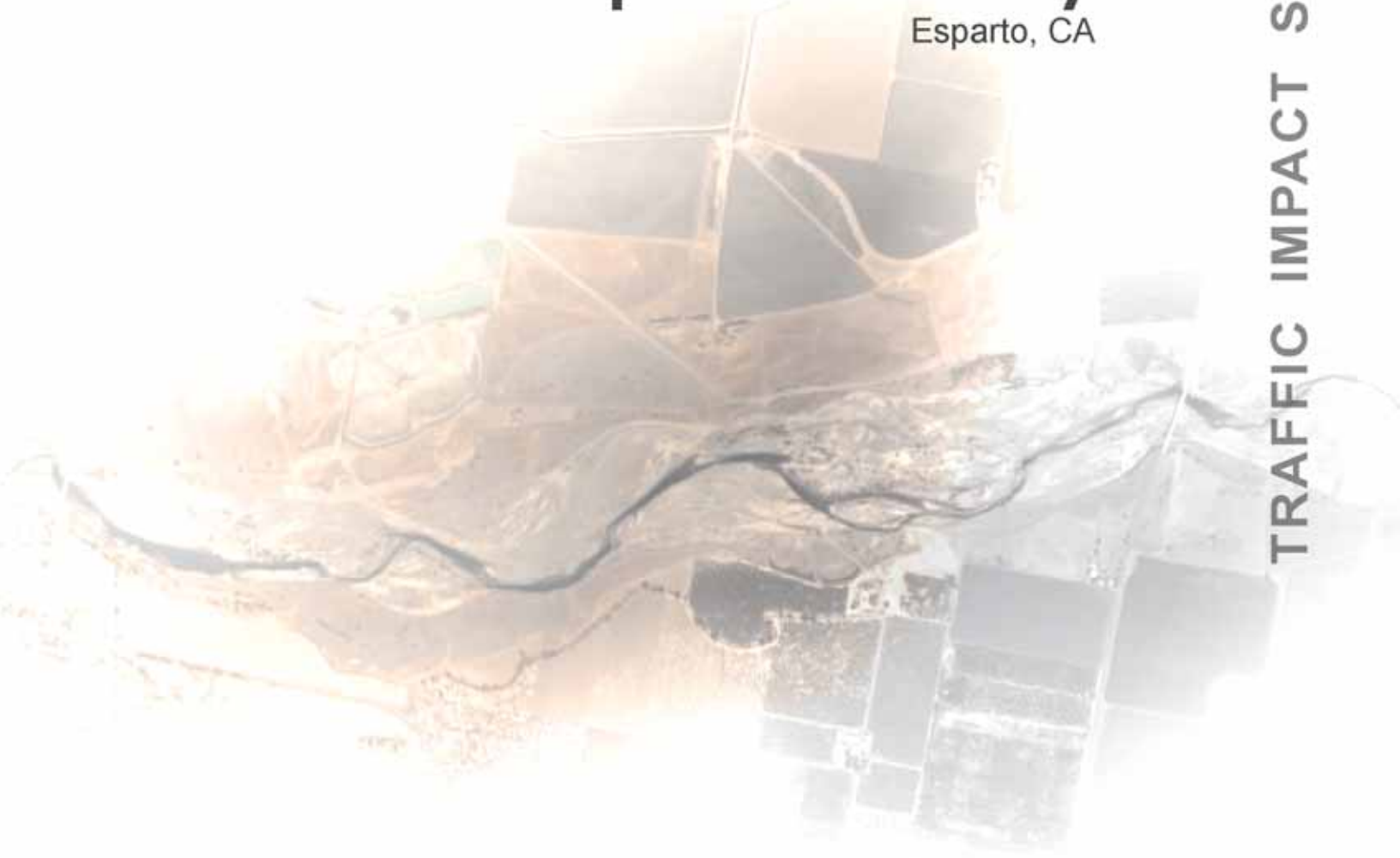
SEPTEMBER 2007

07-1108

TRAFFIC IMPACT STUDY

Granite Esparto Facility

Esparto, CA



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TRAFFIC IMPACT STUDY

FOR THE

GRANITE ESPARTO FACILITY

Esparto, California

September 2007

Prepared for
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ACRONYMS

CCRMP	Cache Creek Resource Management Plan
EB	Eastbound
EBL	Eastbound Left
EBR	Eastbound Right
EBT	Eastbound Through
EIR	Environmental Impact Report
HCM	Highway Capacity Manual
I	Interstate
LOS	Level of Service
NB	Northbound
NBL	Northbound Left
NBR	Northbound Right
NBT	Northbound Through
OCMP	Off-Channel Mining Plan
SACOG	Sacramento Area Council of Governments
SB	Southbound
SBL	Southbound Left
SBR	Southbound Right
SBT	Southbound Through
SR	State Route
SWITRS	Statewide Integrated Traffic Record System
TIS	Traffic Impact Study
TPY	tons per year
TWSC	Two-Way Stop Controlled
WB	Westbound
WBL	Westbound Left
WBR	Westbound Right
WBT	Westbound Through

INTRODUCTION

This Traffic Impact Study (TIS) was prepared to assess the traffic impacts due to the proposed Granite Construction (Granite) Esparto Facility (the "Project") located in western Yolo County north of Esparto, California. The Project includes the production of aggregate at the following levels:

- Average aggregate production of 870,000 tons per year (TPY)
- Maximum permitted aggregate production of 1,044,000 TPY (20% increase) as long as the 10-year production levels do not exceed 8,700,000 tons

Figure 1 shows the Project location.

This report contains the setting, impacts, and mitigation measures associated with the traffic and circulation aspects of the Project. The setting describes the existing conditions of the roadway system in the area. Impacts and mitigation measures are identified for project-specific impacts under cumulative conditions. Mitigation measures are identified to reduce impacts to a less-than-significant level.

Prior Analysis of the Study Area

An Environmental Impact Report (EIR)[1] was prepared in 1996 and a Traffic Impact Study (TIS)[2] was prepared in 1999 for the Granite Capay Facility project located directly west of the proposed Project site. The 1996 EIR addressed the long-term effects of operating the Capay Facility site with a maximum permitted aggregate production of 1,000,000 tons per year. The 1999 TIS addressed three changes to the Capay Facility operations identified in the 1996 EIR. These changes included:

- increasing maximum permitted aggregate production from 1,000,000 TPY to 1,200,000 TPY
- the addition of an asphalt plant
- the addition of a concrete plant

The Capay Facility operational characteristics/traffic volumes as described in the 1999 TIS are used as part of the background conditions in both the existing and cumulative (2029) conditions for this report.

Scope of this Analysis

The scope of this analysis is similar to that conducted in 1999 for the Granite Capay Site, and is meant to identify the cumulative Project maximum production impacts on the surrounding roadways. The study intersections and segments include those along the proposed haul route to I 505, which is the same haul route as identified in the previous studies. Roads used include:

- Road 87
- Road 19
- Interstate (I) 505

[1] *Cache Creek Aggregates Long-Term Off-Channel Mining Permit Environmental Impact Report*, Yolo County, 1996.
[2] *Traffic Impact Study for the Granite Capay Site*, Fehr & Peers Associates, 1999.

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Granite Esparto Facility
Yolo County

Figure 1

VICINITY MAP

Road 88

Road 17

Road 88A

505

Road 17

2

Road 19

Road 87

Road 85

2

1

3

4

Road 19A

Adams Canal

Existing Capay Facility Driveway

(Project Driveway)

1

Road 19B

Cache Creek

ESPARTO

SR 16

N

NOT TO SCALE
(ROAD WAY ALIGNMENT CONCEPTUAL ONLY)

LEGEND

Study Intersection

Project Site

(#) Segments Analyzed

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The following scenarios are analyzed in this study:

- Existing (2007) Conditions with the Capay site at maximum permitted sales levels
- Cumulative (2029) No Project Conditions with the Capay site at maximum permitted sales levels
- Cumulative (2029) Project Conditions with the Capay site and the proposed Project at maximum permitted sales levels

The "Existing (2007) Conditions plus Project" scenario was not analyzed in this document because any impacts identified in this scenario would be encompassed under the "Cumulative (2029) plus Project" scenario.

The peak hours used for level of service (LOS) analysis of the surrounding roadways included:

- 7:00 – 9:00 AM
- 2:00 – 4:00 PM

SETTING

This section describes the existing conditions of the study area including current site operations, roadway level of service, collision history, and operational issues.

Description of the Regional Environment

The study area is located in a rural environment outside any major urban areas. The surrounding area includes mostly agricultural uses and some rural homes. I-505 is the major north-south roadway in the area and State Route (SR) 16, which is located south of the proposed Project site, is the major east-west roadway.

Current Site Operations

The proposed Project site currently consists of agricultural orchards, row crops, and open space with one residence and three ancillary structures. These uses generate very few peak hour trips. The proposed Project will utilize the same private haul road from the Project site to Road 87 as the Capay Facility uses to access Road 87. The portion of the private haul road that will be used for the Project is shown in Figure 1 as the Existing Capay Facility Driveway (Project Driveway).

The existing Granite Capay facility operations allow for the following production levels:

- Average permitted aggregate production of 1,000,000 TPY
- Maximum permitted aggregate production of 1,200,000 TPY (20% increase) as long as the 10-year production levels do not exceed 10,000,000 tons
- The aggregate production includes aggregate used by the approved asphalt and concrete plants

Based on the current maximum permitted aggregate production levels and the approved asphalt and concrete plants, the Capay Facility generates 480 daily, 58 AM peak hour and 48 PM peak hour truck trips. The Capay Facility has 23 employees and it is estimated that 11 enter in the AM peak hour and 11 exit in the PM peak hour.

Traffic counts conducted in June of 2007 and corresponding truck load logs for the Capay Facility show approximately 210 daily, 11 AM peak hour, and 7 PM peak hour truck trips at the existing Capay Facility driveway, indicating that the Capay plant was not operating at the maximum permitted sales levels when the counts were taken. Therefore, the traffic counts used as input for the Existing (2007), Cumulative (2029) No Project, and Cumulative (2029) Project scenarios were adjusted upward to reflect the maximum permitted Capay sales levels as described previously and shown in the 1999 TIS.

Description of the Local Roadway System

Roadways

Table 1 describes the street system in the study area including the street classification, number of lanes, and the posted speed limits.

TABLE 1:
DESCRIPTION OF EXISTING STREET SYSTEM

Street	Classification	No. of Lanes (2-dir)	Posted Speed Limit (mph)
I-505	Freeway	4	65
Road 19	County Road	2	55
Road 87	County Road	2	55

mph = miles per hour

Interstate 505 is a north-south freeway that connects I 80 near Vacaville in the south and I 5 near Dunnigan in the north. In the vicinity of the Project site, interchanges exist at SR 16, Road 19, and Road 14.

Road 19 is an east-west road County road that extends between Road 87 on the west and Road 94B on the east.

Road 87 is a north-south road that begins at SR 16 in Esparto and extends beyond Road 14.

Intersection and Segment Operations

Study locations along the proposed Project haul route that are analyzed include:

Intersections

- Project/Capay Facility Driveway at Road 87
- Road 19 at Road 87
- Road 19 at I-505 SB Ramps
- Road 19 at I-505 NB Ramps

Segments

- Road 87 between Project/Capay Facility Driveway and Road 19
- Road 19 between Road 87 and I-505

Table 2 lists the Existing study intersections and their associated intersection control.

TABLE 2:
EXISTING INTERSECTION CONTROL

Intersection	Signalized/Unsignalized	Type
Project/Capay Facility Driveway at Road 87	Unsignalized	TWSC
Road 19 at Road 87	Unsignalized	TWSC
Road 19 at I-505 SB Ramps	Unsignalized	TWSC
Road 19 at I-505 NB Ramps	Unsignalized	TWSC

TWSC = Two-Way Stop Control *SB = Southbound* *NB = Northbound*

To evaluate Existing intersection and segment operations, peak hour turning movement and 24-hour classification counts were conducted by National Data & Survey Services (NDS) on June 20, 2007 for the study intersections and segments. The count sheets are included in Appendix A. In addition, the Capay Facility truck load log records were provided by the applicant to match to the traffic count data. Based on the expected peak hours of plant operations for the Project, adjacent street traffic, and previous studies, 7:00 to 9:00 a.m. and 2:00 to 4:00 p.m. were selected as the AM and PM peak periods for analysis. It should be noted that the aggregate industry varies seasonally, with the highest activity levels occurring between May and November. The agricultural industry also varies seasonally, with peak operations occurring in the summer months. Counts conducted during June generally represent one of the months with peak background activity in the study area.

Figure 2 displays the existing AM and PM peak hour traffic volumes adjusted to reflect the Capay Facility functioning at its current maximum permitted sales level of 1,200,000 tons per year. These numbers were derived by adding the difference between the observed (counted) trips and the maximum permitted production trips to the Existing intersection and segment volumes.

Two-lane highway segment and unsignalized intersection analyses were completed using the *Highway Capacity Manual* (*HCM 2000*) and associated software (*HCS+*), which is an industry standard for calculating highway segment and intersection levels of service.

For analysis purposes, the *HCM 2000* defines six levels of service for various facility types. The six levels are given letter designations ranging from "A" to "F", with "A" representing the best operating conditions and "F" the worst. Quantifiable measures of effectiveness (MOE) that best describe the quality of operation on the subject facility type are used to determine the facilities level of service. The quantifiable measures of effectiveness for the various analyses are as follows:

- Class I two lane highway segments: average travel speed and percent time spent following
- Unsignalized intersections: average control delay (seconds).[3]

As stated previously, the level of service for Class I two-lane highway segments is based on the average travel speed and the percent time following. Table 3 shows the level of service criteria for Class I two-lane highways. Exhibit 20-3 in the *HCM 2000* shows a graphical representation of the relationship between the average travel speed and percent time spent following.

[3] Control delay, according to the *2000 Highway Capacity Manual*, page 16-1, includes initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay.

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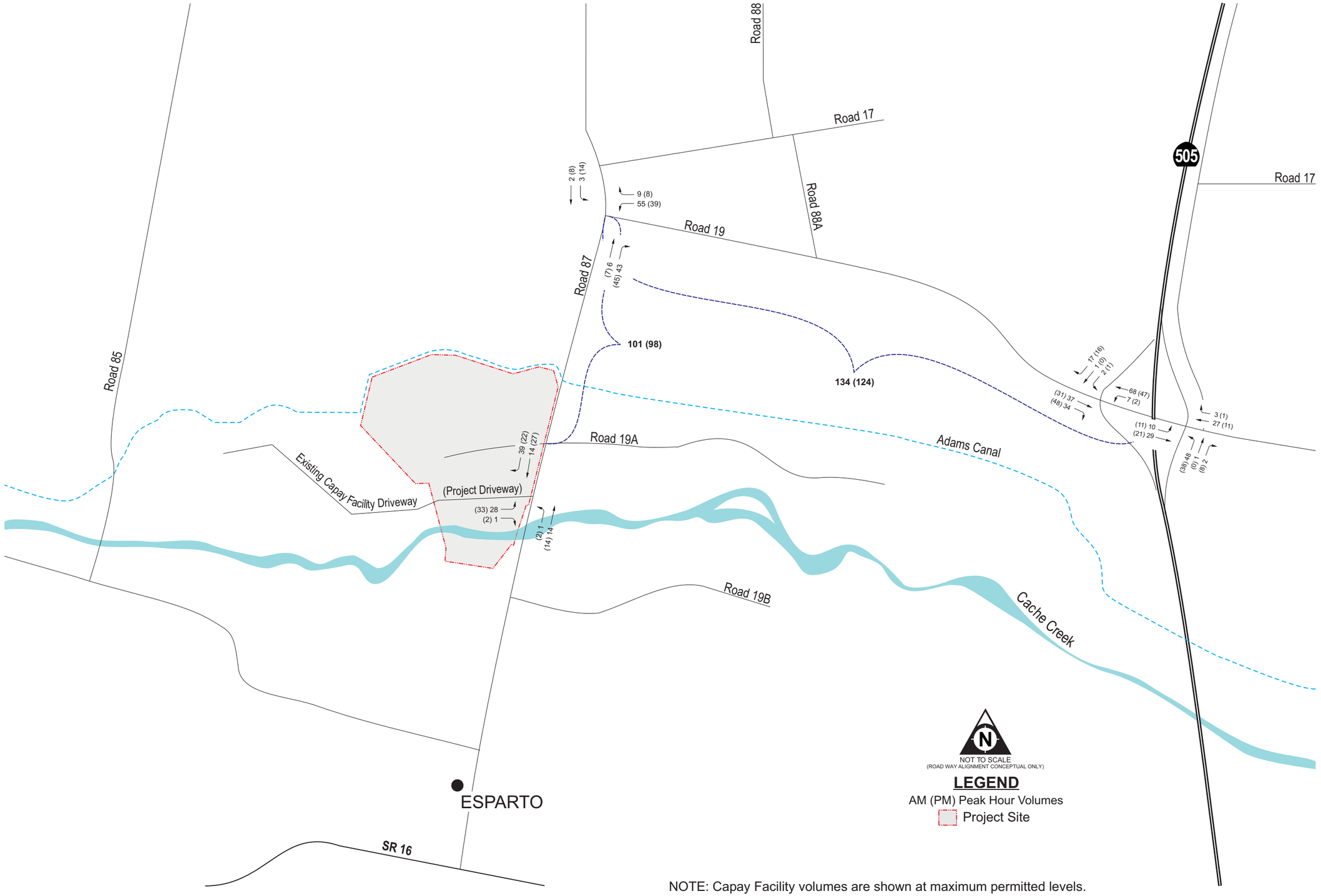
Yolo County

Figure 2

INTERSECTION AND SEGMENT VOLUMES
Existing



NOTE: Capay Facility volumes are shown at maximum permitted levels.

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TABLE 3:
CLASS I SEGMENT LEVEL OF SERVICE CRITERIA DESCRIPTION

LOS	Percent-Time Spent Following	Average Travel Speed (mi/h)
A	≤35	>55
B	>35-50	>50-55
C	>50-65	>45-50
D	>65-80	>40-45
E	>80	≤40

LOS F applies whenever the flow rate exceeds the segment capacity.
Source: 2000 Highway Capacity Manual, Transportation Research Board, Exhibit 20-2.

Control delay for two-way stop-controlled (TWSC) intersections, which have stop signs on only the minor street approaches, is per vehicle but is computed for the stop-controlled or minor street movements only since theoretically the through movements on the major street are not experiencing any delay. Since there is no aggregation of delay for a TWSC intersection, there is no intersection level of service as a whole, only levels of service for the individual minor movements. The minor movements generally consist of separate lefts on the major street approaches and all movements on both minor street approaches. Delay values at level of service thresholds for TWSC intersections will have a plus (+) or minus (-) appended to the delay value if the calculated delay value at full precision is greater (+) or less (-) than the rounded displayed delay value.

Table 4 shows the six levels of service and their corresponding ranges of average control delay for both signalized and unsignalized intersections. Table 4 also contains a brief traffic flow description for signalized intersections for each level of service category.

TABLE 4: INTERSECTION LEVEL OF SERVICE DESCRIPTION			**Intersections**	
			Signalized	**Unsignalized[1]**
Level of Service	**Conditions**	**Signalized Intersection Description**	**Delay (secs/veh)**	**Delay (secs/veh)**
"A"	Free Flow	*Users experience very low delay. Progression is favorable and most vehicles do not stop at all.*	≤ 10.0	≤ 10.0
"B"	Stable Operations	*Vehicles travel with good progression. Some vehicles stop, causing slight delay.*	> 10.0 to 20.0	> 10.0 to 15.0
"C"	Stable Operations	*Higher delays result from fair progression. A significant number of vehicles stop, although many continue to pass through the intersection without stopping.*	> 20.0 to 35.0	> 15.0 to 25.0
"D"	Approaching Unstable	*Congestion is noticeable. Progression is unfavorable, with more vehicles stopping rather than passing through the intersection.*	> 35.0 to 55.0	> 25.0 to 35.0
"E"	Unstable Operations	*Traffic volumes are at capacity. Users experience poor progression and long delays.*	> 55.0 to 80.0	> 35.0 to 50.0
"F"	Forced Flow	*Intersection's capacity is oversaturated, causing poor progression and unusually long delays.*	> 80.0	> 50.0

Source: 2000 Highway Capacity Manual, Transportation Research Board.
[1] *Unsignalized intersections include TWSC and AWSC*

Using the volumes shown on Figure 2, the intersections were analyzed for Existing (2007) levels of service. Again, the volumes used in the Existing (2007) conditions scenario were adjusted to reflect maximum production from the Capay Facility site. Table 5 shows the Existing (2007) levels of service for the study intersections. The Existing intersection levels of service calculations are included in Appendix B.

TABLE 5:
EXISTING (2007) CONDITIONS ANALYSIS[1]
INTERSECTION AND SEGMENT WEEKDAY LEVEL OF SERVICE

	AM LOS	PM LOS
Intersections		
Project Driveway at Road 87		
• EB Approach	A	A
• NB Approach	A	A
Road 19 at Road 87		
• WB Approach	A	A
• SB Approach	A	A
Road 19 at I-505 SB Ramps		
• WB Approach	A	A
• SB Approach	A	A
Road 19 at I-505 NB Ramps		
• EB Approach	A	A
• NB Approach	A	A
Segments		
Road 87 between Project Driveway and Road 19	B	B
Road 19 between Road 87 and I-505	B	B

[1] *Assumes Capay Facility site at maximum production levels* *EB = eastbound* *WB = westbound* *NB = northbound* *SB = southbound*

As shown in Table 5, all study intersections and segments are currently operating at or above the appropriate adopted level of service standard in the Existing (2007) conditions scenario.

Collision History

Accident data on County roads from January 2004 to most current available date (mid 2006) were obtained from the Statewide Integrated Traffic Record System (SWITRS) maintained by the California Highway Patrol. Table 6 summarizes the reported accidents by study location.

TABLE 6:
COLLISION HISTORY FOR THE STUDY LOCATIONS
JANUARY 2004 TO JUNE 2006

Location	Number of Accidents	Type	Cause
Road 19 at Road 87	5	Overturn Hit Object Overturn Hit Object Hit Object	Unknown Unsafe Speed Improper Turn Unsafe Speed Improper Turn
Road 19 at I-505 SB Ramps	0	---	---
Road 19 at I-505 NB Ramps	2	Head-On Broadside	Failure to Yield Failure to Yield
Road 19 between Road 87 and I-505[1]	5[1]	Broadside Broadside[1] Broadside[1] Hit Object Overturn[1]	Improper Pass Failure to Yield[1] Failure to Yield[1] Unsafe Speed Improper Turn[1]
Road 87 between Project Driveway and Road 19	3	Hit Object Hit Object Rear-End	Driving Under the Influence Unsafe Speed Unsafe Speed

Source: California Highway Patrol, 2007.
[1] = includes accidents associated with the intersection of Road 19 at Road 88A

Based on the data shown in Table 6, one (1) of the study locations experienced four (4) or more accidents in a twelve (12) month period. The Road 19 at Road 87 intersection experienced four (4) accidents between April 2004 and March 2005. Since that time period, only one (1) reported accident has occurred at this intersection. Within the last two (2) years, the County installed a stop-ahead sign with flashers on Road 19 on the approach to Road 87. The decrease in accident frequency is likely due to the remedial measures implemented by the County. The Road 19 between Road 87 and I-505 segment also experienced four (4) accidents in the same 12 month period. However, two (2) of those accidents occurred at the Road 19 at Road 88A intersection. Since these accidents involved vehicles from Road 88A entering Road 19, they are not considered accidents occurring "on" the study segment of Road 19. Therefore, these two (2) accidents have been excluded from the analysis of the Road 19 study segment. Since the study twelve (12) month period, only one (1) reported accident has occurred at this segment.

Truck Traffic

Truck travel is allowed on all County roads and State highways unless prohibited at a specific location. For the aggregate industry, primary haul routes have been identified in conjunction with a project's permit. For the proposed Project, Road 87 and Road 19 are the proposed haul route to and from 1-505 as shown in Figure 3.

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Granite Esparto Facility
Yolo County

Figure 3

PROPOSED HAUL ROUTE

Road 88

Road 17

Road 88A

Road 87

Road 19

Road 85

Road 19A

Adams Canal

Existing Capay Facility Driveway

(Project Driveway)

Road 19B

Cache Creek

ESPARTO

SR 16

NOT TO SCALE
(ROAD WAY ALIGNMENT CONCEPTUAL ONLY)

LEGEND

AM (PM) Peak Hour Volumes

Project Site

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Regulatory Setting

The regulatory setting section identifies the policies, plans and regulations of other related planning documents that may be applicable to this analysis. These policies were used to formulate the basis of the standards of significance against which project impacts were evaluated.

The primary bases for the regulatory setting are the Off-Channel Mining Plan (OCMP) for Lower Cache Creek, 1996, the Cache Creek Resource Management Plan (CCRMP), 1996, and the Yolo County General Plan, 1983. The General Plan identifies a series of policies related to the operations and maintenance of the circulation system that were used to develop the standards of significance for this document.

IMPACTS AND MITIGATION MEASURES

The impact analysis identifies the impacts of the proposed project on the roadway system. The first part of this section identifies the standards for determining when an impact may be considered significant. The second part documents the analysis. The third part identifies specific project impacts and mitigation measures.

Standards of Significance

The project may have a significant effect on traffic and circulation if it would:

- Change the level of service on a County roadway segment or intersection from acceptable levels of service (i.e., LOS A, B, C) to unacceptable levels of service (i.e., LOS D, E or F) as specified by Circulation Policy CIR-7 of the Yolo County General Plan, July 1983.
- Exacerbate conditions on a roadway or an intersection that currently operates at an unacceptable level of service.
- Add substantial (e.g., 10 or more per day) vehicle trips to a roadway facility that does not currently meet the standards identified below:
    - Non-standard road design according to County and State design standards;
    - Bridges less than 20 feet in width or those identified by the Federal or State government as being in need of structural repair;
    - Pavement that has deteriorated to the degree that it may affect public health and safety; and
    - Intersections in which limited curve radii cause a truck to access an on-coming lane while making a turning movement.
- Add substantial (e.g., 50 or more per day) loaded truck trips to a County-maintained roadway in which the pavement will deteriorate and require repair during the life of the permit.
- Result in inadequate emergency access.

The majority of these standards of significance are identical to those applied in the 1996 EIR and the 1999 TIS. The prior standard of significance pertaining to accident frequency has been removed since it is not part of the County of Yolo General Plan and was not identified by current Yolo County staff.

Proposed Project

The proposed Project will allow an average aggregate production of 870,000 TPY with a maximum

production level of 1,044,000 TPY in a peak year, as long as the ten-year average does not exceed 8,700,000 tons.

Impact Analysis

The impact analysis was conducted for both Cumulative (2029) No Project and Cumulative (2029) Project conditions. The assumptions and results of each Cumulative (2029) analysis scenario are described in the following sections.

Analysis of Cumulative Conditions

This section begins with a discussion of the background roadway assumptions for Cumulative (2029) conditions. Next the expected trip generation of the proposed Project is summarized, as are Cumulative (2029) haul route assumptions. The Cumulative (2029) conditions analysis is conducted for 2029, the year corresponding to the last year of permitted production for the Capay Facility.

Background Roadway Assumptions

According to the Yolo County General Plan, Yolo County, July, 1983 and the Yolo County Congestion Management Program, Yolo County, January, 1994, no major road improvements are planned in the study area. However, some improvements were included as conditions of approval for area developments under previous entitlements in the area. These improvements include the realignment of Road 19 and replacement of a bridge on Road 19 west of I-505, both of which have been completed.

Background Growth Assumptions

TPG contacted the Sacramento Area Council of Governments (SACOG) to obtain background growth rates from the SACOG Regional Travel Demand Model. However the SACOG Regional Travel Demand Model is currently being updated and has not yet been approved for use. Therefore the two (2) percent per year growth rate, utilized in the 1999 TIS, was applied to the Existing (2007) background peak hour counts to develop the Cumulative (2029) No Project and Project traffic volumes. The two (2) percent per year growth rate was recommended by County staff based on anticipated growth in the surrounding area.

Analysis of Cumulative (2029) Conditions Without the Project

This section analyzes the Cumulative (2029) No Project conditions, with the Capay facility operating at maximum permitted levels with 4% recycling. Capay facility operations at this rate would generate 484 daily trips.[4]

Analysis Results

The Cumulative (2029) No Project intersection and segment volumes are shown on Figure 4. Using the volumes shown on Figure 4, the intersections and segments were analyzed for Cumulative (2029) No Project conditions levels of service. Table 7 shows the Cumulative (2029) No Project levels of service for the study intersections. The Cumulative (2029) No Project intersection levels of service calculations are included in Appendix C.

[4] Traffic Impact Study for the Granite Capay Site, Fehr & Peers, 1999.

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Granite Esparto Facility
Yolo County

Figure 4

INTERSECTION AND SEGMENT VOLUMES
2029 No Project

Road 85
Road 87
Road 88
Road 88A
Road 17
Road 19
Road 19A
Road 19B
505
Adams Canal
Cache Creek
Existing Capay Facility Driveway
(Project Driveway)
ESPARTO
SR 16

3 (13)
5 (22)
14 (13)
64 (49)
(11) 9
(52) 52
120 (123)
172 (164)
19 (21)
2 (0)
3 (2)
92 (65)
11 (3)
(43) 53
(63) 43
5 (2)
43 (17)
(11) 11
(33) 46
(51) 61
(0) 2
(13) 3
39 (22)
22 (43)
(33) 28
(2) 1
(2) 1
(22) 22

NOT TO SCALE
(ROAD WAY ALIGNMENT CONCEPTUAL ONLY)

LEGEND
AM (PM) Peak Hour Volumes
Project Site

NOTE: Capay Facility volumes are shown at maximum permitted levels.

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TABLE 7:
CUMULATIVE (2029) NO PROJECT CONDITIONS ANALYSIS[1]
INTERSECTION AND SEGMENT WEEKDAY LEVEL OF SERVICE

	AM LOS	PM LOS
Intersection		
Project Driveway at Road 87		
• EB Approach	B	A
• NB Approach	A	A
Road 19 at Road 87		
• WB Approach	A	B
• SB Approach	A	A
Road 19 at I-505 SB Ramps		
• WB Approach	A	A
• SB Approach	A	A
Road 19 at I-505 NB Ramps		
• EB Approach	A	A
• NB Approach	B	A
Segments		
Road 87 between Project Driveway and Road 19	B	B
Road 19 between Road 87 and I-505	B	B

[1] *Assumes Capay Facility site at maximum production levels* *EB = eastbound* *WB = westbound* *NB = northbound* *SB = southbound*

As shown in Table 7, all study intersections and segments are projected to operate at or above the appropriate adopted level of service standard in the Cumulative (2029) No Project conditions scenario.

Analysis of Cumulative Conditions with the Project

This section analyzes the Cumulative (2029) Project conditions considering the proposed maximum permitted sales level.

This section analyzes the Cumulative (2029) Project conditions, with the Capay facility operating at maximum permitted levels and 4% recycling. This scenario also includes the proposed maximum permitted levels for the proposed Esparto Facility.

Project Trip Generation

The following lists the key assumptions associated with the trip generation of the proposed Project. It should be noted that these assumptions are conservative to ensure that the potential impacts are not underestimated.

1. The Project will operate at the maximum permitted sales levels of 1,044,000 TPY.
2. Trucks are assumed to carry an average of 22 tons per load. An average work year is assumed to include 247 work days.
3. 12% of daily truck trips occur during the AM peak hour and 10% of daily truck trips occur during the PM peak hour.

Table 8 displays the expected daily, AM peak hour, and PM peak hour trip generation for the Project.

TABLE 8:
PROJECT TRIP GENERATION DATA

Project Components	**Average Annual Operations**		**Maximum Annual Operations**	
Annual Production (tons)				
• Aggregate	870,000		1,044,000	
Average Annual Truck Loads				
• Aggregate	39,545		47,455	
Average Daily Truck Loads				
• Aggregate	160		192	
Average Daily Truck Trips				
• Aggregate	320		384	
Number of Employees	15		15	
	AM PEAK HOUR		**PM PEAK HOUR**	
Project Uses	**Enter (trips)**	**Exit (trips)**	**Enter (trips)**	**Exit (trips)**
Aggregate Trucks	23	23	19	19
Employees	7	0	0	7
Total	**30**	**23**	**19**	**26**

The Project will likely operate at peak production for 10-15 days per year between the months of May and November.

Trip Distribution

The existing haul routes for the Granite Capay facility will be utilized for the proposed Project, as shown in Figure 5.

Analysis Results

The Cumulative (2029) Project intersection and segment volumes are shown on Figure 6. Using the volumes shown on Figure 6, the intersections and segments were analyzed for Cumulative (2029) Project conditions levels of service. Table 9 shows the Cumulative (2029) Project levels of service for the study intersections. The Cumulative (2029) Project intersection levels of service calculations are included in Appendix D.

Road 88

Road 17

Road 88A

Road 87

Road 19

Road 85

Road 19A

Adams Canal

Existing Capay Facility Driveway

(Project Driveway)

Road 19B

Cache Creek

ESPARTO

SR 16

Road 17

33%

67%

NOT TO SCALE
(ROAD WAY ALIGNMENT CONCEPTUAL ONLY)

LEGEND

AM (PM) Peak Hour Volumes

Project Site

NOTE: Fewer than 1% of Project trips travel south of the Project Driveway on Road 87 for local deliveries.

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Granite Esparto Facility
Yolo County

Figure 5

DISTRIBUTION PERCENTAGES
Project Trips

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Road 88

Road 17

Road 88A

Road 19

Road 87

Road 85

505

Road 17

3 (13)
5 (22)

14 (13)
93 (66)

(11) 9
(76) 74

171 (164)

223 (205)

29 (27)
2 (0)
3 (2)

111 (76)
11 (3)

(51) 60
(79) 58

5 (2)
43 (17)

(19) 18
(33) 46

(62) 80
(0) 2
(13) 3

68 (39)
22 (43)

Road 19A

Adams Canal

Existing Capay Facility Driveway

(Project Driveway)

(57) 50
(4) 2

(4) 2
(22) 22

Road 19B

Cache Creek

ESPARTO

SR 16

N

NOT TO SCALE
(ROAD WAY ALIGNMENT CONCEPTUAL ONLY)

LEGEND

AM (PM) Peak Hour Volumes

Project Site

NOTE: Capay Facility volumes are shown at maximum permitted levels.

07-1108

Granite Esparto Facility
Yolo County

Figure 6

INTERSECTION AND SEGMENT VOLUMES
2029 Project

TPG Consulting Incorporated

TABLE 9:
CUMULATIVE (2029) PROJECT CONDITIONS ANALYSIS[1]
INTERSECTION AND SEGMENT WEEKDAY LEVEL OF SERVICE

	AM LOS	PM LOS
Intersection		
Project Driveway at Road 87		
• EB Approach	B	B
• NB Approach	A	A
Road 19 at Road 87		
• WB Approach	B	B
• SB Approach	A	A
Road 19 at I-505 SB Ramps		
• WB Approach	A	A
• SB Approach	B	A
Road 19 at I-505 NB Ramps		
• EB Approach	A	A
• NB Approach	B	B
Segments		
Road 87 between Project Driveway and Road 19	B	B
Road 19 between Road 87 and I-505	B	B

[1] *Assumes Esparto and Capay Facility sites at maximum production levels* *EB = eastbound*
WB = westbound *NB = northbound* *SB = southbound*

As shown in Table 9, all study intersections and segments are projected to operate at or above the appropriate adopted level of service standard in the Cumulative (2029) Project conditions scenario with maximum permitted conditions for both the Project and existing Capay facility.

In terms of emergency access, the project applicant does not propose to modify the existing Capay haul route or site access provisions. Therefore, no impacts to emergency access were identified.

Impacts and Mitigation Measures

The results of the Cumulative conditions impact analysis was evaluated for the proposed project based on the standards of significance listed previously. Each impact is identified and followed by a proposed mitigation measure. An assessment of the significance of the impact with the mitigation in place is also provided.

Impact 1

The proposed project would add 50 or more loaded truck trips per day and would accelerate the deterioration of roadway pavement on Road 87 and Road 19. This is considered to be a potentially significant impact if not adequately mitigated.

Mitigation Measure 1

The same mitigation measure identified in the 1999 TIS for the Capay facility is proposed to mitigate Project impacts, as follows:

"The applicant shall assume joint pavement maintenance responsibility with the County on County Road 87 from the project access road to Road 19, and on Road 19 from Road 87 to 1-505, for the permit period per performance standard 2.5-5 (amended) of the Off-Channel Mining Plan. The applicant must submit an annual evaluation of the structural integrity of the road and implement pavement improvements to maintain safe and efficient traffic operation on the road for each upcoming year.

Implementation of this mitigation measure would reduce this impact to a less than significant level."

APPENDIX A

EXISTING INTERSECTION AND SEGMENT COUNTS

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
AM													
7:00-8:00	1	14	0	0	0	0	0	14	7	11	0	0	47
7:15-8:15	0	15	0	0	0	0	0	13	6	10	0	0	44
7:30-8:30	0	12	0	0	0	0	0	11	12	7	0	1	43
7:45-8:45	1	11	0	0	0	0	0	7	10	9	0	1	39
8:00-9:00	1	8	0	0	0	0	0	14	9	4	0	2	38
Peak Hour	1	14	0	0	0	0	0	14	7	11	0	0	47
7:00-8:00													

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
PM													
2:00-3:00	2	14	0	0	0	0	0	27	2	9	0	2	56
2:15-3:15	1	9	0	0	0	0	0	23	0	6	0	2	41
2:30-3:30	0	7	0	0	0	0	0	12	0	3	0	1	23
2:45-3:45	0	13	0	0	0	0	0	17	0	3	0	0	33
3:00-4:00	0	10	0	0	0	0	0	19	1	3	0	0	33
Peak Hour	2	14	0	0	0	0	0	27	2	9	0	2	56
2:00-3:00													

Intersection: Project Driveway at Road 87

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
AM													
7:00-8:00	0	6	23	17	0	7	6	2	0	0	0	0	61
7:15-8:15	0	6	26	23	0	9	3	2	0	0	0	0	69
7:30-8:30	0	6	25	19	0	8	3	2	0	0	0	0	63
7:45-8:45	0	6	26	15	0	6	5	3	0	0	0	0	61
8:00-9:00	0	4	22	23	0	7	6	4	0	0	0	0	66
Peak Hour	0	6	26	23	0	9	3	2	0	0	0	0	69
7:15-8:15													
Wednesday 6/20/07													
PM													
2:00-3:00	0	7	21	19	0	8	14	8	0	0	0	0	77
2:15-3:15	0	6	14	16	0	8	17	7	0	0	0	0	68
2:30-3:30	0	4	11	11	0	6	18	5	0	0	0	0	55
2:45-3:45	0	5	13	12	0	4	11	6	0	0	0	0	51
3:00-4:00	0	3	9	11	0	0	10	7	0	0	0	0	40
Peak Hour	0	7	21	19	0	8	14	8	0	0	0	0	77
2:00-3:00													

Intersection: Road 19 at Road 87

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
AM													
7:00-8:00	0	0	0	7	38	0	3	1	6	0	29	26	110
7:15-8:15	0	0	0	7	47	0	2	1	6	0	31	22	116
7:30-8:30	0	0	0	7	41	0	1	1	4	0	26	14	94
7:45-8:45	0	0	0	4	44	0	1	0	7	0	26	17	99
8:00-9:00	0	0	0	6	43	0	0	0	9	0	21	19	98
Peak Hour	0	0	0	7	47	0	2	1	6	0	31	22	116
7:15-8:15													

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
PM													
2:00-3:00	0	0	0	2	33	0	1	0	10	0	22	33	101
2:15-3:15	0	0	0	2	30	0	1	0	10	0	22	33	98
2:30-3:30	0	0	0	2	30	0	1	0	10	0	22	33	98
2:45-3:45	0	0	0	2	24	0	1	0	10	0	16	33	86
3:00-4:00	0	0	0	2	26	0	1	0	10	0	15	33	87
Peak Hour	0	0	0	2	33	0	1	0	10	0	22	33	101
2:00-3:00													

Intersection: Road 19 at I-505 SB Ramps

Wednesday 6/20/07	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR	Totals
AM													
7:00-8:00	21	1	4	0	24	3	0	0	0	7	26	0	86
7:15-8:15	27	1	2	0	27	3	0	0	0	5	29	0	94
7:30-8:30	24	1	3	0	24	1	0	0	0	3	24	0	80
7:45-8:45	27	1	3	0	21	0	0	0	0	3	24	0	79
8:00-9:00	29	1	3	0	20	0	0	0	0	2	19	0	74
Peak Hour	27	1	2	0	27	3	0	0	0	5	29	0	94
7:15-8:15													
Wednesday 6/20/07													
PM													
2:00-3:00	24	0	8	0	11	1	0	0	0	2	21	0	67
2:15-3:15	20	0	8	0	12	2	0	0	0	3	20	0	65
2:30-3:30	18	0	7	0	14	2	0	0	0	3	20	0	64
2:45-3:45	10	0	9	0	16	2	0	0	0	7	10	0	54
3:00-4:00	8	1	7	0	20	3	0	0	0	5	11	0	55
Peak Hour	24	0	8	0	11	1	0	0	0	2	21	0	67
2:00-3:00													

Intersection: Road 19 at I-505 NB Ramps

Date: 6/20/07 Location: Road 87 from Project Driveway to Road 19 Project #: 07-7142-001n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	2	0	1	0	0	0	0	0	0	0	0	5
05:00	0	11	3	0	3	0	0	0	1	0	1	0	0	19
06:00	0	8	3	1	3	1	0	1	11	0	0	0	0	28
07:00	0	4	2	0	2	0	0	1	10	0	0	0	0	19
08:00	1	5	2	0	5	2	0	0	5	0	0	0	0	20
09:00	1	5	1	0	2	1	0	0	9	0	0	0	0	19
10:00	0	3	3	1	5	1	0	0	10	0	0	0	0	23
11:00	0	4	0	0	4	1	0	1	6	0	0	0	0	16
12:00 PM	0	6	4	0	4	1	0	0	11	0	0	0	0	26
13:00	0	3	4	0	2	1	0	1	6	0	0	0	0	17
14:00	0	7	4	0	5	0	0	1	4	0	0	0	0	21
15:00	1	4	4	0	3	0	0	0	3	0	0	0	0	15
16:00	0	8	2	0	3	0	0	0	0	0	0	0	0	13
17:00	1	8	2	0	4	1	0	1	1	0	0	0	0	18
18:00	0	7	2	0	2	0	0	1	0	0	0	0	0	12
19:00	0	6	2	0	1	0	0	0	0	0	0	0	0	9
20:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4
21:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
22:00	0	2	0	0	1	0	0	0	0	0	0	0	0	3
23:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
Totals	**4**	**112**	**44**	**2**	**51**	**9**		**7**	**77**		**1**			**307**
% of Totals	1%	36%	14%	1%	17%	3%		2%	25%		0%			100%

Date: 6/20/07 Location: Road 87 from Project Driveway to Road 19 Project #: 07-7142-001s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	4	2	0	1	0	0	0	2	0	0	0	0	9
05:00	0	5	3	0	0	0	0	0	7	0	1	0	0	16
06:00	1	8	2	0	4	3	0	0	4	0	1	0	0	23
07:00	1	6	3	0	3	1	0	1	7	0	1	0	0	23
08:00	0	7	4	0	2	3	0	1	4	0	1	0	0	22
09:00	0	6	3	0	2	1	0	3	10	0	1	0	0	26
10:00	0	2	2	0	2	2	0	1	6	0	1	0	0	16
11:00	0	5	5	1	2	1	0	1	8	0	0	0	0	23
12:00 PM	0	7	2	0	5	1	0	1	7	0	1	0	0	24
13:00	0	5	2	1	2	1	0	1	7	0	0	0	0	19
14:00	0	11	7	0	2	1	0	1	4	0	0	0	0	26
15:00	0	12	5	0	2	0	0	0	2	0	0	0	0	21
16:00	0	14	7	0	4	0	1	1	0	0	0	0	0	27
17:00	0	13	3	0	2	0	0	0	0	0	0	0	0	18
18:00	0	14	3	0	1	0	0	0	0	0	0	0	0	18
19:00	0	8	3	0	0	0	0	0	0	0	0	0	0	11
20:00	1	2	0	0	1	0	0	0	0	0	0	0	0	4
21:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
22:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
23:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Totals	**3**	**146**	**57**	**2**	**35**	**14**	**1**	**11**	**68**		**7**			**344**
% of Totals	1%	42%	17%	1%	10%	4%	0%	3%	20%		2%			100%

Date: 6/20/07 Location: Road 19 from Road 87 to I-505 Project #: 07-7142-002e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	1	0	1	0	0	0	0	0	0	0	0	3
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
05:00	0	9	0	0	1	0	0	0	0	0	1	0	0	11
06:00	1	10	2	1	1	0	0	2	10	0	1	0	0	28
07:00	1	10	4	0	4	0	1	3	18	0	1	0	1	43
08:00	2	6	4	1	2	0	0	1	8	0	1	0	2	27
09:00	1	11	2	1	4	1	0	3	13	0	1	0	1	38
10:00	1	7	11	0	6	0	0	1	19	0	2	0	1	48
11:00	0	11	4	0	3	0	0	1	13	0	2	0	0	34
12:00 PM	1	9	5	0	4	0	0	3	17	0	2	0	0	41
13:00	0	10	6	1	8	1	0	3	13	0	1	0	0	43
14:00	3	9	4	3	8	3	0	3	4	0	2	0	0	39
15:00	1	6	3	3	11	1	0	1	0	0	0	0	0	26
16:00	0	19	4	0	2	0	0	0	0	0	0	0	0	25
17:00	1	17	4	0	3	1	0	0	0	0	0	0	0	26
18:00	0	16	4	0	3	1	0	0	1	0	0	0	0	25
19:00	0	4	2	0	1	1	0	0	0	0	0	0	0	8
20:00	0	6	1	0	1	0	0	0	0	0	0	0	0	8
21:00	0	5	1	0	1	0	0	0	0	0	0	0	0	7
22:00	1	4	1	0	1	0	0	0	0	0	0	0	0	7
23:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
Totals	**13**	**186**	**65**	**10**	**65**	**9**	**1**	**21**	**116**		**14**		**5**	**505**
% of Totals	3%	37%	13%	2%	13%	2%	0%	4%	23%		3%		1%	100%

Date: 6/20/07 Location: Road 19 from Road 87 to I-505 Project #: 07-7142-002w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	8	2	0	0	0	0	0	3	0	1	0	0	14
05:00	0	22	8	0	1	0	0	1	8	0	1	0	0	41
06:00	0	15	6	0	1	1	0	0	9	0	3	0	0	35
07:00	0	9	9	0	2	3	0	1	11	0	1	0	0	36
08:00	1	9	7	0	1	1	1	2	18	0	1	0	0	41
09:00	1	8	3	0	4	1	0	1	14	0	1	0	0	33
10:00	1	5	4	0	4	1	0	1	17	0	0	0	0	33
11:00	0	11	3	0	5	0	0	1	14	0	3	0	0	37
12:00 PM	0	8	2	0	3	2	0	2	14	0	2	0	0	33
13:00	0	8	5	1	3	3	0	1	15	0	1	0	0	37
14:00	0	11	3	1	6	2	0	3	6	0	1	0	0	33
15:00	0	10	3	1	4	1	0	0	5	0	0	0	0	24
16:00	0	12	3	0	6	0	0	0	1	0	0	0	0	22
17:00	0	14	6	0	4	0	0	0	0	0	0	0	0	24
18:00	1	12	4	0	1	1	0	0	0	0	0	0	0	19
19:00	1	11	2	0	1	0	0	0	0	0	0	0	0	15
20:00	0	5	0	0	1	0	0	0	0	0	0	0	0	6
21:00	0	4	1	0	1	1	0	0	0	0	0	0	0	7
22:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	**5**	**194**	**74**	**3**	**48**	**17**	**1**	**13**	**135**		**15**			**505**
% of Totals	1%	38%	15%	1%	10%	3%	0%	3%	27%		3%			100%

APPENDIX B

EXISTING (2007) CONDITIONS

INTERSECTION AND SEGMENT

LEVELS OF SERVICE CALCULATIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2007 (max production)*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Project Driveway* | North/South Street: *Road 87*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*14*			*14*	*39*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*1*	*15*	*0*	*0*	*15*	*44*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*28*		*1*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*31*	*0*	*1*	*0*	*0*	*0*
Percent Heavy Vehicles	*100*	*0*	*100*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*1*						*32*	
C (m) (veh/h)	*1545*						*759*	
v/c	*0.00*						*0.04*	
95% queue length	*0.00*						*0.13*	
Control Delay (s/veh)	*7.3*						*10.0*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*10.0*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2007 (max production)*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Project Driveway*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*14*			*27*	*22*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*2*	*15*	*0*	*0*	*30*	*25*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*33*		*2*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*37*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*70*	*0*	*70*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*2*						*39*	
C (m) (veh/h)	*1550*						*802*	
v/c	*0.00*						*0.05*	
95% queue length	*0.00*						*0.15*	
Control Delay (s/veh)	*7.3*						*9.7*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.7*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*6*	*43*	*3*	*2*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*6*	*48*	*3*	*2*	*0*
Percent Heavy Vehicles	*0*	--	--	*62*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*55*		*9*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*62*	*0*	*10*
Percent Heavy Vehicles	*0*	*0*	*0*	*59*	*0*	*59*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*3*		*72*				
C (m) (veh/h)		*1241*		*852*				
v/c		*0.00*		*0.08*				
95% queue length		*0.01*		*0.28*				
Control Delay (s/veh)		*7.9*		*9.6*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--	*9.6*					
Approach LOS	--	--	*A*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*7*	*45*	*14*	*8*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*7*	*51*	*15*	*9*	*0*
Percent Heavy Vehicles	*0*	--	--	*45*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*39*		*8*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*44*	*0*	*9*
Percent Heavy Vehicles	*0*	*0*	*0*	*58*	*0*	*58*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*15*		*53*				
C (m) (veh/h)		*1311*		*817*				
v/c		*0.01*		*0.06*				
95% queue length		*0.03*		*0.21*				
Control Delay (s/veh)		*7.8*		*9.7*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--	*9.7*					
Approach LOS	--	--	*A*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*37*	*34*	*7*	*68*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*42*	*38*	*7*	*77*	*0*
Percent Heavy Vehicles	*0*	--	--	*51*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*2*	*1*	*17*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*2*	*1*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*65*	*65*	*65*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*7*					*22*	
C (m) (veh/h)		*1259*					*808*	
v/c		*0.01*					*0.03*	
95% queue length		*0.02*					*0.08*	
Control Delay (s/veh)		*7.9*					*9.6*	
LOS		*A*					*A*	
Approach Delay (s/veh)	--	--				*9.6*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*31*	*48*	*2*	*47*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*35*	*54*	*2*	*53*	*0*
Percent Heavy Vehicles	*0*	--	--	*52*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*1*	*0*	*16*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*1*	*0*	*18*
Percent Heavy Vehicles	*0*	*0*	*0*	*41*	*41*	*41*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*2*					*19*	
C (m) (veh/h)		*1244*					*907*	
v/c		*0.00*					*0.02*	
95% queue length		*0.00*					*0.06*	
Control Delay (s/veh)		*7.9*					*9.1*	
LOS		*A*					*A*	
Approach Delay (s/veh)	--	--				*9.1*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*AM*		

Project Description *07-1108*	
East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*10*	*29*			*27*	*3*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*11*	*32*	*0*	*0*	*30*	*3*
Percent Heavy Vehicles	*67*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*48*	*1*	*2*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*54*	*1*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*11*			*57*				
C (m) (veh/h)	*1245*			*780*				
v/c	*0.01*			*0.07*				
95% queue length	*0.03*			*0.24*				
Control Delay (s/veh)	*7.9*			*10.0*				
LOS	*A*			*A*				
Approach Delay (s/veh)	--	--	*10.0*					
Approach LOS	--	--	*A*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2007*
Analysis Time Period	*PM*		

Project Description *07-1108*	
East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*11*	*21*			*11*	*1*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*12*	*23*	*0*	*0*	*12*	*1*
Percent Heavy Vehicles	*59*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*38*	*0*	*8*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*43*	*0*	*9*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

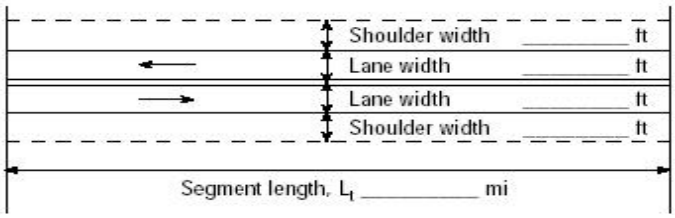
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*12*			*52*				
C (m) (veh/h)	*1302*			*822*				
v/c	*0.01*			*0.06*				
95% queue length	*0.03*			*0.20*				
Control Delay (s/veh)	*7.8*			*9.7*				
LOS	*A*			*A*				
Approach Delay (s/veh)	--	--	*9.7*					
Approach LOS	--	--	*A*					

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2007*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*101* veh/h
Directional split	*54 / 46*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*162*
v_p * highest directional split proportion[2] (pc/h)	*87*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*122*
v_p * highest directional split proportion[2] (pc/h)	*66*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*10.2*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.5*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*15.7*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.05*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*37*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*131*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.7*

Notes

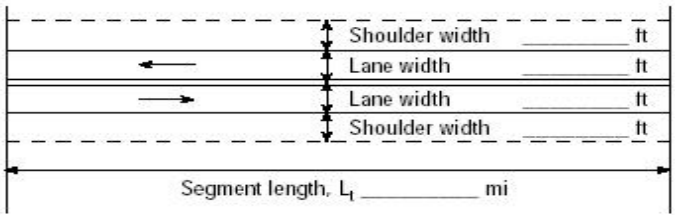
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2007*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*98* veh/h
Directional split	*51 / 49*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*40* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.781*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*143*
v_p * highest directional split proportion[2] (pc/h)	*73*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.2*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.962*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*116*
v_p * highest directional split proportion[2] (pc/h)	*59*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*9.7*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*4.8*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*14.5*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.04*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*36*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*127*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.7*

Notes

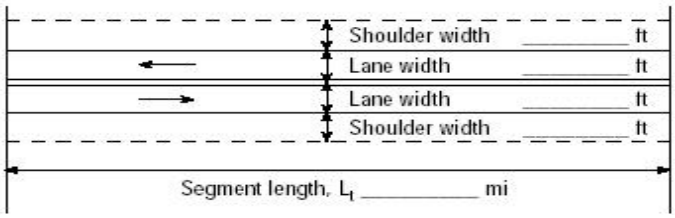
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2007*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*134* veh/h
Directional split	*56 / 44*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*63* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.694*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*219*
v_p * highest directional split proportion[2] (pc/h)	*123*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.9*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.941*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*162*
v_p * highest directional split proportion[2] (pc/h)	*91*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*13.3*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*6.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*19.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.07*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*107*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*375*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*2.1*

Notes

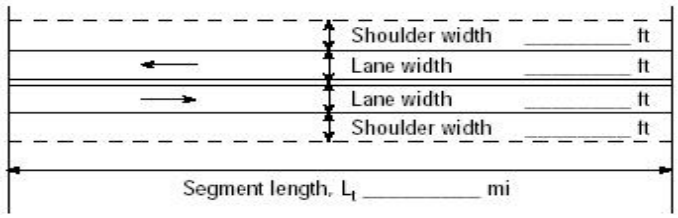
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2007*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*124* veh/h
Directional split	*56 / 44*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*199*
v_p * highest directional split proportion[2] (pc/h)	*111*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*149*
v_p * highest directional split proportion[2] (pc/h)	*83*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*12.3*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*6.0*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*18.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*99*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*347*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*1.9*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

APPENDIX C

CUMULATIVE (2029) NO PROJECT CONDITIONS

INTERSECTION AND SEGMENT

LEVELS OF SERVICE CALCULATIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Project Driveway*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*22*			*22*	*39*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*1*	*25*	*0*	*0*	*25*	*44*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*28*		*1*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*31*	*0*	*1*	*0*	*0*	*0*
Percent Heavy Vehicles	*100*	*0*	*100*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*1*						*32*	
C (m) (veh/h)	*1532*						*737*	
v/c	*0.00*						*0.04*	
95% queue length	*0.00*						*0.14*	
Control Delay (s/veh)	*7.4*						*10.1*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--				*10.1*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Project Driveway*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*22*			*43*	*22*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*2*	*25*	*0*	*0*	*48*	*25*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*33*		*2*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*37*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*70*	*0*	*70*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*2*						*39*	
C (m) (veh/h)	*1527*						*772*	
v/c	*0.00*						*0.05*	
95% queue length	*0.00*						*0.16*	
Control Delay (s/veh)	*7.4*						*9.9*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.9*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19* | North/South Street: *Road 87*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*9*	*52*	*5*	*3*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*10*	*59*	*5*	*3*	*0*
Percent Heavy Vehicles	*0*	--	--	*62*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*64*		*14*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*72*	*0*	*15*
Percent Heavy Vehicles	*0*	*0*	*0*	*59*	*0*	*59*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*5*		*87*				
C (m) (veh/h)		*1224*		*837*				
v/c		*0.00*		*0.10*				
95% queue length		*0.01*		*0.35*				
Control Delay (s/veh)		*8.0*		*9.8*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--	*9.8*					
Approach LOS	--	--	*A*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19* | North/South Street: *Road 87*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*11*	*52*	*22*	*13*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*12*	*59*	*25*	*14*	*0*
Percent Heavy Vehicles	*0*	--	--	*45*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*49*		*13*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*55*	*0*	*14*
Percent Heavy Vehicles	*0*	*0*	*0*	*58*	*0*	*58*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*25*		*69*				
C (m) (veh/h)		*1296*		*782*				
v/c		*0.02*		*0.09*				
95% queue length		*0.06*		*0.29*				
Control Delay (s/veh)		*7.8*		*10.0*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.0*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*53*	*43*	*11*	*92*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*60*	*48*	*12*	*104*	*0*
Percent Heavy Vehicles	*0*	--	--	*51*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*3*	*2*	*19*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*3*	*2*	*21*
Percent Heavy Vehicles	*0*	*0*	*0*	*65*	*65*	*65*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*12*					*26*	
C (m) (veh/h)		*1227*					*758*	
v/c		*0.01*					*0.03*	
95% queue length		*0.03*					*0.11*	
Control Delay (s/veh)		*8.0*					*9.9*	
LOS		*A*					*A*	
Approach Delay (s/veh)	--	--					*9.9*	
Approach LOS	--	--					*A*	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*43*	*63*	*3*	*65*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*48*	*71*	*3*	*73*	*0*
Percent Heavy Vehicles	*0*	--	--	*52*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*2*	*0*	*21*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*2*	*0*	*23*
Percent Heavy Vehicles	*0*	*0*	*0*	*41*	*41*	*41*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*3*					*25*	
C (m) (veh/h)		*1210*					*876*	
v/c		*0.00*					*0.03*	
95% queue length		*0.01*					*0.09*	
Control Delay (s/veh)		*8.0*					*9.2*	
LOS		*A*					*A*	
Approach Delay (s/veh)	--	--				*9.2*		
Approach LOS	--	--				*A*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*11*	*46*			*43*	*5*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*12*	*52*	*0*	*0*	*48*	*5*
Percent Heavy Vehicles	*67*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*61*	*2*	*3*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*69*	*2*	*3*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*12*			*74*				
C (m) (veh/h)	*1222*			*738*				
v/c	*0.01*			*0.10*				
95% queue length	*0.03*			*0.33*				
Control Delay (s/veh)	*8.0*			*10.4*				
LOS	*A*			*B*				
Approach Delay (s/veh)	--	--	*10.4*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 No Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*11*	*33*			*17*	*2*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*12*	*37*	*0*	*0*	*19*	*2*
Percent Heavy Vehicles	*59*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*51*	*0*	*13*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*57*	*0*	*14*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

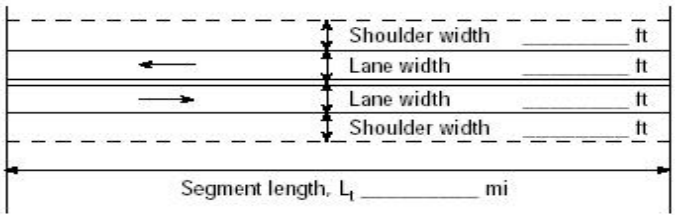
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*12*			*71*				
C (m) (veh/h)	*1293*			*802*				
v/c	*0.01*			*0.09*				
95% queue length	*0.03*			*0.29*				
Control Delay (s/veh)	*7.8*			*9.9*				
LOS	*A*			*A*				
Approach Delay (s/veh)	--	--	*9.9*					
Approach LOS	--	--	*A*					

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2029 No Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*120* veh/h
Directional split	*53 / 47*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*193*
v_p * highest directional split proportion[2] (pc/h)	*102*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.2*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*144*
v_p * highest directional split proportion[2] (pc/h)	*76*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*11.9*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.4*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*17.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*44*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*156*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.8*

Notes

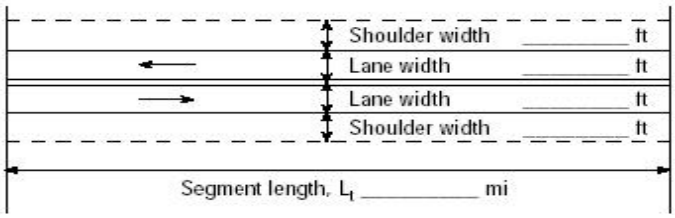
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2029 No Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*123* veh/h
Directional split	*52 / 48*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*40* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.781*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*179*
v_p * highest directional split proportion[2] (pc/h)	*93*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.3*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*52.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.962*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*145*
v_p * highest directional split proportion[2] (pc/h)	*75*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*12.0*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*17.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.06*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*45*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*160*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*0.9*

Notes

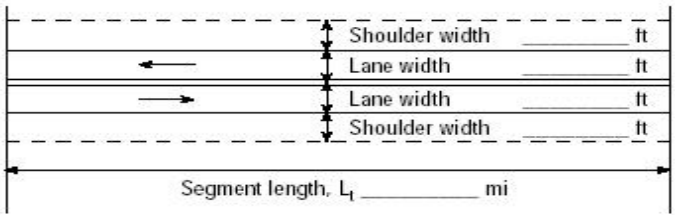
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2029 No Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*172* veh/h
Directional split	*55 / 45*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*63* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.694*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*282*
v_p * highest directional split proportion[2] (pc/h)	*155*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.3*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.941*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*208*
v_p * highest directional split proportion[2] (pc/h)	*114*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*16.7*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*22.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*137*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*482*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*2.7*

Notes

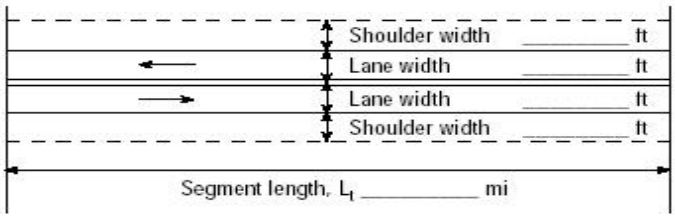
1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2029 No Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*164* veh/h
Directional split	*55 / 45*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*263*
v_p * highest directional split proportion[2] (pc/h)	*145*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.5*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*197*
v_p * highest directional split proportion[2] (pc/h)	*108*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*15.9*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.9*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*21.8*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.08*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*130*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*459*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*2.5*

Notes

1. If Vp >= 3,200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split Vp>= 1,700 pc/h, terminated anlysis-the LOS is F.

APPENDIX D

CUMULATIVE (2029) PROJECT CONDITIONS

INTERSECTION AND SEGMENT

LEVELS OF SERVICE CALCULATIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Project Driveway*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*22*			*22*	*68*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*2*	*25*	*0*	*0*	*25*	*77*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*50*		*1*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*56*	*0*	*1*	*0*	*0*	*0*
Percent Heavy Vehicles	*100*	*0*	*100*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*2*						*57*	
C (m) (veh/h)	*1490*						*715*	
v/c	*0.00*						*0.08*	
95% queue length	*0.00*						*0.26*	
Control Delay (s/veh)	*7.4*						*10.5*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--				*10.5*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Project Driveway @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*County of Yolo*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Project Driveway*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*22*			*43*	*39*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*4*	*25*	*0*	*0*	*48*	*44*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*57*		*4*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*64*	*0*	*4*	*0*	*0*	*0*
Percent Heavy Vehicles	*70*	*0*	*70*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*4*						*68*	
C (m) (veh/h)	*1503*						*756*	
v/c	*0.00*						*0.09*	
95% queue length	*0.01*						*0.30*	
Control Delay (s/veh)	*7.4*						*10.2*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--				*10.2*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *Road 87*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*9*	*74*	*5*	*3*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*10*	*84*	*5*	*3*	*0*
Percent Heavy Vehicles	*0*	--	--	*62*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*93*		*14*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*105*	*0*	*15*
Percent Heavy Vehicles	*0*	*0*	*0*	*59*	*0*	*59*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*5*		*120*				
C (m) (veh/h)		*1196*		*820*				
v/c		*0.00*		*0.15*				
95% queue length		*0.01*		*0.51*				
Control Delay (s/veh)		*8.0*		*10.1*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.1*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ Road 87*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19* | North/South Street: *Road 87*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*11*	*76*	*22*	*13*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*12*	*86*	*25*	*14*	*0*
Percent Heavy Vehicles	*0*	--	--	*45*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*66*		*13*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*75*	*0*	*14*
Percent Heavy Vehicles	*0*	*0*	*0*	*58*	*0*	*58*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*25*		*89*				
C (m) (veh/h)		*1265*		*762*				
v/c		*0.02*		*0.12*				
95% queue length		*0.06*		*0.39*				
Control Delay (s/veh)		*7.9*		*10.3*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.3*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*60*	*58*	*11*	*111*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*68*	*65*	*12*	*126*	*0*
Percent Heavy Vehicles	*0*	--	--	*51*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*3*	*2*	*29*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*3*	*2*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*65*	*65*	*65*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*12*					*37*	
C (m) (veh/h)		*1199*					*744*	
v/c		*0.01*					*0.05*	
95% queue length		*0.03*					*0.16*	
Control Delay (s/veh)		*8.0*					*10.1*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--				*10.1*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 SB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 SB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*51*	*79*	*3*	*76*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*57*	*89*	*3*	*86*	*0*
Percent Heavy Vehicles	*0*	--	--	*52*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*2*	*0*	*27*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*2*	*0*	*30*
Percent Heavy Vehicles	*0*	*0*	*0*	*41*	*41*	*41*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*					*LTR*	
v (veh/h)		*3*					*32*	
C (m) (veh/h)		*1180*					*863*	
v/c		*0.00*					*0.04*	
95% queue length		*0.01*					*0.12*	
Control Delay (s/veh)		*8.1*					*9.3*	
LOS		*A*					*A*	
Approach Delay (s/veh)	--	--					*9.3*	
Approach LOS	--	--					*A*	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*PM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*19*	*33*			*17*	*2*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*21*	*37*	*0*	*0*	*19*	*2*
Percent Heavy Vehicles	*59*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*62*	*0*	*13*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*70*	*0*	*14*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*21*			*84*				
C (m) (veh/h)	*1293*			*777*				
v/c	*0.02*			*0.11*				
95% queue length	*0.05*			*0.36*				
Control Delay (s/veh)	*7.8*			*10.2*				
LOS	*A*			*B*				
Approach Delay (s/veh)	--	--	*10.2*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*W Hutcheson*	Intersection	*Road 19 @ I-505 NB Ramps*
Agency/Co.	*TPG Consulting*	Jurisdiction	*Caltrans/Yolo County*
Date Performed	*8/9/2007*	Analysis Year	*2029 Project*
Analysis Time Period	*AM*		

Project Description *07-1108*

East/West Street: *Road 19*	North/South Street: *I-505 NB Ramps*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*18*	*46*			*43*	*5*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*20*	*52*	*0*	*0*	*48*	*5*
Percent Heavy Vehicles	*67*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*80*	*2*	*3*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*90*	*2*	*3*	*0*	*0*	*0*
Percent Heavy Vehicles	*63*	*63*	*63*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

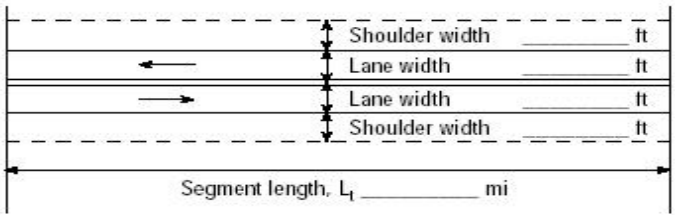
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*			*LTR*				
v (veh/h)	*20*			*95*				
C (m) (veh/h)	*1222*			*716*				
v/c	*0.02*			*0.13*				
95% queue length	*0.05*			*0.46*				
Control Delay (s/veh)	*8.0*			*10.8*				
LOS	*A*			*B*				
Approach Delay (s/veh)	--	--	*10.8*					
Approach LOS	--	--	*B*					

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2029 Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*171* veh/h
Directional split	*54 / 46*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*275*
v_p * highest directional split proportion[2] (pc/h)	*149*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.5*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*206*
v_p * highest directional split proportion[2] (pc/h)	*111*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*16.6*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.7*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*22.3*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.09*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*63*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*222*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*1.2*

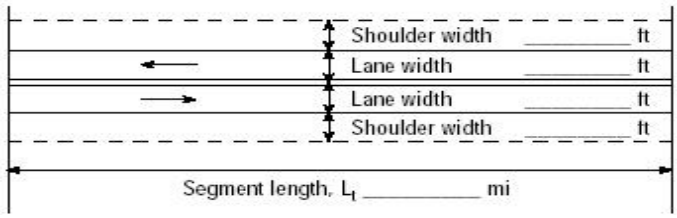
Notes

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 87*
Agency or Company	*TPG Consulting*	From/To	*Project Driveway to Road 19*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2029 Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*164* veh/h
Directional split	*51 / 49*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*40* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.781*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*239*
v_p * highest directional split proportion[2] (pc/h)	*122*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.4*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*51.7*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.962*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*194*
v_p * highest directional split proportion[2] (pc/h)	*99*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*15.7*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*5.2*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*20.9*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.07*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*61*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*213*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*1.2*

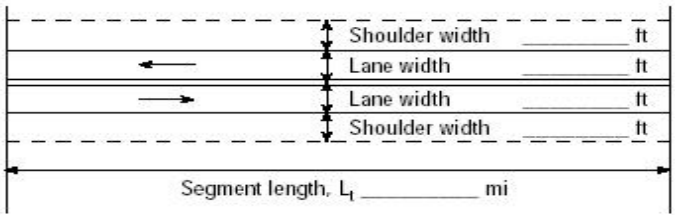
Notes

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*AM*	Analysis Year	*2029 Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*223* veh/h
Directional split	*56 / 44*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*63* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.694*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*365*
v_p * highest directional split proportion[2] (pc/h)	*204*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.8*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.4*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.941*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*269*
v_p * highest directional split proportion[2] (pc/h)	*151*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*21.1*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*6.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*27.1*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.11*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*177*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*624*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*3.5*

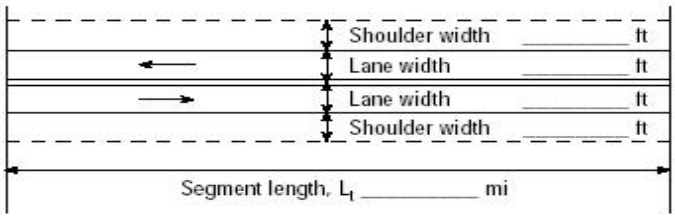
Notes

TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*W Hutcheson*	Highway	*Road 19*
Agency or Company	*TPG Consulting*	From/To	*Road 87 to I-505*
Date Performed	*8/9/2007*	Jurisdiction	*Yolo County*
Analysis Time Period	*PM*	Analysis Year	*2029 Project*

Project Description: *07-1108*

Input Data



☑ Class I highway ☐ Class II highway

Terrain ☑ Level ☐ Rolling

Two-way hourly volume	*205* veh/h
Directional split	*56 / 44*
Peak-hour factor, PHF	*0.88*
No-passing zone	*10*
% Trucks and Buses , P_T	*59* %
% Recreational vehicles, P_R	*0*%
Access points/ *mi*	*4*

Average Travel Speed

Grade adjustment factor, f_G (Exhibit 20-7)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-9)	*1.7*
Passenger-car equivalents for RVs, E_R (Exhibit 20-9)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.708*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*329*
v_p * highest directional split proportion[2] (pc/h)	*184*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed, S_{FM}	*mi/h*	Base free-flow speed, $BFFS_{FM}$	*55.0 mi/h*
Observed volume, V_f	*veh/h*	Adj. for lane width and shoulder width[3], f_{LS} (Exhibit 20-5)	*0.0 mi/h*
Free-flow speed, FFS FFS=S_{FM}+0.00776(V_f/ f_{HV})	*mi/h*	Adj. for access points, f_A (Exhibit 20-6)	*1.0 mi/h*
		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*54.0 mi/h*

Adj. for no-passing zones, f_{np} (*mi/h*) (Exhibit 20-11)	*0.7*
Average travel speed, ATS (*mi/h*) ATS=FFS-0.00776v_p-f_{np}	*50.8*

Percent Time-Spent-Following

Grade Adjustment factor, f_G (Exhibit 20-8)	*1.00*
Passenger-car equivalents for trucks, E_T (Exhibit 20-10)	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 20-10)	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.944*
Two-way flow rate[1], v_p (pc/h)=V/ (PHF * f_G * f_{HV})	*247*
v_p * highest directional split proportion[2] (pc/h)	*138*
Base percent time-spent-following, BPTSF(%)=100(1-$e^{-0.000879v_p}$)	*19.5*
Adj. for directional distribution and no-passing zone, $f_{d/hp}$(%)(Exh. 20-12)	*6.1*
Percent time-spent-following, PTSF(%)=BPTSF+$f_{d/np}$	*25.6*

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 20-3 for Class I or 20-4 for Class II)	*B*
Volume to capacity ratio, v/c=V_p/ 3,200	*0.10*
Peak 15-min veh-miles of travel, VMT_{15} (veh- *mi*)= 0.25L_t(V/PHF)	*163*
Peak-hour vehicle-miles of travel, VMT_{60}(veh- *mi*)=V*L_t	*574*
Peak 15-min total travel time, TT_{15}(veh-h)= VMT_{15}/ATS	*3.2*

Notes