Final Report

Transportation/Circulation Analysis for Tracy Gateway Business Park

Prepared for:
City of Tracy

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I. INTRODUCTION

This report analyzes the traffic impacts associated with the development of the Tracy Gateway Business Park in Tracy, California. Tracy Gateway ("Project"), a new development proposed for the northwestern Tracy area, includes a mixture of office and commercial/recreational land uses. The project site encompasses approximately 540 acres along Eleventh Street and Lammers Road, situated between I-205 and I-580. Figure 1 shows the project's location and the surrounding Baseline roadway network.

The project site is currently primarily agricultural with one single-family residence in the northeast corner at the intersection of Lammers Road and Eleventh Street. The project area is included in the North Schulte Community Area as designated by the 1993 Urban Management Plan. The approved land use for this site under the Urban Management Plan is low-density residential at 3.5 dwelling units per acre.

This traffic analysis evaluates a 2025 Cumulative Scenario with and without buildout of the proposed project.. The p.m. peak hour is considered more critical than the a.m. peak hour for capacity and impact evaluations since traffic volumes are generally higher during the p.m. peak hour than during the a.m. peak hour. Maximum peak hour trip generation for the project would occur during the p.m. peak hour. Therefore, special emphasis is placed on the p.m. peak hour traffic volumes generated by the project and their impact on the Tracy roadway network and regional freeway system for impact evaluation.

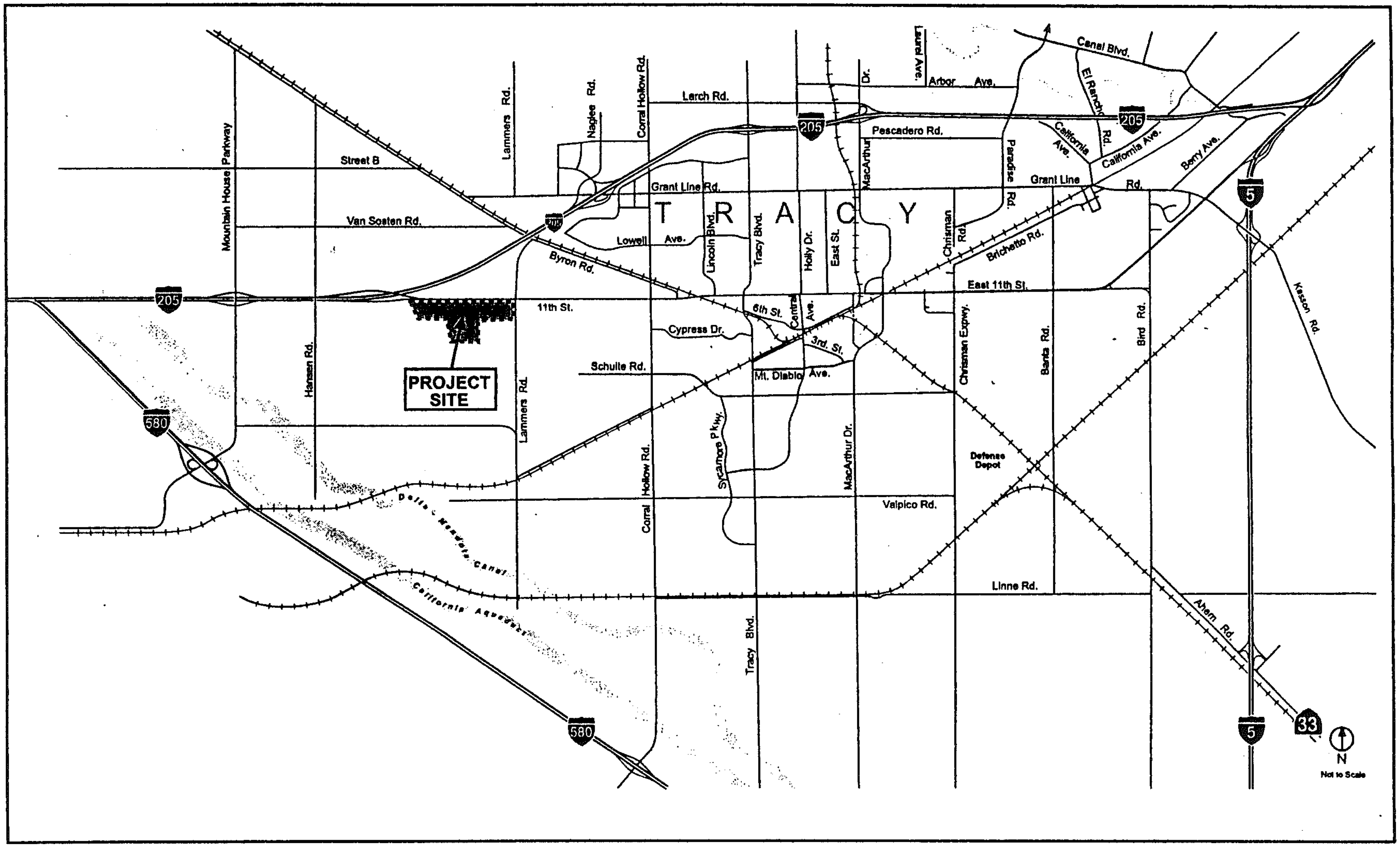

Figure 1 PROJECT SITE AND BASELINE ROADWAY SYSTEM

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II. FORECASTING ASSUMPTIONS AND STANDARDS OF SIGNIFICANCE

A. Traffic Forecasts

Traffic forecasts are prepared using the Tracy Citywide Traffic Model. The model reflects the most recent information on future projects and planned roadway improvements, as described in Chapter III of this report. In addition to the Tracy Gateway project, the cumulative traffic forecasts include 20 - 25 years' growth for all other reasonably foreseeable projects in Tracy and nearby county areas.

Outside of the Tracy Planning Area, the development assumptions used in preparing the traffic forecasts are consistent with the 2020 scenario of the San Joaquin County Council of Governments (SJCOG) traffic model.

B. Intersection Level of Service Methodology

In order to measure and describe the operation of a local roadway network, traffic engineers and planners commonly use a grading system called Level of Service (LOS). The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of traffic. These levels range from LOS A, which indicates free-flow traffic conditions with little or no delay experienced by motorists, to LOS F, which describes congested conditions where traffic flows exceed design capacity, resulting in long queues and delays. This LOS grading system applies to both signalized and unsignalized intersections. LOS A, B, and C are generally considered to be satisfactory service levels, while the influence of congestion becomes more noticeable at LOS D. LOS E is undesirable and is considered by most agencies to be the limit of acceptable delay, and LOS F conditions are considered to be unacceptable to most drivers.

For local signalized intersections, traffic conditions are evaluated using the Transportation Research Board Circular 212 planning methodology. The planning analysis uses various intersection characteristics (such as traffic volumes, lane geometry and signal phasing) to estimate the average critical volume-to-capacity (V/C) ratio at an intersection.

At freeway interchanges, the intersection level of service methodology approved by Caltrans evaluates an intersection's operation based on the average vehicular control delay calculated using the method described in Chapter 9 of the *2000 Highway Capacity Manual* (HCM). Synchro 5.0 was used to analyze freeway interchanges. Synchro 5.0 is an intersection level of service analysis software program that evaluates intersections based on the 2000 HCM, and also accounts for coordination between closely spaced signals, such as those commonly seen at freeway interchanges. Table 1 summarizes the relationship between V/C ratio, average delay, and LOS for signalized intersections.

TABLE 1
INTERSECTION LEVEL OF SERVICE DEFINITIONS
SIGNALIZED INTERSECTIONS

Level of Service	Description of Traffic Conditions	Volume to Capacity (V/C) Ratio	Average Control Delay per Vehicle (sec.)
A	No approach phase is fully utilized and no vehicle waits longer than one red indication.	≤ 0.60	≤ 10.0
B	An occasional approach phase is fully utilized. Drivers begin to feel restricted.	0.61 to 0.70	≤ 20.0
C	Major approach phase may become fully utilized. Most drivers feel somewhat restricted.	0.71 to 0.80	≤ 35.0
D	Drivers may wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	0.81 to 0.90	≤ 55.0
E	Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues form upstream.	0.91 to 1.00	≤ 80.0
F	Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 1.00	> 80.0

C. Standards of Significance

As described in Section B, Level of Service (LOS) is a measure of the congestion of a facility, ranging from A (free-flow conditions) to F (volume greater than capacity). Future intersection LOS for local intersections is determined using the Transportation Research Board Circular 212 planning technique for local signalized intersections, and the 2000 HCM operations methodology for freeway interchanges. Both techniques have been modified to measure service levels over the average of the peak hour rather than the peak 15 minutes, consistent with the City of Tracy's adopted LOS policy. The level of service standard for the City of Tracy is LOS C, except for intersections located within ¼ mile of a freeway, where the standard is LOS D. On I-205, the San Joaquin County Congestion Management Plan (CMP) specifies LOS E as the acceptable level of service. On I-580, the CMP standard is LOS D. A project impact is considered significant if the proposed project reduces the Level of Service at an intersection below the City of Tracy standards.

For purposes of identifying possible impact locations, this study analyzes LOS operations if the proposed project contributes more than 3% to the total future traffic on a roadway segment or intersection.

III. 2025 FUTURE CONDITIONS

A. 2025 Cumulative Development

The cumulative scenario used as a baseline for the Tracy Gateway project is based on adopted regional forecasts, and the forecasted 2025 development in Tracy and regulatory controls such as Measure A within the Tracy Urban Management Plan (UMP). In addition to existing development, this includes the following:

Specific Plans and PUDs:	Level of Buildout Potential:
▪ Residential Specific Plan (RSP)	100%
▪ Industrial Specific Plan (ISP)	100%
▪ I-205 Specific Plan (I-205 SP)	100%
▪ Infill	100%
▪ Plan C	100%
▪ Northeast Industrial (NEI)	100%
▪ Elissagaray	100%
▪ Lourence Ranch	100%
▪ Presidio	100%
▪ Tracy Hills Specific Plan	100%
▪ South Schulte Specific Plan	25% (Residential Only)
▪ Castro	25%
▪ Kagehiro	25%
▪ Saddlebrook	25%
▪ Moitoso II	25%
▪ Souchek	25%

These forecasts are considered to be an adopted "summary of projections" for purposes of determining Cumulative impacts, as defined in Section 15130(b)(1)(B) of the CEQA Guidelines. The future Year 2025 population and employment estimates for the Tracy Area are 101,000 and 46,500, respectively. Table 2 summarizes the development assumptions for the Tracy Planning Area.

Table 2
BACKGROUND CUMULATIVE DEVELOPMENT ASSUMPTIONS FOR TRACY GATEWAY TRAFFIC ANALYSIS

Project	Remaining to be Built (1990)			Total Population	Total Employment
	Residential (DU)	Commercial (Acre)	Industrial (Acre)		
Baseline:					
Pre-1989 Development	-	-	-	35,700	12,300
RSP	-	-	-	16,900	800
ISP	375	37	310	1,100	4,800
I-205 SP	1,038	186	131	3,000	4,800
Plan C	5,553	11	-	16,100	200
Northeast Industrial Phase I	-	-	274	-	2,200
Baseline Infill	781	97	150	2,300	3,100
Sub-Total Baseline	**7,747**	**331**	**865**	**75,100**	**28,200**
Cumulative (to 2025):					
Bright Business Park	-	-	-	-	-
Castro	192	-	-	600	-
Catellus Business Park	-	-	-	-	-
Filios/Sousa	-	-	-	-	-
Infill	117	15	22	300	500
Kagehiro	213	-	-	600	-
Larch-Clover	-	-	-	-	-
Moitoso II	162	-	-	500	-
Northeast Industrial	-	26	486	-	10,600
Presidio	550	-	-	1,600	-
Saddlebrook	128	-	-	400	-
Souchek	51	-	-	100	-
South Macarthur	599	-	-	1,700	-
South Schulte	1,457	-	-	4,200	-
Tracy Hills	5,499	208	384	15,900	7,200
Tracy Learning Center	-	-	-	-	-
Sub-Total Cumulative	**8,968**	**249**	**892**	**25,900**	**18,300**
Grand Total	**16,715**	**580**	**1,757**	**101,000**	**46,500**

Notes:

Residential development assumes 100% buildout of RSP, ISP, I-205 SP, Plan C, Infill, Presidio, South Macarthur, and Tracy Hills plus 25% buildout of Castro, Kagehiro, Moitoso II, Saddlebrook, Souchek and South Schulte.

Non-residential development assumes 100% buildout of RSP, ISP, I-205 SP, Plan C, NEI, Infill, and Tracy Hills.

In the UMP Patterson Community, a total of about 470 acres of mostly industrial development was assumed. This includes all projects having submitted an application in the Patterson Pass Business Park (including the 1994 Special Purpose Plan), the Karle General Plan Amendment Area, and 84 acres of industrial development along Schulte Road, east of Hansen Road.[1] This accounts for about 16% of the buildout employment potential for the whole Patterson Community.

Beyond the development levels assumed for the Tracy Planning area, the 2025 cumulative analysis assumes partial buildout of the Mountain House community located in San Joaquin County to the north and west of Tracy. Market-constrained 20-year forecasts by the San Joaquin Council of Governments (SJCOG) have projected approximately 13,000 residential units (population of 37,900) and 7,800 jobs in the Mountain House community.

B. 2025 Roadway Network

The assumed 2025 roadway improvements in Tracy include all facilities currently included in the Capital Improvements Programs for the RSP, ISP, I-205 SP and Plan C. Also in the 2025 network are improvements identified as necessary to support Tracy's Baseline development, including Infill and Phase 1 of NEI.[2]

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1 The detailed land use assumptions for the UMP Patterson Community were obtained from the Special Purpose Plan for a portion of the Patterson Pass Business Park, published on May 10, 1994.

2 The City of Tracy Roadway Master Plan (1994) and Amendments No. 1 and No. 2 of the Tracy Roadway Master Plan (1998,1999) defines a short-range level of development and associated roadway improvements referred to as "Baseline." Refer to these documents for more specific definition of Baseline improvements.

Beyond what is needed for Baseline development, the 2025 base network includes some major components of Tracy's Roadway Master Plan (RMP)[3] system. These improvements include:

- New Lammers Road extending from I-205 to I-580; its completion includes the construction of a grade-separated railroad crossing (at UPRR), two new structures over the Delta-Mendota Canal and the California Aqueduct
- New freeway interchanges at I-205 and I-580 with Lammers Road
- Widening Corral Hollow Road to four lanes between Linne Road and Lammers Parkway
- Construction of the Chrisman/I-205 interchange
- Constructing four-lane Schulte Road between Crossroads Drive and Lammers Road
- Constructing Street B from Naglee Road to Byron Road as a four-lane arterial. This new arterial will connect directly with the western segment of Grant Line Road to improve access between Tracy and Mountain House
- Widening Grant Line Road to six lanes between Tracy Boulevard and Corral Hollow
- Upgrading City portions of Linne Road, Chrisman Road and Eleventh Street east of MacArthur to Expressway status

Outside the City of Tracy, improvements to the I-205 and I-580 ramps with Mountain House Parkway and widening of Mountain House Parkway as a result of the Mountain House development are assumed to be in place. This includes partial cloverleaf interchanges at both I-205 and I-580 with Mountain House Parkway with traffic signals at the end of the diagonal ramps. All of the above improvements were required to support the 2025 cumulative development as assumed in this analysis without the addition of project traffic. Figure 2 highlights all additional improvements required beyond the Baseline network for 2025 Cumulative No Project conditions.

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3 The City of Tracy Roadway Master Plan (RMP) identifies roadway improvements required at the citywide level to support the long-range buildout of the city. The alignments and cross-sections of the new roadways

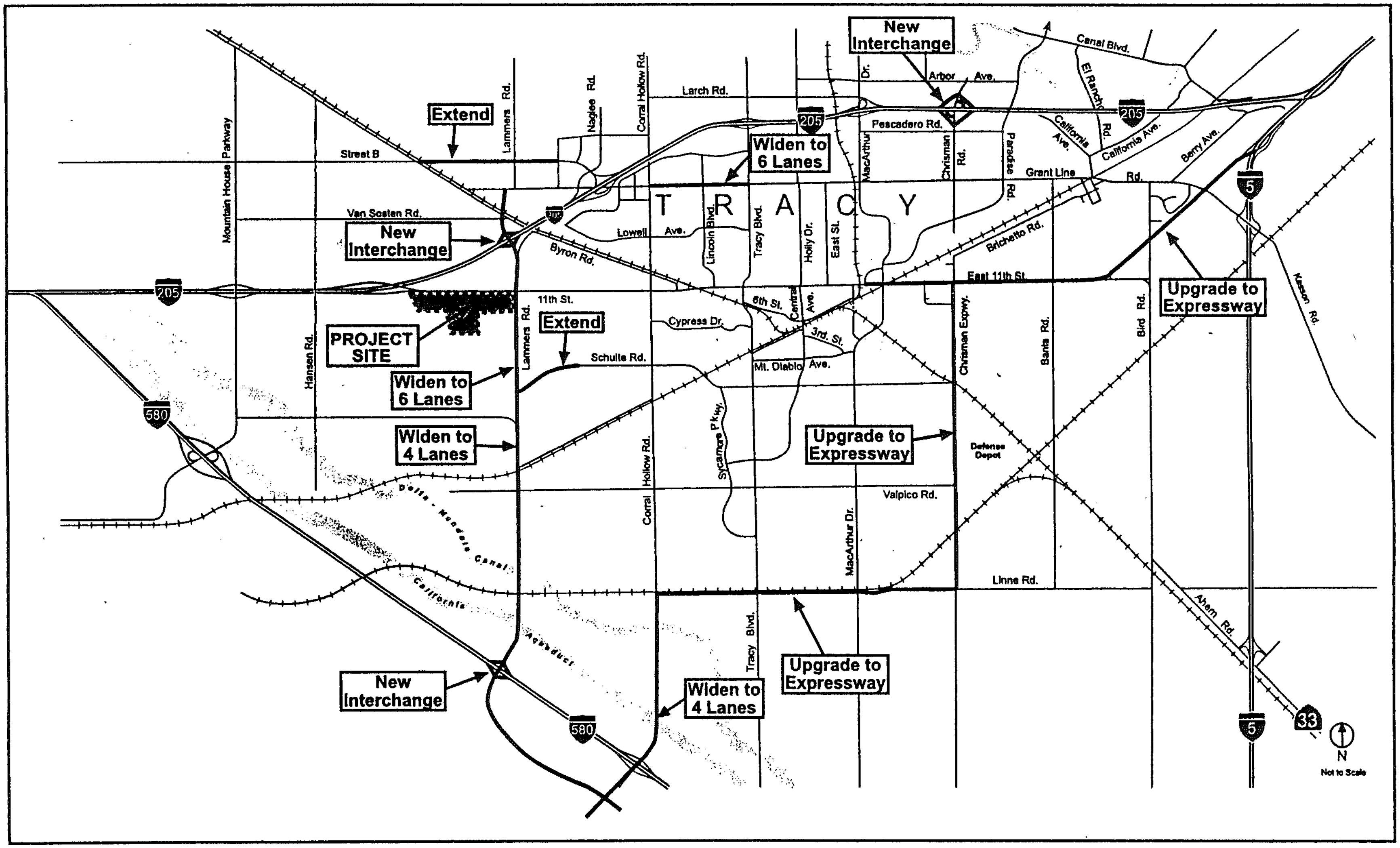

Figure 2 1689-23a	CUMULATIVE (YEAR 2025) NO PROJECT ROADWAY SYSTEM	fp

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C. Proposed Project Description and Impacts

1. Land Use and Trip Generation

Tracy Gateway is a proposed new office park that includes office, commercial, and retail development, along with a new golf course. The project site encompasses approximately 538 acres of land at the western edge of the City of Tracy.

Table 3 presents the total land use and trip generation for the Proposed Project. Buildout of the proposed project would generate a total of 7,345 trips during the p.m. peak hour and 7,051 trips during the a.m. peak hour. Trip generation rates are based on the Tracy Citywide traffic model, which has been calibrated and validated for peak hour traffic conditions.

Table 3
Tracy Gateway
Project Trip Generation

Land Use Description	Approx. Size	Unit	PM Peak Hour Trip Rate	PM Peak Hour Trips	AM Peak Hour Trip Rate	AM Peak Hour Trips	ADT Trip Rate	Project ADT
Business Park	5,844.01	KSF	1.01	5,902	1.06	6,198	11.72	68,492
Office	339.45	KSF	1.17	397	1.22	416	10.11	3,432
Retail	220.00	KSF	3.67	807	1.01	222	47.76	10,507
Hotel	217.88	KSF	0.98	214	0.90	196	12.60	2,745
Golf Course	82.70	KSF	0.29	24	0.23	19	8.33	689
Total				**7,345**		**7,051**		**85,865**

Notes:

1. Total trips for Office land use category were determined using a logarithmic equation. Average trip rate was then determined by dividing total number of trips by the size of office space.

2. The ratio of ITE trip generation rates for Business Park to Office was multiplied by the Office trip generation rate calculated from the City of Tracy Model to obtain a Business Park trip generation rate consistent with the trip generation rates calibrated in the model.

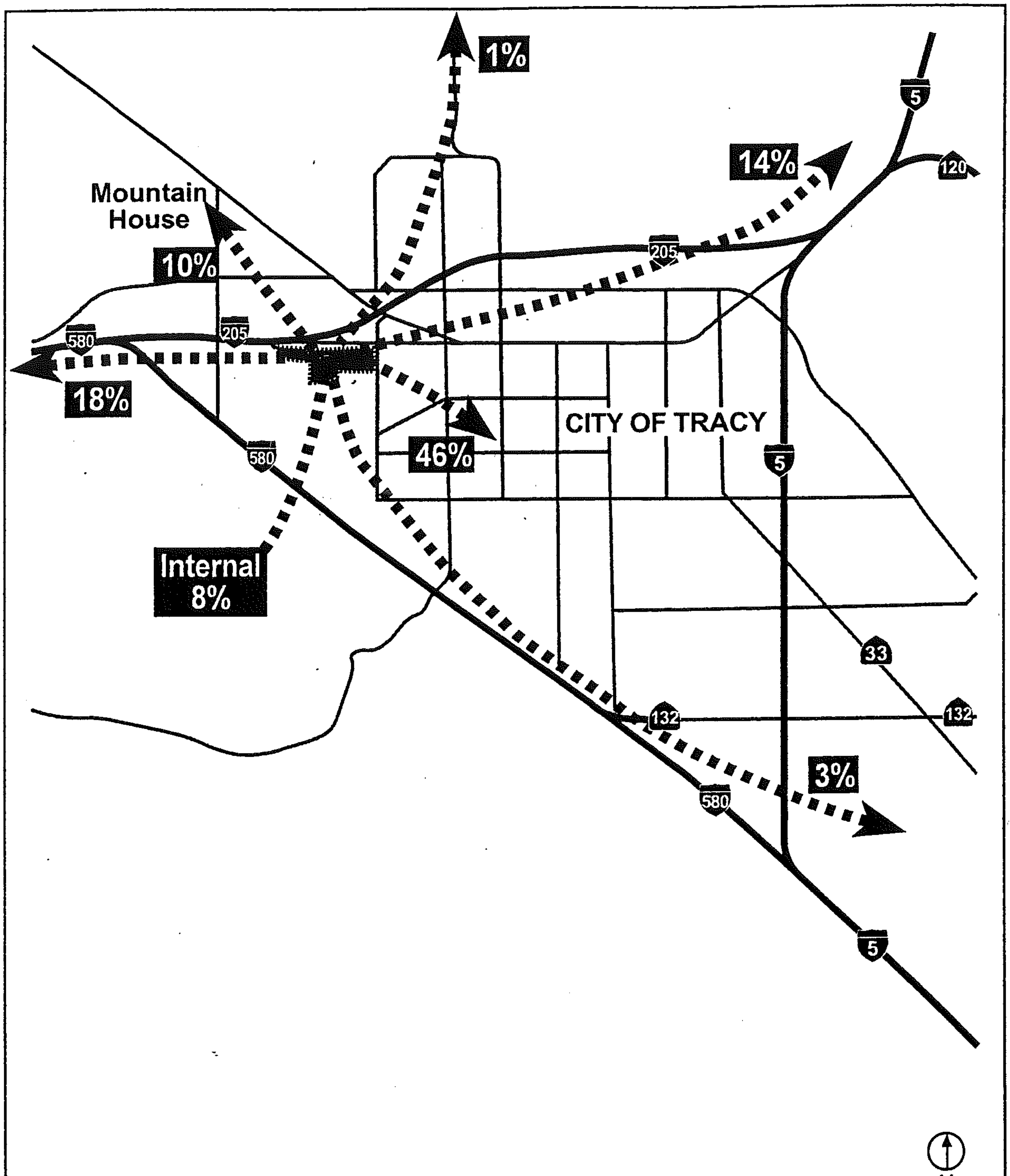
Source: Fehr & Peers Associates March 2002

Assumptions on mode shares and vehicle occupancy rates that have been calibrated to replicate existing conditions are built into the citywide traffic model trip rates. In July 2001, the City of Tracy implemented a fixed route bus service. The Gateway Project also proposes an internal shuttle system that would serve tenants and visitors to the site. Both services may affect mode choice and consequently vehicle trip generation. However, since the degree to which vehicle trips would be reduced due to these expected changes in transit service is unknown, this analysis takes a conservative approach to project impact estimates by assuming no change to the current mode share and transit usage.

2. Project Trip Distribution

Regional trip distribution estimates were developed using the San Joaquin County Council of Governments (SJCOG) regional traffic model, which encompasses all of San Joaquin County, the nine-county San Francisco Bay Area, Stanislaus County, the Sacramento area, and parts of the mountain counties of Amador, Calaveras and Tuolumne. Local trip distribution estimates were developed using the Tracy Citywide traffic model. Figures 3 and 4 present the trip distribution for all trips having either an origin or a destination, respectively, at the Tracy Gateway project during the p.m. peak hour.

By providing local job opportunities for Tracy residents, the proposed Tracy Gateway project provides a better jobs-housing balance overall for the City of Tracy. The proposed project provides a job center for residents of the San Joaquin Valley who might otherwise commute over the Altamont Pass into the Tri-valley area. Thus, by capturing commuters from within the City of Tracy, and from points further east this project may reduce the number of commuters over the Altamont Pass and provide a beneficial impact to traffic volumes on I-580. Table 4 shows the trip distribution assumptions for the project traffic.



NOTE: Project generates approximately 7,300 vehicle trips during the p.m. peak hour, with 80% (5,800 trips) outbound from Tracy Gateway.

Figure 3 1689-12	**PM PEAK HOUR TRIP DISTRIBUTION- OUTBOUND TRIPS**

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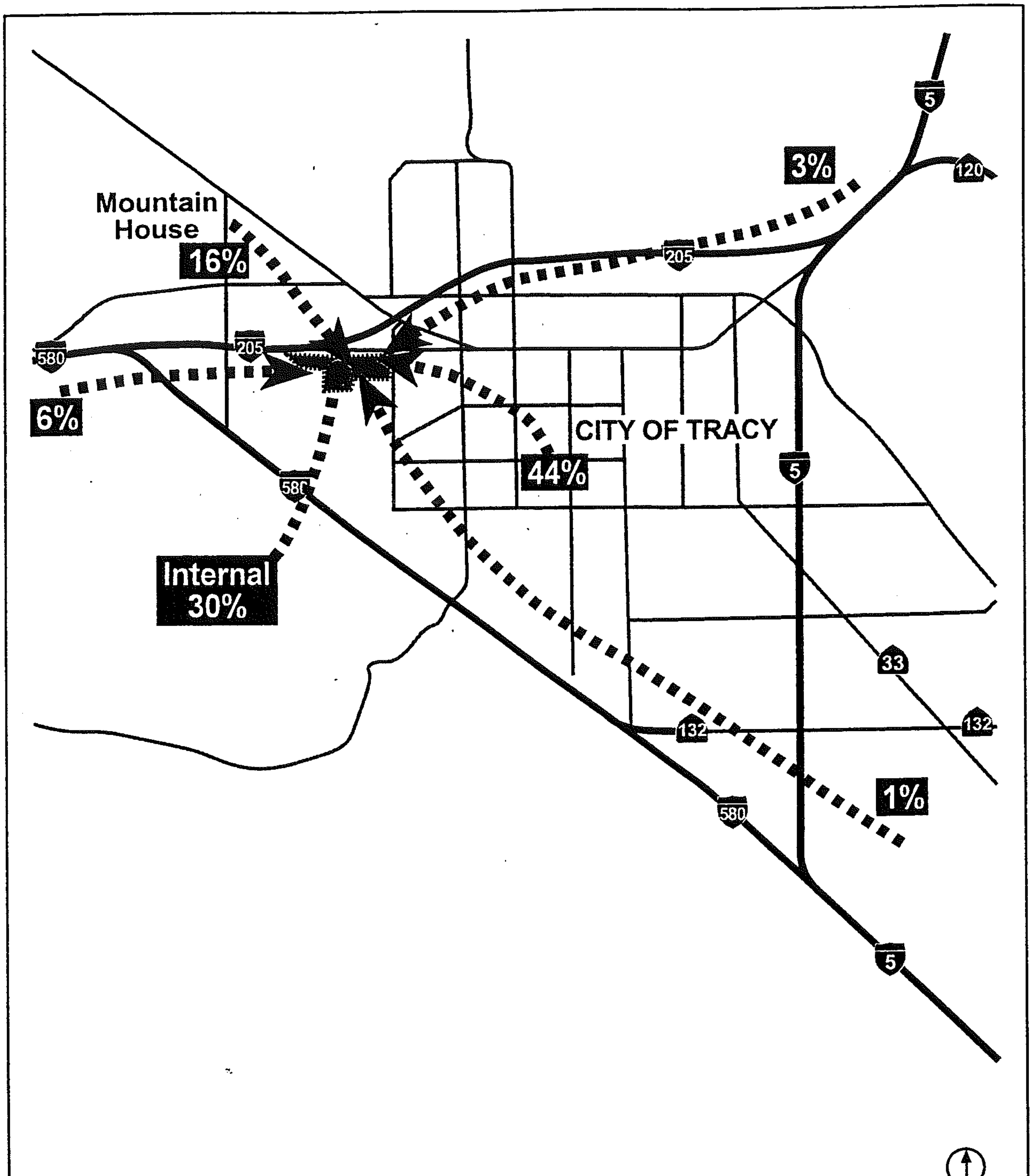

NOTE: Project generates approximately 7,300 vehicle trips during the p.m. peak hour, with 20% (1,500 trips) inbound to Tracy Gateway.

Figure 4 1689-11	PM PEAK HOUR TRIP DISTRIBUTION- INBOUND TRIPS

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Table 4
PM Peak Hour Trip Distribution
For Tracy Gateway

	Outbound Trips From Tracy Gateway To:		**Inbound Trips To Tracy Gateway From:**	
To or From City of Tracy				
Tracy Gateway	Trips		Trips	
Other Tracy Sphere	450	8%	450	30%
	2,700	46%	650	44%
	3,150	**54%**	**1,100**	**74%**
To or From Outside City of Tracy	Trips		Trips	
Mountain House	600	10%	250	16%
West (Altamont Pass)	1,050	18%	100	6%
Southeast (Stanislaus)	150	3%	<15	1%
Northeast (Stockton/Manteca)	800	14%	50	3%
North (Delta)	50	1%	<15	1%
	2,650	**46%**	**400**	**26%**
Total	**5,800**		**1,500**	

Source: Fehr & Peers Associates — March 2002

3. 2025 Traffic Impacts

P.M. peak hour traffic volume forecasts were developed using the 2025 cumulative development assumptions detailed in Section III-A with the proposed project added to the traffic model. Roadway and intersection levels of service during the p.m. peak hour were used to determine what changes to the roadway network beyond what was required for the Cumulative No Project scenario would be necessary. Roadway LOS was used throughout the entire Tracy Planning Area, while intersection analysis, which is more precise, was used for 15 local intersections, 4 project intersections, and 7 freeway interchange intersections where the proposed project contributes 3% or more of the total intersection volume. Figure 5 shows the percent difference in traffic demand on roadway and freeway segments between Cumulative Plus Project conditions and Cumulative No Project conditions.

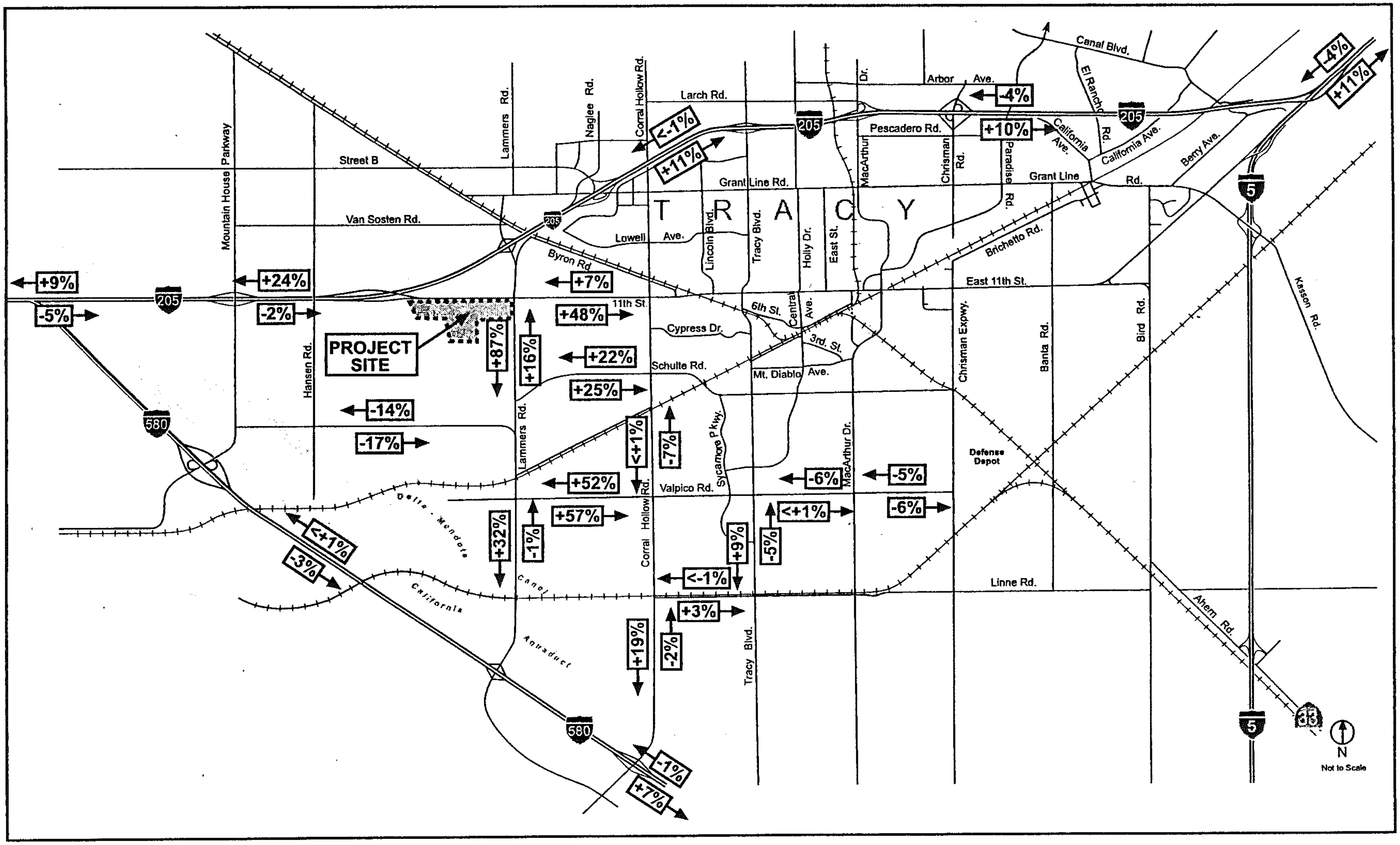

Figure 5

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DIFFERENCES IN TRAFFIC DEMAND BETWEEN TRACY GATEWAY PROPOSED PROJECT AND NO PROJECT

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The results of the analysis found the need to widen Eleventh Street to six lanes from I-205 to Lincoln. The Lammers Road/Eleventh Street intersection would also need to be grade separated[4]. Additionally, a second southbound left-turn lane would need to be installed at the Lammers/Valpico intersection. Figure 6 shows necessary improvements with the addition of project traffic to the Cumulative Year 2025 roadway network. Figure 7 compares the levels of service on area freeways and at local intersections and interchanges for the 2025 cumulative scenario with and without the proposed project.

Freeways

In comparison to the No Project scenario, the proposed project would both reduce and add trips to the Tracy freeway network. The proposed project would reduce the p.m. peak hour traffic demand through the Altamont Pass by five percent. However, eastbound I-580 would still operate with LOS F conditions. The project would also add additional traffic demand to eastbound I-205, exacerbating conditions that will be unacceptable LOS F, from the new Lammers interchange to I-5. At the same time the project would reduce westbound I-205 traffic demand. Figure 8 displays projected freeway segment and ramp volumes along I-205.

The proposed project would reduce the eastbound traffic demand on I-580 between I-205 and Lammers Expressway by about three percent. The proposed project would add seven percent more traffic to eastbound I-580 east of Corral Hollow Road. Westbound I-580 would not be significantly affected by the Project. Neither direction would have a capacity problem.

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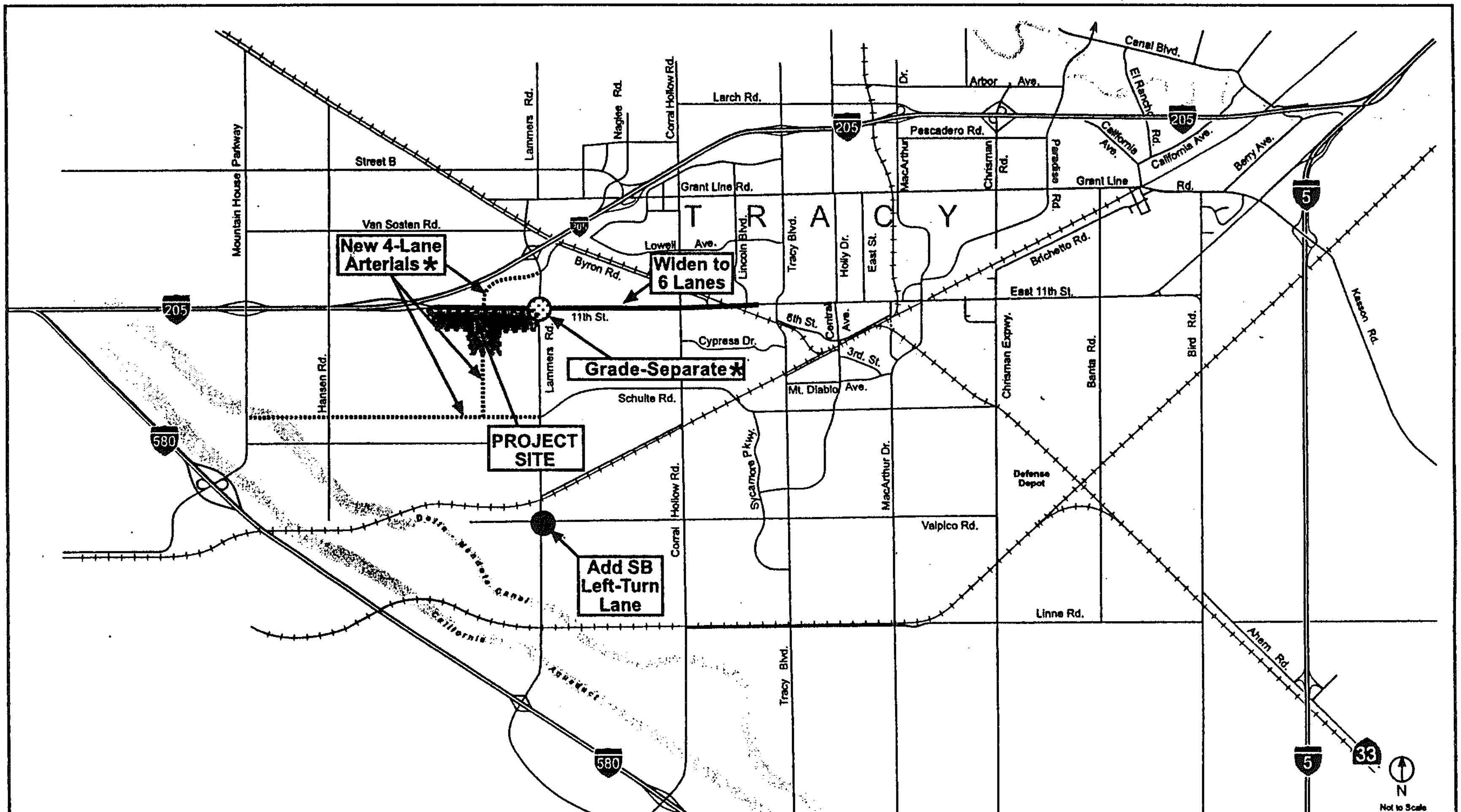
4 One option to defer the need for grade separation would be to construct additional arterial system west of Lammers Road, which would consist of the following: a new four-lane arterial opposite the Main Project arterial intersection at Eleventh Street extending north and east to intersect with Lammers Road between I-205 and Eleventh Street; a new four-lane arterial extending from the New Schulte Road/Lammers Road intersection westward to Mountain House Parkway; and a new four-lane arterial extension of the main Project north/south arterial to intersect with the new four-lane extension of New Schulte Road (See Figure 6).



* Unaccepatable LOS F conditions at Lammers/11th Street could be mitigated by either a grade-separated interchange or constructing new 4-lane arterials.

Figure 6

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CUMULATIVE (YEAR 2025) PLUS PROJECT ROADWAY IMPROVEMENTS

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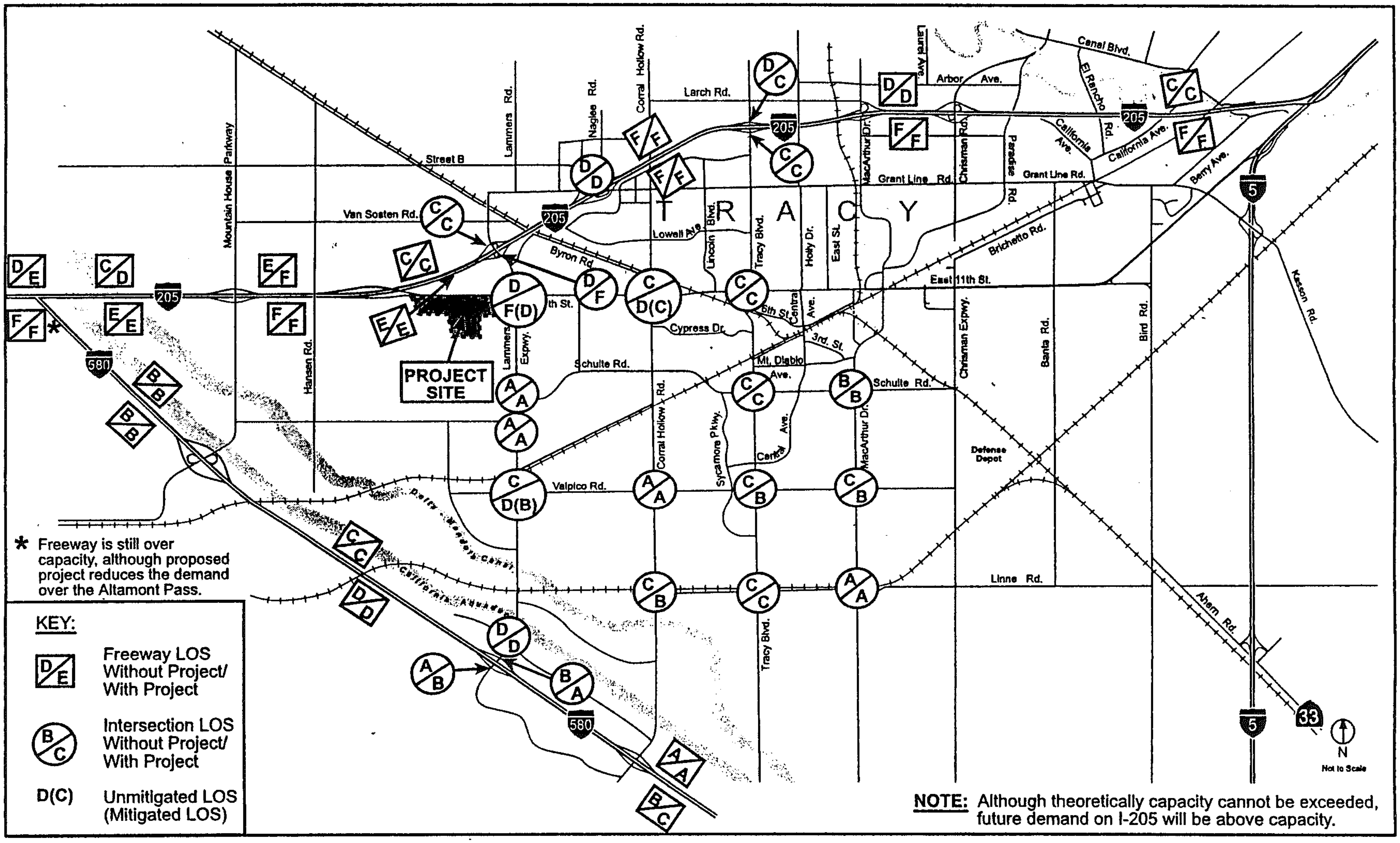

NOTE: Although theoretically capacity cannot be exceeded, future demand on I-205 will be above capacity.

Figure 7 — **YEAR 2025 PM PEAK HOUR LEVEL OF SERVICE**

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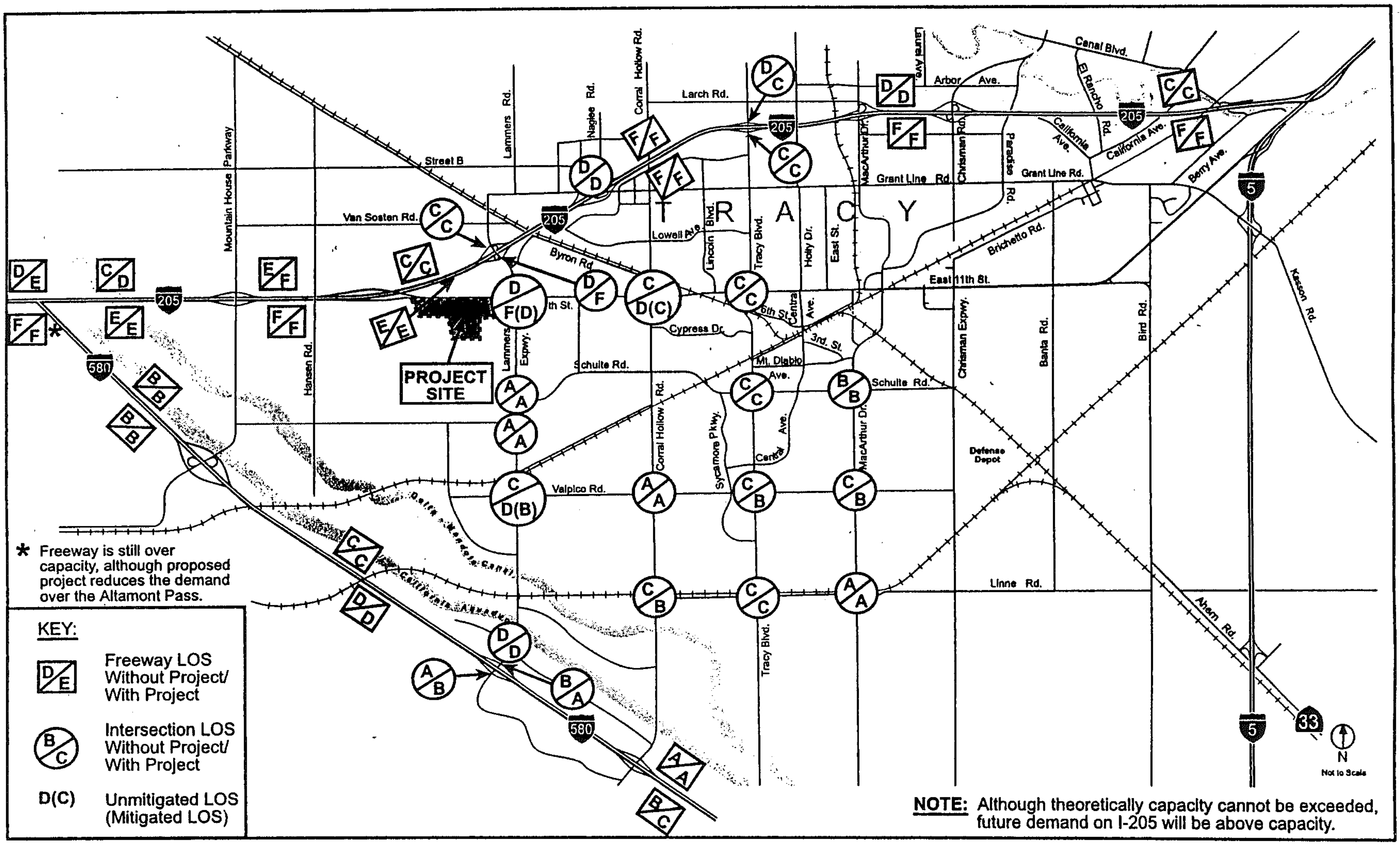

Figure 7 — YEAR 2025 PM PEAK HOUR LEVEL OF SERVICE

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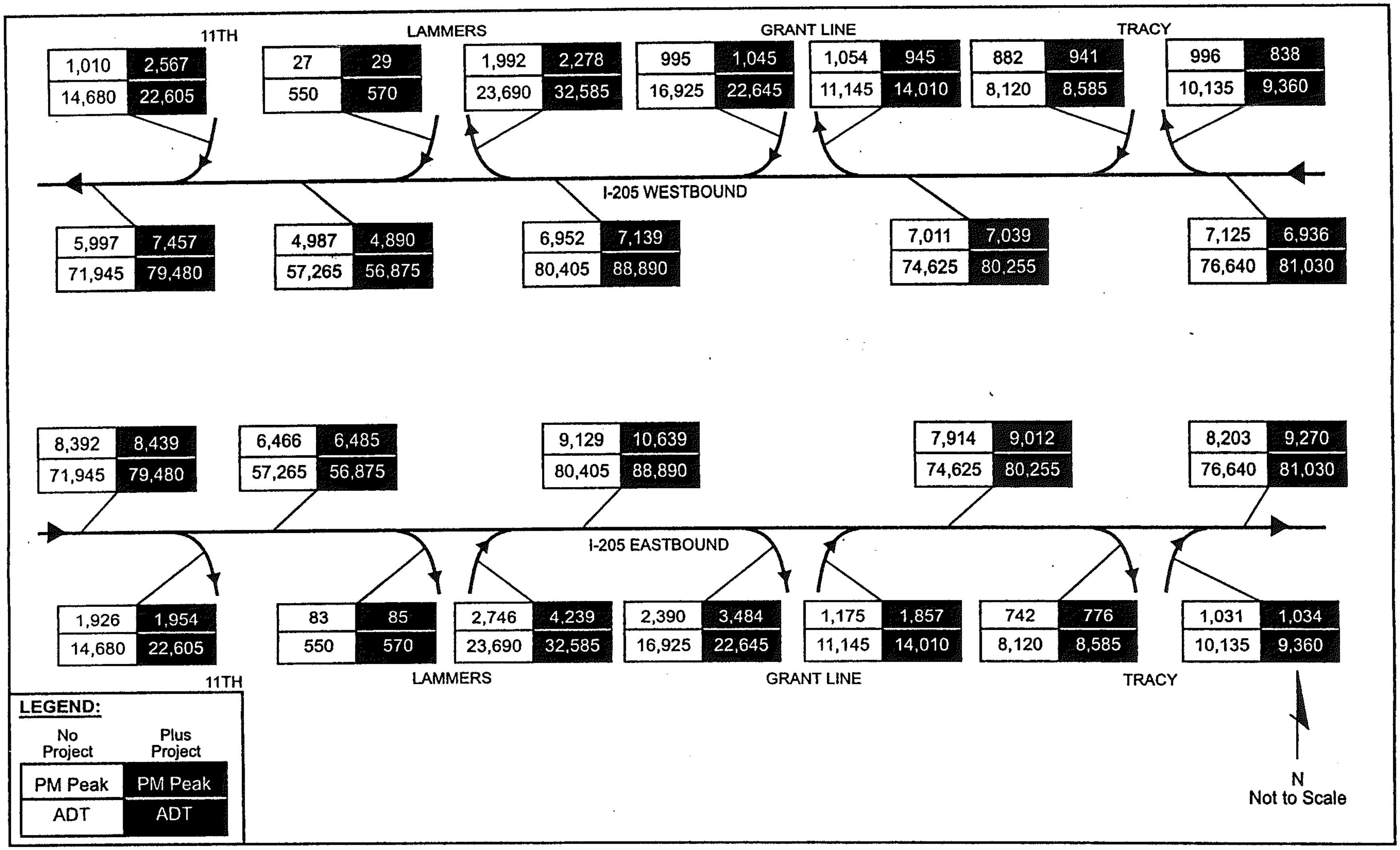

Figure 8

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2025 NO PROJECT AND 2025 PLUS PROJECT
I-205 TRAFFIC VOLUMES

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The project would also add eleven percent more northbound trips onto the Mossdale Y on I-5, which would continue to exacerbate the LOS F conditions expected for this eight-lane freeway. Total unconstrained demand on that segment would increase to 12,545 vehicles per hour.

Likewise during the a.m. peak hour, with travel patterns the reverse of the p.m. peak hour, the project would reduce westbound I-580 traffic demand across the Altamont Pass. However, the project would also add more than 3% to westbound I-205 traffic east of Lammers Road. Westbound traffic conditions along I-205 and I-580 west of I-205 would operate at LOS F with or without the proposed project. With the westbound freeway mainline operating at capacity, the westbound on-ramp traffic from Eleventh Street may experience unacceptable delays. This significant cumulative impact results from cumulative growth with or without the project. At the I-205/Lammers Road interchange, the project would add more than 3% to the total westbound off-ramp volume, contributing to a significant impact at the interchange.

Expressways & Arterials

The proposed project would add more trips to Lammers Road and Eleventh Street leaving the Tracy Gateway area. Project traffic would increase total traffic on Lammers Road and Eleventh Street leaving the project area by 50-90%, while traffic on these two roads travelling toward the project is expected to increase by 10-20% during the p.m. peak hour. Traffic demand on other major east-west roadways, including Schulte Road and Valpico Road are expected to increase by 20-60%. Traffic volumes on Schulte Road west of Lammers are expected to decrease by approximately 15% with the project.

Further away from the project site, as expected, traffic volumes are not expected to have as significant changes. Traffic on Linne Expressway is expected to increase by only 3% away from the project, and decrease slightly toward the project.

Rural Roads

Corral Hollow Road (County Road J2) located southwest of the study area leads to Tesla Road in Livermore. The proposed project would add 5 vehicle trips to the westbound direction and reduce the eastbound trips by 21 vehicle trips. These changes would not affect the capacity of this rural road.

Intersections

Three local intersections within the City of Tracy are expected to deteriorate to unacceptable levels of service, based on City standards. As discussed earlier, the intersection of Eleventh/Lammers would operate at LOS F with the project, if left unmitigated. Grade-separating this intersection would improve operations to LOS A. Alternatively, construction of additional arterial system capacity west of Lammers Road could mitigate conditions at Eleventh/Lammmers to LOS D. The project is also expected to cause the intersection of Corral Hollow/Eleventh to operate at LOS D. Widening Eleventh Street from four to six lanes from I-205 to Lincoln Boulevard would improve the LOS at Corral Hollow/Eleventh to acceptable LOS C. The third intersection that is significantly impacted by the project is Lammers/Valpico. The addition of a second left-turn lane from southbound Lammers onto Valpico would improve the unmitigated LOS D to acceptable LOS B.

One freeway interchange intersection, Lammers/I-205 Eastbound ramps, is expected to operate at LOS D[5] without the proposed Project and deteriorate to LOS F with the addition of project traffic. The main cause for this significant impact is increased traffic traveling north on Lammers to enter

5 This intersection may experience LOS E conditions for 15 minutes of the p.m. peak hour without the proposed Project.

eastbound I-205. The freeway downstream of this entrance is expected to be at capacity by this time. Therefore, any capacity improvements to the interchange ramp intersection to increase the flow of cars onto the freeway would not result in any operational improvement to the on-ramp intersection because the capacity of this interchange is constrained by the freeway congestion. This impact is significant and unavoidable. All other study intersections are expected to remain within City of Tracy LOS standards.

Project Access

The project proposes four new access points along Eleventh Street and one from Lammers Road. The Lammers access road and the main access road on Eleventh Street should be signalized, with all turning movements allowed. The other remaining access roads on Eleventh Street should be unsignalized, with left turns prohibited into and out of the project.

At both of the project's signalized access roads, dual left-turn lanes should be provided to accommodate the expected traffic entering the project during the morning peak hour. At the signalized project driveway and Eleventh Street, three outbound lanes should be provided at the intersection, including two dedicated left-turn lanes, and one dedicated right-turn lane. With this configuration, it is expected that this intersection will operate at acceptable LOS C. At the project's other signalized driveway, on Lammers Road, three outbound lanes should be provided. Because exiting volumes during the p.m. peak are expected to be somewhat evenly distributed between northbound and southbound, one dedicated left-turn lane and one dedicated right-turn lane should be provided in addition to one shared lane. Under this configuration, this intersection is also expected to operate at acceptable LOS C.

Project's Responsibility for Roadway Improvements Required for 2025 Cumulative Scenario

Additional roadway improvements are required to support cumulative development beyond what has been funded through Baseline development fees. These improvements include the following:

Due to cumulative development (without proposed project):

- New Lammers Road extending from I-205 to I-580; its completion includes the construction of a grade-separated railroad crossing (at UPRR), two new structures over the Delta-Mendota Canal and the California Aqueduct
- New freeway interchanges at I-205 and I-580 with Lammers Road
- Widening Corral Hollow Road to four lanes between Linne Road and Lammers Parkway
- Construction of the Chrisman/I-205 interchange
- Constructing four-lane Schulte Road between Crossroads Drive and Lammers Road
- Constructing Street B from Naglee Road to Byron Road as a four-lane arterial. This new arterial will connect directly with the western segment of Grant Line Road to improve access between Tracy and Mountain House
- Widening Grant Line Road to six lanes between Tracy Boulevard and Corral Hollow
- Upgrading City portions of Linne Road, Chrisman Road and Eleventh Street east of MacArthur to Expressway status

Due to Proposed Project:

- Widening of Eleventh Street from four to six lanes
- Either grade-separating the intersection of Lammers/Eleventh or constructing additional arterial capacity west of Lammers Road
- Constructing a second southbound left-turn lane from Lammers onto Valpico
- Providing right-of-way to allow for dual left-turn lanes into the proposed project at the signalized intersections into the project from both Eleventh Street and Lammers Road

To mitigate its impacts, the proposed project will have to contribute its fair share of the costs of the above improvements. A separate Finance and Implementation Plan study will be conducted to determine project contribution requirements.

4. Non-motorized Transportation

The project's connectivity to external bicycle circulation routes within the City of Tracy was analyzed to determine appropriate improvements to the project. No bicycle lanes currently exist on Eleventh Street or Lammers Road at the project site, although they do exist on Eleventh street, east of the project. The City of Tracy 2001 Bikeways Master Plan Update proposes to extend the existing bicycle lane on Eleventh Street, which ends between Corral Hollow Road and Lammers to the Eleventh Street/Lammers intersection. This would bring bicycle lanes to the corner of the project site. Therefore, it is recommended that the project provide bicycle lanes on both Eleventh Street and Lammers Road along the portions of these roads that front the project. This would fully connect the project to the City of Tracy's bikeway system.

The project's internal bicycle circulation includes bikeways that are separated from the roadway on all local roadways within the project area, and also provides a separate paved facility for pedestrians. Curb lanes are designed with additional width (14 feet) along four and six-lane roadways to accommodate shared bicycle/motor vehicle use. This is consistent with the policies and standards expressed in the City of Tracy Bikeways Master Plan.

APPENDIX

INTERSECTION LEVEL OF SERVICE WORKSHEETS

INTERSECTIONS

1. Linne / MacArthur
2. Linne / Tracy
3. Linne / Corral Hollow
4. Tracy Hills E-W Arterial / Lammers
5. Valpico / MacArthur
6. Valpico / Tracy
7. Valpico / Corral Hollow
8. Valpico / Lammers
9. Schulte / MacArthur
10. Schulte / Tracy
11. Schulte / Lammers
12. Old Schulte / Lammers
13. Eleventh / Tracy
14. Eleventh / Corral Hollow
15. Eleventh / Lammers
16. I-205 WB Ramps / Lammers
17. I-205 EB Ramps / Lammers
18. I-205 WB Ramps / Tracy
19. I-205 EB Ramps / Tracy
20. Grant Line / I-205 WB Ramps
21. I-580 WB Ramps / Lammers
22. I-580 EB Ramps / Lammers

CUMULATIVE 2025
NO PROJECT

(1)

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                          Critical Movement Analysis: PLANNING
                                  Calculation Form 1

Intersection: LINNE/MACARTHUR                          Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
================================================================================================
Step 1. IDENTIFY LANE GEOMETRY  | Step 4. LEFT TURN CHECK         | Step 6b. VOLUME ADJUSTMENT FOR   |
         | Approach 3:MACARTHUR |          -------Approach-----|       MULTIPHASE SIGNAL OVERLAP   |
         | 1    1  |     ^      |          : -1-  -2-  -3-  -4-|     Possible    Volume    Adjusted|
         |   R   L |     N      |a.No. of change :  0   0   0   0|Prob-  Critical  Carryover Critical|
LINNE    | R T T T L |          | intervals/hour :               |able   Volume   to next   Volume |
------------ T H H H T ---------|b.LT capacity on :  0   0   0   0|Phase  in vph    phase    in vph |
 Approach 1  < < | > >  ^--RT  | change (vph)   :               |-----------------------------------|
  1  LT--^    v v v   <^-RTH  1 |c.G/C ratio     :  0   0   0   0|B2B1    4(B1)  253-   4= 249(B2)   4|
     LTH-^>           <--TH     |d.Opposing volume : 0  0   0   0|A1B2  249(B2)  550- 249= 301(A1) 249|
      TH-->           <v-LTH    | in vph         :               |A1A2  314(A2)  OR  301(A1)      314|
  1  RTH-v>   ^ ^ ^    v--LT  1 |e.LT capacity on :  0   0   0   0|A4B3  108(A4)  OR    0(B3)      108|
     RT--v   < < | > > Approach 2| green (vph)   :               |A3B4   91(A3)  OR   75(B4)       91|
------------ L L T R R ---------|f.LT capacity in :  0   0   0   0|                                   |
         | T T H T T |LINNE     | vph (b+e)      :               |                                   |
         |   H   H   |          |g.Left turn volume : 0  0  0   0|                                   |
         |   1     1 |          | in vph         :               |                                   |
         | Approach 4:MACARTHUR |h.Is volume > cap. :            :                                   |
                                | (g>f) ?        :               |                                   |
================================+================================+===================================|
Step 2. IDENTIFY VOLUMES, in vph| Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                |     |                   |      |                                   |
                                |     |                   |      |253(B1B2)+314(A2)+108(A4)+91(A3)   |
         | Approach 3|          |-------   1 1 7         -------|                                   |
3:  LT=  76 | |      | 2:RT=  45|          6 6 5         ^+  45 |          = 766 vph                |
    TH=  16 | |      |   TH= 269|          | + +         <+ 269 |===================================|
    RT=  16 | v      |   LT=   4|          < v >         v-   4 | Step 8. INTERSECTION LEVEL OF     |
-------------      -------------|                               |         SERVICE                   |
                   <--Approach 2|                               |     (compare step 7 with table 6) |
                                |                               |            -------                |
                                |                               |            | A |                |
Approach 1-->                   |                               |            -------                |
-------------      -------------| 253 -^              < ^ >     |V/C RATIO = 0.47                   |
1:LT= 253 |            ^ | 4: RT=  97| 550 +>          + + |      | Step 9. RECALCULATE               |
  TH= 550 |            | |   TH= 108|   0 +v                    |                                   |
  RT=   0 |            | |   LT=   0|-------           1   -------|Geometric Change:                  |
          | Approach 4|             |     |           0 9 |      |Signal Change:                     |
                                |     |             0 8 7 |      |Volume Change:                     |
================================+================================+===================================|
Step 3. IDENTIFY PHASING        | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                       |
                                |      (two phase signal)        |                                   |
     --^ v--   B2B1             |          | Approach 3|         |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                |          |           |         |                                   |
   --^ AND <--     A1B2 AND     |          |           |         |                                   |
   --> OR  v--     /OR A2B1     |          |           |         |                                   |
     --> <--   A1A2             |-------------    -------------|                                   |
                                | Approach 1                     |                                   |
       <   ^   A4B3             |                                |                                   |
       |   |                    |        See Step 6b.            |                                   |
       |   |   A3B4             |                                |                                   |
       v   >                    |                    Approach 2  |                                   |
                                |-------------    -------------|                                   |
                                |          |           |         |                                   |
--------------------------------|          |           |         |                                   |
A1 -->   A3 |     B1 v--   B3  <|          |           |         |                                   |
        v ^               | |   |          | Approach 4|         | Exclusive right turns reduced 0 % |
```

2

```
                              Critical Movement Analysis: PLANNING
                                        Calculation Form 1
Intersection: LINNE/TRACY                                        Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
==============================================================================================
 Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR          |
          | Approach 3:TRACY         |                  -------Approach-----|      MULTIPHASE SIGNAL OVERLAP         |
          | 1   1   1 |     ^        |                  : -1-  -2-  -3-  -4-|  Possible   Volume     Adjusted|
          |  R   L    |     N        |a.No. of change   :  0    0    0    0|Prob-  Critical  Carryover  Critical|
LINNE     | R T T T L |              |  intervals/hour  :                   |able   Volume   to next    Volume |
------------- T H H H T -------------|b.LT capacity on  :  0    0    0    0|Phase  in vph    phase     in vph |
 Approach 1   < < | > >   ^--RT  1   |  change (vph)    :                   |-------------------------------------|
  2  LT--^     v v v     <^-RTH      |c.G/C ratio       :  0    0    1    1|B2B1    5(B1)  340-   5= 335(B2)    5|
     LTH-^>              <--TH   1   |d.Opposing volume :  0    0   12  168|A1B2  335(B2)  714- 335= 379(A1)  335|
      TH-->              <v-LTH      |  in vph          :                   |A1A2  723(A2) OR  379(A1)         723|
  1  RTH-v>   ^ ^ ^      v--LT   1   |e.LT capacity on  :  0    0 1188 1032|A3A4  164(A3) OR    8(A4)         164|
     RT--v   < < | > >   Approach 2  |  green (vph)     :                   |                                     |
------------ L L T R R  -------------|f.LT capacity in  :  0    0 1188 1032|                                     |
          | T T H T T |LINNE         |  vph (b+e)       :                   |                                     |
          |   H   H   |              |g.Left turn volume :  0    0  181   11|                                     |
          | 1   1   1 |              |  in vph          :                   |                                     |
          | Approach 4:TRACY         |h.Is volume > cap. :            NO   NO:                                     |
                                     |  (g>f) ?         :                   |                                     |
=====================================+==================================+======================================|
 Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES    |
                                     |     |                      |     |                                      |
                                     |     | 1   1                |     |340(B1B2)+723(A2)+164(A3)+0()         |
          | Approach 3|              |-------  6   8           -------|                                      |
 3:  LT= 181 | |        | 2:RT= 190  |         4 4 1              ^- 190 |           = 1227 vph                 |
     TH=   4 | |        |    TH= 723 |         | | |              <- 723 |======================================|
     RT= 164 | v        |    LT=   5 |         < v >              v-   5 | Step 8. INTERSECTION LEVEL OF        |
------------           -------------|                                     |          SERVICE                     |
                      <--Approach 2 |                                     |    (compare step 7 with table 6)     |
                                     |                                     |              -------                 |
                                     |                                     |               | C |                  |
Approach 1-->                        | 340 -^                              |              -------                 |
------------           -------------| 278 -^              < ^ >          |  V/C RATIO = 0.76                    |
1:LT= 617   |           ^ | 4: RT=  4 | 703 +>              | | |          | Step 9. RECALCULATE                  |
  TH= 703   |          | |    TH=  8 |  11 +v                             |                                      |
  RT=  11   |          | |    LT= 11 |-------                      -------|Geometric Change:                     |
          | Approach 4|              |       |             1      |      |Signal Change:                        |
                                     |       |             1 8 4  |      |Volume Change:                        |
=====================================+==================================+======================================|
 Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS                             |
                                     |        (two phase signal)          |                                      |
      --^ v--   B2B1                 |           | Approach 3|            |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |           |           |            |                                      |
   --^ AND <--      A1B2 AND         |           |           |            |                                      |
   --> OR  v--      /OR A2B1         |           |           |            |                                      |
      --> <--   A1A2                 |-------------           -------------|                                      |
                                     | Approach 1                         |                                      |
        |   ^   A3A4                 |                                    |                                      |
        v   |                        |           See Step 6b.             |                                      |
                                     |                                    |                                      |
                                     |                         Approach 2 |                                      |
                                     |-------------           -------------|                                      |
                                     |           |           |            |                                      |
-------------------------------------|           |           |            |                                      |
A1 -->   A3 |     B1 v--    B3    <| |           |           |            |                                      |
            v ^                | | | |           | Approach 4|            | Exclusive right turns reduced 0 %    |
```

(3)

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                          Critical Movement Analysis: PLANNING
                                    Calculation Form 1
Intersection: LINNE / CORRAL HOLLOW                          Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
==========================================================================================
 Step 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR   |
          | Approach 3:CORRAL HOLLOW|           -------Approach-----|       MULTIPHASE SIGNAL OVERLAP  |
          |    2   1 |      ^       |                 : -1-  -2-  -3-  -4-|       Possible   Volume    Adjusted|
          |  R   L   |      N       |a.No. of change  :   0    0    0    0|Prob-  Critical  Carryover  Critical|
LINNE     | R T T T L |             | intervals/hour  :                   |able   Volume   to next    Volume |
-------------  T H H H T  -------------|b.LT capacity on :   0    0    0    0|Phase  in vph    phase      in vph |
  Approach 1   < < | > >   ^--RT  1   | change (vph)    :                   |-----------------------------------|
     LT--^       v v v     <^-RTH     |c.G/C ratio      :   0    0    0    0|A2B1   589(B1) OR  257(A2)       589|
    LTH-^>                 <--TH      |d.Opposing volume: 257    0    0  545|A3B4   182(B4)  273- 182= 91(A3)  182|
     TH-->                 <v-LTH     | in vph          :                   |A3A4   431(A4) OR   91(A3)        431|
    RTH-v>       ^ ^ ^     v--LT  2   |e.LT capacity on :   0    0    0    0|                                   |
     RT--v     < < | > >   Approach 2 | green (vph)     :                   |                                   |
-------------  L L T R R  -------------|f.LT capacity in :   0    0    0    0|                                   |
          | T T H T T |LINNE          | vph (b+e)       :                   |                                   |
          |   H   H   |               |g.Left turn volume:  0    0    0    0|                                   |
          |     2   2 |               | in vph          :                   |                                   |
          | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :  NO            NO:                                   |
                                      | (g>f) ?         :                   |                                   |
======================================+=================================+===================================|
 Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                      |       |                   |       |                                   |
                                      |       | 2 2 1             |       |589(B1)+613(B4A4)+0()+0()          |
            | Approach 3|             |-------  7 7 8           -------|                                   |
 3:  LT= 182 | |        | 2:RT= 257   |         3 3 2           ^- 257 |         = 1202 vph                |
   TH= 545  | |         |   TH=   0   |         | | |           v- 482 |===================================|
   RT=   0  | v         |   LT=1069   |         v v >           v- 589 | Step 8. INTERSECTION LEVEL OF     |
-------------           -------------|                                 |          SERVICE                  |
                        <--Approach 2 |                                 |    (compare step 7 with table 6)  |
                                      |                                 |             -------               |
                                      |                                 |             | C |               |
 Approach 1-->                        |                                 |             -------               |
-------------           -------------|                     ^ ^ > >     | V/C RATIO = 0.72                 |
 1:LT=   0   |          ^ | 4: RT= 212 |                     | | | |     | Step 9. RECALCULATE               |
   TH=   0   |          | |    TH= 861 |                                 |                                   |
   RT=   0   |          | |    LT=   0 |-------              4 4 1 1 -------|Geometric Change:                |
            | Approach 4|             |       |              3 3 0 0 |  |Signal Change:                    |
                                      |       |              1 1 6 6 |  |Volume Change:                    |
======================================+=================================+===================================|
 Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                        |
                                      |          (two phase signal)     |                                   |
          <--  A2B1                   |          | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
          v--                         |          |           |          |                                   |
       |   |   A3B4                   |          |           |          |                                   |
       v   >                          |          |           |          |                                   |
       |   ^   A3A4                   |-------------       -------------|                                   |
       v   |                          | Approach 1                      |                                   |
                                      |                                 |                                   |
                                      |          See Step 6b.           |                                   |
                                      |                                 |                                   |
                                      |                    Approach 2   |                                   |
                                      |-------------       -------------|                                   |
                                      |          |           |          |                                   |
--------------------------------------|          |           |          |                                   |
 A1 -->   A3 |     B1 v--    B3   <|  |          |           |          |                                   |
```

(4)

```
                         Critical Movement Analysis: PLANNING
                                  Calculation Form 1
Intersection: TRACY HILLS E-W ARTERIAL / LAMMERS                       Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
=====================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK           | Step 6b. VOLUME ADJUSTMENT FOR    |
           | Approach 3:LAMMERS      |                -------Approach-----|       MULTIPHASE SIGNAL OVERLAP   |
           | 1   1   1 |      ^      |                : -1-  -2-  -3-  -4-|   Possible    Volume     Adjusted|
           |  R   L    |      N      |a.No. of change :  0    0    0    0|Prob-  Critical  Carryover  Critical|
TRACY HILLS E| R T T T L |           | intervals/hour :                   |able   Volume    to next    Volume |
------------ T H H H T  -------------|b.LT capacity on :  0    0    0    0|Phase  in vph     phase     in vph |
 Approach 1  < < | > >   ^--RT  1    | change (vph)   :                   |-----------------------------------|
  1 LT--^     v v v     <^-RTH       |c.G/C ratio     :  0    0    0    0|B2B1  255(B1)  297- 255=  42(B2)  255|
    LTH-^>              <--TH   1    |d.Opposing volume :  0    0    0    0|A1B2   42(B2)  106-  42=  64(A1)   42|
  1  TH-->              <v-LTH       | in vph         :                   |A1A2   64(A1) OR    22(A2)          64|
    RTH-v>    ^ ^ ^     v--LT  1     |e.LT capacity on :  0    0    0    0|B4B3  116(B3)  360- 116= 244(B4)  116|
  1 RT--v    < < | > >   Approach 2  | green (vph)    :                   |A3B4  244(B4)  560- 244= 316(A3)  244|
------------ L L T R R  -------------|f.LT capacity in :  0    0    0    0|A3A4  572(A4) OR   316(A3)         572|
           | T T H T T |TRACY HILLS E| vph (b+e)      :                   |                                   |
           |  H   H    |             |g.Left turn volume :  0    0    0  0|                                   |
           | 1   1   1 |             | in vph         :                   |                                   |
           | Approach 4:LAMMERS      |h.Is volume > cap. :                :                                   |
                                     | (g>f) ?        :                   |                                   |
=====================================+===================================+===================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES  |
                                     |      |                   |         |                                   |
                                     |      |   5 3             |         |297(B1B2)+64(A1)+360(B3B4)+572(A4) |
           | Approach 3|             |-------   6 6             -------|                                   |
3:  LT= 360 | |        | 2:RT=   0   |        0 0 0             ^-   0 |           = 1293 vph              |
   TH= 560 | |         |   TH=  22   |        | | |             <-  22 |===================================|
   RT=   0 | v         |   LT= 255   |        < v >             v- 255 | Step 8. INTERSECTION LEVEL OF     |
------------              -------------|                                |         SERVICE                   |
                        <--Approach 2 |                                |    (compare step 7 with table 6)  |
                                     |                                   |            -------                |
                                     |                                   |            | D |                |
Approach 1-->                        |                                   |            -------                |
------------            -------------| 297 -^            < ^ >           |   V/C RATIO = 0.80                |
1:LT= 297  |          ^ | 4: RT=  64 | 106 ->            | | |           | Step 9. RECALCULATE               |
  TH= 106  |          | |   TH= 572  |  69 -v                            |                                   |
  RT=  69  |          | |   LT= 116  |-------            1 5     -------|Geometric Change:                  |
           | Approach 4|             |      |            1 7 6 |         |Signal Change:                     |
                                     |      |            6 2 4 |         |Volume Change:                     |
=====================================+===================================+===================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                          |
                                     |        (two phase signal)         |                                   |
      --^ v--  B2B1                  |          | Approach 3|            |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |          |           |            |                                   |
   --^ AND <--    A1B2 AND           |          |           |            |                                   |
   --> OR  v--    /OR A2B1           |          |           |            |                                   |
      --> <--  A1A2                  |-------------       -------------|                                   |
                                     | Approach 1                        |                                   |
       |  <    B4B3                  |                                   |                                   |
       >  |                          |          See Step 6b.             |                                   |
   | | AND < ^    A3B4 AND           |                                   |                                   |
   v > OR  | |    /OR A4B3           |                      Approach 2   |                                   |
       |  ^    A3A4                  |-------------       ------------|                                   |
       v  |                          |          |           |            |                                   |
-------------------------------------|          |           |            |                                   |
A1 -->   A3 |    B1 v--    B3    <|  |          |           |            |                                   |
```

(5)

Critical Movement Analysis: PLANNING

Calculation Form 1

```
Intersection: VALPICO/MACARTHUR                                    Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
=====================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY        | Step 4. LEFT TURN CHECK              | Step 6b. VOLUME ADJUSTMENT FOR       |
              | Approach 3:MACARTHUR   |                  -------Approach-----|         MULTIPHASE SIGNAL OVERLAP    |
              |  1     1 |      ^      |                  : -1-  -2-  -3-  -4-|     Possible   Volume      Adjusted|
              |  R   L   |      N      |a.No. of change   :  0    0    0     0|Prob-  Critical  Carryover   Critical|
VALPICO       | R T T T L |            | intervals/hour   :                   |able   Volume   to next     Volume |
------------  T H H H T  -------------|b.LT capacity on  :  0    0    0     0|Phase  in vph    phase      in vph |
 Approach 1   < < | > >   ^--RT        | change (vph)     :                   |--------------------------------------|
  1  LT--^     v v v    <^-RTH  1      |c.G/C ratio       :  0    0    0     0|B2B1    20(B1)  220-  20= 200(B2)    20|
     LTH-^>             <--TH          |d.Opposing volume :  0    0    0     0|A1B2   200(B2)  103- 200=   0(A1)   200|
      TH-->             <v-LTH         | in vph           :                   |A1A2    72(A2) OR    0(A1)             72|
  1  RTH-v>    ^ ^ ^    v--LT  1       |e.LT capacity on  :  0    0    0     0|A3B4   477(A3) OR   30(B4)            477|
     RT--v    < < | > >  Approach 2    | green (vph)      :                   |A4B3   386(A4) OR    7(B3)            386|
------------  L L T R R  -------------|f.LT capacity in  :  0    0    0     0|                                      |
              | T T H T T |VALPICO     | vph (b+e)        :                   |                                      |
              |   H   H   |            |g.Left turn volume :  0    0    0     0|                                      |
              |     1     |            | in vph           :                   |                                      |
              | Approach 4:MACARTHUR   |h.Is volume > cap. :                  :                                      |
                                       | (g>f) ?          :                   |                                      |
========================================+======================================+======================================|
 Step 2. IDENTIFY VOLUMES, in vph      | Step 5. ASSIGN LANE VOLUMES, in vph  | Step 7. SUM OF CRITICAL VOLUMES      |
                                       |       |                       |      |                                      |
                                       |       | 1 3                   |      |220(B1B2)+72(A2)+477(A3)+386(A4)      |
              | Approach 3|            |-------  0 7 3                 -------|                                      |
 3:  LT=  30  | |        | 2:RT=  36   |         6 1 0                 ^+  36 |          = 1155 vph                  |
   TH= 371    | |        |   TH=  36   |         + + |                 <+  36 |======================================|
   RT= 106    | v        |   LT=  20   |         < v >                 v-  20 | Step 8. INTERSECTION LEVEL OF        |
-------------            -------------|                                      |          SERVICE                     |
                        <--Approach 2  |                                      |      (compare step 7 with table 6)   |
                                       |                                      |             -------                  |
                                       |                                      |             | C |                    |
 Approach 1-->                         |                                      |             -------                  |
                                       |                                      | V/C RATIO = 0.71                     |
-------------            -------------| 220 -^                  < ^ >        |======================================|
 1:LT= 220    |          ^ | 4: RT=  41| 76 +>                   + | +        | Step 9. RECALCULATE                  |
   TH=  76    |          | |   TH= 338 | 27 +v                                |                                      |
   RT=  27    |          | |   LT=   7 |-------                   3    -------|Geometric Change:                     |
              | Approach 4|            |       |                  3 4 |       |Signal Change:                        |
                                       |       |                7 8 1 |       |Volume Change:                        |
========================================+======================================+======================================|
 Step 3. IDENTIFY PHASING              | Step 6a. CRITICAL VOLUMES, in vph    | COMMENTS                             |
                                       |          (two phase signal)          |                                      |
       --^ v--  B2B1                   |              | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                       |              |           |           |                                      |
   --^ AND <--     A1B2 AND            |              |           |           |                                      |
   --> OR  v--     /OR A2B1            |              |           |           |                                      |
       --> <--  A1A2                   |-------------          -------------|                                      |
                                       | Approach 1                           |                                      |
        |   |   A3B4                   |                                      |                                      |
        v   >                          |          See Step 6b.                |                                      |
        <   ^   A4B3                   |                                      |                                      |
        |   |                          |                         Approach 2   |                                      |
                                       |-------------          ------------|                                      |
                                       |              |           |           |                                      |
--------------------------------------|              |           |           |                                      |
 A1 -->   A3 |     B1 v--    B3   <|   |              |           |           |                                      |
```

6

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: VALPICO/TRACY   Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 NO PROJECT

```
===============================================================================================
 Step 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK         | Step 6b. VOLUME ADJUSTMENT FOR   |
          | Approach 3:TRACY          |                -------Approach-----|       MULTIPHASE SIGNAL OVERLAP  |
          |  1 1   1 |      ^         |                : -1-  -2-  -3-  -4-|   Possible   Volume    Adjusted|
          |  R   L   |      N         |a.No. of change :  0    0    0    0|Prob- Critical Carryover Critical|
VALPICO   | R T T T L |               | intervals/hour :                 |able  Volume   to next   Volume |
------------ T H H H T -------------|b.LT capacity on :  0    0    0    0|Phase in vph    phase    in vph |
 Approach 1  < < | > >   ^--RT        | change (vph)   :                 |-----------------------------------|
  1 LT--^     v v v    <^-RTH  1      |c.G/C ratio     :  0    0    0    0|B2B1  100(B1)  116- 100=  16(B2)  100|
   LTH-^>              <--TH   1      |d.Opposing volume : 0  0    0    0|A1B2   16(B2)  156-  16= 140(A1)   16|
  1  TH-->             <v-LTH         | in vph         :                 |A1A2  303(A2)  OR  140(A1)        303|
  1 RTH-v>   ^ ^ ^      v--LT  1      |e.LT capacity on :  0    0    0    0|B4B3  161(B4)  246- 161=  85(B3)  161|
   RT--v   < < | > >   Approach 2     | green (vph)    :                 |A4B3   85(B3)  603-  85= 518(A4)   85|
------------ L L T R R -------------|f.LT capacity in :  0    0    0    0|A3A4  518(A4)  OR  443(A3)        518|
          | T T H T T |VALPICO        | vph (b+e)      :                 |                                   |
          |  H   H   |                |g.Left turn volume : 0  0    0    0|                                   |
          | 1   1 1  |                | in vph         :                 |                                   |
          | Approach 4:TRACY          |h.Is volume > cap. :                :                                   |
                                      | (g>f) ?        :                 |                                   |
===============================================================================================
Step 2. IDENTIFY VOLUMES, in vph      | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                      |      |                |            |                                 |
                                      |      | 2 1 4 1        |            |116(B1B2)+303(A2)+246(B4B3)+518(A4)|
         | Approach 3|                |-------  4 9 4 6       -------|                                 |
3:  LT= 161 | |        | 2:RT= 303    |         9 4 3 1        ^+ 303 |          = 1183 vph             |
   TH= 636 | |        |   TH= 228     |         + + | |        <+   0 |=================================|
   RT= 249 | v        |   LT= 100     |         < v v >        <- 228 | Step 8. INTERSECTION LEVEL OF   |
------------          -------------|                        v- 100 |         SERVICE                 |
                     <--Approach 2 |                               |    (compare step 7 with table 6)|
                                      |                               |             -------             |
                                      |                               |              | C |              |
Approach 1-->                         | 116 -^                        |  V/C = 0.73                     |
------------          -------------| 156 ->             < ^ ^ >    |=================================|
1:LT= 116  |         ^ | 4: RT= 109   |  59 +>             | | + +    | Step 9. RECALCULATE             |
  TH= 215  |         | |   TH=1096    |  97 +v                        |                                 |
  RT=  97  |         | |   LT= 246    |-------             2 6 4 1 -------|Geometric Change:                |
         | Approach 4|                |       |            4 0 9 0 |  |Signal Change:                   |
                                      |       |            6 3 4 9 |  |Volume Change:                   |
===============================================================================================
Step 3. IDENTIFY PHASING              | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                      |
                                      |        (two phase signal)     |                                 |
     --^ v--   B2B1                   |          | Approach 3|        |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                      |          |           |        |                                 |
   --^ AND <--      A1B2 AND          |          |           |        |                                 |
   --> OR  v--      /OR A2B1          |          |           |        |                                 |
     --> <--   A1A2                   |-------------    -------------|                                 |
                                      |  Approach 1                   |                                 |
      |   <    B4B3                   |                               |                                 |
      >   |                           |          See Step 6b.         |                                 |
   | | AND < ^      A3B4 AND          |                               |                                 |
   v > OR  | |      /OR A4B3          |                  Approach 2   |                                 |
      |   ^    A3A4                   |-------------    -------------|                                 |
      v   |                           |          |           |        |                                 |
--------------------------------------|          |           |        |                                 |
A1 -->   A3 |     B1 v--     B3   <|  |          |           |        |                                 |
        v ^                     | |   |          | Approach 4|        |                                 |
```

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: VALPICO / CORRAL HOLLOW　　　　Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 NO PROJECT

```
========================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK                | Step 6b. VOLUME ADJUSTMENT FOR      |
               | Approach 3:CORRAL HOLLOW|             -------Approach-----|        MULTIPHASE SIGNAL OVERLAP    |
               |  1 1   1 |      ^        |                 : -1-  -2-  -3-  -4-|      Possible   Volume    Adjusted|
               |  R  L    |      N        |a.No. of change   :  0    0    0    0|Prob-  Critical  Carryover  Critical|
VALPICO        | R T T T L |              |  intervals/hour  :                   |able   Volume    to next    Volume |
-------------  T H H H T  -------------|b.LT capacity on   :  0    0    0    0|Phase  in vph     phase      in vph |
 Approach 1    < < | > >    ^--RT       |  change (vph)     :                   |-------------------------------------|
  1  LT--^      v v v      <^-RTH  1    |c.G/C ratio        :  0    0    0    0|B2B1    34(B2)  245- 34= 211(B1)    34|
    LTH-^>                 <--TH   1    |d.Opposing volume  :  0    0    0    0|A2B1   211(B1)   55- 211=   0(A2)   211|
  1  TH-->                 <v-LTH       |  in vph           :                   |A1A2    96(A1) OR   0(A2)            96|
  1  RTH-v>     ^ ^ ^       v--LT  1    |e.LT capacity on   :  0    0    0    0|B4B3    31(B4)   69- 31=  38(B3)    31|
    RT--v      < < | > >   Approach 2   |  green (vph)      :                   |A4B3    38(B3)  460- 38= 422(A4)    38|
-------------  L L T R R  -------------|f.LT capacity in   :  0    0    0    0|A3A4   422(A4) OR 290(A3)           422|
               | T T H T T |VALPICO     |  vph (b+e)        :                   |                                     |
               |   H   H   |            |g.Left turn volume :  0    0    0    0|                                     |
               | 1   1 1   |            |  in vph           :                   |                                     |
               | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :                  :                                     |
                                        |  (g>f) ?          :                   |                                     |
========================================+=======================================+=====================================|
 Step 2. IDENTIFY VOLUMES, in vph       | Step 5. ASSIGN LANE VOLUMES, in vph   | Step 7. SUM OF CRITICAL VOLUMES     |
                                        |      |                    |           |                                     |
                                        |      |   2 2              |           |245(B2B1)+96(A1)+69(B4B3)+422(A4)    |
               | Approach 3|            |-------  2 6 9 3          -------|                                     |
 3:  LT=  31 | |          | 2:RT=  34   |         6 4 0 1          ^+  34 |          = 832 vph                  |
   TH= 554  | |           |   TH=  75   |         + + | |          <+  21 |=====================================|
  RT=  26   | v           |   LT= 245   |         < v v >          <-  55 | Step 8. INTERSECTION LEVEL OF       |
-------------             -------------|                          v- 245 |        SERVICE                      |
                          <--Approach 2 |                                   |    (compare step 7 with table 6)    |
                                        |                                   |          -------                    |
                                        |                                   |           | A |                     |
 Approach 1-->                          | 34 -^                             |    V/C RATIO = 0.51                 |
-------------             -------------| 96 ->             < ^ ^ >         |=====================================|
 1:LT=  34  |             ^ | 4: RT= 186 | 20 +>             | | + +         | Step 9. RECALCULATE                 |
   TH= 116  |             | |   TH= 734 | 76 +v                             |                                     |
   RT=  76  |             | |   LT=  69 |-------            4 2 1   -------|Geometric Change:                    |
               | Approach 4|            |      |          6 6 7 8 |        |Signal Change:                       |
                                        |      |          9 0 4 6 |        |Volume Change:                       |
========================================+=======================================+=====================================|
 Step 3. IDENTIFY PHASING               | Step 6a. CRITICAL VOLUMES, in vph     | COMMENTS                            |
                                        |      (two phase signal)               |                                     |
      --^ v--   B2B1                    |           | Approach 3|               |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                        |           |           |               |                                     |
   --^ AND <--      A1B2 AND            |           |           |               |                                     |
   --> OR  v--      /OR A2B1            |           |           |               |                                     |
      --> <--   A1A2                    |-------------     ------------|                                     |
                                        | Approach 1                            |                                     |
       |   <    B4B3                    |                                       |                                     |
       >   |                            |          See Step 6b.                 |                                     |
   | | AND < ^      A3B4 AND            |                                       |                                     |
   v > OR  | |      /OR A4B3            |                      Approach 2       |                                     |
       |   ^    A3A4                    |-------------     ------------|                                     |
       v   |                            |           |           |               |                                     |
----------------------------------------|           |           |               |                                     |
 A1 -->   A3 |     B1 v--    B3   <|    |           |           |               |                                     |
          v ^                   | |     |           | Approach 4|               |                                     |
```

```
                         Critical Movement Analysis: PLANNING
                                Calculation Form 1
Intersection: VALPICO/LAMMERS                                    Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
==============================================================================================
 Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK         | Step 6b. VOLUME ADJUSTMENT FOR      |
         | Approach 3:LAMMERS       |              -------Approach-----|       MULTIPHASE SIGNAL OVERLAP     |
         | 1   2   1 |      ^       |              : -1-  -2-  -3-  -4-|     Possible    Volume    Adjusted|
         |   R   L   |      N       |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
VALPICO  | R T T T L |              | intervals/hour  :                 |able    Volume    to next    Volume |
------------- T H H H T ------------|b.LT capacity on :  0    0    0    0|Phase   in vph     phase     in vph |
 Approach 1   < < | > >   ^--RT  1  | change (vph)    :                 |-------------------------------------|
  1  LT--^      v v v    <^-RTH     |c.G/C ratio      :  0    0    0    0|B2B1    22(B1)   28-  22=  6(B2)   22|
     LTH-^>              <--TH   1  |d.Opposing volume :  0    0    0   0|A1B2     6(B2)   30-   6= 24(A1)    6|
  1   TH-->              <v-LTH     | in vph          :                 |A1A2    24(A1) OR   19(A2)          24|
     RTH-v>     ^ ^ ^     v--LT  1  |e.LT capacity on :  0    0    0    0|B4B3     0(B3)  399-   0= 399(B4)   0|
  1  RT--v    < < | > >  Approach 2 | green (vph)     :                 |A3B4   399(B4)  473- 399=  74(A3)  399|
------------- L L T R R ------------|f.LT capacity in :  0    0    0    0|A3A4   684(A4) OR   74(A3)         684|
         | T T H T T |VALPICO       | vph (b+e)       :                 |                                     |
         |   H   H   |              |g.Left turn volume :  0    0    0  0|                                     |
         | 1   2   1 |              | in vph          :                 |                                     |
         | Approach 4:LAMMERS       |h.Is volume > cap. :               :                                     |
                                    | (g>f) ?         :                 |                                     |
====================================+=================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES   |
                                    |      |                  |       |                                     |
                                    |      |   4 4 3          |       |28(B1B2)+24(A1)+399(B3B4)+684(A4)    |
           | Approach 3|            |-------   7 7 9          -------|                                     |
3:  LT= 399 | |        | 2:RT=   0  |         0 3 3 9          ^-   0 |          = 1135 vph                 |
   TH= 945 | |         |  TH=  19   |         | | | |          <-  19 |=====================================|
   RT=   0 | v         |  LT=  22   |         < v v >          v-  22 | Step 8. INTERSECTION LEVEL OF       |
-------------          -------------|                                 |         SERVICE                     |
                      <--Approach 2 |                                 |   (compare step 7 with table 6)     |
                                    |                                 |             -------                 |
                                    |                                 |             | C |                 |
Approach 1-->                       |                                 |             -------                 |
-------------          -------------|  28 -^             < ^ ^ >      |=====V/C RATIO = 0.70================|
1:LT=  28  |           ^ | 4: RT=  19 |  30 ->            | | | |      | Step 9. RECALCULATE                 |
  TH=  30  |           | |  TH=1368 |   0 -v                          |                                     |
  RT=   0  |           | |  LT=   0 |-------              6 6  -------|Geometric Change:                    |
          | Approach 4|             |      |            8 8 1 |       |Signal Change:                       |
                                    |      |          0 4 4 9 |       |Volume Change:                       |
====================================+=================================+=====================================|
Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                          |
                                    |        (two phase signal)       |                                     |
     --^ v--  B2B1                  |           | Approach 3|         |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                    |           |           |         |                                     |
  --^ AND <--     A1B2 AND          |           |           |         |                                     |
  --> OR  v--     /OR A2B1          |           |           |         |                                     |
     --> <--  A1A2                  |-------------     -------------|                                     |
                                    | Approach 1                      |                                     |
      |  <  B4B3                    |                                 |                                     |
      >  |                          |         See Step 6b.            |                                     |
  | | AND < ^     A3B4 AND          |                                 |                                     |
  v > OR  | |     /OR A4B3          |                      Approach 2 |                                     |
      |  ^  A3A4                    |-------------     -------------|                                     |
      v  |                          |           |           |         |                                     |
------------------------------------|           |           |         |                                     |
A1 -->   A3 |     B1 v--    B3   <| |           |           |         |                                     |
        v ^                    | |  |           | Approach 4|         | Exclusive right turns reduced 0 %   |
```

```
                         Critical Movement Analysis: PLANNING
                               Calculation Form 1

Intersection: SCHULTE/MACARTHUR                              Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
==========================================================================================
Step 1. IDENTIFY LANE GEOMETRY    | Step 4. LEFT TURN CHECK       | Step 6b. VOLUME ADJUSTMENT FOR   |
        | Approach 3:MACARTHUR     |          -------Approach-----|       MULTIPHASE SIGNAL OVERLAP  |
        | 1  2  1 |     ^          |              : -1- -2- -3- -4-|    Possible   Volume    Adjusted|
        |  R  L   |     N          |a.No. of change  :  0   0   0   0|Prob- Critical Carryover Critical|
SCHULTE | R T T T L |              |  intervals/hour :               |able  Volume   to next   Volume |
------------ T H H H T ------------|b.LT capacity on :  0   0   0   0|Phase in vph    phase    in vph |
 Approach 1   < < | > >   ^--RT    |  change (vph)   :               |-----------------------------------|
  1 LT--^      v v v    <^-RTH  1  |c.G/C ratio      :  0   0   0   0|B2B1  62(B1)  180- 62= 118(B2)  62|
    LTH-^>              <--TH      |d.Opposing volume:  0   0   0   0|A1B2 118(B2)  250- 118= 132(A1) 118|
  1  TH-->              <v-LTH     |  in vph         :               |A1A2 176(A2) OR 132(A1)        176|
    RTH-v>     ^ ^ ^     v--LT  1  |e.LT capacity on :  0   0   0   0|A3B4 343(A3) OR  13(B4)        343|
  1 RT--v     < < | > >  Approach 2|  green (vph)    :               |A4B3 378(B3) OR 344(A4)        378|
------------ L L T R R ------------|f.LT capacity in :  0   0   0   0|                                   |
        | T T H T T |SCHULTE       |  vph (b+e)      :               |                                   |
        |  H   H   |               |g.Left turn volume : 0  0   0   0|                                   |
        | 1   1 1  |               |  in vph         :               |                                   |
        | Approach 4:MACARTHUR     |h.Is volume > cap. :             :                                   |
                                   |  (g>f) ?        :               |                                   |
==================================+================================+===================================|
Step 2. IDENTIFY VOLUMES, in vph  | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                  |      |                  |      |                                  |
                                  |      | 2 3 3            |      |180(B1B2)+176(A2)+343(A3)+378(B3) |
        | Approach 3|             |-------  0 4 4 1          -------|                                  |
3:  LT=  13 | |       | 2:RT=   9 |         4 3 3 3          ^+   9 |            = 1077 vph            |
  TH= 685 | |         |   TH= 167 |         | | | |          <+ 167 |===================================|
  RT= 204 | v         |   LT=  62 |         < v v >          v-  62 | Step 8. INTERSECTION LEVEL OF    |
------------          ------------|                                 |         SERVICE                  |
                     <--Approach 2 |                                |   (compare step 7 with table 6)  |
                                   |                                |             -------              |
                                   |                                |              B                   |
Approach 1-->                      |                                |             -------              |
------------          -------------| 180 -^          <^ ^ >        |  V/C RATIO = 0.67               |
1:LT= 180 |          ^ | 4: RT= 160 | 250 ->          | | + +       | Step 9. RECALCULATE              |
  TH= 250 |          | |    TH= 528 |  73 -v                        |                                  |
  RT=  73 |          | |    LT= 378 |-------          3 3 1 1 -------|Geometric Change:                 |
        | Approach 4|              |       |         7 4 8 6 |      |Signal Change:                    |
                                   |       |         8 4 4 0 |      |Volume Change:                    |
==================================+================================+===================================|
Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                       |
                                   |     (two phase signal)        |                                   |
    --^ v--  B2B1                  |          | Approach 3|        |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                   |          |           |        |                                   |
  --^ AND <--     A1B2 AND         |          |           |        |                                   |
  --> OR  v--     /OR A2B1         |          |           |        |                                   |
    --> <--  A1A2                  |-------------    -------------|                                   |
                                   | Approach 1                    |                                   |
     |  |   A3B4                   |                               |                                   |
     v  >                          |        See Step 6b.           |                                   |
     <  ^   A4B3                   |                               |                                   |
     |  |                          |                    Approach 2 |                                   |
                                   |-------------    -------------|                                   |
                                   |          |           |        |                                   |
-----------------------------------|          |           |        |                                   |
A1 -->   A3 |      B1 v--    B3  <| |          |           |        |                                   |
        v ^                  |  | |          | Approach 4|        | Exclusive right turns reduced 0 % |
```

1C

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                              Critical Movement Analysis: PLANNING
                                      Calculation Form 1
Intersection: SCHULTE / TRACY                                    Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY        | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR       |
           | Approach 3:TRACY          |                -------Approach-----|        MULTIPHASE SIGNAL OVERLAP      |
           | 1   2   1 |       ^       |                : -1-  -2-  -3-  -4-|      Possible   Volume     Adjusted|
           |   R   L   |       N       |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
SCHULTE    | R T T T L |               | intervals/hour  :                  |able   Volume    to next    Volume |
------------ T H H H T ----------------|b.LT capacity on :  0    0    0    0|Phase  in vph     phase     in vph |
 Approach 1  < < | > >    ^--RT  1     | change (vph)    :                  |--------------------------------------|
  1  LT--^     v v v     <^-RTH        |c.G/C ratio      :  0    0    0    0|B2B1     44(B1)  160-  44= 116(B2)    44|
     LTH-^>              <--TH    2    |d.Opposing volume:  0    0    0    0|A1B2    116(B2)  266- 116= 150(A1)   116|
  2  TH-->               <v-LTH        | in vph          :                  |A1A2    197(A2) OR  150(A1)          197|
     RTH-v>    ^ ^ ^     v--LT   1     |e.LT capacity on :  0    0    0    0|B4B3     69(B3)  234-  69= 165(B4)    69|
  1  RT--v   < < | > >   Approach 2    | green (vph)     :                  |A3B4    165(B4)  450- 165= 285(A3)   165|
------------ L L T R R ----------------|f.LT capacity in :  0    0    0    0|A3A4    602(A4) OR  285(A3)          602|
           | T T H T T |SCHULTE        | vph (b+e)       :                  |                                      |
           |   H   H   |               |g.Left turn volume:  0    0    0    0|                                      |
           | 1   2   1 |               | in vph          :                  |                                      |
           | Approach 4:TRACY          |h.Is volume > cap.:                 :                                      |
                                       | (g>f) ?         :                  |                                      |
=======================================+====================================+======================================|
 Step 2. IDENTIFY VOLUMES, in vph      | Step 5. ASSIGN LANE VOLUMES, in vph| Step 7. SUM OF CRITICAL VOLUMES      |
                                       |       |                    |       |                                      |
                                       |       |  4 4 2             |       |160(B1B2)+197(A2)+234(B3B4)+602(A4)   |
           | Approach 3|               |-------  2 5 5 3             -------|                                      |
 3:  LT= 234 | |        | 2:RT=    0   |         7 0 0 4             ^-   0 |            = 1193 vph                |
     TH= 900 | |        |   TH= 394    |         | | | |            <- 197 |======================================|
     RT=  27 | v        |   LT=  44    |         < v v >            <- 197 | Step 8. INTERSECTION LEVEL OF        |
-------------            --------------|                            v-  44 |         SERVICE                      |
                        <--Approach 2  |                                   |    (compare step 7 with table 6)     |
                                       |                                   |              -------                 |
                                       |                                   |              | C |                   |
 Approach 1-->                         | 160 -^                            |              -------                 |
-------------            --------------| 266 ->              < ^ ^ >      |   V/C RATIO = 0.74                   |
 1:LT= 160   |             ^ | 4: RT= 13| 266 ->             | | | |      | Step 9. RECALCULATE                  |
   TH= 531   |            | |   TH=1203| 0 -v                             |                                      |
   RT=   0   |            | |   LT=  69|-------            6 6    -------|Geometric Change:                     |
             | Approach 4|             |       |         6 0 0 1 |        |Signal Change:                        |
                                       |       |         9 2 2 3 |        |Volume Change:                        |
=======================================+====================================+======================================|
 Step 3. IDENTIFY PHASING              | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS                             |
                                       |        (two phase signal)          |                                      |
     --^ v--  B2B1                     |         | Approach 3|              |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                       |         |           |              |                                      |
  --^ AND <--     A1B2 AND             |         |           |              |                                      |
  --> OR  v--     /OR A2B1             |         |           |              |                                      |
     --> <--  A1A2                     |-------------        -------------|                                      |
                                       | Approach 1                         |                                      |
      |  <   B4B3                      |                                    |                                      |
      >  |                             |          See Step 6b.              |                                      |
  | | AND < ^     A3B4 AND             |                                    |                                      |
  v > OR  | |     /OR A4B3             |                       Approach 2   |                                      |
      |  ^   A3A4                      |-------------        -------------|                                      |
      v  |                             |         |           |              |                                      |
---------------------------------------|         |           |              |                                      |
 A1 -->   A3 |     B1 v--    B3   <|   |         |           |              |                                      |
```

(11)

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                        Critical Movement Analysis: PLANNING
                                Calculation Form 1
Intersection: SCHULTE / LAMMERS                          Design Hour: PM PEAK
Problem Statement: TRACEY GATEWAY 2025 NO PROJECT
==================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY    | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR   |
         | Approach 3:LAMMERS      |                -------Approach-----|        MULTIPHASE SIGNAL OVERLAP   |
         |   2   1 |      ^        |                : -1-  -2-  -3-  -4-|       Possible   Volume    Adjusted|
         |  R   L  |      N        |a.No. of change :  0    0    0    0|Prob-  Critical  Carryover  Critical|
SCHULTE  | R T T T L |             |  intervals/hour :                  |able   Volume    to next    Volume |
------------- T H H H T -----------|b.LT capacity on :  0    0    0    0|Phase  in vph     phase     in vph |
 Approach 1  < < | > >   ^--RT  1  |  change (vph)   :                  |-----------------------------------|
     LT--^    v v v     <^-RTH     |c.G/C ratio      :  0    0    1    1|A2B1    81(B1)  OR   0(A2)       81|
     LTH-^>             <--TH      |d.Opposing volume :  0    0 1437 1108|A3A4  696(A4) OR  554(A3)      696|
      TH-->             <v-LTH     |  in vph          :                  |                                   |
     RTH-v>   ^ ^ ^     v--LT  1   |e.LT capacity on :  0    0    0   92|                                   |
     RT--v   < < | > >  Approach 2 |  green (vph)     :                  |                                   |
------------- L L T R R -----------|f.LT capacity in :  0    0    0   92|                                   |
         | T T H T T |SCHULTE      |  vph (b+e)       :                  |                                   |
         |  H   H  |               |g.Left turn volume :  0    0    0    0|                                   |
         |   2   1 |               |  in vph          :                  |                                   |
         | Approach 4:LAMMERS      |h.Is volume > cap. : NO        NO   NO:                                   |
                                   |  (g>f) ?         :                  |                                   |
===================================+==================================+===================================|
 Step 2. IDENTIFY VOLUMES, in vph  | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                   |      |                  |        |                                   |
                                   |      | 5 5              |        |81(B1)+696(A4)+0()+0()             |
         | Approach 3|             |-------  5 5            -------|                                   |
 3:  LT=   0 | |        | 2:RT=   0 |        4 4 0           ^-    0|          = 777 vph                |
   TH=1108 | |          |  TH=    0 |        | | |          v-   81|===================================|
   RT=   0 | v          |  LT=   81 |        v v >                 | Step 8. INTERSECTION LEVEL OF     |
-------------            -----------|                                  |         SERVICE                   |
                     <--Approach 2 |                                  |  (compare step 7 with table 6)    |
                                   |                                  |             -------               |
                                   |                                  |             | A |               |
 Approach 1-->                     |                                  |             -------               |
-------------            -----------|                  ^ ^ >          |=== V/C RATIO = 0.44 ===============|
 1:LT=   0  |         ^ | 4: RT=  46 |                  | | |          | Step 9. RECALCULATE               |
   TH=   0  |         | |  TH=1391 |                                  |                                   |
   RT=   0  |         | |  LT=    0 |-------           6 6     -------|Geometric Change:                  |
         | Approach 4|             |      |           9 9 4 |       |Signal Change:                     |
                                   |      |           6 6 6 |       |Volume Change:                     |
===================================+==================================+===================================|
 Step 3. IDENTIFY PHASING          | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                          |
                                   |        (two phase signal)        |                                   |
        <--  A2B1                  |           | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
        v--                        |           |           |          |                                   |
      |  ^   A3A4                  |           |           |          |                                   |
      v  |                         |           |           |          |                                   |
                                   |-------------   |    -------------|                                   |
                                   | Approach 1     |                  |                                   |
                                   |                     v----  81    |                                   |
                                   |                                  |                                   |
                                   |       ----        ^              |                                   |
                                   |                   |  Approach 2  |                                   |
                                   |-------------      |  ------------|                                   |
                                   |           |   696 |              |                                   |
-----------------------------------|           |       |              |                                   |
 A1 -->    A3 |     B1 v--    B3  <|           |       |              |                                   |
      v ^                    |   | |           | Approach 4|          | Exclusive right turns reduced 0 % |
```

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                              Critical Movement Analysis: PLANNING

                                    Calculation Form 1

Intersection: OLD WEST SCHULTE / LAMMERS                      Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 NO PROJECT

==========================================================================================
 Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK              | Step 6b. VOLUME ADJUSTMENT FOR      |
            | Approach 3:LAMMERS     |                 -------Approach-----|        MULTIPHASE SIGNAL OVERLAP    |
            | 1   2    |      ^      |                 : -1-  -2-  -3-  -4-|     Possible    Volume    Adjusted|
            |  R   L   |      N      |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
OLD WEST SCHU| R T T T L |           |  intervals/hour :                   |able   Volume   to next    Volume |
------------- T H H H T  -------------|b.LT capacity on :  0    0    0    0|Phase  in vph    phase     in vph |
 Approach 1   < < | > >    ^--RT      |  change (vph)   :                   |------------------------------------|
  1  LT--^      v v v     <^-RTH      |c.G/C ratio      :  0    0    1    1|A1B2   218(B2) OR   53(A1)       218|
     LTH-^>               <--TH       |d.Opposing volume :  0   53 1262  916|A3A4   631(A4) OR  458(A3)       631|
      TH-->               <v-LTH      |  in vph         :                   |                                    |
     RTH-v>     ^ ^ ^      v--LT      |e.LT capacity on :  0    0    0  284|                                    |
  1  RT--v    < < | > >   Approach 2  |  green (vph)    :                   |                                    |
------------- L L T R R  -------------|f.LT capacity in :  0    0    0  284|                                    |
            | T T H T T |OLD WEST SCHU|  vph (b+e)      :                   |                                    |
            |  H   H    |             |g.Left turn volume :  0    0    0   41|                                    |
            | 1   2     |             |  in vph         :                   |                                    |
            | Approach 4:LAMMERS      |h.Is volume > cap. :      NO   NO   NO:                                    |
                                      |  (g>f) ?        :                   |                                    |
======================================+=====================================+=====================================|
 Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES     |
                                      |       |                     |       |                                     |
                                      |       |  4 4                |       |218(B2)+631(A4)+0()+0()              |
            | Approach 3|             |-------   5 5                 -------|                                     |
3:  LT=   0 | |         | 2:RT=   0   |         0 8 8                       |            = 849 vph                |
  TH= 916   | |         |   TH=   0   |         | | |                       |=====================================|
  RT=   0   | v         |   LT=   0   |         < v v                       | Step 8. INTERSECTION LEVEL OF       |
-------------           -------------|                                     |          SERVICE                    |
                         <--Approach 2 |                                   |    (compare step 7 with table 6)    |
                                      |                                     |               -------               |
                                      |                                     |               | A |                 |
Approach 1-->                         |                                     |               -------               |
                                                                              V/C RATIO = 0.48
-------------           -------------|                        < ^ ^        |=====================================|
1:LT= 218   |           ^ | 4: RT=   0 | 218 -^                 | | |      | Step 9. RECALCULATE                 |
  TH=   0   |           | |   TH=1262 |  53 -v                              |                                     |
  RT=  53   |           | |   LT=  41 |-------                6 6  -------|Geometric Change:                    |
            | Approach 4|             |       |             4 3 3 |       |Signal Change:                       |
                                      |       |             1 1 1 |       |Volume Change:                       |
======================================+=====================================+=====================================|
 Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS                            |
                                      |        (two phase signal)           |                                     |
       --^        A1B2                |          | Approach 3|              |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
       -->                            |          |           |              |                                     |
        |   ^     A3A4                |          |           |              |                                     |
        v   |                         |          |           |              |                                     |
                                      |-------------  |      -------------|                                     |
                                      |  Approach 1   |                     |                                     |
                                      |                      ----           |                                     |
                                      |                                     |                                     |
                                      |     218----^          ^             |                                     |
                                      |                       |  Approach 2 |                                     |
                                      |-------------          |  -----------|                                     |
                                      |          |       631 |              |                                     |
--------------------------------------|          |           |              |                                     |
A1 -->    A3 |      B1 v--     B3   <| |          |           |              |                                     |
              v ^                  | | |          | Approach 4|              | Exclusive right turns reduced 0\ %  |
```

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: 11TH / TRACY   Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 NO PROJECT

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===================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK                  | Step 6b. VOLUME ADJUSTMENT FOR         |
              | Approach 3:TRACY         |                        -------Approach-----|          MULTIPHASE SIGNAL OVERLAP     |
              | 1   2   2 |      ^       |                        : -1-  -2-  -3-  -4-|       Possible    Volume     Adjusted|
              |   R   L   |      N       |a.No. of change        :   0    0    0    0|Prob-  Critical   Carryover   Critical|
11TH          | R T T T L |              |  intervals/hour      :                   |able    Volume    to next     Volume |
------------- T H H H T -------------|b.LT capacity on      :   0    0    0    0|Phase   in vph     phase      in vph |
 Approach 1    < < | > >    ^--RT  1     |  change (vph)        :                   |---------------------------------------|
  2  LT--^      v v v     <^-RTH         |c.G/C ratio           :   0    0    0    0|B2B1    83(B1)  114-  83=  31(B2)    83|
    LTH-^>                <--TH   2      |d.Opposing volume     :   0    0    0    0|A1B2    31(B2)  366-  31= 335(A1)    31|
  2   TH-->               <v-LTH         |  in vph              :                   |A1A2   361(A2) OR  335(A1)          361|
    RTH-v>      ^ ^ ^      v--LT  2      |e.LT capacity on      :   0    0    0    0|B4B3    45(B4)  394-  45= 349(B3)    45|
  1  RT--v     < < | > >   Approach 2    |  green (vph)         :                   |A4B3   349(B3)  410- 349=  61(A4)   349|
------------- L L T R R -------------|f.LT capacity in      :   0    0    0    0|A3A4   394(A3) OR   61(A4)          394|
              | T T H T T |11TH          |  vph (b+e)           :                   |                                       |
              |   H   H   |              |g.Left turn volume    :   0    0    0    0|                                       |
              | 2   2   1 |              |  in vph              :                   |                                       |
              | Approach 4:TRACY         |h.Is volume > cap.    :                   :                                       |
                                         |  (g>f) ?             :                   |                                       |
=========================================+==========================================+=======================================|
 Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph      | Step 7. SUM OF CRITICAL VOLUMES        |
                                         |        |                           |     |                                       |
                                         |        | 2 3 3                     |     |114(B1B2)+361(A2)+394(B4B3)+394(A3)    |
              | Approach 3|              |-------  2 9 9 3 4             -------|                                       |
 3:  LT=  81  | |       | 2:RT=  39      |         3 4 4 7 5             ^-  39 |             = 1263 vph                 |
   TH= 787    | |       |   TH= 722      |         | | | | |             <- 361 |=======================================|
   RT= 223    | v       |   LT= 149      |         < v v > >             <- 361 | Step 8. INTERSECTION LEVEL OF          |
-------------             -------------|                               v-  68 |         SERVICE                       |
                          <--Approach 2  |                               v-  83 |     (compare step 7 with table 6)     |
                                         |                                      |              -------                  |
                                         | 114 -^                               |              | C |                    |
 Approach 1-->                           |  94 -^                               |              -------                  |
-------------             -------------| 366 ->              < < ^ ^ >        | V/C RATIO = 0.78                      |
 1:LT= 207    |          ^ | 4: RT=  73  | 366 ->              | | | | |        | Step 9. RECALCULATE                    |
   TH= 731    |         | |    TH= 820   | 221 -v                               |                                       |
   RT= 221    |         | |   LT= 716    |-------              3 3 4 4   -------|Geometric Change:                      |
              | Approach 4|              |        |            9 2 1 1 7 |      |Signal Change:                         |
                                         |        |            4 2 0 0 3 |      |Volume Change:                         |
=========================================+==========================================+=======================================|
 Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph        | COMMENTS                               |
                                         |        (two phase signal)                |                                       |
        --^ v--  B2B1                    |             | Approach 3|                |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                         |             |           |                |                                       |
   --^ AND <--      A1B2 AND             |             |           |                |                                       |
   --> OR  v--      /OR A2B1             |             |           |                |                                       |
        --> <--  A1A2                    |-------------            -------------|                                       |
                                         | Approach 1                               |                                       |
        |  <   B4B3                      |                                          |                                       |
        >  |                             |         See Step 6b.                     |                                       |
   | | AND < ^      A3B4 AND             |                                          |                                       |
   v > OR  | |      /OR A4B3             |                          Approach 2      |                                       |
        |  ^   A3A4                      |-------------            ------------|                                       |
        v  |                             |             |           |                |                                       |
-----------------------------------------|             |           |                |                                       |
 A1 -->   A3 |     B1 v--    B3   <|     |             |           |                |                                       |
```

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                     Critical Movement Analysis: PLANNING
                              Calculation Form 1

Intersection: 11TH/CORRAL HOLLOW                              Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
================================================================================
Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK        | Step 6b. VOLUME ADJUSTMENT FOR |
           | Approach 3:CORRAL HOLLOW|          -------Approach-----|      MULTIPHASE SIGNAL OVERLAP |
           | 1   3   2 |      ^      |                : -1- -2- -3- -4-|    Possible   Volume    Adjusted|
           |   R   L   |      N      |a.No. of change :  0   0   0   0|Prob- Critical Carryover Critical|
11TH       | R T T T L |             | intervals/hour :               |able  Volume   to next   Volume |
------------ T H H H T ------------- |b.LT capacity on :  0   0   0   0|Phase in vph   phase     in vph |
 Approach 1  < < | > >   ^--RT  1    | change (vph)   :               |--------------------------------|
  2 LT--^     v v v     <^-RTH       |c.G/C ratio     :  0   0   0   0|B2B1  77(B2)  248- 77= 171(B1)  77|
   LTH-^>               <--TH   2    |d.Opposing volume : 0  0   0   0|A2B1 171(B1)  354- 171= 183(A2) 171|
  2  TH-->              <v-LTH       | in vph         :               |A1A2 374(A1)  OR  183(A2)       374|
   RTH-v>     ^ ^ ^      v--LT  2    |e.LT capacity on :  0   0   0   0|B4B3  29(B3)  202- 29= 173(B4)  29|
  1 RT--v    < < | > >   Approach 2  | green (vph)    :               |A3B4 173(B4)  403- 173= 230(A3) 173|
------------ L L T R R ------------- |f.LT capacity in :  0   0   0   0|A3A4 443(A4)  OR  230(A3)       443|
           | T T H T T |11TH         | vph (b+e)      :               |                                |
           |   H   H   |             |g.Left turn volume : 0  0   0   0|                                |
           | 2   3   1 |             | in vph         :               |                                |
           | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :             :                                |
                                     | (g>f) ?        :               |                                |
=====================================+================================+================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                     |      |              |          |                                |
                                     |      |  4 4 4 1 2   |          |248(B2B1)+374(A1)+202(B3B4)+443(A4)|
          | Approach 3|              |-------  9 0 0 0 6 0    -------|                                |
3:  LT= 368 | |        | 2:RT= 127   |         7 3 3 3 6 2    ^- 127 |          = 1267 vph            |
  TH=1209 | |          |   TH= 707   |         | | | | | |    <- 354 |================================|
  RT=  97 | v          |   LT= 449   |         < v v v > >    <- 354 | Step 8. INTERSECTION LEVEL OF  |
-------------          -------------|                         v- 203 |         SERVICE                |
                       <--Approach 2 |                        v- 248 |  (compare step 7 with table 6) |
                                     |                                |         -------                |
                                     | 77 -^                          |         | C |                  |
Approach 1-->                        | 63 -^                          |         -------                |
-------------          -------------| 374 ->          < < ^ ^ ^ >     |=== V/C RATIO = 0.78 ===========|
1:LT= 140  |          ^ | 4: RT=  80 | 374 ->          | | | | | |     | Step 9. RECALCULATE            |
  TH= 747  |          | |   TH=1328  | 46 -v                          |                                |
  RT=  46  |          | |   LT=  52  |-------          4 4 4   -------|Geometric Change:               |
          | Approach 4|              |      |      2 2 4 4 4 8 |      |Signal Change:                  |
                                     |      |      9 3 3 3 3 0 |      |Volume Change:                  |
=====================================+================================+================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                      |
                                     |      (two phase signal)        |                                |
    --^ v--   B2B1                   |         | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |         |           |          |                                |
  --^ AND <--    A1B2 AND            |         |           |          |                                |
  --> OR  v--    /OR A2B1            |         |           |          |                                |
    --> <--   A1A2                   |-------------    -------------|                                |
                                     | Approach 1                     |                                |
     |  <   B4B3                     |                                |                                |
     >  |                            |        See Step 6b.            |                                |
  | | AND < ^    A3B4 AND            |                                |                                |
  v > OR  | |    /OR A4B3            |                     Approach 2 |                                |
     |  ^   A3A4                     |-------------    -------------|                                |
     v  |                            |         |           |          |                                |
-------------------------------------|         |           |          |                                |
A1 -->  A3 |    B1 v--    B3   <|    |         |           |          |                                |
       v ^                     |  |  |         | Approach 4|          | Exclusive right turns reduced 0 % |
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                         Critical Movement Analysis: PLANNING
                                   Calculation Form 1
ntersection: 11TH/LAMMERS                                      Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 NO PROJECT
=========================================================================================================
Step 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR       |
             | Approach 3:LAMMERS    |                 -------Approach-----|        MULTIPHASE SIGNAL OVERLAP     |
             | 1   3   1 |     ^     |                 : -1-  -2-  -3-  -4-|     Possible   Volume    Adjusted|
             |  R   L    |     N     |a.No. of change  :  0    0    0    0|Prob-  Critical Carryover Critical|
1TH          | R T T T L |           | intervals/hour  :                   |able   Volume   to next   Volume |
------------  T H H H T  ------------|b.LT capacity on :  0    0    0    0|Phase  in vph    phase    in vph |
 Approach 1   < < | > >   ^--RT  1   | change (vph)    :                   |--------------------------------------|
  1  LT--^     v v v     <^-RTH      |c.G/C ratio      :  0    0    0    0|B2B1    0(B1)   66-   0=  66(B2)    0|
     LTH-^>              <--TH   2   |d.Opposing volume:  0    0    0    0|A1B2   66(B2)  789-  66= 723(A1)   66|
  2  TH-->               <v-LTH      | in vph          :                   |A1A2  723(A1) OR  466(A2)         723|
     RTH-v>    ^ ^ ^      v--LT  1   |e.LT capacity on :  0    0    0    0|B4B3   95(B3)  136-  95=  41(B4)   95|
  1  RT--v    < < | > >   Approach 2 | green (vph)     :                   |A3B4   41(B4)  290-  41= 249(A3)   41|
------------  L L T R R  ------------|f.LT capacity in :  0    0    0    0|A3A4  447(A4) OR  249(A3)         447|
             | T T H T T |11TH       | vph (b+e)       :                   |                                      |
             |  H   H    |           |g.Left turn volume :  0    0    0   0|                                      |
             | 1   3   1 |           | in vph          :                   |                                      |
             | Approach 4:LAMMERS    |h.Is volume > cap. :                 :                                      |
                                     | (g>f) ?         :                   |                                      |
=====================================+=====================================+======================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES      |
                                     |      |                     |        |                                      |
                                     |      |  2 2 2 1            |        |66(B1B2)+723(A1)+136(B3B4)+447(A4)    |
             | Approach 3|           |-------   9 9 9 3            -------|                                      |
3:  LT= 136  | |        | 2:RT=   0  |        0 0 0 0 6           ^-   0 |            = 1372 vph                |
    TH= 869  | |        |   TH= 931  |        | | | | |           <- 466 |======================================|
    RT=   0  | v        |   LT=   0  |        < v v v >           <- 466 | Step 8. INTERSECTION LEVEL OF        |
------------            ------------|                             v-   0 |         SERVICE                      |
                       <--Approach 2 |                                     |   (compare step 7 with table 6)      |
                                     |                                     |              -------                 |
                                     |                                     |              | D |                   |
Approach 1-->                        | 66 -^                               |              -------                 |
------------            ------------| 789 ->          < ^ ^ ^ >           |  V/C RATIO = 0.85                    |
1:LT=  66    |           ^ | 4: RT=  0 | 789 ->          | | | | |           |======================================|
  TH=1578    |          | |   TH=1342 | 176 -v                              | Step 9. RECALCULATE                  |
  RT= 176    |          | |   LT=  95 |-------           4 4 4     -------|Geometric Change:                     |
             | Approach 4|           |      |           9 4 4 4   |        |Signal Change:                        |
                                     |      |           5 7 7 7 0 |        |Volume Change:                        |
=====================================+=====================================+======================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS                             |
                                     |       (two phase signal)            |                                      |
       --^ v--  B2B1                 |            | Approach 3|            |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |            |           |            |                                      |
    --^ AND <--     A1B2 AND         |            |           |            |                                      |
    --> OR  v--     /OR A2B1         |            |           |            |                                      |
       --> <--  A1A2                 |-------------           -------------|                                      |
                                     | Approach 1                          |                                      |
        |  <    B4B3                 |                                     |                                      |
        >  |                         |          See Step 6b.               |                                      |
    | | AND < ^     A3B4 AND         |                                     |                                      |
    v > OR  | |     /OR A4B3         |                          Approach 2 |                                      |
        |  ^    A3A4                 |-------------           -------------|                                      |
        v  |                         |            |           |            |                                      |
-------------------------------------|            |           |            |                                      |
A1 -->   A3 |     B1 v--    B3   <|  |            |           |            |                                      |
```

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↱↱	↰	↑↑			↑↑↑	↱		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor		0.88	1.00	0.95			0.91	1.00		
Frt		0.85	1.00	1.00			1.00	0.85		
Flt Protected		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (prot)		2787	1770	3539			5085	1583		
Flt Permitted		1.00	0.08	1.00			1.00	1.00		
Satd. Flow (perm)		2787	155	3539			5085	1583		
Volume (vph)	0	1165	5	346	0	0	1724	27	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1165	5	346	0	0	1724	27	0	0
Lane Group Flow (vph)	0	1165	5	346	0	0	1724	27	0	0
Turn Type		custom	Perm					Perm		
Protected Phases				2			6			
Permitted Phases		8	2					6		
Actuated Green, G (s)		44.0	48.0	48.0			48.0	48.0		
Effective Green, g (s)		44.0	48.0	48.0			48.0	48.0		
Actuated g/C Ratio		0.44	0.48	0.48			0.48	0.48		
Clearance Time (s)		4.0	4.0	4.0			4.0	4.0		
Vehicle Extension (s)		3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)		1226	74	1699			2441	760		
v/s Ratio Prot				0.10			c0.34			
v/s Ratio Perm		c0.42	0.03					0.02		
v/c Ratio		0.95	0.07	0.20			0.71	0.04		
Uniform Delay, d1		26.9	14.0	15.0			20.5	13.8		
Progression Factor		1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2		15.3	1.8	0.3			1.7	0.1		
Delay (s)		42.3	15.7	15.3			22.2	13.8		
Level of Service		D	B	B			C	B		
Approach Delay (s)	42.3			15.3			22.1		0.0	
Approach LOS	D			B			C		A	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	A
c Critical Lane Group			

(17)

HCM Signalized Intersection Capacity Analysis
6: I-205 EB Ramps & Lammers

PM Peak Hour
2/14/2002

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations		↱		↑↑↑↱	↱	↰↰	↑↑↑			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0			
Lane Util. Factor		1.00		0.86	0.86	0.97	0.91			
Frt		0.86		0.90	0.85	1.00	1.00			
Flt Protected		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)		1611		4321	1362	3433	5085			
Flt Permitted		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)		1611		4321	1362	3433	5085			
Volume (vph)	0	49	0	312	1286	1460	1091	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	49	0	312	1286	1460	1091	0	0	0
Lane Group Flow (vph)	0	49	0	955	643	1460	1091	0	0	0
Turn Type		custom			Perm	Prot				
Protected Phases				2		1	6			
Permitted Phases		4			2					
Actuated Green, G (s)		3.3		37.7	37.7	37.0	78.7			
Effective Green, g (s)		3.3		37.7	37.7	37.0	78.7			
Actuated g/C Ratio		0.04		0.42	0.42	0.41	0.87			
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0			
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)		59		1810	571	1411	4447			
v/s Ratio Prot				0.22		c0.43	0.21			
v/s Ratio Perm		c0.03			c0.47					
v/c Ratio		0.83		0.53	1.13	1.03	0.25			
Uniform Delay, d1		43.1		19.5	26.1	26.5	0.9			
Progression Factor		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2		60.6		1.1	77.4	33.4	0.1			
Delay (s)		103.7		20.6	103.5	59.9	1.0			
Level of Service		F		C	F	E	A			
Approach Delay (s)	103.7			54.0			34.7		0.0	
Approach LOS	F			D			C		A	

Intersection Summary			
HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	F
c Critical Lane Group			

Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations	↰		↱	↰↰	↑↑			↑↑	↱		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00		1.00	0.97	0.95			0.95	1.00		
Frt	1.00		0.85	1.00	1.00			1.00	0.85		
Flt Protected	0.95		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (prot)	1770		1583	3433	3539			3539	1583		
Flt Permitted	0.95		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (perm)	1770		1583	3433	3539			3539	1583		
Volume (vph)	743	0	253	553	654	0	0	639	329	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	743	0	253	553	654	0	0	639	329	0	0
Lane Group Flow (vph)	743	0	253	553	654	0	0	639	329	0	0
Turn Type	custom		custom	Prot					Perm		
Protected Phases				5	2			6			
Permitted Phases	8		8					6	6		
Actuated Green, G (s)	37.7		37.7	15.4	37.8			18.4	18.4		
Effective Green, g (s)	37.7		37.7	15.4	37.8			18.4	18.4		
Actuated g/C Ratio	0.45		0.45	0.18	0.45			0.22	0.22		
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0		
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	799		715	633	1602			780	349		
v/s Ratio Prot				c0.16	0.18			0.18			
v/s Ratio Perm	c0.42		0.16						c0.21		
v/c Ratio	0.93		0.35	0.87	0.41			0.82	0.94		
Uniform Delay, d1	21.7		14.9	33.1	15.3			31.0	32.0		
Progression Factor	1.00		1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	17.0		0.3	12.7	0.2			6.7	33.4		
Delay (s)	38.6		15.3	45.8	15.5			37.7	65.4		
Level of Service	D		B	D	B			D	E		
Approach Delay (s)		32.7			29.4			47.1		0.0	
Approach LOS		C			C			D		A	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	D
c Critical Lane Group			

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations	↰		↱		↑↑	↱	↰	↑↑			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00		1.00		0.95	1.00	1.00	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	1770	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.22	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	416	3539			
Volume (vph)	229	0	513	0	978	832	199	1183	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	229	0	513	0	978	832	199	1183	0	0	0
Lane Group Flow (vph)	229	0	513	0	978	832	199	1183	0	0	0
Turn Type	custom		custom			Perm	Perm				
Protected Phases					2			6			
Permitted Phases	4		4		2	2	6				
Actuated Green, G (s)	25.0		25.0		38.9	38.9	38.9	38.9			
Effective Green, g (s)	25.0		25.0		38.9	38.9	38.9	38.9			
Actuated g/C Ratio	0.35		0.35		0.54	0.54	0.54	0.54			
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0		3.0		3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	615		550		1915	856	225	1915			
v/s Ratio Prot					0.28			0.33			
v/s Ratio Perm	0.13		c0.32			c0.53	0.48				
v/c Ratio	0.37		0.93		0.51	0.97	0.88	0.62			
Uniform Delay, d1	17.6		22.6		10.5	16.0	14.5	11.4			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4		22.9		0.2	23.9	31.0	0.6			
Delay (s)	18.0		45.6		10.7	39.9	45.5	12.0			
Level of Service	B		D		B	D	D	B			
Approach Delay (s)		37.0			24.1			16.8		0.0	
Approach LOS		D			C			B		A	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085		1770	3539	1583		1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085		1770	3539	1583		1863	1583
Volume (vph)	84	340	96	571	375	0	406	373	275	0	128	145
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	84	340	96	571	375	0	406	373	275	0	128	145
Lane Group Flow (vph)	84	340	96	571	375	0	406	373	275	0	128	145
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.3	12.3	12.3	30.1	35.1		21.1	36.5	36.5		11.4	11.4
Effective Green, g (s)	7.3	12.3	12.3	30.1	35.1		21.1	36.5	36.5		11.4	11.4
Actuated g/C Ratio	0.08	0.14	0.14	0.33	0.39		0.23	0.40	0.40		0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	142	688	214	586	1964		411	1421	636		234	199
v/s Ratio Prot	0.05	c0.07		c0.32	0.07		c0.23	0.11			0.07	
v/s Ratio Perm			0.06						0.17			c0.09
v/c Ratio	0.59	0.49	0.45	0.97	0.19		0.99	0.26	0.43		0.55	0.73
Uniform Delay, d1	40.4	36.4	36.2	30.0	18.5		34.8	18.2	19.7		37.3	38.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.5	0.6	1.5	30.5	0.0		40.8	0.1	0.5		2.6	12.5
Delay (s)	46.8	37.0	37.7	60.5	18.5		75.5	18.3	20.2		39.9	50.8
Level of Service	D	D	D	E	B		E	B	C		D	D
Approach Delay (s)		38.7			43.9			40.8			45.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
35: I-580 WB Ramps & Lammers

PM Peak Hour
3/8/2002

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations			↰	↑			↑	↱	↰	Y	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor				1.00			1.00	1.00	1.00	1.00	
Frt				1.00			1.00	0.85	1.00	0.85	
Flt Protected				1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1863			1863	1583	1770	1583	
Flt Permitted				1.00			1.00	1.00	0.95	1.00	
Satd. Flow (perm)				1863			1863	1583	1770	1583	
Volume (vph)	0	0	0	496	0	0	576	457	55	0	564
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	496	0	0	576	457	55	0	564
Lane Group Flow (vph)	0	0	0	496	0	0	576	457	55	564	0
Turn Type			Perm					Perm	Perm		
Protected Phases				2			6			8	
Permitted Phases			2					6	8		
Actuated Green, G (s)				17.1			17.1	17.1	14.0	14.0	
Effective Green, g (s)				17.1			17.1	17.1	14.0	14.0	
Actuated g/C Ratio				0.44			0.44	0.44	0.36	0.36	
Clearance Time (s)				4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)				3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)				815			815	692	634	567	
v/s Ratio Prot				0.27			c0.31			c0.36	
v/s Ratio Perm								0.29	0.03		
v/c Ratio				0.61			0.71	0.66	0.09	0.99	
Uniform Delay, d1				8.4			9.0	8.7	8.3	12.5	
Progression Factor				1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				1.3			2.8	2.4	0.1	36.2	
Delay (s)				9.7			11.8	11.1	8.4	48.7	
Level of Service				A			B	B	A	D	
Approach Delay (s)	0.0			9.7			11.5			45.1	
Approach LOS	A			A			B			D	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
c Critical Lane Group			

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations				↑	↱	↰	↑		↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0				4.0
Lane Util. Factor				1.00	1.00	1.00	1.00				1.00
Frt				1.00	0.85	1.00	1.00				0.85
Flt Protected				1.00	1.00	0.95	1.00				1.00
Satd. Flow (prot)				1863	1583	1770	1863				1583
Flt Permitted				1.00	1.00	0.40	1.00				1.00
Satd. Flow (perm)				1863	1583	744	1863				1583
Volume (vph)	0	0	0	496	366	134	497	0	0	0	366
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	496	366	134	497	0	0	0	366
Lane Group Flow (vph)	0	0	0	496	366	134	497	0	0	0	366
Turn Type					Perm	Perm			custom		custom
Protected Phases				2			6				
Permitted Phases					2	6			4		4
Actuated Green, G (s)				15.1	15.1	15.1	15.1				9.3
Effective Green, g (s)				15.1	15.1	15.1	15.1				9.3
Actuated g/C Ratio				0.47	0.47	0.47	0.47				0.29
Clearance Time (s)				4.0	4.0	4.0	4.0				4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0				3.0
Lane Grp Cap (vph)				868	738	347	868				454
v/s Ratio Prot				0.27			c0.27				
v/s Ratio Perm					0.23	0.18					c0.23
v/c Ratio				0.57	0.50	0.39	0.57				0.81
Uniform Delay, d1				6.3	6.0	5.6	6.3				10.7
Progression Factor				1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2				0.9	0.5	0.7	0.9				10.1
Delay (s)				7.2	6.5	6.3	7.2				20.8
Level of Service				A	A	A	A				C
Approach Delay (s)	0.0			6.9			7.0			20.8	
Approach LOS	A			A			A			C	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	32.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	A
c Critical Lane Group			

CUMULATIVE 2025
PLUS PROJECT

(1)

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: LINNE/MACARTHUR　　　　Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT

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Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR   |
            | Approach 3:MACARTHUR |              -------Approach-----|     MULTIPHASE SIGNAL OVERLAP    |
            | 1    1  |     ^      |              : -1-  -2-  -3-  -4-|       Possible   Volume   Adjusted|
            |  R   L  |     N      |a.No. of change    :  0    0    0   0|Prob-  Critical  Carryover Critical|
LINNE       | R T T T L |          |  intervals/hour   :                  |able   Volume   to next   Volume |
------------ T H H H T ------------|b.LT capacity on   :  0    0    0   0|Phase  in vph    phase    in vph |
 Approach 1  < < | > >   ^--RT     |  change (vph)     :                  |----------------------------------|
  1 LT--^     v v v    <^-RTH 1    |c.G/C ratio        :  0    0    0   0|B2B1   3(B1)  245-  3= 242(B2)   3|
    LTH-^>             <--TH       |d.Opposing volume  :  0    0    0   0|A1B2  242(B2) 605- 242= 363(A1) 242|
     TH-->             <v-LTH      |  in vph           :                  |A1A2  363(A1) OR  305(A2)       363|
  1 RTH-v>   ^ ^ ^      v--LT 1    |e.LT capacity on   :  0    0    0   0|A4B3  116(A4) OR    0(B3)       116|
    RT--v    < < | > > Approach 2  |  green (vph)      :                  |A3B4  104(A3) OR   75(B4)       104|
------------ L L T R R ------------|f.LT capacity in   :  0    0    0   0|                                  |
            | T T H T T |LINNE     |  vph (b+e)        :                  |                                  |
            |  H   H  |            |g.Left turn volume :  0    0    0   0|                                  |
            |  1    1 |            |  in vph           :                  |                                  |
            | Approach 4:MACARTHUR |h.Is volume > cap. :                 :|                                  |
                                   |  (g>f) ?          :                  |                                  |
===================================+==================================+==================================|
Step 2. IDENTIFY VOLUMES, in vph   | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                   |       |                 |        |                                  |
                                   |       |                 |        |245(B1B2)+363(A1)+116(A4)+104(A3) |
            | Approach 3|          |-------    2 7           -------|                                  |
3:  LT=  75 | |      | 2:RT=  41   |          1 9 5           ^+ 41 |          = 828 vph               |
    TH=  29 | |      |   TH= 264   |          | + +           <+ 264 |==================================|
    RT=   1 | v      |   LT=   3   |          < v >           v-  3 | Step 8. INTERSECTION LEVEL OF    |
------------         ------------- |                                  |         SERVICE                  |
                     <--Approach 2 |                                  |    (compare step 7 with table 6) |
                                   |                                  |            -------               |
                                   |                                  |            | A |                 |
Approach 1-->                      |                                  |            -------               |
                                   |                                  | V/C RATIO = 0.51                 |
------------         ------------- | 245 -^             < ^ >         |----------------------------------|
1:LT= 245  |         ^ | 4: RT= 116| 605 +>             + + |         | Step 9. RECALCULATE              |
  TH= 605  |        | |    TH= 111 |   0 +v                           |                                  |
  RT=   0  |        | |    LT=   0 |-------             1 1   -------|Geometric Change:                 |
           | Approach 4|           |       |            1 1 |         |Signal Change:                    |
                                   |       |          0 1 6 |         |Volume Change:                    |
===================================+==================================+==================================|
Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                         |
                                   |         (two phase signal)       |                                  |
     --^ v--   B2B1                |          | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                   |          |           |           |                                  |
  --^ AND <--    A1B2 AND          |          |           |           |                                  |
  --> OR  v--    /OR A2B1          |          |           |           |                                  |
     --> <--   A1A2                |-------------     ------------|                                  |
                                   | Approach 1                       |                                  |
      <   ^    A4B3                |                                  |                                  |
      |   |                        |         See Step 6b.             |                                  |
      |   |    A3B4                |                                  |                                  |
      v   >                        |                 Approach 2       |                                  |
                                   |-------------     ------------|                                  |
                                   |          |           |           |                                  |
-----------------------------------|          |           |           |                                  |
 A1 -->   A3 |    B1 v--    B3   <|  |          |           |           |                                  |
            v ^               | |  |          | Approach 4|           | Exclusive right turns reduced 0 % |
```

```
                              Critical Movement Analysis: PLANNING
                                       Calculation Form 1

Intersection: LINNE/TRACY                                     Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
=====================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY        | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR   |
             | Approach 3:TRACY        |                 -------Approach-----|        MULTIPHASE SIGNAL OVERLAP  |
             | 1   1   1 |      ^      |                 : -1-  -2-  -3-  -4-|      Possible   Volume    Adjusted|
             |   R   L   |      N      |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover Critical|
LINNE        | R T T T L |             |  intervals/hour :                   |able   Volume   to next   Volume  |
------------- T H H H T  --------------|b.LT capacity on :  0    0    0    0|Phase  in vph    phase     in vph  |
 Approach 1   < < | > >   ^--RT  1     |  change (vph)   :                   |----------------------------------|
  2  LT--^     v v v     <^-RTH        |c.G/C ratio      :  0    0    1    1|B2B1    6(B1)  345-   6= 339(B2)    6|
     LTH-^>              <--TH   1     |d.Opposing volume:  0    0    9  170|A1B2  339(B2)  736- 339= 397(A1)  339|
      TH-->              <v-LTH        |  in vph         :                   |A1A2  693(A2)  OR   397(A1)        693|
  1  RTH-v>    ^ ^ ^      v--LT  1     |e.LT capacity on :  0    0 1191 1030|A3A4  163(A3)  OR     7(A4)        163|
     RT--v    < < | > >   Approach 2   |  green (vph)    :                   |                                  |
------------- L L T R R  --------------|f.LT capacity in :  0    0 1191 1030|                                  |
             | T T H T T |LINNE        |  vph (b+e)      :                   |                                  |
             |   H   H   |             |g.Left turn volume:  0   0  211   13|                                  |
             | 1   1   1 |             |  in vph         :                   |                                  |
             | Approach 4:TRACY        |h.Is volume > cap.:          NO   NO:                                  |
                                       |  (g>f) ?        :                                                      |
=====================================================================================================|
Step 2. IDENTIFY VOLUMES, in vph       | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES  |
                                       |      |                      |     |                                  |
                                       |      | 1   2                |     |345(B1B2)+693(A2)+163(A3)+0()     |
             | Approach 3|             |-------  6   1           -------|                                  |
3:  LT= 211  | |          | 2:RT=  18  |        3 7 1             ^-  18 |          = 1201 vph              |
   TH=   7   | |          |   TH= 693  |        | | |             <- 693 |==================================|
  RT= 163    | v          |   LT=   6  |        < v >             v-   6 | Step 8. INTERSECTION LEVEL OF    |
-------------              ------------|                                 |         SERVICE                  |
                          <--Approach 2|                                 |    (compare step 7 with table 6) |
                                       |                                 |           -------                |
                                       |                                 |           | C |                |
Approach 1-->                          | 345 -^                          |      V/C RATIO = 0.74            |
-------------              ------------| 283 -^              < ^ >       |==================================|
1:LT= 628    |         ^ | 4: RT=   2  | 720 +>              | | |       | Step 9. RECALCULATE              |
  TH= 720    |        | |    TH=   7   |  16 +v                          |                                  |
  RT=  16    |        | |   LT=  13    |-------                   -------|Geometric Change:                 |
             | Approach 4|             |      |             1     |      |Signal Change:                    |
                                       |      |             3 7 2 |      |Volume Change:                    |
=====================================================================================================|
Step 3. IDENTIFY PHASING               | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS                         |
                                       |          (two phase signal)         |                                  |
      --^ v--  B2B1                    |            | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                       |            |           |           |                                  |
   --^ AND <--     A1B2 AND            |            |           |           |                                  |
   --> OR  v--     /OR A2B1            |            |           |           |                                  |
      --> <--  A1A2                    |-------------           ------------|                                  |
                                       | Approach 1                          |                                  |
       |   ^   A3A4                    |                                     |                                  |
       v   |                           |          See Step 6b.               |                                  |
                                       |                                     |                                  |
                                       |                        Approach 2   |                                  |
                                       |-------------           ------------|                                  |
                                       |            |           |           |                                  |
---------------------------------------|            |           |           |                                  |
A1 -->   A3 |      B1 v--    B3   <|   |            |           |           |                                  |
```

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                         Critical Movement Analysis: PLANNING

                                  Calculation Form 1

Intersection: LINNE / CORRAL HOLLOW                           Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT

=====================================================================================================
Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR       |
          | Approach 3:CORRAL HOLLOW|                   -------Approach-----|         MULTIPHASE SIGNAL OVERLAP    |
          |   2   1 |       ^       |                   : -1-  -2-  -3-  -4-|       Possible    Volume    Adjusted|
          |  R   L  |       N       |a.No. of change    :  0    0    0    0|Prob-  Critical   Carryover  Critical|
LINNE     | R T T T L |             |  intervals/hour   :                   |able   Volume    to next    Volume |
------------ T H H H T -------------|b.LT capacity on   :  0    0    0    0|Phase  in vph     phase      in vph |
 Approach 1   < < | > >    ^--RT  1 |  change (vph)     :                   |--------------------------------------|
     LT--^     v v v      <^-RTH    |c.G/C ratio        :  0    0    0    0|A2B1  576(B1) OR   39(A2)          576|
     LTH-^>               <--TH     |d.Opposing volume  :  39   0    0  550|A3B4  206(B4)  275- 206=  69(A3)   206|
      TH-->               <v-LTH    |  in vph           :                   |A3A4  373(A4) OR   69(A3)          373|
     RTH-v>    ^ ^ ^       v--LT  2 |e.LT capacity on   :  0    0    0    0|                                      |
     RT--v    < < | > >  Approach 2 |  green (vph)      :                   |                                      |
------------ L L T R R -------------|f.LT capacity in   :  0    0    0    0|                                      |
          | T T H T T |LINNE        |  vph (b+e)        :                   |                                      |
          |   H   H   |             |g.Left turn volume :  0    0    0    0|                                      |
          |   2   2   |             |  in vph           :                   |                                      |
          | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :  NO           NO: |                                      |
                                    |  (g>f) ?          :                   |                                      |
====================================+===================================+======================================|
Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph  | Step 7. SUM OF CRITICAL VOLUMES      |
                                    |       |                     |      |                                      |
                                    |       | 2 2 2               |      |576(B1)+579(B4A4)+0()+0()             |
          | Approach 3|             |-------  7 7 0              -------|                                      |
3:  LT= 206 | |        | 2:RT=  39  |         5 5 6              ^-  39 |           = 1155 vph                 |
   TH= 550 | |         |  TH=   0   |         | | |              v- 472 |======================================|
   RT=   0 | v         |  LT=1048   |         v v >              v- 576 | Step 8. INTERSECTION LEVEL OF        |
------------           -------------|                                   |          SERVICE                     |
                       <--Approach 2|                                   |   (compare step 7 with table 6)      |
                                    |                                   |            -------                   |
                                    |                                   |            | B |                     |
Approach 1-->                       |                                   | V/C RATIO = 0.69                     |
------------           -------------|                   ^ ^ > >         |======================================|
1:LT=   0 |          ^ | 4: RT= 482 |                   | | | |         | Step 9. RECALCULATE                  |
  TH=   0 |          | |    TH= 746 |                                   |                                      |
  RT=   0 |          | |    LT=   0 |-------            3 3 2 2  -------|Geometric Change:                     |
          | Approach 4|             |       |           7 7 4 4 |       |Signal Change:                        |
                                    |       |           3 3 1 1 |       |Volume Change:                        |
====================================+===================================+======================================|
Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS                             |
                                    |      (two phase signal)           |                                      |
          <-- A2B1                  |          | Approach 3|            |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
          v--                       |          |           |            |                                      |
        |  |  A3B4                  |          |           |            |                                      |
        v  >                        |          |           |            |                                      |
        |  ^  A3A4                  |-------------       -------------|                                      |
        v  |                        | Approach 1                        |                                      |
                                    |                                   |                                      |
                                    |          See Step 6b.             |                                      |
                                    |                                   |                                      |
                                    |                       Approach 2  |                                      |
                                    |-------------       -------------|                                      |
                                    |          |           |            |                                      |
------------------------------------|          |           |            |                                      |
A1 -->  A3 |     B1 v--    B3   <|  |          |           |            |                                      |
```

4

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                          Critical Movement Analysis: PLANNING
                                    Calculation Form 1
Intersection: TRACY HILLS E-W ARTERIAL / LAMMERS                  Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
============================================================================================
 Step 1. IDENTIFY LANE GEOMETRY    | Step 4. LEFT TURN CHECK        | Step 6b. VOLUME ADJUSTMENT FOR |
          | Approach 3:LAMMERS     |              -------Approach-----|    MULTIPHASE SIGNAL OVERLAP   |
          | 1   1   1 |      ^     |              : -1-  -2-  -3-  -4-|  Possible   Volume    Adjusted|
          |   R   L   |      N     |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
TRACY HILLS E| R T T T L |         |  intervals/hour :                  |able   Volume   to next    Volume |
------------- T H H H T -----------|b.LT capacity on :  0    0    0    0|Phase   in vph    phase     in vph |
 Approach 1   < < | > >   ^--RT  1 |  change (vph)   :                  |-------------------------------------|
  1  LT--^      v v v     <^-RTH   |c.G/C ratio      :  0    0    0    0|B2B1  249(B1)  279- 249=  30(B2)   249|
     LTH-^>               <--TH  1 |d.Opposing volume :  0    0    0    0|A1B2   30(B2)  107-  30=  77(A1)    30|
  1  TH-->                <v-LTH   |  in vph         :                  |A1A2   77(A1)  OR    23(A2)          77|
     RTH-v>     ^ ^ ^     v--LT  1 |e.LT capacity on :  0    0    0    0|B4B3  133(B3)  457- 133= 324(B4)   133|
  1  RT--v    < < | > >   Approach 2 |  green (vph)   :                  |A3B4  324(B4)  804- 324= 480(A3)   324|
------------- L L T R R -----------|f.LT capacity in :  0    0    0    0|A3A4  612(A4)  OR   480(A3)         612|
          | T T H T T |TRACY HILLS E|  vph (b+e)      :                  |                                     |
          |   H   H   |            |g.Left turn volume :  0    0    0    0|                                    |
          | 1   1   1 |            |  in vph         :                  |                                     |
          | Approach 4:LAMMERS     |h.Is volume > cap. :                :                                     |
                                   |  (g>f) ?        :                  |                                     |
===================================+==================================+=====================================|
 Step 2. IDENTIFY VOLUMES, in vph  | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES  |
                                   |        |                  |       |                                     |
                                   |        |  8 4             |       |279(B1B2)+77(A1)+457(B3B4)+612(A4)   |
          | Approach 3|            |-------    0 5             -------|                                     |
3:  LT= 457 | |          | 2:RT=   0 |        0 4 7             ^-   0 |            = 1425 vph               |
    TH= 804 | |          |   TH=  23 |        | | |             <-  23 |=====================================|
    RT=   0 | v          |   LT= 249 |        < v >             v- 249 | Step 8. INTERSECTION LEVEL OF      |
-------------              ------------|                               |          SERVICE                    |
                         <--Approach 2 |                               |   (compare step 7 with table 6)     |
                                   |                                  |              -------                |
                                   |                                  |              | D |                  |
Approach 1-->                      |                                  |   V/C RATIO = 0.88                  |
-------------             -------------| 279 -^               < ^ >    |=====================================|
1:LT= 279  |          ^ | 4: RT=  54 | 107 ->               | | |    | Step 9. RECALCULATE                 |
  TH= 107  |          | |   TH= 612 |  70 -v                          |                                     |
  RT=  70  |          | |   LT= 133 |-------              1 6   -------|Geometric Change:                   |
          | Approach 4|            |        |             3 1 5 |    |Signal Change:                       |
                                   |        |             3 2 4 |    |Volume Change:                       |
===================================+==================================+=====================================|
Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                           |
                                   |         (two phase signal)       |                                     |
     --^ v--  B2B1                 |             | Approach 3|        |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                   |             |           |        |                                     |
   --^ AND <--    A1B2 AND         |             |           |        |                                     |
   --> OR  v--    /OR A2B1         |             |           |        |                                     |
     --> <--  A1A2                 |-------------             ------------|                                 |
                                   | Approach 1                       |                                     |
      |  <   B4B3                  |                                  |                                     |
      >  |                         |           See Step 6b.           |                                     |
   | | AND < ^    A3B4 AND         |                                  |                                     |
   v > OR  | |    /OR A4B3         |                       Approach 2 |                                     |
      |  ^   A3A4                  |-------------             ------------|                                 |
      v  |                         |             |           |        |                                     |
-----------------------------------|             |           |        |                                     |
A1 -->  A3 |    B1 v--   B3   <|   |             |           |        |                                     |
```

⑤

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                         Critical Movement Analysis: PLANNING
                                Calculation Form 1

Intersection: VALPICO/MACARTHUR                          Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
================================================================================================
Step 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR        |
          | Approach 3:MACARTHUR     |                -------Approach-----|      MULTIPHASE SIGNAL OVERLAP        |
          |  1    1 |       ^        |                : -1-  -2-  -3-  -4-|      Possible   Volume    Adjusted|
          |  R    L |       N        |a.No. of change :  0    0    0    0|Prob-  Critical  Carryover  Critical|
VALPICO   | R T T T L |              | intervals/hour :                   |able   Volume   to next    Volume |
------------ T H H H T --------------|b.LT capacity on:  0    0    0    0|Phase  in vph    phase     in vph |
 Approach 1  < < | > >    ^--RT      | change (vph)   :                   |---------------------------------------|
  1  LT--^     v v v    <^-RTH  1    |c.G/C ratio     :  0    0    0    0|B2B1   24(B1)  209-  24= 185(B2)    24|
     LTH-^>              <--TH       |d.Opposing volume: 0    0    0    0|A1B2  185(B2)  115- 185=   0(A1)   185|
       TH-->             <v-LTH      | in vph         :                   |A1A2   60(A2) OR    0(A1)             60|
  1  RTH-v>    ^ ^ ^      v--LT  1   |e.LT capacity on:  0    0    0    0|A3B4  450(A3) OR   35(B4)            450|
     RT--v   < < | > >   Approach 2  | green (vph)    :                   |A4B3  376(A4) OR   14(B3)            376|
------------ L L T R R --------------|f.LT capacity in:  0    0    0    0|                                       |
          | T T H T T |VALPICO       | vph (b+e)      :                   |                                       |
          |   H   H   |              |g.Left turn volume: 0   0    0    0|                                       |
          |     1     |              | in vph         :                   |                                       |
          | Approach 4:MACARTHUR     |h.Is volume > cap.:                 :                                       |
                                     | (g>f) ?        :                   |                                       |
=====================================+====================================+=======================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph| Step 7. SUM OF CRITICAL VOLUMES       |
                                     |      |                      |      |                                       |
                                     |      |   3                  |      |209(B1B2)+60(A2)+450(A3)+376(A4)       |
          | Approach 3|              |-------  9 6 3              -------|                                       |
3:  LT=  35 | |         | 2:RT=  26  |         0 0 5              ^+  26 |            = 1095 vph                 |
   TH= 360 | |          |   TH=  34  |         + + |              <+  34 |=======================================|
   RT=  90 | v          |   LT=  24  |         < v >              v-  24 | Step 8. INTERSECTION LEVEL OF         |
------------             -------------|                                   |           SERVICE                     |
                         <--Approach 2|                                   |      (compare step 7 with table 6)    |
                                     |                                    |                -------                |
                                     |                                    |                | B |                  |
Approach 1-->                        |                                    |                -------                |
------------             -------------| 209 -^                < ^ >      |  V/C RATIO = 0.68                     |
1:LT= 209  |            ^ | 4: RT=  46| 84 +>                 + | +      | Step 9. RECALCULATE                   |
   TH=  84  |           | |   TH= 316| 31 +v                            |                                       |
   RT=  31  |           | |   LT=  14|-------                 3  -------|Geometric Change:                      |
          | Approach 4|              |      |              1 1 4 |      |Signal Change:                         |
                                     |      |              4 6 6 |      |Volume Change:                         |
=====================================+====================================+=======================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS                              |
                                     |        (two phase signal)          |                                       |
      --^ v--  B2B1                  |            | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |            |           |           |                                       |
   --^ AND <--     A1B2 AND          |            |           |           |                                       |
   --> OR  v--     /OR A2B1          |            |           |           |                                       |
      --> <--  A1A2                  |-------------          -------------|                                       |
                                     | Approach 1                         |                                       |
       |   |   A3B4                  |                                    |                                       |
       v   >                         |          See Step 6b.              |                                       |
       <   ^   A4B3                  |                                    |                                       |
       |   |                         |                        Approach 2  |                                       |
                                     |-------------          -------------|                                       |
                                     |            |           |           |                                       |
-------------------------------------|            |           |           |                                       |
A1 -->  A3 |     B1 v--    B3    <|  |            |           |           |                                       |
        v ^                    | | | |            | Approach 4|           |                                       |
```

(6)

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: VALPICO/TRACY   Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT

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===========================================================================================
 Step 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR      |
            | Approach 3:TRACY        |               -------Approach-----|          MULTIPHASE SIGNAL OVERLAP  |
            |  1 1   1 |      ^       |               : -1-  -2-  -3-  -4-|      Possible   Volume      Adjusted|
            |  R   L   |      N       |a.No. of change  :   0    0    0    0|Prob-  Critical  Carryover  Critical|
VALPICO     | R T T T L |              |  intervals/hour :                  |able   Volume    to next    Volume |
------------ T H H H T  -------------|b.LT capacity on :   0    0    0    0|Phase  in vph    phase      in vph |
 Approach 1  < < | > >    ^--RT      |  change (vph)   :                  |-------------------------------------|
   1 LT--^    v v v     <^-RTH  1    |c.G/C ratio      :   0    0    0    0|B2B1   100(B2)  113- 100=  13(B1)   100|
     LTH-^>             <--TH   1    |d.Opposing volume :  0    0    0    0|A2B1    13(B1)  261-  13= 248(A2)    13|
   1  TH-->             <v-LTH       |  in vph         :                  |A1A2   248(A2) OR  185(A1)           248|
   1 RTH-v>   ^ ^ ^      v--LT  1    |e.LT capacity on :   0    0    0    0|B4B3   153(B4)  249- 153=  96(B3)   153|
     RT--v   < < | > >   Approach 2  |  green (vph)    :                  |A4B3    96(B3)  583-  96= 487(A4)    96|
 ----------- L L T R R  -------------|f.LT capacity in :   0    0    0    0|A3A4   487(A4) OR  454(A3)           487|
            | T T H T T |VALPICO     |  vph (b+e)      :                  |                                     |
            |  H   H   |             |g.Left turn volume :  0    0    0    0|                                     |
            | 1   1 1  |             |  in vph         :                  |                                     |
            | Approach 4:TRACY       |h.Is volume > cap. :                :                                     |
                                     |  (g>f) ?        :                  |                                     |
=====================================+==================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES    |
                                     |       |                 |        |                                     |
                                     |       | 2 2 4 1         |        |113(B2B1)+248(A2)+249(B4B3)+487(A4)  |
            | Approach 3|            |-------  5 0 5 5          -------|                                     |
3:  LT= 153 | |          | 2:RT= 261 |         3 1 4 3           ^+ 261 |          = 1097 vph                 |
   TH= 655  | |          |   TH= 261 |         + + | |           <+   0 |=====================================|
  RT= 253   | v          |   LT= 113 |         < v v >           <- 261 | Step 8. INTERSECTION LEVEL OF       |
-------------             -----------|                           v- 113 |         SERVICE                     |
                        <--Approach 2 |                                  |   (compare step 7 with table 6)     |
                                     |                                  |            -------                  |
                                     |                                  |            | B |                    |
Approach 1-->                        | 100 -^                           |            -------                  |
-------------             -----------| 185 ->           < ^ ^ >         | V/C RATIO = 0.68                    |
1:LT= 100   |           ^ | 4: RT= 107 |  65 +>          | | + +         |=====================================|
  TH= 250   |          | |   TH=1058 | 120 +v                           | Step 9. RECALCULATE                 |
  RT= 120   |          | |   LT= 249 |-------           2 5 4 1  -------|Geometric Change:                    |
            | Approach 4|             |       |          4 8 7 0 |      |Signal Change:                        |
                                     |       |          9 3 6 7 |      |Volume Change:                        |
=====================================+==================================+=====================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                           |
                                     |        (two phase signal)        |                                     |
      --^ v--  B2B1                  |          | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                     |          |           |           |                                     |
   --^ AND <--    A1B2 AND           |          |           |           |                                     |
   --> OR  v--    /OR A2B1           |          |           |           |                                     |
      --> <--  A1A2                  |-------------       ------------ |                                     |
                                     | Approach 1                       |                                     |
        |  <   B4B3                  |                                  |                                     |
        >  |                         |       See Step 6b.               |                                     |
   | | AND < ^    A3B4 AND           |                                  |                                     |
   v > OR  | |    /OR A4B3           |                    Approach 2    |                                     |
        |  ^   A3A4                  |-------------       ------------ |                                     |
        v  |                         |          |           |           |                                     |
-------------------------------------|          |           |           |                                     |
A1 -->  A3 |     B1 v--    B3   <|   |          |           |           |                                     |
```

(7)

```
                         Critical Movement Analysis: PLANNING
                                  Calculation Form 1
Intersection: VALPICO / CORRAL HOLLOW                          Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
=========================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK           | Step 6b. VOLUME ADJUSTMENT FOR    |
           | Approach 3:CORRAL HOLLOW|                ------Approach-----|       MULTIPHASE SIGNAL OVERLAP  |
           |  1 1   1 |      ^       |               : -1-  -2-  -3- -4-|      Possible   Volume    Adjusted|
           |  R   L   |      N       |a.No. of change  :   0    0    0   0|Prob-  Critical  Carryover  Critical|
VALPICO    | R T T T L |             | intervals/hour :                   |able   Volume   to next    Volume |
------------ T H H H T  -------------|b.LT capacity on :   0    0    0   0|Phase  in vph    phase     in vph |
 Approach 1   < < | > >   ^--RT      | change (vph)   :                   |------------------------------------|
  1 LT--^      v v v     <^-RTH  1   |c.G/C ratio      :   0    0    0   0|B2B1   32(B2)  252-  32= 220(B1)   32|
    LTH-^>               <--TH   1   |d.Opposing volume :  0    0    0   0|A2B1  220(B1)   68- 220=   0(A2)  220|
  1  TH-->               <v-LTH      | in vph          :                   |A1A2  195(A1) OR    0(A2)          195|
  1 RTH-v>     ^ ^ ^      v--LT  1   |e.LT capacity on :   0    0    0   0|B4B3   35(B4) 117-  35=  82(B3)   35|
    RT--v     < < | > >  Approach 2  | green (vph)     :                   |A4B3   82(B3) 411-  82= 329(A4)   82|
------------ L L T R R  -------------|f.LT capacity in :   0    0    0   0|A3A4  329(A4) OR  287(A3)         329|
           | T T H T T |VALPICO      | vph (b+e)       :                   |                                    |
           |   H   H   |             |g.Left turn volume :  0    0    0   0|                                   |
           | 1   1 1   |             | in vph          :                   |                                    |
           | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :                 :                                    |
                                     | (g>f) ?         :                   |                                    |
=====================================+===================================+====================================|
 Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES  |
                                     |      |                     |       |                                    |
                                     |      |  2 2                |       |252(B2B1)+195(A1)+117(B4B3)+329(A4) |
           | Approach 3|             |-------  2 6 8 3          -------|                                    |
3:  LT=  35 | |         | 2:RT=  29  |         3 4 7 5              ^+  29 |          = 893 vph                 |
   TH= 550  | |         |   TH= 106  |         + + | |              <+  39 |====================================|
   RT=  23  | v         |   LT= 252  |         < v v >              <-  68 | Step 8. INTERSECTION LEVEL OF      |
-------------            -------------|                             v- 252 |        SERVICE                     |
                        <--Approach 2 |                                    |   (compare step 7 with table 6)    |
                                      |                                    |            -------                 |
                                      |                                    |            | A |                   |
Approach 1-->                         | 32 -^                              |            -------                 |
-------------            -------------| 195 ->             < ^ ^ >         |====================================|
1:LT=  32   |          ^ | 4: RT= 183 |  31 +>             | | + +         | Step 9. RECALCULATE                |
  TH= 225   |         | | |  TH= 638  | 164 +v                             |                                    |
  RT= 164   |         | | |  LT= 117  |-------             1 4 2 1 -------|Geometric Change:                   |
            | Approach 4|             |      |             1 1 2 8 |      |Signal Change:                      |
                                      |      |             7 1 8 3 |      |Volume Change:                      |
======================================+===================================+====================================|
 Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS                          |
                                      |        (two phase signal)          |                                    |
      --^ v--  B2B1                   |          | Approach 3|             |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                      |          |           |             |                                    |
   --^ AND <--     A1B2 AND           |          |           |             |                                    |
   --> OR  v--     /OR A2B1           |          |           |             |                                    |
      -^> <--  A1A2                   |-------------      -------------|                                    |
                                      | Approach 1                         |                                    |
       |  <    B4B3                   |                                    |                                    |
       >  |                           |          See Step 6b.              |                                    |
   | | AND < ^     A3B4 AND           |                                    |                                    |
   v > OR  | |     /OR A4B3           |                        Approach 2  |                                    |
       |  ^    A3A4                   |-------------        ------------|                                    |
       v  |                           |          |           |             |                                    |
--------------------------------------|          |           |             |                                    |
 A1 -->   A3 |     B1 v--    B3  <|   |          |           |             |                                    |
```

V/C RATIO = 0.55

Critical Movement Analysis: PLANNING

Calculation Form 1

```
Intersection: VALPICO/LAMMERS                                                   Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT (UNMITIGATED)
=======================================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK              | Step 6b. VOLUME ADJUSTMENT FOR      |
              | Approach 3:LAMMERS       |                   -------Approach-----|         MULTIPHASE SIGNAL OVERLAP   |
              | 1   2   1 |      ^       |                   : -1-  -2-  -3-  -4-|   Possible    Volume      Adjusted|
              |   R   L   |      N       |a.No. of change    :   0    0    0    0|Prob-  Critical  Carryover  Critical|
VALPICO       | R T T T L |              |  intervals/hour   :                   |able    Volume   to next     Volume |
-------------  T H H H T  ---------------|b.LT capacity on   :   0    0    0    0|Phase   in vph    phase      in vph |
 Approach 1    < < | > >   ^--RT  1      |  change (vph)     :                   |-------------------------------------|
   1  LT--^      v v v    <^-RTH         |c.G/C ratio        :   0    0    0    0|B2B1    23(B2)  26-  23=  3(B1)   23|
     LTH-^>               <--TH   1      |d.Opposing volume  :   0    0    0    0|A2B1     3(B1)  10-   3=  7(A2)    3|
   1   TH-->              <v-LTH         |  in vph           :                   |A1A2    25(A1) OR     7(A2)       25|
     RTH-v>     ^ ^ ^      v--LT  1      |e.LT capacity on   :   0    0    0    0|B4B3     0(B3)  612-   0= 612(B4)  0|
   1  RT--v    < < | > >   Approach 2    |  green (vph)      :                   |A3B4   612(B4)  657- 612=  45(A3) 612|
-------------  L L T R R  ---------------|f.LT capacity in   :   0    0    0    0|A3A4   698(A4) OR    45(A3)      698|
             | T T H T T |VALPICO        |  vph (b+e)        :                   |                                     |
             |   H   H   |               |g.Left turn volume :   0    0    0    0|                                     |
             | 1   2   1 |               |  in vph           :                   |                                     |
             | Approach 4:LAMMERS        |h.Is volume > cap. :                   :                                     |
                                         |  (g>f) ?          :                   |                                     |
=========================================+=======================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph         | Step 5. ASSIGN LANE VOLUMES, in vph   | Step 7. SUM OF CRITICAL VOLUMES     |
                                         |      |                     |          |                                     |
                                         |      |  6 6 6              |          |26(B2B1)+25(A1)+612(B3B4)+698(A4)    |
              | Approach 3|              |-------   5 5 1             -------|                                     |
3:  LT= 612 | |          | 2:RT=   0     |        0 7 7 2             ^-   0   |          = 1361 vph                 |
  TH=1313 | |            |   TH=  10     |        | | | |             <-  10   |=====================================|
  RT=   0 | v            |   LT=  26     |        < v v >             v-  26   | Step 8. INTERSECTION LEVEL OF       |
-------------          ------------------|                                       |          SERVICE                    |
                        <--Approach 2    |                                       |     (compare step 7 with table 6)   |
                                         |                                       |             -------                 |
                                         |                                       |             | D |                   |
Approach 1-->                            |                                       |             -------                 |
-------------          ------------------| 23 -^              < ^ ^ >            | V/C RATIO = 0.84                    |
1:LT=  23   |            ^ | 4: RT=   7  | 25 ->              | | | |            | Step 9. RECALCULATE                 |
  TH=  25   |            | |    TH=1396  |  0 -v                                 |                                     |
  RT=   0   |            | |    LT=   0  |-------              6 6        -------|Geometric Change:                    |
            | Approach 4|                |      |              9 9      |        |Signal Change:                       |
                                         |      |            0 8 8 7    |        |Volume Change:                       |
=========================================+=======================================+=====================================|
Step 3. IDENTIFY PHASING                 | Step 6a. CRITICAL VOLUMES, in vph     | COMMENTS                            |
                                         |        (two phase signal)             |                                     |
        --^ v--  B2B1                    |          | Approach 3|                |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                         |          |           |                |                                     |
    --^ AND <---     A1B2 AND            |          |           |                |                                     |
    --> OR  v--      /OR A2B1            |          |           |                |                                     |
        --> <--  A1A2                    |-------------        -------------|                                     |
                                         | Approach 1                            |                                     |
         |   <   B4B3                    |                                       |                                     |
         >   |                           |         See Step 6b.                  |                                     |
    | | AND < ^      A3B4 AND            |                                       |                                     |
    v > OR  | |      /OR A4B3            |                        Approach 2     |                                     |
         |   ^   A3A4                    |-------------        -------------|                                     |
         v   |                           |          |           |                |                                     |
-----------------------------------------|          |           |                |                                     |
A1 -->   A3 |      B1 v--     B3    <|   |          |           |                |                                     |
          v ^                        | | |          | Approach 4|                | Exclusive right turns reduced 0 %   |
```

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Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: VALPICO/LAMMERS — Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT (MITIGATED)

```
Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK            | Step 6b. VOLUME ADJUSTMENT FOR        |
         | Approach 3:LAMMERS           |               -------Approach-----|        MULTIPHASE SIGNAL OVERLAP       |
         | 1   2   2 |       ^          |               : -1-  -2-  -3-  -4-|      Possible    Volume      Adjusted|
         |   R   L   |       N          |a.No. of change :  0    0    0    0|Prob-  Critical   Carryover   Critical|
ALPICO   | R T T T L |                  |  intervals/hour :                 |able   Volume    to next     Volume  |
------------- T H H H T -------------   |b.LT capacity on :  0    0    0    0|Phase  in vph     phase      in vph  |
Approach 1    < < | > >    ^--RT  1     |  change (vph)   :                 |--------------------------------------|
  1 LT--^       v v v     <^-RTH        |c.G/C ratio      :  0    0    0    0|B2B1    23(B2)   26-  23=   3(B1)   23|
    LTH-^>                <--TH   1     |d.Opposing volume:  0    0    0    0|A2B1     3(B1)   10-   3=   7(A2)    3|
  1  TH-->                <v-LTH        |  in vph         :                 |A1A2    25(A1)  OR     7(A2)         25|
    RTH-v>      ^ ^ ^      v--LT  1     |e.LT capacity on :  0    0    0    0|B4B3     0(B3)  337-   0= 337(B4)    0|
  1 RT--v     < < | > >   Approach 2    |  green (vph)    :                 |A3B4   337(B4)  657- 337= 320(A3)  337|
------------- L L T R R -------------   |f.LT capacity in :  0    0    0    0|A3A4   698(A4)  OR   320(A3)        698|
         | T T H T T |VALPICO           |  vph (b+e)      :                 |                                      |
         |   H   H   |                  |g.Left turn volume: 0    0    0    0|                                      |
         | 1   2   1 |                  |  in vph         :                 |                                      |
         | Approach 4:LAMMERS           |h.Is volume > cap.:                :|                                      |
                                        |  (g>f) ?        :                 |                                      |
========================================+===================================+======================================|
Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph| Step 7. SUM OF CRITICAL VOLUMES      |
                                        |     |                     |       |                                      |
                                        |     |   6 6 2 3           |       |26(B2B1)+25(A1)+337(B3B4)+698(A4)     |
         | Approach 3|                  |-------  5 5 7 3       -------     |                                      |
3: LT= 612 | |        | 2:RT=   0       |        0 7 7 5 7        ^-   0   |          = 1086 vph                  |
  TH=1313  | |        |   TH=  10       |        | | | | |        <-  10   |======================================|
  RT=   0  | v        |   LT=  26       |        < v v > >        v-  26   | Step 8. INTERSECTION LEVEL OF        |
-------------                -------------|                                 |          SERVICE                     |
                         <--Approach 2  |                                   |     (compare step 7 with table 6)   |
                                        |                                   |              -------                 |
                                        |                                   |              | B |                   |
Approach 1-->                           |                                   |              -------                 |
-------------                -------------| 23 -^              < ^ ^ >      | V/C RATIO = 0.67                     |
1:LT=  23  |          ^ | 4: RT=   7    | 25 ->              | | | |      | Step 9. RECALCULATE                  |
  TH=  25  |          | |    TH=1396    |  0 -v                             |                                      |
  RT=   0  |          | |   LT=   0     |-------              6 6   -------|Geometric Change:                     |
         | Approach 4|                  |     |               9 9   |      |Signal Change:                        |
                                        |     |             0 8 8 7 |      |Volume Change:                        |
========================================+===================================+======================================|
Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                             |
                                        |        (two phase signal)         |                                      |
     --^ v--   B2B1                     |           | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                        |           |           |           |                                      |
   --^ AND <--    A1B2 AND              |           |           |           |                                      |
   --> OR  v--    /OR A2B1              |           |           |           |                                      |
     --> <--   A1A2                     |-------------     -------------    |                                      |
                                        |  Approach 1                       |                                      |
       |  <    B4B3                     |                                   |                                      |
       >  |                             |       See Step 6b.                |                                      |
   | | AND < ^    A3B4 AND              |                                   |                                      |
   v > OR  | |    /OR A4B3              |                      Approach 2   |                                      |
       |  ^    A3A4                     |-------------     -------------    |                                      |
       v  |                             |           |           |           |                                      |
----------------------------------------|           |           |           |                                      |
 A1 -->   A3 |      B1 v--    B3    <|  |           |           |           |                                      |
```

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```
                              Critical Movement Analysis: PLANNING
                                       Calculation Form 1
ntersection: SCHULTE/MACARTHUR                                    Design Hour: PM PEAK
roblem Statement: TRACY GATEWAY 2025 PLUS PROJECT
===============================================================================================
Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR      |
          | Approach 3:MACARTHUR   |                -------Approach-----|        MULTIPHASE SIGNAL OVERLAP    |
          | 1   2   1 |     ^      |                  : -1-  -2-  -3-  -4-|      Possible    Volume    Adjusted|
          |   R   L   |     N      |a.No. of change   :  0    0    0    0|Prob-  Critical  Carryover  Critical|
CHULTE    | R T T T L |            |  intervals/hour  :                 |able   Volume    to next    Volume |
------------ T H H H T  -------------|b.LT capacity on  :  0    0    0    0|Phase  in vph     phase     in vph |
 Approach 1   < < | > >   ^--RT    |  change (vph)    :                 |------------------------------------|
  1  LT--^     v v v     <^-RTH  1 |c.G/C ratio       :  0    0    0    0|B2B1    61(B1)  182-  61= 121(B2)  61|
     LTH-^>              <--TH     |d.Opposing volume :  0    0    0    0|A1B2   121(B2)  301- 121= 180(A1) 121|
  1   TH-->              <v-LTH    |  in vph          :                 |A1A2   180(A1)  OR  151(A2)       180|
     RTH-v>    ^ ^ ^      v--LT  1 |e.LT capacity on  :  0    0    0    0|A3B4   309(A3)  OR   12(B4)       309|
  1  RT--v    < < | > >  Approach 2 |  green (vph)     :                 |A4B3   368(B3)  OR  363(A4)       368|
------------ L L T R R  -------------|f.LT capacity in  :  0    0    0    0|                                     |
          | T T H T T |SCHULTE     |  vph (b+e)       :                 |                                     |
          |   H   H   |            |g.Left turn volume :  0    0    0    0|                                     |
          | 1   1 1   |            |  in vph          :                 |                                     |
          | Approach 4:MACARTHUR   |h.Is volume > cap. :                 :                                     |
                                   |  (g>f) ?         :                 |                                     |
==================================+=================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph   | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES     |
                                   |       |                    |     |                                     |
                                   |       | 1 3 3              |     |182(B1B2)+180(A1)+309(A3)+368(B3)    |
          | Approach 3|            |-------  8 0 0 1             -------|                                     |
3:  LT=  12 | |       | 2:RT=  11  |         6 9 9 2              ^+  11 |          = 1039 vph                 |
  TH= 617 | |         |   TH= 140  |         | | | |              <+ 140 |=====================================|
 RT= 186  | v         |   LT=  61  |         < v v >              v-  61 | Step 8. INTERSECTION LEVEL OF       |
------------            -------------|                                    |          SERVICE                    |
                       <--Approach 2 |                                    |   (compare step 7 with table 6)     |
                                   |                                     |             -------                 |
                                   |                                     |             ! B !                   |
Approach 1-->                      |                                     | V/C RATIO = 0.64   -------          |
------------            -------------| 182 -^              < ^ ^ >        |=====================================|
1:LT= 182  |          ^ | 4: RT= 161 | 301 ->              | | + +        | Step 9. RECALCULATE                 |
 TH= 301   |          | |   TH= 564  |  99 -v                             |                                     |
 RT=  99   |          | |   LT= 368  |-------              3 3 2 1  -------|Geometric Change:                    |
          | Approach 4|            |       |             6 6 0 6 |       |Signal Change:                       |
                                   |       |             8 3 2 1 |       |Volume Change:                       |
==================================+=================================+=====================================|
Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                            |
                                   |          (two phase signal)      |                                     |
     --^ v--  B2B1                 |         | Approach 3|            |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                   |         |           |            |                                     |
  --^ AND <--     A1B2 AND         |         |           |            |                                     |
  --> OR  v--     /OR A2B1         |         |           |            |                                     |
     --> <--  A1A2                 |-------------        -------------|                                     |
                                   | Approach 1                       |                                     |
       |   |  A3B4                 |                                  |                                     |
       v   >                       |         See Step 6b.             |                                     |
       <   ^  A4B3                 |                                  |                                     |
       |   |                       |                      Approach 2  |                                     |
                                   |-------------        -------------|                                     |
                                   |         |           |            |                                     |
-----------------------------------|         |           |            |                                     |
A1 -->   A3 |     B1 v--    B3   <|  |         |           |            |                                     |
```

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: SCHULTE / TRACY   Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT

```
==========================================================================================================
Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK              | Step 6b. VOLUME ADJUSTMENT FOR        |
            | Approach 3:TRACY          |                 -------Approach-----|          MULTIPHASE SIGNAL OVERLAP    |
            | 1   2   1 |      ^        |                   : -1- -2- -3- -4-|      Possible    Volume      Adjusted|
            |  R   L    |      N        |a.No. of change    :  0   0   0    0|Prob-  Critical  Carryover   Critical|
SCHULTE     | R T T T L |               |  intervals/hour , :                |able    Volume    to next     Volume |
------------  T H H H T  ---------------|b.LT capacity on   :  0   0   0    0|Phase   in vph     phase      in vph |
Approach 1    < < | > >    ^--RT  1     |  change (vph)     :                |-------------------------------------|
 1 LT--^       v v v     <^-RTH         |c.G/C ratio        :  0   0   0    0|B2B1   50(B1)  147-  50=  97(B2)    50|
   LTH-^>               <--TH   2       |d.Opposing volume  :  0   0   0    0|A1B2   97(B2)  292-  97= 195(A1)    97|
 2  TH-->               <v-LTH          |  in vph           :                |A1A2  199(A2)  OR   195(A1)         199|
   RTH-v>     ^ ^ ^      v--LT  1       |e.LT capacity on   :  0   0   0    0|B4B3   70(B3)  251-  70= 181(B4)    70|
 1 RT--v      < < | > >  Approach 2     |  green (vph)      :                |A3B4  181(B4)  447- 181= 266(A3)   181|
------------  L L T R R  ---------------|f.LT capacity in   :  0   0   0    0|A3A4  574(A4)  OR   266(A3)         574|
            | T T H T T |SCHULTE        |  vph (b+e)        :                |                                     |
            |  H   H    |               |g.Left turn volume :  0   0   0    0|                                     |
            | 1   2   1 |               |  in vph           :                |                                     |
            | Approach 4:TRACY          |h.Is volume > cap. :                :                                     |
                                        |  (g>f) ?          :                |                                     |
========================================+====================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES      |
                                        |      |                     |        |                                     |
                                        |      |  4 4 2              |        |147(B1B2)+199(A2)+251(B3B4)+574(A4)  |
            | Approach 3|               |------- 1 4 4 5           -------|                                     |
3: LT= 251 | |          | 2:RT=   0     |        5 7 7 1           ^-   0 |          = 1171 vph                 |
   TH= 894 | |          |   TH= 397     |        | | | |          <- 199 |=====================================|
   RT=  15 | v          |   LT=  50     |        < v v >          <- 199 | Step 8. INTERSECTION LEVEL OF        |
------------            ----------------|                          v-  50 |          SERVICE                    |
                        <--Approach 2   |                                 |     (compare step 7 with table 6)   |
                                        |                                 |              -------                |
                                        |                                 |              | C |  [handwritten]   |
Approach 1-->                           | 147 -^                          |  V/C RATIO = 0.72  [handwritten]    |
------------            ----------------| 292 ->             < ^ ^ >      |=====================================|
1:LT= 147  |            ^ | 4: RT=   6  | 292 ->             | | | |      | Step 9. RECALCULATE                  |
  TH= 583  |            | |    TH=1147  |   0 -v                          |                                     |
  RT=   0  |            | |    LT=  70  |-------              5 5  -------|Geometric Change:                    |
           | Approach 4|                |      |            7 7 7 |       |Signal Change:                       |
                                        |      |            0 4 4 6 |     |Volume Change:                       |
========================================+====================================+=====================================|
Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS                             |
                                        |       (two phase signal)            |                                     |
      --^ v--  B2B1                     |          | Approach 3|              |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                        |          |           |              |                                     |
   --^ AND <--     A1B2 AND             |          |           |              |                                     |
   --> OR  v--     /OR A2B1             |          |           |              |                                     |
      --> <--  A1A2                     |-------------       -------------|                                     |
                                        | Approach 1                          |                                     |
       |  <    B4B3                     |                                     |                                     |
       >  |                             |          See Step 6b.               |                                     |
   | | AND < ^     A3B4 AND             |                                     |                                     |
   v > OR  | |     /OR A4B3             |                      Approach 2     |                                     |
       |  ^    A3A4                     |-------------       -------------|                                     |
       v  |                             |          |           |              |                                     |
----------------------------------------|          |           |              |                                     |
A1 -->   A3 |     B1 v--    B3    <|    |          |           |              |                                     |
```

```
                              Critical Movement Analysis: PLANNING
                                     Calculation Form 1

Intersection: SCHULTE / LAMMERS                                      Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
=====================================================================================================
 Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK              | Step 6b. VOLUME ADJUSTMENT FOR      |
            | Approach 3:LAMMERS         |                  -------Approach-----|        MULTIPHASE SIGNAL OVERLAP    |
            |    2   1 |       ^         |                  : -1-  -2-  -3-  -4-|        Possible    Volume    Adjusted|
            |   R   L  |       N         |a.No. of change   :  0    0    0     0|Prob-   Critical   Carryover  Critical|
SCHULTE     | R T T T L |                |  intervals/hour  :                   |able    Volume     to next    Volume |
------------- T H H H T -----------------|b.LT capacity on  :  0    0    0     0|Phase   in vph     phase      in vph |
 Approach 1   < < | > >   ^--RT  1       |  change (vph)    :                   |-------------------------------------|
     LT--^       v v v   <^-RTH          |c.G/C ratio       :  0    0    1     1|A2B1    74(B1) OR   0(A2)           74|
     LTH-^>               <--TH          |d.Opposing volume :  0    0 1533  1743|A3A4   872(A3) OR 744(A4)          872|
      TH-->               <v-LTH         |  in vph          :                   |                                     |
     RTH-v>      ^ ^ ^     v--LT  1      |e.LT capacity on  :  0    0    0     0|                                     |
     RT--v    < < | > >   Approach 2     |  green (vph)     :                   |                                     |
------------- L L T R R -----------------|f.LT capacity in  :  0    0    0     0|                                     |
            | T T H T T |SCHULTE         |  vph (b+e)       :                   |                                     |
            |   H   H   |                |g.Left turn volume :  0    0  390    0|                                     |
            |    2   1  |                |  in vph          :                   |                                     |
            | Approach 4:LAMMERS         |h.Is volume > cap. :  NO      YES  NO:                                     |
                                         |  (g>f) ?         :                   |                                     |
=========================================+======================================+=====================================|
 Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph  | Step 7. SUM OF CRITICAL VOLUMES     |
                                         |       |                    |         |                                     |
                                         |       | 8 8 3              |         |74(B1)+872(A3)+0()+0()               |
            | Approach 3|                |-------  7 7 9              -------   |                                     |
3:  LT= 390 | |          | 2:RT=    0    |         2 2 0              ^-    0   |           = 946 vph                 |
   TH=1743  | |          |   TH=    0    |         | | |              v-   74   |=====================================|
   RT=    0 | v          |   LT=   74    |         v v >                        | Step 8. INTERSECTION LEVEL OF       |
-------------             ---------------|                                      |         SERVICE                     |
                         <--Approach 2   |                                      |     (compare step 7 with table 6)   |
                                         |                                      |             -------                 |
                                         |                                      |              | A |                  |
Approach 1-->                            |                                      |   V/C RATIO = 0.54                  |
-------------             ---------------|                        ^ ^ >         |=====================================|
1:LT=   0   |           ^ | 4: RT=  45   |                        | | |         | Step 9. RECALCULATE                 |
  TH=   0   |          | |    TH=1488    |                                      |                                     |
  RT=   0   |          | |    LT=    0   |-------                 7 7   -------|Geometric Change:                   |
            | Approach 4|                |       |                4 4 4 |       |Signal Change:                       |
                                         |       |                4 4 5 |       |Volume Change:                       |
=========================================+======================================+=====================================|
 Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph    | COMMENTS                            |
                                         |         (two phase signal)           |                                     |
            <--  A2B1                    |                | Approach 3|         |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
            v--                          |                |           |         |                                     |
          |  ^   A3A4                    |                |           |         |                                     |
          v  |                           |                | 872       |         |                                     |
                                         |-------------   |        -------------|                                     |
                                         |  Approach 1    |                     |                                     |
                                         |                v       v----  74     |                                     |
                                         |                                      |                                     |
                                         |            ----                      |                                     |
                                         |                        |  Approach 2 |                                     |
                                         |-------------           | ------------|                                     |
                                         |                |           |         |                                     |
-----------------------------------------|                |           |         |                                     |
 A1 -->    A3 |      B1 v--    B3   <|   |                |           |         |                                     |
```

```
                         Critical Movement Analysis: PLANNING
                                  Calculation Form 1

Intersection: OLD WEST SCHULTE / LAMMERS                         Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
==============================================================================================
 Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR   |
            | Approach 3:LAMMERS    |             -------Approach-----|      MULTIPHASE SIGNAL OVERLAP   |
            | 1   2    |     ^      |                 : -1- -2- -3- -4-|    Possible   Volume    Adjusted|
            |  R  L    |     N      |a.No. of change  :  0   0   0   0|Prob-  Critical  Carryover Critical|
OLD WEST SCHU| R T T T L |          | intervals/hour  :               |able   Volume   to next   Volume |
------------- T H H H T ------------|b.LT capacity on :  0   0   0   0|Phase  in vph    phase    in vph |
 Approach 1   < < | > >   ^--RT     | change (vph)    :               |----------------------------------|
  1  LT--^     v v v     <^-RTH     |c.G/C ratio      :  0   0   1   1|A1B2   214(B2) OR  26(A1)      214|
     LTH-^>              <--TH      |d.Opposing volume:  0  26 1355 1551|A3A4 776(A3) OR 678(A4)      776|
      TH-->              <v-LTH     | in vph          :               |                                  |
     RTH-v>    ^ ^ ^      v--LT     |e.LT capacity on :  0   0   0   0|                                  |
  1  RT--v    < < | > >  Approach 2 | green (vph)     :               |                                  |
------------- L L T R R ------------|f.LT capacity in :  0   0   0   0|                                  |
            | T T H T T |OLD WEST SCHU| vph (b+e)     :               |                                  |
            |  H   H   |            |g.Left turn volume:  0   0   0  45|                                  |
            | 1   2    |            | in vph          :               |                                  |
            | Approach 4:LAMMERS    |h.Is volume > cap.:    NO  NO  YES:                                  |
                                    | (g>f) ?         :               |                                  |
====================================+=================================+==================================|
 Step 2. IDENTIFY VOLUMES, in vph   | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                    |      |                 |        |                                  |
                                    |      |   7 7           |        |214(B2)+776(A3)+0()+0()           |
            | Approach 3|           |-------   7 7            -------|                                  |
3:  LT=   0 | |        | 2:RT=  0   |        0 6 6                    |            = 990 vph             |
   TH=1551  | |        |   TH=  0   |        | | |                    |==================================|
  RT=   0   | v        |   LT=  0   |        < v v                    | Step 8. INTERSECTION LEVEL OF    |
-------------          -------------|                                 |         SERVICE                  |
                    <--Approach 2   |                                 |    (compare step 7 with table 6) |
                                    |                                 |             -------              |
                                    |                                 |             | A |              |
 Approach 1-->                      |                                 |  V/C RATIO = 0.56                |
-------------          -------------|                      < ^ ^      |==================================|
 1:LT= 214  |        ^ | 4: RT=  0  | 214 -^               | | |      | Step 9. RECALCULATE              |
   TH=   0  |        | |   TH=1355  |  26 -v                          |                                  |
  RT=  26   |        | |   LT=  45  |-------                 6 6 -------|Geometric Change:                 |
            | Approach 4|           |      |               4 7 7 |    |Signal Change:                    |
                                    |      |               5 8 8 |    |Volume Change:                    |
====================================+=================================+==================================|
 Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                       |
                                    |        (two phase signal)       |                                  |
      --^      A1B2                 |          | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
      -->                           |          |           |          |                                  |
       |   ^   A3A4                 |          |           |          |                                  |
       v   |                        |          |  776      |          |                                  |
                                    |-------------  |      ------------|                                 |
                                    | Approach 1    |                 |                                  |
                                    |               v      ----       |                                  |
                                    |                                 |                                  |
                                    |       214----^                  |                                  |
                                    |                    | Approach 2 |                                  |
                                    |-------------       | -----------|                                  |
                                    |          |         |            |                                  |
------------------------------------|          |         |            |                                  |
 A1 -->   A3 |     B1 v--    B3   <|  |          |         |            |                                  |
```

```
                          Critical Movement Analysis: PLANNING
                                  Calculation Form 1

Intersection: 11TH / TRACY                                   Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT
==============================================================================================
Step 1. IDENTIFY LANE GEOMETRY   | Step 4. LEFT TURN CHECK         | Step 6b. VOLUME ADJUSTMENT FOR  |
          | Approach 3:TRACY     |              -------Approach-----|       MULTIPHASE SIGNAL OVERLAP |
          | 1   2   2 |     ^    |              : -1-  -2-  -3-  -4-|      Possible  Volume    Adjusted|
          |   R   L   |     N    |a.No. of change  :   0    0    0    0|Prob-  Critical  Carryover  Critical|
11TH      | R T T T L |          | intervals/hour  :                 |able    Volume   to next    Volume |
------------ T H H H T ----------|b.LT capacity on :   0    0    0    0|Phase   in vph    phase     in vph |
Approach 1   < < | > >   ^--RT 1 | change (vph)    :                 |---------------------------------|
  2 LT--^     v v v    <^-RTH    |c.G/C ratio      :   0    0    0    0|B2B1    91(B1)  129-  91=  38(B2)   91|
    LTH-^>             <--TH  2  |d.Opposing volume :  0    0    0    0|A1B2    38(B2)  434-  38= 396(A1)   38|
  2  TH-->             <v-LTH    | in vph          :                 |A1A2   396(A1) OR  383(A2)        396|
    RTH-v>    ^ ^ ^     v--LT 2  |e.LT capacity on :   0    0    0    0|B4B3    52(B4)  374-  52= 322(B3)   52|
  1 RT--v    < < | > >  Approach 2| green (vph)     :                 |A4B3   322(B3)  387- 322=  65(A4)  322|
------------ L L T R R ----------|f.LT capacity in :   0    0    0    0|A3A4   358(A3) OR   65(A4)        358|
          | T T H T T |11TH      | vph (b+e)       :                 |                                 |
          |   H   H   |          |g.Left turn volume :  0    0    0    0|                                 |
          | 2   2   1 |          | in vph          :                 |                                 |
          | Approach 4:TRACY     |h.Is volume > cap. :               :                                 |
                                 | (g>f) ?         :                 |                                 |
=================================+=================================+=================================|
Step 2. IDENTIFY VOLUMES, in vph | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                 |      |                     |      |                                 |
                                 |      | 2 3 3               |      |129(B1B2)+396(A1)+374(B4B3)+358(A3)|
          | Approach 3|          |-------  0 5 5 4 5          -------|                                 |
3:  LT=  94 | |      | 2:RT=  35 |         0 8 8 2 2          ^-  35 |          = 1257 vph             |
  TH= 715 | |        |  TH= 765  |         | | | | |         <- 383 |=================================|
  RT= 200 | v        |  LT= 165  |         < v v > >         <- 383 | Step 8. INTERSECTION LEVEL OF   |
------------          -----------|                             v-  75 |         SERVICE                 |
                    <--Approach 2|                             v-  91 |   (compare step 7 with table 6) |
                                 |                                   |            -------              |
                                 | 129 -^                            |            | C |              |
Approach 1-->                    | 105 -^                            |            -------              |
------------          -----------| 434 ->         < < ^ ^ >          | V/C RATIO = 0.78                |
1:LT= 234  |         ^ | 4: RT=  30 | 434 ->         | | | | |          |=================================|
  TH= 868  |         | |  TH= 774 | 236 -v                           | Step 9. RECALCULATE             |
  RT= 236  |         | |  LT= 679 |-------         3 3 3 3     -------|Geometric Change:                |
          | Approach 4|          |      |          7 0 8 8 3 |        |Signal Change:                   |
                                 |      |          4 6 7 7 0 |        |Volume Change:                   |
=================================+=================================+=================================|
Step 3. IDENTIFY PHASING         | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                        |
                                 |        (two phase signal)        |                                 |
     --^ v--  B2B1               |          | Approach 3|           |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                 |          |           |           |                                 |
   --^ AND <--     A1B2 AND      |          |           |           |                                 |
   --> OR  v--     /OR A2B1      |          |           |           |                                 |
     --> <--  A1A2               |-------------    -------------|                                 |
                                 | Approach 1                       |                                 |
      |  <    B4B3               |                                  |                                 |
      >  |                       |          See Step 6b.            |                                 |
   | | AND < ^     A3B4 AND      |                                  |                                 |
   v > OR  | |     /OR A4B3      |                       Approach 2 |                                 |
      |  ^    A3A4               |-------------    -------------|                                 |
      v  |                       |          |           |           |                                 |
---------------------------------|          |           |           |                                 |
A1 -->  A3 |    B1 v--    B3  <| |          |           |           |                                 |
       v ^                 | | | |          | Approach 4|           | Exclusive right turns reduced 0 % |
```

Critical Movement Analysis: PLANNING

Calculation Form 1

ntersection: 11TH/CORRAL HOLLOW   Design Hour: PM PEAK

roblem Statement: TRACY GATEWAY 2025 PLUS PROJECT (UNMITIGATED)

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===============================================================================================
tep 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR    |
           | Approach 3:CORRAL HOLLOW|              -------Approach-----|       MULTIPHASE SIGNAL OVERLAP   |
           | 1   3   2 |      ^     |                : -1-  -2-  -3-  -4-|     Possible    Volume     Adjusted|
           |   R   L   |      N     |a.No. of change  :   0    0    0    0|Prob-  Critical  Carryover  Critical|
TH         | R T T T L |            |  intervals/hour :                   |able    Volume   to next    Volume |
----------- T H H H T  -------------|b.LT capacity on :   0    0    0    0|Phase   in vph    phase     in vph |
Approach 1  < < | > >   ^--RT  1    |  change (vph)   :                   |-----------------------------------|
  2  LT--^   v v v     <^-RTH       |c.G/C ratio      :   0    0    0    0|B2B1   119(B2)  259- 119= 140(B1)   119|
     LTH-^>            <--TH   2    |d.Opposing volume :  0    0    0    0|A2B1   140(B1)  377- 140= 237(A2)   140|
  2   TH-->            <v-LTH       |  in vph         :                   |A1A2   535(A1)  OR  237(A2)          535|
     RTH-v>   ^ ^ ^     v--LT  2    |e.LT capacity on :   0    0    0    0|B4B3    30(B3)  200-  30= 170(B4)    30|
  1  RT--v  < < | > >   Approach 2  |  green (vph)    :                   |A3B4   170(B4)  419- 170= 249(A3)   170|
----------- L L T R R  -------------|f.LT capacity in :   0    0    0    0|A3A4   405(A4)  OR  249(A3)          405|
           | T T H T T |11TH        |  vph (b+e)      :                   |                                   |
           |   H   H   |            |g.Left turn volume : 0    0    0    0|                                   |
           | 2   3   1 |            |  in vph         :                   |                                   |
           | Approach 4:CORRAL HOLLOW|h.Is volume > cap. :                :                                   |
                                    |  (g>f) ?        :                   |                                   |
====================================+=================================+===================================|
tep 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES |
                                    |       |                   |      |                                   |
                                    |       |  4 4 4 1 2        |      |259(B2B1)+535(A1)+200(B3B4)+405(A4) |
           | Approach 3|            |-------  6 1 1 1 6 0        -------|                                   |
3:  LT= 364 | |         | 2:RT= 150 |         9 9 9 9 4 0         ^- 150 |        = 1399 vph                 |
  TH=1258 | |           |  TH= 754  |         | | | | | |         <- 377 |===================================|
  RT=  69 | v           |  LT= 469  |         < v v v > >         <- 377 | Step 8. INTERSECTION LEVEL OF     |
-----------              -----------|                             v- 212 |        SERVICE                    |
                         <--Approach 2 |                          v- 259 |   (compare step 7 with table 6)   |
                                    |                                   |         -------                   |
                                    | 119 -^                            |         | D |                     |
Approach 1-->                       |  97 -^                            |         -------                   |
                         -----------| 535 ->         < < ^ ^ ^ >        |  V/C RATIO = 0.86                 |
1:LT= 215    |          ^ | 4: RT=  76 | 535 ->        | | | | | |      |===================================|
  TH=1069    |          | |  TH=1216 |  38 -v                           | Step 9. RECALCULATE               |
  RT=  38    |          | |  LT=  54 |-------          4 4 4     -------|Geometric Change:                  |
           | Approach 4|            |       |       3 2 0 0 0 7 |      |Signal Change:                     |
                                    |       |       0 4 5 5 5 6 |      |Volume Change:                     |
====================================+=================================+===================================|
Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                          |
                                    |       (two phase signal)          |                                   |
     --^ v--   B2B1                 |            | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                    |            |           |          |                                   |
  --^ AND <--      A1B2 AND         |            |           |          |                                   |
  --> OR  v--      /OR A2B1         |            |           |          |                                   |
     --> <--   A1A2                 |-------------      -------------|                                   |
                                    | Approach 1                        |                                   |
     |  <   B4B3                    |                                   |                                   |
     >  |                           |           See Step 6b.            |                                   |
  | | AND < ^      A3B4 AND         |                                   |                                   |
  v > OR  | |      /OR A4B3         |                      Approach 2   |                                   |
     |  ^   A3A4                    |-------------       ------------|                                   |
     v  |                           |            |           |          |                                   |
------------------------------------|            |           |          |                                   |
A1 -->   A3 |     B1 v--    B3   <| |            |           |          |                                   |
```

Critical Movement Analysis: PLANNING

Calculation Form 1

Intersection: 11TH/CORRAL HOLLOW — Design Hour: PM PEAK

Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT (MITIGATED)

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=========================================================================================================
Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK                | Step 6b. VOLUME ADJUSTMENT FOR       |
              | Approach 3:CORRAL HOLLOW|              -------Approach-----|        MULTIPHASE SIGNAL OVERLAP       |
              | 1    3    2 |      ^    |                 : -1-  -2-  -3-  -4-|      Possible    Volume    Adjusted|
              |   R    L    |      N    |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
11TH          | R T T T L |             |  intervals/hour :                  |able   Volume    to next    Volume |
------------- T H H H T -------------|b.LT capacity on  :  0    0    0    0|Phase  in vph     phase      in vph |
 Approach 1   < < | > >   ^--RT  1      |  change (vph)   :                  |--------------------------------------|
  2  LT--^     v v v    <^-RTH          |c.G/C ratio      :  0    0    0    0|B2B1  119(B2)  259- 119= 140(B1)  119|
     LTH-^>              <--TH   3      |d.Opposing volume:  0    0    0    0|A2B1  140(B1)  251- 140= 111(A2)  140|
  3   TH-->              <v-LTH         |  in vph         :                  |A1A2  356(A1)  OR  111(A2)         356|
     RTH-v>    ^ ^ ^      v--LT  2      |e.LT capacity on :  0    0    0    0|B4B3   30(B3)  200-  30= 170(B4)   30|
  1  RT--v    < < | > >  Approach 2     |  green (vph)    :                  |A3B4  170(B4)  419- 170= 249(A3)  170|
------------- L L T R R -------------|f.LT capacity in  :  0    0    0    0|A3A4  405(A4)  OR  249(A3)         405|
              | T T H T T |11TH         |  vph (b+e)      :                  |                                      |
              |   H    H  |             |g.Left turn volume:  0    0    0    0|                                      |
              | 2    3    1 |           |  in vph         :                  |                                      |
              | Approach 4:CORRAL HOLLOW|h.Is volume > cap.:                 :                                      |
                                        |  (g>f) ?        :                  |                                      |
========================================+========================================+======================================|
Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph    | Step 7. SUM OF CRITICAL VOLUMES       |
                                        |       |                    |           |                                      |
                                        |       |   4 4 4 1 2        |           |259(B2B1)+356(A1)+200(B3B4)+405(A4)    |
              | Approach 3|             |-------  6 1 1 1 6 0         -------|                                      |
 3:  LT= 364 | |         | 2:RT= 150    |         9 9 9 9 4 0         ^- 150 |          = 1220 vph                  |
    TH=1258  | |         |   TH= 754    |         | | | | | |         <- 251 |======================================|
    RT=  69  | v         |   LT= 469    |         < v v v > >         <- 251 | Step 8. INTERSECTION LEVEL OF        |
-------------            -------------|                                <- 251 |         SERVICE                      |
                          <--Approach 2 |                             v- 212 |   (compare step 7 with table 6)      |
                                        | 119 -^                      v- 259 |              -------                 |
                                        |  97 -^                             |              | C |                   |
Approach 1-->                           | 356 ->                             |  V/C RATIO = 0.75                    |
-------------            -------------| 356 ->          < < ^ ^ ^ >        |======================================|
1:LT= 215    |             ^ | 4: RT=  76 | 356 ->          | | | | | |        | Step 9. RECALCULATE                  |
  TH=1069    |            | |   TH=1216 |  38 -v                             |                                      |
  RT=  38    |            | |   LT=  54 |-------              4 4 4   -------|Geometric Change:                     |
              | Approach 4|             |       |         3 2 0 0 0 7 |      |Signal Change:                        |
                                        |       |         0 4 5 5 5 6 |      |Volume Change:                        |
========================================+========================================+======================================|
Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph      | COMMENTS                             |
                                        |        (two phase signal)              |                                      |
      --^ v--   B2B1                    |            | Approach 3|               |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                        |            |           |               |                                      |
   --^ AND <--      A1B2 AND            |            |           |               |                                      |
   --> OR  v--      /OR A2B1            |            |           |               |                                      |
      --> <--   A1A2                    |-------------            -------------|                                      |
                                        | Approach 1                             |                                      |
       |  <     B4B3                    |                                        |                                      |
       >  |                             |           See Step 6b.                 |                                      |
   | | AND < ^      A3B4 AND            |                                        |                                      |
   v > OR  | |      /OR A4B3            |                          Approach 2    |                                      |
       |  ^     A3A4                    |-------------            -------------|                                      |
       v  |                             |            |           |               |                                      |
----------------------------------------|            |           |               |                                      |
A1 -->   A3 |      B1 v--    B3   <|    |            |           |               |                                      |
```

15

```
                    Critical Movement Analysis: PLANNING
                              Calculation Form 1
 ersection: 11TH/LAMMERS                                  Design Hour: PM PEAK
 blem Statement: TRACY GATEWAY 2025 PLUS PROJECT (UNMITIGATED)
=========================================================================================================
 ep 1. IDENTIFY LANE GEOMETRY       | Step 4. LEFT TURN CHECK            | Step 6b. VOLUME ADJUSTMENT FOR       |
          | Approach 3:LAMMERS      |                -------Approach-----|        MULTIPHASE SIGNAL OVERLAP    |
          | 1   3   1 |       ^     |                 : -1-  -2-  -3-  -4-|      Possible    Volume     Adjusted|
          |   R   L   |       N     |a.No. of change  :   0    0    0    0|Prob-  Critical  Carryover  Critical|
 TH       | R T T T L |             |  intervals/hour :                   |able    Volume    to next    Volume |
 ------------  T H H H T  ------------|b.LT capacity on :  0    0    0    0|Phase  in vph     phase     in vph |
 Approach 1   < < | > >   ^--RT  1  |  change (vph)   :                   |-------------------------------------|
  1  LT--^     v v v     <^-RTH     |c.G/C ratio      :   0    0    0    0|B2B1   128(B1)  949- 128= 821(B2)  128|
     LTH-^>              <--TH   2  |d.Opposing volume :  0    0    0    0|A1B2   821(B2)  813- 821=   0(A1)  821|
   2  TH-->              <v-LTH     |  in vph         :                   |A1A2   478(A2)  OR    0(A1)         478|
     RTH-v>    ^ ^ ^      v--LT  1  |e.LT capacity on :  0    0    0    0|B4B3    89(B3)  142-  89=  53(B4)   89|
  1  RT--v    < < | > >   Approach 2 |  green (vph)    :                   |A3B4    53(B4)  328-  53= 275(A3)   53|
 ------------  L L T R R  ------------|f.LT capacity in :  0    0    0    0|A3A4   693(A4)  OR  275(A3)         693|
          | T T H T T |11TH         |  vph (b+e)      :                   |                                     |
          |   H   H   |             |g.Left turn volume :  0   0    0    0|                                     |
          | 1   3   1 |             |  in vph         :                   |                                     |
          | Approach 4:LAMMERS      |h.Is volume > cap. :                 :                                     |
                                    |  (g>f) ?        :                   |                                     |
=========================================================================================================
 Step 2. IDENTIFY VOLUMES, in vph   | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES     |
                                    |       |                    |        |                                     |
                                    |       |   3 3 3 1          |        |949(B1B2)+478(A2)+142(B3B4)+693(A4)  |
          | Approach 3|             |-------    2 2 2 4          -------|                                     |
 3:  LT= 142 | |          | 2:RT=   0 |          0 8 8 8 2          ^-   0 |           = 2262 vph                |
   TH= 983  | |          |   TH= 955 |          | | | | |          <- 478 |=====================================|
   RT=   0  | v          |   LT= 128 |          < v v v >          <- 478 | Step 8. INTERSECTION LEVEL OF       |
 ------------                ------------|                             v- 128 |        SERVICE                      |
                          <--Approach 2 |                                     |   (compare step 7 with table 6)     |
                                    |                                     |            -------                  |
                                    |                                     |            |  F  |                  |
 Approach 1-->                      | 949 -^                              |            -------                  |
                                                                            V/C RATIO= 1.40
  -----------                ------------| 813 ->          < ^ ^ ^ >          |=====================================|
 1:LT= 949    |          ^ | 4: RT=  96 | 813 ->          | | | | |          | Step 9. RECALCULATE                 |
   TH=1625    |          | |   TH=2079 | 120 -v                               |                                     |
   RT= 120    |          | |   LT=  89 |-------            6 6 6      -------|Geometric Change:                    |
          | Approach 4|             |       |          8 9 9 9 9 |        |Signal Change:                       |
                                    |       |          9 3 3 3 6 |        |Volume Change:                       |
=========================================================================================================
 Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS                            |
                                    |         (two phase signal)          |                                     |
     --^ v--   B2B1                 |          | Approach 3|              |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                    |          |           |              |                                     |
   --^ AND <--     A1B2 AND         |          |           |              |                                     |
   --> OR  v--     /OR A2B1         |          |           |              |                                     |
     --> <--   A1A2                 |-------------         -------------|                                     |
                                    |  Approach 1                         |                                     |
       |   <   B4B3                 |                                     |                                     |
       >   |                        |           See Step 6b.              |                                     |
   | | AND < ^     A3B4 AND         |                                     |                                     |
   v > OR  | |     /OR A4B3         |                          Approach 2 |                                     |
       |   ^   A3A4                 |-------------         -------------|                                     |
       v   |                        |          |           |              |                                     |
 -------------------------------------|          |           |              |                                     |
 A1 -->   A3 |      B1 v--    B3   <| |          |           |              |                                     |
        v ^                      | |  |          | Approach 4|              | Exclusive right turns reduced 0 %   |
```

```
                              Critical Movement Analysis: PLANNING
                                      Calculation Form 1
ntersection: 11TH/LAMMERS  (URBAN INTERCHANGE)                  Design Hour: PM PEAK
roblem Statement: TRACY GATEWAY 2025 PLUS PROJECT
=================================================================================================
Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK         | Step 6b. VOLUME ADJUSTMENT FOR     |
           | Approach 3:LAMMERS     |               -------Approach-----|        MULTIPHASE SIGNAL OVERLAP   |
           | 1     1 |       ^      |               : -1-  -2-  -3-  -4-|       Possible   Volume    Adjusted|
           |  R  L   |       N      |a.No. of change :  0    0    0    0|Prob-  Critical  Carryover  Critical|
1TH        | R T T T L |            |  intervals/hour :                 |able   Volume    to next    Volume |
------------ T H H H T -------------|b.LT capacity on :  0    0    0    0|Phase  in vph     phase     in vph |
Approach 1  < < | > >  ^--RT  1     |  change (vph)   :                 |-------------------------------------|
  2  LT--^    v v v   <^-RTH        |c.G/C ratio      :  0    0    1    1|B2B1   128(B1)  523- 128= 395(B2)  128|
    LTH-^>            <--TH   3     |d.Opposing volume :  0    0   96    0|A1B2   395(B2)  542- 395= 147(A1)  395|
  3   TH-->           <v-LTH        |  in vph          :                |A1A2   318(A2) OR  147(A1)          318|
    RTH-v>   ^ ^ ^     v--LT  1     |e.LT capacity on :  0    0 1104 1200|A3A4    96(A4) OR    0(A3)          96|
  1  RT--v  < < | > >  Approach 2   |  green (vph)    :                 |                                     |
------------ L L T R R -------------|f.LT capacity in :  0    0 1104 1200|                                     |
           | T T H T T |11TH        |  vph (b+e)      :                 |                                     |
           |  H   H  |              |g.Left turn volume :  0    0  142   89|                                   |
           | 1     1 |              |  in vph         :                 |                                     |
           | Approach 4:LAMMERS     |h.Is volume > cap. :          NO   NO:                                  |
                                    |  (g>f) ?        :                 |                                     |
====================================+=================================+=====================================|
Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES  |
                                    |      |                    |     |                                     |
                                    |      |   1                |     |523(B1B2)+318(A2)+96(A4)+0()         |
           | Approach 3|            |-------   4                -------|                                     |
3:  LT= 142 | |        | 2:RT=   0  |        0 2               ^-   0 |          = 937 vph                  |
   TH=   0  | |        |   TH= 955  |        | |               <- 318 |=====================================|
  RT=   0   | v        |   LT= 128  |        < >               <- 318 | Step 8. INTERSECTION LEVEL OF       |
------------            ------------|                          <- 318 |         SERVICE                     |
                       <--Approach 2 |                         v- 128 |    (compare step 7 with table 6)    |
                                    | 523 -^                          |            -------                  |
                                    | 428 -^                          |            | A |                  |
Approach 1-->                       | 542 ->                          |            -------                  |
------------            ------------| 542 ->               < >        | V/C RATIO = 0.58                    |
1:LT= 949   |         ^ | 4: RT=  96 | 542 ->               | |        | Step 9. RECALCULATE                 |
  TH=1625   |        | |    TH=   0  | 120 -v                          |                                     |
  RT= 120   |        | |    LT=  89  |-------                  -------|Geometric Change:                    |
           | Approach 4|            |      |               8 9 |     |Signal Change:                       |
                                    |      |               9 6 |     |Volume Change:                       |
====================================+=================================+=====================================|
Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                          |
                                    |       (two phase signal)        |                                     |
     --^ v--  B2B1                  |          | Approach 3|          |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                    |          |           |          |                                     |
   --^ AND <--     A1B2 AND         |          |           |          |                                     |
   --> OR  v--     /OR A2B1         |          |           |          |                                     |
     --> <--  A1A2                  |-------------       -------------|                                     |
                                    | Approach 1                      |                                     |
      |   ^   A3A4                  |                                 |                                     |
      v   |                         |          See Step 6b.           |                                     |
                                    |                                 |                                     |
                                    |                      Approach 2 |                                     |
                                    |-------------       -------------|                                     |
                                    |          |           |          |                                     |
------------------------------------|          |           |          |                                     |
A1 -->   A3 |      B1 v--     B3  <| |          |           |          |                                     |
       v ^                     | |  |          | Approach 4|          | Exclusive right turns reduced 0 %   |
```

(15)

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                              Critical Movement Analysis: PLANNING
                                      Calculation Form 1
Intersection: 11TH/LAMMERS (AT-GRADE)                           Design Hour: PM PEAK
Problem Statement: TRACY GATEWAY 2025 PLUS PROJECT (W/BYPASS RD)
=========================================================================================================
Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK          | Step 6b. VOLUME ADJUSTMENT FOR       |
           | Approach 3:LAMMERS     |                -------Approach-----|        MULTIPHASE SIGNAL OVERLAP      |
           | 1   3   2 |     ^      |                : -1-  -2-  -3-  -4-|      Possible    Volume     Adjusted|
           |   R   L   |     N      |a.No. of change  :  0    0    0    0|Prob-  Critical  Carryover  Critical|
11TH       | R T T T L |            | intervals/hour  :                  |able    Volume    to next    Volume |
------------ T H H H T -------------|b.LT capacity on :  0    0    0    0|Phase   in vph     phase     in vph |
Approach 1   < < | > >  ^--RT  1    | change (vph)    :                  |--------------------------------------|
  2  LT--^    v v v    <^-RTH       |c.G/C ratio      :  0    0    0    0|B2B1     0(B1)  502-    0= 502(B2)    0|
    LTH-^>             <--TH   3    |d.Opposing volume:  0    0    0    0|A1B2   502(B2)  777- 502= 275(A1)  502|
  3  TH-->             <v-LTH       | in vph          :                  |A1A2   401(A2)  OR  275(A1)        401|
    RTH-v>   ^ ^ ^     v--LT  1     |e.LT capacity on :  0    0    0    0|B4B3    84(B3)   85-  84=   1(B4)   84|
  1  RT--v   < < | > >  Approach 2  | green (vph)     :                  |A3B4     1(B4)  260-   1= 259(A3)    1|
------------ L L T R R -------------|f.LT capacity in :  0    0    0    0|A3A4   416(A4)  OR  259(A3)        416|
           | T T H T T |11TH        | vph (b+e)       :                  |                                      |
           |   H   H   |            |g.Left turn volume :  0   0    0   0|                                      |
           | 1   3   1 |            | in vph          :                  |                                      |
           | Approach 4:LAMMERS     |h.Is volume > cap. :                :                                      |
                                    | (g>f) ?         :                  |                                      |
====================================+==================================+======================================|
Step 2. IDENTIFY VOLUMES, in vph    | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES     |
                                    |      |                  |        |                                      |
                                    |      |   2 2 2          |        |502(B1B2)+401(A2)+85(B3B4)+416(A4)    |
           | Approach 3|            |-------   6 6 6 6 8       -------|                                      |
3:  LT= 154 | |        | 2:RT=  22  |        0 0 0 0 9 5       ^-  22 |             = 1404 vph               |
  TH= 780  | |        |   TH=1202  |        | | | | | |       <- 401 |======================================|
  RT=   0  | v        |   LT=   0  |        < v v v > >       <- 401 | Step 8. INTERSECTION LEVEL OF        |
------------            ------------|                          <- 401 |           SERVICE                    |
                       <--Approach 2 |                          v-   0 |      (compare step 7 with table 6)   |
                                    | 502 -^                           |              -------                 |
                                    | 410 -^                           |              | D |                 |
Approach 1-->                       | 777 ->                           |              -------                 |
------------            ------------| 777 ->            < ^ ^ ^ >      |======================================|
1:LT= 912  |         ^ | 4: RT=   0 | 777 ->            | | | | |      | Step 9. RECALCULATE                  |
  TH=2331  |        | |    TH=1249  | 346 -v                           |                                      |
  RT= 346  |        | |    LT=  84  |-------            4 4 4   -------|Geometric Change:                     |
           | Approach 4|            |      |          8 1 1 1  |       |Signal Change:                        |
                                    |      |          4 6 6 6 0 |       |Volume Change:                        |
====================================+==================================+======================================|
Step 3. IDENTIFY PHASING            | Step 6a. CRITICAL VOLUMES, in vph | COMMENTS                             |
                                    |        (two phase signal)        |                                      |
      --^ v--   B2B1                |            | Approach 3|         |DEFAULT ADJUSTMENT FACTORS WERE REVISED|
                                    |            |           |         |                                      |
   --^ AND <--      A1B2 AND        |            |           |         |                                      |
   --> OR  v--      /OR A2B1        |            |           |         |                                      |
      --> <--   A1A2                |-------------       -------------|                                      |
                                    | Approach 1                       |                                      |
       |  <    B4B3                 |                                  |                                      |
       >  |                         |           See Step 6b.           |                                      |
   | | AND < ^      A3B4 AND        |                                  |                                      |
   v > OR  | |      /OR A4B3        |                       Approach 2 |                                      |
       |  ^    A3A4                 |-------------        -------------|                                      |
       v  |                         |            |           |         |                                      |
------------------------------------|            |           |         |                                      |
A1 -->   A3 |     B1 v--    B3   <| |            |           |         |                                      |
        v ^                 | |     |            | Approach 4|         | Exclusive right turns reduced 0 %    |
```

V/C = 0.87

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↱↱	↰	↑↑			↑↑↑	↱		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor		0.88	1.00	0.95			0.91	1.00		
Frt		0.85	1.00	1.00			1.00	0.85		
Flt Protected		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (prot)		2787	1770	3539			5085	1583		
Flt Permitted		1.00	0.10	1.00			1.00	1.00		
Satd. Flow (perm)		2787	191	3539			5085	1583		
Volume (vph)	0	1332	5	525	0	0	1746	24	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1332	5	525	0	0	1746	24	0	0
Lane Group Flow (vph)	0	1332	5	525	0	0	1746	24	0	0
Turn Type		custom	Perm					Perm		
Protected Phases				2			6			
Permitted Phases		8	2					6		
Actuated Green, G (s)		43.0	39.0	39.0			39.0	39.0		
Effective Green, g (s)		43.0	39.0	39.0			39.0	39.0		
Actuated g/C Ratio		0.48	0.43	0.43			0.43	0.43		
Clearance Time (s)		4.0	4.0	4.0			4.0	4.0		
Vehicle Extension (s)		3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)		1332	83	1534			2204	686		
v/s Ratio Prot				0.15			c0.34			
v/s Ratio Perm		c0.48	0.03					0.02		
v/c Ratio		1.00	0.06	0.34			0.79	0.03		
Uniform Delay, d1		23.5	14.8	17.0			22.0	14.7		
Progression Factor		1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2		24.7	1.4	0.6			3.0	0.1		
Delay (s)		48.2	16.2	17.6			25.0	14.8		
Level of Service		D	B	B			C	B		
Approach Delay (s)	48.2			17.6			24.9		0.0	
Approach LOS	D			B			C		A	

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: I-205 EB Ramps & Lammers

PM Peak Hour
2/14/2002

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0			
Lane Util. Factor		1.00		0.86	0.86	0.97	0.91			
Frt		0.86		0.89	0.85	1.00	1.00			
Flt Protected		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)		1611		4270	1362	3433	5085			
Flt Permitted		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)		1611		4270	1362	3433	5085			
Volume (vph)	0	45	0	485	2820	1419	1273	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	45	0	485	2820	1419	1273	0	0	0
Lane Group Flow (vph)	0	45	0	1895	1410	1419	1273	0	0	0
Turn Type		custom			Perm	Prot				
Protected Phases				2		1	6			
Permitted Phases		4			2					
Actuated Green, G (s)		2.2		28.3	28.3	14.1	46.4			
Effective Green, g (s)		2.2		28.3	28.3	14.1	46.4			
Actuated g/C Ratio		0.04		0.50	0.50	0.25	0.82			
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0			
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)		63		2135	681	855	4169			
v/s Ratio Prot				0.44		c0.41	0.25			
v/s Ratio Perm		c0.03			c1.04					
v/c Ratio		0.71		1.33dr	2.07	1.66	0.31			
Uniform Delay, d1		26.9		12.7	14.2	21.2	1.2			
Progression Factor		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2		31.7		4.9	486.8	302.0	0.0			
Delay (s)		58.6		17.6	500.9	323.3	1.3			
Level of Service		E		B	F	F	A			
Approach Delay (s)	58.6			223.8			171.0		0.0	
Approach LOS	E			F			F		A	

Intersection Summary			
HCM Average Control Delay	199.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.87		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	163.6%	ICU Level of Service	H

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations	↰		↱	↰↰	↑↑			↑↑	↱		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00		1.00	0.97	0.95			0.95	1.00		
Frt	1.00		0.85	1.00	1.00			1.00	0.85		
Flt Protected	0.95		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (prot)	1770		1583	3433	3539			3539	1583		
Flt Permitted	0.95		1.00	0.95	1.00			1.00	1.00		
Satd. Flow (perm)	1770		1583	3433	3539			3539	1583		
Volume (vph)	645	0	205	564	644	0	0	595	351	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	645	0	205	564	644	0	0	595	351	0	0
Lane Group Flow (vph)	645	0	205	564	644	0	0	595	351	0	0
Turn Type	custom		custom	Prot					Perm		
Protected Phases				5	2			6			
Permitted Phases	8		8					6	6		
Actuated Green, G (s)	26.0		26.0	12.7	32.0			15.3	15.3		
Effective Green, g (s)	26.0		26.0	12.7	32.0			15.3	15.3		
Actuated g/C Ratio	0.39		0.39	0.19	0.48			0.23	0.23		
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0		
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	697		624	661	1716			820	367		
v/s Ratio Prot				c0.16	0.18			0.17			
v/s Ratio Perm	c0.36		0.13						c0.22		
v/c Ratio	0.93		0.33	0.85	0.38			0.73	0.96		
Uniform Delay, d1	19.1		13.9	25.7	10.7			23.4	25.0		
Progression Factor	1.00		1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	18.1		0.3	10.4	0.1			3.2	35.3		
Delay (s)	37.2		14.2	36.1	10.8			26.6	60.4		
Level of Service	D		B	D	B			C	E		
Approach Delay (s)		31.7			22.7			39.1		0.0	
Approach LOS		C			C			D		A	

Intersection Summary			
HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	C
c Critical Lane Group			

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations	↰		↱		↑↑	↱	↰	↑↑			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00		1.00		0.95	1.00	1.00	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	1770	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.22	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	419	3539			
Volume (vph)	230	0	535	0	978	816	203	1037	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	230	0	535	0	978	816	203	1037	0	0	0
Lane Group Flow (vph)	230	0	535	0	978	816	203	1037	0	0	0
Turn Type	custom		custom			Perm	Perm				
Protected Phases					2			6			
Permitted Phases	4		4		2	2	6				
Actuated Green, G (s)	21.1		21.1		33.0	33.0	33.0	33.0			
Effective Green, g (s)	21.1		21.1		33.0	33.0	33.0	33.0			
Actuated g/C Ratio	0.34		0.34		0.53	0.53	0.53	0.53			
Clearance Time (s)	4.0		4.0		4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0		3.0		3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	601		538		1881	841	223	1881			
v/s Ratio Prot					0.28			0.29			
v/s Ratio Perm	0.13		c0.34			c0.52	0.48				
v/c Ratio	0.38		0.99		0.52	0.97	0.91	0.55			
Uniform Delay, d1	15.6		20.4		9.4	14.1	13.2	9.6			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4		37.1		0.2	23.9	36.7	0.4			
Delay (s)	16.0		57.6		9.7	38.0	49.9	10.0			
Level of Service	B		E		A	D	D	A			
Approach Delay (s)		45.1			22.5			16.5		0.0	
Approach LOS		D			C			B		A	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	B
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Grant Line & I-205 WB Ramps

PM Peak Hour
2/14/2002

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085		1770	3539	1583		1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085		1770	3539	1583		1863	1583
Volume (vph)	77	390	106	576	370	0	363	365	274	0	129	150
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	390	106	576	370	0	363	365	274	0	129	150
Lane Group Flow (vph)	77	390	106	576	370	0	363	365	274	0	129	150
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.8	13.1	13.1	31.1	37.4		20.1	35.6	35.6		11.5	11.5
Effective Green, g (s)	6.8	13.1	13.1	31.1	37.4		20.1	35.6	35.6		11.5	11.5
Actuated g/C Ratio	0.07	0.14	0.14	0.34	0.41		0.22	0.39	0.39		0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	131	726	226	600	2072		388	1372	614		233	198
v/s Ratio Prot	0.04	c0.08		c0.33	0.07		c0.21	0.10			0.07	
v/s Ratio Perm			0.07						0.17			c0.09
v/c Ratio	0.59	0.54	0.47	0.96	0.18		0.94	0.27	0.45		0.55	0.76
Uniform Delay, d1	41.1	36.5	36.2	29.7	17.4		35.2	19.2	20.8		37.7	38.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	0.8	1.5	26.7	0.0		29.6	0.1	0.5		2.8	15.2
Delay (s)	47.7	37.3	37.7	56.4	17.4		64.8	19.3	21.3		40.6	54.0
Level of Service	D	D	D	E	B		E	B	C		D	D
Approach Delay (s)		38.8			41.2			36.3			47.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	C
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations			↰	↑			↑	↱	↰	↰↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor				1.00			1.00	1.00	1.00	1.00	
Frt				1.00			1.00	0.85	1.00	0.85	
Flt Protected				1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1863			1863	1583	1770	1583	
Flt Permitted				1.00			1.00	1.00	0.95	1.00	
Satd. Flow (perm)				1863			1863	1583	1770	1583	
Volume (vph)	0	0	0	497	0	0	801	439	43	0	567
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	497	0	0	801	439	43	0	567
Lane Group Flow (vph)	0	0	0	497	0	0	801	439	43	567	0
Turn Type			Perm					Perm	Perm		
Protected Phases				2			6			8	
Permitted Phases			2					6	8		
Actuated Green, G (s)				24.1			24.1	24.1	13.0	13.0	
Effective Green, g (s)				24.1			24.1	24.1	13.0	13.0	
Actuated g/C Ratio				0.53			0.53	0.53	0.29	0.29	
Clearance Time (s)				4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)				3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)				996			996	846	510	456	
v/s Ratio Prot				0.27			c0.43			c0.36	
v/s Ratio Perm								0.28	0.02		
v/c Ratio				0.50			0.80	0.52	0.08	1.24	
Uniform Delay, d1				6.7			8.6	6.8	11.7	16.1	
Progression Factor				1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				0.4			4.8	0.5	0.1	126.9	
Delay (s)				7.1			13.4	7.3	11.8	143.0	
Level of Service				A			B	A	B	F	
Approach Delay (s)	0.0			7.1			11.2			133.7	
Approach LOS	A			A			B			F	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	D
c Critical Lane Group			

(22)

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations				↑	↱	↰	↑		↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0				4.0
Lane Util. Factor				1.00	1.00	1.00	1.00				1.00
Frt				1.00	0.85	1.00	1.00				0.85
Flt Protected				1.00	1.00	0.95	1.00				1.00
Satd. Flow (prot)				1863	1583	1770	1863				1583
Flt Permitted				1.00	1.00	0.44	1.00				1.00
Satd. Flow (perm)				1863	1583	812	1863				1583
Volume (vph)	0	0	0	497	287	278	566	0	0	0	344
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	497	287	278	566	0	0	0	344
Lane Group Flow (vph)	0	0	0	497	287	278	566	0	0	0	344
Turn Type					Perm	Perm			custom		custom
Protected Phases				2			6				
Permitted Phases					2	6			4		4
Actuated Green, G (s)				21.8	21.8	21.8	21.8				7.9
Effective Green, g (s)				21.8	21.8	21.8	21.8				7.9
Actuated g/C Ratio				0.58	0.58	0.58	0.58				0.21
Clearance Time (s)				4.0	4.0	4.0	4.0				4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0				3.0
Lane Grp Cap (vph)				1077	915	470	1077				332
v/s Ratio Prot				0.27			0.30				
v/s Ratio Perm					0.18	c0.34					c0.22
v/c Ratio				0.46	0.31	0.59	0.53				1.04
Uniform Delay, d1				4.6	4.1	5.1	4.8				14.9
Progression Factor				1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2				0.3	0.2	2.0	0.5				59.1
Delay (s)				4.9	4.3	7.1	5.3				74.0
Level of Service				A	A	A	A				E
Approach Delay (s)	0.0			4.7			5.9			74.0	
Approach LOS	A			A			A			E	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	A
c Critical Lane Group			