measurement	Estimated Free-Flow Speed	-Flow Speed
	Base free-flow speed*, BFFS	55.0 mith
Mean speed of sample ³ , S _{FM}	Adj. for lane and shoulder width, 4 f. g(Exhibit 15-7)	
Total demand flow rate, both directions, v	Adj. for access points 4, f (Exhibit 15-8)	
	Free-flow speed, FFS (FSS-BFFS-4, g-4,)	53.8 mith
Adj. for no-pasalng zones, f _{np.ATS} (Exhibit 15-15) 0.8 mith	Average travel speed, ATS_aFFS-0.00778(v, are + V, are) - f., are	
	Percent free flow speed, PFFS	
The spanist around the spanist a	Analysis Direction (d)	Onnosino Draviem (n)
Passenger-car equivelents for trucks, E-(Exhibit 15-18 or 15-19)	1,0	0'3
Parameters annivelents for DVs E. (Evidité décit ou 15.19)	5	0,7
form to the same of the same o		4;
Heavy-vehicle adjustment factor, $I_{\rm HV}=1/(1+P_{\rm T}(E_{\rm T}-1)+P_{\rm R}(E_{\rm R}-1))$	1.000	1.000
Grade adjustment factor ¹ , f _{apring} (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate ² , v/pcfn) v _e vV/(PHF" _{H-V} ,prse* ^f a.prse)	1422	1424
Base percent time-spent-following , BPTSF (%)=100(1+0**)	84	59.4
Adj. for no-passang zona, i _{ng prze} (Exhibit 15-21)		2.6
Percent time-epera-following, PTSF_(%)_BPTSF+++ ne pras * Vapras * Vapras + Vapras +	93.7	2
Level of Service and Other Performance Measures		
Level of service, LOG (Exhibit 15-3)	3	
Cenedia C Equation 15:12) poin	5	1700
Canadk C (Fruition 15-13) noth	5	1700
December Front Flore Control Office of Control of Contr		
Biopole Lavel of Service		67.0
Directional demand flow rate in outside lane, v.v. (Eq. 15-24) veh/h	1422.1	2.1
Effective width, WV (Eq. 15-28) ft	24.00	8
Effective speed factor, S, (Eq. 15-30)	4.79	6
Bicycle level of service score, BLOS (Eq. 15-31)	4.17	7
Bicycle level of service (Exhibit 15-4)	a	
Notes 1. Note that the adjustment factor for level termin is 1,00 as level termin is one of the base conditions. For the purpose of oratio adjustment, specific downwards are treated as leve	Blorn. For the purpose of grade adjustment, specific	downcrade segments are treated as level
terrain. 2. If sale, on a best 200 and 200 and best analysis. The I OS is F.		
- 6.6		
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade		
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Directional

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		DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET	ET
	General Information		
		ection of Travel	SR 121-12 Washound West of Duhig Road
			Californs Existing plus Proj Conditions
Contact Independent			
	Sheuderwidh		
	Lare Wells		Class II highway Class III highway
Comparison Com		₹	
### State 15-12)		Grade Length mi U	uwop)d
15-11 or 15-12 15-		No-passing zone	100%
Note		Stee Berth Area * Trucks and Buses . P.	*
St. et		% Recreational vehicles, P	
First or 15-12		Access points ma	E S
1-2 1-2			
First or 15-17 First or 1	Average Travel Speed		
1.00 1.00		Analysis Direction (d)	Opposing Direction (o)
15-11 or 15-13 1-000 1-	Passanger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.0	0,1
1,000 1,00	Passenger-car equivalents for RVs, E. (Exhibit 15-11 or 15-13)	1.0	1.0
1.00 1.00	1 to 25 date. In Castillan I calmed brancher abeldantenantal		
100 100	(Way Ward And a sale Say Att consecution account from	2007	200:1
1,0,0,0,0,0	Grade adjustment factor ¹ , f _{s,ATS} (Exhibit 15-8)	1.00	1,00
Third Measurement Estimated Free Flow Speed Add, for since as yeard, 1875 Add, for since and shadder width fighth 15.7) Add, for since a yeard, 1875 C \$55-4875 Add, for since and shadder width fighth 15.7) Add, for since a yeard, 1875 C \$55-4875 Add, for since a yeard, 1875 C \$55-4875 Add, for since a yeard, 1787 Add, for since a yeard,	Demand flow rate ² , v, (poft) v,=V,/ (PHE* f _{a.ATS} "f _{tV.ATS})	1424	1422
Description of the property of 1975 Description of the property of 1975 Description of the property of t	Fran-Flow Speed from Field Measurement	Estimated Fre	-Flow Speed
Add for lars and chandler width * f_age. Reich 15-7)		Base free-flow speed*, BFFS	60.0 mith
Adj. for success points. 1, (Excitation 15.4)	Mean speed of sample 3, Scu.	Adi. for lane and shoulder width. 41, "Exhibit 15-	
115-10 or 15-10 Procedure speed, FTS (FSS-48FTS-Lg-lg) 1,	Total demand flow rate, both directions, v	Adi for second points ⁴ (. Fehillet 15.6)	
0.00 miles Average Provided, ATS_CFS_CADOTTMY_ATTS_Y_ATTS_Y_ATTS_Y_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_T_	Free-flow spend, FFS=S _{FM} +0.00778(#ffty,ATS.)	Constitution and processing	477 444
Average and speed, PTS, PTS, PTS, PTS, PTS, PTS, PTS, PTS	0.0	WEST LOCATION OF THE PROPERTY AND ADDRESS OF THE PARTY AND ADDRESS OF T	
15-16 or 15-19 1-0		Average travel speed, A15, FFS-0.00776(v _{4.A12}	
15-18 or 15-18 Analysis Direction (g) Coop 15-18 or 15-18 1.00 15-18 or 18-18 1.0	Percent Time-Spent-Following		
15.1 for v1.5 ty 15.1 for v1.5 ty 15.1 for v1.5 ty 15.2 for v1		Analysis Direction (d)	Opposing Direction (o)
1,000 1,00	Passanger-car equivalents for trucks, E ₇ (Exhibit 15-18 or 15-19)	1,0	1.0
E. (1)	Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0
1.00 1.00	Heavy-vehicle adjustment factor, (Inv=1/(1+P-(E1)+P-(E1))	1.000	1.000
# (1972)	Grade adjustment factor ¹ . [Exhibit 15-16 or Ex 15-17)	88	100
## 1972 1972			****
10.00 10.0	Lawcastral now rare , Viping V = V(V*T*** 14V,PTSF** 18,PTSF*)	1424	1422
# "4" o, r 12 14 14 15 15 15 15 15 15	Base percent time-spent-following ⁴ , BPTSF ₄ (%)=100(1-e ³⁴ , ²)	1	5)
# 4 op rigs "Ve prigs I Ve prigs I Ve prigs" \$1.5 de prigs I Ve	Ad, for ne-pessing zone, fig. pr.sp. (Exhibit 15-21)	7	9
1-Class e-dy	Percent time-spent-following, PTSF (%)=BPTSF +f prec (V, prec +V, prec)	69	
1 - Citate III orby 1700	Laving of Sarvice and Other Performance Managemen		
1700 1700	Level of service, LOS (Exhibit 15-3)	3	
1 - Ciera III only) (2.0 ciera	Volume to capacity ratio, wit	0.0	71
1-Class 11-04 1700 1700 1-Class 1-Class 1-Class 1-Cla	Capacity, C _{4,A75} (Equation 15-12) poth	6	98
1-Class III cody) (Eq. 15.29) which 1424.2 (Eq. 15.29) which 24.09 4.79 4.	Capachy, C _{d prige} (Equation 15-13) pch	æ	8
(Eq. 15-2q with 152.2 with 152.2 (Eq. 15-2q with 152.2 (Eq. 15-2q with 152.2 (Eq. 15-2q with 152.2 (Eq. 152.2	Percent Frae-Flow Speed PFFS_(Equation 15-11 - Class III orby)	09	
(Eq. 15.20) with	Bicycle Lavel of Service		
26.00 4.79 4.79 4.77 4.17 D D D D D D D D D D D D D	Directional demand flow rate in eutside lane, v _{OI} (Eq. 15-24) veh/h	142	42
4.79 4.79 6.79	Effective width, Wy (Eq. 15.29) ft	76	66
the 1.00 at level termin is one of the base conditions. For the purpose of grade adjustment, specific desergands as the LOS is F. - the LOS i	Effective speed further St. (Fig. 15,203)		
is 1.00 as level terrain is one of the base conditions. For the purpose of grade adjustment, specific devergends as units. Let 1.00 as let it. Fourthment 5:10. Fourthment 5:10. Fourthment 5:10. Fourthment 5:10. Reserved. PCS 2010 TM Version 6:50.	Rythia leand of standing agence 10 OK (first 15.91)		
16 100 to level turnin in one of the base conditions. For the purpose of grade educations, specific devergands as 	Bicycle level of service (Exhibit 15-4)		
Activities and activities of the activities of the activities of the activities of the activities and activities activities and activities acti	Worker A Material than the confirmation of feeding for bound formula in a CO on bound formula in the confirmation of the conf	Market Transfer	
HCS 2010 TM Verbin 6.50	I TOUR WAS BY BEING ON THE PROPERTY OF THE PROPERTY OF LOW, AND REVEN WITHOUT IN CITE OF 179 DRIDG COST	outons, nor are purpose of grade equisament, specific	comprise regments are versed as layer
HCS 2010 TM Version 6,50	2. If V/V _{eff} or V _{eff} > Veff Open Commission analysis—the LOS Is F. F. Free analysis discussion only and far v>200 vebh. F. Free Rea analysis discussion only and far v>200 vebh. F. Free Rea analysis discussion only.		
HCS 2010 TM Version 6.50	6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrad		
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