

# **APPENDIX O**

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*Traffic Impact Studies*

*Final Traffic Impact Study*

**GRATON RANCHERIA  
CASINO AND HOTEL -  
ALTERNATIVES A, B, C, D, E, & H  
SONOMA COUNTY, CA**

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**Prepared for:**

Analytical Environmental Services

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## EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc. (KHA) was retained by Analytical Environmental Services to prepare a traffic impact study for a casino and hotel proposed to be located west of Rohnert Park, California. There were seven alternatives evaluated at this location – No Action Alternative, Wilfred Avenue Alternative, Northwest Stony Point Alternative, Northeast Stony Point Alternative, Northwest Stony Point Reduced Intensity Alternative, Business Park Alternative, and Wilfred Avenue Reduced Intensity Alternative.

When completed, it is proposed that the casino will be 450,000 square feet with a 300 room hotel at the Wilfred Avenue, Northwest Stony Point, and Northeast Stony Point sites. This new development will generate roughly 18,261 daily trips. During the peak hours of the weekday, approximately 1,384 AM peak hour trips and 2,287 PM peak hour trips will enter or exit the casino/hotel and affect nearby intersections and roadway segments.

The Reduced Intensity Alternative casino will be 315,100 square feet with a 100 room hotel. This new development will generate roughly 12,696 daily trips. During the peak hours of the weekday, approximately 949 AM peak hour trips and 1,580 PM peak hour trips will enter or exit the casino/hotel and affect nearby intersections and roadway segments.

The Business Park Alternative will have 400,000 square feet of light industrial and 100,000 square feet of commercial space. This new development will generate roughly 7,082 daily trips. During the peak hours of the weekday, approximately 471 AM peak hour trips and 621 PM peak hour trips will enter or exit the business park and affect nearby intersections and roadway segments.

There are extensive mitigations for all scenarios as a result of the proposed alternatives.

## INTRODUCTION

Kimley-Horn and Associates, Inc was retained by Analytical Environmental Services to prepare a traffic impact study for a casino and hotel proposed to be located west of Rohnert Park, California. The site is immediately west of the city's sphere of influence in land identified as community separator in the Rohnert Park General Plan. It is proposed that the casino and hotel be completed by late 2007/early 2008.

The purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development and to assist the Tribe's environmental consultant in the preparation of an Environmental Impact Statement for the project. This traffic study was prepared based on discussions with, and criteria set forth by, the City of Rohnert Park, County of Sonoma, and the California Department of Transportation (Caltrans).

### Study Methodology

This traffic study was based on planning conditions assumed in the Rohnert Park General Plan (adopted July 2000), the Sonoma County General Plan (adopted 1989), as well as information provided by Caltrans and Sonoma County Regional Transportation Authority. Because none of the agencies' planning and project programming documents anticipated a casino and hotel development or its potential impacts, this study evaluated the addition of a casino and hotel near the intersection of Stony Point Road and Wilfred Avenue.

### Development Conditions

The traffic study was based on the following study scenarios:

- Existing Conditions – evaluates current traffic counts, existing roadway geometry, and existing development conditions.
- 2008 Conditions – evaluates existing traffic volumes with the addition of planned projects anticipated to be completed by 2008 assuming an average 2% per year increase in the background traffic.
- 2008 Conditions Plus Project – evaluates effects of traffic from each Development Alternative on 2008 traffic operations.
- 2020 Cumulative Conditions – analysis of build-out conditions in the area projected for 2020 using the forecast from the Sonoma County travel forecasting model.
- 2020 Cumulative Plus Project Conditions – evaluates effects of traffic from each Development Alternative on 2020 Cumulative traffic operations.

### **Development Alternatives**

Six development alternatives are analyzed in this report. A seventh development alternative, which was proposed along Lakeville Highway near the intersection of SR-39, is analyzed in a separate report.

- No Action Alternative – assumes no action would be taken; evaluates conditions that would occur without the proposed project.
- Alternative A – Wilfred Site – assumes casino/hotel resort approximately 762,300 total square feet with access from Business Park Drive and Wilfred Avenue.
- Alternative B – Northwest Stony Point Site – assumes casino/hotel resort approximately 762,300 total square feet with access from Wilfred Avenue and Stony Point Road.
- Alternative C – Northeast Stony Point Site – assumes casino/hotel resort approximately total 762,300 square feet with access from Wilfred Avenue.
- Alternative D – Northwest Stony Point Reduced Intensity Site – assumes Reduced Intensity casino/hotel resort approximately 413,400 total square feet with access from Wilfred Avenue and Stony Point Road.
- Alternative E – Northwest Stony Point Business Park Site – assumes Business Park approximately 500,000 total square feet of space with access from Wilfred Avenue and Stony Point Road.
- Alternative H – Wilfred Avenue Reduced Intensity Site – assumes Reduced Intensity casino/hotel resort approximately 413,300 total square feet with access from Business Park Drive and Wilfred Avenue.

### **Operating Conditions and Criteria**

Operating conditions experienced by drivers are described in terms of Level of Service (LOS), which is a qualitative measure of factors such as delay, speed, travel time, freedom to maneuver, and driving comfort and convenience. Levels of service are represented by a letter scale from LOS A to LOS F, with LOS A representing the best performance and LOS F representing the poorest performance.

**Table 1** relates the operational characteristics associated with each level of service category for both signalized and unsignalized intersections. **Table 2** summarizes the local level of service standards. LOS F (with delay reported as OVRFL) indicates that

the intersection is in a state of overflow such that the analysis software is unable to calculate an average delay.

**Table 1 – Intersection Level of Service Definitions**

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh)	Unsignalized (Avg. control delay per vehicle sec/veh)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	[ 10	[ 10
B	Stable traffic. Traffic flows smoothly with few delays.	∃ 10 – 20	∃ 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	∃ 20 – 35	∃ 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	∃ 35 – 55	∃ 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	∃ 55 – 80	∃ 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	∃ 80	∃ 50
Source: Transportation Research Board, <i>Highway Capacity Manual 2000</i> , National Research Council, 2000.			

**Table 2 – Local Level Of Service Criteria**

Jurisdiction	Satisfactory Criteria	Significance Criteria
Sonoma County	D	Project causes LOS to fall below D or adds > 5 seconds to intersection already operating at LOS D or worse
Rohnert Park	C	<p>Project causes LOS to fall below C.</p> <p>Lower LOS is permitted if otherwise below or if no feasible improvement is available and project does not cause further decrease in LOS.</p> <p>The following study area study intersections are permitted to operate at LOS D:</p> <p>Wilfred Avenue / Redwood Drive</p> <p>Golf Course Drive Commerce Blvd</p>
Caltrans	<p>D - signalized intersections and highways</p> <p>E – freeway segments and ramps</p>	<p>Project causes LOS to fall below D at intersections and highways</p> <p>Project causes LOS to fall below E for freeway segments</p> <p>Project causes vehicle queues to extend outside of available storage or onto the freeway</p> <p>Project causes freeway ramp merge/diverge LOS to be worse than freeway LOS</p> <p>If LOS already below criteria, the existing LOS and related measure of effectiveness (MOE) are to be maintained.</p>

The change to the LOS standard was contained in a Caltrans response<sup>1</sup> during the scoping period of the project. Normally the standard would be LOS C or better for intersections (per Caltrans' Guide for the Preparation of Traffic Impact Studies) but in the letter, Caltrans indicated at the Rohnert Park site, a lower level of service was acceptable before mitigation would be required.

<sup>1</sup> Timothy Sable (Caltrans) letter to Christine Nagle (NIGC), 1 April 2004.



Traffic analysis was completed using Synchro software at all intersections and Highway Capacity Software (HCS) at ramps and freeway segments. Both software platforms are based on the methodology of the *Highway Capacity Manual*.

## Intersections Included in Analysis

The proposed project will generate new vehicular trips that will increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the project, the following intersections, illustrated in **Figure 1**, were evaluated in this traffic study:

1. Stony Point Rd and Wilfred Ave
2. Primrose Ave and Wilfred Ave
3. Whistler Ave and Wilfred Ave
4. Langner Ave and Wilfred Ave
5. Labath Ave and Wilfred Ave
6. Dowdell Ave and Wilfred Ave
7. Redwood Dr and Wilfred Ave
8. Redwood Dr and Commerce Blvd (evaluated as existing and near-term only – changes as part of the Caltrans interchange project and not evaluated in the cumulative scenario)
9. Wilfred Avenue and US 101 SB Ramps (future intersection)
10. Golf Course Dr and Commerce Blvd
11. Golf Course Dr and Roberts Lake Rd
12. Commerce Blvd and US 101 NB Ramps
13. Project Driveway and Stony Point Rd
14. Business Park Dr and Labath Ave
15. Business Park Dr and Redwood Dr
16. Rohnert Park Expressway and Stony Point Rd
17. Rohnert Park Expressway and Labath Ave
18. Rohnert Park Expressway and Redwood Dr
19. Rohnert Park Expressway and US 101 SB Ramps
20. Rohnert Park Expressway and US 101 NB Ramps
21. Rohnert Park Expressway and Commerce Blvd
22. Gravenstein Hwy (SR-116) and Stony Point Rd
23. Gravenstein Hwy (SR-116) and Redwood Dr
24. Gravenstein Hwy (SR-116) and SB US 101 Ramps
25. Gravenstein Hwy (SR-116) and NB US 101 Off-Ramp
26. Millbrae Ave and Stony Point Rd
27. Millbrae Ave and Primrose Ave
28. Millbrae Ave and Whistler Ave
29. Millbrae Ave and Langner Ave
30. Millbrae Ave and Labath Ave
31. Millbrae Ave and Dowdell Ave

## Freeway Segments and Ramps Included in Analysis

The following freeway segments and ramps were evaluated in this traffic study.

### Segments

- Northbound US-101 south of Gravenstein Highway (SR-116)
- Northbound US-101 between Gravenstein Highway (SR-116) and Rohnert Park Expressway
- Northbound US-101 between Rohnert Park Expressway and Wilfred Avenue
- Northbound US-101 between Wilfred Avenue and Santa Rosa Avenue
- Northbound US-101 north of Santa Rosa Avenue
- Southbound US-101 north of Santa Rosa Avenue
- Southbound US-101 between Santa Rosa Avenue and Wilfred Avenue
- Southbound US-101 between Wilfred Avenue and Rohnert Park Expressway
- Southbound US-101 between Rohnert Park Expressway and Gravenstein Highway (SR-116)
- Southbound US-101 south of Gravenstein Highway (SR-116)

### Ramps

- Northbound Gravenstein Highway (SR-116) on-ramp
- Northbound Rohnert Park Expressway loop on-ramp
- Northbound Rohnert Park Expressway on-ramp
- Northbound Wilfred Avenue on-ramp
- Southbound Santa Rosa Avenue on-ramp
- Southbound Wilfred Avenue on-ramp
- Southbound Rohnert Park Expressway loop on-ramp
- Southbound Rohnert Park Expressway on-ramp
- Southbound Gravenstein Highway (SR-116) on-ramp
- Northbound Gravenstein Highway (SR-116) off-ramp
- Northbound Rohnert Park Expressway off-ramp
- Northbound Wilfred Avenue off-ramp
- Northbound Santa Rosa Avenue off-ramp
- Southbound Wilfred Avenue off-ramp
- Southbound Rohnert Park Expressway off-ramp
- Southbound Gravenstein Highway (SR-116) off-ramp

## EXISTING CONDITIONS

### Existing Site Uses

Both the Wilfred Avenue and Stony Point casino and hotel sites are generally level and currently used for agricultural purposes. Most of the Stony Point site is vacant; however, a large barn and related building are located in the northwest portion of the project site. The project area is divided by the Bellevue-Wilfred Flood Control Channel that passes diagonally through the site. Most of the Wilfred Avenue site is vacant as well with less than five single family dwellings on the site.

### Existing Uses in Vicinity of Sites

Land areas north, south and west of the Stony Point site are currently used for rural agricultural purposes and are not expected to change in the next 20 years. Land uses east of the Stony Point site consist of County Community Separator or are within the City of Rohnert Park and are designated for medium and high density residential, industrial, business park, and commercial uses. Much of the area in Rohnert Park is still vacant and is expected to develop as identified in the Rohnert Park General Plan, the Northwest Specific Plan, and the Wilfred-Dowdell Specific Plan.

Land areas north and west of the Wilfred Avenue site are currently used for agricultural purposes and are not expected to change in the next 20 years. Land areas south and east of the Wilfred Avenue site are currently being developed or are developed as identified in the Rohnert Park General Plan, the Northwest Specific Plan, and the Wilfred-Dowdell Specific Plan.

### Existing Roadways, Freeway Segments, and Ramps

Below is a description of the roadway facilities, freeway segments, and ramps included in the traffic impact study.

#### Roadway Facilities

**Business Park Drive** – is a two lane roadway with curbs and gutters and no parking. The road is classified in the Rohnert Park General Plan as a Minor Collector.

**Dowdell Avenue** – is a narrow two lane roadway with open roadside ditches and no shoulders from south of Wilfred to 385 feet north of Wilfred Avenue where the roadway widens slightly and curbs and gutters are present. The road is classified in the Rohnert Park General Plan as a Minor Collector in the future.

**Commerce Boulevard** – is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road width varies from two lanes to five lanes wide with left (and sometimes right) turn lanes at major intersections.



**Golf Course Drive** – is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road is five lanes wide near the Wilfred interchange with left turn lanes at major intersections.

**Gravenstein Highway (SR-116)** – is an urban roadway with curbs and gutters and is classified in the Rohnert Park General Plan as a Minor Arterial west of Redwood Drive and as a Major Arterial east of Redwood Drive. In the unincorporated area of Sonoma County, SR-116 is classified as a Rural Principal Arterial in the Sonoma County General Plan. The road is four lanes wide with left turn lanes at major intersections.

**Labath Avenue** – is classified as a Minor Collector in the Rohnert Park General Plan (between Rohnert Park Expressway and Wilfred Avenue). Other segments of Labath Avenue are classified as Local Roads. The road is two lanes wide with on-street parking, curbs and gutters south of Business Park Drive. Between Business Park Drive and Wilfred Avenue, the street is one to two lanes wide and unimproved. North of Wilfred Avenue the street is a narrow two lane roadway with open roadside ditches and no shoulders. Currently there is a missing segment north of Business Park Drive but the Rohnert Park General Plan shows the completion of the segment as lands are developed in the vicinity.

**Langner Avenue** – is a two lane roadway with open roadside ditches and no shoulders. The roadway is classified as a local road in the Sonoma County General Plan.

**Millbrae Avenue** – is a narrow two lane roadway with open roadside ditches and no shoulders. The road is classified as a Rural Minor Collector in the Draft 2020 Sonoma County General Plan.

**Primrose Avenue** – is a narrow two lane roadway with open roadside ditches and no shoulders. The road is classified as a local road in the Sonoma County General Plan.

**Redwood Drive** – is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road is five lanes wide with left (and sometimes right) turn lanes at major intersections.

**Rohnert Park Expressway** – is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road is six lanes wide (with turn lanes) near the US-101 freeway but narrows to only two lanes at the city limit. Rohnert Park Expressway between the city limit and Stony Point Road is a two lane facility with wide paved shoulders and is classified as a Minor Arterial in the Rohnert Park General Plan and as a Rural Principal Arterial in the unincorporated areas of Sonoma County in the Sonoma County General Plan.

**Stony Point Road** – is a two lane rural roadway with open roadside ditches, wide shoulders, and left turn bays at major intersections. The road is classified as a Rural Principal Arterial and is shown in the Sonoma County General Plan.



**Whistler Avenue** – is a narrow two lane roadway with open roadside ditches and no shoulders. The road is classified as a local road in the Sonoma County General Plan.

**Wilfred Avenue** – is a rural two lane roadway with open roadside ditches and no shoulders. Designated as Major Arterial in the Rohnert Park General Plan within the City's Sphere of Influence and as a Rural Major Collector outside Rohnert Park as shown in the Sonoma County General Plan, the road is planned to be expanded in the future to 4 lanes within the city limits.

### **Segments**

Northbound/Southbound US-101 south of Gravenstein Highway (SR-116) – is two lanes in each direction with paved shoulders and narrow grassy median and guard rail.

Northbound/Southbound US-101 between Gravenstein Highway (SR-116) and Rohnert Park Expressway – is two lanes in each direction with paved shoulders and narrow grassy median and guard rail.

Northbound/Southbound US-101 between Rohnert Park Expressway and Wilfred Avenue – is two lanes in each direction with paved shoulders and narrow grassy median and guard rail.

Northbound/Southbound US-101 between Wilfred Avenue and Santa Rosa Avenue – is three lanes in each direction with paved shoulders and K-rail in the median. One of the lanes in each direction is for high occupancy vehicles.

Northbound/Southbound US-101 north of Santa Rosa Avenue – is three lanes in each direction with paved shoulders and K-rail in the median. One of the lanes in each direction is for high occupancy vehicles.

### **Ramps**

Northbound Gravenstein Highway (SR-116) on-ramp – consists of a single lane on-ramp.

Northbound Rohnert Park Expressway loop on-ramp – consists of a single lane on-ramp.

Northbound Rohnert Park Expressway on-ramp – consists of a single lane on-ramp.

Northbound Wilfred Avenue on-ramp – consists of a single lane on-ramp.

Southbound Santa Rosa Avenue on-ramp – consists of a single lane on-ramp.

Southbound Wilfred Avenue on-ramp – consists of a single lane on-ramp.

Southbound Rohnert Park Expressway loop on-ramp – consists of a single lane on-ramp.

Southbound Rohnert Park Expressway on-ramp – consists of a single lane on-ramp.

Southbound Gravenstein Highway (SR-116) on-ramp – consists of a single lane on-ramp.

Northbound Gravenstein Highway (SR-116) off-ramp – consists of a single lane off-ramp that widens to two lanes at the intersection with Gravenstein Highway (SR-116).

Northbound Rohnert Park Expressway off-ramp – consists of a single lane off-ramp that widens to two lanes at the intersection with Rohnert Park Expressway.

Northbound Wilfred Avenue off-ramp – consists of a single lane off-ramp that widens to three lanes at the intersection with Commerce Boulevard.

Northbound Santa Rosa Avenue off-ramp – consists of a single lane off-ramp that widens to three lanes at the intersection with Santa Rosa Avenue.

Southbound Wilfred Avenue off-ramp – consists of a single lane off-ramp that widens to three lanes at the intersection with Redwood Drive.

Southbound Rohnert Park Expressway off-ramp – consists of a single lane off-ramp that widens to three lanes at the intersection with Rohnert Park Expressway.

Southbound Gravenstein Highway (SR-116) off-ramp – consists of a single lane off-ramp that widens to three lanes at the intersection with Gravenstein Highway (SR-116).

## **Existing Lane Configurations and Traffic Control**

Existing intersection lane configurations and traffic control at study intersections are illustrated in **Figure 2**. Traffic signals are located at most study intersections near the freeway; whereas, study intersections near the project site are generally unsignalized. The figure also shows the length of the right and left turn bays when present.

## **Existing Traffic Turning Movement Volumes**

Weekday intersection turning movement volumes were manually collected in July and August 2005 at most project study area intersections as well as in November 2006 along Millbrae Avenue and are shown in **Figure 3**. Volumes were collected during the AM and PM peak periods of the day in the middle of the week. It should be noted that a segment of Wilfred Avenue from Stony Point Road to Langner Avenue was closed for

construction when the 2005 counts were being conducted. Traffic was diverted around the closure; therefore, 2004 volumes were used at these locations.

School traffic typically affects AM and mid-afternoon traffic conditions but has little effect on PM peak traffic levels which is the time period evaluated in the TIS. In addition, when schools are in session there would not be a significant increase in traffic due to a high volume of linked trips. Linked trips result from parents dropping off children at school on the way to work or other destinations. Therefore, traffic counts are believed to accurately portray the existing condition during the PM peak period.

Twenty-four hour freeway volumes and percent of trucks and RVs were collected in May and June 2004. Volumes were collected in each direction for US-101 segments north of the Wilfred interchange, south of the Rohnert Park Expressway interchange, and between the two interchanges. Freeway segment volume north of Santa Rosa Avenue and south of Gravenstein Highway (SR-116) was obtained from the 2004 Traffic Volumes on the California State Highway System available on the Caltrans website.

Traffic volume data sheets are available in the **Appendix**.

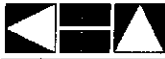
### **Existing Pedestrian and Bicycle Facilities**

There are currently Class II bikeways (i.e. bicycle lanes) through project study intersections on Stony Point Road and Rohnert Park Expressway west of Labath Avenue and east of Commerce Boulevard. Furthermore, there are a Class I bikeways (i.e. multi-use paths) alongside Commerce Boulevard between Golf Course Drive and Redwood Drive as well as between Copeland Creek and East Cotati Avenue. There is another Class I bikeway along Golf Course Drive from Roberts Lake Road extending to the east.

According to the Rohnert Park General Plan, Class II bicycle lanes are planned for Redwood Drive, on Wilfred Avenue (within the city limits) when the road is improved in the future, Langner Avenue south of Wilfred Avenue, Gravenstein Highway (SR-116) east of Stony Point Road, and on Old Redwood Highway to Commerce Boulevard. A Class I bikeway is also planned along Commerce Boulevard between Golf Course Drive and Rohnert Park Expressway. Business Park Drive is a Class III bikeway (i.e. bike route) as well as Labath Avenue south of Business Park Drive.

### **Existing Transit Service**

Sonoma County Transit operates several intra-city routes that pass through a transfer station near the intersection of Commerce Drive and Rohnert Park Expressway (immediately east of the US-101/Rohnert Park Expressway interchange). Intra-city routes include #10, #11, #12, and #14. Buses pass through the transfer station approximately every 30-40 minutes on weekdays and approximately every hour on weekends.



Sonoma County Transit also provides several inter-city routes that serve Sebastopol and Santa Rosa. Inter-city routes include #26, #44, and #48 and connect to a separate transfer station near the intra-city station. Bus frequencies are similar to intra-city service.

Golden Gate Transit operates routes along US-101 that pass through Rohnert Park and connect with cities including San Francisco, San Rafael, Petaluma, and Santa Rosa. During the weekday, routes #72, #74, #75, and #76 operate in the AM and PM peak travel directions and stop at the Rohnert Park inter-city transfer station. Route #80, which offers service all day long, also stops at the Rohnert Park station.

Currently Sonoma County Transit and Golden Gate Transit do not provide service near the site and have no plans to provide service. Serving the casino and hotel site would require a large route deviation and would impact the transit agencies ability to timely manage their current service area. Furthermore, the density in the vicinity of the project site is considered too low for cost-effective service.

A future opportunity for a connection to transit service is with Sonoma-Marin Area Rail Transit (SMART). The proposed rail service would connect San Francisco Bay ferry service terminals to Cloverdale (north of Santa Rosa). If implemented, the proposed rail corridor will pass through Rohnert Park with a stop at a station adjacent to the Wilfred Avenue interchange. The SMART project is planned to add a second track near the Wilfred interchange station. Trains could serve up to 13 other stations, 8 in Sonoma County and 5 in Marin, running every 30 minutes during peak periods, with up to 12-16 trains per day. A bicycle corridor is also proposed on the SMART right-of-way, which parallels US-101 for most of the distance. An Environmental Impact Report (EIR) was prepared to evaluate the impacts of the commuter rail service. If funding is secured, service could begin as early as 2007; however, voters rejected the proposed project in November of 2006 so the actual service start is uncertain.

## Existing Collision History

Caltrans provided Kimley-Horn with a computer generated report summarizing accidents that occurred between 2002 and 2004 at the study intersections as well as on US-101 between Sierra Avenue and Todd Road. The reports provided information about each accident, including the direction of travel and the time of day. The data is helpful in determining any trends that may exist in the traffic accidents that have occurred over the three-year study period. The identification of such trends is crucial for an initial analysis of potential improvements to an intersection.

The summary data provided does have limitations when recommending improvements to the study intersections, to that end, the recommendations below are reflective of the analysis of the data provided to Kimley-Horn and our field observations at each study intersection and freeway segment.

## Study Intersections

### Stony Point Road/Wilfred Avenue.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>6</u>
	6

The prevailing accident trends at this intersection are broadside and rear-end mainly caused by traveling at unsafe speeds and improper turning.

### Labath Avenue/Wilfred Avenue.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>2</u>
	2

The accident trends at this intersection are sideswipe and head-on accidents caused by right of way violation.

### Redwood Drive/Wilfred Avenue.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>3</u>
	3

There was a sideswipe, a broadside, and a rear-end accident at this intersection caused by traveling at unsafe speeds or unsafe lane changes.

### Redwood Drive/Commerce Boulevard.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	1
Vehicle/Vehicle	<u>25</u>
	26



The prevailing accident trends are rear-end and broadside accidents at this intersection caused by traveling at unsafe speeds, improper turning, or right of way violations.

**Golf Course Drive/Commerce Boulevard.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>35</u>
	35

The prevailing accident trend is broadside accidents at this intersection caused by automobile right of way violation.

**Golf Course Drive/Roberts Lake Road.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>7</u>
	7

The prevailing accident trend is sideswipe accidents at this intersection caused by traveling at unsafe speeds and improper turning.

**Commerce Boulevard/US 101 NB Ramps.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>4</u>
	4

There was a sideswipe, a head-on, and a rear-end accident at this intersection caused by traveling at unsafe speeds or improper turning.

### Redwood Drive/Business Park Drive.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>3</u>
	3

There were two rear-end accidents caused by traveling at unsafe speeds and improper starting/backing as well as one broadside accident at this intersection caused by automobile right of way violation.

### Rohnert Park Expressway/Stony Point Road.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>5</u>
	5

There were an equal number of broadside and sideswipe accidents caused by traveling at unsafe speeds or automobile right of way violation.

### Rohnert Park Expressway/Labath Avenue.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>4</u>
	4

The prevailing accident trend at this intersection is broadside accidents caused by traveling at unsafe speeds and automobile right of way violation.

### Rohnert Park Expressway/Redwood Drive.

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	1
Vehicle/Vehicle	<u>49</u>
	49

There are fairly equal number of broadside and rear-end accidents caused by traveling at unsafe speeds, right of way violation, and improper turning.





**Rohnert Park Expressway/US 101 SB Ramps.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>31</u>
	31

The prevailing accident trend is rear-end collisions resulting from failure to comply with traffic signals and signs or unsafe speed.

**Rohnert Park Expressway/US 101 NB Ramps.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>70</u>
	70

The prevailing accident trends are broadside and rear-end collisions resulting from failure to comply with traffic signals and signs, traveling at unsafe speeds, and improper turning.

**Rohnert Park Expressway/Commerce Boulevard.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	2
Bicycle/Vehicle	4
Vehicle/Vehicle	<u>55</u>
	61

The prevailing accident trends are broadside and rear-end accidents that were caused by improper turning, traveling at unsafe speeds, and automobile right of way violation.

**Gravenstein Highway (SR-116)/Stony Point Road.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>39</u>
	39



There are fairly equal amounts of rear-end, broadside, and sideswipe accidents at this intersection caused by traveling at unsafe speeds, improper turning, improper starting/backing, and automobile right of way violation.

**Gravenstein Highway (SR-116)/Redwood Drive.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>18</u>
	18

The prevailing accident trends are rear-end and broadside accidents at this intersection caused by traveling at unsafe speeds and from failure to comply with traffic signals and signs.

**Gravenstein Highway (SR-116)/ US 101 NB Off-Ramp.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	1
Vehicle/Vehicle	<u>9</u>
	10

The prevailing accident trend is rear-end accidents at this intersection caused by traveling at unsafe speeds and improper starting/backing.

**Millbrae Avenue/Stony Point Road.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>8</u>
	8

The prevailing accident trend is rear-end accidents at this intersection caused by traveling at unsafe speeds and improper starting/backing.

**Millbrae Avenue/Primrose Avenue.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	<u>4</u>
	4



The prevailing accident trend is broadside accidents at this intersection caused by automobile right of way violation.

**Millbrae Avenue/Whistler Avenue.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	$\frac{2}{2}$

There was a sideswipe and an overturned vehicle accident at this intersection caused by improper passing or improper turning.

**Millbrae Avenue/Langner Avenue.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	$\frac{5}{5}$

The prevailing accident trend is broadside accidents at this intersection caused by automobile right of way violation.

**Millbrae Avenue/Labath Avenue.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	$\frac{1}{1}$

There was a broadside accident at this intersection caused by improper starting/backing.

**Millbrae Avenue/Dowdell Avenue.**

<u>Accident Type</u>	<u>Number of Accidents</u>
Pedestrian/Vehicle	0
Bicycle/Vehicle	0
Vehicle/Vehicle	$\frac{1}{1}$



There was a rear-end accident at this intersection caused by traveling at unsafe speeds.

There were no accidents at the following intersections during the three years studied:

- Primrose Avenue/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue.
- Gravenstein Highway (SR-116)/US 101 SB Ramps

### Highway Segments

#### US-101 from Sierra Avenue to SR-116.

<u>Accident Type</u>	<u>Number of Accidents (Northbound)</u>	<u>Number of Accidents (Southbound)</u>
Broadside	0	0
Rear-End	14	11
Sideswipe	3	0
Other	<u>5</u>	<u>7</u>
	22	18

The prevailing accident trend is rear-end accidents throughout this freeway segment caused by traveling at unsafe speeds, following too closely, and improper turning.

#### US-101 from SR-116 to Rohnert Park Expressway.

<u>Accident Type</u>	<u>Number of Accidents (Northbound)</u>	<u>Number of Accidents (Southbound)</u>
Broadside	41	1
Rear-End	63	46
Sideswipe	9	5
Other	<u>26</u>	<u>7</u>
	139	59

The prevailing accident trend is rear-end accidents throughout this freeway segment caused by traveling at unsafe speeds, following too closely, and improper turning.



**US-101 from Rohnert Park Expressway to Wilfred Avenue.**

<u>Accident Type</u>	<u>Number of Accidents (Northbound)</u>	<u>Number of Accidents (Southbound)</u>
Broadside	6	5
Rear-End	45	36
Sideswipe	9	12
Other	<u>13</u>	<u>11</u>
	73	64

The prevailing accident trend is rear-end accidents throughout this freeway segment caused by traveling at unsafe speeds and improper turning.

**US-101 from Wilfred Avenue to Santa Rosa Avenue.**

<u>Accident Type</u>	<u>Number of Accidents (Northbound)</u>	<u>Number of Accidents (Southbound)</u>
Broadside	0	1
Rear-End	33	53
Sideswipe	10	18
Other	<u>4</u>	<u>23</u>
	47	95

The prevailing accident trend is rear-end accidents throughout this freeway segment caused by traveling at unsafe speeds, following too closely and improper lane changes.

**US-101 from Santa Rosa Avenue to Todd Road.**

<u>Accident Type</u>	<u>Number of Accidents (Northbound)</u>	<u>Number of Accidents (Southbound)</u>
Broadside	6	1
Rear-End	43	32
Sideswipe	6	12
Other	<u>23</u>	<u>10</u>
	78	55

The prevailing accident trend is rear- accidents throughout this freeway segment caused by traveling at unsafe speeds, following too closely and improper lane changes.

Caltrans provided accident data from “Table B” of the Traffic Accident Surveillance and Analysis System (TASAS) for 2002 to 2004. Actual and average accident rates are shown in **Table 3**. It should be noted that the collision history summarized above and accident rates are from a couple of years before the counts were conducted. During the time between the accident history and the counts, improvements were made to some of

the locations. The US-101 NB Off-Ramp/Rohnert Park Expressway intersection, for example, has been improved since the accident rate data was collected.

**Table 3 – Accident Rate Data**

Location	Number of Accidents					Accident Rate (acc/mv*)					
	Total	Fat.	Inj.	Wet	Dark	Actual			Average		
						Fat.	F+I	Total	Fat.	F+I	Total
101 NB off to SR-116	5	0	1	0	0	0.00	0.14	0.70	.005	0.61	1.50
101 NB off to Rohnert Park Exp.	66	0	15	13	13	0.00	1.79	7.89	.005	0.61	1.50
101 SB on from Rohnert Park Exp.	15	0	5	3	3	0.00	0.64	1.93	.002	.032	0.80
101 NB on from Rohnert Park Exp.	15	0	5	3	7	0.00	0.63	1.89	.002	0.32	0.80
101NB off to Commerce Blvd	4	0	1	0	2	0.00	0.18	0.72	.005	0.39	1.15
101 SB on from Wilfred Ave	1	0	0	1	1	0.00	0.00	0.18	.002	0.20	0.60
101 NB on from Commerce	2	0	0	0	0	0.00	0.00	0.20	.002	0.20	0.60
101SB off to Wilfred Ave	8	0	2	2	1	0.00	0.17	0.70	.005	0.39	1.15

\*acc/mv = accident per million vehicles

### Existing Levels of Service at Study Intersections

Traffic operations were evaluated under existing traffic conditions. As noted previously LOS C or better is established as the criteria for satisfactory operation at intersections within the City of Rohnert Park, with the exception of the following study area intersections that are permitted to operate at LOS D.

- Wilfred Avenue / Redwood Drive
- Wilfred Avenue / US-101 SB Ramps
- Golf Course Drive / Commerce Boulevard
- US-101 NB Ramps / Commerce Boulevard

Intersections that are already operating at LOS D or lower are permitted if no feasible improvements exist to improve the LOS and provided that LOS is not permitted to deteriorate further due to the proposed development project.

LOS D or better is established as the criteria for satisfactory operation at intersections within Sonoma County. Project intersections currently operating below the county standard are considered to be significantly impacted if the average delay per vehicle increases by 5 seconds or more.

LOS D or better is established as the criteria for satisfactory operation at intersections at freeway ramp terminals, freeway segments and ramps (unless specifically noted otherwise above). Intersections currently operating less than the established LOS are expected to maintain the existing measure of effectiveness (i.e. delay per vehicle at intersections and density for ramps and freeway segments).



Results of the analysis are presented in **Table 4**, along with the jurisdictional standard for acceptable level of service (as previously described on p. 2 in Operating Conditions and Criteria). The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. The worst approach is reported because as stated in the *Highway Capacity Manual*, "the LOS criteria for two-way stop-controlled (TWSC) intersections are different from the criteria for signalized intersections primarily because different transportation facilities create different driver perceptions. The expectation is that a signalized intersection is designed to carry higher traffic volumes and experience greater delay than an unsignalized intersection. LOS for a TWSC intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS is not defined for the intersection as a whole. At TWSC intersections the critical movement may control the overall performance of the intersection." Additional detail of the analysis is provided in the **Appendix**. Results of the analysis indicate some existing study area intersections currently operate at unacceptable levels of service based on established significance criteria. (Results shown as bold in the table do not meet operational standards.)



**Table 4 – Existing Levels of Service**

	Intersection	Criteria	Signal Control	2005	
				LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1
9	Wilfred Ave/ US-101 SB Ramps	D	-	-	-
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0
14	Business Park Dr/ Labath Ave	D	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3





Intersections and approaches not meeting standards include the following:

- Stony Point Road/Wilfred Avenue
- Redwood Drive/Commerce Boulevard
- Golf Course Drive/Commerce Boulevard
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **Existing Conditions Traffic Signal Warrant Analysis**

Traffic signals may be justified when traffic operations fall below acceptable thresholds and when one or more signal warrants are satisfied.

Existing traffic volumes at the unsignalized study intersections were compared against the peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*. Traffic Signal Warrant #3 – Peak Hour Volume Warrant (formerly known as Warrant #11) is satisfied when traffic volumes on the major and minor approaches exceed thresholds for one hour of the day. As specified in the *MUTCD* and *California Supplement*, predetermined minimum thresholds for intersections include volume on the minor street of 100 vehicles per hour for one moving lane of traffic and 150 vehicles per hour for two moving lanes of traffic as well as the total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches and 800 vehicles per hour for intersections with four or more approaches.

This warrant is generally the first warrant to be satisfied. The warrant applies to traffic conditions during a one hour peak that are sufficiently high such that minor street traffic experiences excessive delay in entering and crossing the street due to the high traffic volumes on the main street.

Results of the analysis showed that the following intersections currently satisfy Warrant #3:

- Stony Point Road/Wilfred Avenue
- Stony Point Road/Millbrae Avenue

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

## Existing Levels of Service at Freeway Segments and Ramps

Existing traffic volumes on US-101 near the project site were collected using digital wave radar technology to measure vehicle volume and speed per lane. For less critical traffic information at locations farther from the project site, the information was obtained from the Caltrans website.

Traffic analyses were completed to evaluate the existing weekday operation of the study segments and ramps. Results of the analyses are presented in **Table 5**. (Results shown as bold in the table do not meet operational standards.)

**Table 5 – Existing US-101 Levels of Service**

### Existing

US-101 Section/Ramp	Criteria		Existing
	LOS	LOS	Density (pc/mi/ln)
<b>Northbound</b>			
US-101 South of Gravenstein Highway (NB)	E	C	22.2
Gravenstein Highway NB Off-Ramp	E	D	30.8
Gravenstein Highway NB On-Ramp	E	D	34.5
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	28.1
Rohnert Park Expressway NB Off-Ramp	E	D	33.6
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1
Rohnert Park Expressway NB On-Ramp	E	D	32.5
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	28.9
Wilfred Avenue NB Off-Ramp	E	E	35.4
Wilfred Avenue NB On-Ramp	E	<b>F</b>	<b>42.0</b>
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	26.7
Santa Rosa Avenue NB Off-Ramp	E	E	37.2
US-101 North of Santa Rosa Avenue (NB)	E	C	20.3
<b>Southbound</b>			
US-101 North of Santa Rosa Avenue (SB)	E	C	22.9
Santa Rosa Avenue SB On-Ramp	E	D	31.2
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	31.5
Wilfred Avenue SB Off-Ramp	E	E	38.0
Wilfred Avenue SB On-Ramp	E	D	33.7
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	35.2
Rohnert Park Expressway SB Off-Ramp	E	E	38.0
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0
Rohnert Park Expressway SB On-Ramp	E	E	35.1
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	27.1
Gravenstein Highway SB Off-Ramp	E	D	33.9
Gravenstein Highway SB On-Ramp	E	D	33.7
US-101 South of Gravenstein Highway (SB)	E	C	24.7

Results of the analysis indicate that the northbound on-ramp at Wilfred Avenue currently operates at unacceptable levels of service based on established significance criteria.

## NO ACTION ALTERNATIVE

The No Action Alternative represents the evaluation of traffic conditions without the construction of the proposed casino and hotel. Traffic conditions were evaluated for the near-term (2008) and the long-term (2020). 2008 analysis corresponds with the proposed opening year of the casino and hotel. 2020 analysis represents cumulative traffic conditions for the area based upon available traffic forecasts from the Sonoma County travel forecast model provided by the Sonoma County Regional Transportation Authority (SCTA). SCTA made refinements in Rohnert Park to the roadways and TAZs from the most recent information from the Sonoma County General Plan, the Rohnert Park General Plan, and the adopted specific plan assumptions.

The No Action Alternative serves as a baseline for comparison to each of the project alternatives, including the Wilfred Avenue site (Alternative A). It is assumed that if the site is not developed as a casino, it will be built out as it was planned in the Rohnert Park General Plan, the Northwest Specific Plan, and the Wilfred-Dowdell Specific Plan.

### Proposed Roadway Projects in Vicinity of Site

Several major projects are planned in the future that may affect traffic conditions near the project site. These projects are planned to be completed regardless of the proposed casino and hotel.

Caltrans plans to reconstruct the US-101/Wilfred Avenue interchange. The change will connect Golf Course Drive directly with Wilfred Avenue and raise the freeway over the new street connection. Commerce Drive under the freeway (between Golf Course Drive and Redwood Drive) will be removed in the long-term but will remain in the near-term. The project will also include other widening and intersection improvements.

With the reconstruction of the US-101/Wilfred Avenue interchange, the southbound on-ramp at Santa Rosa Avenue will join with the southbound off-ramp traffic at Wilfred Avenue to a distributor/collector road and will enter the freeway with the southbound on-ramp traffic at Wilfred Avenue.

Also with the reconstruction of the US-101/Wilfred Avenue interchange, auxiliary lanes will be constructed from the Rohnert Park Expressway Overcrossing to the Wilfred Avenue interchange and northbound from Wilfred Avenue to Santa Rosa Avenue Overcrossing. The existing northbound and southbound on-ramps at Wilfred Avenue will be widened for ramp metering which will be installed with the completion of the interchange.

According to Caltrans, the interchange will remain open during construction, including the freeway ramps. The project will be constructed in three general phases:

1. Build collector-distributor road from Santa Rosa interchange and southbound on-ramp.
2. Demolish and build northbound structures.
3. Demolish and build southbound structures.

Environmental studies for the proposed interchange project are completed and design is currently in progress with reconstruction planned to begin in 2008 and be completed by 2011. Because the interchange is expected to be completed at approximately the same time as the casino, it was assumed that the US-101/Wilfred Avenue interchange was completed in the 2008 analysis scenarios.

The analysis in this report is based off of the most current information received from Caltrans (at the time the report was prepared). However, it should be noted that the final configuration of the interchange is still being developed and may result in a configuration slightly different from what is analyzed in this report.

Caltrans also plans to add high occupancy vehicle lanes (HOV) to the US-101 freeway from SR-37 through Santa Rosa. HOV lane projects near the site are as follows:

- HOV lanes on US-101 from Old Redwood Highway (in Petaluma) to Rohnert Park Expressway. Construction would start approximately 2009 or 2010. Environmental studies are currently underway but actual construction may be delayed due to funding limitations.
- HOV lanes on US-101 from Rohnert Park Expressway to Wilfred Avenue. This project is to be completed at the same time as the Wilfred Avenue interchange. Environmental studies are currently underway but actual construction may be delayed due to funding limitations.
- HOV lanes on US-101 from Wilfred Avenue to SR-12 (Santa Rosa). This project was completed in 2003.

Other intersection projects are identified in the Rohnert Park General Plan. Some of the projects are intended to increase intersection capacities near the US-101 interchanges. Wilfred Avenue will be widened to four lanes plus left turn lanes from the 1999 City Limits to the Urban Growth Boundary (at Langner Avenue). The left turn lanes on Wilfred Avenue were assumed to be 150 feet long. In addition, the city plans to construct an overpass across US-101 that connects Business Park Drive to the west with State Farm Drive to the east. Exact configuration of the overpass has not been determined by the city; therefore, lane geometry in this evaluation was assumed based on engineering judgment.

The overpass is expected to be used by few casino and hotel visitors but would help to relieve congestion from the Wilfred Avenue and Rohnert Park Expressway

interchanges, which, in turn, would make available additional capacity at the interchanges for the casino/hotel and other traffic growth.

### **Proposed Development Projects in Vicinity of Sites**

No specific development projects were identified as being constructed by the year 2008; however, near-term traffic growth in the study area was prorated based on long-term traffic forecast information provided by Sonoma County Transportation Authority (SCTA). The assumed traffic growth included the Green Music Center and Northwest Specific Plan area east of the proposed casino for future high-density residential, industrial, business park, and regional commercial development as well as other developments. It was assumed in this study that the designated areas would be developed per the Rohnert Park General Plan, the Northwest Specific Plan, and the Wilfred-Dowdell Specific Plan.

### **Near-Term Lane Configurations and Traffic Control**

As discussed above, roadway improvements are planned for the study intersections, particularly at or near the US-101 interchanges. Some improvements are anticipated to be in place before or at approximately the same time as the proposed opening year of the casino and hotel. **Figure 4** illustrates the roadway geometry and traffic control expected to be in place in 2008 regardless of the casino and hotel. Some projects, including the planned reconstruction of the Wilfred Avenue interchange, are expected to occur before or at the same time as the proposed opening of the casino and hotel.

### **Near-Term Traffic Volumes (No Project)**

To reflect the traffic levels anticipated to occur in the year 2008, Kimley-Horn obtained from SCTA base year and cumulative forecast year data for roadways in the study area. The prorated incremental increase in traffic volumes that reflects growth from 2005 to 2008 (from the forecast model) was added to existing traffic volumes to determine near-term cumulative volumes by intersection approach. Approach volumes were then converted to turning movement volumes using a Furness process. Lastly, some turn movements were manually adjusted to balance traffic between intersections or correct for forecast model inconsistencies. The rate of increase per year differs widely based on the roadway segment and the proximity to anticipated development. On average, the increase in traffic volume is roughly 2 percent per year. **Figure 5** shows the assumed increase in background traffic at the study intersections. These volumes represent anticipated traffic levels in the year 2008, regardless of the proposed casino and hotel.

### **Long-Term Lane Configurations and Traffic Control**

Additional roadway improvements are expected within the project study area by the year 2020 including the completion of the HOV lanes on US-101, the overpass across US-101 that connects Business Park Drive to the west with State Farm Drive to the east, and the widening of Wilfred Avenue to four lanes with turn lanes from the 1999

City Limits to the Urban Growth Boundary (Langner Avenue) after the area is annexed by the City. **Figure 6** illustrates the intersection geometry and traffic control assumed in the long-term analysis.

### Long-Term Cumulative Forecast (No Project)

Additional development projects in the vicinity of the site are expected to be completed by the year 2020 and will contribute to a cumulative increase in background traffic regardless of the casino and hotel. These projects include growth in residential, industrial, business park, and commercial land uses located within the city's Urban Growth Boundary, east of the project site. This land use growth, along with other development in the City of Rohnert Park and Sonoma County comprise the long-term cumulative traffic forecast. The cumulative forecast for this study is based on the year 2020 modeling which is consistent with the land use assumptions contained in the Sonoma County General Plan, Rohnert Park General Plan, and other applicable specific plans. Kimley-Horn worked with SCTA to obtain base year and cumulative forecast year data for roadways in the study area. The incremental increases in traffic volumes (from the forecast model) were added to existing traffic volumes to determine long-term cumulative volumes by intersection approach. Approach volumes were then converted to turning movement volumes using a Furness process. Lastly, some turn movements were manually adjusted to balance traffic between intersections or correct for forecast model inconsistencies. **Figure 7** shows the long-term cumulative traffic volumes.

### LOS Conditions and Impacts

Traffic operations were evaluated under the following development conditions:

- Near-term conditions without project (year 2008)
- Long-term Cumulative conditions without project (year 2020)

Results of the analysis are presented in **Table 6**. The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As seen in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria, regardless of the casino and hotel project. (Results shown as bold in the table do not meet operational standards.)

At the intersection of Rohnert Park Expressway/US 101 SB Ramps, between near-term and long-term, the level of service slightly improves as a result of the installation of the overpass across US-101 connecting Business Park Drive with State Farm Drive. The overpass helps relieve traffic volumes away from the interchanges. On the other hand, there is a large increase in delay between the near-term and the long-term at the



intersection of Wilfred Avenue/Redwood Drive due to the different lane geometry currently proposed for the new Wilfred Avenue interchange. Similar changes occur in Alternatives A through E.

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

As noted in the table, significant delays are expected, particularly at the Wilfred Avenue/Stony Point Road intersection and on Wilfred Avenue from Labath Avenue to Redwood Drive, regardless of the proposed casino and hotel project.

### **Traffic Signal Warrant Analysis**

Near-term and long-term traffic volumes (without the project) at unsignalized study intersections were compared against the peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersection will satisfy traffic signal Warrant #3 by the year 2008 and 2020, regardless of the proposed project.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant



thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.





**Table 6 – No Action Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008		2020	
				Existing		Base (w/o Proj.)		Base (w/o Proj.)	
				LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	841.3
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.5
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.5
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	B	12.5
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	169.9
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	26.8
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	E	74.2
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	19.0
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	D	50.8
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	B	18.5
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	28.2
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	29.1
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.0
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	12.3
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	E	63.4
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	45.5
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	D	42.4
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	18.1
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.5
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	90.2
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	12.4
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	12.5
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.7

## LOS Conditions and Impacts on Freeway and Ramps

Year 2010 and year 2030 freeway forecast information was provided by Caltrans within the study area. The year 2010 forecasts reported volumes for freeway travel lanes operating as mixed-use lanes; whereas, the 2030 forecast separated the data for mixed-use and HOV lanes, to reflect the completion of the US-101 HOV lane project.

Because this study is using different analysis years, growth rates were determined from the Caltrans data and then applied to the freeway traffic counts to generate a 2008 and 2020 freeway forecast. On-ramp volumes were obtained from the Sonoma County travel forecast model.

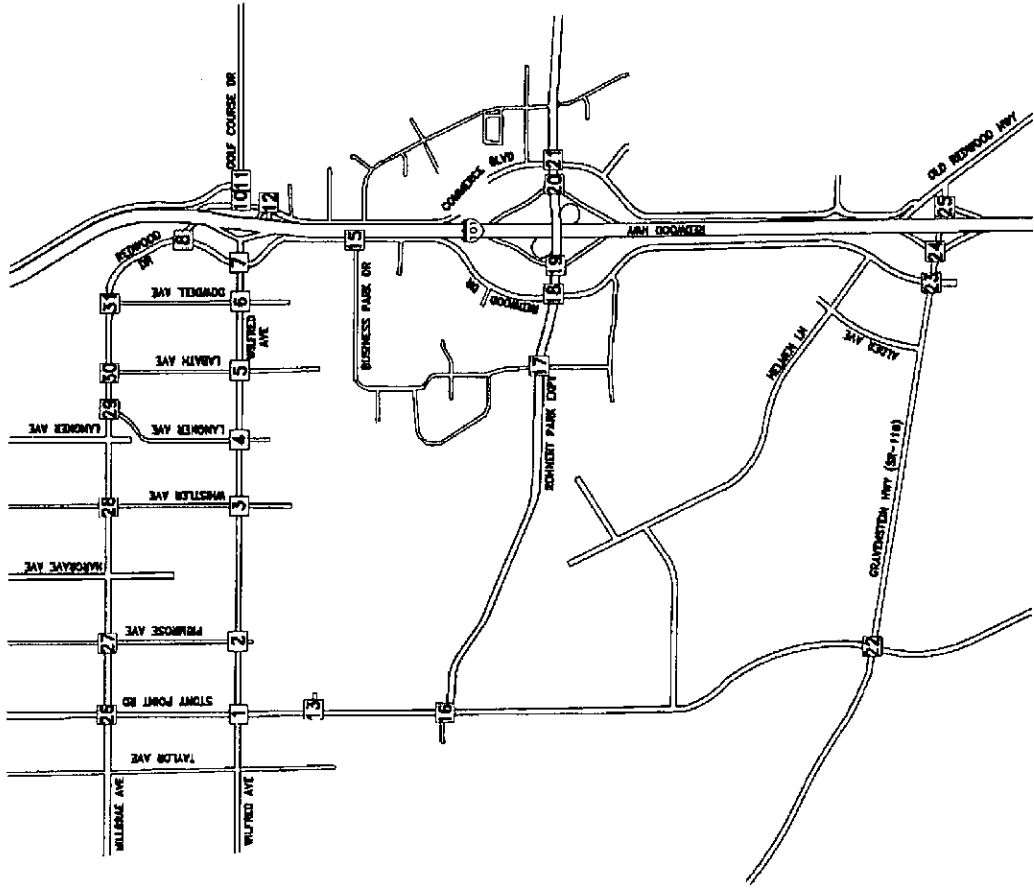
Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020. Freeway segment analyses were limited to the mix-use travel lanes, which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table 7**. As shown in the table, all of the freeway segments and on/off ramps are expected to operate at acceptable levels of service based on established significance criteria in the near-term. In the cumulative condition there are some segments and ramps that operate at unacceptable levels of service in the southbound direction. These levels of service are anticipated to occur even with the completion of the HOV lane project through Rohnert Park and the new auxiliary lanes. (Results shown as bold in the table do not meet operational standards.)



**Table 7 – No Action Alternative Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2020	
	LOS	LOS	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>								
US-101 South of Gravenstein Highway (NB)	E	C	C	22.2	C	19.1	C	25.6
Gravenstein Highway NB Off-Ramp	E	D	C	30.8	C	27.4	D	34.1
Gravenstein Highway NB On-Ramp	E	D	D	34.5	D	29.5	E	36.1
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	C	28.1	C	23.5	D	32.3
Rohnert Park Expressway NB Off-Ramp	E	D	D	33.6	D	28.8	E	37.1
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	C	32.1	C	21.8	C	23.2
Rohnert Park Expressway NB On-Ramp	E	D	C	32.5	C	22.1	D	29.0
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	C	28.9	C	22.1	D	29.0
Wilfred Avenue NB Off-Ramp	E	E	C	35.4	C	22.1	D	29.0
Wilfred Avenue NB On-Ramp	E	F	D	42.0	D	30.3	E	40.4
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	D	26.7	D	30.3	E	40.4
Santa Rosa Avenue NB Off-Ramp	E	E	D	37.2	D	30.3	E	40.4
US-101 North of Santa Rosa Avenue (NB)	E	C	C	20.3	C	22.0	D	29.7
<b>Southbound</b>								
US-101 North of Santa Rosa Avenue (SB)	E	C	C	22.9	C	24.1	D	28.5
Santa Rosa Avenue SB On-Ramp	E	D	D	31.2	D	32.7	F	-
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	D	31.5	D	32.7	F	-
Wilfred Avenue SB Off-Ramp	E	E	E	38.0	E	38.8	F	44.8
Wilfred Avenue SB On-Ramp	E	D	D	33.7	D	33.4	E	39.9
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	D	35.2	D	33.4	E	39.9
Rohnert Park Expressway SB Off-Ramp	E	E	D	38.0	D	33.4	E	39.9
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	D	36.0	D	30.9	E	38.5
Rohnert Park Expressway SB On-Ramp	E	E	D	35.1	D	30.1	F	37.5
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	C	27.1	C	22.3	E	36.6
Gravenstein Highway SB Off-Ramp	E	D	D	33.9	D	29.2	F	40.3
Gravenstein Highway SB On-Ramp	E	D	D	33.7	D	32.1	F	42.3
US-101 South of Gravenstein Highway (SB)	E	C	C	24.7	C	21.8	D	32.0



Grafton Rancheria No. Project - Rohnert Park, CA

PROJECT STUDY INTERSECTIONS

FIGURE 1



Stanley-Horn and Associates, Inc.

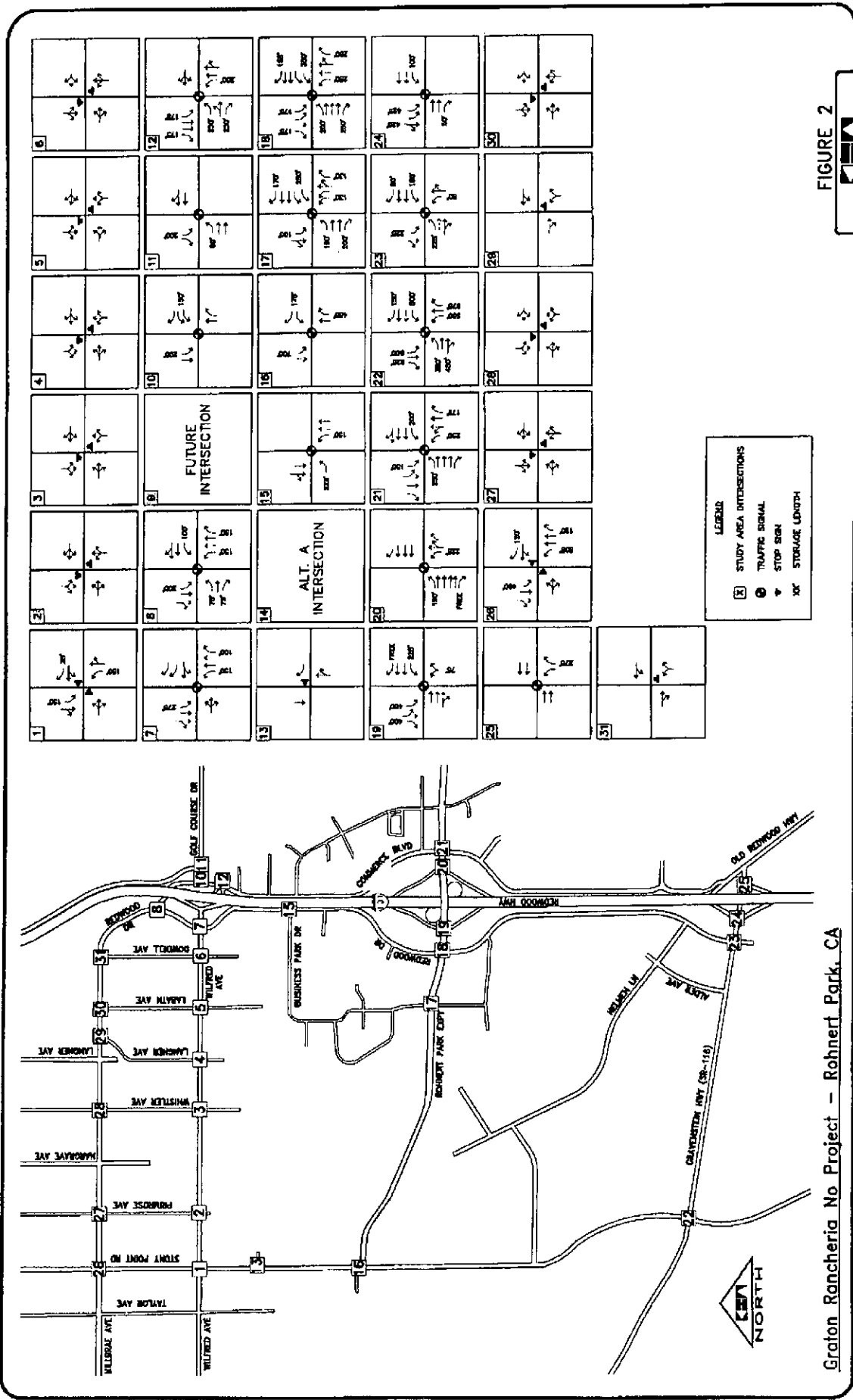
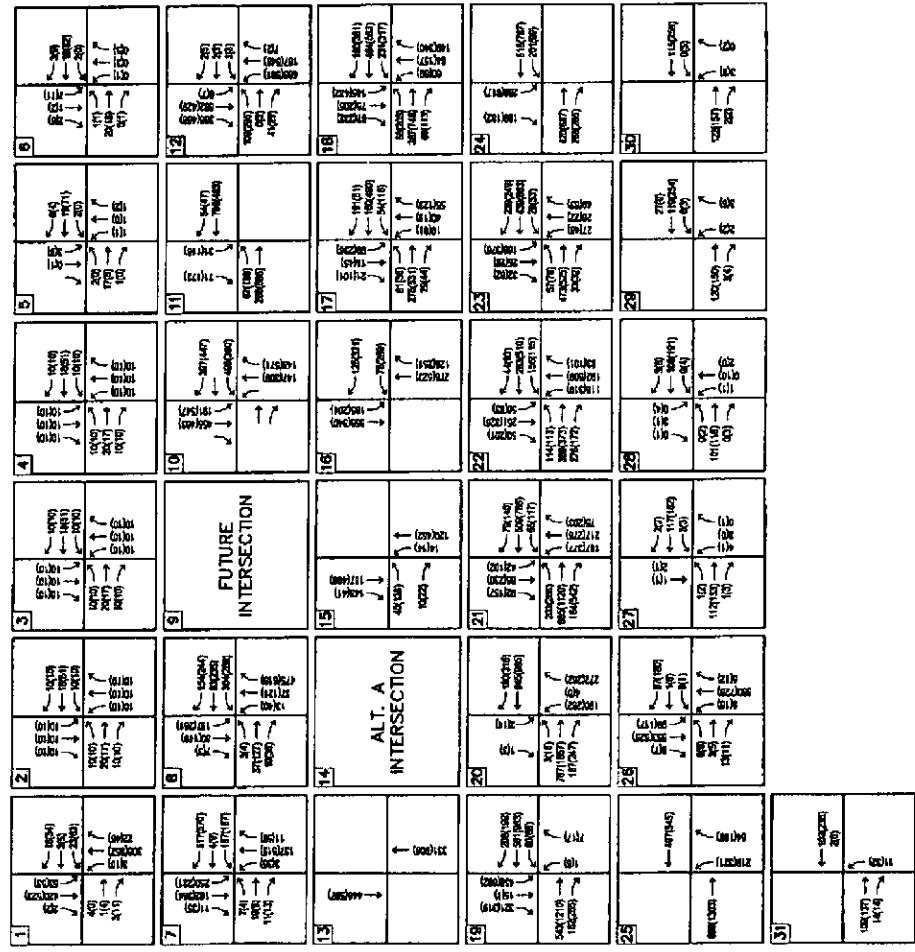
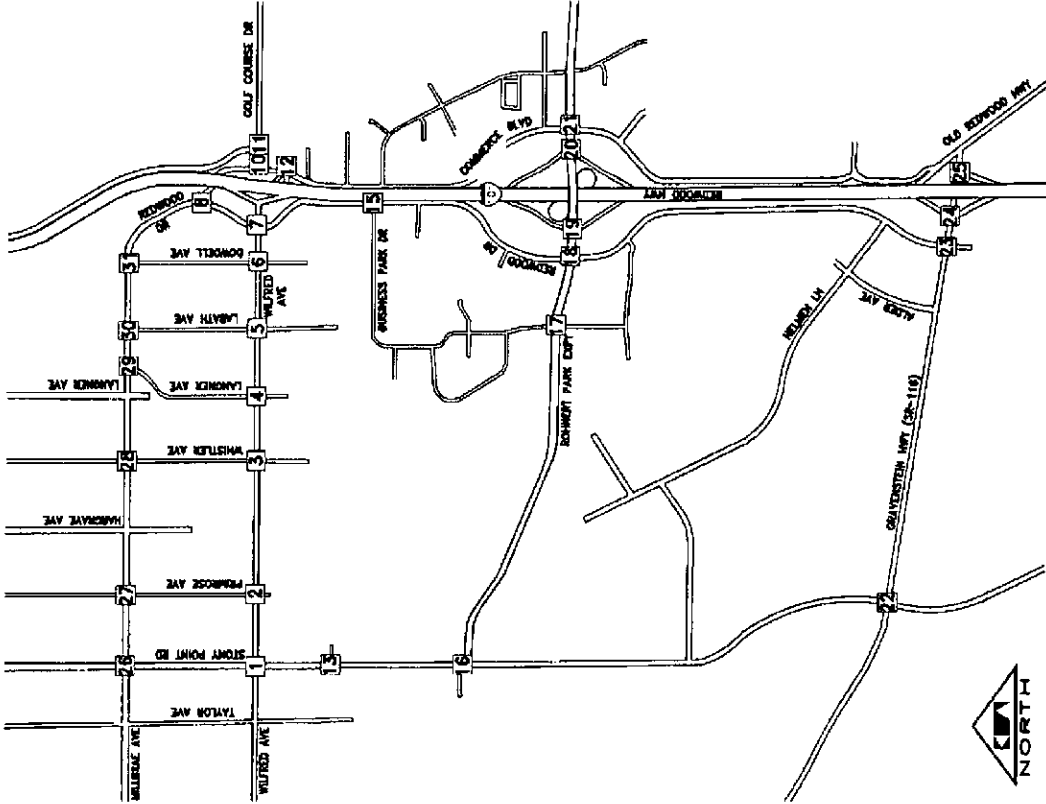


FIGURE 2



Grafton Rancheria No Project - Rohnert Park, CA

EXISTING LANE GEOMETRY AND TRAFFIC CONTROL



LEGEND  
 [Box with number] STUDY AREA INTERSECTIONS  
 [Box with 'X'] PM TRAFFIC VOLUMES



FIGURE 3



Graton Rancheria No Project - Rehnert Park, CA

EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES

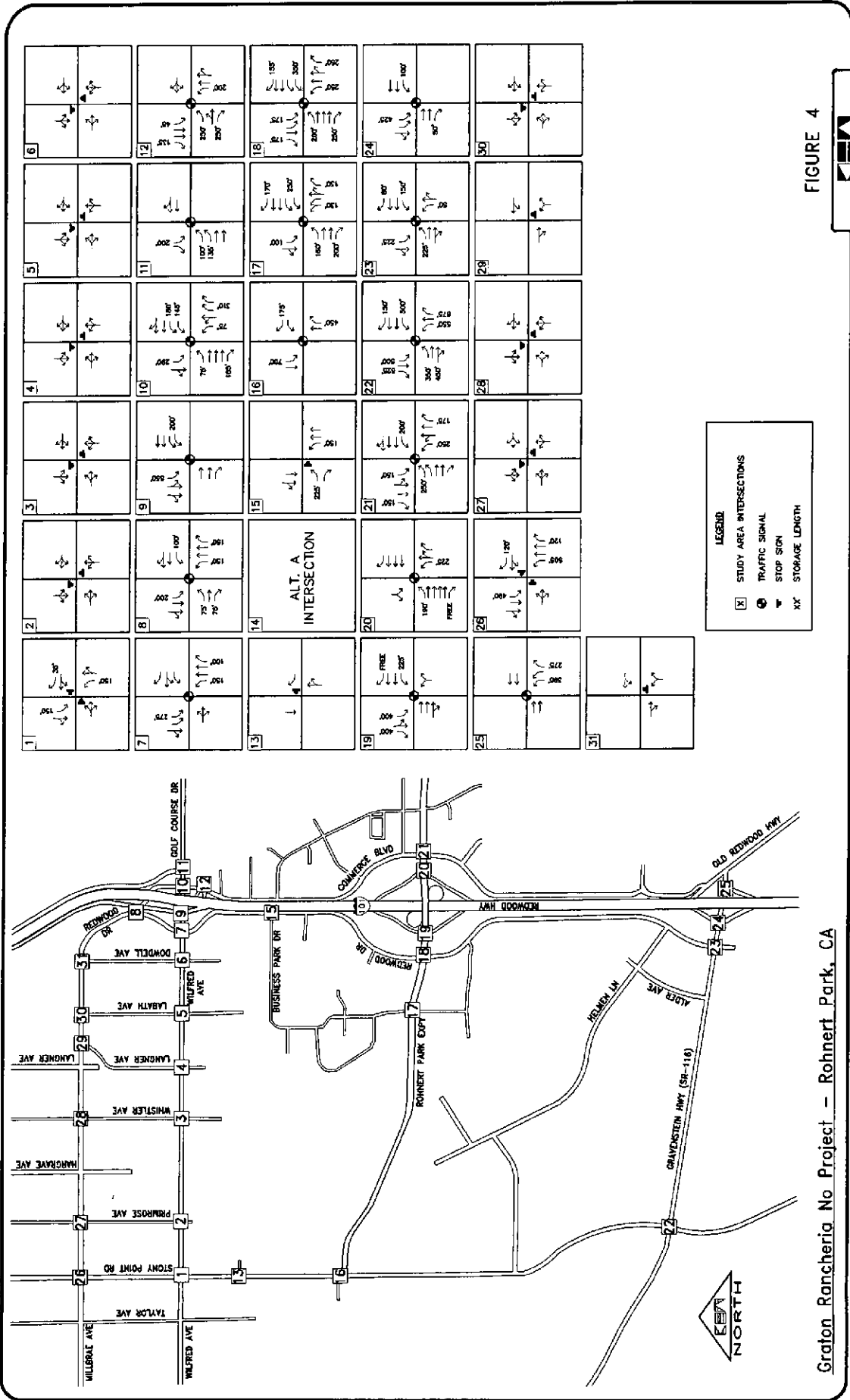


FIGURE 4

Graton Rancheria No Project - Rohnert Park, CA

NEAR-TERM LANE GEOMETRY AND TRAFFIC CONTROL



Miller-Horn and Associates, Inc.

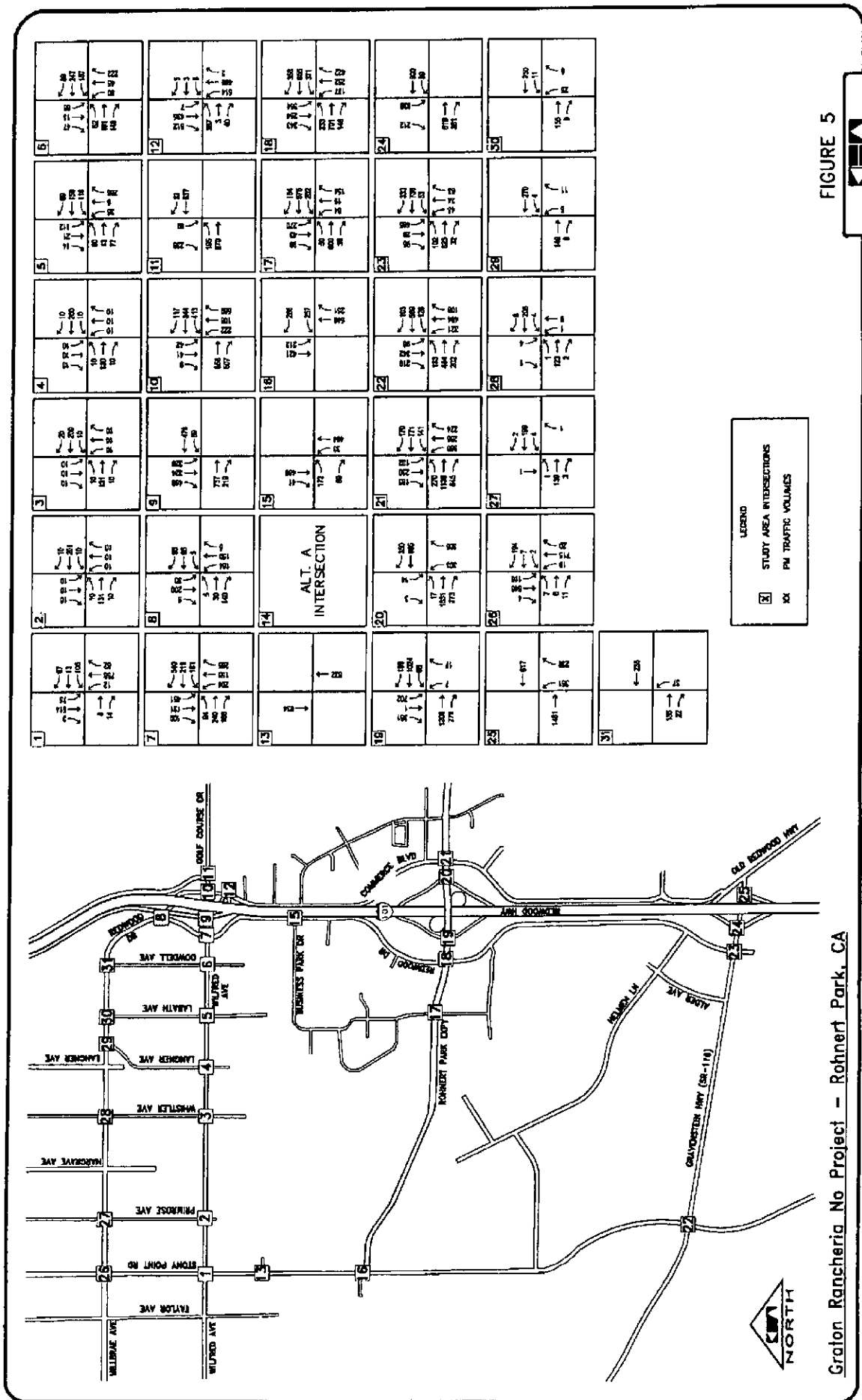


FIGURE 5



Dwyer-Ham and Associates, Inc.

LEGEND  
 [ ] STUDY AREA INTERSECTIONS  
 XX PM TRAFFIC VOLUMES

Graton Rancheria No Project - Rohnert Park, CA

NEAR-TERM PM TRAFFIC VOLUMES



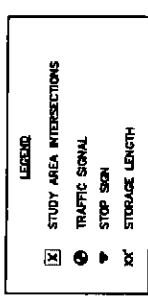
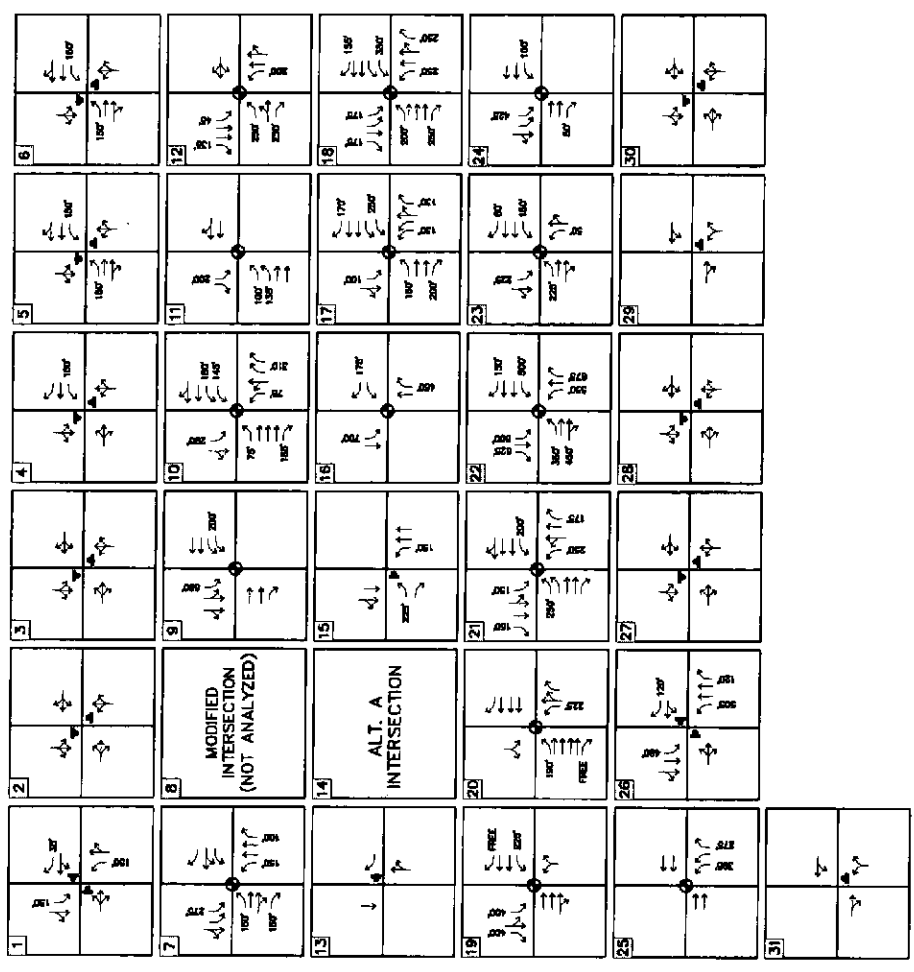
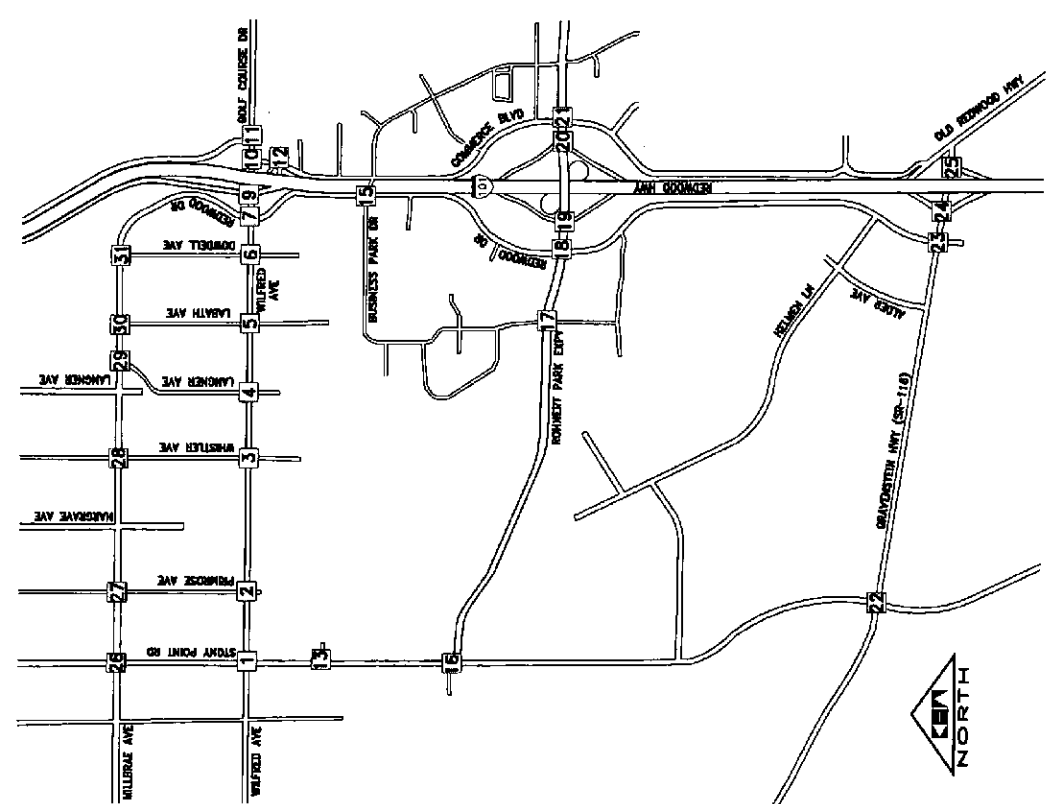


FIGURE 6

Graton Rancheria No. Project - Rohnert Park, CA

LONG TERM LANE GEOMETRY AND TRAFFIC CONTROL



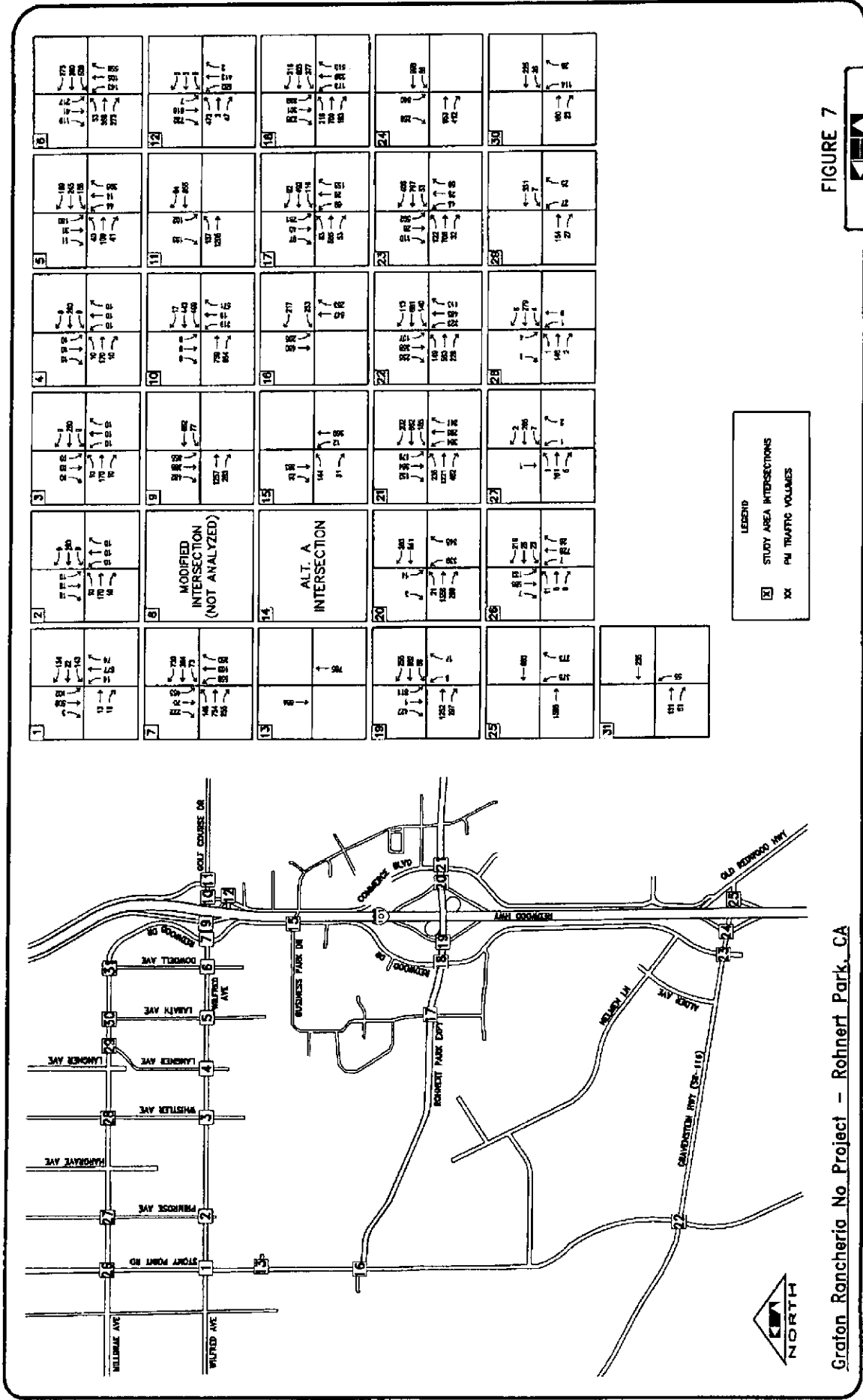


FIGURE 7

Kimley-Horn and Associates, Inc.

Grafton Rancheria No Project - Rohnert Park, CA

LONG-TERM CUMULATIVE PM TRAFFIC VOLUMES

## GENERAL PROJECT INFORMATION

This section presents a description of elements of the analyses that are common to multiple study alternatives included in this study. Traffic impacts were evaluated for the following scenarios:

- 2008 analyses correspond with the proposed opening year of the casino and hotel.
- 2020 analyses represents cumulative traffic conditions for the area based upon available traffic forecasts from the Sonoma County travel forecast model provided by Sonoma County Regional Transportation Authority (SCTA). SCTA made refinements in Rohnert Park to the roadways and TAZs from the most recent information from the Sonoma County General Plan, the Rohnert Park General Plan, and the adopted specific plan assumptions.

The Memorandum of Understanding (MOU) promised funds to the City of Rohnert Park to mitigate potential impacts on transportation and traffic which includes monies to install an on-demand activated traffic signal at the entrance to the Rancho Verde Mobile Home Park on Rohnert Park Expressway.

### Project Trip Generation

Trip generation for Native American gaming facilities generally peaks on Saturday evenings; however, background traffic on adjacent streets is lower than during peak weekday periods, making the overall number of vehicles on the road lower as well. In addition, casino facilities are open 24/7 and typically do not generate extreme peaks like other uses. Instead, casino/hotel traffic follows a smoother curve that builds steadily from early morning until about 7:00 PM, after which traffic levels slowly decline. Based on existing traffic volume information and expected trip generation from the casino and hotel, it was determined that the weekday PM peak period represents the worst case period to evaluate.

Trip generation for development projects is typically based on rates contained in the Institute of Transportation Engineer's publication *Trip Generation, 7th Edition*. This manual is a standard reference used by jurisdictions throughout the country and is based on actual trip generation studies at numerous locations in areas of various populations. However, *Trip Generation* does not have a land use for casinos similar to the type proposed by Graton Rancheria.

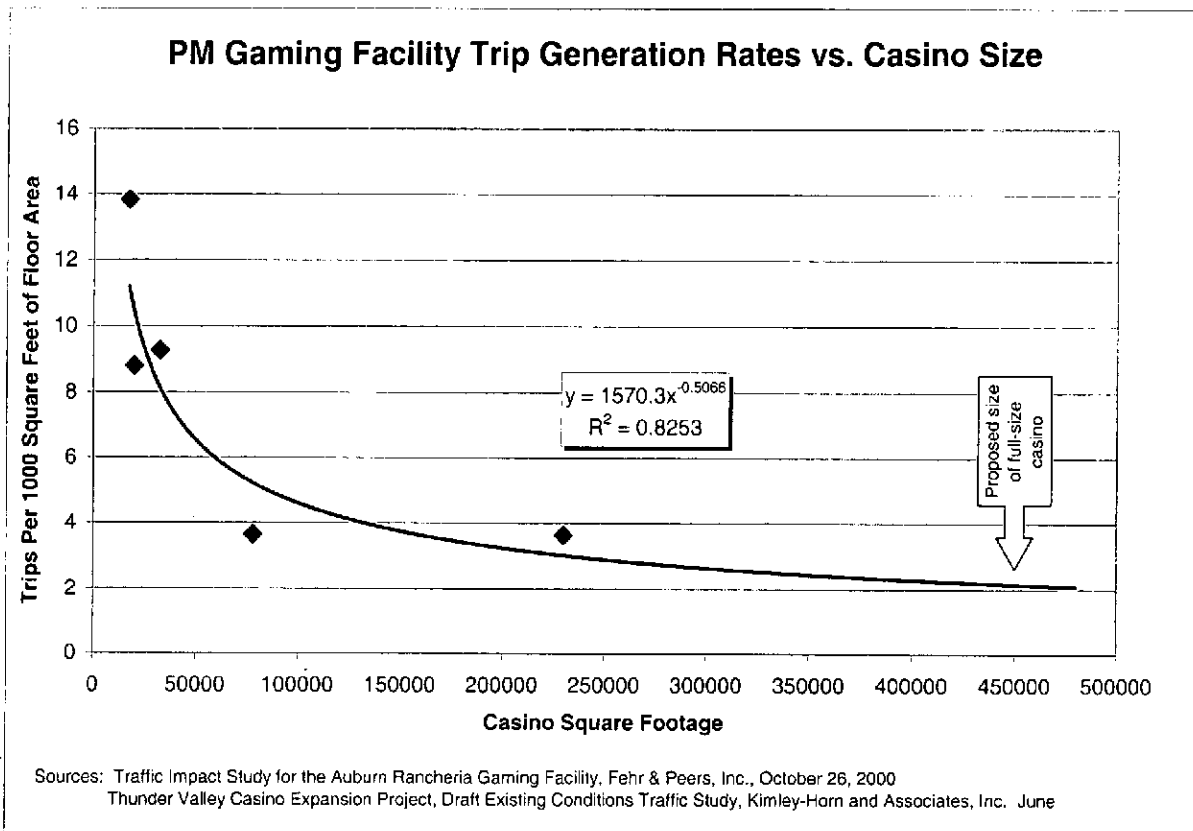
Research has been performed for hotel/casinos such as commonly found in Las Vegas and Reno, but the information is generally not applicable to this project. As a result this project relied on trip generation information obtained from other Native American casino and hotel facilities.

As part of a traffic impact study prepared for the Auburn Rancheria Gaming Facility (A.K.A. Thunder Valley Casino), trip generation was collected at four northern California gaming facilities. Data was reported for the weekday PM peak hour (i.e. the highest one-hour period between 4:00 and 6:00 PM) which is the time in which the greatest amount of combined traffic congestion commonly occurs.

Trip information from the four facilities showed that the smaller gaming facilities had higher trip rates than larger facilities, similar to the trip generation characteristics of shopping centers where small centers generate trips at a somewhat higher rate than larger centers.

Auburn Rancheria traffic study data was supplemented by more recent information collected at the completed Thunder Valley Casino by Kimley-Horn. Based on 2005 traffic data, the facility has a PM peak hour trip generation rate of 3.64 trips per 1,000 square feet of floor area. This rate occurs during the 5:00-6:00 PM period of the weekday and reinforces the principle that trip rates are lower at larger facilities.

Information from the Auburn Rancheria Traffic study and the more recent Thunder Valley Casino data was plotted and clearly shows that the highest trip generation rates based on square footage correspond to the smallest facility and the lowest rate occurs at the largest facility. The data also indicates that trip rates based on building square footages are not linear. A regression analysis showed a  $R^2$  of 0.83 which indicates a strong fit to the data. In Update on Impacts of Tribal Economic Development Projects in San Diego County (April 2003), San Diego County concludes the same premise that trip rates are lower for larger gaming facilities because they include "several accessory uses to encourage customers to stay longer."



The development alternatives in this study are much larger than the facilities documented in the Auburn report and consequently, the Graton Casino and Hotel project is expected to have a lower rate trip rate. The Graton Casino is proposed to include 315,100 - 450,000 square feet for the casino and related functions, plus up to a 300 room hotel. Extrapolation of the fitted curve suggests that the PM trip rate for the much larger casino would be approximately two trips per 1000 square feet. Although the data suggest a PM peak trip rate of 2/1000 s.f. is reasonable, it was determined that a higher and more conservative rate should be considered.

Therefore, the Shingle Springs casino environmental impact report/environmental assessment was also reviewed. The Shingle Springs casino is proposed to include approximately 238,500 square feet and was determined to have the following trip rates.

- Weekday AM Peak Hour: 2.95 trips/1,000 square feet
- Weekday PM Peak Hour: 4.95 trips/1,000 square feet
- Weekday (Daily trips): 39.43 trips/1,000 square feet

Based on the information from the Shingle Springs reports and in comparison with the plotted Auburn Rancheria /Thunder Valley Casino data, it was determined that the trip rate used for Shingle Springs is a reasonable but more conservative assumption for this traffic study to eliminate the possibility of underestimating project trips. Therefore, trip generation also considered the Shingle Springs DEIR/EA which evaluated additional sources of trip generation including San Diego County which, for example, recommends calculation of daily casino trips at 100 trips per 1,000 square feet of gaming area. San Diego rates are based on empirical data from several casinos in southern California and if applied to the Graton project's gaming area, the daily trip generation would be approximately 11,860 trips which is thousands below the number assumed in the Shingle Springs DEIR/EA. Therefore, trip rates used in this analysis are the same as for Shingle Springs and which are listed above. Actual trip rates for the Graton casino are likely to be lower. The Graton PM rate represents a 36% increase over the Thunder Valley data and a 148% increase over data from the combined 5 northern California gaming facilities. Using a trip generation rate that is higher ensures a conservative approach to identifying project impacts and associated mitigations.

As noted earlier, trip generation was prepared in consideration of actual data from five northern California gaming facilities. The largest of the facilities was Thunder Valley Casino located along Highway 65 and which is less than 7 miles from I-80. Thunder Valley is considered by many gaming operators to be the most successful casino in California. It offers slot machines, table games, a wide variety of restaurants, bars, and professional entertainment similar to the proposed Graton Casino. Thunder Valley's location is within roughly 30 miles of 1.9 million people residing in 5 Sacramento area counties (2000 census). At a similar distance from the proposed Graton casino located near Santa Rosa there are four counties with a combined population of approximately

1.0 million (2000 census). Based on this information, comparisons between Thunder Valley and Graton casino are considered reasonable and valid.

Trip generation for the 300 room hotel was based on data contained in ITE *Trip Generation* but adjusted with the assumption that most guests at the hotel would also be guests of the casino. The casino is expected to implement a pricing structure for the rooms that favors casino guests. Therefore, the ITE hotel rate was reduced by 2/3 to account for internal capture to and from the casino. Reducing the rate is based on professional judgment and is consistent with the Shingle Springs report which researched this issue and ultimately assumed a 3/4 reduction for hotel rooms.

Sometimes developments also attract trips that are already on the road that stop as they pass by the site. These are not new vehicle trips but are considered to be pass-by trips. Although some trips to the site will be pass-by trips, no empirical data was readily available to determine a reasonable pass-by rate. Therefore, pass-by trips are conservatively not assumed in the analysis.

Furthermore, development projects also attract diverted link trips. These are also trips that are already on the road but change their route to access to the site. These trips originate from adjacent freeways, highways, or city streets. Although some trips to the casino site will be diverted link trips, no empirical data was readily available to determine a reasonable rate. Therefore, diverted link trips are conservatively not assumed in the analysis.

Although pass-by and diverted link reductions are not assumed in the analysis, it is reasonable to assume that 15 percent or more of the project trips are from these two trip types. Therefore, trips associated with the proposed casino (at 4.95/1000 s.f.) are conservatively overestimated by approximately 15 percent (due to pass-by and diverted link trips) already on the freeway and intersections away from the general vicinity of the project site.

It is recognized that some incidental trips may occur in relation to the casino such as wine tasting tours, costal activities, and other off-site attractions; however, because of the conservative nature of the casino trip generation rate assumptions, these incidental trips are accounted for in the PM trip generation calculations.

## **Project Trip Distribution and Assignment**

In preparation of the traffic distribution, Kimley-Horn reviewed the project's use in proximity to the surrounding population centers. Because of the nature of the project, customers and employees are expected to travel from nearby locations and beyond. Much of the trips are expected to travel to/from US-101. The location of the San Francisco Bay Area population in relation to the project site, as well as peak hour turning movement volumes at the study intersections, the likely customer and employee

base for the site, major connections to highways, and potential access limitations, were evaluated in order to estimate the likely distribution of project traffic.

Trip generation and distribution for the casino/hotel includes a mixture of passenger cars, trucks, and RVs and was evaluated based on the assumption that two percent of the vehicles on roads accessing the site would be trucks or RVs.

### **Potential Conflicts with Special Event Traffic**

The project sites are located more than 4 miles driving distance from the Spreckels Performing Arts Center and Sonoma State University (SSU) which is the home of the future Green Music Center as well as the Evert B. Person Theatre.

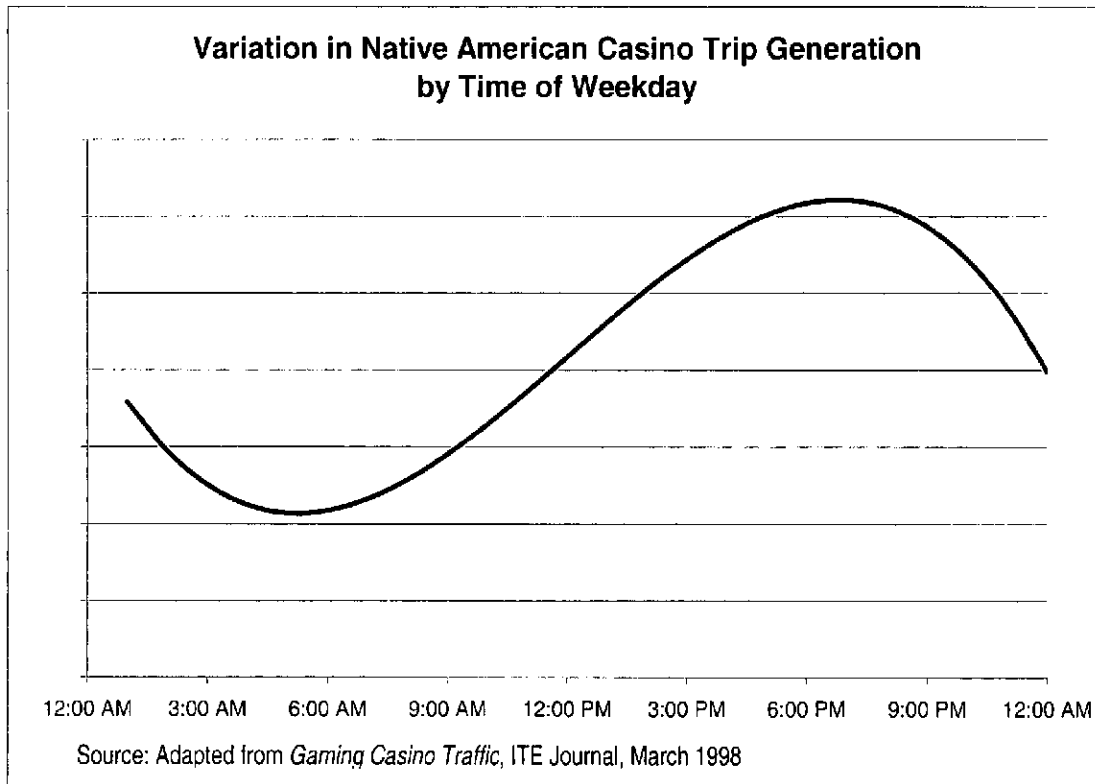
Spreckels Performing Arts Center houses two theatres – the Nellie W. Coddling Theatre which seats 550 patrons and the Bette Condiotti Experimental Theatre which seats up to 125 patrons. Most events occur on Saturday or Sunday with start times between 7:30 and 8:00 PM. Some weekday events also occur but they are frequently held in the middle of the day.

SSU houses many performance spaces – the Warren Auditorium seating up to 182 patrons, Ives 119 seating up to 200 patrons, PE 1 Studio Theatre seating up to 150 patrons, Ives 76 Studio Theatre seating 50 patrons, the Evert B Person Theatre seating up to 475 patrons. The future Green Music Center which is scheduled to open in spring of 2008 will include an inside concert hall seating up to 1,400 patrons with an outside venue for events up to 10,000 patrons. Events are scheduled on weekdays and weekends with start times between 7:30 and 8:00 PM. Occasionally, some weekday events are also scheduled in the middle of the day.

According to the Executive Director of the Green Music Center at SSU, the events with the greatest attendance are most likely to occur during the summer months between June and September and will attract between 3,000-10,000 people per event. Events of this magnitude are expected to occur about once per week (primarily on Saturdays). Other smaller events, with attendance up to 1,000 people, include concerts and other performances, and occur roughly ten times per month throughout the year. Concert times have not been determined but it is assumed that they will be similar to other SSU events.

Due to the proximity of the performing arts centers and concert start times, conflicts between casino/hotel traffic and the performing arts centers will be limited. The centers are located on the east side of the freeway and traffic generally travels through different intersections. However, on days when events are held at the performing arts centers, surges of traffic commonly occur, with a sharp peak immediately following the conclusion of the event.

As noted earlier, casino traffic follows a different arrival and departure pattern, with weekday traffic following a smoother curve that builds steadily from early morning until about 7:00 PM, after which traffic levels slowly decline. On weekends, the peak is generally delayed until around 9:00 PM or later.



Although peak traffic generated by the hotel and casino would not regularly coincide with peak traffic generated by the performing arts centers, there will be times when traffic events overlap and when the size of the events conflict. During summer months when large outdoor events are held, combined traffic congestion will potentially have an adverse effect on traffic operations. This conflict will most likely occur at the Rohnert Park Expressway interchange. Although the frequency of the occurrences is expected to be low, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control. It should be noted that with the Northwest Stony Point Reduced Intensity Alternative and the Wilfred Avenue Reduced Intensity Alternative there will be less traffic conflicting with special event traffic.



## Potential Effects on Transit, Bicycle, and Pedestrian Mobility

As noted earlier, Sonoma County Transit and Golden Gate Transit do not provide service near the site and have no plans to provide service. Therefore, this traffic study conservatively assumed no reduction in peak hour vehicular traffic due to travel by public transit. Transit ridership could be increased if the project operated a shuttle between the casino and Rohnert Park transit hubs. This would allow patrons to reach the site from many areas of the Bay using conventional transit routes. Shuttle service could circulate between the two destinations, thus helping reduce traffic generated by the project. The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.

Although Sonoma County Transit and Golden Gate Transit have previously indicated that they do not plan to provide bus service to the casino sites, the project will include transit facilities/amenities at transit access points, for public and private transit operations. Flexible work schedules and subsidized shuttle service could also be provided; however, subsidized transit passes and validation of transit tickets will not be useful to employees or customers unless Sonoma County Transit and Golden Gate Transit choose to provide service to the casino.

According to the 2000 U.S. Census, 4.7% of Rohnert Park residents use transit to travel to work. This typically represents the highest level of transit ridership during the day. If it is conservatively assumed that 4.7% of employees or customers will use transit (assuming a shuttle connection is provided by the casino) during the peak hours of the day, it represents approximately 107 in the weekday PM peak periods.

Data was not readily available for peak hour ridership levels on the Sonoma County Transit or Golden Gate Transit systems but during the weekday periods, the routes operate every 30 minutes and observations indicate the sufficient capacity exists on the buses to accommodate the potential additional transit demand. Furthermore, dispersion of the project-generated riders to the bus routes would result in a minimal effect on transit capacity. Thus the project impact on transit service is determined to be less than significant.

The effect of the casino/hotel on the proposed Sonoma-Marin Area Rail Transit (SMART) was also evaluated. It was determined that because the SMART system will only operate during the AM and PM commute hours, there is little opportunity for casino employees or patrons to use service. Therefore the project impact on SMART service is determined to be less than significant.

Park and ride facilities at the Rohnert Park Expressway interchange are not expected to be affected development of either a casino or business park.

Due to the low volume of pedestrians and bicyclists in the vicinity of the sites, the lack of continuous sidewalks and bikeways, and the nature of the casino/hotel project, it is unlikely that significant numbers of project patrons will walk or bike to the site. Furthermore, the project is not expected to have a notable effect on current mobility for bicyclists and pedestrians.

### **Construction Traffic Impacts**

The day-to-day construction operations for the proposed construction of the Graton Rancheria Casino and Hotel will include traffic impacts related to construction employees, fill, and construction material importation. The principal activities expected to generate traffic related to the construction are listed below:

- Employee trips are based on the number of employees estimated to be on site during different points throughout the project. Each employee is assumed to drive to and from the site alone each day and it is assumed that 20% of the workers leave and return to the site for various purposes during the day.
- Construction import is based on the number of trucks required to deliver construction materials to the site, including building materials such as wood, steel, and masonry as well as fill from a nearby borrow pit.
- Heavy equipment is based on the number of large construction vehicles expected during the project duration. The heavy equipment expected as part of this project was provided by Station Casinos.

Using the expected traffic information above, construction related traffic generation was estimated. Each construction activity listed above will generate different volumes of traffic at different points in the project. For example, the delivery and removal of heavy equipment to the project site will happen only a few times during the project duration. The construction related traffic is expected to remain relatively consistent throughout the project.

It is estimated that it will take between 20 and 27 months to complete construction of the project including 4 to 5 months for the grading of the site for Alternatives A through E and Alternative H. Alternatives A, B, and C are estimated to take 27 months to complete construction. Alternatives D and H are estimated to take 24 months to complete construction and Alternative E is estimated to take 20 months to complete construction.

**Construction Material Import** – It is estimated that 300,000 cubic yards of earthwork will be required to develop the site for Alternative A. It is expected that construction of the proposed project will involve 25,000 cubic yards of earthwork from an on-site location

adjacent to the development area which would not generate any traffic on the surrounding roadways.

275,000 cubic yards of fill will be taken from an on-site location separated from the development area which would generate traffic on the surrounding roadways. The on-site separated location is the southern portion of the Wilfred site where truck traffic will travel on a 5 mile loop from Rohnert Park Expressway to Stony Point Road to Wilfred Avenue to Redwood and back to Rohnert Park Expressway. Trucks will leave/enter the on-site fill location at the Rohnert Park Expressway driveway just east of the Bellevue-Wilfred Channel. The trucks will leave/enter the development area at the Wilfred/Labath intersection. Based on a carrying capacity of 12 cubic yards per truck, it is estimated that it would take approximately 22,917 trucks to complete this task. Doubling to account for the inbound and outbound component of each round trip, this would result in approximately 45,834 trip ends. Assuming that these were spread out over a period of 5 months, with trucks operating at 6 days per week, 10 hours per day, this would result in 191 trucks making 382 trip ends on an average day with 19 trucks making 38 trip ends in any given hour (including potentially the peak hour) on the 5 mile loop.

It is estimated that 150,000 cubic yards of earthwork will be required to develop the site for Alternative B, Alternative D and Alternative E. It is expected that construction will involve 150,000 cubic yards of fill that will be taken from an on-site location separated from the development area which would generate traffic on the surrounding roadways. The on-site separated location is the southern portion of the Stony Point site where truck traffic will travel on a 5 mile loop from Rohnert Park Expressway to Stony Point Road to Wilfred Avenue to Redwood and back to Rohnert Park Expressway. Trucks will leave/enter the on-site fill location at the Rohnert Park Expressway driveway just east of the Bellevue-Wilfred Channel. The trucks will leave/enter the development area at the Stony Point Road/Project Driveway intersection. Assuming that the trips were spread out over a period of 4 months, with trucks operating at 6 days per week, 10 hours per day, this would result in 131 trucks making 262 trip ends on an average day with 13 trucks making 26 trip ends in any given hour (including potentially the peak hour) on the 5 mile loop.

It is estimated that 350,000 cubic yards of earthwork will be required to develop the site for Alternative C. It is expected that construction will involve 350,000 cubic yards of fill that will be taken from an on-site location separated from the development area which would generate traffic on the surrounding roadways. The on-site separated location is the southern portion of the Wilfred site where truck traffic will travel on a 5 mile loop from Rohnert Park Expressway to Stony Point Road to Wilfred Avenue to Redwood and back to Rohnert Park Expressway. Trucks will leave/enter the on-site fill location at the Rohnert Park Expressway driveway just east of the Bellevue-Wilfred Channel. The trucks will leave/enter the development area at the Wilfred/Whistler intersection. Assuming that the trips were spread out over a period of 5 months, with trucks operating at 6 days per week, 10 hours per day, this would result in 243 trucks making 486 trip

ends on an average day with 25 trucks making 50 trip ends in any given hour (including potentially the peak hour) on the 5 mile loop.

It is estimated that 270,000 cubic yards of earthwork will be required to develop the site for Alternative H. It is expected that construction will involve 25,000 cubic yards of earthwork from an on-site location adjacent to development area which would not generate any traffic on the surrounding roadways.

245,000 cubic yards of fill will be taken from an on-site location separated from the development area which would generate traffic on the surrounding roadways. The on-site separated location is the southern portion of the Wilfred site where truck traffic will travel on a 5 mile loop from Rohnert Park Expressway to Stony Point Road to Wilfred Avenue to Redwood and back to Rohnert Park Expressway. Trucks will leave/enter the on-site fill location at the Rohnert Park Expressway driveway just east of the Bellevue-Wilfred Channel. The trucks will leave/enter the development area at the Wilfred/Labath intersection. Assuming that these were spread out over a period of 5 months, with trucks operating at 6 days per week, 10 hours per day, this would result in 171 trucks making 342 trip ends on an average day with 17 trucks making 34 trip ends in any given hour (including potentially the peak hour) on the 5 mile loop.

Once the site is graded, the project will also require the importation of construction material including, raw materials, the building pad, concrete, the parking lot base and asphalt paving. This results in a material importation of 3,000 to 4,000 truckloads of material which will occur over approximately 23 months (or less, depending on the alternative). The importation will require approximately 8 to 9 truck trips per day outside of the off-site fill delivery. Each truck will generate 1 inbound and 1 outbound trip, accounting for 2 trips. Therefore, during the peak construction period the project will generate about 18 truck trips ends per day.

Because the import truck traffic generates significantly less traffic than the project's equivalent passenger car traffic generation (even when added to employee trips described below) and the vehicle path travels through generally uncongested intersection movements, it should not significantly impact the capacity of any study intersection. However, this level of truck traffic may have an impact on quality of life including increased noise, visual impact, perception of lower traffic safety, and the track of debris and mud onto roadways may create a perceptual impact as well as a physical impact. See Project Mitigations section for measures to address these impacts.

Employees – The weekday work will begin around 7:00 a.m. and end around 4:00 p.m. The construction worker arrival peak occurs between 6:30 a.m. and 7:30 a.m., and the departure peak occurs between 4:00 p.m. and 5:00 p.m. This is generally prior to the areawide commute peaks between 7:30 a.m. and 8:30 a.m. and between 4:30 p.m. and 5:30 p.m. with a period of overlap into the commute peak periods. There will be 600 to 800 employees on-site during construction and only half will be on the roadway during the peak hours.

Workers will generate peak parking demand equivalent to roughly 800 vehicles during the peak construction period. Additionally, deliveries, visits, and other activities may generate peak non-worker parking demand of up to another 50 trucks and autos. Therefore, an approximate demand of 850 vehicle parking spaces will be required during the peak construction period for the construction employees. It is anticipated that this demand will be able to be met on site at the casino construction site. As an alternative, the project could lease a remote lot and shuttle employees to the construction site.

The impacts of construction related employee traffic and parking are considered less than significant because the construction commute peak and the areawide commute peak will only have a brief period of overlap and the parking demand will be able to be met at the casino construction site.

**Heavy Equipment** – A total of approximately 30 pieces of heavy equipment will be used based on wide-load permits necessary at various times over the course of the construction period. Delivery and removal of heavy equipment will occur outside of the areawide commute peak and equipment will be moved in and out of the site on different days. The periodic delivery during off-peak hours constitutes a minimum disruption of traffic.

The impacts of the periodic delivery and removal of heavy equipment during off-peak hours constitutes a minimum disruption of traffic and thus is considered less than significant.

## ALTERNATIVE A – WILFRED AVENUE SITE

The Alternative A casino and hotel is proposed to be located as shown in **Figure A1**, which is bordered by Wilfred Avenue in the north, Business Park Drive in the south, Langner Avenue in the west, and Dowdell Avenue in the east.

The site layout as shown in **Figure A2** includes a main building of approximately 450,000 square feet for a casino, restaurants, food court, event center, banquet facilities, lobby, pool, and other ancillary functions. In addition, the project is planned to include up to 300 hotel rooms, primarily for casino guests.

A breakdown of square footage as it relates to traffic impacts is shown below:

- Casino and Entertainment areas – 408,150 s.f.
- Lobby/Bar/Back of House/Sundries – 14,750 s.f.
- Pool and Spa – 27,100 s.f.  
450,000 s.f.
  
- Hotel Rooms – 291,000 s.f.

The site plan also shows supporting uses such as parking lots, parking structure, and wastewater treatment facilities.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

The main access points to the project are located on Langner Avenue and Labath Avenue via Wilfred Avenue. These approaches are assumed to operate as full movement driveways with no turn limitations. The project will extend Labath Avenue to the south to intersect Business Park Drive. A third project access will be on Labath Avenue just north of Business Park Drive and is assumed to be a full movement driveway with no turn limitations.

Currently, none of the accesses are signalized.

### Trip Generation – Alternatives A, B, and C

Trip generation was calculated based on the previous discussions and is reported in **Table A1**. Additional trip generation calculations are contained in the **Appendix**. Since Alternatives A, B and C are all casinos with the same amount of gaming space and hotel space, trip generation numbers are the same for all three Alternatives. As seen in

the table Alternatives A, B and C are expected to generate 1,384 new trips in the AM and 2,287 new trips in the weekday PM peak hour. Although project trip generation was prepared for daily, AM, and PM periods, only the PM traffic conditions were evaluated in this report because it represents the time period where the project will contribute to the greatest amount of congestion and potential mitigation. Other time periods that were considered included weekday AM, weekday late PM, and Saturday. On weekday late evenings and Saturday evenings the casino facility will generate more trips than during the 4-6 PM weekdays, but the background traffic is lower, making the overall number of vehicles on the road lower as well. Therefore, the PM peak represents the worst case period to evaluate.

**Table A 1 – Alternatives A, B and C Project Trip Generation**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Casino 450,000 s.f.	17,744	930	398	1,328	1,181	1,047	2,228
Hotel 300 Room*	817	34	22	56	31	28	59
<b>Net New Vehicle Trips</b>	<b>18,261</b>	<b>964</b>	<b>420</b>	<b>1,384</b>	<b>1,212</b>	<b>1,075</b>	<b>2,287</b>

\*Trip rate is ITE Land Use Code 310 – Hotel. Rate reduced by 2/3 to account for internal capture to/from casino.

## Project Trip Distribution and Assignment

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to destinations north of the site, with the remaining 70% distributed south of the site. To be conservative, only a small percentage of project traffic was assumed to be generated or attracted in the immediate vicinity of the project site. The project traffic distribution is shown in **Figure A3** and **Figure A4**. **Figure A5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure A5**, most of the project traffic is expected to come from the freeway therefore it was assumed that most of the traffic would use Labath Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

## Near-Term Plus Project Traffic Volumes

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the Alternative A casino and hotel project. **Figure A6** illustrates the combined near-term turning movement volumes at the study intersections.

## Long-Term Plus Project Traffic Volumes

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the Alternative A casino and hotel project. **Figure A7** illustrates the combined long-term turning movement volumes at the study intersections.

## Alternative A LOS Conditions and Impacts at Intersections

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative A (year 2008)
- Long-term Cumulative conditions with Alternative A (year 2020)

In the near-term analysis for Alternative A, it was assumed that the Wilfred Avenue widening project will not have taken place before the casino/hotel opens. The Memorandum of Understanding (MOU) between the City of Rohnert Park and the Federated Indians of the Graton Rancheria stated that the tribe would help financially to speed up the timeline of the widening project to occur before the casino/hotel opens in 2008. The MOU was negotiated before Alternative A existed, but it was assumed that the MOU will be renegotiated to apply to Alternative A as well.

Results of the analysis are presented in **Table A2**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

### 2008 Results

- Stony Point Road/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Labath Avenue
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road





**Table A 2 – Alternative A Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	13.8	B	12.5	C	16.2
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	13.8	B	12.5	C	15.8
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	F	51.3	B	12.5	F	111.1
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	148.7	F	169.9	F	182.3
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	22.5	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	27.7	C	26.8	D	45.7
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	E	69.4	E	74.2	F	96.2
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	14.6	B	19.0	B	19.7
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	64.8	D	50.8	E	66.2
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	-	-	-	-	-	B	10.6	-	-	B	10.3
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	22.2
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	B	19.8	B	18.5	C	21.7
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	D	43.3	C	28.2	D	40.6
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	26.0	C	29.1	C	26.4
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.2	B	16.0	B	16.0
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	18.5	B	12.3	B	17.4
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	38.9	E	63.4	C	33.0
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	37.6	D	45.5	F	118.2
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	28.0	C	28.0	D	42.4	E	56.3
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	17.4	B	18.1	B	19.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.4	B	11.5	B	11.4
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	72.0	F	90.2	F	156.3
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.6	B	12.4	B	12.2
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.7	B	12.5	B	12.4
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	B	11.0	B	11.3	B	11.4
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	12.0	B	14.7	B	13.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.4

## **2020 Results**

- Stony Point Road/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Labath Avenue
- Gravenstein Highway (SR-116)/Stony Point Road
- Gravenstein Highway (SR-116)/Redwood Drive
- Millbrae Avenue/Stony Point Road

## **Alternative A Traffic Signal Warrant Analysis**

Alternative A, near-term and long-term, traffic volumes at unsignalized study intersections were compared against peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Langner Avenue/Wilfred Avenue (2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.



## **Alternative A LOS Conditions and Impacts on Freeway and Ramps**

Project trips generated by the proposed casino and hotel were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the casino and hotel project. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table A3**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project.



**Table A 3 – Alternative A Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt A		2020		2020 + Alt A		
	LOS	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>													
US-101 South of Gravenstein Highway (NB)	E	C	22.2	C	19.1	D	26.9	C	25.6	E	38.4		
Gravenstein Highway NB Off-Ramp	E	D	30.8	C	27.4	E	35.2	D	34.1	F	41.8		
Gravenstein Highway NB On-Ramp	E	D	34.5	D	29.5	E	36.5	E	36.1	F	43.1		
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	28.1	C	23.5	D	31.7	D	32.3	F	-		
Rohnert Park Expressway NB Off-Ramp	E	D	33.6	D	28.8	D	33.9	E	37.1	F	42.1		
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1	C	21.8	C	24.5	C	23.2	C	25.9		
Rohnert Park Expressway NB On-Ramp	E	D	32.5	C	22.1	D	31.2	D	29.0	E	39.1		
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	28.9	C	22.1	D	31.2	D	29.0	E	39.1		
Wilfred Avenue NB Off-Ramp	E	E	35.4	C	22.1	D	31.2	D	29.0	E	39.1		
Wilfred Avenue NB On-Ramp	E	F	42.0	D	30.3	D	33.6	E	40.4	E	41.0		
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	26.7	D	30.3	D	33.6	E	40.4	E	41.0		
Santa Rosa Avenue NB Off-Ramp	E	E	37.2	D	30.3	D	33.6	E	40.4	E	41.0		
US-101 North of Santa Rosa Avenue (NB)	E	C	20.3	C	22.0	C	23.8	D	29.7	D	32.6		
<b>Southbound</b>													
US-101 North of Santa Rosa Avenue (SB)	E	C	22.9	C	24.1	D	26.1	D	28.5	D	31.2		
Santa Rosa Avenue SB On-Ramp	E	D	31.2	D	32.7	E	36.2	F	-	F	-		
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	31.5	D	32.7	E	36.2	F	-	F	-		
Wilfred Avenue SB Off-Ramp	E	E	38.0	E	38.8	E	40.8	F	44.8	F	46.8		
Wilfred Avenue SB On-Ramp	E	D	33.7	D	33.4	E	39.4	E	39.9	F	48.8		
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	35.2	D	33.4	E	39.4	E	39.9	F	48.8		
Rohnert Park Expressway SB Off-Ramp	E	E	38.0	D	33.4	E	39.4	E	39.9	F	48.8		
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0	D	30.9	D	35.4	E	38.5	F	41.3		
Rohnert Park Expressway SB On-Ramp	E	E	35.1	D	30.1	D	36.1	F	37.5	F	43.0		
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	27.1	C	22.3	D	29.8	E	36.6	F	-		
Gravenstein Highway SB Off-Ramp	E	D	33.9	D	29.2	E	36.1	F	40.3	F	47.2		
Gravenstein Highway SB On-Ramp	E	D	33.7	D	32.1	E	38.3	F	42.3	F	48.5		
US-101 South of Gravenstein Highway (SB)	E	C	24.7	C	21.8	D	29.0	D	32.0	F	-		

## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.



## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table A4**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.

**Table A 4 – Alternative A Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length		
			2008	2020				2008	2020	
1 Story Point Road and Wilfred Avenue	EBL				16 Story Point Road and Rohnert Park Expy	EBL				
	EBR					EBR				
	WBL					WBL				
	WBR	35		OVRFLOVRFL		WBR	175	54	60	
	NBL	150		25		25	NBL			
	NBR						NBR	450	38	40
4 Langner Avenue and Wilfred Avenue	SBL	150		26	35	SBL	700	194	213	
	SBR				SBR					
	EBL				EBL	160	61	67		
	EBR				EBR	200	25	26		
	WBL	150			25	WBL	250	62	41	
	WBR					WBR	170	25	25	
5 Labath Avenue and Wilfred Avenue	NBL					NBL	130	36	38	
	NBR					NBR	130	36	33	
	SBL					SBL	100	573	547	
	SBR					SBR				
	EBL	150			25	EBL	200	109	98	
	EBR					EBR	200	25	25	
6 Dowdell Avenue and Wilfred Avenue	WBL	150			88	WBL	350	154	204	
	WBR					WBR	155	36	41	
	NBL					NBL	250	157	136	
	NBR					NBR	250	65	64	
	SBL					SBL	175	188	237	
	SBR					SBR	175	58	56	
7 Redwood Drive and Wilfred Avenue	EBL	150			25	EBL				
	EBR					EBR				
	WBL	150			80	WBL	225	56	63	
	WBR					WBR				
	NBL					NBL				
	NBR					NBR				
8 Redwood Drive and Commerce Boulevard	SBL					SBL	400	318	311	
	SBR					SBR	400	228	203	
	EBL	150			111	EBL	190	25	25	
	EBR	150			168	EBR				
	WBL					WBL				
	WBR					WBR				
9 Willfred Avenue and SB US 101 Ramps	NBL	150			317	352	NBL	225	473	495
	NBR	100			97	110	NBR			
	SBL	275			314	474	SBL			
	SBR						SBR			
	EBL	75			25		EBL	250	69	69
	EBR	75			49		EBR			
10 Golf Course Drive and Commerce Blvd	WBL	100			25		WBL	200	187	264
	WBR						WBR			
	NBL	150			131		NBL	250	210	245
	NBR	150			25		NBR	175	56	75
	SBL	200			40		SBL	150	98	147
	SBR						SBR	150	51	50
11 Roberts Lake Drive and Golf Course Drive	EBL						EBL	350	162	183
	EBR						EBR			
	WBL	200			30	25	WBL	500	155	136
	WBR						WBR	150	43	42
	NBL						NBL	550	296	290
	NBR						NBR	675	30	29
12 Commerce Blvd and NB US 101 Ramps	SBL	550			261	405	SBL	500	169	344
	SBR						SBR	625	49	51
	EBL						EBL	225	161	171
	EBR						EBR			
	WBL	180			191	99	WBL	150	53	79
	WBR						WBR	80	25	32
13 Business Park Drive and Redwood Drive	NBL	75			284	116	NBL	50	65	65
	NBR						NBR			
	SBL	290			45	25	SBL	225	388	513
	SBR						SBR			
	EBL	100			107	68	EBL			
	EBR						EBR	50	101	102
14 Story Point Road and Rohnert Park Expy	WBL						WBL	100	104	124
	WBR						WBR			
	NBL						NBL			
	NBR						NBR			
	SBL	200			77	106	SBL	425	222	216
	SBR						SBR			
15 Story Point Road and Rohnert Park Expy	EBL	250			442	460	EBL			
	EBR	250			23	37	EBR			
	WBL						WBL			
	WBR						WBR			
	NBL	200			478	531	NBL	395	144	150
	NBR						NBR	275	178	191
16 Story Point Road and Rohnert Park Expy	SBL	100			25	25	SBL			
	SBR	175			236	203	SBR			
	EBL	225			97	75	EBL			
	EBR						EBR			
	WBL						WBL			
	WBR						WBR	120	48	132
17 Labath Avenue and Rohnert Park Expy	NBL	150			25	25	NBL	505	25	25
	NBR						NBR	120	25	25
	SBL						SBL	490	25	25
	SBR						SBR			
	EBL						EBL			
	EBR						EBR			
18 Redwood Drive and Rohnert Park Expy	WBL						WBL			
	WBR						WBR			
	NBL						NBL			
	NBR						NBR			
	SBL						SBL			
	SBR						SBR			
19 SB US 101 Ramps and Rohnert Park Expy	EBL						EBL			
	EBR						EBR			
	WBL	225			56	63	WBL			
	WBR						WBR			
	NBL						NBL			
	NBR						NBR			
20 NB US 101 Ramps and Rohnert Park Expy	SBL	400			318	311	SBL			
	SBR	400			228	203	SBR			
	EBL	190			25	25	EBL			
	EBR						EBR			
	WBL						WBL			
	WBR						WBR			
21 Commerce Blvd and Rohnert Park Expy	NBL	225			473	495	NBL			
	NBR						NBR			
	SBL						SBL			
	SBR						SBR			
	EBL	250			69	69	EBL			
	EBR						EBR			
22 Story Point Road and Gravenstein Hwy	WBL	200			187	264	WBL			
	WBR						WBR			
	NBL	250			210	245	NBL			
	NBR	175			56	75	NBR			
	SBL	150			98	147	SBL			
	SBR	150			51	50	SBR			
23 Redwood Road and Gravenstein Hwy	EBL	350			162	183	EBL			
	EBR						EBR			
	WBL	500			155	136	WBL			
	WBR	150			43	42	WBR			
	NBL	550			296	290	NBL			
	NBR	675			30	29	NBR			
24 Gravenstein Hwy and SB US 101 Ramps	SBL	500			169	344	SBL			
	SBR	625			49	51	SBR			
	EBL	225			161	171	EBL			
	EBR						EBR			
	WBL	150			53	79	WBL			
	WBR	80			25	32	WBR			
25 Gravenstein Hwy and NB US 101 Ramps	NBL	50			65	65	NBL			
	NBR						NBR			
	SBL	225			388	513	SBL			
	SBR						SBR			
	EBL						EBL			
	EBR						EBR			
26 Story Point Road and Millbrae Avenue	WBL						WBL			
	WBR						WBR			
	NBL						NBL			
	NBR						NBR			
	SBL						SBL			
	SBR						SBR			

## Alternative A Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative A traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown on **Table A5** are needed in the near-term (2008) and long-term (2020) to mitigate project impacts.

**Table A6** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections.

**Figures A8 and 9** illustrate the mitigated lane geometry and traffic control.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue.

The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to Langner Avenue at the edge of the project site. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be two lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and should include Class II bike lanes out to Stony Point Road to connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be accommodated on a three lane roadway section from Redwood Drive to Langner Avenue, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Langner Avenue and Labath Avenue should be improved and either removed from County jurisdiction or designed to the County standard.

An overcrossing should be built from State Farm Drive to Business Park Drive over US-101 with a southbound slip ramp lane that would open up just south of the US-101 NB off-ramp directly to the overcrossing. The overcrossing helps redirect project traffic away from the Wilfred interchange to a new facility capable of accommodating casino traffic. Additional right-of-way is necessary on State Farm Drive as well as Business Park Drive. Access to State Farm Drive will need to be modified and adjusted, but it is not anticipated that there will need to be any closures associated with the overcrossing. The overcrossing should begin east of the State Farm Drive/Commerce Boulevard intersection and touch down west of the Business Park Drive/Redwood Drive intersection. With this mitigation, all of the existing turning movements at the





Commerce/State Farm and the Redwood/Business Park intersections will be permitted as they currently exist.

In addition to the overcrossing in the long-term, modification of the Commerce Boulevard/US-101 NB Ramps intersection should be completed which would realign Wilfred Avenue, Commerce Boulevard, Golf Course Drive, and US-101 NB Ramps and combine with the Golf Course Dr/Commerce Blvd intersection. The southbound approach from Wilfred Avenue will be two left turn lanes, one through lane, and a free right turn lane. The northbound approach from Commerce Boulevard will be two left turn lanes, two through lanes, and a right turn lane. The eastbound approach from the US-101 NB off-ramp will be two left turn lanes, one through lane, and one right turn lane. The westbound approach from Golf Course Drive will be a left turn lane, a through lane, and a right turn lane.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.

**Table A 5 – Alternative A Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Willfred Ave	• Signalize	No	Capacity
	2	Primrose Ave/ Willfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Willfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Willfred Ave	• Add NB left and change all shared to through-right • Add a WB left turn lane and change all shared to through-right <sup>1</sup>	Tribe land Yes	Capacity Capacity
	5	Labath Ave/ Willfred Ave	• Signalize • Add EB left and change EB all shared to through-right <sup>1</sup> • Add WB left and change WB all shared to through-right <sup>1</sup> • Add NB right and change NB all shared to left-through	No Yes Yes Yes	Capacity Capacity Capacity Tribeland
	6	Dowdell Ave/ Willfred Ave	• Signalize • Add WB left and change WB all shared to through-right <sup>1</sup> • Add EB left and change EB all shared to through-right <sup>1</sup>	No Yes Yes	Capacity Capacity Capacity
	7	Redwood Dr/ Willfred Ave	• Change WB left-through to WB through • Change phasing east-west to protected from split • Add EB left and EB right and change EB all shared to through <sup>1</sup>	No No Yes	Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Willfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	Commerce Blvd/US-101 NB Ramps mitigation alleviates the impact	-	-
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	• Construct the State Farm-Business Park Overcrossing and a southbound slip ramp from the US-101 NB Ramps to the overcrossing	Yes	Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	No mitigation necessary	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	• Change SB through-right to all-shared • Change NB/SB phasing from protected to split phasing • Extend SB left turn bay to 350 feet (from 100 feet)	Yes No Yes	Capacity Capacity Queue
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 400 feet (from 225 feet) • Add second NB left turn lane	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	• Optimize signal timing	No	Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

<sup>1</sup> In summary, widen Willfred Ave to three lanes from Langer Ave to Redwood Dr



Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	• Signalize	No	Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	• Add NB left and change all shared to through-right * • Signalize	Tribe land No	Capacity Capacity
	5	Labath Ave/ Wilfred Ave	• Signalize * • Optimize signal timing • Add NB right and change NB all shared to through-left *	No No Tribe land	Capacity Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	• Signalize * • Optimize signal timing	No No	Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	• Optimize signal timing • Change WB left-through to through * • Change phasing east-west to protected from split *	No Yes No	Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	Modified Intersection (Combined with Intersection #12)	-	-
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	• Modify intersection to realign Wilfred Avenue, Commerce Boulevard, Golf Course Drive, and US-101 NB Ramps and combine with the Golf Course Dr/Commerce Blvd intersection. The southbound approach will be from Wilfred Avenue, the northbound approach will be from Commerce Boulevard, the eastbound approach will be from the US-101 NB off-ramp, and the westbound approach will be from Golf Course Drive. • Construct the State Farm-Business Park Overcrossing and a southbound slip ramp from the US-101 NB Ramps to the overcrossing*	Yes Yes	Capacity Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	No mitigation necessary	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	• Change SB through-right to all-shared * • Change NB/SB phasing from protected to split phasing * • Extend SB left turn bay to 350 feet (from 100 feet) *	Yes No Yes	Capacity Capacity Queue
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 400 feet (from 225 feet) * • Add second NB left turn lane *	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	No mitigation necessary	-	-
	22	Gravenstein Hwy/ Stony Point Rd	• Add an EB right turn bay for 100 feet • Optimize signal timing	Yes No	Capacity Capacity
	23	Gravenstein Hwy/ Redwood Dr	• Optimize signal timing	No	Capacity
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

\* Improvement assumed to occur with 2008 mitigation



**Table A 6 – Alternative A Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005				2008				2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	C	25.4	F	841.3	F	OVRFL	D	35.2
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	13.8	B	13.8	B	12.5	C	16.2	C	16.2
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	13.8	B	13.8	B	12.5	C	15.8	C	15.8
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	F	51.3	C	18.0	B	12.5	F	111.1	C	26.5
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	C	26.9	F	OVRFL	F	OVRFL	C	25.8
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	B	10.8	F	OVRFL	F	OVRFL	C	35.0
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	148.7	D	37.5	F	169.9	F	182.3	D	40.2
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	22.5	C	27.5	-	-	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	27.7	C	22.3	C	26.8	D	45.7	C	24.3
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	E	69.4	C	46.9	E	74.2	F	96.2	-	-
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	14.6	C	20.1	B	19.0	B	19.7	B	12.4
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	64.8	D	48.5	D	50.8	E	66.2	C	28.5
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	-	-	-	-	-	B	10.6	B	12.9	-	-	B	10.3	B	12.4
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	22.2	C	22.2
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	B	19.8	B	19.8	B	18.5	C	21.7	C	21.7
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	D	43.3	C	28.6	C	28.2	D	40.6	C	28.2
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	26.0	C	26.8	C	29.1	C	28.4	C	27.0
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.2	B	18.6	B	16.0	B	16.0	B	16.0
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	18.5	B	12.5	B	12.3	B	17.4	B	11.3
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	38.9	C	32.0	E	63.4	C	33.0	C	37.2
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	37.6	D	37.6	D	45.5	F	118.2	D	54.5
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	27.0	C	27.0	D	42.4	E	56.3	D	52.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.1	B	19.1	B	18.1	B	19.6	B	19.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.4	B	11.4	B	11.5	B	11.4	B	11.4
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	72.0	B	10.6	F	90.2	F	156.3	B	10.1
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.6	B	11.6	B	12.4	B	12.2	B	12.2
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.7	B	11.7	B	12.5	B	12.4	B	12.4
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	B	11.0	B	11.0	B	11.3	B	11.4	B	11.4
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	12.0	B	12.0	B	14.7	B	13.7	B	13.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.4	B	11.4

Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table A7**:

- Adjust the ramp metering to account for the additional project traffic at the Wilfred Avenue interchange in the long-term (2020). Most metering adjustments can be minor and are not expected to have queuing effects on the local street network. However, the southbound on-ramp will require heavy metering to obtain an acceptable level of service for the freeway ramp merge area which may create a long queue backed up on the ramp.
- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to south of Gravenstein Highway (SR-116) as well as an additional traffic lane in the northbound direction from West Sierra Avenue to Gravenstein Highway (SR-116) in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the casino and hotel should coordinate with the Green Music Center during outdoor events that will generate high traffic levels. During that period, traffic control services at the Rohnert Park interchange may be necessary. Therefore, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control

Because no fixed route service will be available at the project site, the casino/hotel should provide a shuttle that serves the two Rohnert Park transfer stations. The shuttle should run throughout the day or could be called out on demand. The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.

Table A 7 – Alternative A Mitigated Freeway Level of Service Summary

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt A		2020		2020 + Alt A		2020 + Alt A Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>														
US-101 South of Gravenstein Highway (NB)	E	C	C	22.2	C	19.1	D	26.9	C	25.6	E	38.4	E	38.4
Gravenstein Highway NB Off-Ramp	E	D	C	30.8	C	27.4	E	35.2	D	34.1	F	41.8	D	29.1
Gravenstein Highway NB On-Ramp	E	D	D	34.5	D	29.5	E	36.5	E	36.1	F	43.1	E	40.4
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	C	28.1	C	23.5	D	31.7	D	32.3	F	-	E	40.4
Rohnert Park Expressway NB Off-Ramp	E	D	D	33.6	D	28.8	D	33.9	E	37.1	F	42.1	E	40.4
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	C	32.1	C	21.8	C	24.5	C	23.2	C	25.9	C	25.9
Rohnert Park Expressway NB On-Ramp	E	D	D	32.5	C	22.1	D	31.2	D	29.0	E	39.1	E	39.1
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	C	28.9	C	22.1	D	31.2	D	29.0	E	39.1	E	39.1
Wilfred Avenue NB Off-Ramp	E	E	C	35.4	C	22.1	D	31.2	D	29.0	E	39.1	E	39.1
Wilfred Avenue NB On-Ramp	E	F	D	42.0	D	30.3	D	33.6	E	40.4	E	41.0	E	41.0
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	D	26.7	D	30.3	D	33.6	E	40.4	E	41.0	E	41.0
Santa Rosa Avenue NB Off-Ramp	E	E	D	37.2	D	30.3	D	33.6	E	40.4	E	41.0	E	41.0
US-101 North of Santa Rosa Avenue (NB)	E	C	C	20.3	C	22.0	C	23.8	D	29.7	D	32.6	D	32.6
<b>Southbound</b>														
US-101 North of Santa Rosa Avenue (SB)	E	C	C	22.9	C	24.1	D	26.1	D	28.5	D	31.2	D	31.2
Santa Rosa Avenue SB On-Ramp	E	D	D	31.2	D	32.7	E	36.2	F	-	F	-	C	24.8
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	D	31.5	D	32.7	E	36.2	F	-	F	-	C	24.8
Wilfred Avenue SB Off-Ramp	E	E	E	38.0	E	38.8	E	40.8	F	44.8	F	46.8	D	33.0
Wilfred Avenue SB On-Ramp	E	D	D	33.7	D	33.4	E	39.4	E	39.9	F	46.8	D	34.2
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	E	35.2	D	33.4	E	39.4	E	39.9	F	46.8	D	34.2
Rohnert Park Expressway SB Off-Ramp	E	E	E	38.0	D	33.4	E	39.4	E	39.9	F	46.8	D	34.2
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	E	36.0	D	30.9	D	35.4	E	38.5	F	41.3	C	26.1
Rohnert Park Expressway SB On-Ramp	E	E	D	35.1	D	30.1	D	36.1	F	37.5	F	43.0	D	40.0
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	C	27.1	C	22.3	D	29.8	E	36.6	F	-	D	40.0
Gravenstein Highway SB Off-Ramp	E	D	D	33.9	D	29.2	E	36.1	F	40.3	F	47.2	D	40.0
Gravenstein Highway SB On-Ramp	E	D	D	33.7	D	32.1	E	38.3	F	42.3	F	48.5	D	29.7
US-101 South of Gravenstein Highway (SB)	E	C	C	24.7	C	21.8	D	29.0	D	32.0	F	-	C	23.5

It is recommended that the casino contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.

If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.

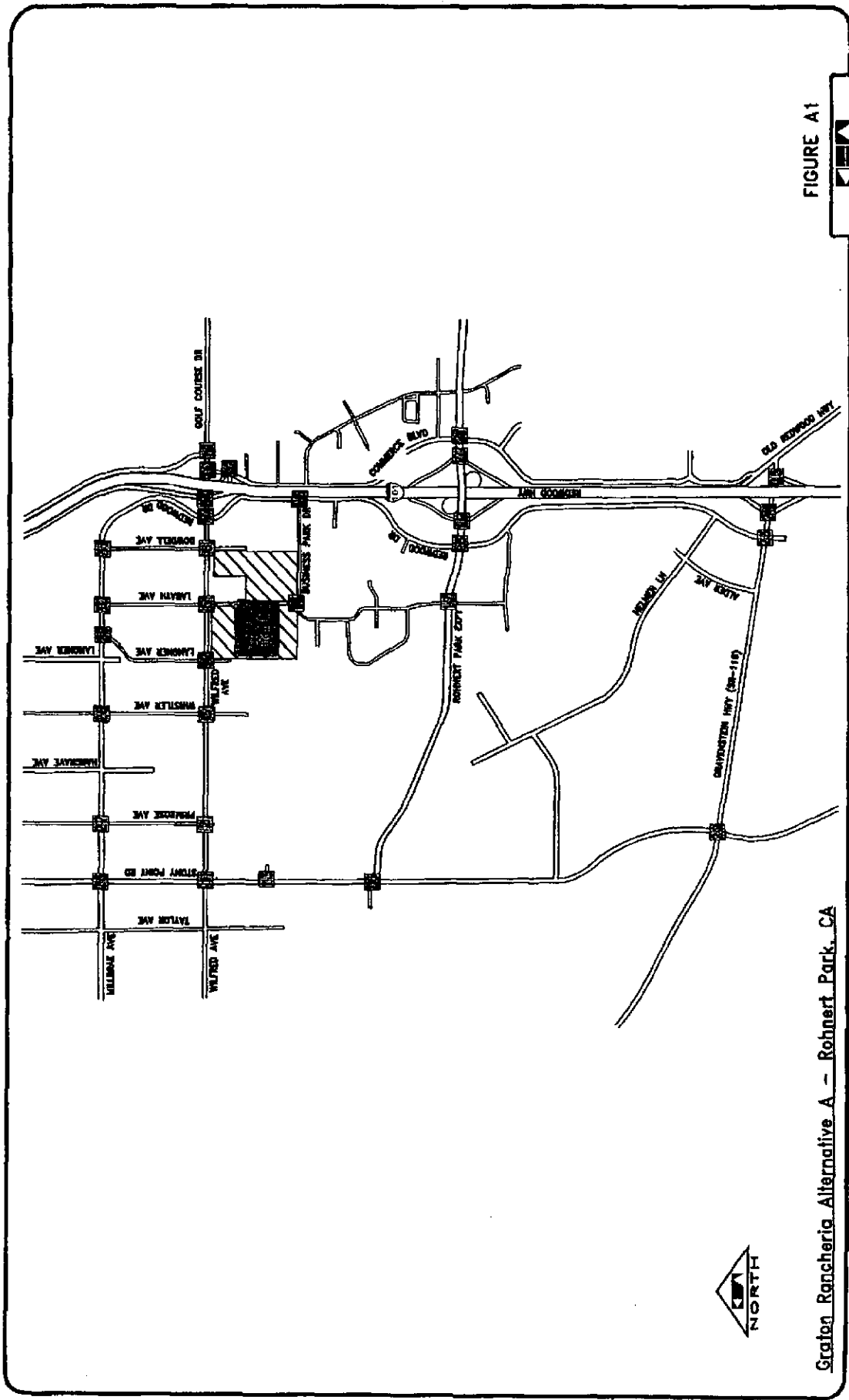


FIGURE A1



Graton Rancheria Alternative A - Rohnert Park, CA

PROJECT LOCATION





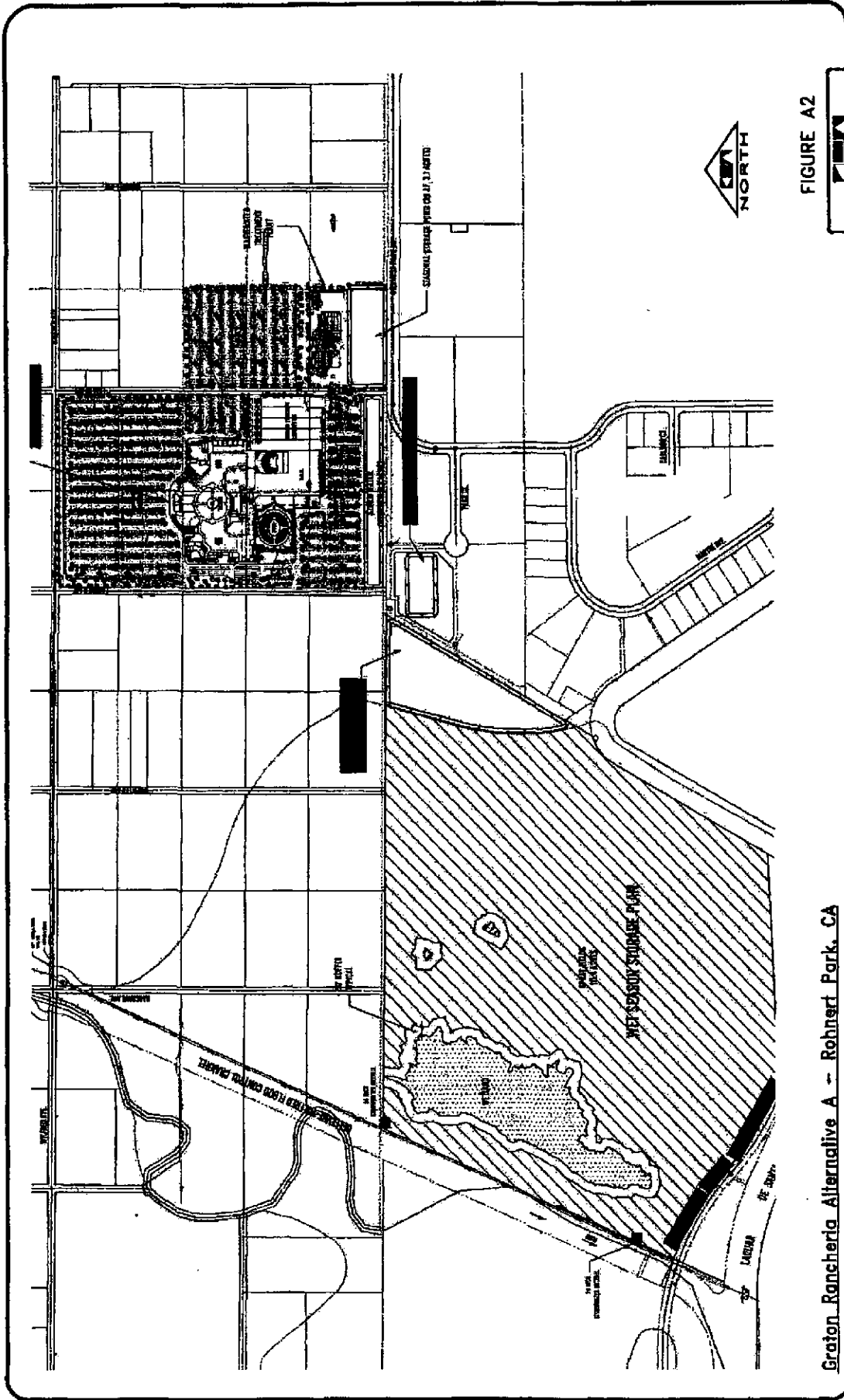


FIGURE A2



Graton Rancheria Alternative A - Rohnert Park, CA

SITE PLAN

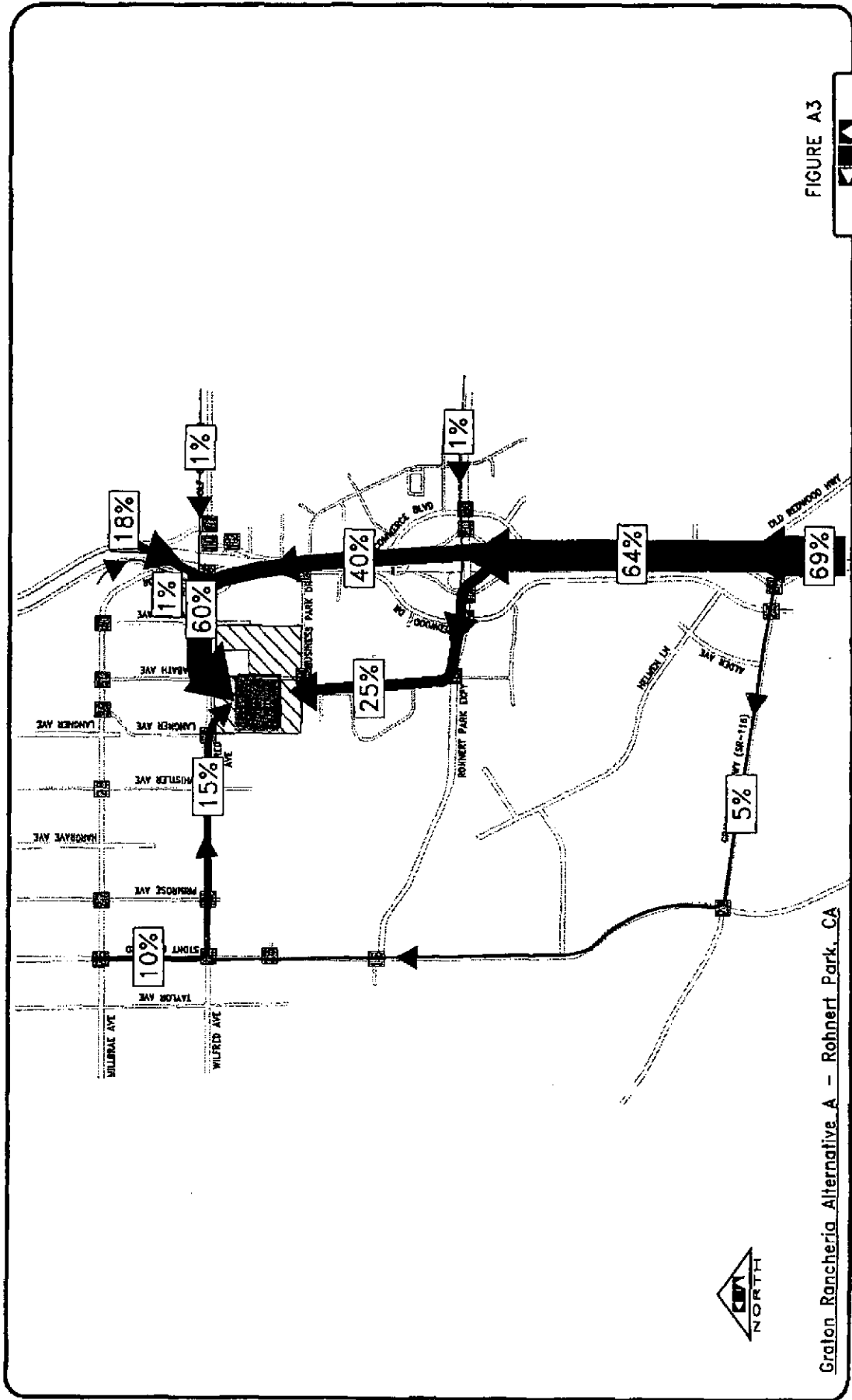


FIGURE A3



Knight-Ridder and Associates, Inc.



Graton Rancheria Alternative A - Rohnert Park, CA

TRIP DISTRIBUTION - IN

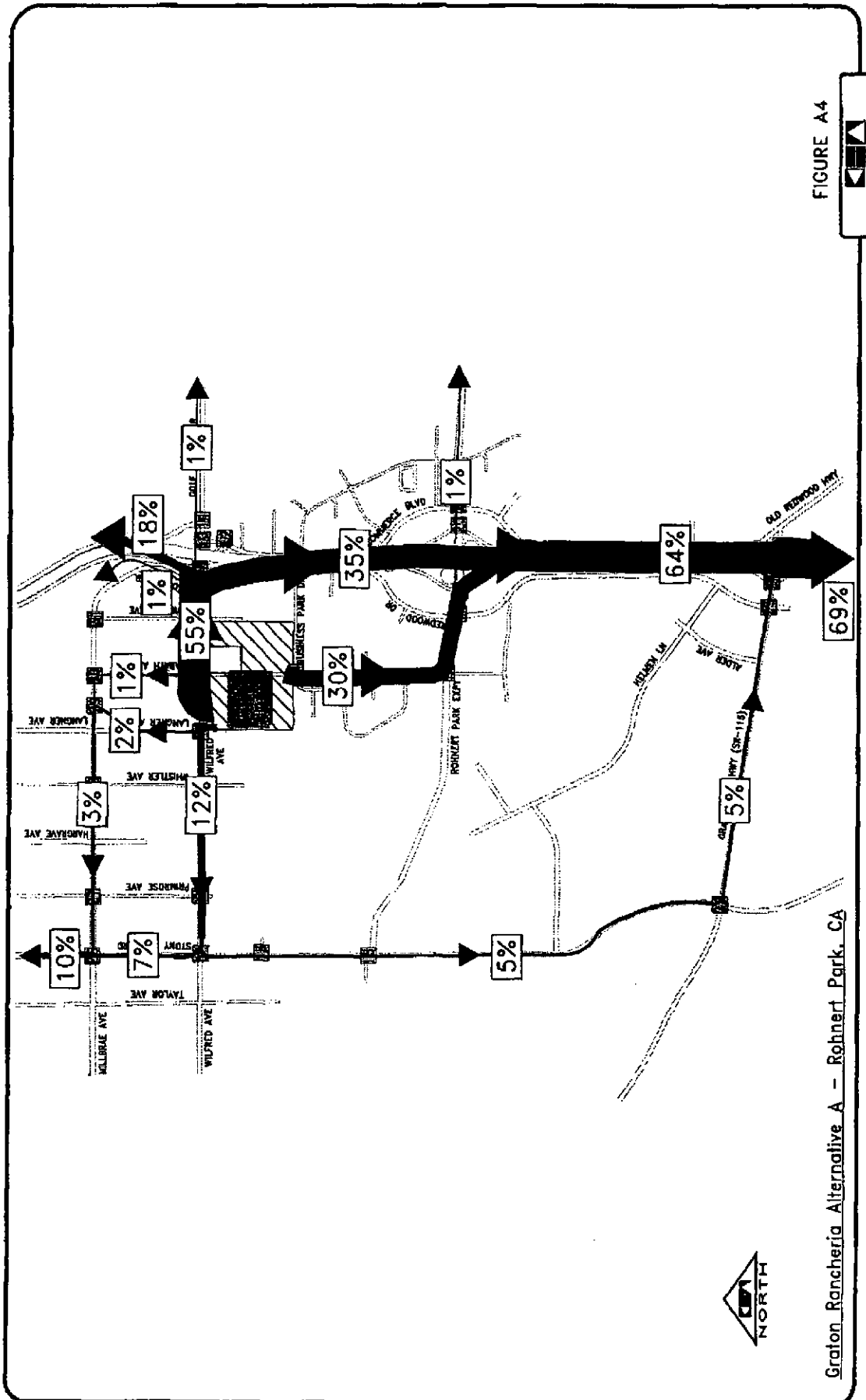


FIGURE A4



Graton Rancheria Alternative A - Rohnert Park, CA

TRIP DISTRIBUTION - OUT



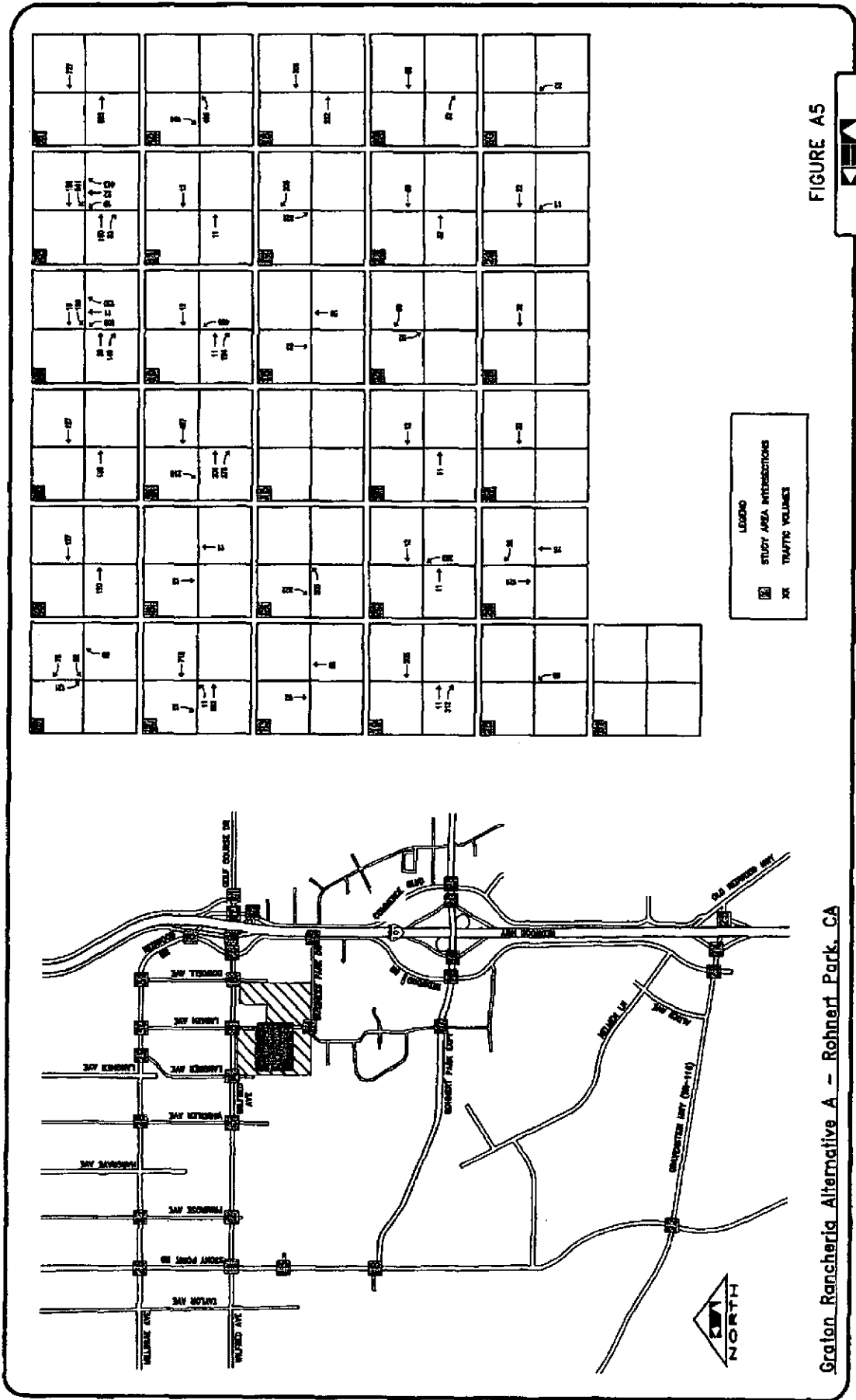
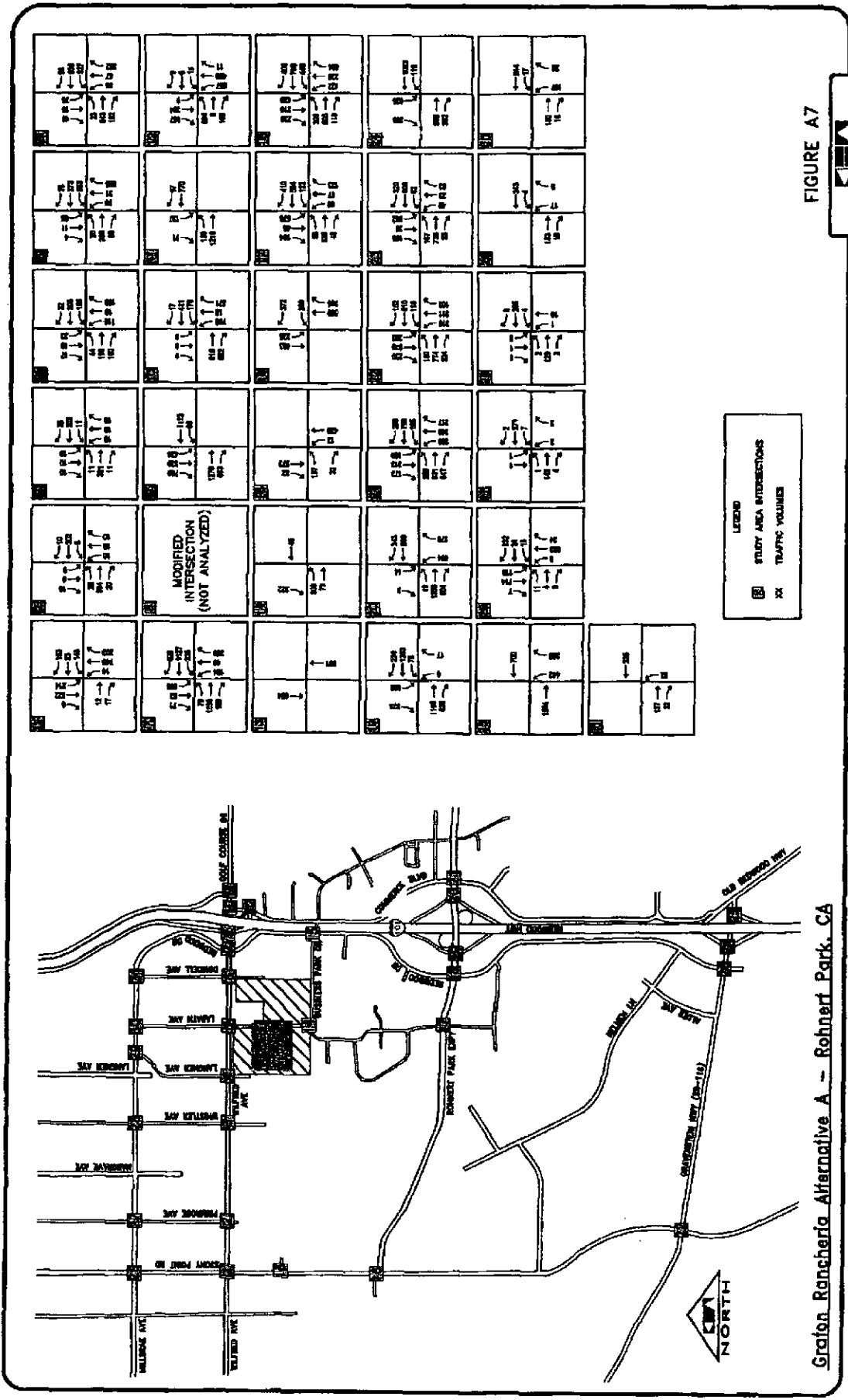


FIGURE A5

PROJECT GENERATED PM TRAFFIC VOLUMES





Grafton Rancheria Alternative A - Rohmert Park, CA

LONG-TERM CUMULATIVE + PROJECT PM TRAFFIC VOLUMES

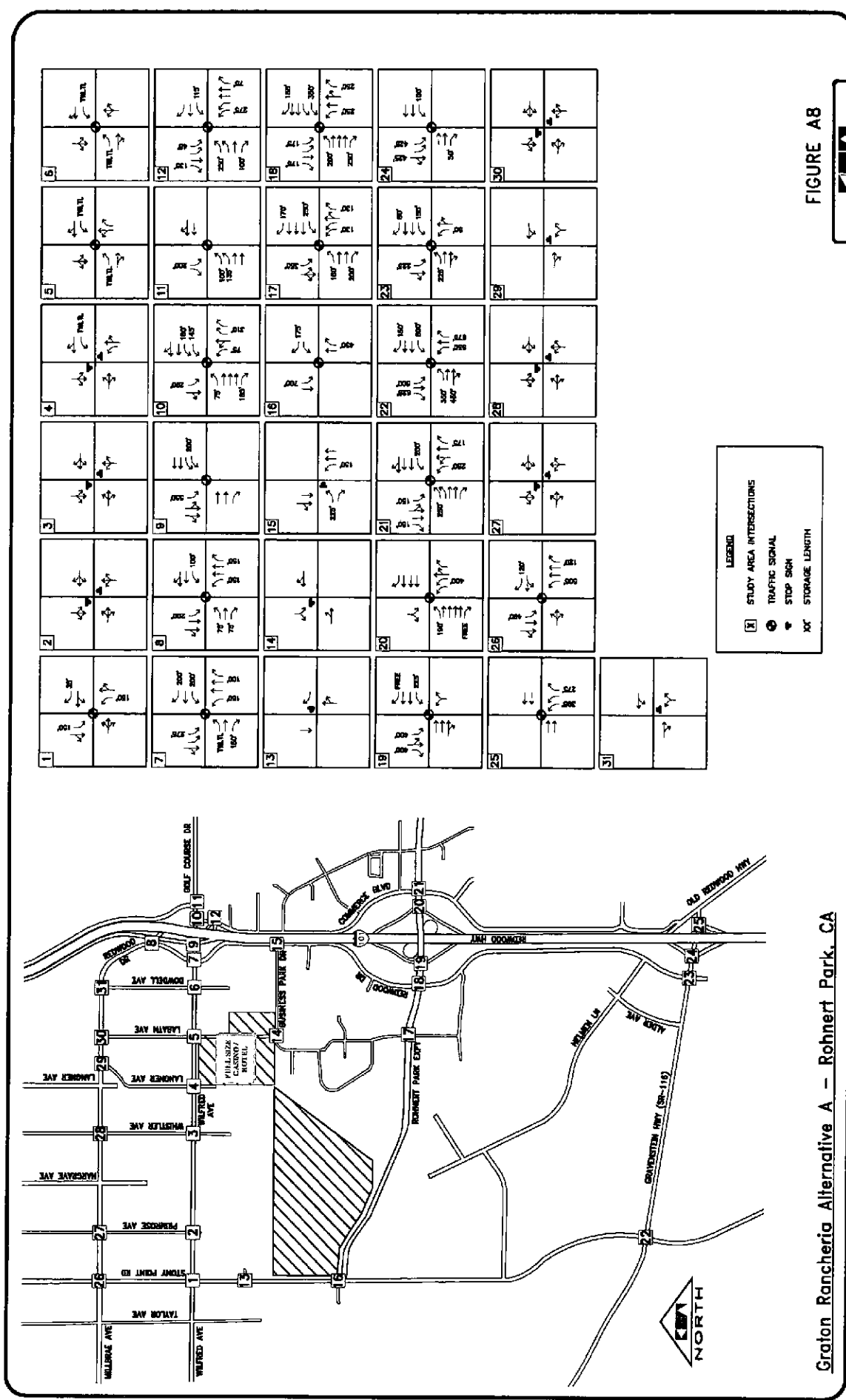


FIGURE A8



Graeton Rancheria Alternative A - Rohnert Park, CA

NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

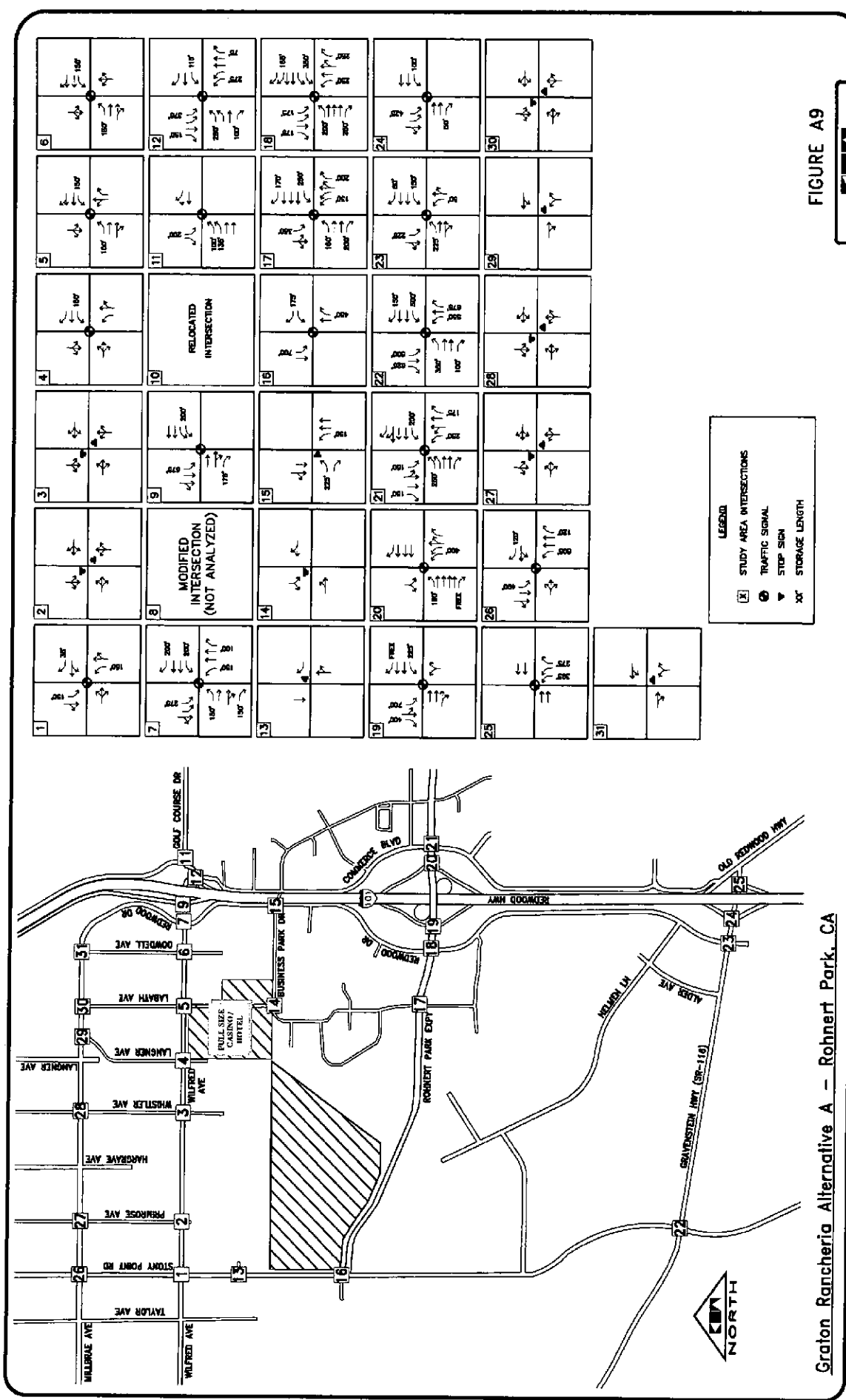


FIGURE A9



Graton Rancheria Alternative A - Rohnert Park, CA

LONG-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL



## ALTERNATIVE B – NORTHWEST STONY POINT SITE

The Alternative B casino and hotel is proposed to be located as shown in **Figure B1**, which is bordered by Wilfred Avenue in the north, Rohnert Park Expressway in the south, Stony Point Road in the west, and Langner Avenue in the east.

The site layout as shown in **Figure B2** includes a main building of approximately 450,000 square feet for a casino, restaurants, food court, event center, banquet facilities, lobby, pool, and other ancillary functions. In addition, the project is planned to include up to 300 hotel rooms, primarily for casino guests.

A breakdown of square footage as it relates to traffic impacts is shown below:

- Casino and Entertainment areas – 408,150 s.f.
- Lobby/Bar/Back of House/Sundries – 14,750 s.f.
- Pool and Spa – 27,100 s.f.  
450,000 s.f.
  
- Hotel Rooms – 291,000 s.f.

The site plan also shows supporting uses such as parking lots, parking structure, and wastewater treatment facilities.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

The main project access is from the south side of Wilfred Avenue, where an existing driveway aligns with Primrose Avenue. This approach is assumed to operate as a full movement driveway with no turn limitations.

A second project access from Stony Point Road is located on this plan approximately 880 feet south of the Stony Point Road/Wilfred Avenue intersection. The location is at an existing driveway access; however, due to conflicts with the northbound turn bay at the Stony Point Road/Wilfred Avenue intersection, the access is assumed to be limited to right in/out operation.

Currently, neither access is signalized.

### Trip Generation – Alternative B

Trip generation for Alternative B is identical to Alternative A. See Trip Generation – Alternatives A, B, and C section under Alternative A for specific information.

## Project Trip Distribution and Assignment

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to destinations north of the site, with the remaining 70% distributed south of the site. To be conservative, only a small percentage of project traffic was assumed to be generated or attracted in the immediate vicinity of the project site. The project traffic distribution is shown in **Figure B3** and **Figure B4**. **Figure B5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure B5**, most of the project traffic is expected to come from the freeway therefore it was assumed that most of the traffic would use Primrose Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

## Near-Term Plus Project Traffic Volumes

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the Alternative B casino and hotel project. **Figure B6** illustrates the combined near-term turning movement volumes at the study intersections.

## Cumulative Plus Project Traffic Volumes

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the Alternative B casino and hotel project. **Figure B7** illustrates the combined long-term turning movement volumes at the study intersections.

## Alternative B LOS Conditions and Impacts at Intersections

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative B (year 2008)
- Long-term Cumulative conditions with Alternative B (year 2020)

In the near-term analysis for Alternative B, it was assumed that the Wilfred Avenue widening project will not have taken place before the casino/hotel opens. The Memorandum of Understanding (MOU) between the City of Rohnert Park and the Federated Indians of the Graton Rancheria stated that the tribe would help financially to speed up the timeline of the widening project to occur before the casino/hotel opens in 2008.

Results of the analysis are presented in **Table B1**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst



approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Primrose Avenue/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Labath Avenue
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Primrose Avenue/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Wilfred Avenue/US-101 SB Ramps
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Labath Avenue
- Rohnert Park Expressway/Commerce Boulevard
- Gravenstein Highway (SR-116)/Redwood Drive
- Millbrae Avenue/Stony Point Road



**Table B 1 – Alternative B Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	OVRFL	B	12.5	F	OVRFL
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	86.6	B	12.5	F	115.2
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	F	82.9	B	12.5	F	114.3
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	313.1	F	169.9	F	274.0
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.0	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	32.0	C	26.8	D	36.7
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	82.3	E	74.2	F	127.2
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	19.0	B	19.3
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	60.5	D	50.8	F	129.0
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	D	27.6	A	0.0	C	24.6
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	D	43.0	B	18.5	C	32.2
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	D	39.5	C	28.2	E	59.8
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	26.1	C	29.1	C	28.1
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.7	B	16.0	B	16.0
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	C	21.3	B	12.3	C	23.3
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	38.1	E	63.4	E	57.6
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	44.0	D	45.5	D	52.8
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	28.1	D	42.4	E	63.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	C	20.4	B	18.1	B	18.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	12.8	B	11.5	B	12.6
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	69.0	F	90.2	F	204.7
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	12.4	B	12.4
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	12.5	B	12.5
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	A	9.9	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.7

## Alternative B Traffic Signal Warrant Analysis

Alternative B, near-term and long-term, traffic volumes at unsignalized study intersections were compared against peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Primrose Avenue/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Project Driveway/Stony Point Road (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

## Alternative B LOS Conditions and Impacts on Freeway and Ramps

Project trips generated by the proposed casino and hotel were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the casino and hotel project. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table B2**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project.



**Table B 2 – Alternative B Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt B		2020		2020 + Alt B		
	LOS	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>													
US-101 South of Gravenstein Highway (NB)	E	C	22.2	C	19.1	C	25.1	C	25.6	E	38.4	E	38.4
Gravenstein Highway NB Off-Ramp	E	D	30.8	C	27.4	D	33.7	D	34.1	F	41.8	F	41.8
Gravenstein Highway NB On-Ramp	E	D	34.5	D	29.5	E	35.2	E	36.1	F	43.1	F	43.1
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	28.1	C	23.5	D	28.8	D	32.3	F	-	F	-
Rohnert Park Expressway NB Off-Ramp	E	D	33.6	D	28.8	D	34.2	E	37.1	F	43.7	F	43.7
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1	C	21.8	C	21.8	C	23.2	C	26.7	C	26.7
Rohnert Park Expressway NB On-Ramp	E	D	32.5	C	22.1	D	29.1	D	29.0	E	37.4	E	37.4
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	28.9	C	22.1	D	29.1	D	29.0	E	37.4	E	37.4
Wilfred Avenue NB Off-Ramp	E	E	35.4	C	22.1	D	29.1	D	29.0	E	37.4	E	37.4
Wilfred Avenue NB On-Ramp	E	F	42.0	D	30.3	D	33.9	E	40.4	F	44.3	F	44.3
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	26.7	D	30.3	D	33.9	E	40.4	F	44.3	F	44.3
Santa Rosa Avenue NB Off-Ramp	E	E	37.2	D	30.3	D	33.9	E	40.4	F	44.3	F	44.3
US-101 North of Santa Rosa Avenue (NB)	E	C	20.3	C	22.0	C	23.8	D	29.7	D	32.6	D	32.6
<b>Southbound</b>													
US-101 North of Santa Rosa Avenue (SB)	E	C	22.9	C	24.1	D	26.1	D	28.5	D	31.2	D	31.2
Santa Rosa Avenue SB On-Ramp	E	D	31.2	D	32.7	E	39.3	F	-	F	-	F	-
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	31.5	D	32.7	E	39.3	F	-	F	-	F	-
Wilfred Avenue SB Off-Ramp	E	E	38.0	E	38.8	E	40.8	F	44.8	F	49.7	F	49.7
Wilfred Avenue SB On-Ramp	E	D	33.7	D	33.4	F	45.0	E	39.9	F	54.1	F	54.1
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	35.2	D	33.4	F	45.0	E	39.9	F	54.1	F	54.1
Rohnert Park Expressway SB Off-Ramp	E	E	38.0	D	33.4	F	45.0	E	39.9	F	54.1	F	54.1
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0	D	30.9	D	34.5	E	38.5	F	43.0	F	43.0
Rohnert Park Expressway SB On-Ramp	E	E	35.1	D	30.1	D	34.1	F	37.5	F	42.3	F	42.3
Rohnert Park Expressway SB On-Ramp	E	D	27.1	C	22.3	D	27.1	E	36.6	F	-	F	-
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	33.9	D	29.2	D	34.0	F	40.3	F	46.2	F	46.2
Gravenstein Highway SB Off-Ramp	E	D	33.7	D	32.1	E	37.2	F	42.3	F	48.5	F	48.5
Gravenstein Highway SB On-Ramp	E	D	33.7	D	32.1	E	37.2	F	42.3	F	48.5	F	48.5
US-101 South of Gravenstein Highway (SB)	E	C	24.7	C	21.8	D	27.4	D	32.0	F	-	F	-

## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. . Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.

## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table B3**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.



**Table B 3 – Alternative B Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length	
			2008	2020				2008	2020
1 Stony Point Road and Wilfred Avenue	EBL				16 Stony Point Road and Rohnert Park Expy	EBL			
	EBR					EBR			
	WBL					WBL			
	WBR	35	OVFL	OVFL		WBR	175	359	289
	NBL	150	25	25		NBL			
	NBR					NBR	450	38	38
4 Langner Avenue and Wilfred Avenue	SBL	150	30	32	SBL	700	264	257	
	SBR				SBR				
	EBL				EBL	160	61	111	
	EBR				EBR	200	25	29	
	WBL	150		25	WBL	250	57	31	
	WBR				WBR	170	25	25	
5 Labath Avenue and Wilfred Avenue	NBL				NBL	130	36	38	
	NBR				NBR	130	36	37	
	SBL				SBL	100	193	202	
	SBR				SBR				
	EBL	150		25	EBL	200	136	113	
	EBR				EBR	200	25	25	
6 Dowdell Avenue and Wilfred Avenue	WBL	150		29	WBL	350	148	150	
	WBR				WBR	155	33	29	
	NBL				NBL	250	157	210	
	NBR				NBR	250	65	106	
	SBL				SBL	175	188	172	
	SBR				SBR	175	58	57	
7 Redwood Drive and Wilfred Avenue	EBL	150		25	EBL				
	EBR				EBR				
	WBL	150		529	WBL	225	51	53	
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
8 Redwood Drive and Commerce Boulevard	SBL				SBL	400	318	238	
	SBR				SBR	400	230	302	
	EBL	150		203	EBL	190	25	25	
	EBR	150		304	EBR				
	WBL				WBL				
	WBR				WBR				
9 Willfred Avenue and SB US 101 Ramps	NBL	150	402	1271	NBL	225	543	587	
	NBR	100	95	110	NBR				
	SBL	275	350	350	SBL				
	SBR				SBR				
	EBL	75	25		EBL	250	65	55	
	EBR	75	50		EBR				
10 Golf Course Drive and Commerce Blvd	WBL	100	25		WBL	200	187	222	
	WBR				WBR				
	NBL	150	134		NBL	250	210	214	
	NBR	150	25		NBR	175	56	58	
	SBL	200	40		SBL	150	98	158	
	SBR				SBR	150	51	47	
11 Roberts Lake Drive and Golf Course Drive	EBL				EBL	350	162	183	
	EBR				EBR				
	WBL	300	30	25	WBL	500	155	170	
	WBR				WBR	150	50	51	
	NBL				NBL	550	296	298	
	NBR				NBR	675	30	31	
12 Commerce Blvd and NB US 101 Ramps	SBL	250	229	251	SBL	500	243	255	
	SBR				SBR	625	49	54	
	EBL				EBL	225	161	194	
	EBR				EBR				
	WBL	150	789	1000	WBL	150	57	54	
	WBR				WBR	80	25	261	
13 Willfred Avenue and SB US 101 Ramps	NBL	150	876	1007	NBL	50	65	65	
	NBR				NBR				
	SBL	200	94	30	SBL	225	388	556	
	SBR				SBR				
	EBL	80	100	52	EBL				
	EBR				EBR	50	111	123	
14 Commerce Blvd and NB US 101 Ramps	WBL				WBL	100	103	72	
	WBR				WBR				
	NBL	200	478	524	NBL				
	NBR				NBR				
	SBL	100	25	25	SBL	425	222	222	
	SBR	175	215	256	SBR				
15 Business Park Drive and Redwood Drive	EBL	225	97	40	EBL				
	EBR				EBR				
	WBL	250	372	430	WBL				
	WBR	250	25	25	WBR				
	NBL				NBL	395	162	162	
	NBR				NBR	275	176	201	
16 Stony Point Road and Wilfred Avenue	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR	120	46	201	
17 Labath Avenue and Rohnert Park Expy	NBL				NBL	505	25	25	
	NBR				NBR	120	25	25	
	SBL				SBL	490	25	25	
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
18 Redwood Drive and Rohnert Park Expy	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
19 SB US 101 Ramps and Rohnert Park Expy	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
20 NB US 101 Ramps and Rohnert Park Expy	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
21 Commerce Blvd and Rohnert Park Expy	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
22 Stony Point Road and Gravenstein Hwy	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
23 Redwood Road and Gravenstein Hwy	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
24 Gravenstein Hwy and SB US 101 Ramps	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
25 Gravenstein Hwy and NB US 101 Ramps	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
26 Stony Point Road and Millbrae Avenue	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				



## Alternative B Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative B traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown on **Table B4** are needed in the near-term (2008) and long-term (2020) to mitigate project impacts.

The basis of the Alternative B mitigations is the assumption that intersection #13, the Project Driveway at Stony Point Road, should be relocated further south along Stony Point Road and be signalized so that it can function as a full movement access. This change permits more project traffic to conveniently arrive and exit from the site and use the Rohnert Park Expressway interchange, thus relieving some the traffic pressure through the Wilfred Avenue interchange. In the event that intersection #13 cannot be relocated and signalized as discussed above, additional mitigation improvements will be needed, particularly at intersections surrounding the Wilfred Avenue interchange. The project will create a significant unavoidable impact at the intersection of Commerce Boulevard/US-101 NB Ramps regardless of the relocation of intersection #13.

**Table B5** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections.

**Figures B8 and B9** illustrate the mitigated lane geometry and traffic control.

A single asterisk in the table denotes an intersection that operates at an acceptable level of service and does not require mitigation, but a mitigated level of service and delay are provided for reference as a result of the mitigation to signalize the Project Driveway/Stony Point Road which changes traffic patterns at some intersections. A double asterisk indicates an intersection where the delay increases as a result of the mitigation to signalize the Project Driveway/Stony Point Road intersection.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue.

The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to the Urban Growth Boundary. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be three lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and



should include Class II bike lanes out to Stony Point Road to connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be accommodated on a three lane roadway section from Redwood Drive to Stony Point Road, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.



**Table B 4 – Alternative B Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Widen Wilfred to 3 lanes (Add WB left) <sup>1</sup></li> </ul>	No Yes	Capacity Capacity
	2	Primrose Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Add a NB right and change NB all shared to left-through</li> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	No Tribe land Yes	Capacity Capacity Capacity
	3	Whistler Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	Yes	Capacity
	4	Langer Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	Yes	Capacity
	5	Labath Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	No Yes	Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Add NB right and change NB all shared to left-through</li> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	No Yes Yes	Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	<ul style="list-style-type: none"> <li>Add EB left <sup>1</sup> and through and change EB all-shared to through-right</li> <li>Change WB left-through to through</li> <li>Change phasing east-west to protected from split</li> </ul>	Yes No No	Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	<ul style="list-style-type: none"> <li>Add an EB right overlap phase</li> </ul>	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Extend SB right turn bay back to the Golf Course Dr/Commerce Blvd intersection as a drop lane (to 345 feet from 175 feet)</li> <li>Add a SB right overlap phase</li> </ul>	Yes No	Queue Capacity
	13	Project Driveway/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize</li> <li>Add NB right and change NB through-right to through</li> <li>Add WB left out of project driveway</li> </ul>	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	<ul style="list-style-type: none"> <li>Extend WB right turn bay to 400 feet (from 175 feet)</li> </ul>	Tribe land	Queue
	17	Rohnert Park Expwy/ Labath Ave	<ul style="list-style-type: none"> <li>Optimize signal timing</li> </ul>	No	Capacity
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Extend NB left turn bay to 600 feet (from 225 feet)</li> <li>Add a second NB left turn bay</li> </ul>	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	<ul style="list-style-type: none"> <li>Optimize signal timing</li> </ul>	No	Capacity
	22	Gravenstein Hwy/ Stony Point Rd	<ul style="list-style-type: none"> <li>Add an EB right turn bay for 100 feet</li> <li>Optimize signal timing</li> </ul>	Yes No	Capacity Capacity
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize</li> </ul>	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

<sup>1</sup> In summary, widen Wilfred Ave to three lanes from Stony Point Rd to Redwood Dr



Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Widen Wilfred to 3 lanes (Add WB left) <sup>1</sup></li> </ul>	No Yes	Capacity Capacity
	2	Primrose Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add a NB right *</li> <li>Add a NB left and change all shared to through</li> <li>Widen Wilfred to 3 lanes (Add WB left and EB left) <sup>1</sup></li> </ul>	No Tribe land Tribe land Yes	Capacity Capacity Capacity Capacity
	3	Whistler Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Widen Wilfred to 3 lanes (Add WB left and EB left) <sup>1</sup></li> </ul>	Yes	Capacity
	4	Langer Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Widen Wilfred to 3 lanes (Add EB left) <sup>1</sup></li> </ul>	Yes	Capacity
	5	Labath Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Optimize signal timing</li> </ul>	No No	Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Optimize signal timing</li> <li>Add a second WB left turn (250 feet)</li> <li>Add an EB right turn bay and change the EB through-right to through *</li> <li>Add 1 SB left turn bay and change all shared to through-right</li> <li>Add a NB right overlap phase</li> <li>Add 1 NB left turn bay and 1 NB right turn bay* and change all shared to through-right</li> </ul>	No No Yes Yes Yes No Yes	Capacity Capacity Capacity Capacity Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	<ul style="list-style-type: none"> <li>Add WB through</li> <li>Change NB through to left-through</li> <li>Change phasing north-south to split from protected</li> <li>Optimize signal timing</li> <li>Change WB left-through to through *</li> <li>Change phasing east-west to protected from split *</li> </ul>	Yes Yes No No No No	Capacity Capacity Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	<ul style="list-style-type: none"> <li>Add an EB right overlap phase *</li> </ul>	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	<ul style="list-style-type: none"> <li><b>Significant Unavoidable Impact</b></li> </ul>		
	13	Project Driveway/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add NB right and change NB through-right to through *</li> <li>Add WB left out of project driveway *</li> </ul>	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	<ul style="list-style-type: none"> <li>Extend WB right turn bay to 400 feet (from 175 feet) *</li> </ul>	Tribe land	Queue
	17	Rohnert Park Expwy/ Labath Ave	<ul style="list-style-type: none"> <li>Optimize signal timing</li> </ul>	No	Capacity
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Extend NB left turn bay to 600 feet (from 225 feet) *</li> <li>Add a second NB left turn bay *</li> </ul>	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	<ul style="list-style-type: none"> <li>Optimize signal timing *</li> <li>Add a third EB through lane that merges back into 2 lanes east of the intersection</li> </ul>	No Yes	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	<ul style="list-style-type: none"> <li>Add an EB right turn bay for 100 feet *</li> <li>Optimize signal timing *</li> </ul>	Yes No	Capacity Capacity
	23	Gravenstein Hwy/ Redwood Dr	<ul style="list-style-type: none"> <li>Add a WB right turn overlap phase</li> <li>Optimize signal timing</li> </ul>	No No	Queue Capacity
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize</li> </ul>	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

<sup>1</sup> In summary, widen Wilfred Ave to three lanes from Stony Point Rd to the Urban Growth Boundary

\* Improvement assumed to occur in 2008 mitigation

**Table B 5 – Alternative B Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008						2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/Willfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	C	23.6	F	841.3	F	OVRFL	C	34.3
2	Primrose Ave/Willfred Ave	D	TWSC	A	9.4	B	11.4	F	OVRFL	C	20.2	B	12.5	F	OVRFL	C	25.6
3	Whistler Ave/Willfred Ave	D	TWSC	A	9.4	B	11.4	F	86.6	F	51.4	B	12.5	F	115.2	F	64.9
4	Langer Ave/Willfred Ave	D	TWSC	A	9.4	B	11.3	F	85.0	F	193.4	B	12.5	F	114.3	F	279.6
5	Labath Ave/Willfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	C	27.5	F	OVRFL	F	OVRFL	C	30.0
6	Dowdell Ave/Willfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	D	48.3	F	OVRFL	F	OVRFL	D	38.1
7	Redwood Dr/Willfred Ave	D	TS	C	23.3	E	77.6	F	313.1	D	53.3	F	169.9	F	274.0	D	44.7
8	Redwood Dr/Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.0	C	25.8	-	-	-	-	-	-
9	Willfred Ave/US-101 SB Ramps	D	TS	-	-	C	23.2	C	32.0	C	31.3	C	26.8	D	36.7	C	24.0*
10	Golf Course Dr/Commerce Blvd	D	TS	F	103.4	E	71.7	F	82.3	D	49.6	E	74.2	F	127.2	D	53.5
11	Golf Course Dr/Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	18.7	B	19.0	B	19.3	B	15.1
12	Commerce Blvd/US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	60.5	C	28.4	D	50.8	F	129.0	F	116.7
13	Project Driveway/Stony Point Rd	D	TWSC	A	0.0	A	0.0	D	27.6	B	10.5	A	0.0	C	24.6	A	9.9
14	Business Park Dr/Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	16.7	C	16.7
16	Rohnert Park Expwy/Stony Point Rd	D	TS	B	20.0	B	19.1	D	43.0	D	51.4**	B	18.5	C	32.2	D	44.0
17	Rohnert Park Expwy/Labath Ave	C	TS	C	24.6	C	25.8	D	39.5	C	24.4	C	28.2	E	59.8	C	25.2
18	Rohnert Park Expwy/Redwood Dr	C	TS	C	24.2	C	26.3	C	26.1	C	27.3	C	29.1	C	28.1	C	29.1
19	Rohnert Park Expwy/US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.7	B	19.6**	B	16.0	B	16.0	B	18.1
20	Rohnert Park Expwy/US-101 NB Ramps	D	TS	A	9.8	B	10.8	C	21.3	C	13.8	B	12.3	C	23.3	B	14.3
21	Rohnert Park Expwy/Commerce Blvd	C	TS	D	39.2	D	44.6	D	38.1	C	32.0	E	63.4	E	57.6	C	31.9
22	Gravenstein Hwy/Stony Point Rd	D	TS	C	32.1	D	37.1	D	44.0	D	43.9	D	45.5	D	52.8	D	46.5
23	Gravenstein Hwy/Redwood Dr	D	TS	C	22.1	C	26.2	C	28.1	D	37.4**	D	42.4	E	63.8	D	41.7
24	Gravenstein Hwy/US-101 SB Ramps	D	TS	B	20.0	B	19.9	C	20.4	C	21.2**	B	18.1	B	18.6	B	26.2**
25	Gravenstein Hwy/US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	12.8	B	14.3**	B	11.5	B	12.6	B	13.9**
26	Millbrae Ave/Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	69.0	A	9.9	F	90.2	F	204.7	B	10.4
27	Millbrae Ave/Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	11.5	B	12.4	B	12.4	B	12.4
28	Millbrae Ave/Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	11.5	B	12.5	B	12.5	B	12.5
29	Millbrae Ave/Langer Ave	D	TWSC	A	9.7	A	9.9	A	9.9	A	9.9	B	11.3	B	11.3	B	11.3
30	Millbrae Ave/Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	11.7	B	14.7	B	14.7	B	14.7
31	Millbrae Ave/Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.7	B	11.7

Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table B6**:

- Adjust the ramp metering to account for the additional project traffic at the Wilfred Avenue interchange in the near-term (2008). Most metering adjustments can be minor and are not expected to have queuing effects on the local street network. However, the southbound on-ramp will require heavy metering to obtain an acceptable level of service for the freeway ramp merge area which may create a long queue backed up on the ramp.
- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to Wilfred Avenue and from Gravenstein Highway (SR-116) to West Sierra Avenue as well as an additional traffic lane in the northbound direction from West Sierra Avenue to Gravenstein Highway (SR-116) in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the casino and hotel should coordinate with the Green Music Center during outdoor events that will generate high traffic levels. During that period, traffic control services at the Rohnert Park interchange may be necessary. Therefore, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control.

Because no fixed route service will be available at the project site, the casino/hotel should provide a shuttle that serves the two Rohnert Park transfer stations. The shuttle should run throughout the day or could be called out on demand.

The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.



**Table B 6 – Alternative B Mitigated Freeway Level of Service Summary**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt B		2008 + Alt B Mitigated		2020		2020 + Alt B		2020 + Alt B Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>																
US-101 South of Gravenstein Highway (NB)	E	22.2	C	19.1	C	25.1	C	25.1	C	25.6	C	25.6	E	38.4	E	38.4
Gravenstein Highway NB Off-Ramp	E	30.8	C	27.4	D	33.7	D	33.7	D	34.1	D	34.1	F	41.8	D	29.3
Gravenstein Highway NB On-Ramp	E	34.5	D	29.5	E	35.2	E	35.2	E	36.1	F	36.1	F	43.1	E	42.1
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	D	28.8	D	28.8	D	32.3	F	32.3	F	-	E	42.1
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	34.2	D	34.2	D	37.1	F	37.1	F	43.7	E	42.1
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	C	21.8	C	21.8	C	23.2	C	23.2	C	26.7	C	26.7
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	D	29.1	D	29.1	D	29.0	E	29.0	E	37.4	E	37.4
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	D	29.1	D	29.1	D	29.0	E	29.0	E	37.4	E	37.4
Wilfred Avenue NB Off-Ramp	E	35.4	C	22.1	D	29.1	D	29.1	D	29.0	E	29.0	E	37.4	E	37.4
Wilfred Avenue NB On-Ramp	E	42.0	D	30.3	D	33.9	D	33.9	D	40.4	F	40.4	F	44.3	E	43.0
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	33.9	D	33.9	D	40.4	F	40.4	F	44.3	E	43.0
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	33.9	D	33.9	D	40.4	F	40.4	F	44.3	E	43.0
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	23.8	C	23.8	C	29.7	D	29.7	D	32.6	D	32.6
<b>Southbound</b>																
US-101 North of Santa Rosa Avenue (SB)	E	22.9	C	24.1	D	26.1	D	26.1	D	28.5	D	28.5	D	31.2	D	31.2
Santa Rosa Avenue SB On-Ramp	E	31.2	D	32.7	E	39.3	E	39.3	E	40.8	F	40.8	F	49.7	C	24.8
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	31.5	D	32.7	E	39.3	E	39.3	E	40.8	F	40.8	F	49.7	C	24.8
Wilfred Avenue SB Off-Ramp	E	38.0	F	38.8	E	40.8	E	40.8	E	44.8	F	44.8	F	54.1	E	43.0
Wilfred Avenue SB On-Ramp	E	33.7	D	33.4	F	45.0	D	45.0	D	39.9	F	39.9	F	54.1	E	43.0
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	F	45.0	D	45.0	D	39.9	F	39.9	F	54.1	E	43.0
Rohnert Park Expressway SB Off-Ramp	E	38.0	D	33.4	F	45.0	D	45.0	D	39.9	F	39.9	F	54.1	E	43.0
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	34.5	D	34.5	D	38.5	F	38.5	F	42.3	E	39.8
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	34.1	D	34.1	D	37.5	F	37.5	F	42.3	E	39.8
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	D	27.1	D	27.1	D	36.6	F	36.6	F	-	E	39.8
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	34.0	D	34.0	D	40.3	F	40.3	F	46.2	E	39.8
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	E	37.2	E	37.2	E	42.3	F	42.3	F	48.5	D	29.1
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	D	27.4	D	27.4	D	32.0	F	32.0	F	-	C	23.5





It is recommended that the casino contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating or shortening the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.

If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.

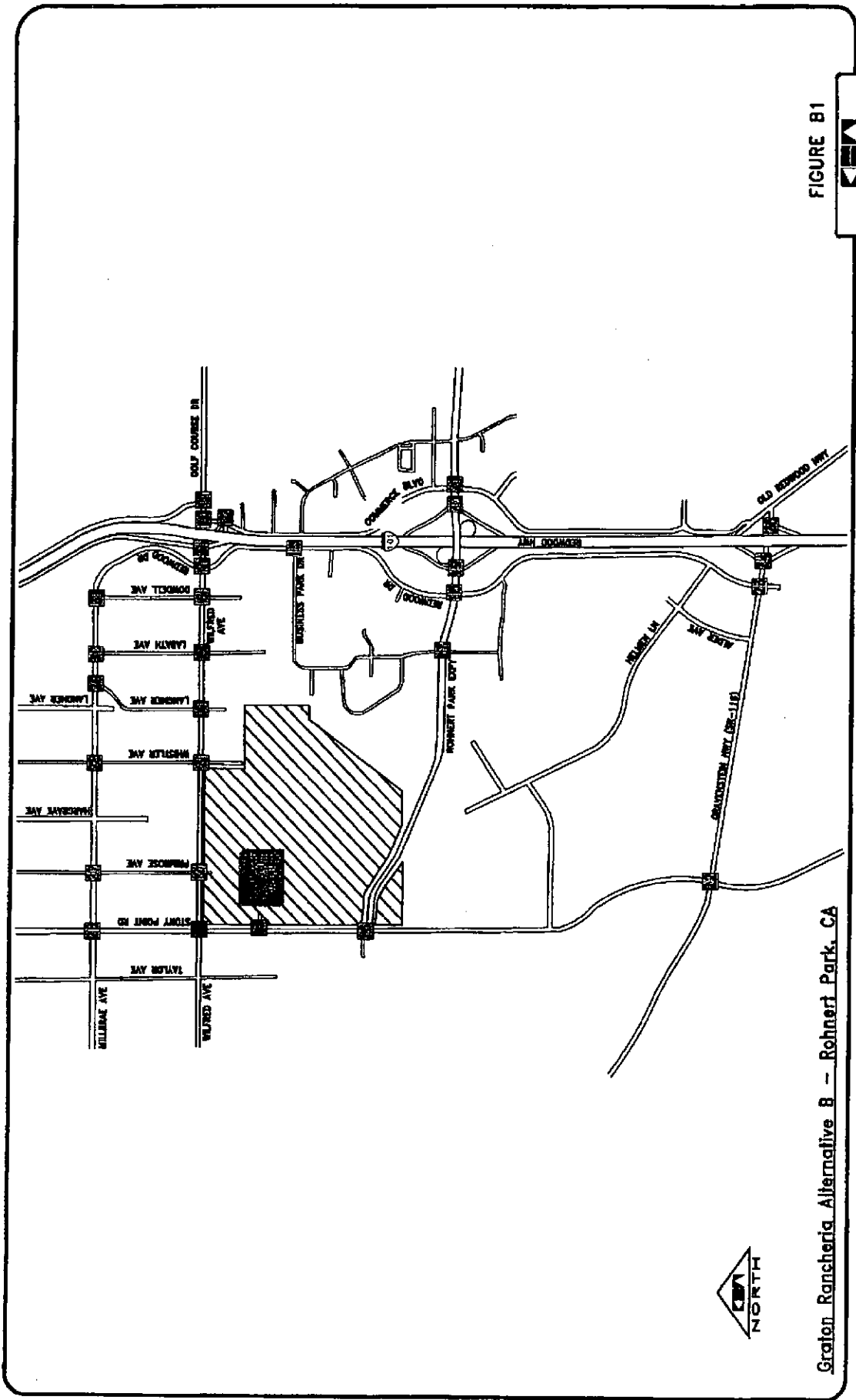


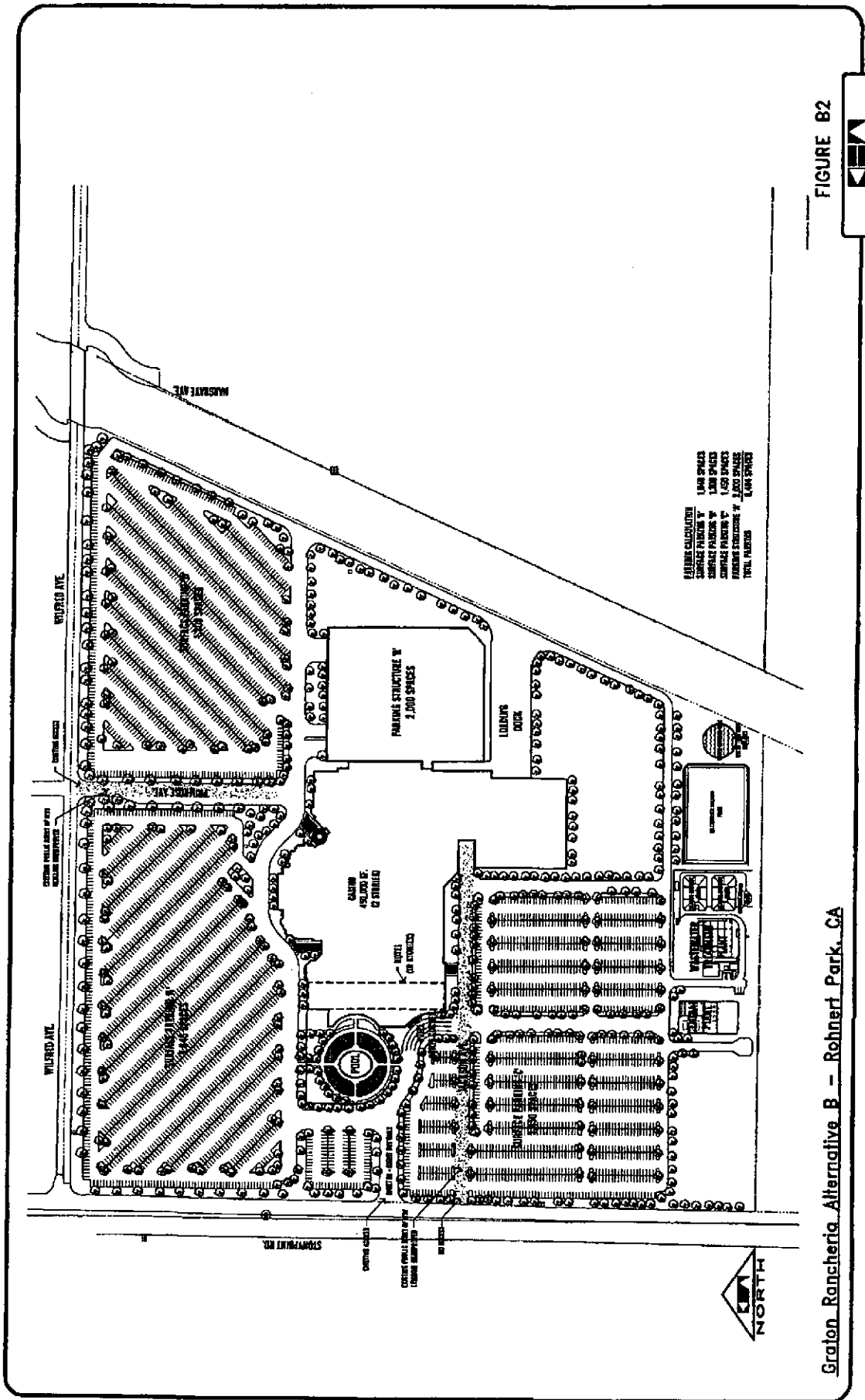
FIGURE B1



PROJECT LOCATION

Graton Rancheria Alternative B - Rohnert Park, CA





PARKING CALCULATION  
 SURFACE PARKING W/ 1,500 SPACES  
 SURFACE PARKING W/ 1,500 SPACES  
 PARKING STRUCTURE W/ 2,000 SPACES  
 TOTAL PARKING

FIGURE B2



Graton Rancheria Alternative B - Rohnert Park, CA

SITE PLAN

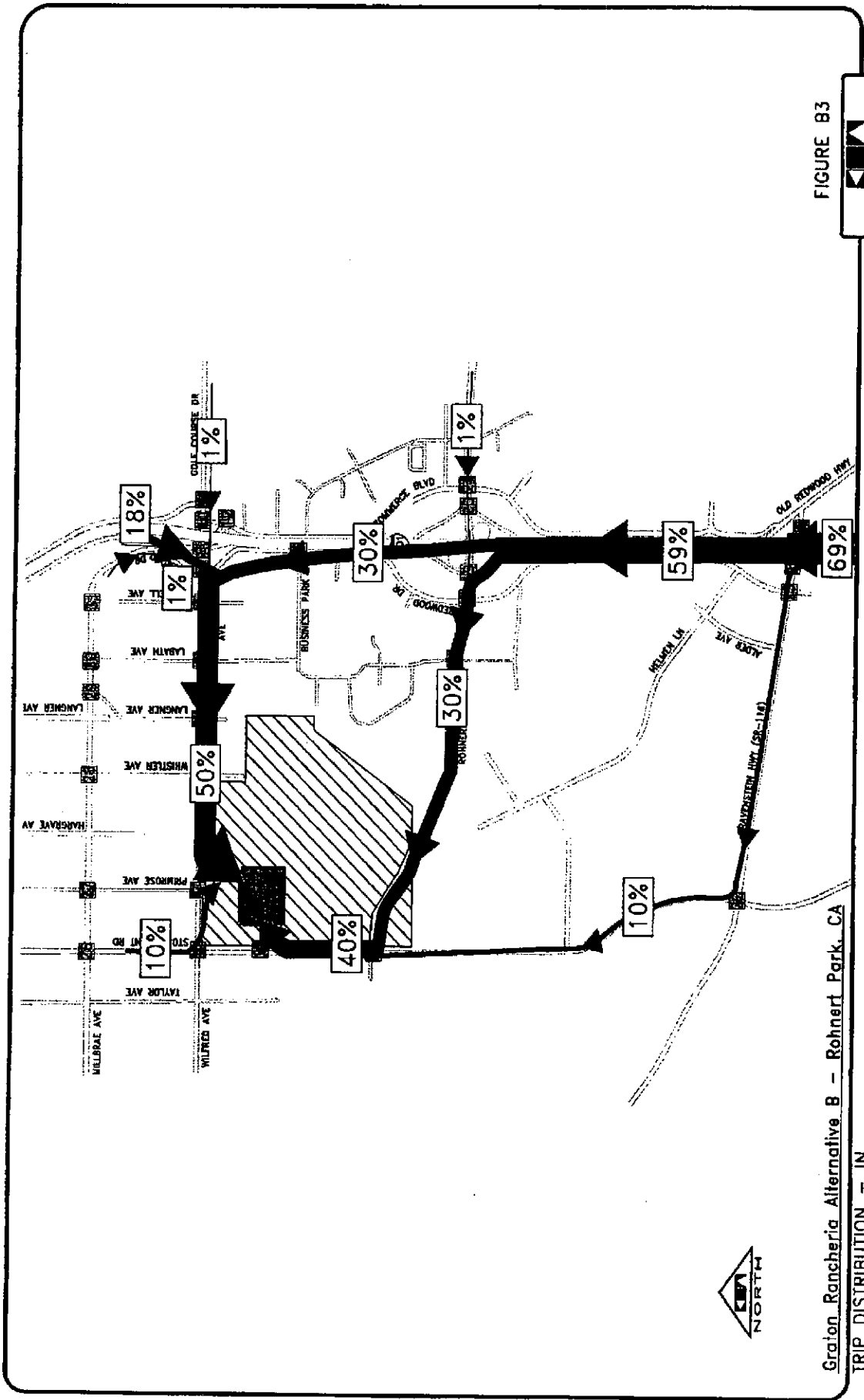


FIGURE B3



Graton Rancheria Alternative B - Rohnert Park, CA

TRIP DISTRIBUTION - IN



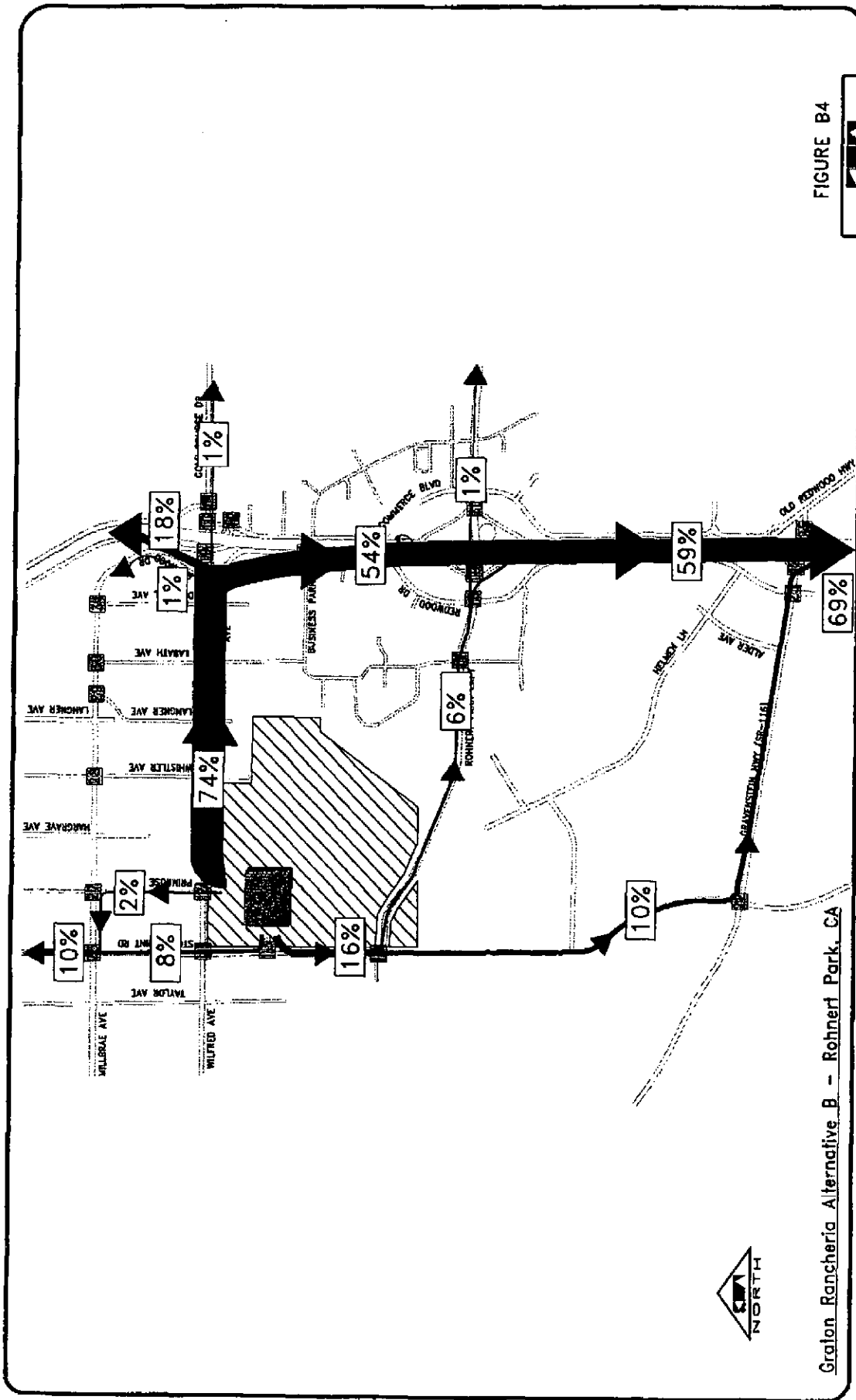
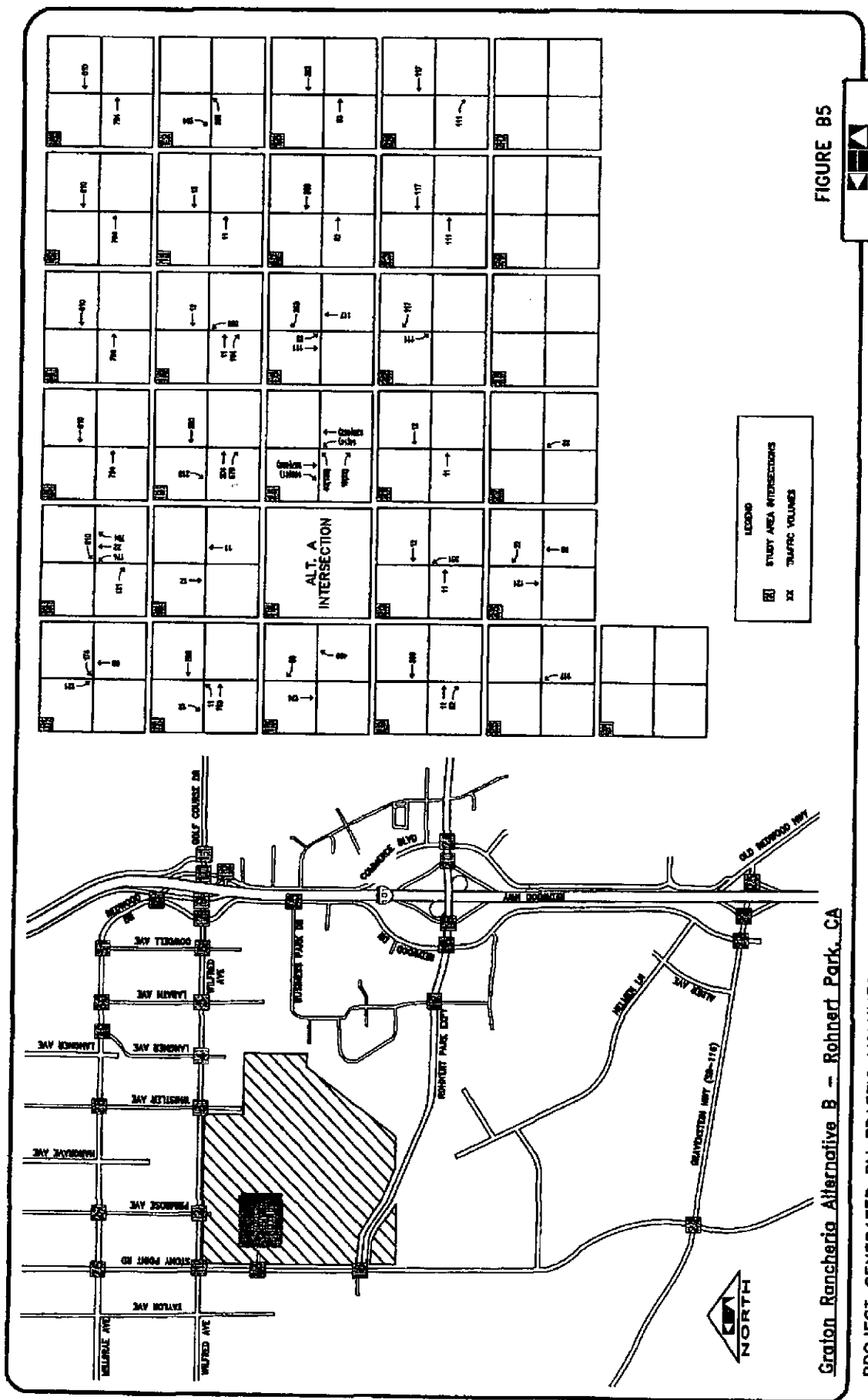


FIGURE B4





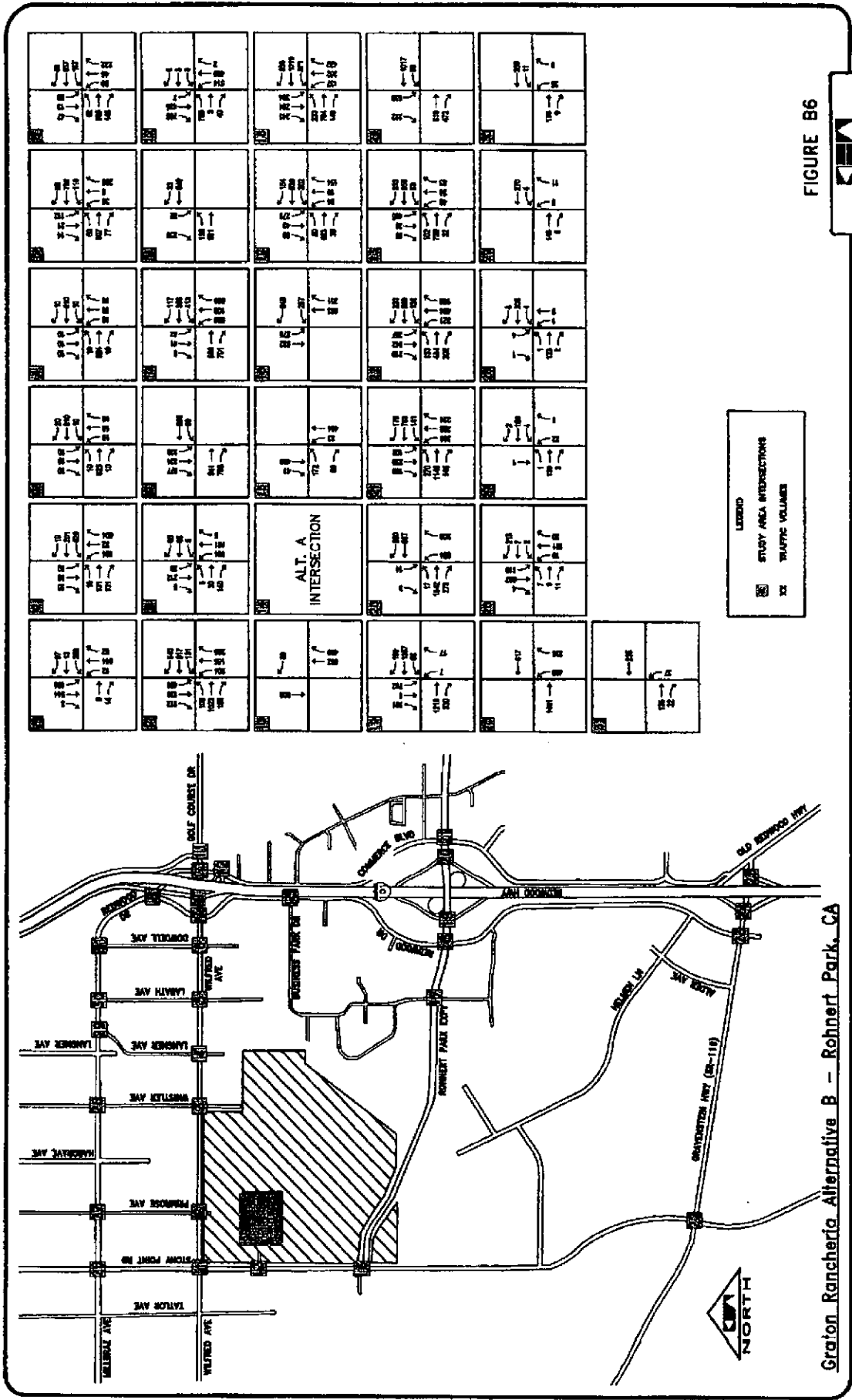


FIGURE B6

Engineering and Architecture, Inc.

NEAR-TERM + PROJECT PM TRAFFIC VOLUMES

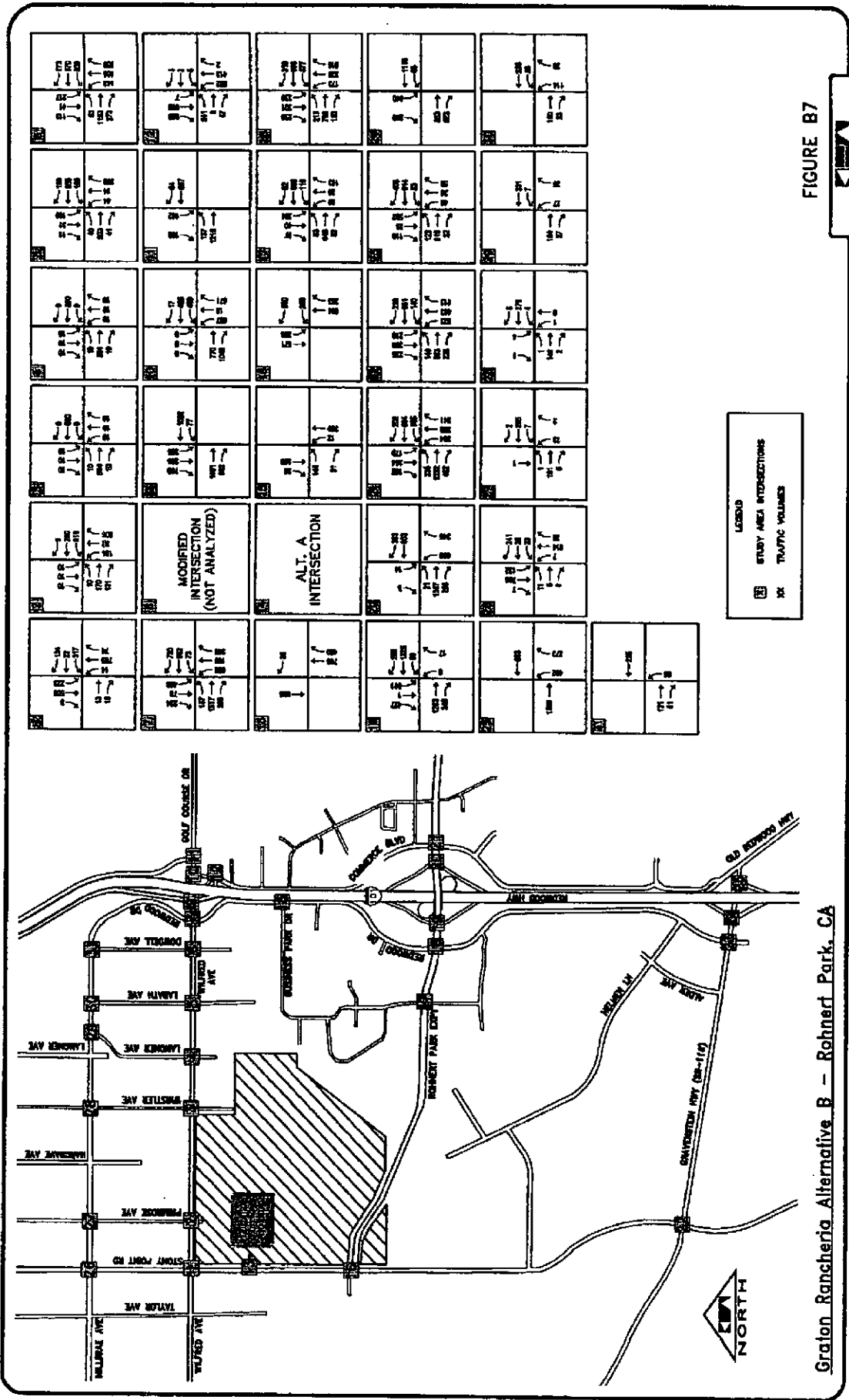


FIGURE B7

Graton-Rahner and Associates, Inc.

Graton Rancheria Alternative B - Rahnert Park, CA

LONG-TERM CUMULATIVE + PROJECT PM TRAFFIC VOLUMES



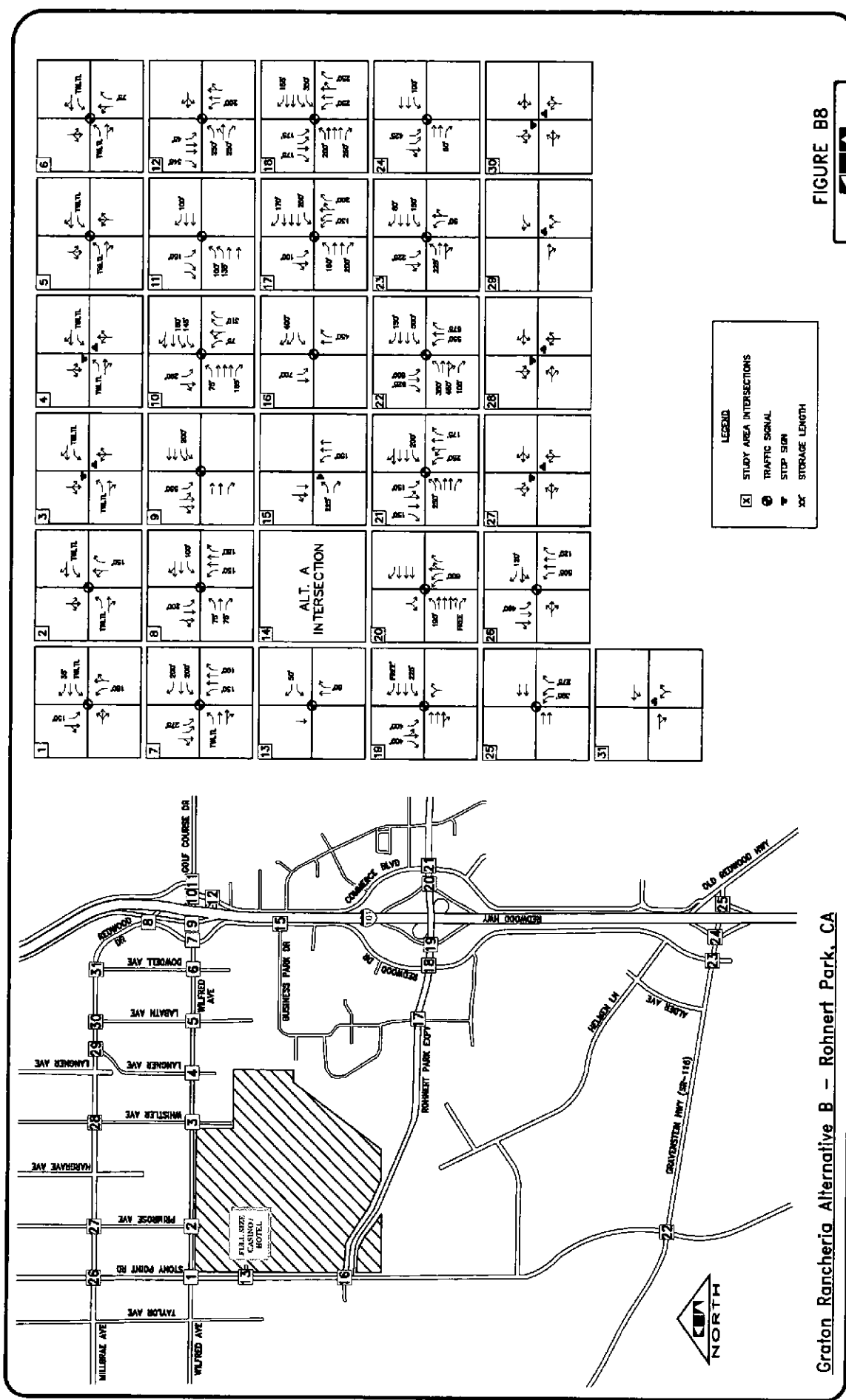
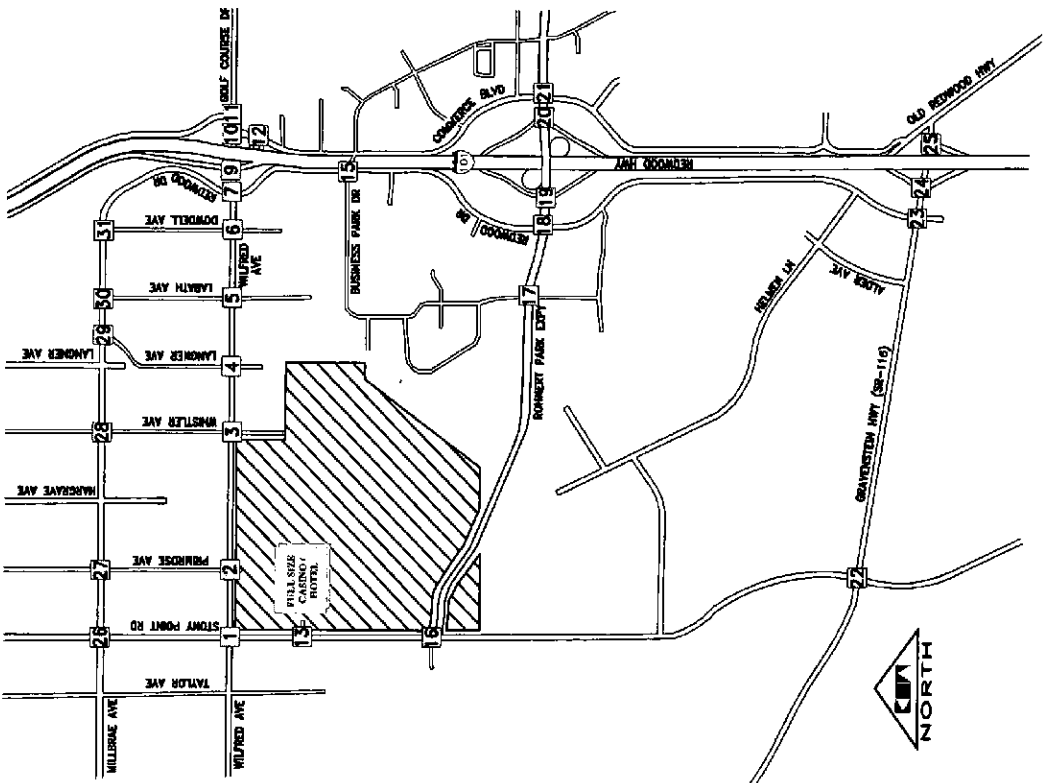
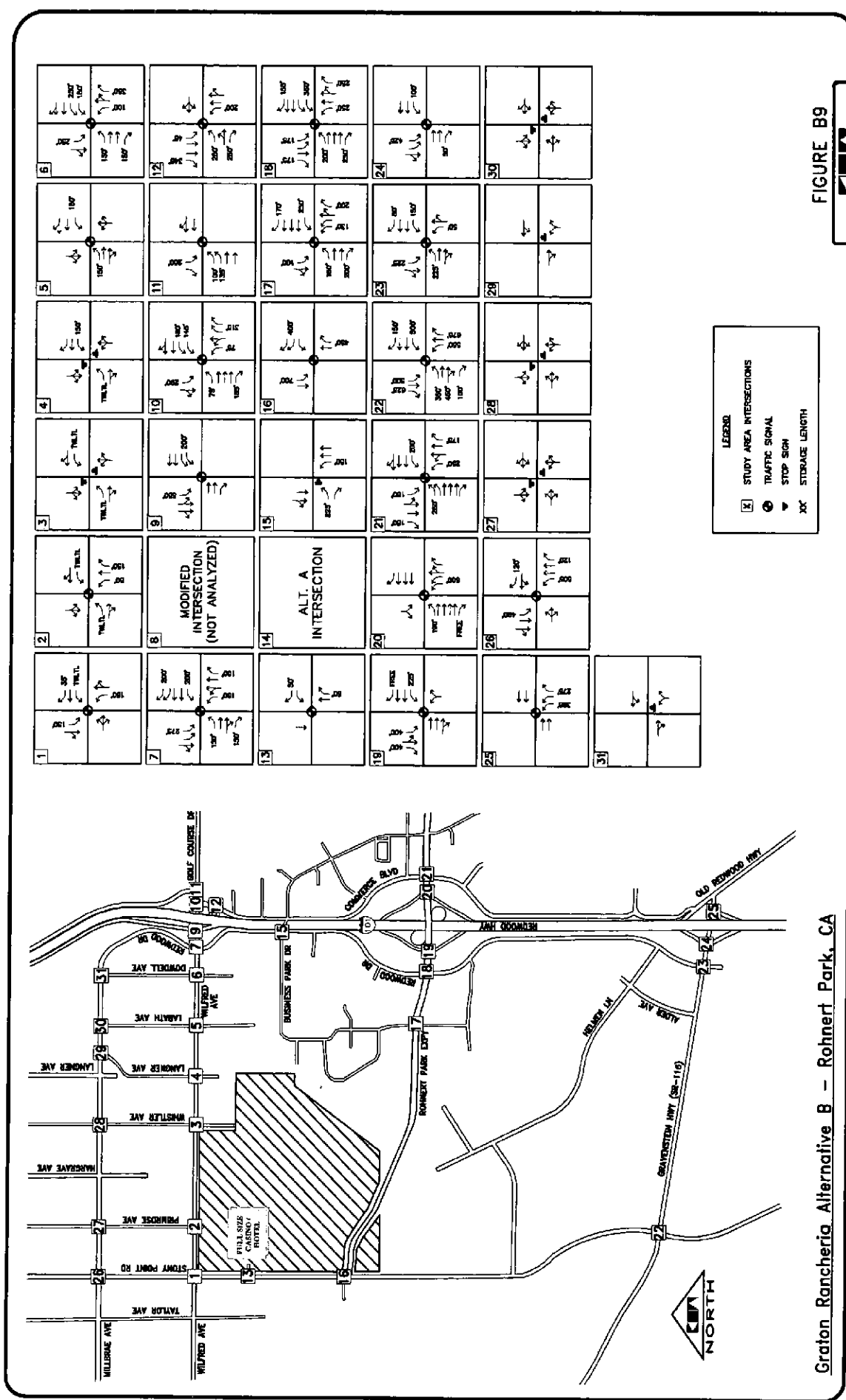


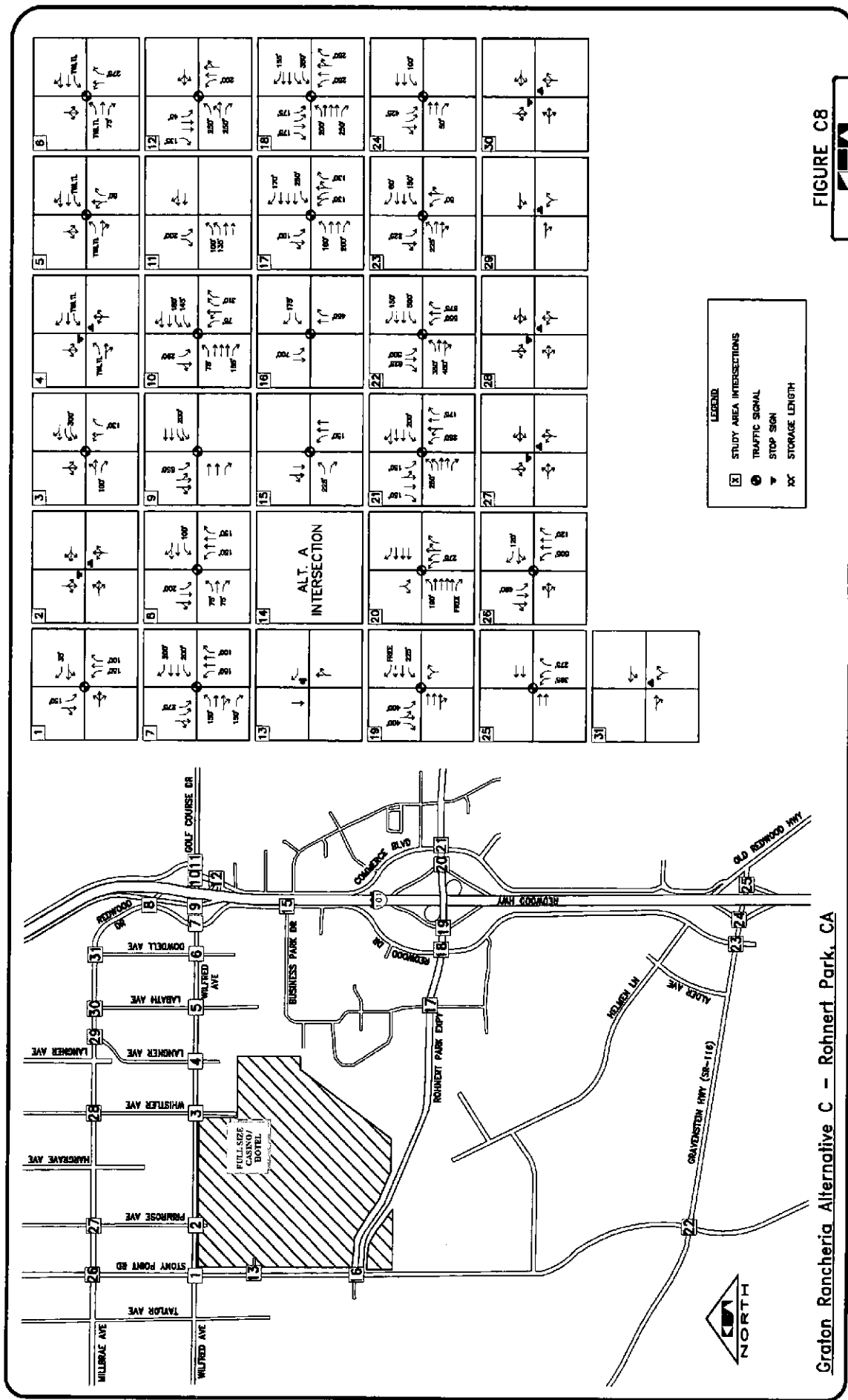
FIGURE B8

Ranley-Horn and Associates, Inc.

Graton Rancheria Alternative B - Rohnert Park, CA

NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL





**LEGEND**

- STUDY AREA INTERSECTIONS
- TRAFFIC SIGNAL
- ▼ STOP SIGN
- XX STORAGE LENGTH

**FIGURE C8**



**Grafton Rancheria Alternative C - Rohnert Park, CA**

**NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL**



## ALTERNATIVE C – NORTHEAST STONY POINT SITE

The Alternative C casino and hotel is proposed to be located as shown in **Figure C1**, which is bordered by Wilfred Avenue in the north, Rohnert Park Expressway in the south, Stony Point Road in the west, and Langner Avenue in the east.

**Figure C2** shows the proposed layout of the casino and hotel facility. As seen in the figure, the buildings and other related facilities are located in the northwest corner of the site. The site layout includes a main building of approximately 450,000 square feet for a casino, restaurants, food court, event center, banquet facilities, lobby, pool, and other ancillary functions. In addition the project is planned to include up to 300 hotel rooms, primarily for casino guests.

A breakdown of square footage as it relates to traffic impacts is shown below:

- Casino and Entertainment areas – 408,150 s.f.
- Lobby/Bar/Back of House/Sundries – 14,750 s.f.
- Pool and Spa – 27,100 s.f.  
450,000 s.f.
  
- Hotel Rooms – 291,000 s.f.

The site plan also shows supporting uses such as parking lots, parking structure, and wastewater treatment facilities. This layout is virtually the same as Alternative A except in a different location on the project site.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

The only project access is from Wilfred Avenue from the south leg of Whistler Avenue. This approach is assumed to operate as a full movement intersection with no turn limitations. Currently, the access is unsignalized.

### Trip Generation – Alternative C

Trip generation for Alternative C is identical to Alternative A. See Trip Generation – Alternatives A, B, and C section under Alternative A for specific information.

### Project Trip Distribution and Assignment

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to

destinations north of the site, with the remaining 70% distributed south of the site. To be conservative, no project traffic was assumed to be generated or attracted in the immediate vicinity of the project site. The project traffic distribution is shown in **Figure C3** and **Figure C4**. **Figure C5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure C5**, most of the project traffic is expected to come from the freeway therefore it was assumed that most of the traffic would use Whistler Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

### **Near-Term Plus Project Traffic Volumes**

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the Alternative C casino and hotel project. **Figure C6** illustrates the combined near-term turning movement volumes at the study intersections.

### **Cumulative Long -Term Plus Project Traffic Volumes**

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the Alternative C casino and hotel project. **Figure C7** illustrates the combined long-term turning movement volumes at the study intersections.

### **Alternative C LOS Conditions and Impacts at Intersections**

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative C (year 2008)
- Long-term Cumulative conditions with Alternative C (year 2020)

In the near-term analysis for Alternative C, it was assumed that the Wilfred Avenue widening project will not have taken place before the casino/hotel opens. The Memorandum of Understanding (MOU) between the City of Rohnert Park and the Federated Indians of the Graton Rancheria stated that the tribe would help financially to speed up the timeline of the widening project to occur before the casino/hotel opens in 2008.

Results of the analysis are presented in **Table C1**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the Appendix. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

**Table C 1 – Alternative C Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	C	24.7	B	12.5	D	29.3
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	OVRFL	B	12.5	F	OVRFL
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	F	132.1	B	12.5	F	192.1
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	334.5	F	169.9	F	311.0
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	24.9	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	33.8	C	26.8	D	36.5
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	116.7	E	74.2	F	154.4
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	19.0	B	19.3
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	F	83.8	D	50.8	F	153.7
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	D	39.8	B	18.5	D	37.6
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.6	C	28.2	C	31.6
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	24.9	C	29.1	C	28.0
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.5	B	16.0	B	15.7
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	13.6	B	12.3	B	15.1
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	43.0	E	63.4	E	61.9
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	43.0	D	45.5	D	51.6
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	28.3	D	42.4	E	63.3
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.3	B	18.1	B	18.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	12.1	B	11.5	B	12.6
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	69.6	F	90.2	F	207.1
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.7	B	12.4	B	12.6
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.6	B	12.5	B	12.7
29	Millbrae Ave/ Langer Ave	D	TWSC	A	9.7	A	9.9	A	9.9	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.7

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Wilfred Avenue/US-101 SB Ramps
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Commerce Boulevard
- Gravenstein Highway (SR-116)/Redwood Drive
- Millbrae Avenue/Stony Point Road

### **Alternative C Traffic Signal Warrant Analysis**

Alternative C, near-term and long-term, traffic volumes at unsignalized study intersections were compared against the peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by the year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Whistler Avenue/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic



volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

### **Alternative C LOS Conditions and Impacts on Freeway and Ramps**

Project trips generated by the proposed Alternative C casino and hotel were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the casino and hotel project. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table C2**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project.





**Table C 2 – Alternative C Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt C		2020		2020 + Alt C	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>												
US-101 South of Gravenstein Highway (NB)	E	22.2	C	19.1	C	25.1	C	25.6	E	38.4		
Gravenstein Highway NB Off-Ramp	E	30.8	C	27.4	D	31.8	D	34.1	F	41.8		
Gravenstein Highway NB On-Ramp	E	34.5	D	29.5	D	33.4	E	36.1	F	43.1		
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	D	28.8	D	32.3	F	-		
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	32.5	E	37.1	F	43.7		
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	D	31.4	C	23.2	F	41.8		
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	D	30.4	D	29.0	E	38.6		
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	D	30.4	D	29.0	E	38.6		
Wilfred Avenue NB Off-Ramp	E	35.4	C	22.1	D	30.4	D	29.0	E	38.6		
Wilfred Avenue NB On-Ramp	E	42.0	D	30.3	D	33.9	E	40.4	F	44.3		
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	33.9	E	40.4	F	44.3		
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	33.9	E	40.4	F	44.3		
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	23.8	D	29.7	D	32.6		
<b>Southbound</b>												
US-101 North of Santa Rosa Avenue (SB)	E	22.9	C	24.1	D	26.1	D	28.5	D	31.2		
Santa Rosa Avenue SB On-Ramp	E	31.2	D	32.7	E	36.2	F	-	F	-		
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	31.5	D	38.8	E	40.8	F	44.8	F	46.8		
Wilfred Avenue SB Off-Ramp	E	38.0	E	33.4	F	46.6	E	39.9	F	50.7		
Wilfred Avenue SB On-Ramp	E	33.7	D	33.4	F	46.6	E	39.9	F	50.7		
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	F	46.6	E	39.9	F	50.7		
Rohnert Park Expressway SB Off-Ramp	E	38.0	D	33.4	F	46.6	E	39.9	F	50.7		
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	33.4	E	38.5	F	43.4		
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	32.8	F	37.5	F	43.3		
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	D	27.1	E	36.5	F	-		
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	32.5	F	40.3	F	46.2		
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	E	35.7	F	42.3	F	48.4		
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	D	27.4	D	32.0	F	-		

## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. . Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.

## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table C3**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.

**Table C 3 – Alternative C Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length	
			2008	2020				2008	2020
1 Stony Point Road and Wilfred Avenue	EBL				15 Stony Point Road and Rohnert Park Expy	EBL			
	EBR					EBR			
	WBL					WBL			
	WBR	35	OVFL	OVFL		WBR	175	104	59
	NBL	150	25	25		NBL			
	NBR					NBR	450	38	38
4 Langner Avenue and Wilfred Avenue	SBL	150	37	40	SBL	760	329	320	
	SBR				SBR				
	EBL				EBL	160	61	111	
	EBR				EBR	200	25	29	
	WBL	150		25	WBL	250	90	38	
	WBR				WBR	170	25	25	
5 Labath Avenue and Wilfred Avenue	NBL				NBL	130	36	38	
	NBR				NBR	130	35	37	
	SBL				SBL	100	193	202	
	SBR				SBR				
	EBL	150		25	EBL	200	107	98	
	EBR				EBR	200	25	25	
6 Dowdell Avenue and Wilfred Avenue	WBL	150		28	WBL	350	159	157	
	WBR				WBR	155	28	27	
	NBL				NBL	250	157	210	
	NBR				NBR	250	65	108	
	SBL				SBL	175	188	172	
	SBR				SBR	175	58	57	
7 Redwood Drive and Wilfred Avenue	EBL	150		25	EBL				
	EBR				EBR				
	WBL	150		483	WBL	225	70	67	
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
8 Redwood Drive and Commerce Boulevard	SBL				SBL	400	318	238	
	SBR				SBR	400	217	268	
	EBL	150		203	EBL	190	25	25	
	EBR	150		302	EBR				
	WBL				WBL				
	WBR				WBR				
9 Wilfred Avenue and SB US 101 Ramps	NBL	150	402	1271	NBL	225	247	279	
	NBR	100	95	110	NBR				
	SBL	275	350	350	SBL				
	SBR				SBR				
	EBL	75	25		EBL	250	69	58	
	EBR	75	50		EBR				
10 Golf Course Drive and Commerce Blvd	WBL	100	25		WBL	200	187	222	
	WBR				WBR				
	NBL	150	136		NBL	250	210	214	
	NBR	150	25		NBR	175	56	56	
	SBL	200	40		SBL	150	98	159	
	SBR				SBR	150	51	47	
11 Roberts Lake Drive and Golf Course Drive	EBL				EBL	350	162	183	
	EBR				EBR				
	WBL	300	25	25	WBL	500	155	170	
	WBR				WBR	150	50	51	
	NBL				NBL	550	296	298	
	NBR				NBR	675	30	31	
12 Commerce Blvd and NB US 101 Ramps	SBL	250	229	251	SBL	500	234	247	
	SBR				SBR	625	49	54	
	EBL				EBL	225	161	194	
	EBR				EBR				
	WBL	150	789	1000	WBL	150	56	54	
	WBR				WBR	80	25	261	
13 Commerce Blvd and NB US 101 Ramps	NBL	150	1131	1194	NBL	50	65	65	
	NBR				NBR				
	SBL	200	94	30	SBL	225	388	556	
	SBR				SBR				
	EBL	80	102	54	EBL				
	EBR				EBR	50	110	122	
14 Commerce Blvd and NB US 101 Ramps	WBL				WBL	100	101	72	
	WBR				WBR				
	NBL	200	478	524	NBL				
	NBR				NBR				
	SBL	100	25	25	SBL	425	222	222	
	SBR	175	217	256	SBR				
15 Business Park Drive and Redwood Drive	EBL	225	95	40	EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR	120	49	195	
	NBL	150	25	25	NBL	505	25	25	
	NBR				NBR	120	25	25	
16 Labath Avenue and Wilfred Avenue	SBL				SBL	480	25	25	
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
17 Langner Avenue and Wilfred Avenue	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
18 Labath Avenue and Wilfred Avenue	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
19 Redwood Drive and Wilfred Avenue	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
20 Dowdell Avenue and Wilfred Avenue	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
21 Redwood Drive and Commerce Boulevard	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
22 Redwood Drive and Commerce Boulevard	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
23 Redwood Drive and Commerce Boulevard	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
24 Redwood Drive and Commerce Boulevard	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
25 Redwood Drive and Commerce Boulevard	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
26 Redwood Drive and Commerce Boulevard	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				

## Alternative C Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative C traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown in **Table C4** are needed in the near-term (2008) and long-term (2020).

**Table C5** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections.

**Figures C8 and C9** illustrate the mitigated lane geometry and traffic control.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue.

The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to the Urban Growth Boundary. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be three lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and should include Class II bike lanes out to Stony Point Road to connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be accommodated on a three lane roadway section from Redwood Drive to Stony Point Road, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.

The project will create a significant unavoidable impact at the intersection of Golf Course Drive/Commerce Boulevard.



**Table C 4 – Alternative C Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Add NB right and change through-right to through</li> </ul>	No Tribe land	Capacity Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Add EB right and change EB all shared to left-through</li> <li>Add a NB right and change all shared to left-through</li> <li>Add 2 WB lefts and change all shared to through-right</li> </ul>	No Tribe land Tribe land Yes	Capacity Capacity Capacity Capacity
	4	Langer Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> </ul>	Yes	Capacity
	5	Labath Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> <li>Add NB right and change NB all shared to left-through</li> </ul>	No Yes Yes	Capacity Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize</li> <li>Widen Wilfred to 3 lanes (Add EB left &amp; WB left) <sup>1</sup></li> <li>Add an EB right turn lane and change all shared to through</li> <li>Add WB through</li> </ul>	No Yes Yes Yes	Capacity Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	<ul style="list-style-type: none"> <li>Add WB through</li> <li>Change WB left-through to through</li> <li>Add EB through</li> <li>Add EB left and EB right and change EB all-shared to through</li> <li>Change phasing east-west to protected from split</li> </ul>	Yes No Yes Yes No	Capacity Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	<ul style="list-style-type: none"> <li>Add an EB right turn overlap phase</li> <li><b>Significant Unavoidable Impact</b></li> </ul>	Yes	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Add a SB right turn overlap phase</li> </ul>	No	Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	No mitigation necessary	-	-
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Extend NB left turn bay to 275 feet (from 225 feet)</li> <li>Add second NB left turn lane</li> </ul>	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	<ul style="list-style-type: none"> <li>Optimize signal timing</li> <li>Add an EB right overlap phase</li> </ul>	No No	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize</li> </ul>	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

<sup>1</sup> In summary, widen Wilfred Ave to three lanes from Stony Point Rd to Redwood Dr

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add WB left and change WB left-through to through</li> <li>Add NB right and change through-right to through *</li> <li>Extend WB right turn bay to 75 feet (from 35 feet)</li> <li>Optimize signal timing</li> </ul>	No Yes Tribe land Yes No	Capacity Capacity Capacity Queue Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add EB right and change EB all shared to left-through *</li> <li>Add a NB right and change all shared to left-through *</li> <li>Add 2 WB lefts and change all shared to through-right *</li> </ul>	No Tribe land Tribe land Yes	Capacity Capacity Capacity Capacity
	4	Langer Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Add EB left *</li> </ul>	Yes	Capacity
	5	Labath Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add NB right and change NB all shared to left-through *</li> <li>Optimize signal timing</li> <li>Add a SB left and change SB all shared to through-right</li> </ul>	No Yes No Yes	Capacity Capacity Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	<ul style="list-style-type: none"> <li>Signalize *</li> <li>Add an EB right turn lane and change through-right to through *</li> <li>Optimize signal timing</li> <li>Add a second WB left turn</li> <li>Add a NB right overlap phase</li> <li>Add 1 SB left turn bay and 1 SB right turn bay and change all shared to through</li> <li>Add 1 NB left turn bay and 1 NB right turn bay and change all shared to through-right</li> </ul>	No Yes No Yes No Yes Yes	Capacity Capacity Capacity Capacity Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	<ul style="list-style-type: none"> <li>Add WB through *</li> <li>Optimize signal timing</li> <li>Change NB through to left-through &amp; change north-south phasing to split from protected</li> <li>Change WB left-through to through *</li> <li>Change phasing east-west to protected from split *</li> </ul>	Yes No No Yes No	Capacity Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	<ul style="list-style-type: none"> <li>Add an exclusive EB right turn overlap phase *</li> <li>Add a second exclusive EB right turn lane</li> <li>Significant Unavoidable Impact</li> </ul>	Yes Yes	Capacity Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Add a SB right turn overlap phase *</li> <li>Add a second SB right turn lane. Will require a two lane on-ramp with one lane as an auxiliary lane between the Wilfred Avenue and Santa Rosa Avenue interchanges. May require additional bridge structure widening over Wilfred Avenue as well as over the Northwest Pacific Railroad tracks.</li> <li>Optimize signal timing</li> </ul>	No Yes No	Capacity Queue Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	No mitigation necessary	-	-
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	<ul style="list-style-type: none"> <li>Extend NB left turn bay to 275 feet (from 225 feet) *</li> <li>Add second NB left turn lane *</li> </ul>	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	<ul style="list-style-type: none"> <li>Optimize signal timing *</li> <li>Add a third EB through lane that merges back into 2 lanes east of the intersection</li> </ul>	No Yes	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	<ul style="list-style-type: none"> <li>Add a WB right overlap phase</li> <li>Optimize signal timing</li> </ul>	No No	Queue Capacity
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	<ul style="list-style-type: none"> <li>Signalize *</li> </ul>	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langer Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

\* Improvement assumed to occur with 2008 mitigation

**Table C 5 – Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008						2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	D	37.2	F	841.3	F	OVRFL	D	39.8
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	C	24.7	C	24.7	B	12.5	D	29.3	D	29.3
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	OVRFL	C	25.7	B	12.5	F	OVRFL	C	26.3
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	F	136.3	F	OVRFL	B	12.5	F	192.1	F	OVRFL
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	D	36.8	F	OVRFL	F	OVRFL	C	27.3
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	D	47.5	F	OVRFL	F	OVRFL	D	35.5
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	334.5	D	54.8	F	169.9	F	311.0	D	41.9
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	24.9	C	25.3	-	-	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	33.8	C	30.3	C	26.8	D	36.5	C	26.5
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	116.7	E	67.9	E	74.2	F	154.4	E	63.6
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	18.5	B	19.0	B	19.3	B	18.2
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	F	83.8	D	40.9	D	50.8	F	153.7	D	50.3
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	D	39.8	D	39.8	B	18.5	D	37.6	D	37.6
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.6	C	29.6	C	28.2	C	31.6	C	31.6
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	24.9	C	25.2	C	29.1	C	28.0	C	28.3
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.5	B	18.5	B	16.0	B	15.7	B	15.9
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	13.6	B	10.6	B	12.3	B	15.1	B	11.5
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	43.0	C	30.9	E	63.4	E	61.9	C	32.6
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	43.0	D	43.0	D	45.5	D	51.6	D	51.6
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	28.3	C	28.3	D	42.4	E	63.3	D	38.0
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.3	B	19.3	B	18.1	B	18.6	C	24.4
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	12.1	B	12.1	B	11.5	B	12.6	B	12.6
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	69.6	A	10.0	F	90.2	F	207.1	B	10.4
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.7	B	11.7	B	12.4	B	12.6	B	12.6
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.6	B	11.6	B	12.5	B	12.7	B	12.7
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	A	9.9	A	9.9	B	11.3	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	11.7	B	14.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.7	B	11.7



Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table C6**:

- Adjust the ramp metering to account for the additional project traffic at the Wilfred Avenue interchange in the near-term (2008). Most metering adjustments can be minor and are not expected to have queuing effects on the local street network. However, the southbound on-ramp will require heavy metering to obtain an acceptable level of service for the freeway ramp merge area which may create a long queue backed up on the ramp.
- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to Wilfred Avenue and from Gravenstein Highway (SR-116) to West Sierra Avenue as well as an additional traffic lane in the northbound direction from West Sierra Avenue to Gravenstein Highway (SR-116) in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the casino and hotel should coordinate with the Green Music Center during outdoor events that will generate high traffic levels. During that period, traffic control services at the Rohnert Park interchange may be necessary. Therefore, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control.

Because no fixed route service will be available at the project site, the casino/hotel should provide a shuttle that serves the two Rohnert Park transfer stations. The shuttle should run throughout the day or could be called out on demand.

The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.



**Table C 6 – Alternative C Mitigated Freeway Level of Service Summary**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt C		2020		2020 + Alt C		2020 + Alt C Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>														
US-101 South of Gravenstein Highway (NB)	E	22.2	C	19.1	C	25.1	C	25.1	C	25.6	E	38.4	E	38.4
Gravenstein Highway NB Off-Ramp	E	30.8	C	27.4	D	31.8	D	31.8	D	34.1	F	41.8	D	29.3
Gravenstein Highway NB On-Ramp	E	34.5	D	29.5	D	33.4	D	33.4	E	36.1	F	43.1	E	39.3
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	D	28.8	D	28.8	D	32.3	F	-	E	39.3
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	32.5	D	32.5	E	37.1	F	43.7	E	39.3
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	D	31.4	D	31.4	C	23.2	F	41.8	E	38.6
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	D	30.4	D	30.4	D	29.0	E	38.6	E	38.6
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	D	30.4	D	30.4	D	29.0	E	38.6	E	38.6
Wilfred Avenue NB Off-Ramp	E	35.4	C	22.1	D	30.4	D	30.4	D	29.0	E	38.6	E	38.6
Wilfred Avenue NB On-Ramp	E	42.0	D	30.3	D	33.9	D	33.9	E	40.4	F	44.3	E	43.0
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	33.9	D	33.9	E	40.4	F	44.3	E	43.0
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	33.9	D	33.9	E	40.4	F	44.3	E	43.0
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	23.8	C	23.8	D	29.7	D	32.6	D	32.6
<b>Southbound</b>														
US-101 North of Santa Rosa Avenue (SB)	E	22.9	C	24.1	D	26.1	D	26.1	D	28.5	D	31.2	D	31.2
Santa Rosa Avenue SB On-Ramp	E	31.2	D	32.7	E	36.2	E	36.2	F	-	F	-	C	24.8
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	31.5	D	32.7	E	36.2	E	36.2	F	-	F	-	C	24.8
Wilfred Avenue SB Off-Ramp	E	38.0	E	38.8	E	40.8	E	40.8	F	44.8	F	46.8	D	32.7
Wilfred Avenue SB On-Ramp	E	33.7	D	33.4	F	46.6	E	52.2	E	39.9	F	50.7	E	43.0
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	F	46.6	E	52.2	E	39.9	F	50.7	E	43.0
Rohnert Park Expressway SB Off-Ramp	E	36.0	D	33.4	F	46.6	E	52.2	E	39.9	F	50.7	E	43.0
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	33.4	D	33.4	E	38.5	F	43.4	E	40.7
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	32.8	D	32.8	F	37.5	F	43.3	E	40.7
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	D	27.1	D	27.1	E	36.6	F	-	E	40.7
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	32.5	D	32.5	F	40.3	F	46.2	E	40.7
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	E	35.7	E	35.7	F	42.3	F	48.4	D	29.1
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	D	27.4	D	27.4	D	32.0	F	-	C	23.5

It is recommended that the casino contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating or shortening the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.

If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.

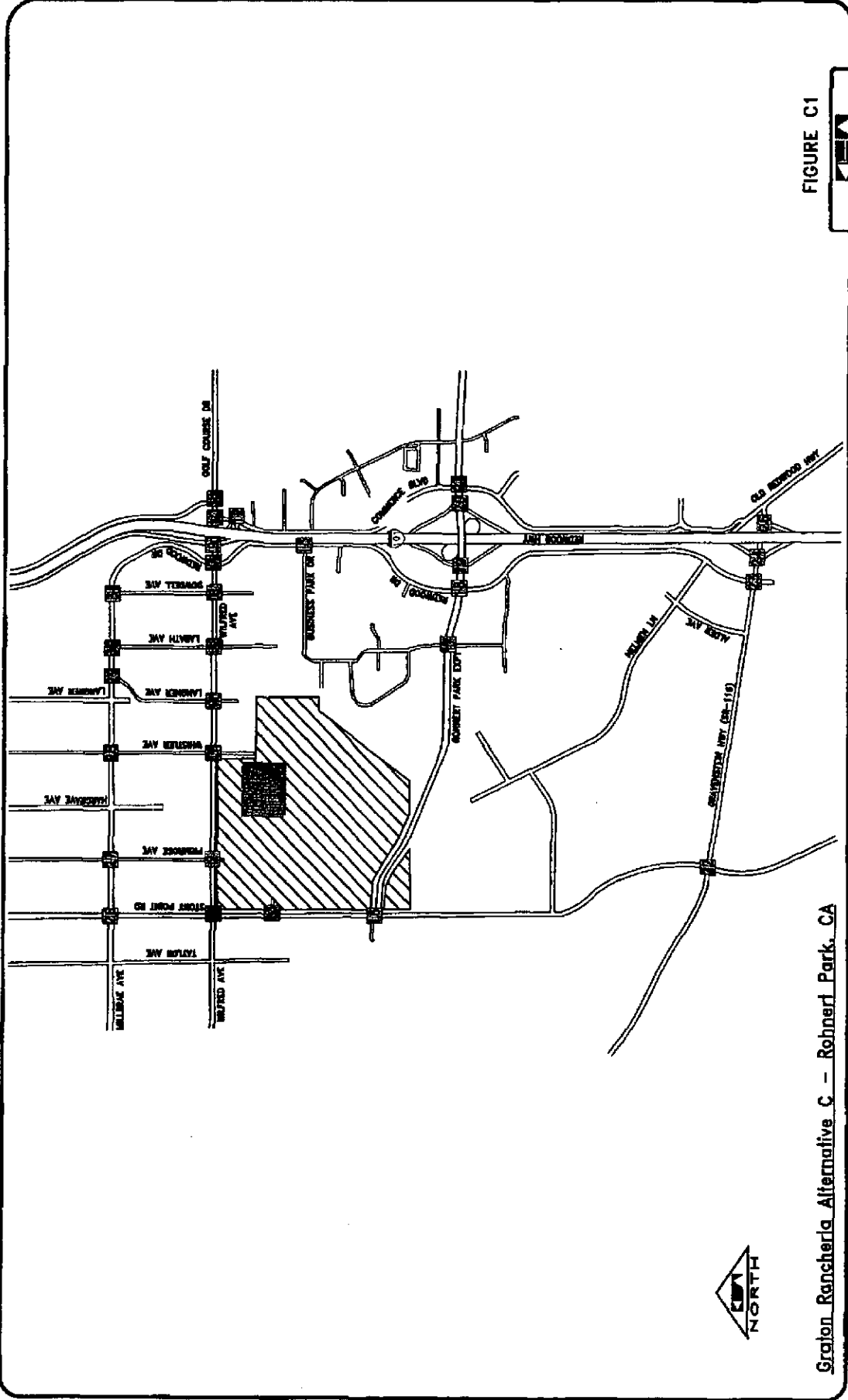


FIGURE C1



Graton Rancheria Alternative C - Robnerd Park, CA

PROJECT LOCATION



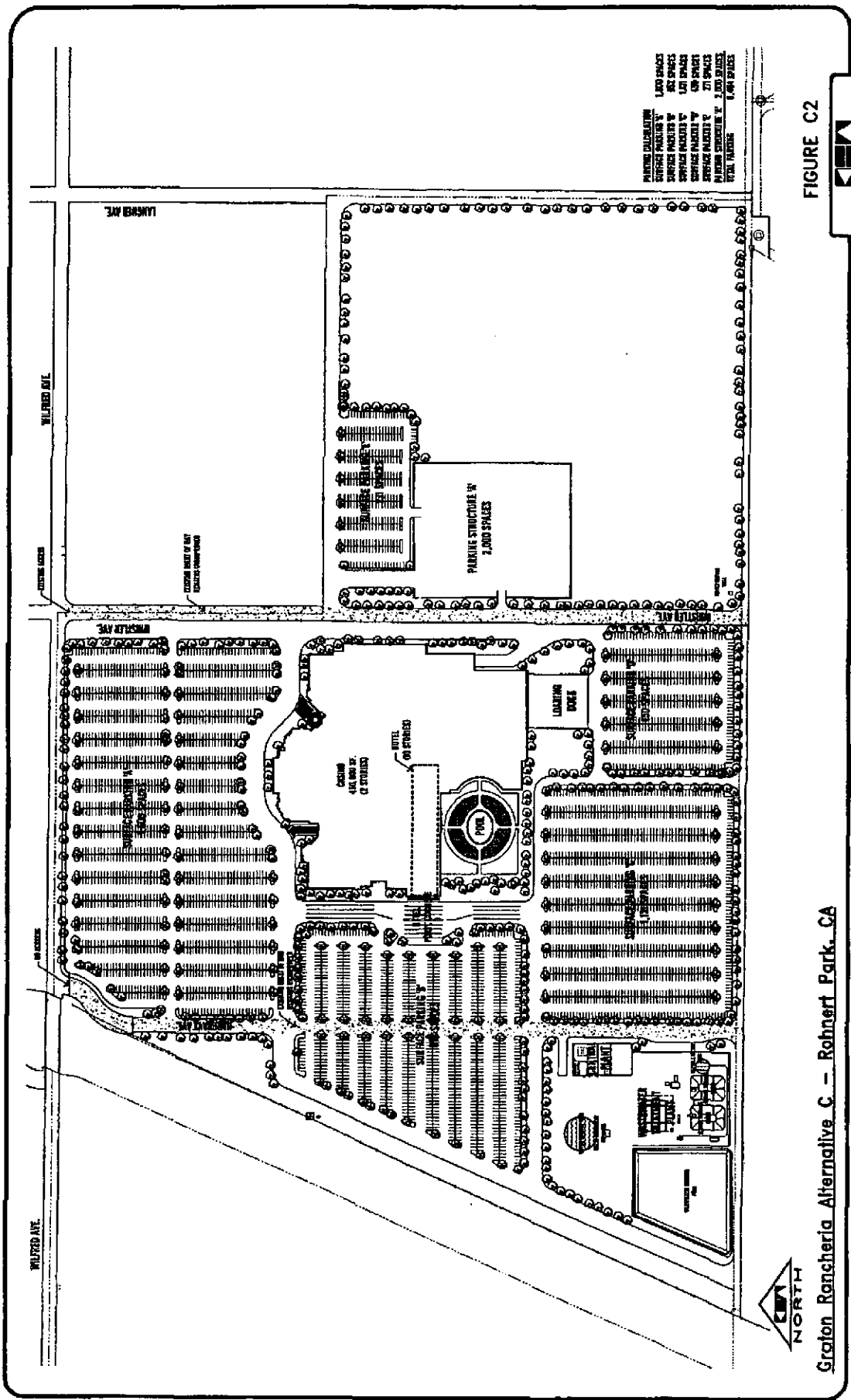


FIGURE C2



Graton Rancheria Alternative C - Robnett Park, CA

SITE PLAN





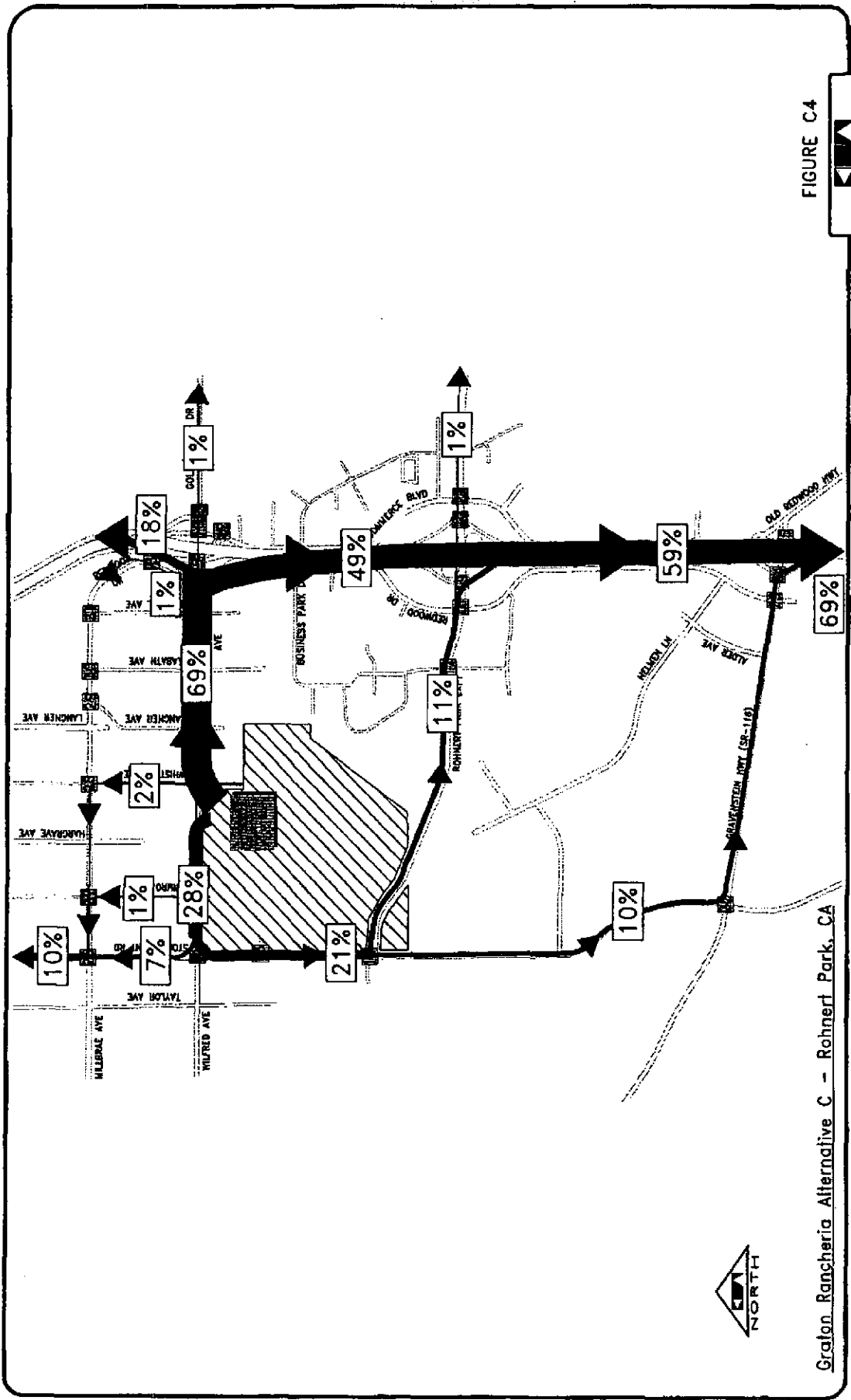


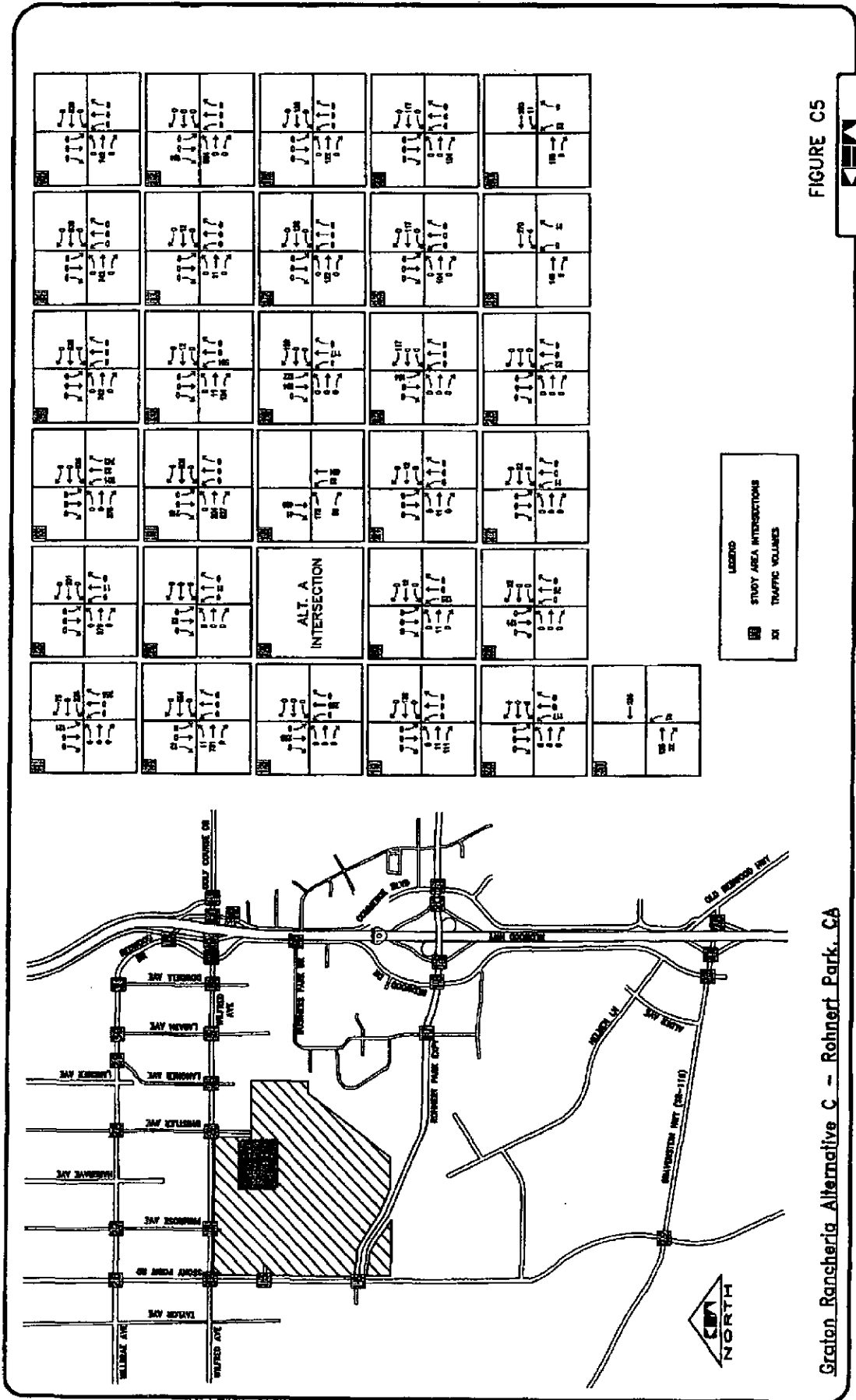
FIGURE C-4



Graton Rancheria Alternative C - Rohnert Park, CA

TRIP DISTRIBUTION - OUT







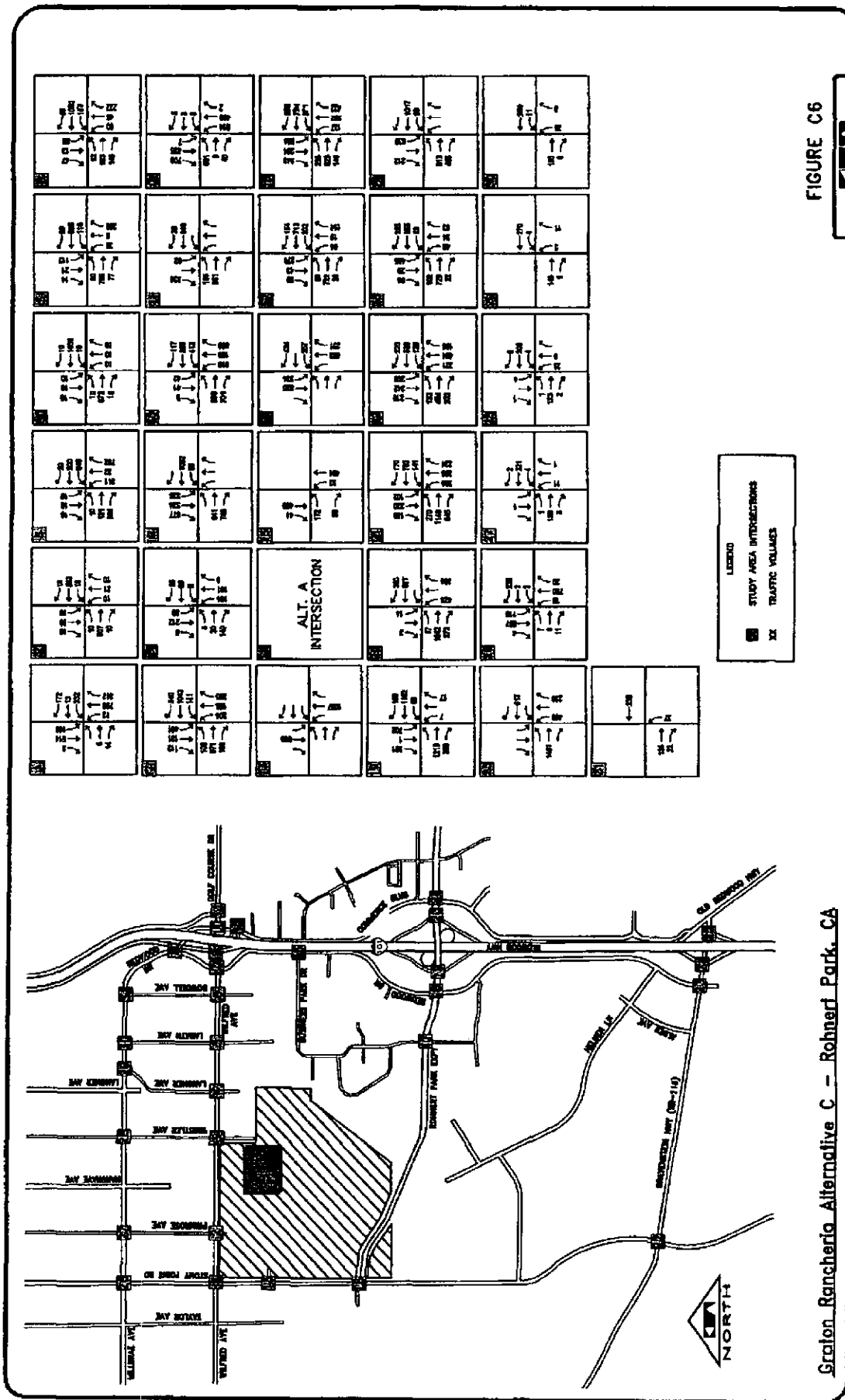


FIGURE C6

Sraeton Rancheria Alternative C - Rohnert Park, CA

NEAR-TERM + PROJECT PM TRAFFIC VOLUMES

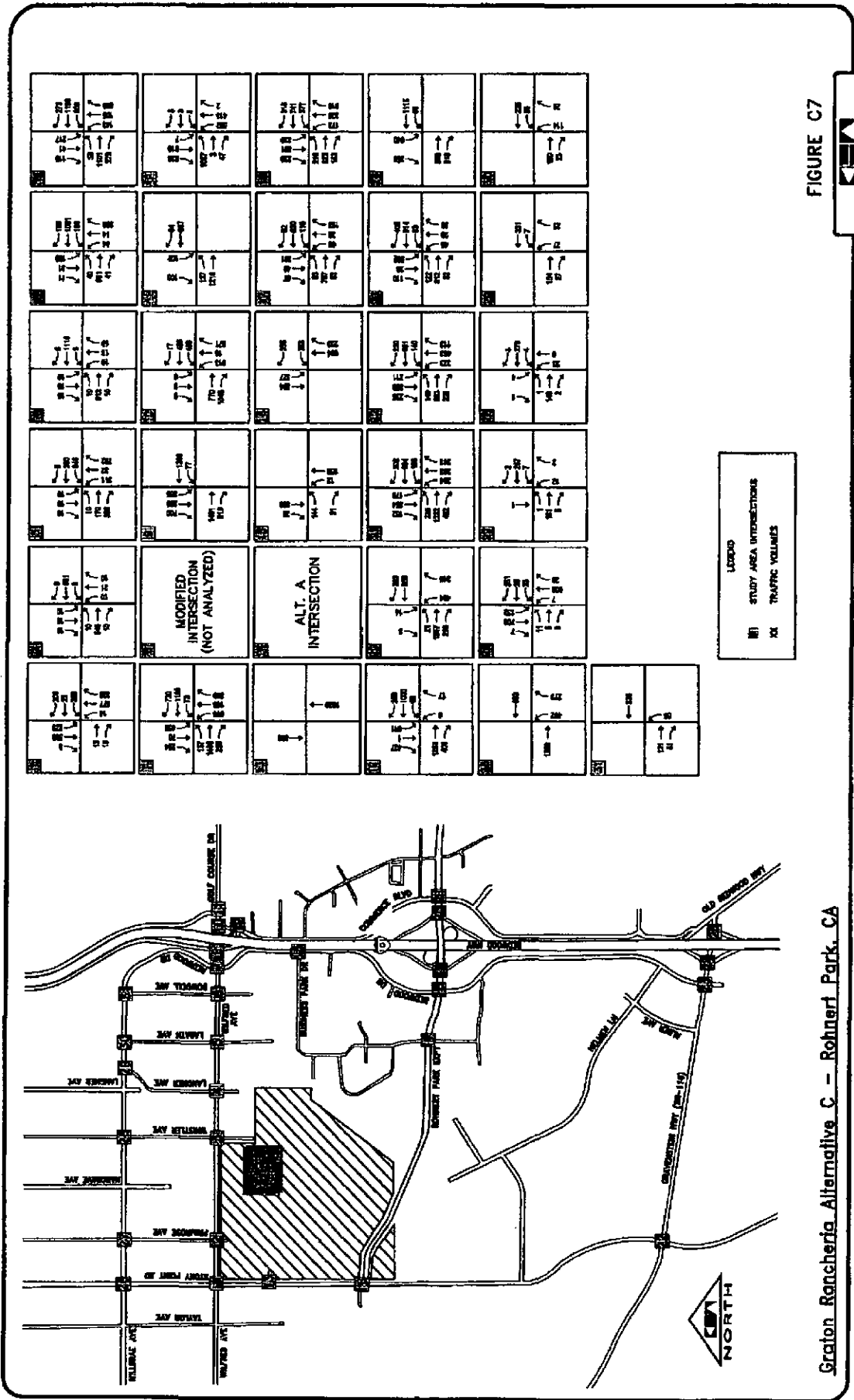


FIGURE C7

Sycamore Rancheria Alternative C - Rohnert Park, CA

LONG-TERM + PROJECT PM TRAFFIC VOLUMES



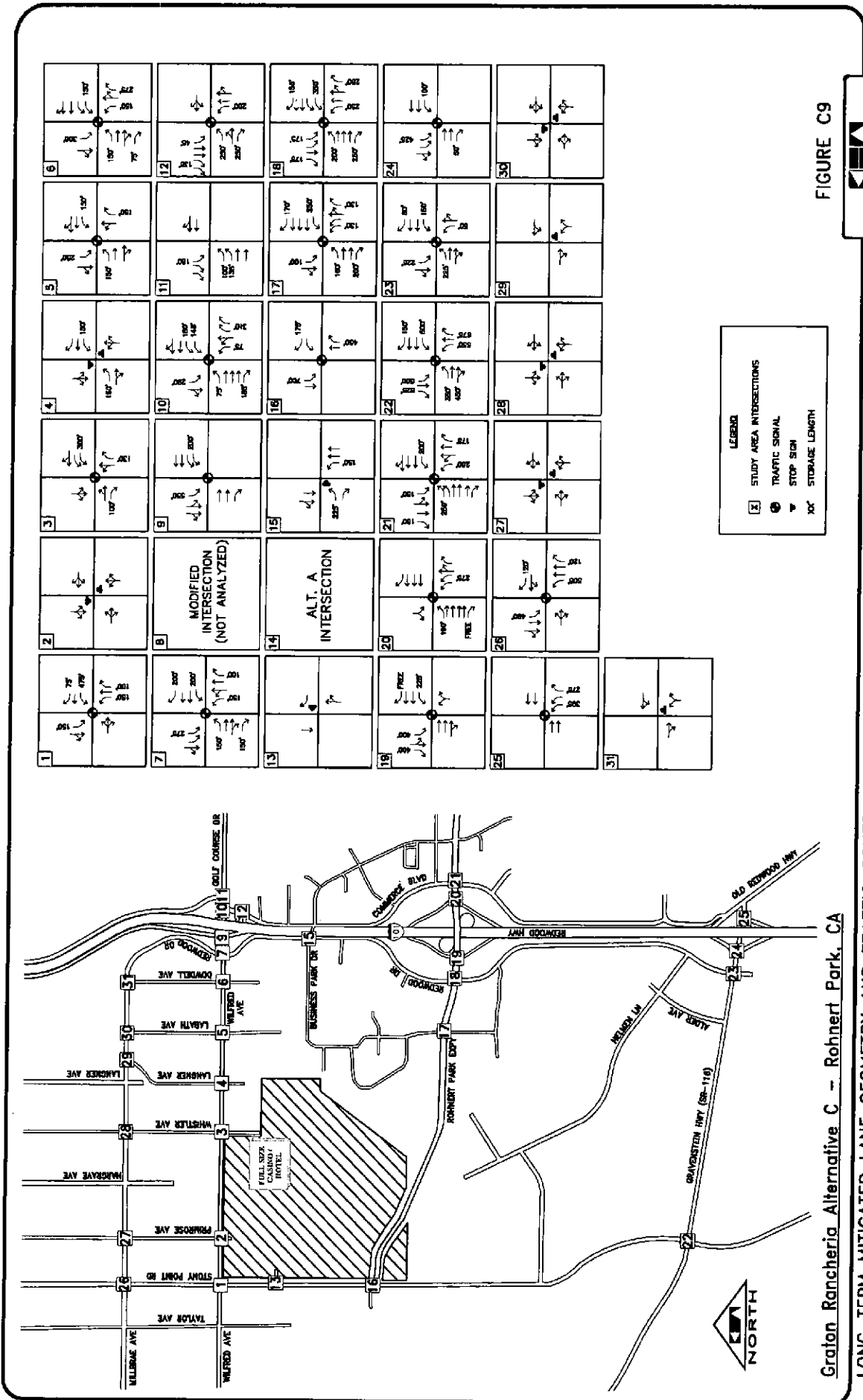


FIGURE C9

Kimley-Horn and Associates, Inc.

**LEGEND**

- [Z] STUDY AREA INTERSECTIONS
- ⊙ TRAFFIC SIGNAL
- ▼ STOP SIGN
- XX STORAGE LENGTH

Graeton Rancheria Alternative C -- Rohnert Park, CA

LONG-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

## ALTERNATIVE D – NORTHWEST STONY POINT REDUCED INTENSITY OPTION

The Alternative D casino and hotel is proposed to be located as shown in **Figure D1**, which is bordered by Wilfred Avenue in the north, Rohnert Park Expressway in the south, Stony Point Road in the west, and Langner Avenue in the east.

**Figure D2** shows the proposed layout of the casino and hotel facility. As seen in the figure, the buildings and other related facilities are located in the northwest corner of the site. The site layout includes a main building of approximately 315,100 square feet for a casino, restaurants, food court, event center, banquet facilities, lobby, pool, and other ancillary functions. In addition the project is planned to include up to 100 hotel rooms, primarily for casino guests.

A breakdown of square footage as it relates to traffic impacts is shown below:

- Casino and Entertainment areas – 293,250 s.f.
- Lobby/Bar/Back of House/Sundries – 14,750 s.f.
- Pool – 7,100 s.f.  
315,100 s.f.
  
- Hotel Rooms – 77,000 s.f.

The site plan also shows supporting uses such as parking lots, parking structure, and wastewater treatment facilities. This layout is virtually the same as Alternative A except that the project has been reduced in size and intensity.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

The main project access is from the south side of Wilfred Avenue, where an existing driveway aligns with Primrose Avenue. This approach is assumed to operate as a full movement driveway with no turn limitations.

A second project access from Stony Point Road is located on this plan approximately 880 feet south of the Stony Point Road/Wilfred Avenue intersection. The location is at an existing driveway access; however, due to conflicts with the northbound turn bay at the Stony Point Road/Wilfred Avenue intersection, the access is assumed to be limited to right in/out operation.

Currently, neither access is signalized.

## Trip Generation – Alternative D

Project trip generation for Alternative D is shown in **Table D1**. Additional trip generation calculations are contained in the **Appendix**. Since Alternatives D and H are both casinos with the same amount of gaming and hotel space, trip generation numbers are the same for both Alternatives. As seen in the table Alternatives D and H are expected to generate 949 new trips in the AM and 1,580 new trips in the PM peak hour. Although project trip generation was prepared for daily, AM, and PM periods, only the weekday PM traffic conditions were evaluated in this report because it represents the time period where the project will contribute to the greatest amount of congestion and potential mitigation. Other time periods that were considered included weekday AM, weekday late PM, and Saturday. On weekday late evenings and Saturday evenings the casino facility will generate more trips than during the 4-6 PM weekdays, but the background traffic is lower, making the overall number of vehicles on the road lower as well. Therefore, the PM peak represents the worst case period to evaluate.

**Table D 1 – Alternatives D and H Project Trip Generation**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Casino 315,100 s.f.	12,424	651	279	930	827	733	1,560
Hotel 100 Room*	272	12	7	19	11	9	20
Net New Vehicle Trips	12,696	663	286	949	838	742	1,580

\*Trip rate is ITE Land Use Code 310 – Hotel. Rate reduced by 2/3 to account for internal capture to/from casino.

## Project Trip Distribution and Assignment

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to destinations north of the site, with the remaining 70% distributed south of the site. To be conservative, no project traffic was assumed to be generated or attracted in the immediate vicinity of the project site. The project traffic distribution is shown in **Figure D3** and **Figure D4**. **Figure D5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure D5**, most of the project traffic is expected to come from the freeway therefore it was assumed that most of the traffic would use Primrose Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

## Near-Term Plus Project Traffic Volumes

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the Alternative D casino and hotel project. **Figure D6** illustrates the combined near-term turning movement volumes at the study intersections.

## Cumulative Plus Project Traffic Volumes

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the Alternative D casino and hotel project. **Figure D7** illustrates the combined long-term turning movement volumes at the study intersections.

## Alternative D LOS Conditions and Impacts at Intersections

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative D (year 2008)
- Long-term Cumulative conditions with Alternative D (year 2020)

In the near-term analysis for Alternative D, it was assumed that the Wilfred Avenue widening project will not have taken place before the casino/hotel opens. The Memorandum of Understanding (MOU) between the City of Rohnert Park and the Federated Indians of the Graton Rancheria stated that the tribe would help financially to speed up the timeline of the widening project to occur before the casino/hotel opens in 2008.

Results of the analysis are presented in **Table D2**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

**Table D 2 – Alternative D Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	743.6	B	12.5	F	OVRFL
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	E	35.5	B	12.5	E	42.9
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	E	35.1	B	12.5	E	42.7
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	206.0	F	169.9	F	215.4
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.0	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	25.7	C	26.8	C	28.9
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	83.0	E	74.2	F	101.1
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.4	B	19.0	B	19.1
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	61.7	D	50.8	F	85.6
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	C	21.8	A	0.0	C	19.9
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	C	26.1	B	18.5	C	23.2
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.0	C	28.2	D	39.4
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.2	C	29.1	C	28.2
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.6	B	16.0	B	16.0
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	17.2	B	12.3	B	18.7
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	39.9	E	63.4	E	58.6
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	39.6	D	45.5	D	48.1
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	27.4	D	42.4	E	55.6
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.2	B	18.1	B	18.4
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.7	B	11.5	B	12.2
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	59.1	F	90.2	F	153.9
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	12.4	B	12.4
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	12.5	B	12.5
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	A	9.9	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.7

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Primrose Avenue/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Primrose Avenue/Wilfred Avenue
- Whistler Avenue/Wilfred Avenue
- Langner Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Wilfred Avenue/US-101 SB Ramps
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Labath Avenue
- Rohnert Park Expressway/Commerce Boulevard
- Gravenstein Highway (SR-116)/Redwood Drive
- Millbrae Avenue/Stony Point Road

### **Alternative D Traffic Signal Warrant Analysis**

Alternative D, near-term and long-term, traffic volumes at unsignalized study intersections were compared against peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by the year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Primrose Avenue/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)



Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

### **Alternative D LOS Conditions and Impacts on Freeway and Ramps**

Project trips generated by the proposed Alternative D, reduced-intensity casino and hotel were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the casino and hotel project. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table D3**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project; however the congestion is reduced as a result of the smaller casino and hotel.



**Table D 3 – Alternative D Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt D		2020		2020 + Alt D		
	LOS	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>													
US-101 South of Gravenstein Highway (NB)	E	C	22.2	C	19.1	C	23.1	C	25.6	D	33.4	D	33.4
Gravenstein Highway NB Off-Ramp	E	D	30.8	C	27.4	D	31.8	D	34.1	D	39.4	E	39.4
Gravenstein Highway NB On-Ramp	E	D	34.5	D	29.5	D	33.4	E	36.1	F	40.9	F	40.9
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	28.1	C	23.5	D	27.0	D	32.3	E	40.4	E	40.4
Rohnert Park Expressway NB Off-Ramp	E	D	33.6	D	28.8	D	32.5	E	37.1	F	41.6	F	41.6
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1	C	21.8	D	31.4	C	23.2	F	39.9	F	39.9
Rohnert Park Expressway NB On-Ramp	E	D	32.5	C	22.1	C	26.8	D	29.0	D	34.7	D	34.7
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	28.9	C	22.1	C	26.8	D	29.0	D	34.7	D	34.7
Wilfred Avenue NB Off-Ramp	E	E	35.4	C	22.1	C	26.8	D	29.0	D	34.7	D	34.7
Wilfred Avenue NB On-Ramp	E	F	42.0	D	30.3	D	32.8	E	40.4	F	43.1	F	43.1
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	26.7	D	30.3	D	32.8	E	40.4	F	43.1	F	43.1
Santa Rosa Avenue NB Off-Ramp	E	E	37.2	D	30.3	D	32.8	E	40.4	F	43.1	F	43.1
US-101 North of Santa Rosa Avenue (NB)	E	C	20.3	C	22.0	C	23.2	D	29.7	D	31.7	D	31.7
<b>Southbound</b>													
US-101 North of Santa Rosa Avenue (SB)	E	C	22.9	C	24.1	C	25.5	D	28.5	D	30.3	D	30.3
Santa Rosa Avenue SB On-Ramp	E	D	31.2	D	32.7	D	31.0	F	-	F	-	F	-
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	31.5	D	32.7	D	31.0	F	-	F	-	F	-
Wilfred Avenue SB Off-Ramp	E	E	38.0	E	38.8	E	40.2	F	44.8	F	46.2	F	46.2
Wilfred Avenue SB On-Ramp	E	D	33.7	D	33.4	F	43.3	E	39.9	F	47.1	F	47.1
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	35.2	D	33.4	F	43.3	E	39.9	F	47.1	F	47.1
Rohnert Park Expressway SB Off-Ramp	E	E	38.0	D	33.4	F	43.3	E	39.9	F	47.1	F	47.1
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0	D	30.9	D	33.4	E	38.5	F	41.6	F	41.6
Rohnert Park Expressway SB On-Ramp	E	E	35.1	D	30.1	D	32.8	F	37.5	F	40.8	F	40.8
Rohnert Park Expressway SB On-Ramp	E	D	27.1	C	22.3	C	25.5	E	36.6	F	-	F	-
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	33.9	D	29.2	D	32.5	F	40.3	F	44.4	F	44.4
Gravenstein Highway SB Off-Ramp	E	D	33.7	D	32.1	E	35.7	F	42.3	F	46.6	F	46.6
US-101 South of Gravenstein Highway (SB)	E	C	24.7	C	21.8	C	25.5	D	32.0	E	41.4	E	41.4

## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.

## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table D4**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.

**Table D 4 – Alternative D Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length	
			2006	2020				2006	2020
1 Stony Point Road and Wilfred Avenue	EBL				16 Stony Point Road and Rohnert Park Expy	EBL			
	EBR					EBR			
	WBL					WBL			
	WBR	35	OVFL	OVFL		WBR	175	235	139
	NBL	150	25	25		NBL			
	NBR					NBR	450	38	38
4 Langner Avenue and Wilfred Avenue	SBL	150	25	25	SBL	700	242	234	
	SBR				SBR				
	EBL				EBL	160	61	111	
	EBR				EBR	200	25	29	
	WBL	150		25	WBL	250	76	34	
	WBR				WBR	170	25	25	
5 Labath Avenue and Wilfred Avenue	NBL				NBL	130	36	38	
	NBR				NBR	130	36	37	
	SBL				SBL	100	193	202	
	SBR				SBR				
	EBL	150		25	EBL	200	168	124	
	EBR				EBR	200	25	25	
6 Dowdell Avenue and Wilfred Avenue	WBL	150		25	WBL	350	153	156	
	WBR				WBR	155	37	30	
	NBL				NBL	250	157	210	
	NBR				NBR	250	65	104	
	SBL				SBL	175	188	172	
	SBR				SBR	175	58	57	
7 Redwood Drive and Wilfred Avenue	EBL	150		25	18 Redwood Drive and Rohnert Park Expy	EBL			
	EBR					EBR			
	WBL	150		324		WBL	225	62	62
	WBR					WBR			
	NBL					NBL			
	NBR					NBR			
8 Redwood Drive and Commerce Boulevard	SBL				SBL	400	318	238	
	SBR				SBR	400	224	284	
	EBL	150		199	EBL	190	25	25	
	EBR	150		289	EBR				
	WBL				WBL				
	WBR				WBR				
9 Wilfred Avenue and SB US 101 Ramps	NBL	150	402	1271	19 SB US 101 Ramps and Rohnert Park Expy	NBL			
	NBR	100	95	110		NBL			
	SBL	275	351	350		NBR			
	SBR					SBL			
	EBL	75	<25			SBR			
	EBR	75	50			EBL	250	69	58
10 Golf Course Drive and Commerce Blvd	WBL	100	<25		EBR	200	187	222	
	WBR				WBR				
	NBL	150	131		NBL	250	210	214	
	NBR	150	<25		NBR	175	56	58	
	SBL	200	40		SBL	150	98	158	
	SBR				SBR	150	51	47	
11 Roberts Lake Drive and Golf Course Drive	EBL				EBL	350	162	183	
	EBR				EBR				
	WBL	300	35	27	WBL	500	155	170	
	WBR				WBR	150	45	47	
	NBL				NBL	550	296	298	
	NBR				NBR	675	30	31	
12 Commerce Blvd and NB US 101 Ramps	SBL	250	229	251	SBL	500	200	214	
	SBR				SBR	625	49	54	
	EBL				EBL	225	161	184	
	EBR				EBR				
	WBL	150	788	997	WBL	150	60	55	
	WBR				WBR	80	25	183	
15 Business Park Drive and Redwood Drive	NBL	150	674	854	20 Redwood Road and Gravenstein Hwy	NBL	50	65	65
	NBR					NBR			
	SBL	200	94	30		SBL	225	388	556
	SBR					SBR			
	EBL	80	100	52		EBL			
	EBR					EBR			
13 Commerce Blvd and NB US 101 Ramps	WBL				21 Commerce Blvd and Rohnert Park Expy	WBL			
	WBR					WBR			
	NBL	200	478	524		NBL	250	210	214
	NBR					NBR	175	56	58
	SBL	100	25	25		SBL	150	98	158
	SBR	175	123	197		SBR	150	51	47
14 Stony Point Road and Wilfred Avenue	EBL	225	97	40	EBL	350	162	183	
	EBR				EBR				
	WBL				WBL	500	155	170	
	WBR				WBR	150	45	47	
	NBL	200	478	524	NBL	550	296	298	
	NBR				NBR	675	30	31	
16 Stony Point Road and Wilfred Avenue	SBL	100	25	25	22 Stony Point Road and Gravenstein Hwy	SBL	500	200	214
	SBR	175	123	197		SBR	625	49	54
	EBL	225	97	40		EBL	225	161	184
	EBR					EBR			
	WBL					WBL	150	60	55
	WBR					WBR	80	25	183
17 Labath Avenue and Rohnert Park Expy	NBL				23 Redwood Road and Gravenstein Hwy	NBL	50	65	65
	NBR					NBR			
	SBL					SBL	225	388	556
	SBR					SBR			
	EBL					EBL			
	EBR					EBR			
18 Redwood Drive and Rohnert Park Expy	EBL				24 Gravenstein Hwy and SB US 101 Ramps	EBL			
	EBR					EBR	50	106	122
	WBL					WBL	100	102	74
	WBR					WBR			
	NBL					NBL			
	NBR					NBR			
19 SB US 101 Ramps and Rohnert Park Expy	SBL				25 Gravenstein Hwy and NB US 101 Ramps	SBL	425	222	222
	SBR					SBR			
	EBL					EBL			
	EBR					EBR			
	WBL					WBL			
	WBR					WBR			
20 NB US 101 Ramps and Rohnert Park Expy	NBL				26 Stony Point Road and Millbrae Avenue	NBL	395	152	150
	NBR					NBR	275	178	201
	SBL					SBL			
	SBR					SBR			
	EBL					EBL			
	EBR					EBR			
21 Commerce Blvd and Rohnert Park Expy	EBL				26 Stony Point Road and Millbrae Avenue	EBL			
	EBR					EBR			
	WBL					WBL	120	43	163
	WBR					WBR	120	43	163
	NBL					NBL	505	25	25
	NBR					NBR	120	25	25
22 Stony Point Road and Gravenstein Hwy	SBL				SBL	490	25	25	
	SBR				SBR				
	EBL								
	EBR								
	WBL								
	WBR								
23 Redwood Road and Gravenstein Hwy	NBL								
	NBR								
	SBL								
	SBR								
	EBL								
	EBR								
24 Gravenstein Hwy and SB US 101 Ramps	EBL								
	EBR								
	WBL								
	WBR								
	NBL								
	NBR								
25 Gravenstein Hwy and NB US 101 Ramps	SBL								
	SBR								
	EBL								
	EBR								
	WBL								
	WBR								
26 Stony Point Road and Millbrae Avenue	NBL								
	NBR								
	SBL								
	SBR								
	EBL								
	EBR								

## Alternative D Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative D traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown in **Table D5** are needed in the near-term (2008) and long-term (2020).

The basis of the Alternative D mitigations is the assumption that intersection #13, the Project Driveway at Stony Point Road, should be relocated further south along Stony Point Road and be signalized so that it can function as a full movement access. This change permits more project traffic to conveniently arrive and exit from the site and use the Rohnert Park Expressway interchange, thus relieving some the traffic pressure through the Wilfred Avenue interchange.

In the event that intersection #13 cannot be relocated and signalized as discussed above, additional mitigation improvements will be needed, particularly at intersections surrounding the Wilfred Avenue interchange.

**Table D6** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections.

**Figures D8 and D9** illustrate the mitigated lane geometry and traffic control.

A single asterisk in the table denotes an intersection that operates at an acceptable level of service and does not require mitigation, but a mitigated level of service and delay are provided for reference as a result of the mitigation to signalize the Project Driveway/ Stony Point Road which changes traffic patterns at some intersections. A double asterisk indicates an intersection where the delay increases as a result of the mitigation to signalize the Project Driveway/Stony Point Road intersection.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue. The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to the Urban Growth Boundary. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be three lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and should include Class II bike lanes out to Stony Point Road to connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be



accommodated on a three lane roadway section from Redwood Drive to Stony Point Road, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.



**Table D 5 – Alternative D Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Wilfred Ave	• Signalize	No	Capacity
	2	Primrose Ave/ Wilfred Ave	• Signalize	No	Capacity
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize • Add NB right and change NB all shared to left-through • Add SB left and change SB all shared to through-right	No Yes Yes	Capacity Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	• Signalize • Add NB right and change NB all shared to left-through • Add WB left (drop lane) and change all shared to through-right	No Yes Yes	Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	• Add EB through • Add EB left and change all-shared to through-right • Change WB left-through to WB through • Change phasing east-west to protected from split	Yes Yes No No	Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	• Add an exclusive EB right turn overlap phase	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	Mitigation at Intersection #13 alleviated the impact here	-	-
	13	Project Driveway/ Stony Point Rd	• Signalize • Add NB right and change NB through-right to through • Add WB left out of project driveway	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	• Extend WB right turn bay to 250 feet	Tribe land	Queue
	17	Rohnert Park Expwy/ Labath Ave	No mitigation necessary	-	-
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 400 feet (from 225 feet) • Add a second NB left turn lane	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	• Add an EB right turn overlap phase • Optimize signal timing	No No	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-





Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	• Signalize *	No	Capacity
	2	Primrose Ave/ Wilfred Ave	• Signalize * • Add NB right and change NB all shared to left-through	No Tribe land	Capacity Capacity
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize * • Optimize signal timing • Add NB right and change NB all shared to through-left * • Add SB left and change SB all shared to through-right *	No No Yes Yes	Capacity Capacity Capacity Capacity
	6	Dowdell Ave/ Wilfred Ave	• Signalize * • Optimize signal timing • Add 2nd WB left (drop lane) • Add a SB left and change SB all shared to through-right • Add NB right and change NB all shared to left-through * • Add a NB left and second NB right and change all shared to through	No No Yes Yes Yes Yes	Capacity Capacity Capacity Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	• Change NB through to left-through & change north-south phasing to split from protected • Optimize signal timing • Change WB left-through to through * • Change phasing east-west to protected from split *	No No No No	Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	• Optimize signal timing	No	Capacity
	10	Golf Course Dr/ Commerce Blvd	• Add an exclusive EB right turn overlap phase * • Add a second exclusive EB right turn bay and change EB through-right to through	No Yes	Capacity Capacity
	11	Golf Course Dr/ Roberts Lake Rd	• Optimize signal timing	No	Capacity
	12	Commerce Blvd/ US-101 NB Ramps	• Add a second SB right turn lane. Will require a two lane on-ramp with one lane as an auxiliary lane between the Wilfred Avenue and Santa Rosa Avenue interchanges. May require additional bridge structure widening over Wilfred Avenue as well as over the Northwest Pacific Railroad tracks. • Optimize signal timing • Add a SB right turn overlap phase	Yes No No	Capacity Capacity Capacity
	13	Project Driveway/ Stony Point Rd	• Signalize * • Add NB right and change NB through-right to through * • Add WB left out of project driveway *	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	• Change SB through-right to all-shared • Change NB/SB phasing from protected to split phasing	Yes No	Capacity Capacity
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 400 feet (from 225 feet) * • Add a second NB left turn lane *	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	• Add an EB right turn overlap phase * • Optimize signal timing * • Add a third EB through lane that merges back into 2 lanes east of the intersection	No No Yes	Capacity Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	• Add an EB right turn bay for 100 feet • Optimize signal timing	Yes No	Capacity Capacity
	23	Gravenstein Hwy/ Redwood Dr	• Optimize signal timing	No	Capacity
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize *	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

\* Improvement assumed to occur with 2008 mitigation

**Table D 6 – Alternative D Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008						2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	C	20.7	F	841.3	F	OVRFL	C	24.2
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	F	743.6	B	11.7	B	12.5	F	OVRFL	B	12.5
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	E	35.5	D	27.7 *	B	12.5	E	42.9	D	32.7 *
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	E	35.1	D	32.6 *	B	12.5	E	42.7	E	49.2
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	OVRFL	C	21.1	F	OVRFL	F	OVRFL	C	24.3
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	C	30.2	F	OVRFL	F	OVRFL	C	33.1
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	206.0	D	51.6	F	169.9	F	215.4	D	52.2
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.0	C	25.9 **	-	-	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	25.7	C	25.9 **	C	26.8	C	28.9	C	21.4
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	83.0	D	45.8	E	74.2	F	101.1	D	52.2
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.4	B	18.3 **	B	19.0	B	19.1	B	13.7
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	61.7	D	54.6	D	50.8	F	85.6	D	37.1
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	C	21.8	A	8.6	A	0.0	C	19.9	A	8.2
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	C	26.1	C	30.0 **	B	18.5	C	23.2	C	26.6 **
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.0	C	29.1	C	28.2	D	39.4	C	26.1
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.2	C	25.4 **	C	29.1	C	28.2	C	28.9 **
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.6	B	19.1	B	16.0	B	16.0	C	18.1 **
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	17.2	B	12.3	B	12.3	B	18.7	B	13.1
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	39.9	C	30.9	E	63.4	E	58.6	C	31.8
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	39.6	D	51.0 **	D	45.5	D	48.1	D	42.9
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	27.4	C	30.6 **	D	42.4	E	55.6	D	42.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.2	B	19.5 **	B	18.1	B	18.4	C	25.0 **
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.7	B	12.6 **	B	11.5	B	12.2	B	13.2 **
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	59.1	A	9.9	F	90.2	F	153.9	B	10.4
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	11.5	B	12.4	B	12.4	B	12.4
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	11.5	B	12.5	B	12.5	B	12.5
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	A	9.9	A	9.9	B	11.3	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	11.7	B	14.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.7	B	11.7

Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table D7**:

- Adjust the ramp metering to account for the additional project traffic at the Wilfred Avenue interchange in the near-term (2008). Most metering adjustments can be minor and are not expected to have queuing effects on the local street network. However, the southbound on-ramp will require heavy metering to obtain an acceptable level of service for the freeway ramp merge area which may create a long queue backed up on the ramp.
- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to Wilfred Avenue and from Gravenstein Highway (SR-116) to West Sierra Avenue as well as an additional traffic lane in the northbound direction from Wilfred Avenue to Santa Rosa Avenue in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the casino and hotel should coordinate with the Green Music Center during outdoor events that will generate high traffic levels. During that period, traffic control services at the Rohnert Park interchange may be necessary. Therefore, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control.

Because no fixed route service will be available at the project site, the casino/hotel should provide a shuttle that serves the two Rohnert Park transfer stations. The shuttle should run throughout the day or could be called out on demand.

The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.



**Table D 7 – Alternative D Mitigated Freeway Level of Service Summary**

Criteria	Existing		2008		2008 + Alt D		2008 + Alt D Mitigated		2020		2020 + Alt D		2020 + Alt D Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>														
	E	22.2	C	19.1	C	23.1	C	23.1	C	25.6	D	33.4	D	33.4
US-101 South of Gravenstein Highway (NB)	E	30.8	C	27.4	D	31.8	D	31.8	D	34.1	E	39.4	E	39.4
Gravenstein Highway NB Off-Ramp	E	34.5	D	29.5	D	33.4	D	33.4	E	36.1	F	40.9	E	39.1
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	D	27.0	D	27.0	D	32.3	E	40.4	E	39.1
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	32.5	D	32.5	E	37.1	F	41.6	E	39.1
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	D	31.4	D	31.4	C	23.2	F	39.9	D	34.7
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	C	26.8	C	26.8	D	29.0	D	34.7	D	34.7
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	C	26.8	C	26.8	D	29.0	D	34.7	D	34.7
Wilfred Avenue NB Off-Ramp	E	35.4	C	22.1	C	26.8	C	26.8	D	29.0	D	34.7	D	34.7
Wilfred Avenue NB On-Ramp	F	42.0	D	30.3	D	32.8	D	32.8	E	40.4	F	43.1	D	29.7
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	32.8	D	32.8	E	40.4	F	43.1	D	29.7
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	32.8	D	32.8	E	40.4	F	43.1	D	29.7
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	23.2	C	23.2	D	29.7	D	31.7	D	31.7
<b>Southbound</b>														
	E	22.9	C	24.1	C	25.5	C	25.5	C	28.5	D	30.3	D	30.3
US-101 North of Santa Rosa Avenue (SB)	E	31.2	D	32.7	D	31.0	D	31.0	F	-	F	-	C	24.4
Santa Rosa Avenue SB On-Ramp	E	31.5	D	32.7	D	31.0	D	31.0	F	-	F	-	C	24.4
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	38.0	E	38.8	E	40.2	E	40.2	F	44.8	F	46.2	D	32.2
Wilfred Avenue SB Off-Ramp	E	33.7	D	33.4	F	43.3	D	33.8	E	39.9	F	47.1	E	43.0
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	F	43.3	D	33.8	E	39.9	F	47.1	E	43.0
Rohnert Park Expressway SB Off-Ramp	E	38.0	D	33.4	F	43.3	D	33.8	E	39.9	F	47.1	E	43.0
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	33.4	D	33.4	E	38.5	F	41.6	E	38.1
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	32.8	D	32.8	F	37.5	F	40.8	E	38.1
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	C	25.5	C	25.5	E	36.6	F	-	E	38.1
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	32.5	D	32.5	F	40.3	F	44.4	E	38.1
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	E	35.7	E	35.7	F	42.3	F	46.6	D	28.2
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	C	25.5	C	25.5	D	32.0	E	41.4	E	41.4

It is recommended that the casino contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating or shortening the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.

If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.



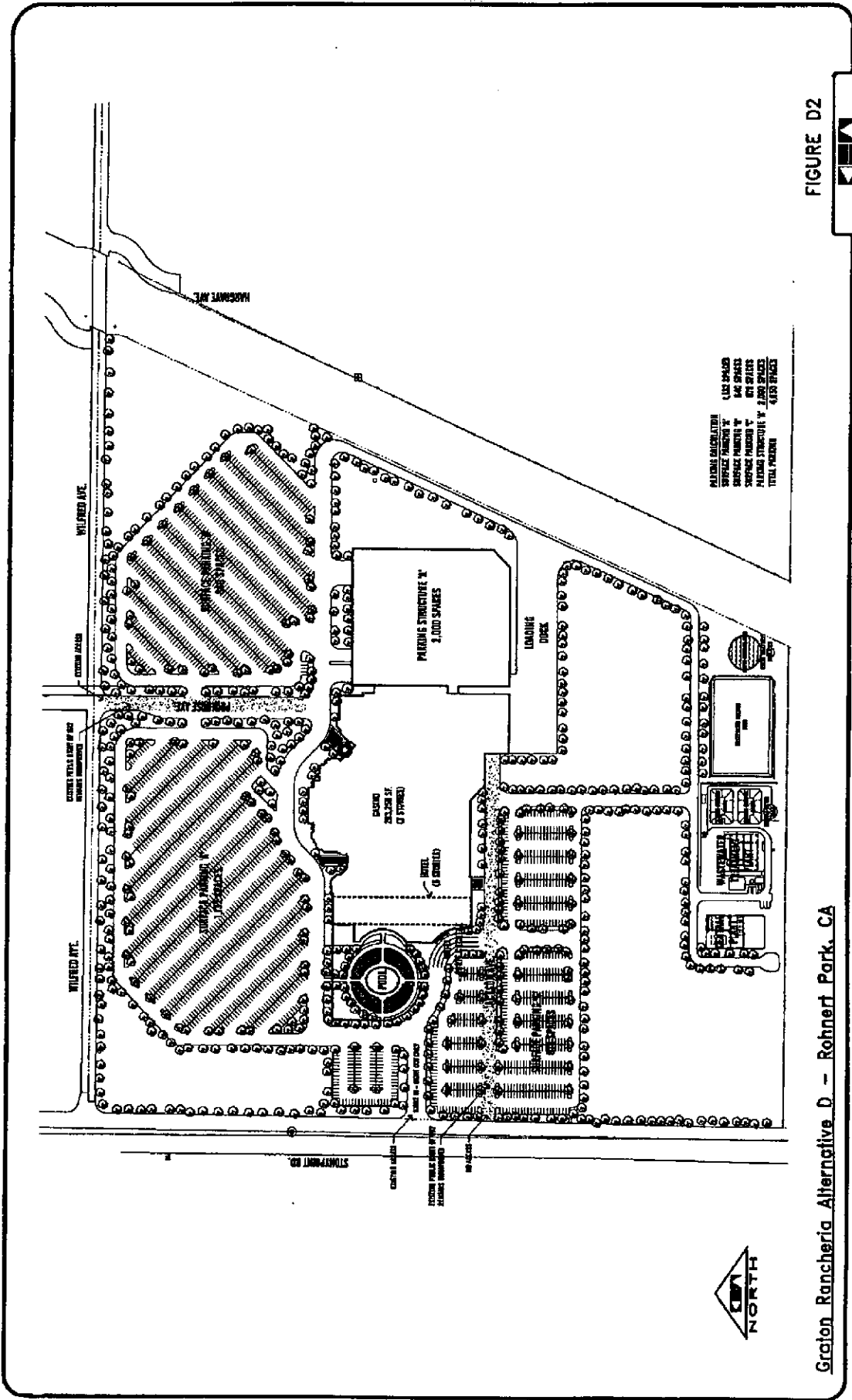


FIGURE D2



Graton Rancheria Alternative D - Rohnert Park, CA

SITE PLAN

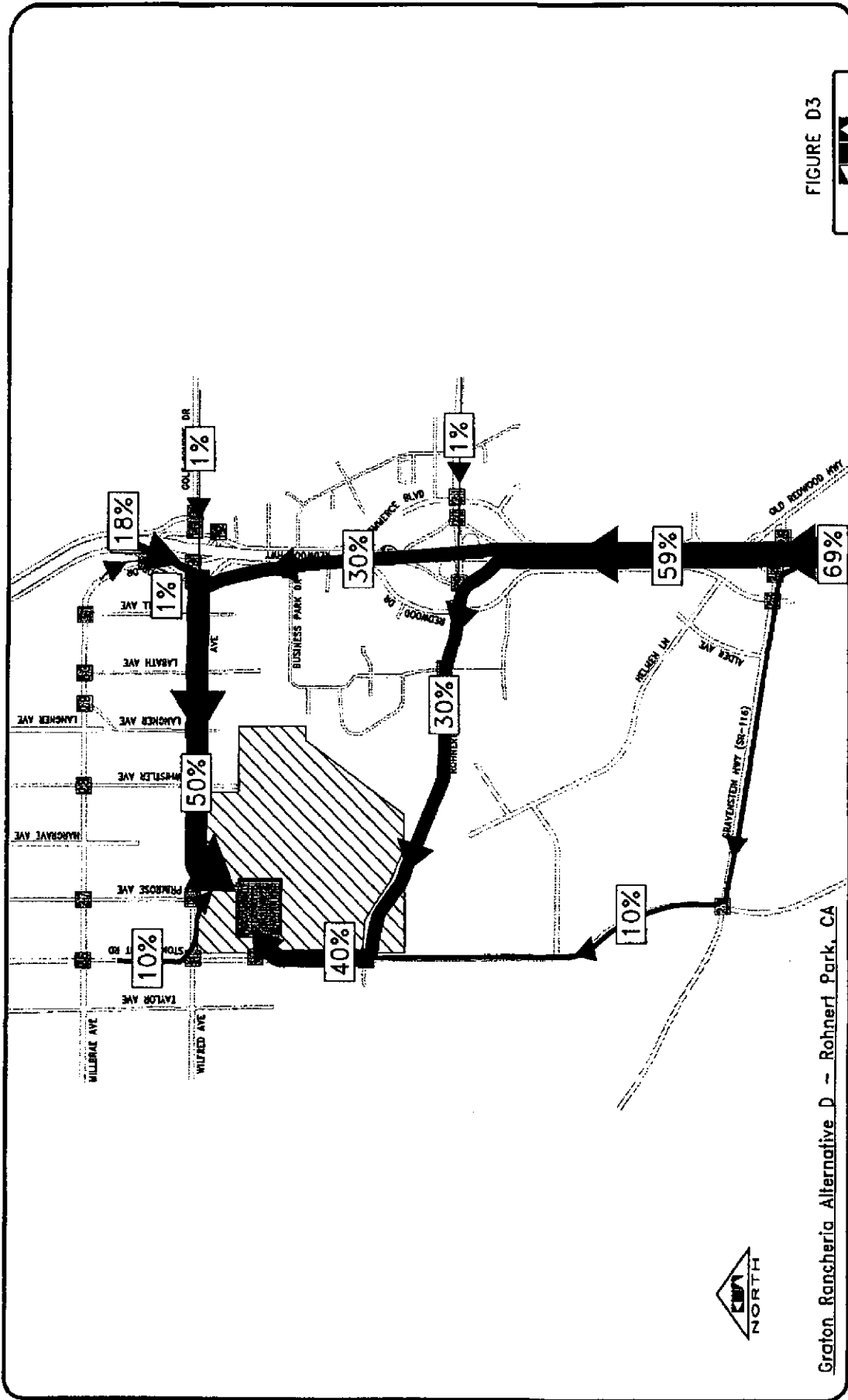


FIGURE D3



Graton Rancheria Alternative D - Rohnert Park, CA

TRIP DISTRIBUTION - IN



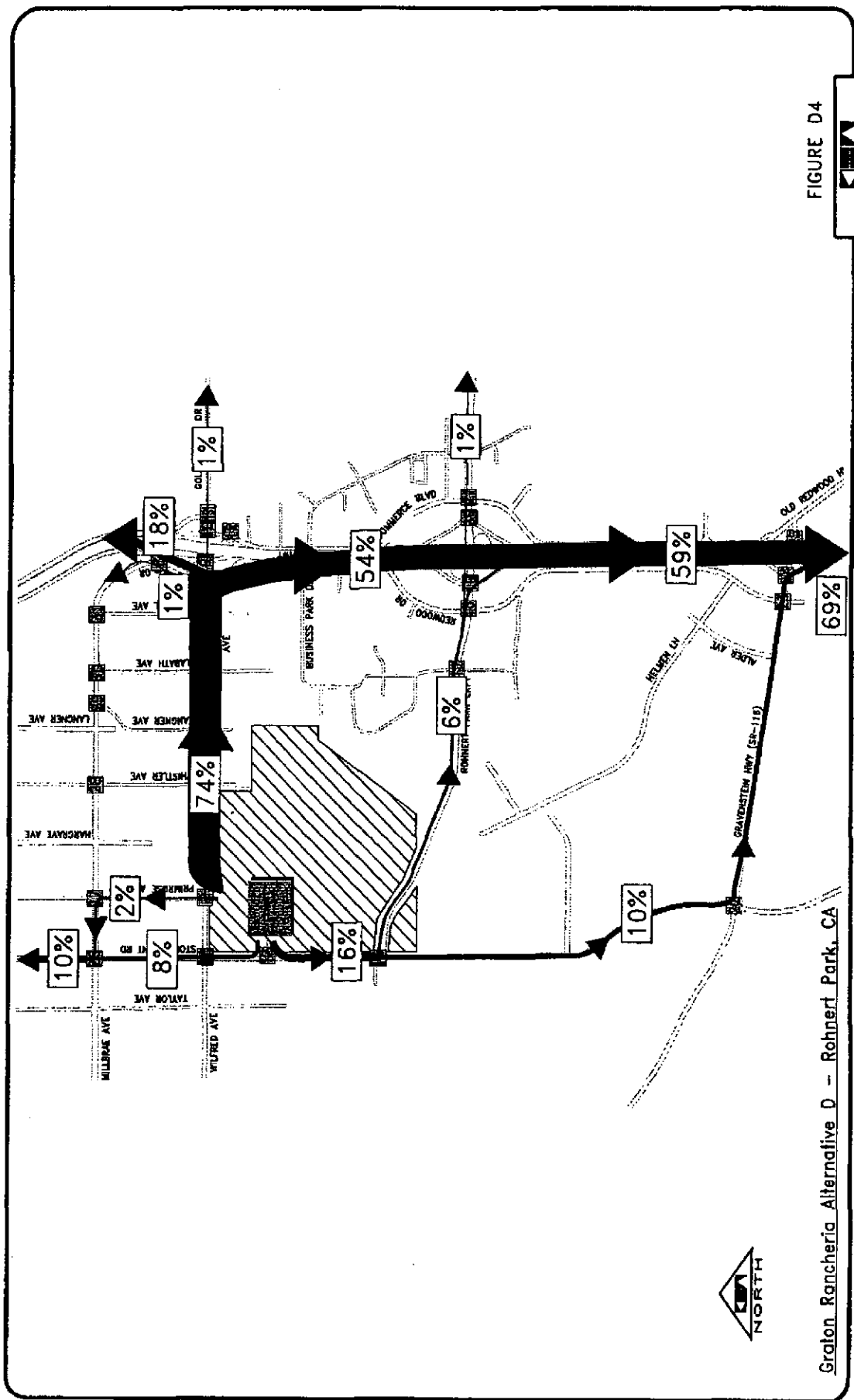


FIGURE D4



Kimley-Horn and Associates, Inc.

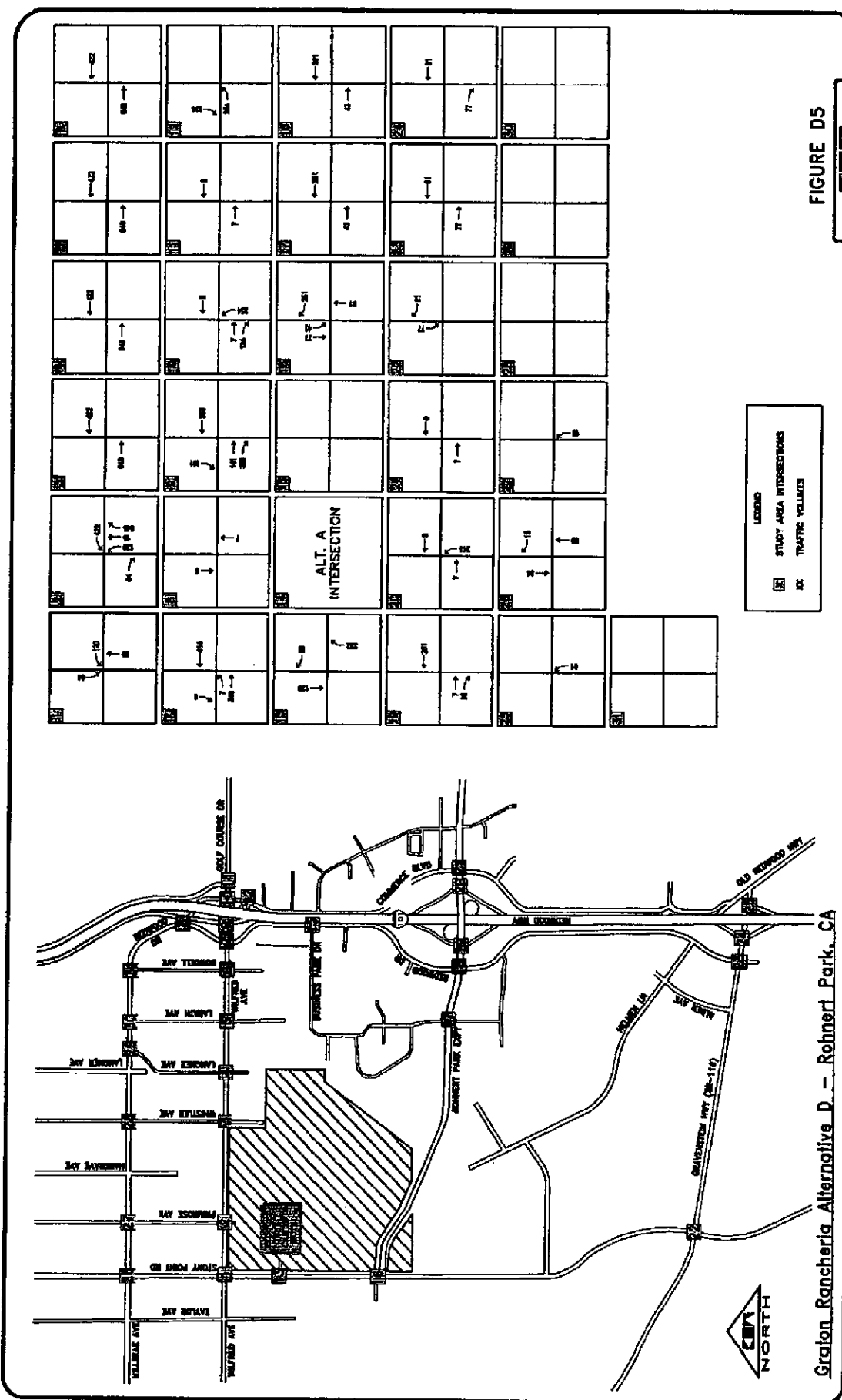


FIGURE D5

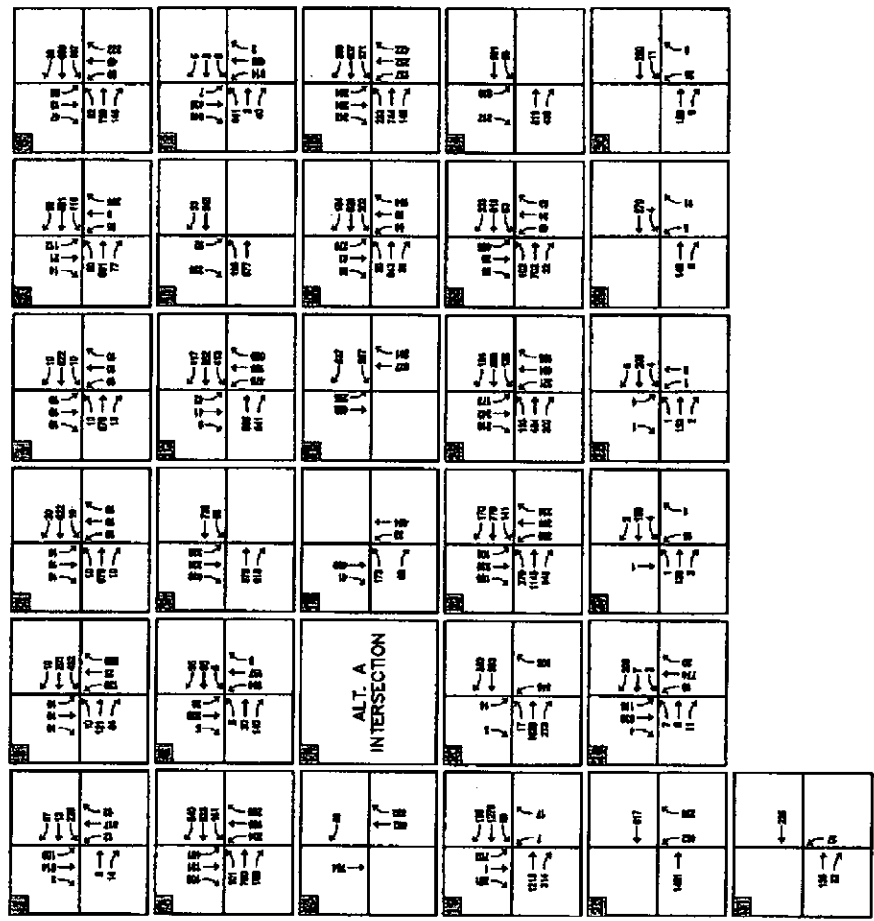
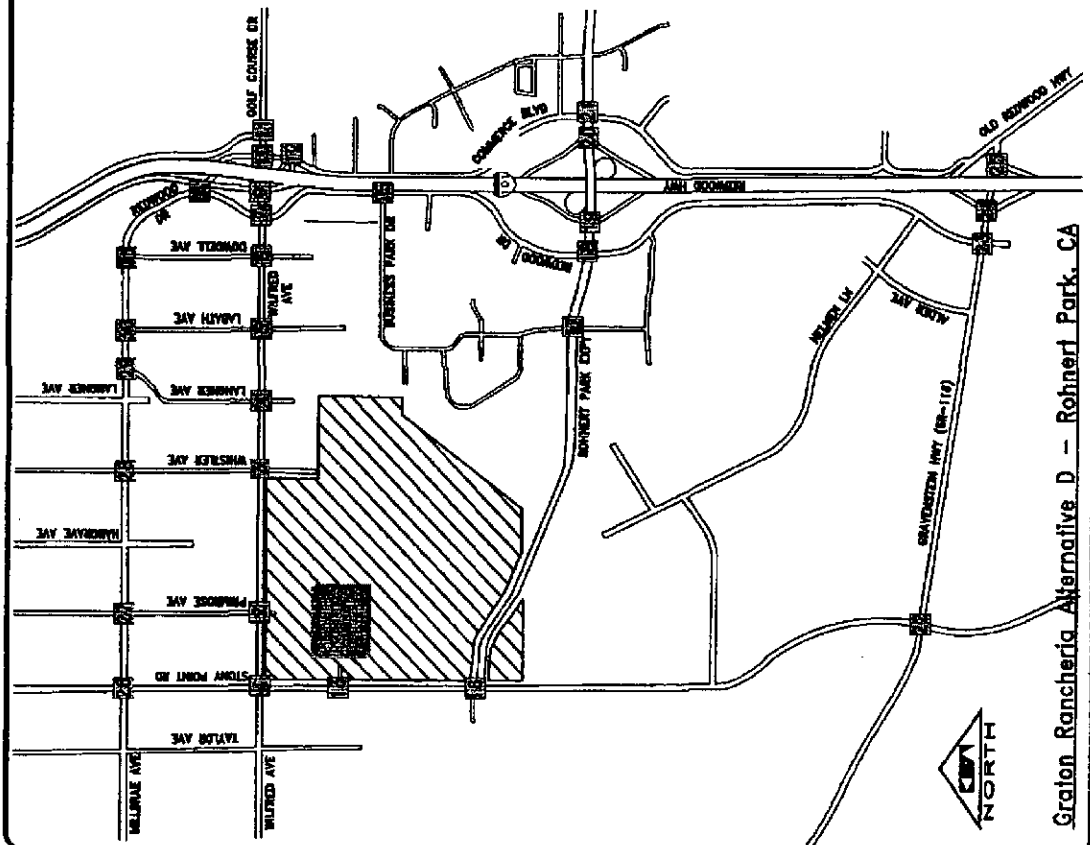
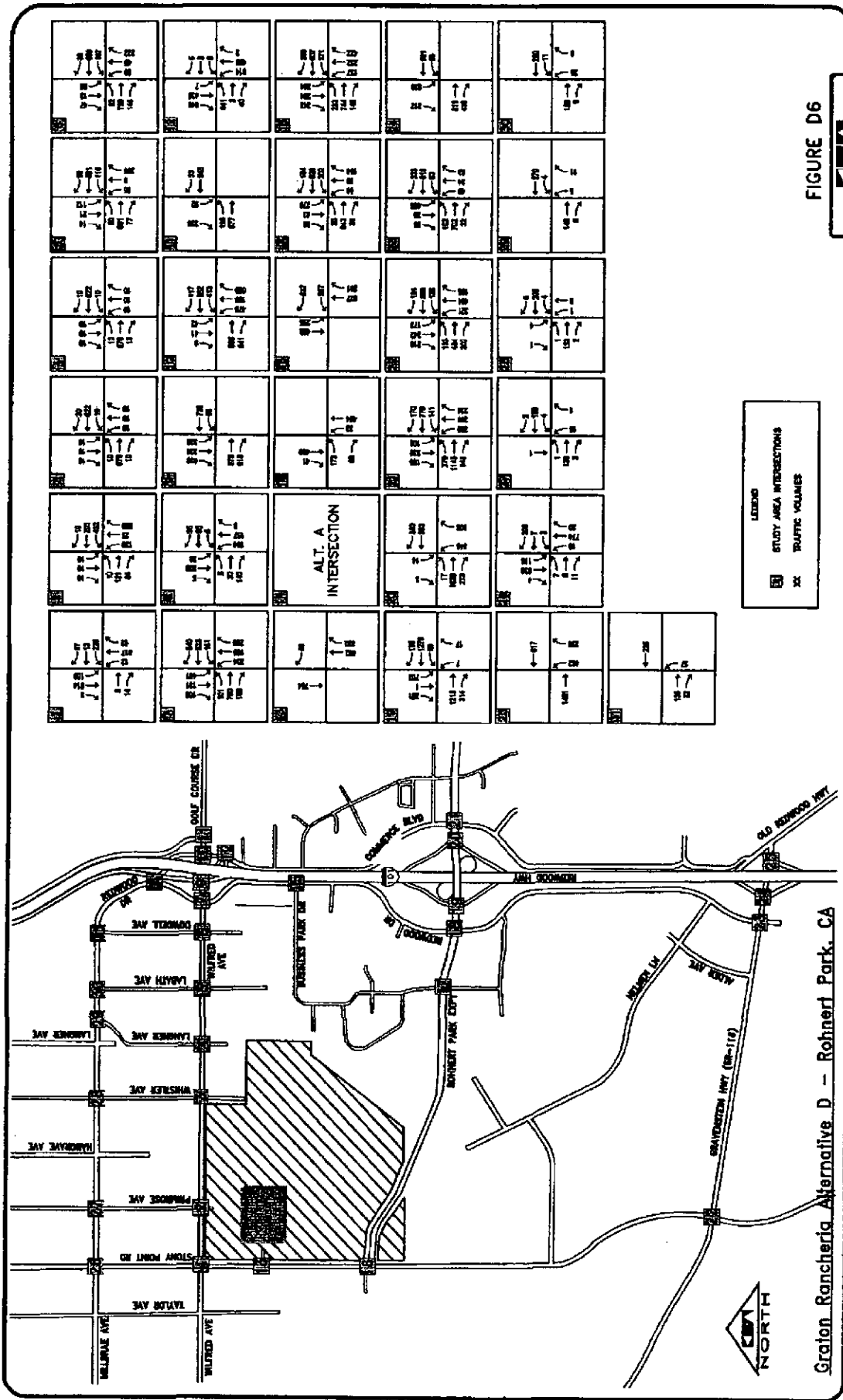
Graton Rancheria and Associates, Inc.

LEGEND  
 [Symbol] STUDY AREA INTERSECTIONS  
 [Symbol] TRAFFIC VOLUMES

Graton Rancheria Alternative D - Rohmert Park, CA

PROJECT GENERATED PM TRAFFIC VOLUMES





**Legend**  
 [Symbol] STUDY AREA INTERSECTIONS  
 [Symbol] TRAFFIC VOLUMES

**ALT. A INTERSECTION**

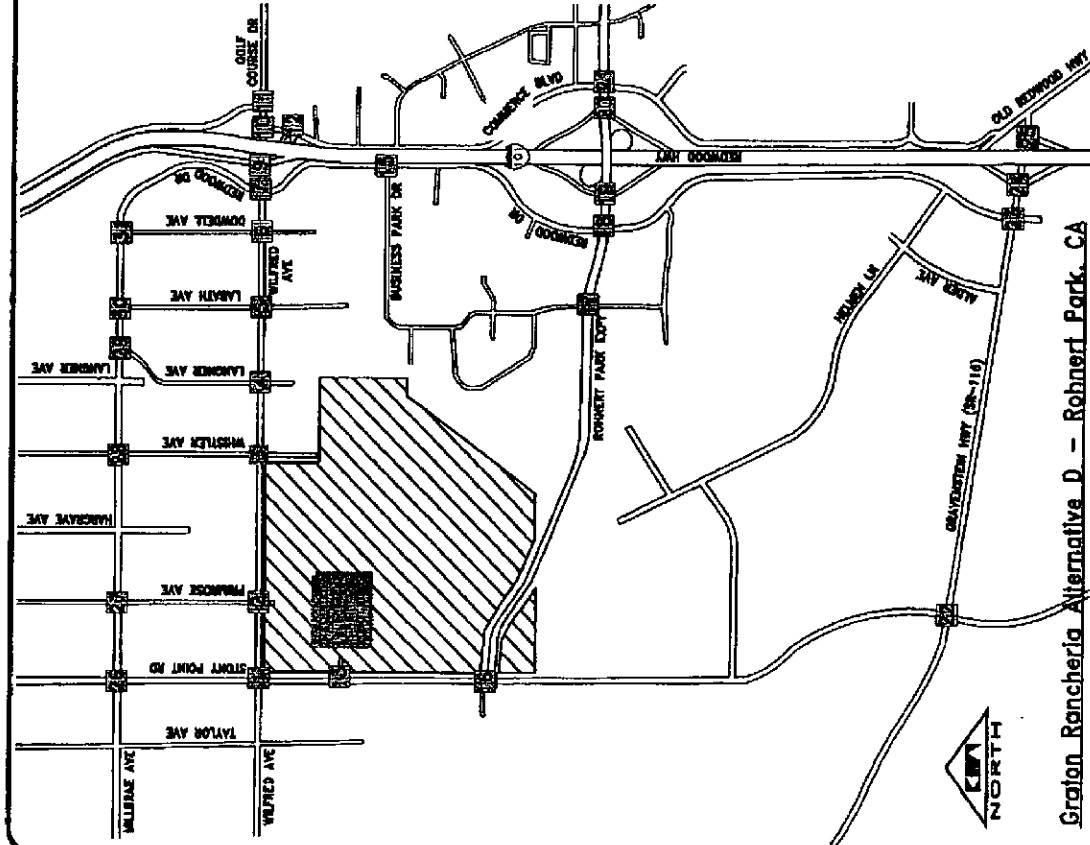
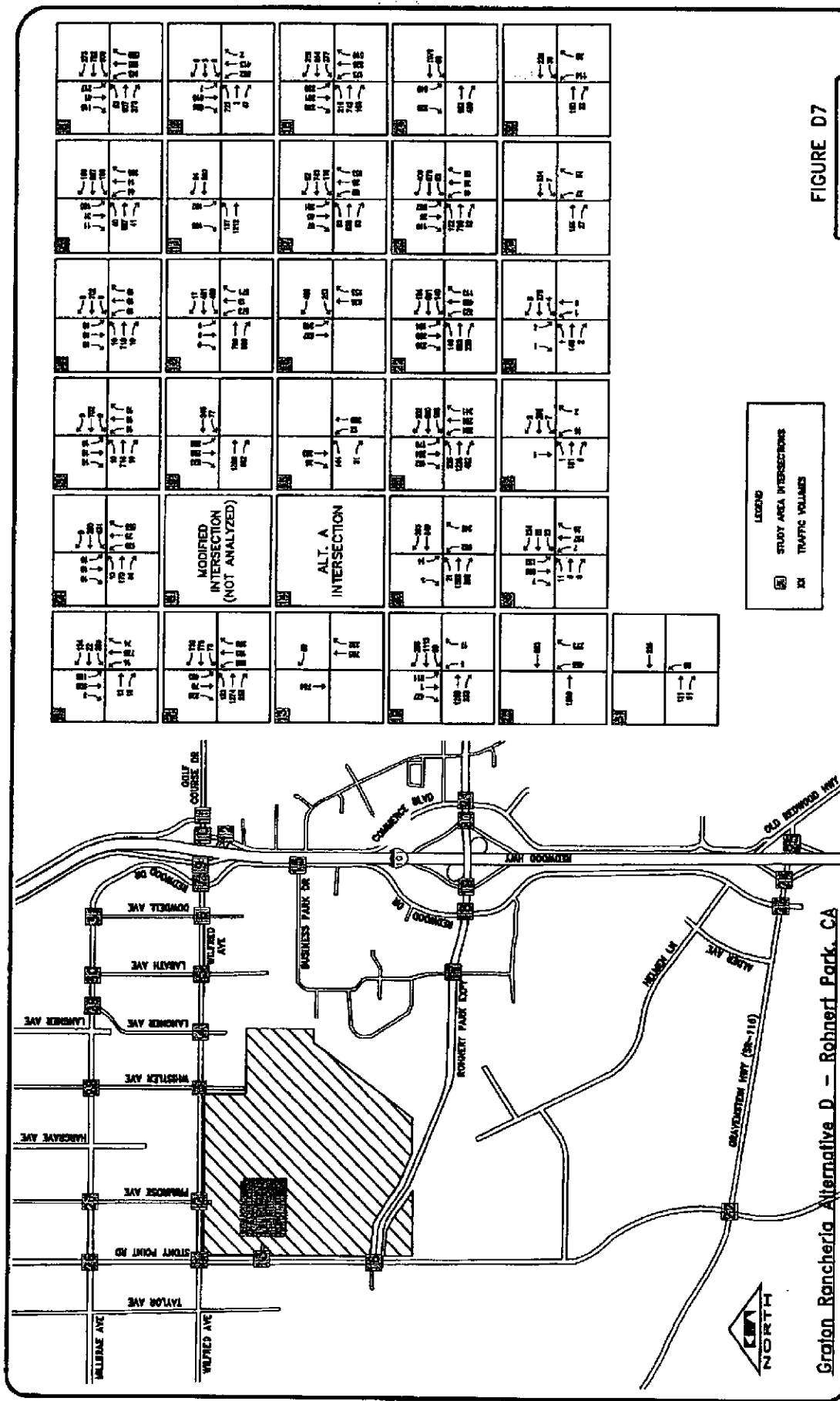
**FIGURE D6**

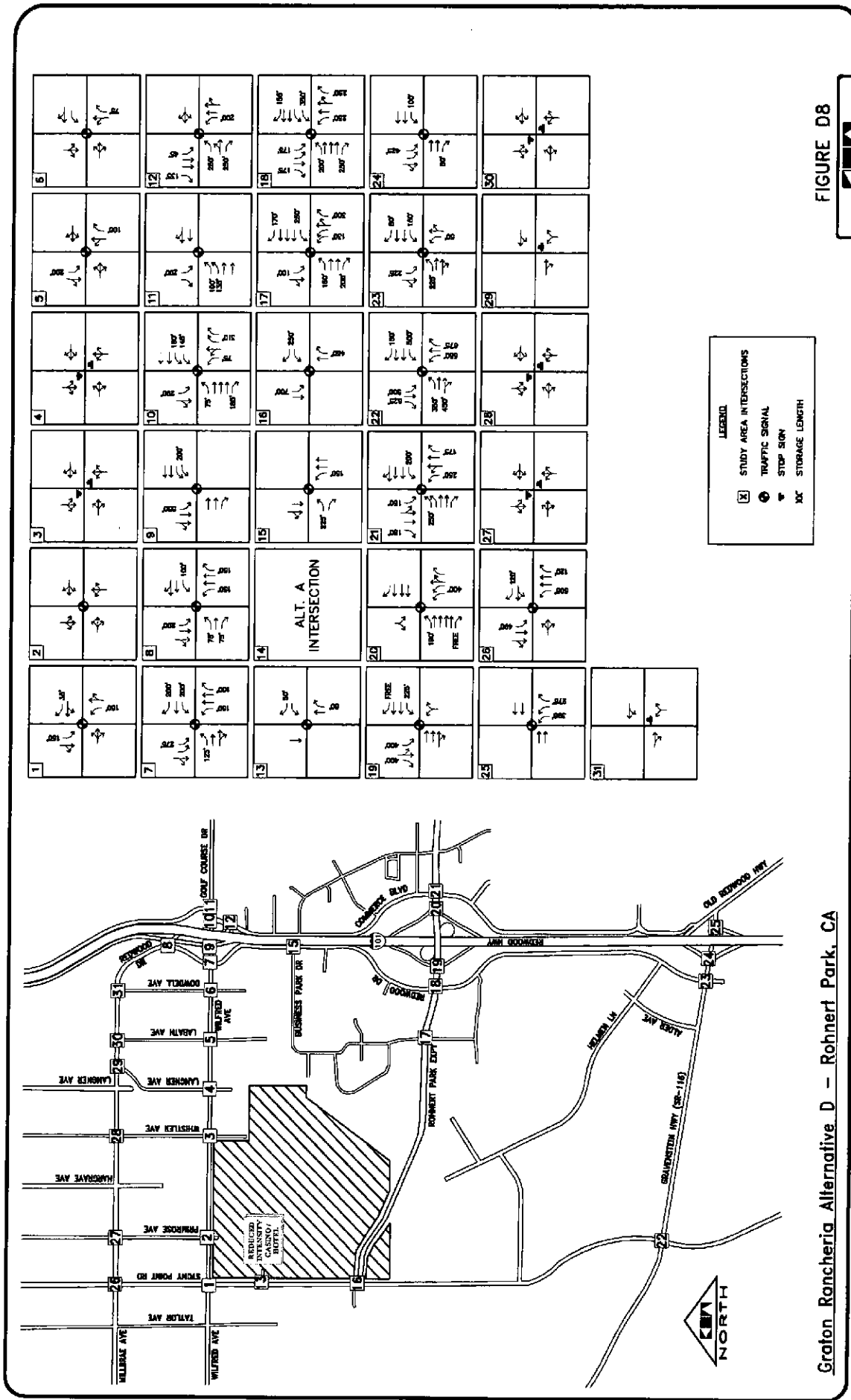
Chong-Hart and Associates, Inc.

**Gaton Rancheria Alternative D - Rohnert Park, CA**

**NEAR-TERM + PROJECT PM TRAFFIC VOLUMES**







**LEGEND**

- (X) STUDY AREA INTERSECTIONS
- ⊕ TRAFFIC SIGNAL
- ⊖ STOP SIGN
- XX STORAGE LENGTH

**FIGURE D8**



**Grafton Rancheria Alternative D - Rohnert Park, CA**

**NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL**

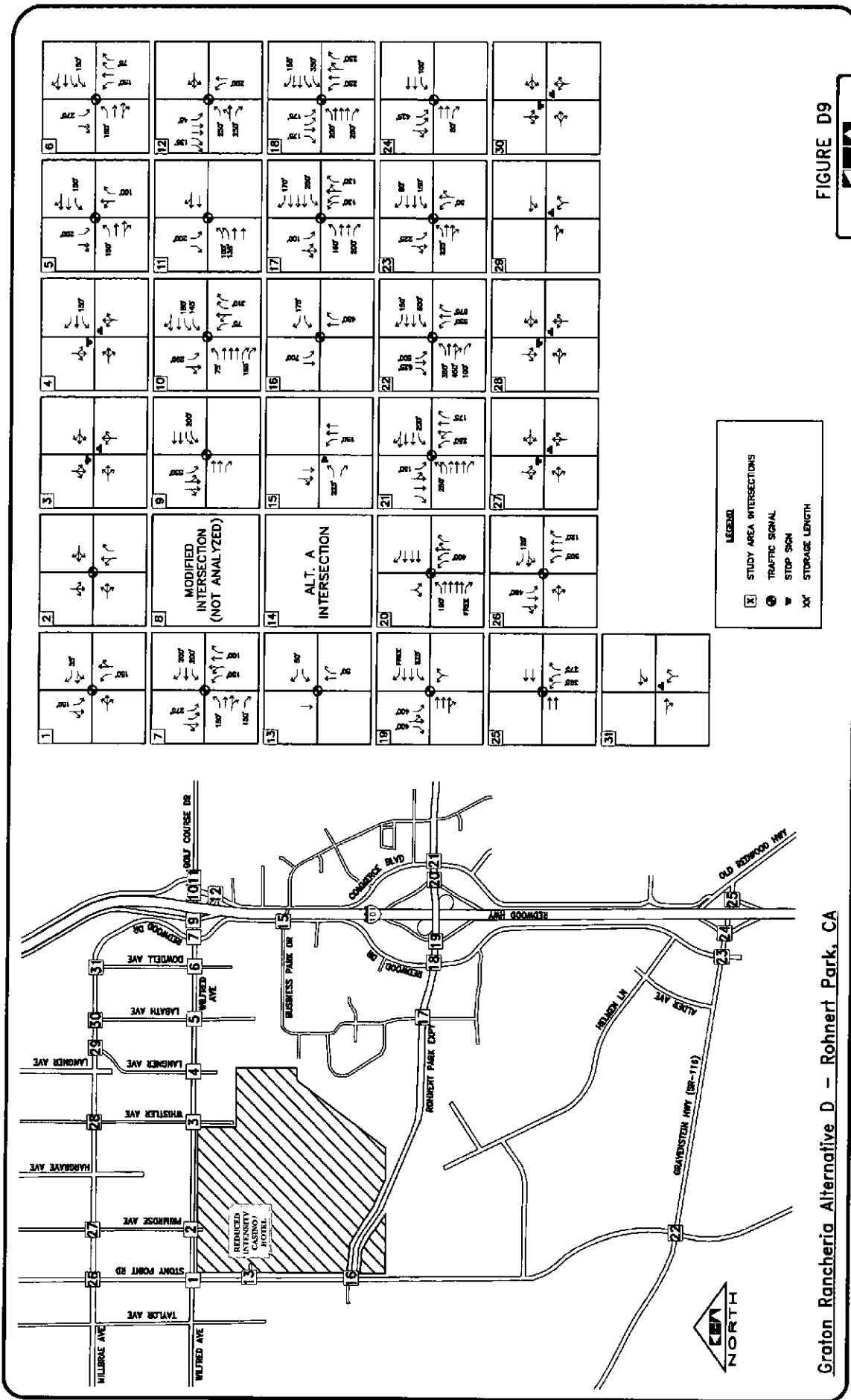


FIGURE D9

KIMLEY-HORN AND ASSOCIATES, INC.

Grafton Rancheria Alternative D - Rohnert Park, CA

LONG-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

## ALTERNATIVE E – NORTHWEST STONY POINT BUSINESS PARK OPTION

The Alternative E business park option is proposed to be located as shown in **Figure E1**, which is bordered by Wilfred Avenue in the north, Rohnert Park Expressway in the south, Stony Point Road in the west, and Langner Avenue in the east.

**Figure E2** shows the proposed layout of six buildings and other related facilities located in the northwest corner of the site. The site layout includes approximately 400,000 square feet for light industrial uses and 100,000 square feet for commercial uses. The site plan also shows supporting uses such as parking lots and wastewater treatment facilities.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

The main project access is from the south side of Wilfred Avenue, where an existing driveway aligns with Primrose Avenue. This approach is assumed to operate as a full movement driveway with no turn limitations.

A second project access from Stony Point Road is located on this plan approximately 880 feet south of the Stony Point Road/Wilfred Avenue intersection. The location is at an existing driveway access; however, due to conflicts with the northbound turn bay at the Stony Point Road/Wilfred Avenue intersection, the access is assumed to be limited to right in/out operation.

Neither access is currently signalized.

### Trip Generation – Alternative E

Trip generation was based on rates contained in the Institute of Transportation Engineer’s publication *Trip Generation, 7th Edition*. This manual is a standard reference used by jurisdictions throughout the country and is based on actual trip generation studies at numerous locations in areas of various populations.

Project trip generation for Alternative E is shown in **Table E1**. Additional trip generation calculations are contained in the **Appendix**. Because the project includes light industrial land uses, it is expected to include truck trips. However, no information in ITE *Trip Generation* was available regarding typical truck percentages for Land Use Code

110. Therefore, it was assumed that the trucks associated with the light industrial component of the project would be 10 percent of the total project traffic during the peak hour at the site. It should be noted that depending on the intersection location, the overall truck percentage is lower as project truck trips mix with other background traffic. Thus, the percentage of truck traffic diminishes away from the project site.

Sometimes developments attract trips that are already on the road that stop as they pass by the site. These are not new vehicle trips but are considered to be pass-by trips. Thus, a portion of the commercial trips will be attracted from Stony Point Road and Wilfred Avenue as they pass from their origin to their ultimate destination.

A pass-by reduction was applied to the project trip generation to determine the net new trips expected to be produced by the industrial and commercial center. Pass-by factors were derived from the Institute of Transportation Engineers *Trip Generation Handbook*. It should be noted that pass-by trips do not typically occur with industrial uses; therefore, pass-by rates were only applied to the commercial uses.

As seen in the table the project is expected to generate 471 new trips in the AM and 621 new trips in the PM peak hour. Although project trip generation was prepared for daily, AM, and PM periods, only the weekday PM traffic conditions were evaluated in this report because it represents the time period where the project will contribute to the greatest amount of congestion and potential mitigation. In addition, only PM peak hour future year traffic forecast data was available from the City of Rohnert Park to complete a cumulative traffic analysis of the proposed industrial and commercial development.

**Table E 1 – Alternative E Project Trip Generation**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Light Industrial 400,000 s.f.	2,788	324	44	368	47	345	392
Commercial 100,000 s.f.	4,294	63	40	103	180	195	375
Subtotal	7,082	387	84	471	227	540	767
Commercial Pass-by Reduction	N/A	N/A	N/A	N/A	-70	-76	-146
Net New Vehicle Trips	7,082	387	84	471	157	464	621

### Project Trip Distribution and Assignment

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to



destinations north of the site, with 20% directed to the Rohnert Park area, and the remaining 50% distributed south of the site. The project traffic distribution is shown in **Figure E3** and **Figure E4**. **Figure E5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure E5**, most of the project traffic is expected to come from the freeway therefore it was assumed that the majority of traffic would use Primrose Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

### **Near-Term Plus Project Traffic Volumes**

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the industrial and commercial project. **Figure E6** illustrates the combined near-term turning movement volumes at the study intersections.

### **Long -Term Plus Project Traffic Volumes**

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the industrial and commercial project. **Figure E7** illustrates the combined long-term turning movement volumes at the study intersections.

### **Alternative E LOS Conditions and Impacts at Intersections**

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative E (year 2008)
- Long-term Cumulative conditions with Alternative E (year 2020)

Results of the analysis are presented in **Table E2**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

**Table E 2 – Alternative E Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	D	27.0	B	12.5	E	40.5
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	C	16.3	B	12.5	C	18.3
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	C	16.2	B	12.5	C	18.2
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	541.2	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	136.1	F	169.9	F	171.1
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.8	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	21.6	C	26.8	C	26.2
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	E	77.0	E	74.2	F	84.4
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	19.0	B	19.3
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	D	52.4	D	50.8	D	48.9
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	C	17.2	A	0.0	C	16.0
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	16.7
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	C	27.2	B	18.5	C	25.5
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	27.0	C	28.2	C	30.4
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.7	C	29.1	C	28.5
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.7	B	16.0	B	15.9
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	11.5	B	12.3	B	13.0
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	C	30.8	E	63.4	E	68.8
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	37.4	D	45.5	D	45.6
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	26.7	D	42.4	D	45.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	18.8	B	18.1	B	18.0
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	10.9	B	11.5	B	11.6
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	E	46.0	F	90.2	F	109.6
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	12.4	B	12.4
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	12.5	B	12.5
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	A	9.9	B	11.3	B	11.3
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	14.7	B	14.7
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.7

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Primrose Avenue/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

## **Alternative E Traffic Signal Warrant Analysis**

Alternative E, near-term and long-term, traffic volumes at unsignalized study intersections were compared against peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by the year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Primrose Avenue/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

## Alternative E LOS Conditions and Impacts on Freeway and Ramps

Project trips generated by the proposed Alternative E industrial and commercial development were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the industrial and commercial uses. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table E3**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project: however the congestion is reduced as a result of the different land use.

## Potential Conflicts with Special Event Traffic

Potential conflicts with special event traffic from nearby performing arts venues will not occur under this Alternative due to the arrival and departure patterns associated with this type of land use. Periods of heavy traffic for the business park will not coincide with those of the performance venues.



**Table E 3 – Alternative E Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt E		2020		2020 + Alt E		
	LOS	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>													
US-101 South of Gravenstein Highway (NB)	E	C	22.2	C	19.1	C	19.6	C	25.6	D	26.4	D	26.4
Gravenstein Highway NB Off-Ramp	E	D	30.8	C	27.4	C	28.0	D	34.1	D	34.8	D	34.8
Gravenstein Highway NB On-Ramp	E	D	34.5	D	29.5	D	30.0	E	36.1	E	36.7	E	36.7
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	28.1	C	23.5	C	23.9	D	32.3	D	37.6	D	37.6
Rohnert Park Expressway NB Off-Ramp	E	D	33.6	D	28.8	D	29.3	E	37.1	E	37.6	E	37.6
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1	C	21.8	D	34.0	C	23.2	E	36.2	E	36.2
Rohnert Park Expressway NB On-Ramp	E	D	32.5	C	22.1	C	22.5	D	29.0	D	29.5	D	29.5
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	28.9	C	22.1	C	22.5	D	29.0	D	29.5	D	29.5
Wilfred Avenue NB Off-Ramp	E	E	35.4	C	22.1	C	22.5	D	29.0	D	29.5	D	29.5
Wilfred Avenue NB On-Ramp	E	F	42.0	D	30.3	D	31.9	E	40.4	E	42.1	E	42.1
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	26.7	D	30.3	D	31.9	E	40.4	E	42.1	E	42.1
Santa Rosa Avenue NB Off-Ramp	E	E	37.2	D	30.3	D	31.9	E	40.4	E	42.1	E	42.1
US-101 North of Santa Rosa Avenue (NB)	E	C	20.3	C	22.0	C	22.8	D	29.7	F	47.7	F	47.7
<b>Southbound</b>													
US-101 North of Santa Rosa Avenue (SB)	E	C	22.9	C	24.1	C	24.4	D	28.5	D	28.8	D	28.8
Santa Rosa Avenue SB On-Ramp	E	D	31.2	D	32.7	D	33.1	F	-	F	-	F	-
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	31.5	D	32.7	D	33.1	F	-	F	-	F	-
Wilfred Avenue SB Off-Ramp	E	E	38.0	E	38.8	E	39.1	F	44.8	F	45.1	F	45.1
Wilfred Avenue SB On-Ramp	E	D	33.7	D	33.4	E	38.5	E	39.9	F	43.3	F	43.3
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	35.2	D	33.4	E	38.5	E	39.9	F	43.3	F	43.3
Rohnert Park Expressway SB Off-Ramp	E	E	38.0	D	33.4	E	38.5	E	39.9	F	43.3	F	43.3
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0	D	30.9	D	32.0	E	38.5	F	39.9	F	39.9
Rohnert Park Expressway SB On-Ramp	E	E	35.1	D	30.1	D	31.4	F	37.5	F	39.0	F	39.0
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	27.1	C	22.3	C	23.6	E	36.6	E	40.4	E	40.4
Gravenstein Highway SB Off-Ramp	E	D	33.9	D	29.2	D	30.6	F	40.3	F	42.0	F	42.0
Gravenstein Highway SB On-Ramp	E	D	33.7	D	32.1	D	33.7	F	42.3	F	44.2	F	44.2
US-101 South of Gravenstein Highway (SB)	E	C	24.7	C	21.8	C	23.4	D	32.0	E	35.6	E	35.6

## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. . Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.

## Potential Effects on Transit

The effect of the industrial/commercial uses on the proposed Sonoma-Marín Area Rail Transit (SMART) was also evaluated. It was determined that because the SMART system will operate during the AM and PM commute hours, some project employees may use the service, if a shuttle is provided between the SMART station and the project. The exact number is unknown but is not anticipated to be greater than for conventional transit. Therefore, the impact of this alternative on the SMART system is determined to be less than significant.

## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table E4**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.



**Table E 4 – Alternative E Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length	
			2008	2020				2008	2020
1 Stony Point Road and Wilfred Avenue	EBL				16 Stony Point Road and Rohnert Park Expy	EBL			
	EBR					EBR			
	WBL					WBL			
	WBR	35	OVRFLOVRFL			WBR	175	57	52
	NBL	150	25	25		NBL			
	NBR					NBR	450	38	38
4 Langner Avenue and Wilfred Avenue	SBL	150	25	25	SBL	700	272	254	
	SBR				SBR				
	EBL				EBL	160	61	111	
	EBR				EBR	200	25	29	
	WBL	150		25	WBL	250	104	40	
	WBR				WBR	170	25	25	
5 Labath Avenue and Wilfred Avenue	NBL				NBL	130	36	39	
	NBR				NBR	130	36	37	
	SBL				SBL	100	193	202	
	SBR				SBR				
	EBL	150		25	EBL	200	133	111	
	EBR				EBR	200	25	25	
6 Dowdell Avenue and Wilfred Avenue	WBL	150		25	WBL	350	167	160	
	WBR				WBR	155	47	42	
	NBL				NBL	250	157	210	
	NBR				NBR	250	65	107	
	SBL				SBL	175	198	172	
	SBR				SBR	175	56	57	
7 Redwood Drive and Wilfred Avenue	EBL	150		25	EBL				
	EBR				EBR	200	71	71	
	WBL	150		25	WBL	225			
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
8 Redwood Drive and Commerce Boulevard	SBL				SBL	400	318	238	
	SBR				SBR	400	209	255	
	EBL	150		195	EBL	190	25	25	
	EBR	150		268	EBR				
	WBL				WBL				
	WBR				WBR				
9 Wilfred Avenue and SB US 101 Ramps	NBL	150	402	1271	NBL	225	210	223	
	NBR	100	95	110	NBR				
	SBL	275	351	350	SBL				
	SBR				SBR				
	EBL	75	25		EBL	250	87	66	
	EBR	75	50		EBR				
10 Golf Course Drive and Commerce Blvd	WBL	100	25		WBL	200	187	222	
	WBR				WBR				
	NBL	150	131		NBL	250	210	214	
	NBR	150	25		NBR	175	56	58	
	SBL	200	40		SBL	150	98	158	
	SBR				SBR	150	51	47	
11 Roberts Lake Drive and Golf Course Drive	EBL				EBL	350	182	183	
	EBR				EBR				
	WBL	300	40	31	WBL	500	155	170	
	WBR				WBR	150	37	39	
	NBL				NBL	550	296	298	
	NBR				NBR	675	30	31	
12 Commerce Blvd and NB US 101 Ramps	SBL	250	229	251	SBL	500	161	176	
	SBR				SBR	625	49	54	
	EBL				EBL	225	161	194	
	EBR				EBR				
	WBL	150	786	1003	WBL	150	69	58	
	WBR				WBR	80	25	111	
15 Business Park Drive and Redwood Drive	NBL	150	342	411	NBL	50	65	65	
	NBR				NBR				
	SBL	200	94	30	SBL	225	388	556	
	SBR				SBR				
	EBL	80	95	50	EBL				
	EBR				EBR	50	101	121	
16 Stony Point Road and Rohnert Park Expy	WBL				WBL	100	108	78	
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL	200	76	83	SBL	425	222	222	
	SBR				SBR				
17 Labath Avenue and Rohnert Park Expy	EBL	250	168	204	EBL				
	EBR	250	25	25	EBR				
	WBL				WBL				
	WBR				WBR				
	NBL	200	578	524	NBL	395	129	131	
	NBR				NBR	275	178	205	
18 Redwood Drive and Rohnert Park Expy	SBL	100	25	25	SBL				
	SBR	175	107	142	SBR				
	EBL	225	97	40	EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
19 SB US 101 Ramps and Rohnert Park Expy	NBL	150	25	25	NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
20 NB US 101 Ramps and Rohnert Park Expy	WBL				WBL				
	WBR				WBR				
	NBL				NBL				
	NBR				NBR				
	SBL				SBL				
	SBR				SBR				
21 Commerce Blvd and Rohnert Park Expy	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL	150	131		NBL				
	NBR	150	25		NBR				
22 Stony Point Road and Gravenstein Hwy	SBL	200	40		SBL				
	SBR				SBR				
	EBL	80	95	50	EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
23 Redwood Road and Gravenstein Hwy	NBL				NBL				
	NBR				NBR				
	SBL	200	76	83	SBL				
	SBR				SBR				
	EBL	250	168	204	EBL				
	EBR	250	25	25	EBR				
24 Gravenstein Hwy and SB US 101 Ramps	WBL				WBL				
	WBR				WBR				
	NBL	200	578	524	NBL				
	NBR				NBR				
	SBL	100	25	25	SBL				
	SBR	175	107	142	SBR				
25 Commerce Blvd and NB US 101 Ramps	EBL	225	97	40	EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
	NBL	150	25	25	NBL				
	NBR				NBR				
26 Stony Point Road and Millbrae Avenue	SBL				SBL				
	SBR				SBR				
	EBL				EBL				
	EBR				EBR				
	WBL				WBL				
	WBR				WBR				
15 Business Park Drive and Redwood Drive	NBL	150	25	25	NBL	120	38	126	
	NBR				NBL	505	25	25	
	SBL				NBR	120	25	25	
	SBR				SBL	490	25	25	
	EBL				SBR				
	EBR				SBR				



## Alternative E Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative E traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown in **Table E5** are needed in the near-term (2008) and long-term (2020).

The basis of the Alternative E mitigations is the assumption that intersection #13, the Project Driveway at Stony Point Road, should be relocated further south along Stony Point Road and be signalized so that it can function as a full movement access. This change permits more project traffic to conveniently arrive and exit from the site and use the Rohnert Park Expressway interchange, thus relieving some the traffic pressure through the Wilfred Avenue interchange.

In the event that intersection #13 cannot be relocated and signalized as discussed above, additional mitigation improvements will be needed, particularly at intersections surrounding the Wilfred Avenue interchange. The project will create a significant unavoidable impact at the intersection of Golf Course Drive/Commerce Boulevard regardless of whether intersection #13 is relocated.

**Table E6** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections.

**Figures E8 and E9** illustrate the mitigated lane geometry and traffic control.

A single asterisk in the table denotes an intersection that operates at an acceptable level of service and does not require mitigation, but a mitigated level of service and delay are provided for reference as a result of the mitigation to signalize the Project Driveway/ Stony Point Road which changes traffic patterns at some intersections. A double asterisk indicates an intersection where the delay increases as a result of the mitigation to signalize the Project Driveway/Stony Point Road intersection.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue. The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to the Urban Growth Boundary. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be three lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and should include Class II bike lanes out to Stony Point Road to



connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be accommodated on a three lane roadway section from Redwood Drive to Stony Point Road, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.



**Table E 5 – Alternative E Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Wilfred Ave	• Signalize	No	Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize	No	Capacity
	6	Dowdell Ave/ Wilfred Ave	• Signalize	No	Capacity
	7	Redwood Dr/ Wilfred Ave	• Add EB right and change EB all-shared to left-through • Change WB left-through to through • Change phasing east-west to protected & permitted from split	Yes No No	Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	• Add an EB right overlap phase	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	No mitigation necessary	-	-
	13	Project Driveway/ Stony Point Rd	• Signalize • Add NB right and change NB through-right to through • Add WB left out of project driveway	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	No mitigation necessary	-	-
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Add a second NB left turn lane	Yes	Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	No mitigation necessary	-	-
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	• Signalize *	No	Capacity
	2	Primrose Ave/ Wilfred Ave	• Signalize	No	Capacity
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize *	No	Capacity
	6	Dowdell Ave/ Wilfred Ave	• Signalize * • Add SB left and change SB all shared to through-right • Add a second WB left • Add a NB left and NB right and change NB all shared to through-right	No Yes Yes Yes	Capacity Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	• Change WB left-through to through * • Change NB through to through-left and change north-south phasing to split from protected • Change phasing east-west to protected from split * • Optimize signal timing	No No No No	Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	• Add an EB right overlap phase * • Unavoidable Significant Impact	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	No mitigation necessary	-	-
	13	Project Driveway/ Stony Point Rd	• Signalize * • Add NB right and change NB through-right to through * • Add WB left out of project driveway *	No Tribe land Tribe land	Capacity Capacity Capacity
	14	Business Park Dr/ Labath Ave	Alternative A intersection	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	No mitigation necessary	-	-
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Add a second NB left turn lane *	Yes	Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	• Optimize signal timing • Add a third EB through lane that merges back into 2 lanes east of the intersection	No Yes	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize *	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langer Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

\* Improvement assumed to occur with 2008 mitigation



**Table E 6 – Alternative E Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005						2008						2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated					
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay				
1	Stony Point Rd/ Willfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	B	17.5	F	841.3	F	OVRFL	C	20.2				
2	Primrose Ave/ Willfred Ave	D	TWSC	A	9.4	B	11.4	D	27.0	C	19.4 *	B	12.5	E	40.5	A	8.5				
3	Whistler Ave/ Willfred Ave	D	TWSC	A	9.4	B	11.4	C	16.3	C	16.3	B	12.5	C	18.3	C	18.3				
4	Langer Ave/Willfred Ave	D	TWSC	A	9.4	B	11.3	C	16.2	C	16.2	B	12.5	C	18.2	C	19.3				
5	Labath Ave/Willfred Ave	D	TWSC	A	9.1	F	77.4	F	541.2	C	34.0	F	OVRFL	F	OVRFL	C	31.9				
6	Dowdell Ave/Willfred Ave	D	TWSC	A	9.1	F	623.3	F	OVRFL	C	21.0	F	OVRFL	F	OVRFL	D	35.8				
7	Redwood Dr/Willfred Ave	D	TS	C	23.3	E	77.6	F	136.1	D	51.1	F	169.9	F	171.1	D	45.5				
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	25.8	C	26.5	-	-	-	-	-	-				
9	Willfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	21.6	C	21.7 *	C	26.8	C	26.2	C	22.0				
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	E	77.0	D	43.7	E	74.2	F	84.4	E	55.3				
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	18.5	B	18.4 **	B	19.0	B	19.3	B	19.4				
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	D	52.4	D	47.4	D	50.8	D	48.9	D	43.1				
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	C	17.2	A	6.9	A	0.0	C	16.0	A	6.7				
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	16.7	C	16.7				
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	C	27.2	C	27.2	B	18.5	C	25.5	C	25.5				
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	27.0	C	27.0	C	28.2	C	30.4	C	30.4				
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.7	C	25.7	C	29.1	C	28.5	C	29.0				
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.7	B	17.8	B	16.0	B	15.9	B	17.2				
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	11.5	A	8.7	B	12.3	B	13.0	B	10.5				
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	C	30.8	C	33.5	E	63.4	E	68.8	C	31.3				
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	37.4	D	37.4	D	45.5	D	45.6	D	45.6				
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	26.7	C	26.7	D	42.4	D	45.8	D	45.8				
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	18.8	B	18.8	B	18.1	B	18.0	B	18.0				
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	10.9	B	10.9	B	11.5	B	11.6	B	11.6				
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	E	46.0	B	10.0	F	90.2	F	109.6	B	10.5				
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.5	B	11.5	B	12.4	B	12.4	B	11.8				
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.5	B	11.5	B	12.5	B	12.5	B	12.5				
29	Millbrae Ave/ Langer Ave	D	TWSC	A	9.7	A	9.9	A	9.9	A	9.9	B	11.3	B	11.3	B	11.3				
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	11.7	B	14.7	B	14.7	B	14.7				
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.7	B	11.7				

Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table E7**:

- Adjust the ramp metering to account for the additional project traffic at the Wilfred Avenue interchange in the long-term (2020). Most metering adjustments can be minor and are not expected to have queuing effects on the local street network. However, the southbound on-ramp will require heavy metering to obtain an acceptable level of service for the freeway ramp merge area which may create a long queue backed up on the ramp.
- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to Wilfred Avenue and from Gravenstein Highway (SR-116) to West Sierra Avenue in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the industrial/commercial project should provide a shuttle that serves the two Rohnert Park transfer stations and the SMART rail station. The shuttle should run throughout the day.

Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.

It is recommended that the casino help contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating or shortening the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.



If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.



**Table E 7 – Mitigated Freeway Level of Service Summary**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt E		2020		2020 + Alt E		2020 + Alt E Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>														
US-101 South of Gravenstein Highway (NB)	E	22.2	C	19.1	C	19.6	C	19.6	C	25.6	D	26.4	D	26.4
Gravenstein Highway NB Off-Ramp	E	30.8	C	27.4	C	28.0	C	28.0	D	34.1	D	34.8	D	34.8
Gravenstein Highway NB On-Ramp	E	34.5	D	29.5	D	30.0	D	30.0	E	36.1	E	36.7	D	33.3
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	C	23.9	D	23.9	D	32.3	D	37.6	D	33.3
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	29.3	D	29.3	E	37.1	E	37.6	D	33.3
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	C	21.8	D	21.8	C	23.2	E	36.2	E	36.2
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	C	22.5	D	22.5	D	29.0	D	29.5	D	29.5
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	C	22.5	D	22.5	D	29.0	D	29.5	D	29.5
Wilfred Avenue NB Off-Ramp	E	35.4	C	22.1	C	22.5	D	22.5	D	29.0	D	29.5	D	29.5
Wilfred Avenue NB On-Ramp	E	42.0	D	30.3	D	31.9	E	31.9	E	40.4	E	42.1	E	42.1
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	31.9	E	31.9	E	40.4	E	42.1	E	42.1
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	31.9	E	31.9	E	40.4	E	42.1	E	42.1
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	22.8	D	22.8	D	29.7	D	31.0	D	31.0
<b>Southbound</b>														
US-101 North of Santa Rosa Avenue (SB)	E	22.9	C	24.1	C	24.4	C	24.4	D	28.5	D	28.8	D	28.8
Santa Rosa Avenue SB On-Ramp	E	31.2	D	32.7	D	33.1	D	33.1	F	-	F	-	C	23.6
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	31.5	D	32.7	D	33.1	D	33.1	F	44.8	F	45.1	D	64.0
Wilfred Avenue SB Off-Ramp	E	38.0	E	38.8	E	39.1	E	39.1	F	39.9	F	43.3	E	42.7
Wilfred Avenue SB On-Ramp	E	33.7	D	33.4	E	38.5	E	38.5	E	39.9	F	43.3	E	42.7
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	E	38.5	E	38.5	E	39.9	F	43.3	E	42.7
Rohnert Park Expressway SB Off-Ramp	E	38.0	D	33.4	E	38.5	E	38.5	E	39.9	F	43.3	E	42.7
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	32.0	D	32.0	E	38.5	F	39.9	E	36.2
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	31.4	D	31.4	F	37.5	F	39.0	E	36.2
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	C	23.6	C	23.6	E	36.6	E	40.4	E	36.2
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	30.6	D	30.6	F	40.3	F	42.0	E	36.2
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	D	33.7	D	33.7	F	42.3	F	44.2	C	26.9
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	C	23.4	C	23.4	D	32.0	E	35.6	E	35.6



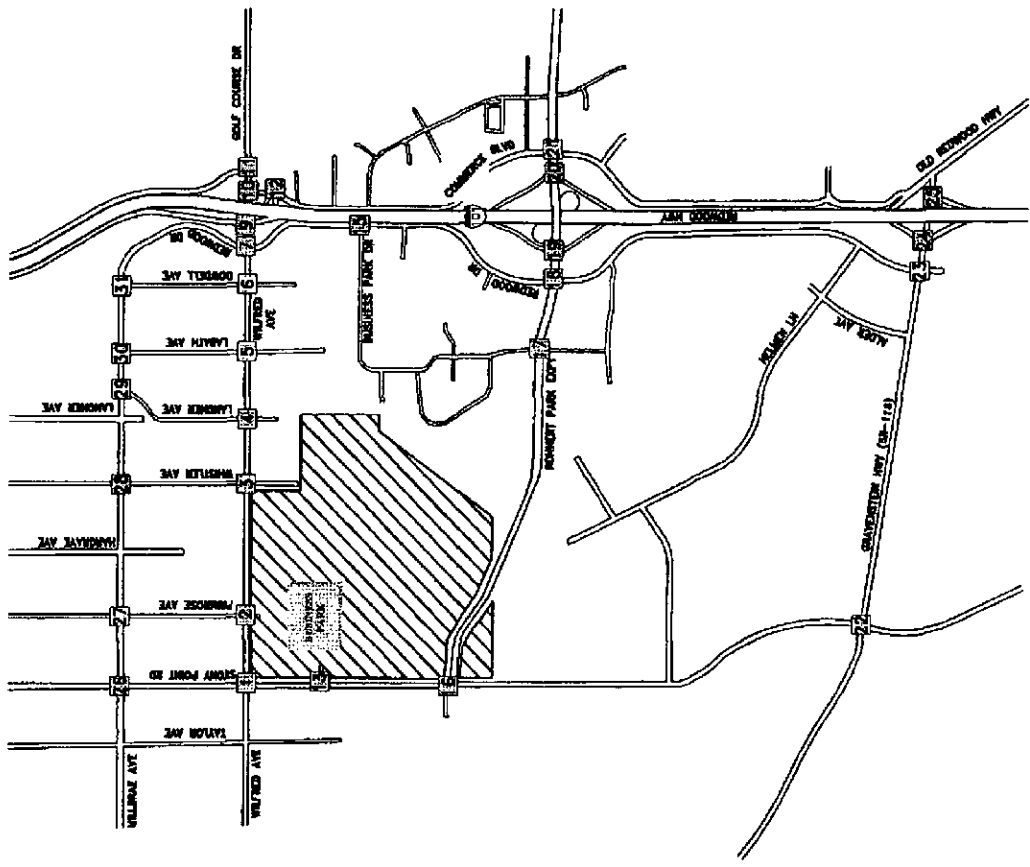


FIGURE E1



Groton Rancheria Alternative E - Rohnert Park, CA

PROJECT LOCATION



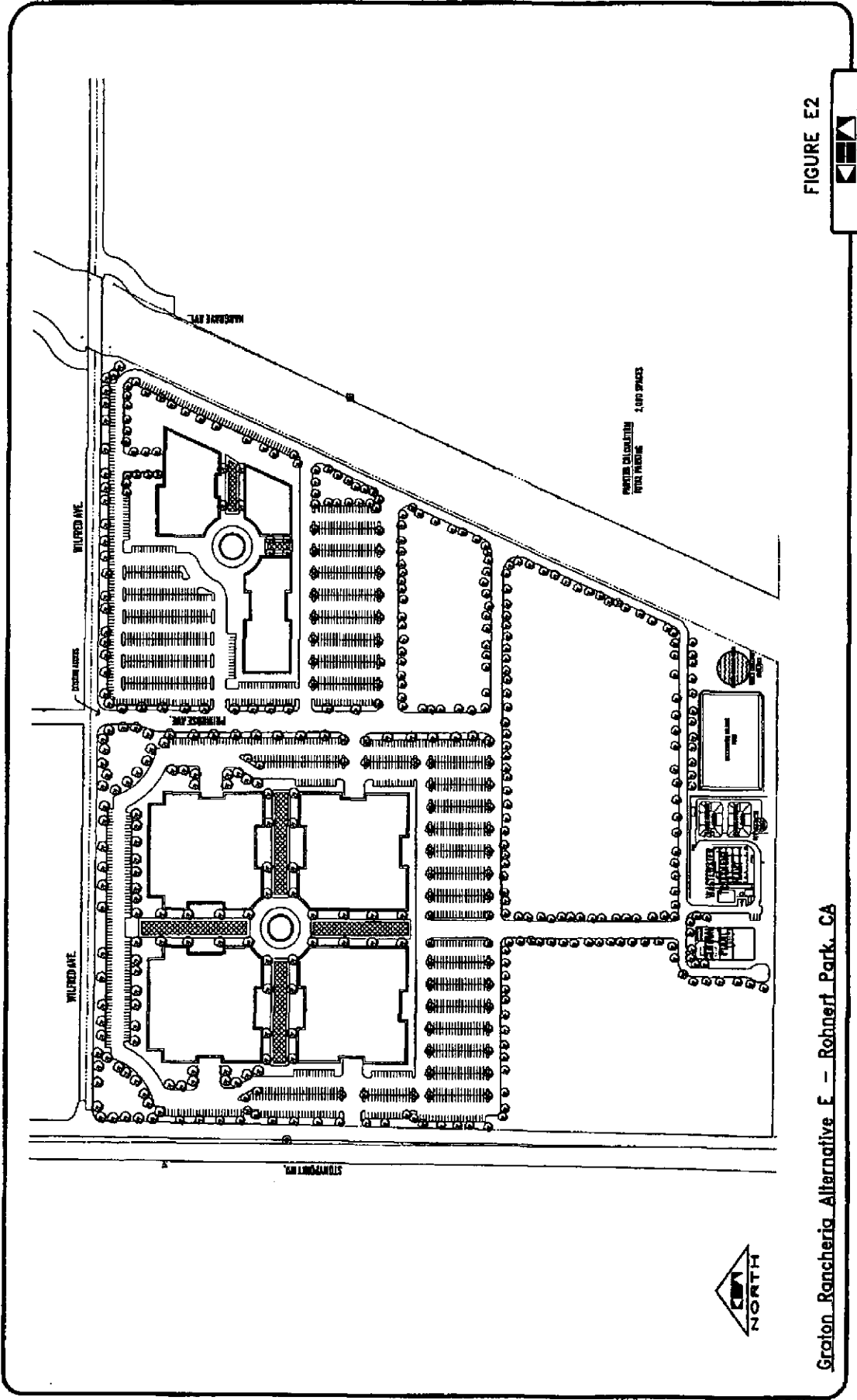
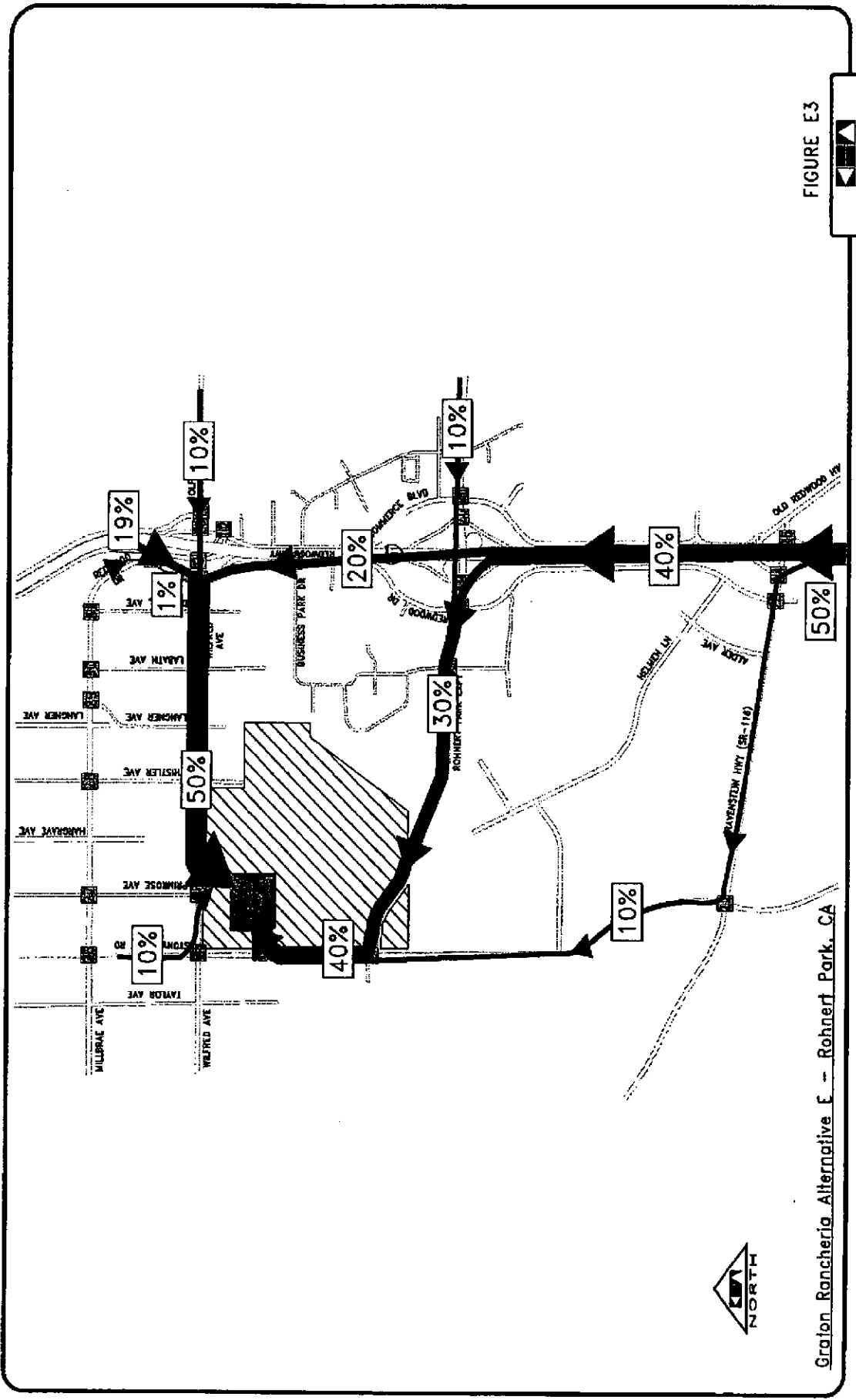


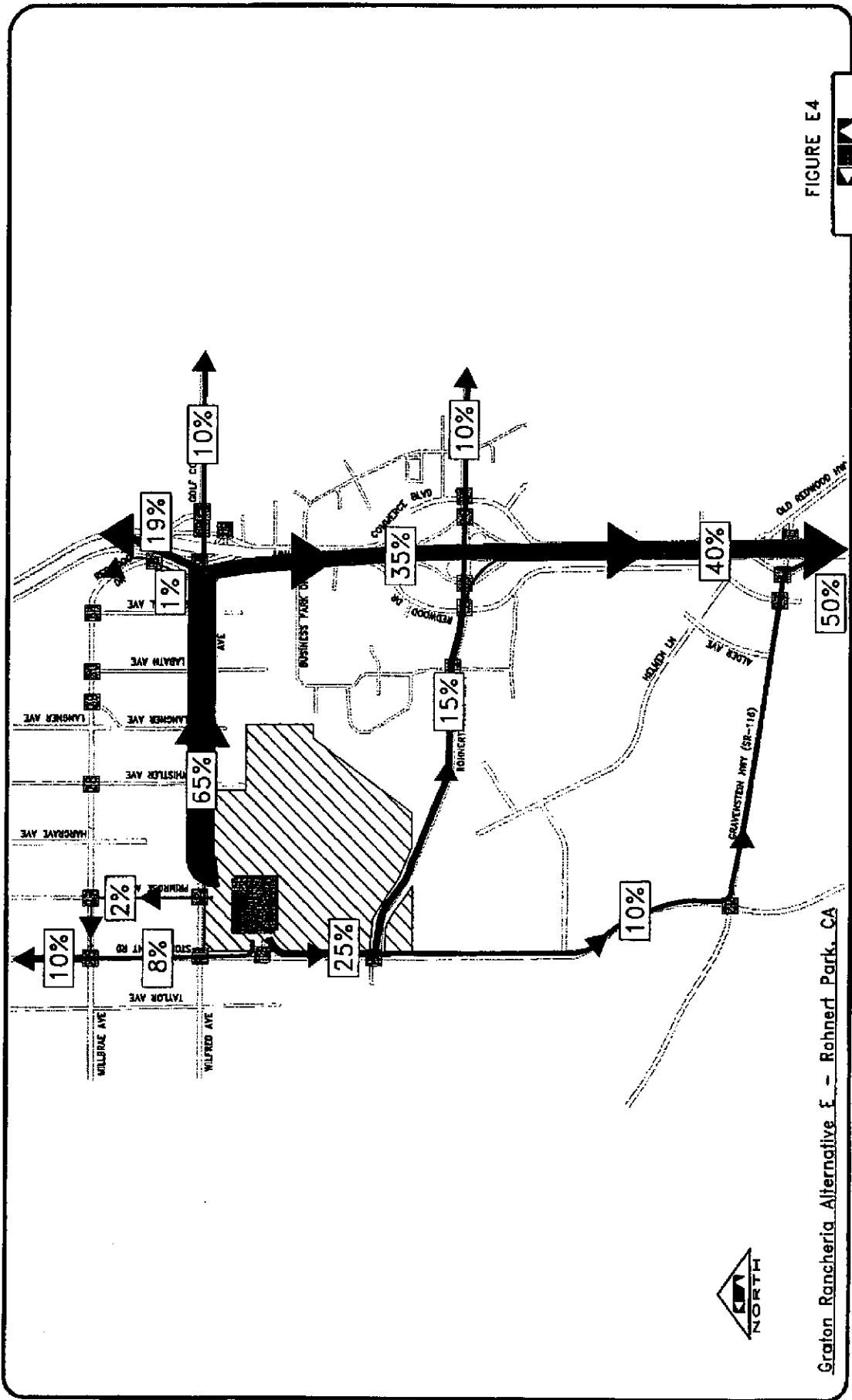
FIGURE E2

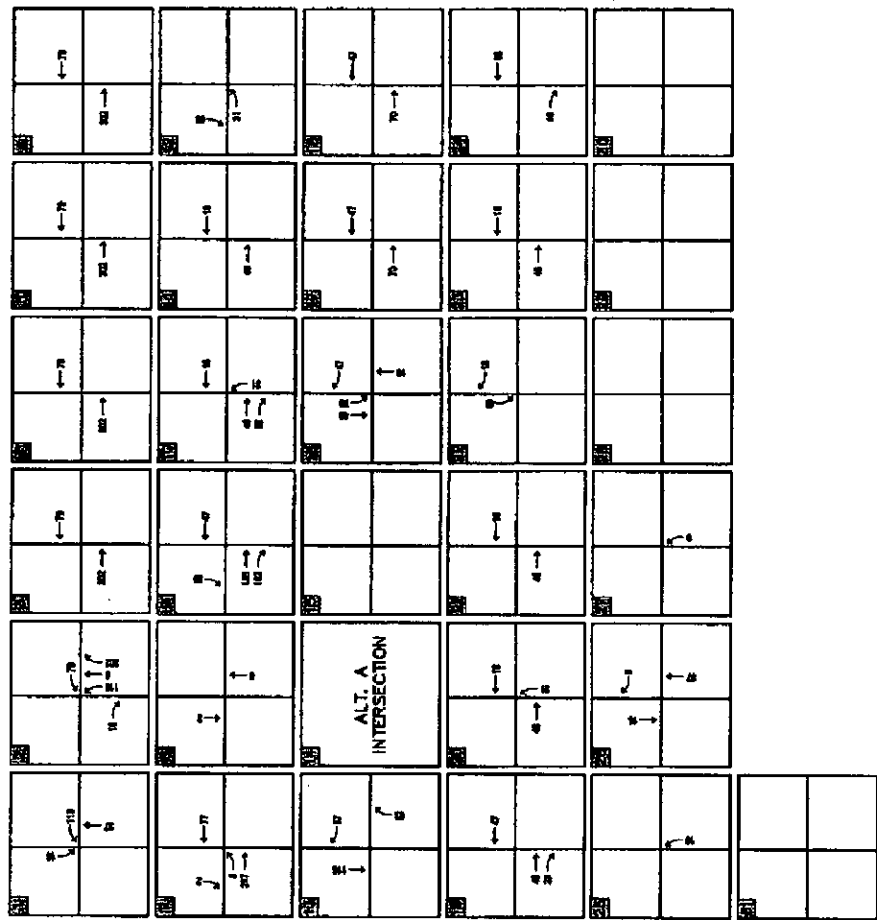
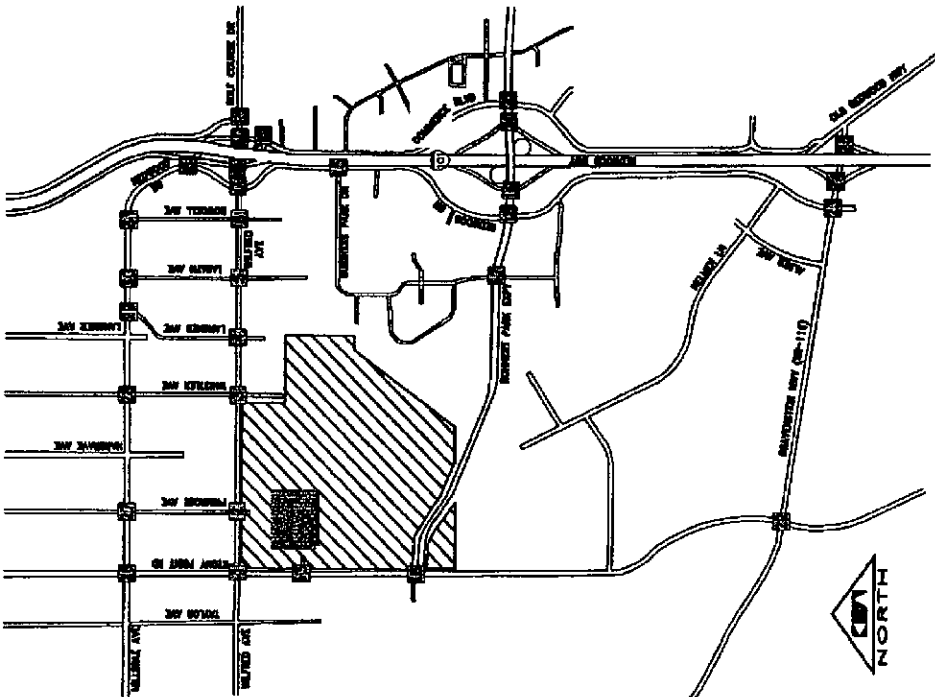


Graton Rancheria Alternative E - Rohnert Park, CA

SITE PLAN







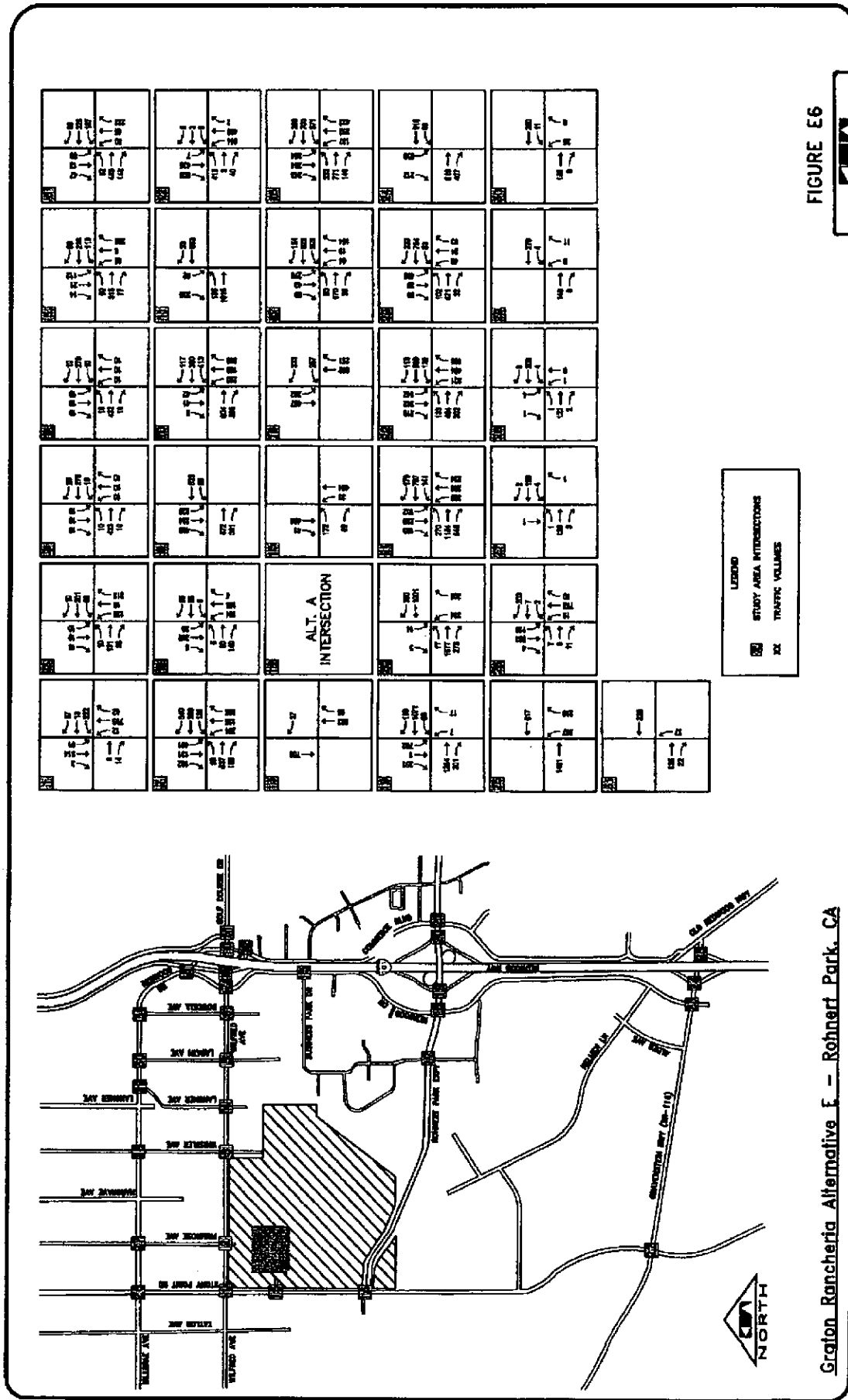
LEGEND  
 ■ STUDY AREA INTERSECTIONS  
 X TRAFFIC VOLUMES

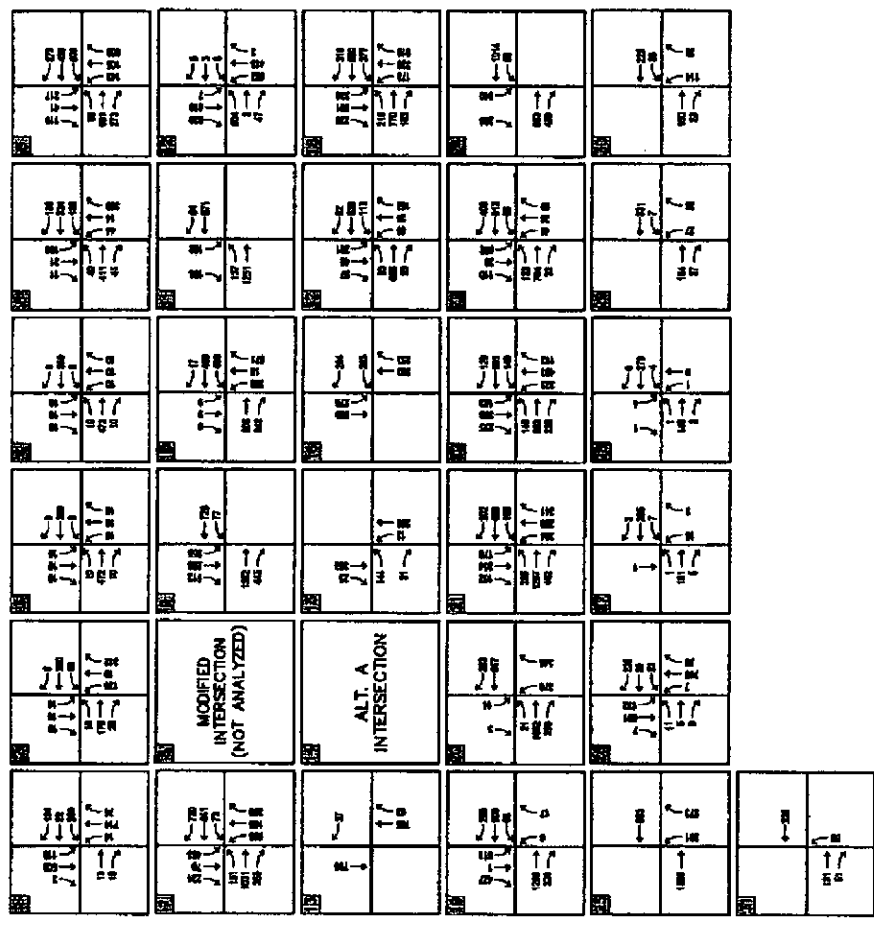
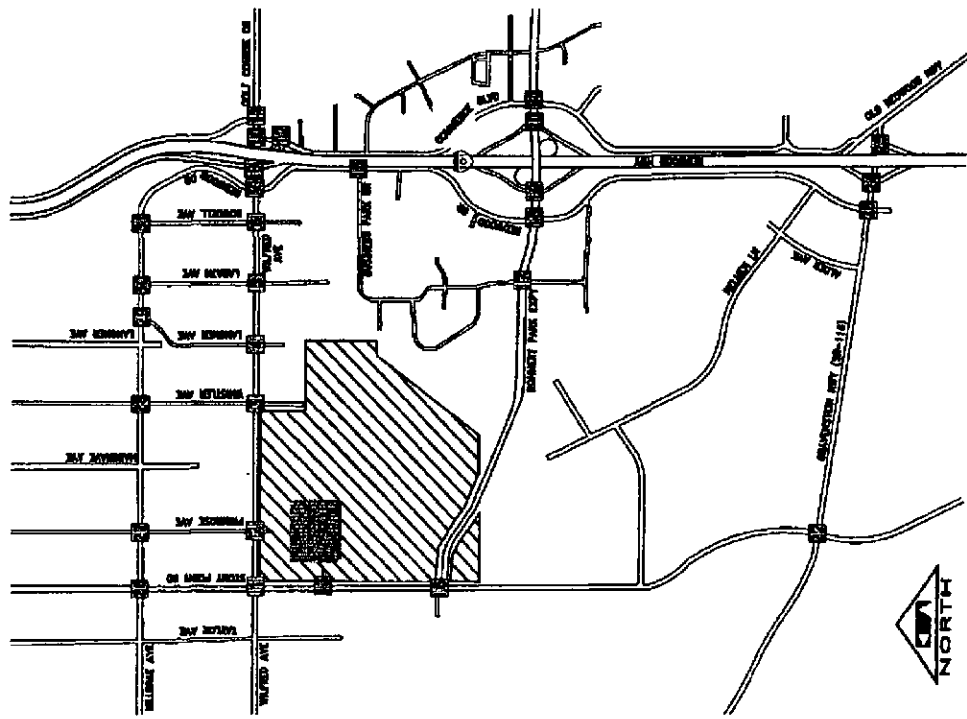
FIGURE E5



Graton Rancheria Alternative E - Rohnert Park, CA

PROJECT GENERATED PM TRAFFIC VOLUMES





LORDED  
 STUDY AREA INTERSECTIONS  
 TRAFFIC VOLUMES

FIGURE E7

Graton Rancheria Alternative E - Rohnert Park, CA

LONG-TERM CUMULATIVE + PROJECT PM TRAFFIC VOLUMES

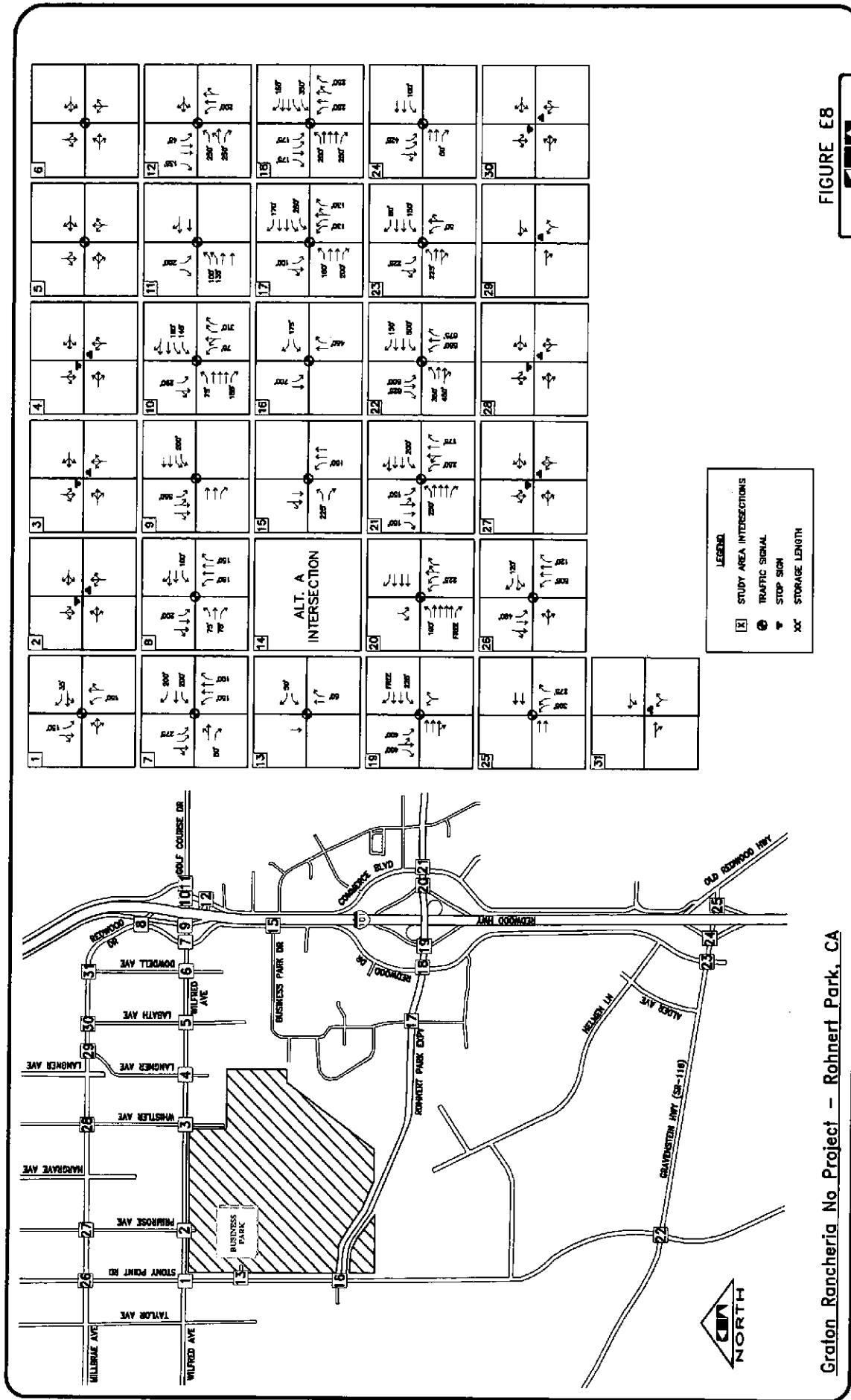


FIGURE E8



Graton Rancheria No Project - Rohnert Park, CA

NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL



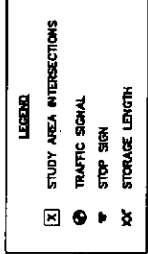
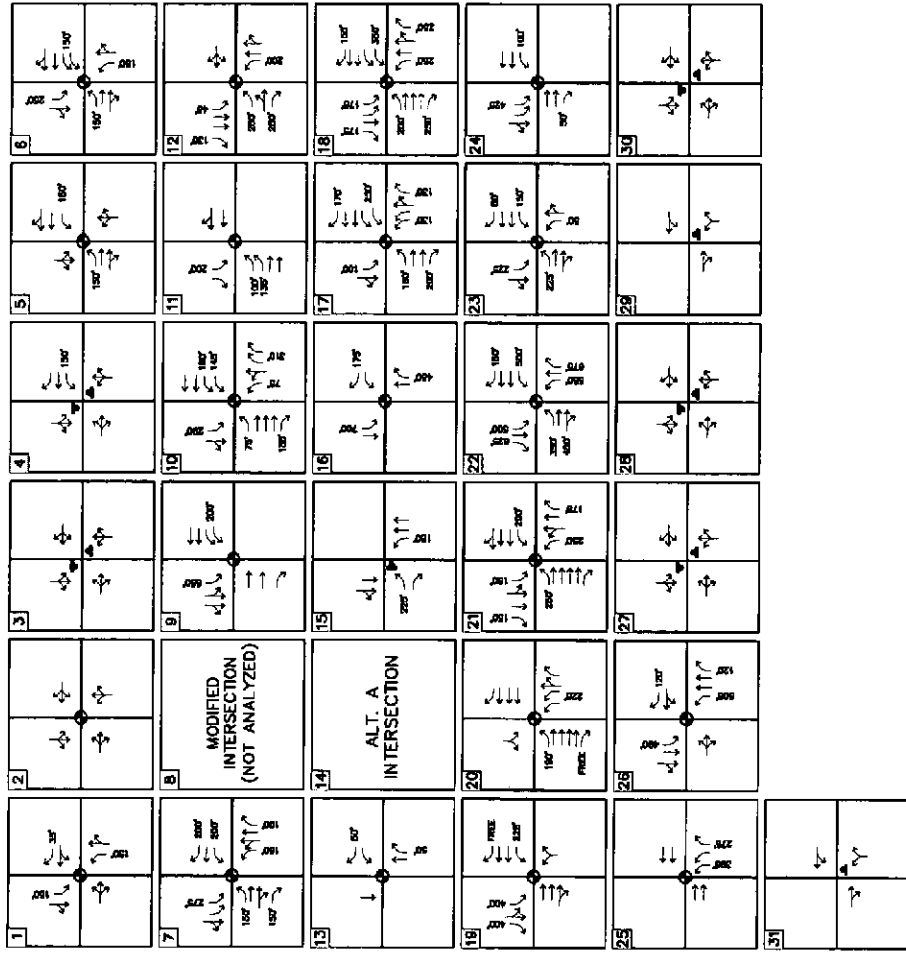
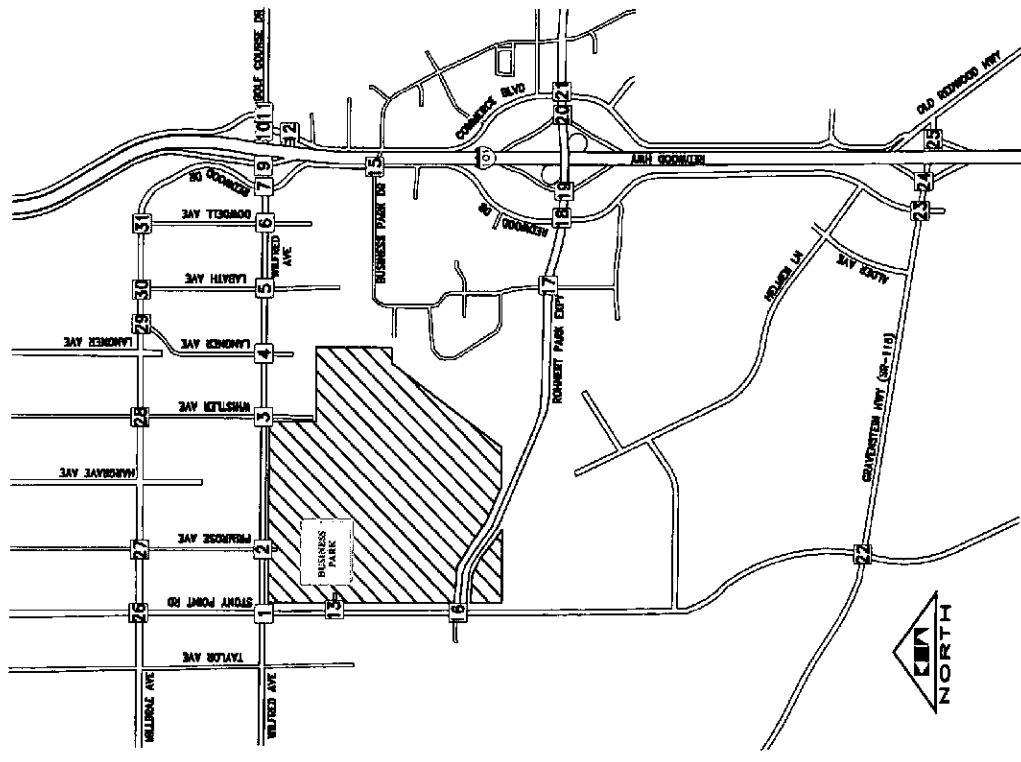


FIGURE E9



Graton Rancheria No Project - Rohnert Park, CA

LONG-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

## ALTERNATIVE H – WILFRED AVENUE SITE REDUCED INTENSITY OPTION

The Alternative H casino and hotel is proposed to be located as shown in **Figure H1**, which is bordered by Wilfred Avenue in the north, Business Park Drive in the south, Langner Avenue in the west, and Dowdell Avenue in the east.

**Figure H2** shows the proposed layout of the casino and hotel facility. The site layout includes a main building of approximately 315,100 square feet for a casino, restaurants, food court, event center, banquet facilities, lobby, pool, and other ancillary functions. In addition the project is planned to include 100 hotel rooms, primarily for casino guests.

A breakdown of square footage as it relates to traffic impacts is shown below:

- Casino and Entertainment areas – 293,250 s.f.
- Lobby/Bar/Back of House/Sundries – 14,750 s.f.
- Pool – 7,100 s.f.
- 315,100 s.f.
  
- Hotel Rooms – 77,000 s.f.

The site plan also shows supporting uses such as parking lots, parking structure, and wastewater treatment facilities. This layout is virtually the same as Alternative A except that the project has been reduced in size and intensity.

Within each alternative there is a reference made to the “project site” which changes for each alternative. There is not a specific project site that is being evaluated for all of the alternatives.

### Site Access

There are three access points to the project. The main access points to the project are located on Langner Avenue and Labath Avenue via Wilfred Avenue. These approaches are assumed to operate as full movement driveways with no turn limitations. With the addition of the project, Labath Avenue will be extended to the south to intersect Business Park Drive. A third project access will be on Labath Avenue just north of Business Park Drive in the new extension and is assumed to be a full movement driveway with no turn limitations as well.

Currently, none of the accesses are signalized.

## **Trip Generation – Alternative H**

Trip generation for Alternative H is identical to Alternative D. See Trip Generation – Alternatives D and H section under Alternative D for specific information.

## **Project Trip Distribution and Assignment**

Based on the factors discussed in the General Project Information section above it was determined that approximately 30% of the project traffic would be distributed to destinations north of the site, with the remaining 70% distributed south of the site. To be conservative, only a small percentage of project traffic was assumed to be generated or attracted in the immediate vicinity of the project site. The project traffic distribution is shown in **Figure H3** and **Figure H4**. **Figure H5** illustrates project traffic assigned to the study intersections based on the assumed trip distribution. As seen in **Figure H5**, most of the project traffic is expected to come from the freeway therefore it was assumed that most of the traffic would use Labath Avenue because of its closer proximity to the freeway. As noted in the distribution, some traffic leaving the project site is expected to avoid congestion at Wilfred Avenue and Stony Point Road by using Millbrae Avenue.

## **Near-Term Plus Project Traffic Volumes**

Near-term 2008 traffic volumes were combined with vehicle trips expected to be generated by the Alternative H casino and hotel project. **Figure H6** illustrates the combined near-term turning movement volumes at the study intersections.

## **Cumulative Plus Project Traffic Volumes**

Long-term 2020 traffic volumes were combined with vehicle trips expected to be generated by the Alternative H casino and hotel project. **Figure H7** illustrates the combined long-term turning movement volumes at the study intersections.

## **Alternative H LOS Conditions and Impacts at Intersections**

Traffic operations were evaluated under the following development conditions:

- Near-term conditions with Alternative H (year 2008)
- Long-term Cumulative conditions with Alternative H (year 2020)

In the near-term analysis for Alternative H, it was assumed that the Wilfred Avenue widening project will not have taken place before the casino/hotel opens. The Memorandum of Understanding (MOU) between the City of Rohnert Park and the Federated Indians of the Graton Rancheria stated that the tribe would help financially to speed up the timeline of the widening project to occur before the casino/hotel opens in 2008.

Results of the analysis are presented in **Table H1**. (Results shown as bold in the table do not meet operational standards.) The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections may operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. Additional detail is provided in the **Appendix**. As shown in the results, the following intersections and approaches will fail to meet acceptable level of service thresholds based on established significance criteria and with the addition of project-related traffic.

### **2008 Results**

- Stony Point Road/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Rohnert Park Expressway/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

### **2020 Results**

- Stony Point Road/Wilfred Avenue
- Labath Avenue/Wilfred Avenue
- Dowdell Avenue/Wilfred Avenue
- Redwood Drive/Wilfred Avenue
- Wilfred Avenue/US-101 SB Ramps
- Golf Course Drive/Commerce Boulevard
- Commerce Boulevard/US-101 NB Ramps
- Gravenstein Highway/Stony Point Road
- Millbrae Avenue/Stony Point Road

**Table H 1 – Alternative H Levels of Service**

	Intersection	Criteria	Signal Control	2005		2008				2020			
				Existing		Base (w/o Proj.)		With Project		Base (w/o Proj.)		With Project	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	F	841.3	F	OVRFL
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.7	B	12.5	B	14.7
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.6	B	12.5	B	14.4
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	C	20.1	B	12.5	D	28.5
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	557.9	F	OVRFL	F	OVRFL
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	323.7	F	OVRFL	F	OVRFL
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	83.4	F	169.9	F	116.2
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	24.6	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	24.0	C	26.8	D	36.0
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	82.7	E	74.2	F	87.0
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	17.9	B	19.0	B	19.6
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	63.3	D	50.8	E	55.9
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	A	9.8	-	-	A	9.6
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	C	16.7	C	22.2
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	B	19.6	B	18.5	C	21.5
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.6	C	28.2	C	29.1
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.7	C	29.1	C	26.9
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.3	B	16.0	B	16.1
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	15.6	B	12.3	B	14.9
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	40.6	E	63.4	C	34.0
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	36.9	D	45.5	F	114.9
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	26.8	D	42.4	D	52.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.0	B	18.1	B	19.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.2	B	11.5	B	11.2
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	61.3	F	90.2	F	120.3
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.6	B	12.4	B	12.1
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.7	B	12.5	B	12.3
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	B	10.7	B	11.3	B	11.1
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	14.7	B	13.5
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.7	B	11.4

## Alternative H Traffic Signal Warrant Analysis

Alternative H, near-term and long-term, traffic volumes at unsignalized study intersections were compared against peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*.

Results of the analysis showed that the following intersections will satisfy traffic signal Warrant #3 by the year 2008 and 2020.

- Stony Point Road/Wilfred Avenue (2008 and 2020)
- Labath Avenue/Wilfred Avenue (2008 and 2020)
- Dowdell Avenue/Wilfred Avenue (2008 and 2020)
- Millbrae Avenue/Stony Point Road (2008 and 2020)

Other warrants such as for minimum vehicle volumes, interruption of continuous traffic, and traffic progression were not evaluated because they generally require higher traffic volumes to be satisfied. Accident history and school areas were also not evaluated based on the results of field observations, which noted that neither of these warrant thresholds was likely to be met. A copy of the analysis summary for Warrant #3 is included in the **Appendix**.

## Alternative H LOS Conditions and Impacts on Freeway and Ramps

Project trips generated by the proposed Alternative H, reduced-intensity casino and hotel were added to the year 2008 and 2020 forecast freeway volumes.

Traffic analyses were completed to evaluate the operation of the study freeway segments and ramps in the year 2008 and 2020, with the addition on the casino and hotel project. Freeway segment analyses were limited to the mix-use travel lanes which are expected to have significantly more congestion than the future HOV lanes.

Results of the analyses are presented in **Table H2**. (Results shown as bold in the table do not meet operational standards.) As shown in the table, project traffic will add to the background congestion of the freeway. Significant congestion is expected with the project; however the congestion is reduced as a result of the smaller casino and hotel.



**Table H 2 – Alternative H Freeway Levels of Service**

US-101 Section/Ramp	Criteria		Existing		2008		2008 + Alt H		2020		2020 + Alt H	
	LOS	Density (pc/mi/in)	LOS	Density (pc/mi/in)	LOS	Density (pc/mi/in)	LOS	Density (pc/mi/in)	LOS	Density (pc/mi/in)	LOS	Density (pc/mi/in)
<b>Northbound</b>												
US-101 South of Gravenstein Highway (NB)	E	C	C	19.1	C	24.1	C	25.6	D	33.3	D	33.3
Gravenstein Highway NB Off-Ramp	E	D	C	27.4	C	32.8	D	34.1	E	39.4	E	39.4
Gravenstein Highway NB On-Ramp	E	D	D	29.5	D	34.0	E	36.1	F	40.6	F	40.6
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	D	C	23.5	D	28.4	D	32.3	E	41.4	E	41.4
Rohnert Park Expressway NB Off-Ramp	E	D	D	28.8	D	33.8	E	37.1	F	42.0	F	42.0
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	C	21.8	C	23.4	C	23.2	C	24.8	C	24.8
Rohnert Park Expressway NB On-Ramp	E	D	C	32.5	C	27.7	D	29.0	E	35.2	E	35.2
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	D	C	22.1	C	27.7	D	29.0	E	35.2	E	35.2
Wilfred Avenue NB Off-Ramp	E	E	C	22.1	C	27.7	D	29.0	E	35.2	E	35.2
Wilfred Avenue NB On-Ramp	E	F	D	30.3	D	31.2	E	40.4	F	43.1	F	43.1
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	D	D	26.7	D	31.2	E	40.4	F	43.1	F	43.1
Santa Rosa Avenue NB Off-Ramp	E	E	D	30.3	D	31.2	E	40.4	F	43.1	F	43.1
Santa Rosa Avenue NB On-Ramp	E	E	D	30.3	D	31.2	E	40.4	F	43.1	F	43.1
US-101 North of Santa Rosa Avenue (NB)	E	C	C	22.0	C	23.2	D	29.7	D	31.7	D	31.7
<b>Southbound</b>												
US-101 North of Santa Rosa Avenue (SB)	E	C	C	24.1	C	25.5	D	28.5	D	30.3	D	30.3
Santa Rosa Avenue SB On-Ramp	E	D	D	31.2	D	32.7	E	35.1	F	-	F	-
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	D	D	31.5	D	32.7	E	35.1	F	-	F	-
Wilfred Avenue SB Off-Ramp	E	E	E	38.0	E	38.8	E	40.2	F	44.8	F	46.2
Wilfred Avenue SB On-Ramp	E	D	D	33.7	D	33.4	E	39.9	F	45.4	F	45.4
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	E	D	35.2	D	33.4	E	40.9	F	45.4	F	45.4
Rohnert Park Expressway SB Off-Ramp	E	E	D	38.0	D	33.4	E	40.9	F	45.4	F	45.4
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	D	36.0	D	30.9	D	33.1	E	40.7	F	40.7
Rohnert Park Expressway SB On-Ramp	E	E	D	35.1	D	30.1	D	33.9	F	41.3	F	41.3
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	D	C	22.3	D	26.8	E	36.6	F	-	F	-
Gravenstein Highway SB Off-Ramp	E	D	D	33.9	D	33.6	E	40.3	F	44.7	F	44.7
Gravenstein Highway SB On-Ramp	E	D	D	33.7	D	32.1	E	36.4	F	46.6	F	46.6
US-101 South of Gravenstein Highway (SB)	E	C	C	21.8	C	21.8	D	26.5	D	32.0	E	32.0



## Potential Effects on Intersection Safety

Traffic volumes generated by the project were reviewed in consideration of existing intersection collision history and the potential for increased accidents. According to collision data, accidents involving bicyclist and pedestrians are very low. Many intersections did not report any collisions of this type during the survey period. This suggests that bicycle and pedestrian volumes are relatively low and study intersections have minimal safety hazards for individuals biking or walking. Although the project will introduce increased traffic volumes at some intersections, bicyclists and pedestrians are expected to be able to travel through study intersections with similar levels of safety. Historically casinos do not attract a significant amount of bicycle and pedestrian traffic. . Therefore, the expected amount of pedestrian and bicycle traffic is nominal and a significant increase in bicycle and pedestrian accidents is unlikely.

The potential for increased collisions between motorized vehicles was also considered. Collision frequency and severity are a function of many complex factors that vary depending on the location and type of intersection or roadway segment. Factors include traffic control such as signals or stop signs, lane and shoulder widths, grades, driveway densities, roadside hazards or obstacles, presence of left and right turn lanes, sight distance, congestion, and others.

Because of the number and interrelationships of the variables, accurate crash prediction is difficult. However, the proposed casino and hotel project will increase roadway congestion, a factor which could result in an increase in traffic collisions if left unmitigated. Other factors are expected to remain unaffected.

As noted previously, the purpose of this study is to address the traffic and transportation effects of the proposed casino and hotel development. This includes mitigation improvements to restore traffic operations to levels within acceptable standards or to levels as good as or better than without the casino/hotel project. Any potential increases in accidents due to project-related traffic would be offset by the implementation of roadway improvements included as mitigation. Therefore, if mitigations are implemented as proposed in this report, no significant increase in daytime or nighttime collisions is expected.



## Queuing Summary

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will backup in each direction approaching an intersection. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. Average queuing is generally less. Ninety-fifth percentile queuing was checked under the various future year development conditions and in consideration of the planned intersection and signal timing improvements. A typical vehicle length of 25 feet is used in the queuing analysis. A summary of the queuing results can be seen in **Table H3**. The results indicate dedicated turn lanes where queuing may exceed their storage limits. It should be noted that some variations in intersection queuing between scenarios is a result of planned intersection and signal timing improvements.

**Table H 3 – Alternative H Queuing Summary**

Intersection	Turning Movement	Bay Length	Queue Length		Intersection	Turning Movement	Bay Length	Queue Length	
			2008	2020				2008	2020
1 Stony Point Road and Wilfred Avenue	EBL				16 Stony Point Road and Rohnert Park Expy	EBL			
	EBR			EBR					
	WBL			WBL		175	54	50	
	WBR	35	OVRFLW	OVRFL		NBL			
	NBL	150	25	25		NBR	450	38	40
	NBR					SBL	700	194	213
4 Langner Avenue and Wilfred Avenue	SBL	150	25	26	SBR				
	SBR				17 Labath Avenue and Rohnert Park Expy	EBL	150	61	67
	EBL			EBR		200	25	26	
	EBR			WBL		250	80	43	
	WBL	150		25		WBR	170	25	25
	WBR					NBL	130	36	38
NBL				NBR		130	36	33	
5 Labath Avenue and Wilfred Avenue	NBR				SBL	100	451	424	
	SBL				SBR				
	SBR				18 Redwood Drive and Rohnert Park Expy	EBL	200	116	106
	EBL	150		25		EBR	200	25	25
	EBR					WBL	350	156	211
	WBL	150		52		WBR	155	37	48
WBR				NBL		250	157	136	
NBL				NBR		250	65	64	
6 Dowdell Avenue and Wilfred Avenue	NBR				SBL	175	188	237	
	SBL				SBR	175	58	56	
	SBR				19 SB US 101 Ramps and Rohnert Park Expy	EBL			
	EBL	150		25		EBR			
	EBR					WBL	225	65	78
	WBL	150		59		WBR			
WBR				NBL					
NBL				NBR					
7 Redwood Drive and Wilfred Avenue	NBR				SBL	400	318	311	
	SBL				SBR	400	222	197	
	SBR				EBL	190	25	25	
	EBL	150		106	EBR				
	EBR	150		154	20 NB US 101 Ramps and Rohnert Park Expy	WBL			
	WBL					WBR			
WBR				NBL		225	321	342	
NBL	150	317	352	NBR					
NBR	100	97	110	SBL					
SBL	275	316	474	SBR					
8 Redwood Drive and Commerce Boulevard	SBR				21 Commerce Blvd and Rohnert Park Expy	EBL	250	69	70
	EBL	75	25	EBR		200	187	264	
	EBR	75	49	WBL					
	WBL	100	25	WBR		250	210	245	
	WBR			NBL		175	58	75	
	NBL	150	132	NBR		150	98	147	
9 Wilfred Avenue and SB US 101 Ramps	NBR	150	25	25	SBL	150	51	50	
	SBL	200	40	EBL	350	162	183		
	SBR			EBR					
	EBL			WBL	500	155	138		
	EBR			WBR	150	41	39		
	WBL	300	34	27	NBL	550	296	290	
10 Golf Course Drive and Commerce Blvd	NBR				22 Stony Point Road and Gravenstein Hwy	NBR	675	30	29
	SBL	250	229	342		SBL	500	146	325
	SBR					SBR	625	49	51
	EBL					EBL	225	161	171
	EBR					EBR			
	WBL	150	778	190		23 Redwood Road and Gravenstein Hwy	WBL	150	65
WBR				WBR	80		25	33	
NBL	150	718	1011	NBL	50		65	65	
NBR				NBR					
SBL	200	94	30	SBL	225		388	513	
SBR				SBR					
11 Roberts Lake Drive and Golf Course Drive	EBL	80	107	67	24 Gravenstein Hwy and SB US 101 Ramps	EBL			
	EBR					EBR	50	99	99
	WBL					WBL	100	106	125
	WBR					WBR			
	NBL					NBL			
	NBR					NBR			
12 Commerce Blvd and NB US 101 Ramps	SBL	200	77	107	25 Gravenstein Hwy and NB US 101 Ramps	SBL	425	222	216
	SBR					SBR			
	EBL	250	341	360		EBL			
	EBR	250	25	37		EBR			
	WBL					WBL			
	WBR					WBR			
15 Business Park Drive and Redwood Drive	NBL	200	478	531	26 Stony Point Road and Millbrae Avenue	NBL	395	137	144
	NBR					NBR	275	178	192
	SBL	100	25	25		SBL			
	SBR	175	152	195		SBR			
	EBL	225	97	75		EBL			
	EBR					EBR			
16 Stony Point Road and Rohnert Park Expy	WBL				26 Stony Point Road and Millbrae Avenue	WBL			
	WBR					WBR	120	43	110
	NBL					NBL	505	25	25
	NBR					NBR	120	25	25
	SBL					SBL	490	25	25
	SBR					SBR			

## Alternative H Mitigations

Intersections with levels of service below established thresholds were investigated to determine the role of the Alternative H traffic in the projected operating conditions at those intersections. The evaluation disclosed that the following improvements as shown in **Table H4** are needed in the near-term (2008) and long-term (2020).

**Table H5** summarizes the expected levels of service with the proposed mitigation. Roadway improvements will be consistent with design standards for local jurisdictions in providing facilities and amenities for bicycles and pedestrians. This includes improvements such as sidewalks, countdown signals, and striped crosswalks if required by local design standards.

As mentioned previously, the signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. Two-way stop-controlled (TWSC) intersections maybe operate acceptably overall but only the worst approach is reported in the table. The overall level of service is reported for signalized intersections. **Figures H8 and H9** illustrate the mitigated lane geometry and traffic control. Some mitigations are associated with queuing impacts.

Traffic signal interconnect and coordinated timing plans are included in the proposed traffic signals for Wilfred Avenue.

The combination of casino traffic and other nearby future development will require Wilfred Avenue to ultimately be widened to five lanes (including Class II bike lanes) from Redwood Drive to Langner Avenue at the edge of the project site. From Langner Avenue west to Stony Point Road, Wilfred Avenue should be two lanes with improved pavement and shoulders and it is recommended that the upgrade of Wilfred Avenue to include improved pavement and shoulders should be designed to the County standard and should include Class II bike lanes out to Stony Point Road to connect into the Class II bike lanes on Stony Point Road. Casino traffic alone can be accommodated on a three lane roadway section from Redwood Drive to Langner Avenue, therefore, they will contribute a proportionate share for the ultimate cost of the widening of Wilfred Avenue.

Langner Avenue and Labath Avenue should be improved and either removed from County jurisdiction or designed to the County standard.

An overcrossing should be built from State Farm Drive to Business Park Drive over US-101 with a southbound slip ramp lane that would open up just south of the US-101 NB off-ramp directly to the overcrossing. The overcrossing helps redirect project traffic away from the Wilfred interchange to a new facility capable of accommodating casino traffic. Additional right-of-way is necessary on State Farm Drive as well as Business Park Drive. Access to State Farm Drive will need to be modified and adjusted, but it is not anticipated that there will need to be any closures associated with the overcrossing. The overcrossing should begin east of the State Farm Drive/Commerce Boulevard intersection and touch down west of the Business Park Drive/Redwood Drive



intersection. With this mitigation, all of the existing turning movements at the Commerce/State Farm and the Redwood/Business Park intersections will be permitted as they currently exist.

Modification to any interchanges requires review and approval from Caltrans' Department Headquarters Division of Design.



**Table H 4 – Alternative H Summary of Mitigations**

Period	#	Intersection	Mitigation	Requires ROW?	Reason
2008	1	Stony Point Rd/ Wilfred Ave	• Signalize	No	Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize • Add WB left and change WB all shared to through-right <sup>1</sup> • Add NB right and change NB all shared to left-through	No Yes Yes	Capacity Capacity Tribeland
	6	Dowdell Ave/ Wilfred Ave	• Signalize • Add WB left and change WB all shared to through-right <sup>1</sup> • Add EB left and change EB all shared to through-right <sup>1</sup>	No Yes Yes	Capacity Capacity Capacity
	7	Redwood Dr/ Wilfred Ave	• Change WB left-through to WB through • Change phasing east-west to protected from split • Optimize signal timing • Add EB left and change EB all shared to through-right <sup>1</sup>	No No No Yes	Capacity Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	No mitigation necessary	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	No mitigation necessary	-	-
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	• Construct the State Farm-Business Park Overcrossing and a southbound slip ramp from the US-101 NB Ramps to the overcrossing	Yes	Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	No mitigation necessary	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	• Extend SB left turn bay to 300 feet (from 100 feet)	Yes	Queue
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 350 feet (from 225 feet) • Add second NB left turn lane	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	• Add an EB right turn overlap phase • Optimize signal timing	Yes No	Capacity Capacity
	22	Gravenstein Hwy/ Stony Point Rd	No mitigation necessary	-	-
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langer Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

<sup>1</sup> In summary, widen Wilfred Ave to three lanes from Labath Ave to Redwood Dr



Period	#	Intersection	Mitigation	Requires ROW?	Reason
2020	1	Stony Point Rd/ Wilfred Ave	• Signalize *	No	Capacity
	2	Primrose Ave/ Wilfred Ave	No mitigation necessary	-	-
	3	Whistler Ave/ Wilfred Ave	No mitigation necessary	-	-
	4	Langer Ave/ Wilfred Ave	No mitigation necessary	-	-
	5	Labath Ave/ Wilfred Ave	• Signalize * • Add NB right and change NB all shared to left-through *	No Yes	Capacity Tribeland
	6	Dowdell Ave/ Wilfred Ave	• Signalize *	No	Capacity
	7	Redwood Dr/ Wilfred Ave	• Optimize signal timing * • Change WB left-through to WB through * • Change phasing east-west to protected from split *	No No No	Capacity Capacity Capacity
	8	Redwood Dr/ Commerce Blvd	Modified Intersection (not analyzed)	-	-
	9	Wilfred Ave/ US-101 SB Ramps	No mitigation necessary	-	-
	10	Golf Course Dr/ Commerce Blvd	• Add EB right turn overlap phase	No	Capacity
	11	Golf Course Dr/ Roberts Lake Rd	No mitigation necessary	-	-
	12	Commerce Blvd/ US-101 NB Ramps	• Construct the State Farm-Business Park Overcrossing and a southbound slip ramp from the US-101 NB Ramps to the overcrossing *	Yes	Capacity
	13	Project Driveway/ Stony Point Rd	No mitigation necessary	-	-
	14	Business Park Dr/ Labath Ave	No mitigation necessary	-	-
	15	Business Park Dr/ Redwood Dr	No mitigation necessary	-	-
	16	Rohnert Park Expwy/ Stony Point Rd	No mitigation necessary	-	-
	17	Rohnert Park Expwy/ Labath Ave	• Extend SB left turn bay to 300 feet (from 100 feet) *	Yes	Queue
	18	Rohnert Park Expwy/ Redwood Dr	No mitigation necessary	-	-
	19	Rohnert Park Expwy/ US-101 SB Ramps	No mitigation necessary	-	-
	20	Rohnert Park Expwy/ US-101 NB Ramps	• Extend NB left turn bay to 350 feet (from 225 feet) * • Add second NB left turn lane *	Yes Yes	Queue Capacity
	21	Rohnert Park Expwy/ Commerce Blvd	No mitigation necessary	-	-
	22	Gravenstein Hwy/ Stony Point Rd	• Add a EB right turn bay for 100 feet • Optimize signal timing	Yes No	Capacity Capacity
	23	Gravenstein Hwy/ Redwood Dr	No mitigation necessary	-	-
	24	Gravenstein Hwy/ US-101 SB Ramps	No mitigation necessary	-	-
	25	Gravenstein Hwy/ US-101 NB Off-Ramp	No mitigation necessary	-	-
	26	Millbrae Ave/ Stony Point Rd	• Signalize *	No	Capacity
	27	Millbrae Ave/ Primrose Ave	No mitigation necessary	-	-
	28	Millbrae Ave/ Whistler Ave	No mitigation necessary	-	-
	29	Millbrae Ave/ Langner Ave	No mitigation necessary	-	-
	30	Millbrae Ave/ Labath Ave	No mitigation necessary	-	-
	31	Millbrae Ave/ Dowdell Ave	No mitigation necessary	-	-

\* Improvement assumed to occur with 2008 mitigation

**Table H 5 – Alternative H Mitigated Intersection Levels of Service**

	Intersection	Criteria	Signal Control	2005				2008				2020					
				Existing		Base (w/o Proj.)		With Project		Mitigated		Base (w/o Proj.)		With Project		Mitigated	
				LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Stony Point Rd/ Wilfred Ave	D	TWSC	F	180.8	F	495.5	F	OVRFL	C	21.2	F	841.3	F	OVRFL	C	28.1
2	Primrose Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.7	B	12.7	B	12.5	B	14.7	B	14.7
3	Whistler Ave/ Wilfred Ave	D	TWSC	A	9.4	B	11.4	B	12.6	B	12.6	B	12.5	B	14.4	B	14.4
4	Langer Ave/Wilfred Ave	D	TWSC	A	9.4	B	11.3	C	20.1	C	16.5	B	12.5	D	28.5	C	21.4
5	Labath Ave/Wilfred Ave	D	TWSC	A	9.1	F	77.4	F	557.9	C	26.3	F	OVRFL	F	OVRFL	C	25.8
6	Dowdell Ave/Wilfred Ave	D	TWSC	A	9.1	F	623.3	F	323.7	C	24.7	F	OVRFL	F	OVRFL	C	35.1
7	Redwood Dr/Wilfred Ave	D	TS	C	23.3	E	77.6	F	83.4	D	38.6	F	169.9	F	116.2	D	53.1
8	Redwood Dr/ Commerce Blvd	C	TS	F	86.1	C	26.0	C	24.6	C	25.6	-	-	-	-	-	-
9	Wilfred Ave/ US-101 SB Ramps	D	TS	-	-	C	23.2	C	24.0	C	20.7	C	26.8	D	36.0	C	26.5
10	Golf Course Dr/ Commerce Blvd	D	TS	F	103.4	E	71.7	F	82.7	D	52.1	E	74.2	F	87.0	D	54.8
11	Golf Course Dr/ Roberts Lake Rd	C	TS	B	14.8	B	18.3	B	17.9	B	17.8	B	19.0	B	19.6	B	19.4
12	Commerce Blvd/ US-101 NB Ramps	D	TS	C	28.2	D	46.7	E	63.3	D	47.9	D	50.8	E	55.9	D	43.8
13	Project Driveway/ Stony Point Rd	D	TWSC	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
14	Business Park Dr/ Labath Ave	D	TWSC	-	-	-	-	A	9.8	B	10.9	-	-	A	9.6	B	10.6
15	Business Park Dr/ Redwood Dr	D	TWSC	C	23.9	D	27.5	D	27.5	D	27.5	C	16.7	C	22.2	C	22.2
16	Rohnert Park Expwy/ Stony Point Rd	D	TS	B	20.0	B	19.1	B	19.6	B	19.6	B	18.5	C	21.5	C	21.5
17	Rohnert Park Expwy/ Labath Ave	C	TS	C	24.6	C	25.8	C	29.6	C	29.6	C	28.2	C	29.1	C	29.1
18	Rohnert Park Expwy/ Redwood Dr	C	TS	C	24.2	C	26.3	C	25.7	C	25.8	C	29.1	C	26.9	C	26.9
19	Rohnert Park Expwy/ US-101 SB Ramps	D	TS	B	16.5	B	16.9	B	16.3	B	18.5	B	16.0	B	16.1	B	17.8
20	Rohnert Park Expwy/ US-101 NB Ramps	D	TS	A	9.8	B	10.8	B	15.6	B	11.5	B	12.3	B	14.9	B	12.5
21	Rohnert Park Expwy/ Commerce Blvd	C	TS	D	39.2	D	44.6	D	40.6	C	30.9	E	63.4	C	34.0	C	33.7
22	Gravenstein Hwy/ Stony Point Rd	D	TS	C	32.1	D	37.1	D	36.9	D	36.9	D	45.5	F	114.9	D	52.7
23	Gravenstein Hwy/ Redwood Dr	D	TS	C	22.1	C	26.2	C	26.8	C	26.8	D	42.4	D	52.8	D	52.8
24	Gravenstein Hwy/ US-101 SB Ramps	D	TS	B	20.0	B	19.9	B	19.0	B	19.0	B	18.1	B	19.6	B	19.6
25	Gravenstein Hwy/ US-101 NB Off-Ramp	D	TS	B	13.1	B	11.5	B	11.2	B	11.2	B	11.5	B	11.2	B	11.2
26	Millbrae Ave/ Stony Point Rd	D	TWSC	E	43.9	E	43.5	F	61.3	A	9.8	F	90.2	F	120.3	B	10.1
27	Millbrae Ave/ Primrose Ave	D	TWSC	B	11.1	B	11.5	B	11.6	B	11.6	B	12.4	B	12.1	B	12.1
28	Millbrae Ave/ Whistler Ave	D	TWSC	B	11.4	B	11.5	B	11.7	B	11.7	B	12.5	B	12.3	B	12.3
29	Millbrae Ave/ Langner Ave	D	TWSC	A	9.7	A	9.9	B	10.7	B	10.7	B	11.3	B	11.1	B	11.1
30	Millbrae Ave/ Labath Ave	D	TWSC	B	11.3	B	11.7	B	11.7	B	11.7	B	14.7	B	13.5	B	13.5
31	Millbrae Ave/ Dowdell Ave	D	TWSC	B	11.3	B	11.4	B	11.4	B	11.4	B	11.7	B	11.4	B	11.4

Results indicate that the freeway will not meet standards with the project, even with the future construction of HOV lanes, ramp metering, and auxiliary lanes associated with the Wilfred interchange project. As mitigation the project should do the following which will result in the mitigated levels of service shown in **Table H6**:

- The project should contribute a proportionate share of the costs of the construction of auxiliary lanes between Rohnert Park Expressway and Gravenstein Highway (SR-116) in the long-term (2020).
- The project should contribute a proportionate share of the costs of the construction of the Wilfred Avenue interchange project, including HOV lanes, ramp metering, and auxiliary lanes in the near-term (2008).
- The project should contribute a proportionate share of the costs of the construction of an additional traffic lane in the southbound direction from Santa Rosa Avenue to Rohnert Park Expressway and from Gravenstein Highway (SR-116) to West Sierra Avenue as well as an additional traffic lane in the northbound direction from Wilfred Avenue to Santa Rosa Avenue in the long-term (2020).

Aside from roadway improvements to mitigate protect impacts, the casino and hotel should coordinate with the Green Music Center during outdoor events that will generate high traffic levels. During that period, traffic control services at the Rohnert Park interchange may be necessary. Therefore, the casino/hotel project should provide funding for special event traffic monitoring at the Rohnert Park Expressway interchange to identify conflicts during outdoor events generate high traffic levels. If conflicts occur, the project should provide traffic management coordination between the casino/hotel project and Green Music Center in consultation with CHP and Caltrans to assist in traffic control.

Because no fixed route service will be available at the project site, the casino/hotel should provide a shuttle that serves the two Rohnert Park transfer stations. The shuttle should run throughout the day or could be called out on demand.

The casino should also sponsor charter buses from farther away destinations such as Marin County and the south Bay. The buses could serve specific groups such as senior citizens or social clubs, while reducing the number of single occupancy vehicles to the site. Preferential carpool or vanpool spaces should also be provided at the project site to encourage ridesharing by patrons and employees. The casino should provide employee incentives such as subsidized transit passes, flexible work schedules, the validation of transit tickets to provide free return trips, or subsidized shuttle services.





**Table H 6 – Alternative H Mitigated Freeway Level of Service Summary**

Criteria	Existing		2008		2008 + Alt H		2008 + Alt H Mitigated		2020		2020 + Alt H		2020 + Alt H Mitigated	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
<b>Northbound</b>														
US-101 South of Gravenstein Highway (NB)	E	22.2	C	19.1	C	24.1	C	24.1	C	25.6	D	33.3	D	33.3
Gravenstein Highway NB Off-Ramp	E	30.8	C	27.4	D	32.8	D	32.8	D	34.1	E	39.4	E	39.4
Gravenstein Highway NB On-Ramp	E	34.5	D	29.5	D	34.0	D	34	E	36.1	F	40.6	E	42.5
US-101 Between Gravenstein Highway and Rohnert Park Expressway (NB)	E	28.1	C	23.5	D	28.4	D	28.4	D	32.3	E	41.4	E	42.5
Rohnert Park Expressway NB Off-Ramp	E	33.6	D	28.8	D	33.8	D	33.8	E	37.1	F	42.0	E	42.5
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	32.1	C	21.8	C	23.4	C	23.4	C	23.2	C	24.8	C	24.8
Rohnert Park Expressway NB On-Ramp	E	32.5	C	22.1	C	27.7	C	27.7	D	29.0	E	35.2	E	35.2
US-101 Between Rohnert Park Expressway and Wilfred Avenue (NB)	E	28.9	C	22.1	C	27.7	C	27.7	D	29.0	E	35.2	E	35.2
Wilfred Avenue NB On-Ramp	E	35.4	C	22.1	C	27.7	C	27.7	D	29.0	E	35.2	E	35.2
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	42.0	D	30.3	D	31.2	D	31.2	E	40.4	F	43.1	D	30.4
US-101 Between Wilfred Avenue and Santa Rosa Avenue (NB)	E	26.7	D	30.3	D	31.2	D	31.2	E	40.4	F	43.1	D	30.4
Santa Rosa Avenue NB Off-Ramp	E	37.2	D	30.3	D	31.2	D	31.2	E	40.4	F	43.1	D	30.4
US-101 North of Santa Rosa Avenue (NB)	E	20.3	C	22.0	C	23.2	C	23.2	D	29.7	D	31.7	D	31.7
<b>Southbound</b>														
US-101 North of Santa Rosa Avenue (SB)	E	22.9	C	24.1	C	25.5	C	25.5	D	28.5	D	30.3	D	30.3
Santa Rosa Avenue SB On-Ramp	E	31.2	D	32.7	E	35.1	E	35.1	F	-	F	-	C	24.4
US-101 Between Santa Rosa Avenue and Wilfred Avenue (SB)	E	31.5	D	32.7	E	35.1	E	35.1	F	-	F	-	C	24.4
Wilfred Avenue SB Off-Ramp	E	36.0	E	38.8	E	40.2	E	40.2	F	44.8	F	46.2	D	32.2
Wilfred Avenue SB On-Ramp	E	33.7	D	33.4	E	40.9	E	40.9	E	39.9	F	45.4	D	32.4
US-101 Between Rohnert Park Expressway and Wilfred Avenue (SB)	E	35.2	D	33.4	E	40.9	E	40.9	E	39.9	F	45.4	D	32.4
Rohnert Park Expressway SB Off-Ramp	E	38.0	D	33.4	E	40.9	E	40.9	E	39.9	F	45.4	D	32.4
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	36.0	D	30.9	D	33.1	D	33.1	E	38.5	F	40.7	C	26.0
Rohnert Park Expressway SB On-Ramp	E	35.1	D	30.1	D	33.9	D	33.9	F	37.5	F	41.3	E	38.5
US-101 Between Rohnert Park Expressway and Gravenstein Highway (SB)	E	27.1	C	22.3	D	26.8	D	26.8	D	36.6	F	-	E	38.5
Gravenstein Highway SB Off-Ramp	E	33.9	D	29.2	D	33.6	D	33.6	F	40.3	F	44.7	E	38.5
Gravenstein Highway SB On-Ramp	E	33.7	D	32.1	E	36.4	E	36.4	F	42.3	F	46.5	D	30.6
US-101 South of Gravenstein Highway (SB)	E	24.7	C	21.8	D	26.5	D	26.5	D	32.0	E	41.3	C	22.2

It is recommended that the casino contribute to the operation of SMART if it is implemented. Implementation of the SMART transit option will reduce the commuter congestion on US-101.

Mitigations to reduce the impact of the construction include the implementation of a construction traffic management plan for the duration of construction of the project and training for construction delivery vehicle drivers.

It is recommended that the project attempt to minimize the amount of construction fill transported on the surrounding street network by eliminating or shortening the off-site travel route. Potential options for eliminating off-site transport include moving fill material via conveyors across barriers such as creeks and ditches or installing temporary bridges for haul vehicles across the barriers.

If there is a special exception and off-site fill is necessary, construction material importation should be scheduled outside of the areawide commute peak hours. Debris along the truck route caused by trucks should be monitored daily and the roadways should be cleaned as necessary. Roadways subject to fill truck traffic should be assessed by an independent third party consultant prior to the start of construction and following the completion of construction. If the third party determines that roadway deterioration has occurred as a result of casino construction, it is recommended that the developer pay to have surrounding roadways resurfaced to restore the pavement to the pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements.

To help ensure adequate public safety during construction, particularly near the project site, the tribe should provide flagging when necessary in consultation with CHP, Caltrans, and the County's Sheriff's Department to assist with traffic control.

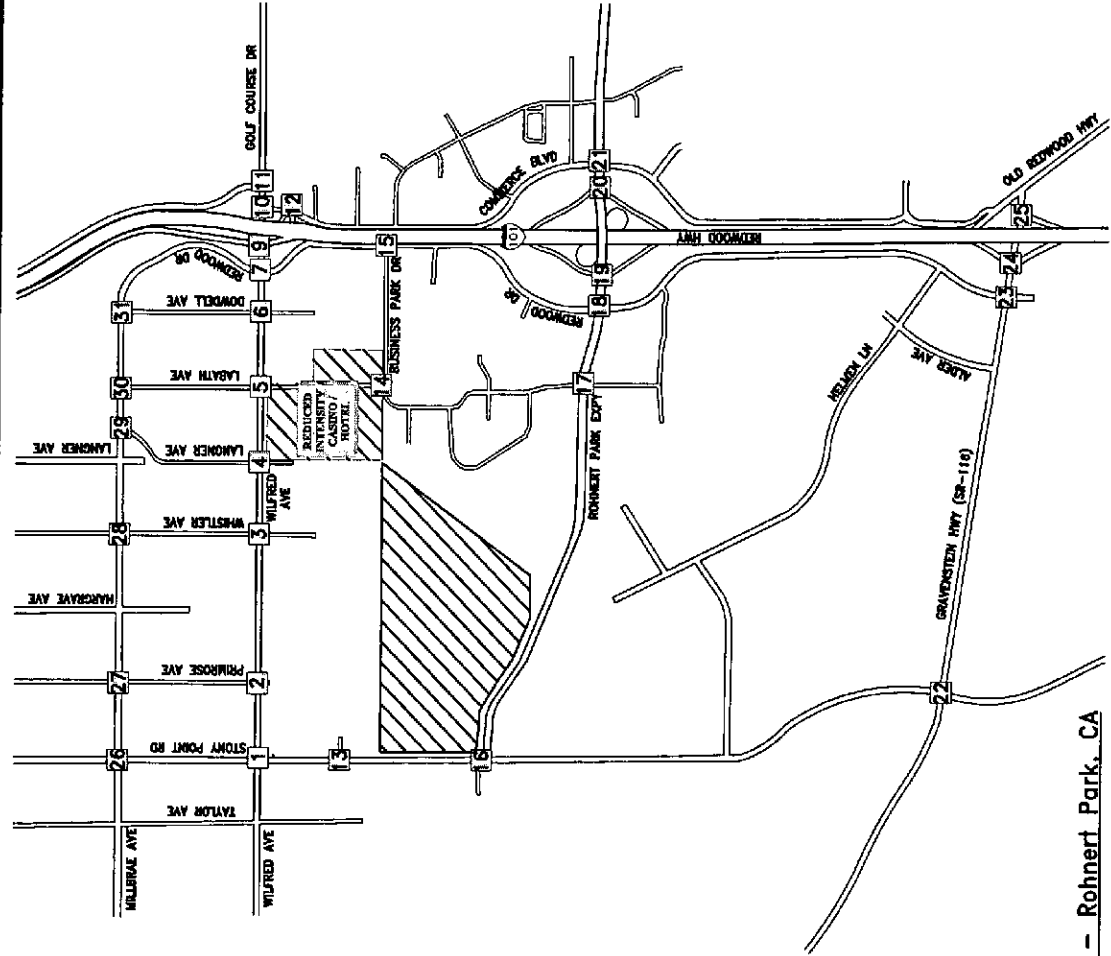


FIGURE H1



Rinkley-Horn and Associates, Inc.

Graton Rancheria Alternative H - Rohnert Park, CA

PROJECT LOCATION

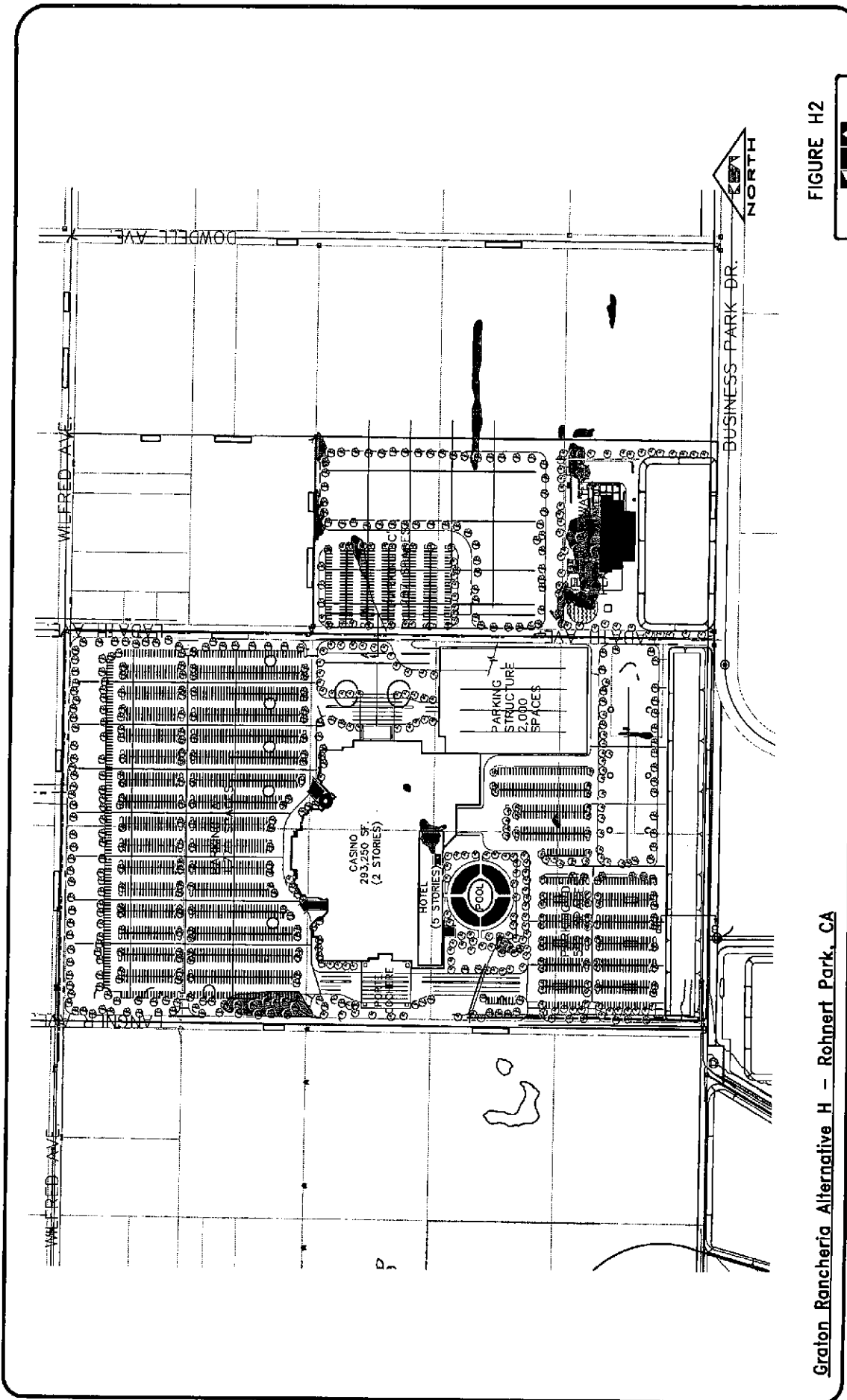


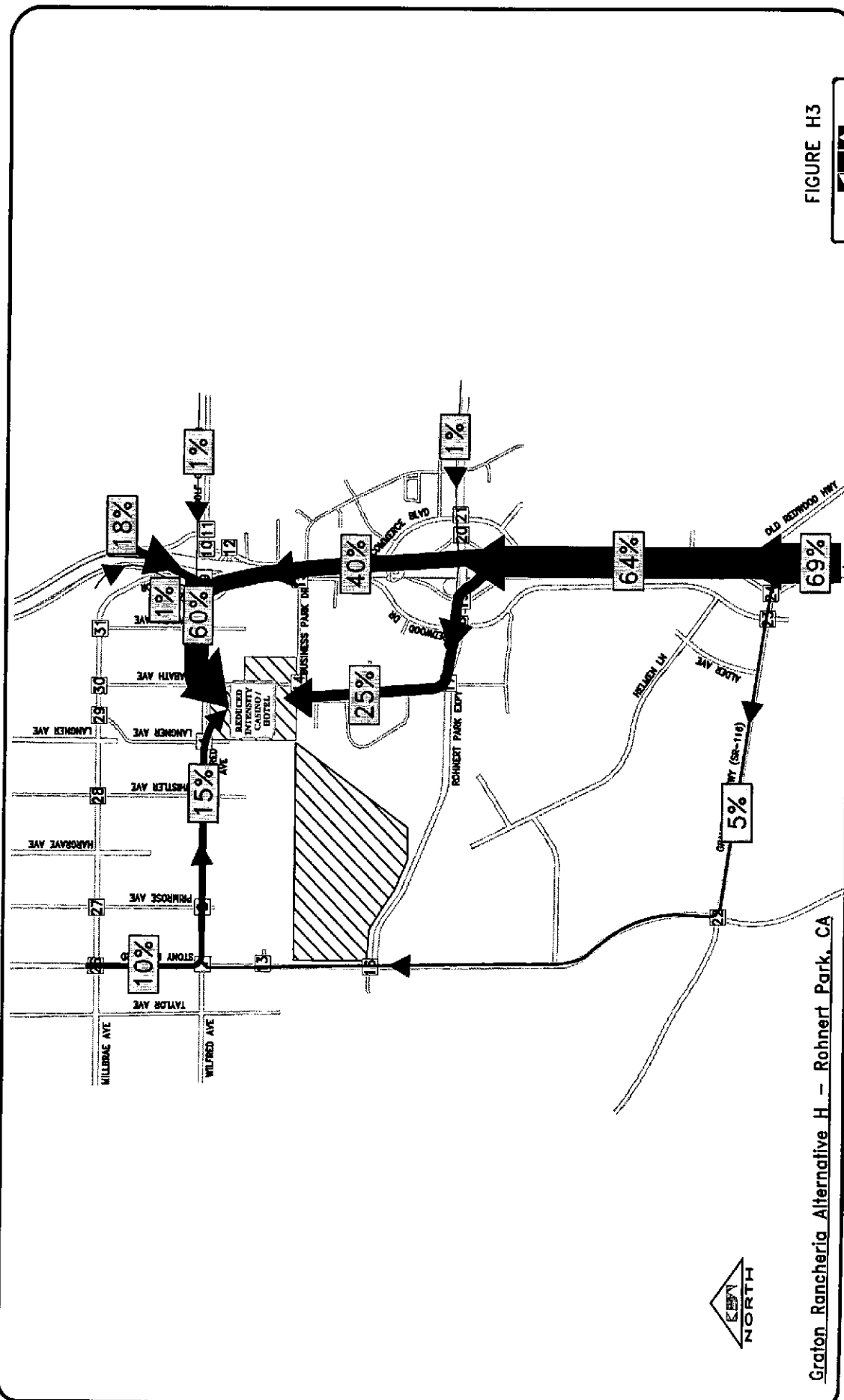
FIGURE H2



Graton Rancheria Alternative H - Rohnert Park, CA

SITE PLAN

FIGURE H3



Graton Rancheria Alternative H - Rohnert Park, CA

TRIP DISTRIBUTION - IN



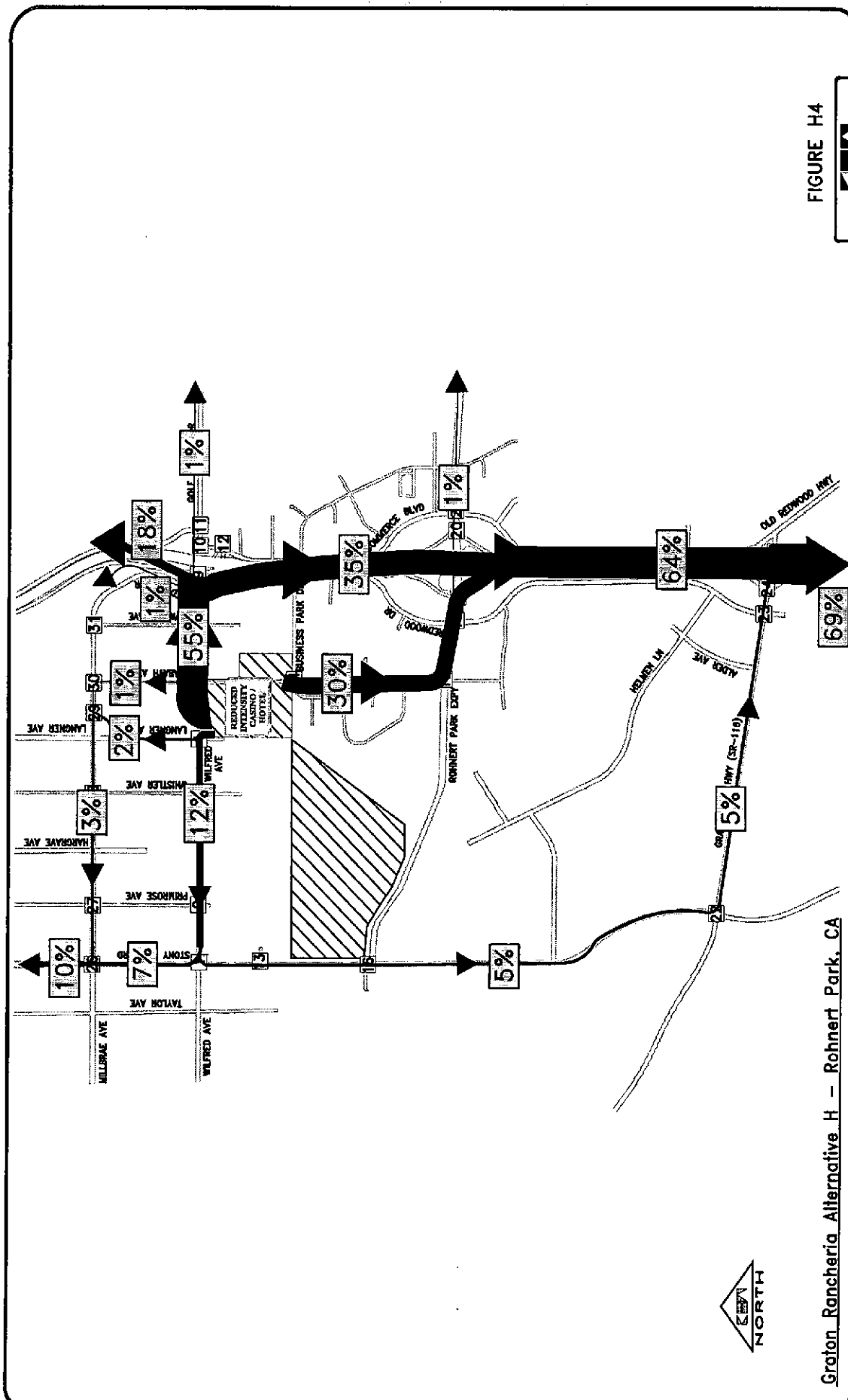


FIGURE H4



Graton Rancheria Alternative H - Rohnert Park, CA

TRIP DISTRIBUTION - OUT



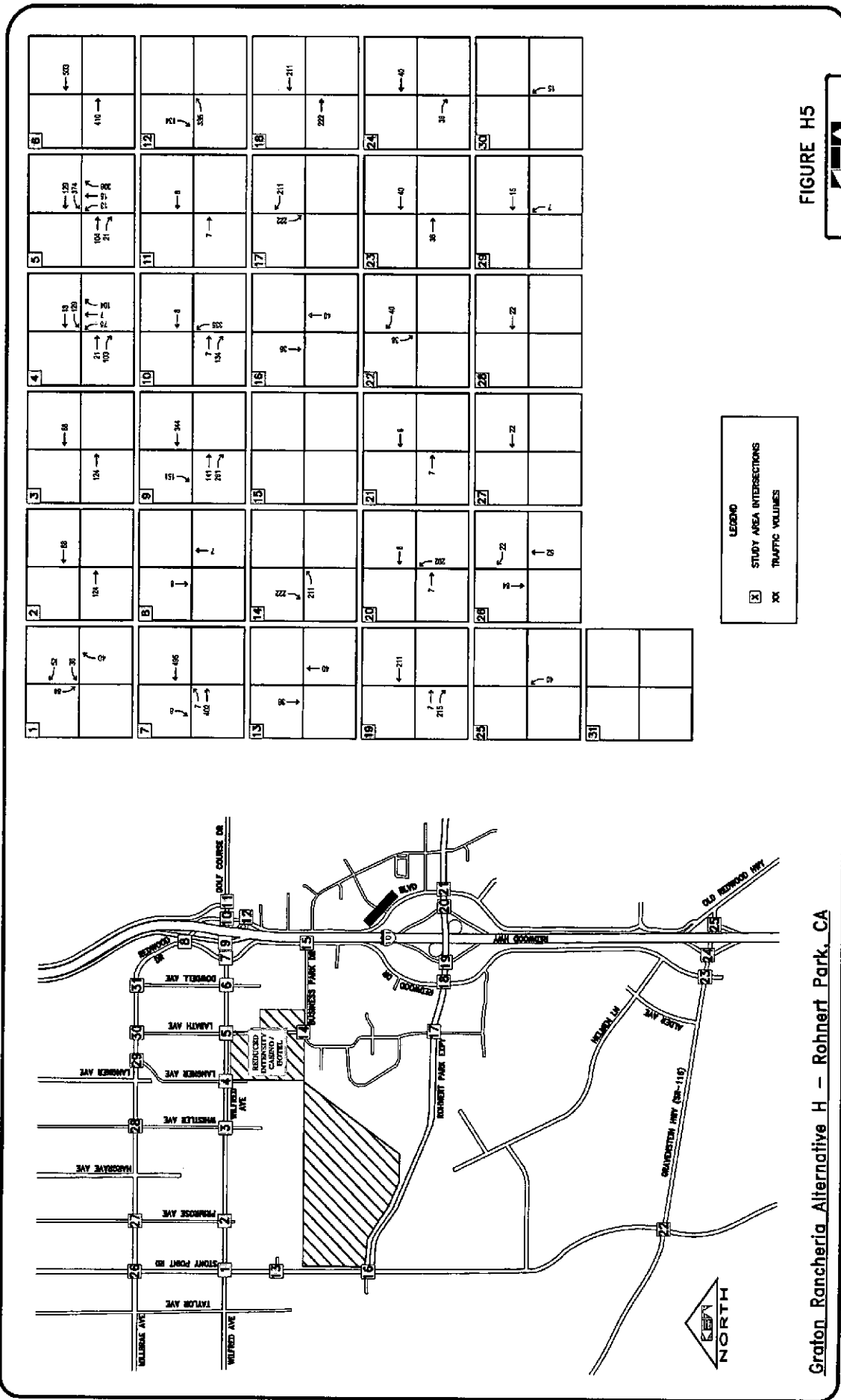


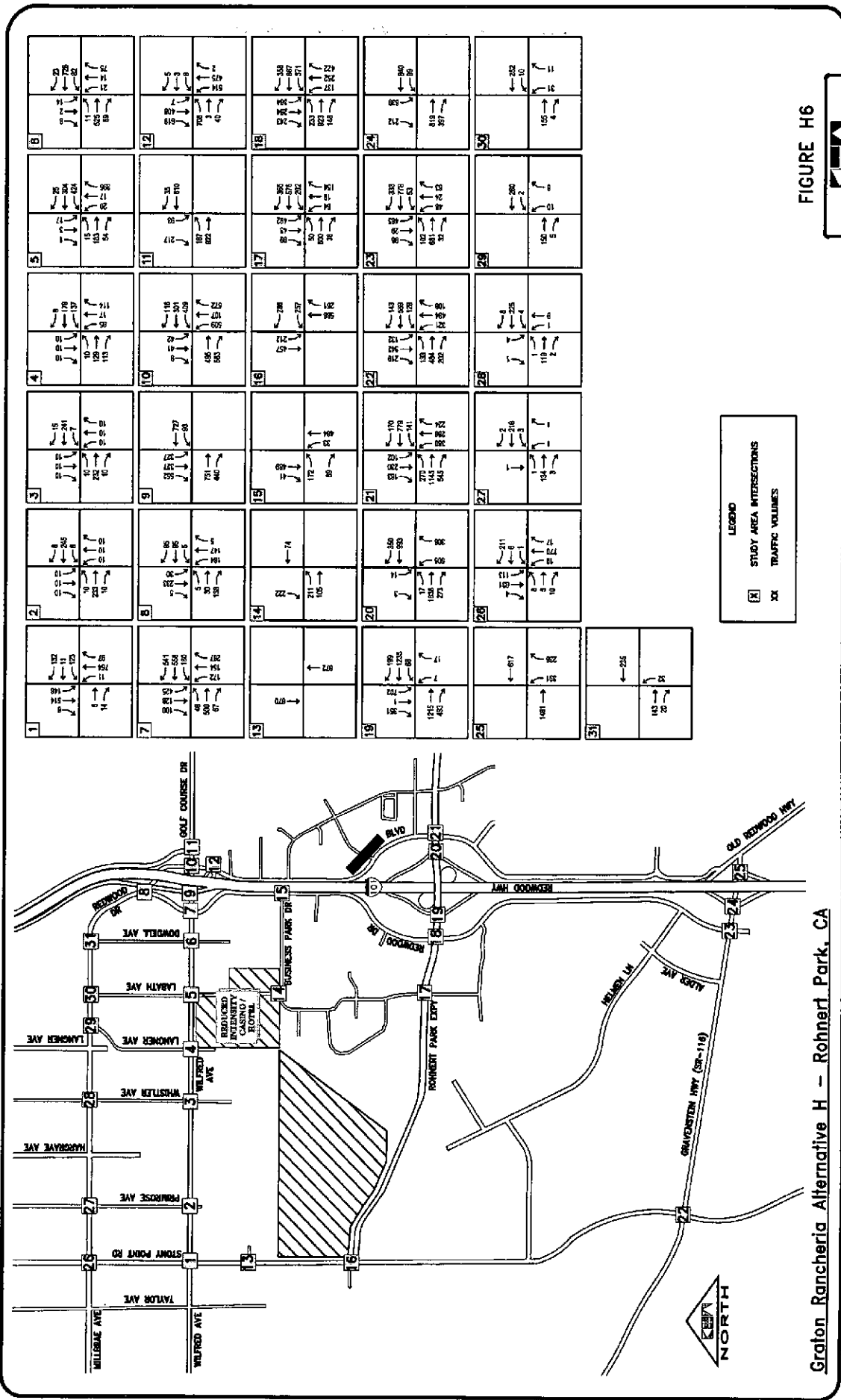
FIGURE H5

Raytheon and Associates, Inc.

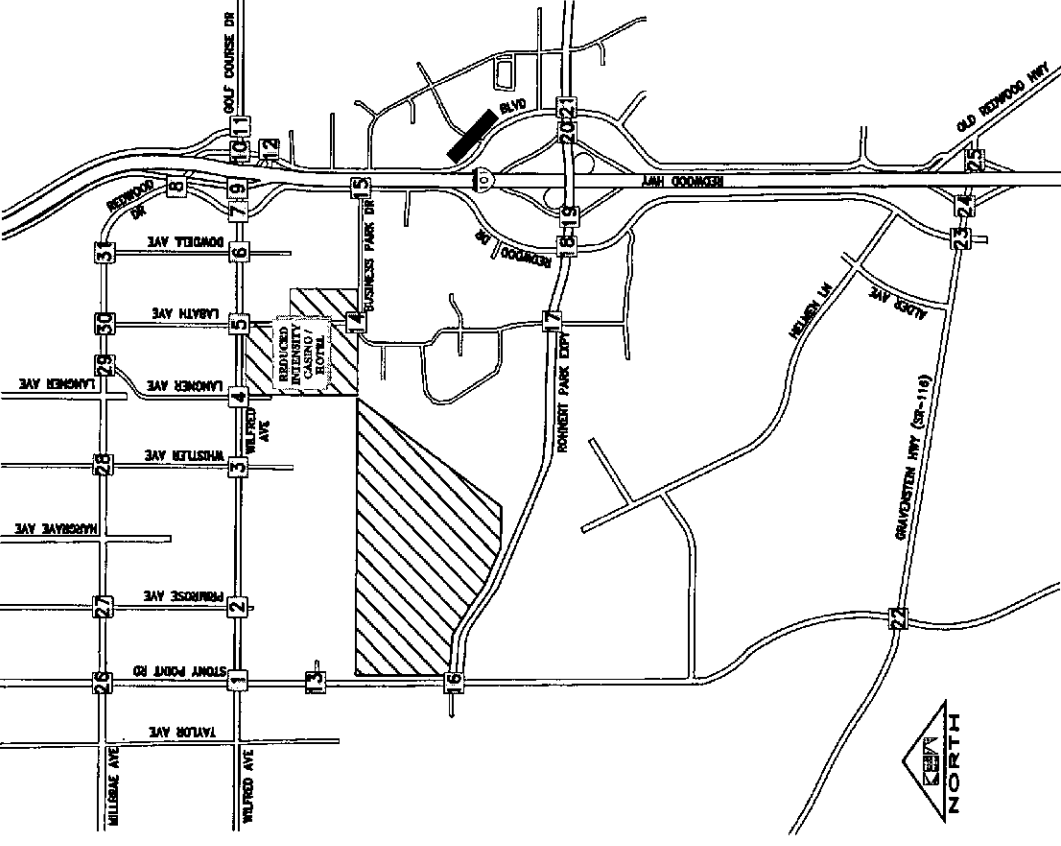
LEGEND  
 X STUDY AREA INTERSECTIONS  
 XX TRAFFIC VOLUMES

Graton Rancheria Alternative H - Rohnert Park, CA

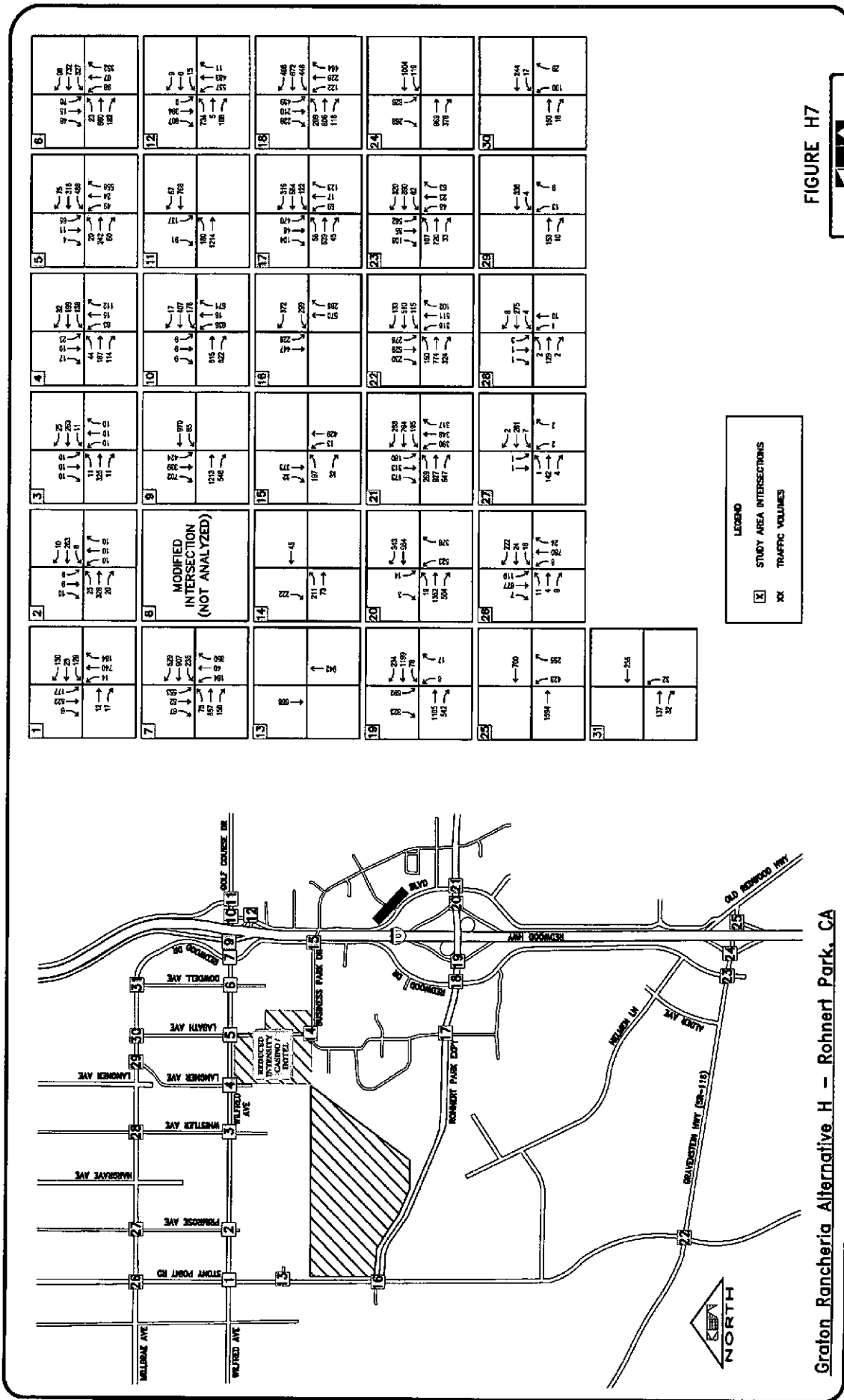
PROJECT GENERATED PM TRAFFIC VOLUMES



1	2	3	4	5	8
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					







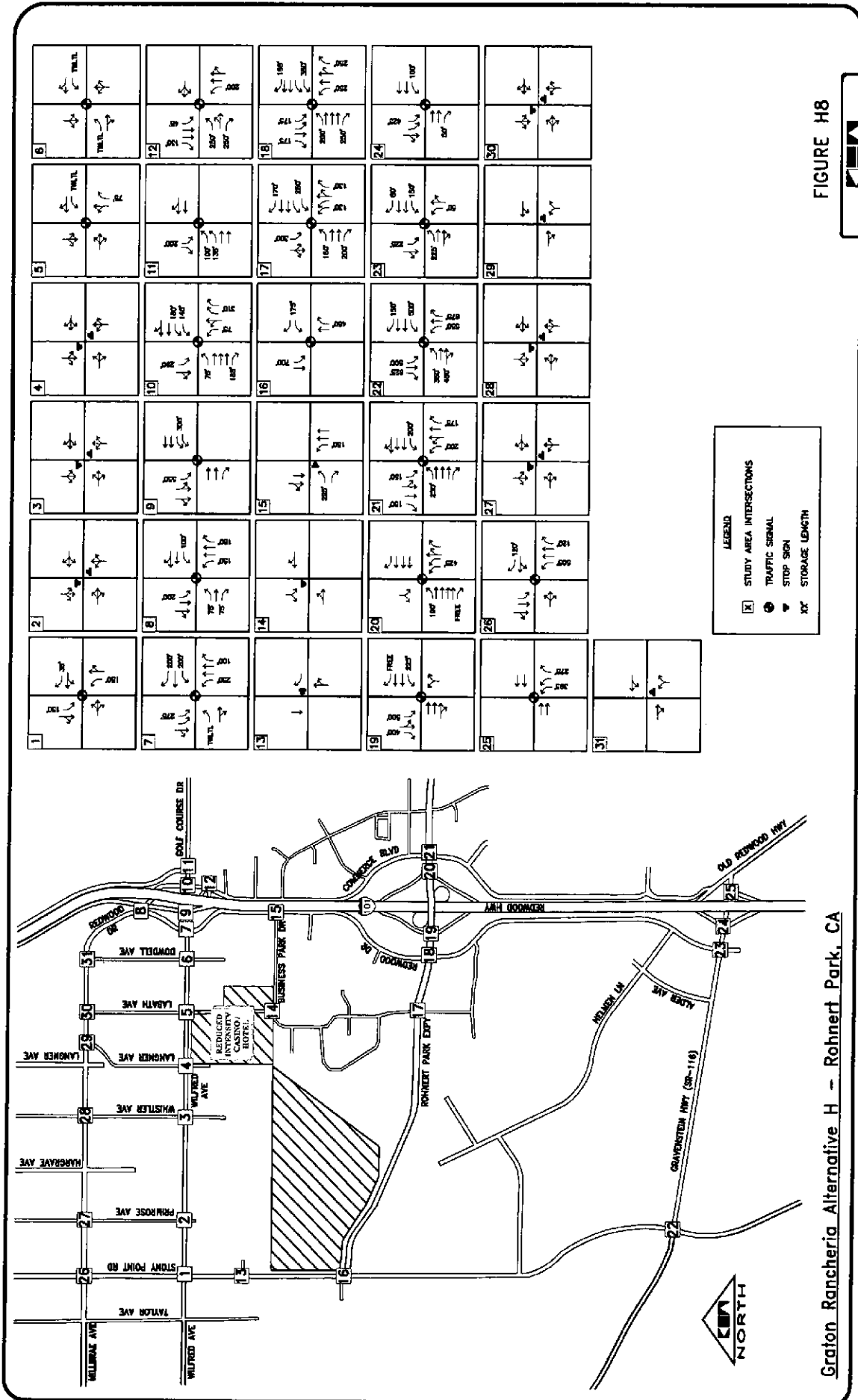


FIGURE H8

Hamby-Horne and Associates, Inc.

Graton Rancheria Alternative H - Rohnert Park, CA

NEAR-TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

LEGEND

- [X] STUDY AREA INTERSECTIONS
- ⊙ TRAFFIC SIGNAL
- ▼ STOP SIGN
- XY STORAGE LENGTH



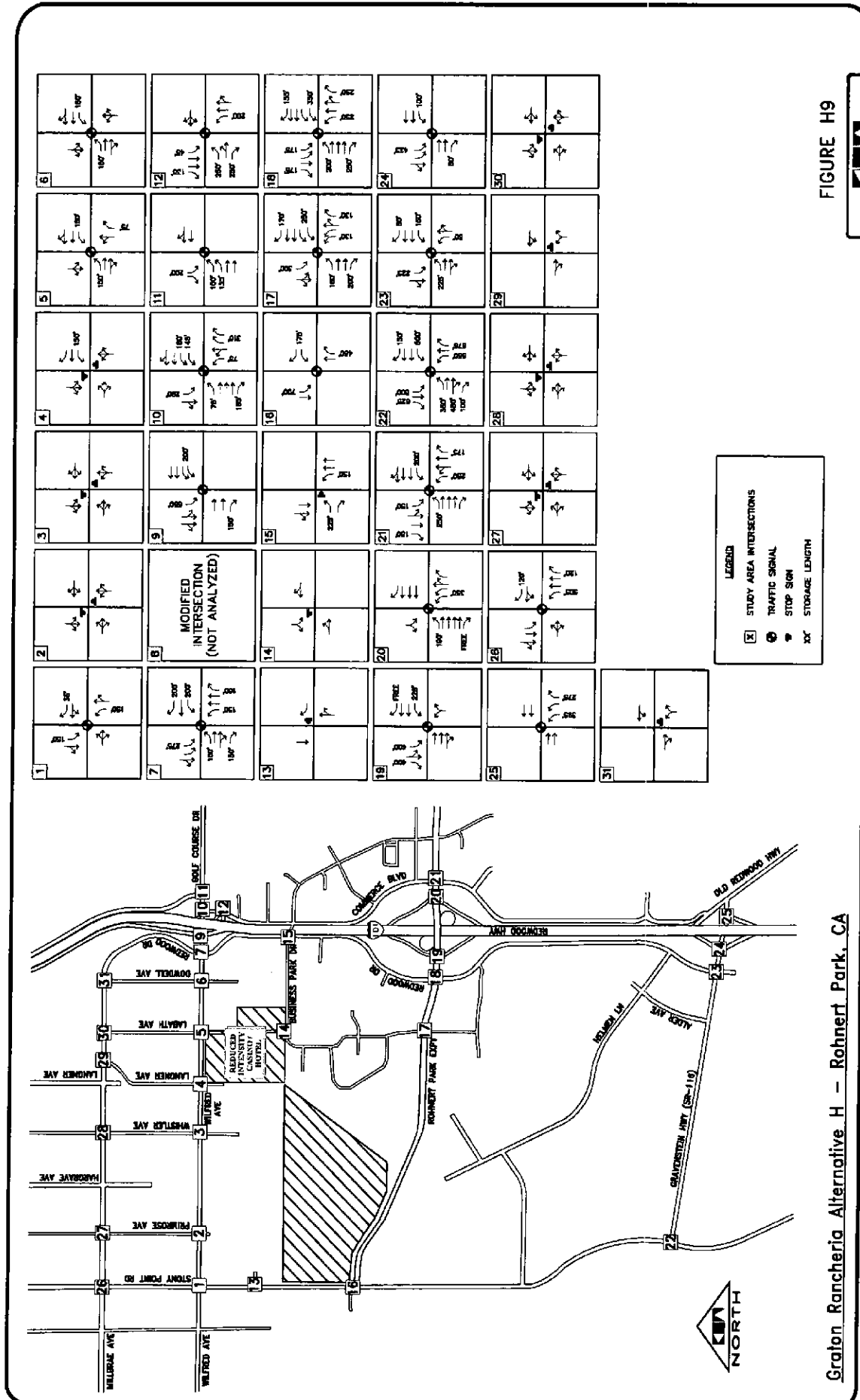


FIGURE H9

Graton Rancheria Alternative H - Rohnert Park, CA

LONG TERM MITIGATED LANE GEOMETRY AND TRAFFIC CONTROL

Unity-Horn and Associates, Inc.

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## **APPENDIX**

## **APPENDIX**

TURNING MOVEMENT VOLUMES

EXISTING CONDITIONS

NEAR-TERM 2008 NO ACTION TRAFFIC CONDITIONS

CUMULATIVE 2020 NO ACTION TRAFFIC CONDITIONS

TRIP GENERATION – ALTERNATIVES A, B & C

TRIP GENERATION – ALTERNATIVE D & H

TRIP GENERATION – ALTERNATIVE E

NEAR TERM 2008 + ALTERNATIVE A TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE A TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE B TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE B TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE C TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE C TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE D TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE D TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE E TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE E TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE H TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE H TRAFFIC CONDITIONS

SIGNAL WARRANT ANALYSIS – NO BUILD

SIGNAL WARRANT ANALYSIS – ALTERNATIVE A

SIGNAL WARRANT ANALYSIS – ALTERNATIVE B

SIGNAL WARRANT ANALYSIS – ALTERNATIVE C

SIGNAL WARRANT ANALYSIS – ALTERNATIVE D

SIGNAL WARRANT ANALYSIS – ALTERNATIVE E

SIGNAL WARRANT ANALYSIS – ALTERNATIVE H

NEAR TERM 2008 + ALTERNATIVE A MITIGATED TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE A MITIGATED TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE B MITIGATED TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE B MITIGATED TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE C MITIGATED TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE C MITIGATED TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE D MITIGATED TRAFFIC CONDITIONS

CUMULATIVE 2020 + ALTERNATIVE D MITIGATED TRAFFIC CONDITIONS

NEAR TERM 2008 + ALTERNATIVE E MITIGATED TRAFFIC CONDITIONS  
CUMULATIVE 2020 + ALTERNATIVE E MITIGATED TRAFFIC CONDITIONS  
NEAR TERM 2008 + ALTERNATIVE H MITIGATED TRAFFIC CONDITIONS  
CUMULATIVE 2020 + ALTERNATIVE H MITIGATED TRAFFIC CONDITIONS

## **TURNING MOVEMENT VOLUMES**



All Traffic Data

5098 Foothills Blvd, 3-302  
 Roseville, CA. 95678  
 (916) 771-8700

Site Code : 00000000  
 Start Date: 08/24/05  
 File I.D. : R16  
 Page : 1

CITY OF ROHNERT PARK

Start Time	STONY POINT ROAD Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	
7:00am	25	66	0	89	34	0	19	53	0	47	23	70	0	0	0	0	212
7:15	33	88	0	121	22	0	33	55	0	59	25	84	0	0	0	0	260
7:30	50	113	0	163	18	0	30	48	0	72	24	96	0	0	0	0	307
7:45	49	103	0	152	18	0	34	52	0	65	37	102	0	0	0	0	306
Hour Total	157	368	0	525	92	0	116	208	0	243	109	352	0	0	0	0	1065
8:00am	32	78	0	110	26	0	34	60	0	61	23	84	0	0	0	0	254
8:15	54	62	0	116	16	0	27	43	0	77	44	121	0	0	0	0	280
8:30	43	71	0	114	16	0	24	40	0	59	45	104	0	0	0	0	250
8:45	35	61	0	96	16	0	34	50	0	47	45	92	0	0	0	0	238
Hour Total	164	272	0	436	74	0	119	193	0	244	157	401	0	0	0	0	1030
Grand	321	640	0	961	166	0	235	401	0	487	266	753	0	0	0	0	2115
% of Total	15.2%	30.3%	0.0%		7.8%	0.0%	11.1%		0.0%	23.0%	12.6%		0.0%	0.0%	0.0%		
Approch %				45.4%				19.0%				35.5%					
% of Approch	33.4%	66.6%	0.0%		42.4%	0.0%	58.6%		0.0%	64.7%	35.3%		0.0%	0.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 08/24/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages			
				Left	Thru	Rght	Total	Left	Thru	Rght	Total
Southbound	STONY POINT ROAD	07:30am	.830	185	356	0	541	34.1	65.8	.0	.0
Westbound	ROHNERT PARK EXPRESSWAY		.646	78	0	125	203	38.4	.0	61.6	.0
Northbound			.533	0	275	128	403	.0	68.2	31.7	.0
Eastbound			.0	0	0	0	0	0.0	0.0	0.0	0.0

CITY OF ROHNERT PARK

All Traffic Data  
5098 Foothills Blvd. 3-302  
Roseville, CA. 95678  
(916)771-8700

Site Code : 00000000  
Start Date: 08/24/05  
File I.D. : R16  
Page : 2

STONY POINT ROAD		
0	356	185
		0
		275
		125
		====
		400
	Inbound	541
	Outbound	400
	Total	941
		125
0	0	0
0	0	0
		0
		0

	Inbound	0	
	Outbound	0	
0	Total	0	
			Inbound 203
			Outbound 313 78
			Total 516
			185
			0 313
			128

ROHNERT PARK EXPRESSWAY		
	Inbound	403
	Outbound	434
	Total	837
	78	0 275
	356	128
	0	
	====	
	434	

All Traffic Data  
 509B Foothills Blvd. 3-302  
 Roseville, CA. 95678  
 (916)771-8700

CITY OF ROHNERT PARK

Site Code : 0000000  
 Start Date: 08/24/05  
 File I.D. : R16  
 Page : 1

Start Time	STONY POINT ROAD Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	45	80	0	125	72	0	78	150	0	130	49	179	0	0	0	0	454
4:15	47	76	0	123	76	0	70	146	0	129	65	194	0	0	0	0	463
4:30	61	99	0	160	77	0	85	162	0	129	61	190	0	0	0	0	512
4:45	48	80	0	128	71	0	78	149	0	124	65	189	0	0	0	0	466
Hour Total	201	335	0	536	296	0	311	607	0	512	240	752	0	0	0	0	1895
5:00pm	40	85	0	125	65	0	86	151	0	141	60	201	0	0	0	0	487
5:15	63	89	0	152	74	0	66	140	0	117	50	167	0	0	0	0	459
5:30	64	78	0	142	58	0	58	116	0	125	56	181	0	0	0	0	439
5:45	44	56	0	100	64	0	51	115	0	107	51	160	0	0	0	0	375
Hour Total	219	309	0	527	261	0	263	524	0	490	219	709	0	0	0	0	1760
Grand	420	643	0	1063	557	0	574	1131	0	1002	459	1461	0	0	0	0	3655
% of Total	11.5%	17.6%	0.0%	29.1%	15.2%	0.0%	15.7%	30.9%	0.0%	27.4%	12.6%	40.0%	0.0%	0.0%	0.0%		
Approch %	39.5%	60.5%	0.0%	49.2%	0.0%	50.0%	0.0%	63.6%	31.4%	0.0%	0.0%	0.0%					

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 08/24/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages			
				Left	Thru	Right	Total	Left	Thru	Right	Total
Southbound	STONY POINT ROAD	04:15pm	.850	204	340	0	544	37.5	62.5	.0	.0
Westbound	ROHNERT PARK EXPRESSWAY		.941	289	0	321	610	47.3	.0	52.6	.0
Northbound			.963	0	523	251	774	.0	67.5	32.4	.0
Eastbound			.0	0	0	0	0	0.0	0.0	0.0	0.0

All Traffic Data  
5098 Foothills Blvd. 3-302  
Roseville, CA. 95678  
(916) 771-8700

Site Code : 00000000  
Start Date: 08/24/05  
File I.D. : R16  
Page : 2

CITY OF ROHNERT PARK

STONY POINT ROAD

0	340	204	0
			523
			321
			====
			844
Inbound			544
Outbound			844
Total			1388

0	0
0	0
0	0
====	
0	0

Inbound	0
Outbound	0
Total	0

0
---

Inbound	774
Outbound	629
Total	1403

289	0	523
340		
0		
====		
629		

321
-----

Inbound	610	
Outbound	455	289
Total	1065	

204	
0	455
251	

ROHNERT PARK EXPRESSWAY

251
-----

Start Time	REDWOOD DRIVE Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	22	10	1	33	31	87	22	140	11	5	36	52	7	51	4	62	287
7:15	27	12	9	48	33	87	34	154	16	14	36	66	12	62	17	91	359
7:30	29	15	17	61	52	109	28	189	5	5	57	67	15	81	6	102	419
7:45	18	20	14	52	68	126	51	245	14	12	43	69	8	116	10	134	500
Hour Total	96	57	41	194	184	409	135	728	46	36	172	254	42	310	37	389	1565
8:00am	33	18	17	68	57	126	36	221	11	15	32	58	10	85	20	115	462
8:15	31	18	16	65	56	109	33	198	18	15	32	65	13	101	19	133	461
8:30	37	18	17	72	47	104	33	184	17	17	38	72	12	109	17	138	466
8:45	44	21	17	82	71	125	56	252	14	17	47	78	21	92	12	125	537
Hour Total	145	75	67	287	231	464	160	855	60	64	149	273	56	387	68	511	1926
Grand	241	132	108	481	415	873	295	1583	106	100	321	527	98	697	105	900	3491
% of Total	6.9%	3.8%	3.1%		11.9%	25.0%	8.5%		3.0%	2.9%	9.2%		2.8%	20.0%	3.0%		
Approach %				13.8%				45.3%				15.1%					25.8%
% of Approach	50.1%	27.4%	22.5%		26.2%	55.1%	10.6%		20.1%	19.0%	60.9%		10.9%	77.4%	11.7%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	08:00am	.875	145	75	67	287	50.5	26.1	23.3
Westbound	ROHNERT PARK EXPRESSWAY		.848	231	464	160	855	27.0	54.2	18.7
Northbound			.875	60	64	149	273	21.9	23.4	54.5
Eastbound			.926	56	387	68	511	10.9	75.7	13.3

REDWOOD DRIVE

67	75	145	
			56
			64
			160
			====
			280
	Inbound	287	
	Outbound	280	
	Total	567	

	160
--	-----

	60
591	464
	67
-----	
	56

	464
--	-----

	Inbound	511
-----	Outbound	591
387	Total	1102

	Inbound	855
-----	Outbound	681
231	Total	1536

	68
--	----

	145
	387
	681
	149

	Inbound	273
	Outbound	374
	Total	647

ROHNERT PARK EXPRESSWAY

231	60	64
75		
68		
====		
374		

	149
--	-----

Start Time	REDWOOD DRIVE Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	97	39	66	202	80	145	83	308	18	35	79	132	55	199	21	275	917
4:15	102	55	60	217	67	142	77	286	22	42	87	151	52	213	34	299	953
4:30	100	48	54	202	79	141	104	324	24	37	98	159	41	179	29	249	934
4:45	109	48	61	218	71	145	88	304	23	36	77	136	52	152	21	225	883
Hour Total	408	190	241	839	297	573	352	1222	87	150	341	578	200	743	105	1048	3687
5:00pm	121	54	57	232	100	135	92	327	20	42	78	140	58	204	29	291	990
5:15	110	64	74	248	73	147	79	299	20	38	77	135	47	157	21	225	907
5:30	112	56	71	239	86	133	92	311	18	25	64	107	45	165	20	230	887
5:45	92	73	69	234	93	154	93	340	23	37	76	130	64	145	18	227	931
Hour Total	435	247	271	953	352	569	356	1277	81	136	295	512	214	671	88	973	3715
Grand	843	437	512	1792	649	1142	708	2499	168	286	636	1090	414	1414	193	2021	7402
% of Total	11.4%	5.9%	6.9%		8.8%	15.4%	9.6%		2.3%	3.9%	8.6%		5.6%	19.1%	2.6%		
Approch %				24.2%				33.8%				14.7%					27.3%
% of Approch	47.0%	24.4%	28.6%		26.0%	45.7%	28.3%		15.4%	26.2%	58.3%		20.5%	70.0%	9.5%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	04:15pm	.936	432	205	232	869	49.7	23.5	26.6
Westbound	ROHNERT PARK EXPRESSWAY		.949	317	563	361	1241	25.5	45.3	29.0
Northbound			.921	89	157	340	586	15.1	26.7	58.0
Eastbound			.890	203	748	113	1064	19.0	70.3	10.6

REDWOOD DRIVE

232	205	432	203
			157
			361
			====
			721
	Inbound	869	
	Outbound	721	
	Total	1590	

361

	89
884	563
	232

203

563

	Inbound	1064
	Outbound	884
748	Total	1948

113

Inbound	1241	
Outbound	1520	317
Total	2761	

432	
748	1520
340	

Inbound	586
Outbound	635
Total	1221

ROHNERT PARK EXPRESSWAY

317	89	157
205		
113		
====		
635		

340



Start Time	LABATH AVENUE Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	16	1	2	13	7	43	25	75	5	4	18	27	14	38	6	58	173
7:15	14	1	3	18	3	36	40	79	3	6	9	18	12	54	11	77	192
7:30	15	1	7	23	10	58	27	95	4	4	5	13	14	64	7	85	216
7:45	22	5	5	32	4	37	57	98	6	15	12	33	25	80	8	113	276
Hour Total	61	8	17	86	24	174	149	347	18	29	44	91	65	236	32	333	857
8:00am	26	5	2	33	13	51	49	113	4	11	9	24	25	66	7	98	268
8:15	32	3	6	41	17	40	45	102	7	8	12	27	20	62	3	85	255
8:30	19	5	8	32	20	32	40	92	2	6	22	30	11	67	11	89	243
8:45	17	10	5	32	26	37	34	97	4	7	21	32	10	67	7	84	245
Hour Total	94	23	21	138	76	160	168	404	17	32	64	113	66	262	28	356	1011
Grand	155	31	38	224	100	334	317	751	35	61	108	204	131	498	60	689	1868
% of Total	8.3%	1.7%	2.0%		5.4%	17.9%	17.0%		1.9%	3.3%	5.8%		7.0%	26.7%	3.2%		
Approch %				12.0%				40.2%				10.9%				36.9%	
% of Approch	69.2%	13.8%	17.0%		13.3%	44.5%	42.2%		17.2%	29.9%	52.9%		19.0%	72.3%	8.7%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	LABATH AVENUE	07:45am	.841	99	18	21	138	71.7	13.0	15.2
Westbound	ROHNERT PARK EXPRESSWAY		.896	54	160	191	405	13.3	39.5	47.1
Northbound			.864	19	40	55	114	16.6	35.0	48.2
Eastbound			.852	8	275	29	385	2.0	71.4	7.5

LABATH AVENUE

21	18	99	81
			40
			191
			=====
			312
	Inbound	138	
	Outbound	312	
	Total	450	

	19
200	160
	21
=====	
	81

	191
=====	
	160

	Inbound	385
	Outbound	200
275	Total	585

	Inbound	405
	Outbound	429
	Total	834

	29
--	----

	99
	275
	429
	55

	Inbound	114
	Outbound	101
	Total	215

ROHNERT PARK EXPRESSWAY

54	19	40
18		
29		
=====		
101		

55

Start Time	LABATH AVENUE Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	62	9	25	96	30	106	13	149	14	3	26	43	6	118	6	130	418
4:15	45	8	23	76	21	120	14	155	17	3	46	66	14	149	7	170	467
4:30	72	12	30	114	30	120	10	160	15	6	26	47	6	107	13	126	447
4:45	41	8	14	63	41	121	12	174	17	4	19	40	7	117	10	134	411
Hour Total	220	37	92	349	122	467	49	638	63	16	117	196	33	491	36	560	1743
5:00pm	78	17	34	129	24	129	15	168	12	0	32	44	9	156	14	181	522
5:15	37	7	11	55	24	105	11	140	16	3	22	41	5	105	10	120	356
5:30	25	11	11	47	25	124	5	154	10	3	17	30	1	118	22	141	372
5:45	22	4	7	33	35	136	7	178	24	4	27	55	5	138	18	161	427
Hour Total	162	39	63	264	108	494	38	640	62	10	98	170	20	519	64	603	1677
Grand	382	76	155	613	230	961	87	1278	125	26	215	366	53	1010	100	1163	3420
% of Total	11.2%	2.2%	4.5%		6.7%	28.1%	2.5%		3.7%	.8%	6.3%		1.5%	29.5%	2.9%		
Approch %				17.9%				37.4%				10.7%					34.0%
% of Approch	62.3%	12.4%	25.3%		18.0%	75.2%	6.8%		34.2%	7.1%	58.7%		4.6%	86.8%	8.6%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	LABATH AVENUE	04:15pm	.740	236	45	101	382	61.7	11.7	26.4
Westbound	ROHNERT PARK EXPRESSWAY		.944	116	480	51	647	17.6	74.5	7.7
Northbound			.746	61	13	122	197	30.9	6.5	62.4
Eastbound			.844	36	531	44	611	5.8	86.9	7.2

LABATH AVENUE

101 | 45 | 236

36

13

51

=====  
100

Inbound 382

Outbound 100

Total 482

51

61  
652 490  
101

36

490

Inbound 611  
Outbound 652  
531 Total 1263

Inbound 657  
Outbound 890 116  
Total 1547

44

236  
531 890  
123

ROHNERT PARK EXPRESSWAY

Inbound 197

Outbound 205

Total 402

116 | 61 | 13

45 | | 123

44 | |

=====  
205

Start Time	SR 101 NB RAMPS/PARK AND ROHNERT PARK EXPRESSWAY				SR 101 NB RAMPS				SR 101 NB RAMPS				SR 101 NB RAMPS				
	Southbound		Westbound		Northbound		Northbound		Northbound		Northbound		Eastbound		Eastbound		
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
7:00am	0	0	1	1	0	100	45	145	37	1	43	81	2	87	33	122	349
7:15	0	0	0	0	0	129	39	168	41	0	35	76	2	158	55	215	459
7:30	2	0	1	3	0	145	48	193	37	0	48	85	1	197	59	257	538
7:45	0	0	0	0	0	160	41	201	57	1	91	149	2	241	49	292	642
Hour Total	2	0	2	4	0	534	173	707	172	2	217	391	7	683	196	886	1908
8:00am	2	0	0	2	0	185	31	216	51	0	62	113	0	163	48	213	544
8:15	0	0	1	1	0	149	39	188	43	2	58	103	0	185	41	226	518
8:30	0	0	0	0	0	151	49	200	39	1	61	101	1	196	49	246	547
8:45	0	0	0	0	0	145	47	192	55	0	89	144	1	202	51	254	590
Hour Total	2	0	1	3	0	630	166	796	188	3	270	461	2	748	189	939	2199
Grand	4	0	3	7	0	1164	339	1503	360	5	487	852	9	1431	385	1825	4187
% of Total	.1%	0.0%	.1%		0.0%	27.8%	8.1%		8.6%	.1%	11.6%		.2%	34.2%	9.2%		
Approch %				.2%				35.9%				20.3%					43.6%
% of Approch	57.1%	0.0%	42.9%		0.0%	77.4%	22.6%		42.3%	.6%	57.2%		.5%	78.4%	21.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 NB RAMPS/PARK AN	07:45am	.375	2	0	1	3	66.6	.0	33.3
Westbound	ROHNERT PARK EXPRESSWAY		.932	0	645	160	805	.0	80.1	19.8
Northbound	SR 101 NB RAMPS		.782	190	4	272	466	40.7	.8	58.3
Eastbound			.836	3	787	187	977	.3	80.5	19.1

SR 101 NB RAMPS/PARK AND RIDE

1	0	2	3
			4
			160
			=====
			167
	Inbound	3	
	Outbound	167	
	Total	170	

	190
836	645
	1
=====	
	3

	160
=====	
	645

	Inbound	977
	Outbound	836
787	Total	1813

	Inbound	805
	Outbound	1061
	Total	1866

	187
--	-----

	2
787	1061
272	

	Inbound	466
	Outbound	187
	Total	653

ROHNERT PARK EXPRESSWAY

0	190	4	272
0			
187			
=====			
187			
SR 101 NB RAMPS			

Start Time	SR 101 NB RAMPS/PARK AND ROHNERT PARK EXPRESSWAY				SR 101 NB RAMPS				SR 101 NB RAMPS				SR 101 NB RAMPS				
	Southbound		Westbound		Northbound		Northbound		Northbound		Eastbound		Eastbound		Eastbound		
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
4:00pm	3	0	1	4	0	192	52	244	42	0	79	121	5	355	67	427	796
4:15	2	0	2	4	0	252	82	334	64	0	60	124	5	391	64	460	922
4:30	0	0	1	1	0	262	73	335	74	0	79	153	3	387	67	457	946
4:45	7	0	0	7	0	260	64	324	56	0	74	130	4	398	51	453	914
Hour Total	12	0	4	16	0	966	271	1237	236	0	292	528	17	1531	249	1797	3578
5:00pm	5	0	0	5	0	211	96	307	68	0	49	117	3	481	65	549	978
5:15	6	0	2	8	0	205	88	293	57	0	61	118	5	402	76	483	902
5:30	5	0	0	5	0	225	73	298	65	1	63	129	6	364	75	445	877
5:45	2	0	0	2	0	210	53	263	73	1	69	143	4	356	42	402	810
Hour Total	18	0	2	20	0	851	310	1161	263	2	242	507	18	1603	258	1879	3567
Grand	30	0	6	36	0	1817	581	2398	499	2	534	1035	35	3134	507	3676	7145
% of Total	.4%	0.0%	.1%		0.0%	25.4%	8.1%		7.0%	0.0%	7.5%		.5%	43.9%	7.1%		
Approach %				.5%				33.6%				14.5%					51.4%
% of Approach	83.3%	0.0%	16.7%		0.0%	75.8%	24.2%		48.2%	.2%	51.6%		1.0%	85.3%	13.8%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 NB RAMPS/PARK AN	04:15pm	.607	14	0	3	17	82.3	.0	17.6
Westbound	ROHNERT PARK EXPRESSWAY		.970	0	985	315	1300	.0	75.7	24.2
Northbound	SR 101 NB RAMPS		.856	262	0	262	524	50.0	.0	50.0
Eastbound			.874	15	1657	247	1919	.7	86.3	12.8

SR 101 NB RAMPS/PARK AND RIDE

3	0	14	15
			0
			315
			=====
			330
	Inbound		17
	Outbound		330
	Total		347

315

	262
1250	985
	3

15

985

	Inbound	1919
	Outbound	1250
1657	Total	3169

247

	Inbound	1300	
	Outbound	1933	0
	Total	3233	

	14
1657	1933
262	

	Inbound	524
	Outbound	247
	Total	771

ROHNERT PARK EXPRESSWAY

	0	262	0	262
	0			
	247			
	=====			
	247			
	SR 101 NB RAMPS			



Start Time	COMMERCE BLVD. Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
7:00am	4	9	11	24	6	96	6	108	38	37	11	86	21	75	34	130
7:15	6	10	13	29	10	115	16	149	40	41	6	87	32	112	48	192
7:30	11	14	27	52	14	113	31	158	53	56	24	133	34	178	36	248
7:45	9	22	15	46	19	130	13	162	56	56	16	128	79	214	39	332
Hour Total	30	55	66	151	57	454	66	577	187	190	57	434	166	579	157	902
8:00am	11	13	28	52	19	148	14	181	40	50	17	107	42	156	31	229
8:15	11	17	22	50	13	118	21	152	48	55	18	121	48	137	58	243
8:30	19	15	23	57	6	123	22	151	54	40	11	105	43	155	59	257
8:45	8	20	25	53	17	114	26	157	53	41	18	112	51	169	71	291
Hour Total	49	65	98	212	55	503	83	641	195	186	64	445	184	617	219	1020
Grand	79	120	164	363	112	957	149	1218	382	376	121	879	350	1196	376	1922
% of Total	1.8%	2.7%	3.7%		2.6%	21.8%	3.4%		8.7%	8.6%	2.8%		8.0%	27.3%	8.6%	
Approach %				8.3%				27.8%				20.1%				43.9%
% of Approach	21.8%	33.1%	45.2%		9.2%	78.6%	12.2%		43.5%	42.8%	13.8%		18.2%	62.2%	19.6%	

Peak Hour Analysis By Entire Intersection For the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	07:30am	.962	42	66	92	200	21.0	33.0	46.0
Westbound	ROHNERT PARK EXPRESSWAY		.902	65	509	79	653	9.9	77.9	12.0
Northbound			.919	197	217	75	489	40.2	44.3	15.3
Eastbound			.792	203	685	164	1052	19.2	65.1	15.5

COMMERCE BLVD.

92	66	42	203
			217
			79
			====
			499
Inbound		200	
Outbound		499	
Total		699	

197  
 798 509  
 92

203

Inbound 1052  
 Outbound 798  
 685 Total 1850

164

Inbound 489  
 Outbound 295  
 Total 784

65 197 217  
 66  
 164  
 =====  
 295

79
----

79

509

Inbound 653  
 Outbound 802 65  
 Total 1455

42  
 685 802  
 75

ROHNERT PARK EXPRESSWAY

75

Start Time	COMMERCE BLVD. Southbound				ROHNERT PARK EXPRESSWAY Westbound				Northbound				Eastbound				
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
4:00pm	24	67	31	122	30	133	27	190	80	83	52	215	66	247	124	437	964
4:15	21	53	44	118	19	197	44	260	93	71	48	212	52	270	131	453	1043
4:30	27	54	52	133	34	200	33	267	83	68	42	193	75	251	140	466	1059
4:45	29	62	33	124	31	197	34	262	94	69	59	222	61	291	127	479	1087
Hour Total	101	236	160	497	114	727	138	979	350	291	201	842	254	1059	522	1835	4153
5:00pm	25	61	28	114	33	172	29	234	107	67	54	228	80	308	144	532	1108
5:15	24	53	24	101	35	160	27	222	109	73	58	240	59	286	124	469	1032
5:30	37	36	34	107	25	158	21	204	106	96	71	273	49	266	117	432	1016
5:45	26	43	38	107	32	141	20	193	84	73	44	201	64	243	120	427	928
Hour Total	112	193	124	429	125	631	97	853	406	309	227	942	252	1103	505	1860	4084
Grand	213	429	284	926	239	1358	235	1832	756	600	428	1784	506	2162	1027	3695	8237
% of Total	2.6%	5.2%	3.4%		2.9%	16.5%	2.9%		9.2%	7.3%	5.2%		6.1%	26.2%	12.5%		
Approach %				11.2%				22.2%				21.7%				44.9%	
% of Approach	23.0%	46.3%	30.7%		13.0%	74.1%	12.8%		42.4%	33.6%	24.0%		13.7%	58.5%	27.8%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	04:15pm	.919	102	230	157	489	20.8	47.0	32.1
Westbound	ROHNERT PARK EXPRESSWAY		.958	117	766	140	1023	11.4	74.8	13.6
Northbound			.938	377	275	203	855	44.0	32.1	23.7
Eastbound			.907	268	1120	542	1930	13.8	58.0	28.0

COMMERCE BLVD.

157	230	102	268
			275
			140
			=====
			683

Inbound	489
Outbound	683
Total	1172

140

1300	377
	766
	157

268

766

Inbound	1930
Outbound	1300
Total	3230

542

Inbound	1023
Outbound	1425
Total	2448

102	
1120	1425
203	

Inbound	855
Outbound	889
Total	1744

ROHNERT PARK EXPRESSWAY

117	377	275
230		
542		
=====		
889		

203

Start Time	SR 101 SB RAMPS Southbound				ROHNERT PARK EXPRESSWAY Westbound				SR 101 SB RAMPS/PARK AND RIDE Northbound				Eastbound				
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	67	1	52	120	5	94	39	138	0	0	0	0	0	55	32	87	345
7:15	104	0	62	166	11	106	53	170	1	0	0	1	0	111	27	138	475
7:30	127	11	74	212	17	106	60	183	0	0	3	3	0	127	37	164	562
7:45	127	1	103	231	9	169	39	217	1	0	0	1	0	165	48	213	662
Hour Total	425	13	291	729	42	475	191	708	2	0	3	5	0	458	144	602	2044
8:00am	92	3	71	156	20	146	70	236	0	0	2	2	0	129	32	161	555
8:15	102	0	73	175	14	140	39	193	0	0	2	2	0	122	45	167	537
8:30	115	0	66	181	14	127	49	190	0	0	0	0	0	131	46	177	548
8:45	109	1	85	195	9	149	42	200	0	0	0	0	0	145	35	180	575
Hour Total	408	4	295	707	57	562	200	819	0	0	4	4	0	527	158	685	2215
Grand	833	17	586	1436	99	1037	391	1527	2	0	7	9	0	985	302	1287	4259
% of Total	19.6%	.4%	13.8%		2.3%	24.3%	9.2%		0.0%	0.0%	.2%		0.0%	23.1%	7.1%		
Approach %				33.7%				35.9%				.2%					30.2%
% of Approach	58.0%	1.2%	40.8%		6.5%	67.9%	25.6%		22.2%	0.0%	77.8%		0.0%	76.5%	23.5%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 SB RAMPS	07:30am	.836	438	15	321	774	56.5	1.9	41.4
Westbound	ROHNERT PARK EXPRESSWAY		.878	60	561	208	829	7.2	67.6	25.0
Northbound	SR 101 SB RAMPS/PARK AN		.667	1	6	7	8	12.5	.0	87.5
Eastbound			.827	0	543	162	705	.0	77.0	22.9

SR 101 SB RAMPS

321 | 15 | 438

0  
0  
208  
=====  
208

Inbound 774  
Outbound 208  
Total 982

208

883      1  
          561  
          321

0

561

Inbound 705  
Outbound 883  
543      Total 1588

Inbound 829  
Outbound 988      60  
Total 1817

162

438  
543      988  
7

Inbound 8  
Outbound 237  
Total 245

ROHNERT PARK EXPRESSWAY

60 | 1 | 0 | 7  
15 | | |  
162 | | |  
=====  
237 | | |

SR 101 SB RAMPS/PARK AND RIDE

Start Time	SR 101 SB RAMPS Southbound				ROHNERT PARK EXPRESSWAY Westbound				SR 101 SB RAMPS/PARK AND RIDE Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	162	1	73	236	19	182	34	235	0	0	0	0	0	265	80	345	816
4:15	163	0	79	242	13	250	47	318	1	0	3	4	0	294	67	361	925
4:30	184	0	102	286	18	254	55	327	0	0	0	0	0	273	68	341	964
4:45	150	0	65	215	13	251	52	316	0	0	11	11	0	292	65	357	899
Hour Total	659	1	319	979	63	985	188	1206	1	0	14	15	0	1124	280	1404	3604
5:00pm	195	1	73	269	24	210	45	279	5	0	3	6	0	351	65	416	972
5:15	188	0	74	262	12	204	48	264	0	0	2	2	0	293	63	356	884
5:30	161	0	86	247	17	229	44	290	2	0	10	12	0	274	72	346	895
5:45	150	0	80	230	20	227	36	283	3	0	5	8	0	247	57	304	825
Hour Total	694	1	313	1008	73	870	173	1116	10	0	20	30	0	1165	257	1422	3576
Grand	1353	2	632	1987	136	1825	361	2322	11	0	34	45	0	2289	537	2826	7180
% of Total	18.8%	0.0%	8.8%		1.9%	25.4%	5.0%		.2%	0.0%	.5%		0.0%	31.9%	7.5%		
Approch %			27.7%				32.3%					.6%				39.4%	
% of Approch	68.1%	.1%	31.8%		5.9%	78.6%	15.5%		24.4%	0.0%	75.6%		0.0%	81.0%	19.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages .....		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 SB RAMPS	04:15pm	.885	692	1	319	1012	68.3	.0	31.5
Westbound	ROHNERT PARK EXPRESSWAY		.927	68	983	199	1250	5.4	78.6	15.9
Northbound	SR 101 SB RAMPS/PARK AN		.523	6	0	17	23	26.0	.0	73.9
Eastbound			.886	0	1210	265	1475	.0	82.0	17.9

1308	6
983	
319	
<hr/>	
0	

SR 101	SB	RAMPS	
319	1	692	
<hr/>			
Inbound		1012	
Outbound		199	
Total		1211	

0  
0  
199  
=====  
199

199	
<hr/>	
983	

Inbound	1475
Outbound	1308
1210	Total 2783
<hr/>	
265	

Inbound	1250
Outbound	1919
68	Total 3169

692	
1210	1919
17	

68
1
265
===== 334

Inbound	23
Outbound	334
Total	357
6	0
6	0
17	

ROHNERT PARK EXPRESSWAY
17

SR 101 SB RAMPS/PARK AND RIDE



Start Time	REDWOOD DRIVE Southbound				GRAVENSTEIN HWY (SR 116) Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	29	8	7	44	15	96	42	153	4	1	11	16	12	86	6	104	317
7:15	21	2	9	32	9	106	49	164	9	1	19	29	11	117	5	133	358
7:30	39	4	4	47	4	101	58	163	8	7	12	27	13	121	9	143	380
7:45	43	6	10	59	8	120	66	194	9	9	11	29	20	134	5	159	441
Hour Total	132	20	30	182	36	423	215	674	30	18	53	101	56	458	25	539	1496
8:00am	40	8	8	56	9	109	64	182	3	3	15	21	10	106	9	125	304
8:15	44	7	10	61	5	109	51	165	7	7	11	25	14	112	10	136	387
8:30	31	3	9	43	11	98	41	150	6	5	11	22	12	125	6	143	358
8:45	22	3	14	39	11	110	44	165	3	3	9	15	14	130	7	151	370
Hour Total	137	21	41	199	36	426	200	662	19	18	46	83	50	473	32	555	1499
Grand	269	41	71	381	72	849	415	1336	49	36	99	184	106	931	57	1094	2995
% of Total	9.6%	1.4%	2.4%		2.4%	28.3%	13.9%		1.6%	1.2%	3.3%		3.5%	31.1%	1.9%		
Approach %				12.7%				44.6%				6.1%					36.5%
% of Approach	70.6%	10.8%	18.6%		5.4%	63.5%	31.1%		26.6%	19.6%	53.8%		9.7%	85.1%	5.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start	Peak Hr	Volumes				Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	07:30am	.914	166	25	32	223	74.4	11.2	14.3
Westbound	GRAVENSTEIN HWY (SR 116)		.907	26	439	239	704	3.6	62.3	33.9
Northbound			.879	27	26	49	102	26.4	25.4	48.0
Eastbound			.885	57	473	33	563	10.1	84.0	5.8

REDWOOD DRIVE

32	25	166	57
			26
			239
			====
			322
Inbound			223
Outbound			322
Total			545

239

	27
498	439
	32

57

439

	Inbound	563
	Outbound	498
473	Total	1061

	Inbound	704	
	Outbound	688	26
	Total	1392	

33

	166	
	473	688
	49	

	Inbound	102
	Outbound	84
	Total	186

GRAVENSTEIN HWY (SR 116)

26	27	26
25		
33		
====		
84		

49

Start Time	REDWOOD DRIVE Southbound				GRAVENSTEIN HWY (SR 116) Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	97	4	19	120	21	169	64	254	12	5	8	25	15	113	6	134	533
4:15	83	8	14	105	13	144	50	215	13	7	19	39	20	132	12	164	523
4:30	105	14	22	141	10	177	74	261	8	8	22	38	15	153	8	176	616
4:45	91	2	27	120	9	173	53	235	15	2	14	31	28	127	6	161	547
Hour Total	376	28	82	486	53	663	249	965	48	22	63	133	78	525	32	635	2219
5:00pm	106	8	30	144	8	146	78	232	6	2	13	21	12	109	3	124	521
5:15	73	6	15	94	8	150	63	221	8	6	3	17	13	156	3	172	504
5:30	96	3	31	130	19	127	43	189	11	4	14	29	8	144	6	158	506
5:45	57	9	20	86	10	142	55	207	9	3	8	20	20	103	6	129	442
Hour Total	332	26	96	454	45	565	239	849	34	15	38	87	53	512	18	583	1973
Grand	708	54	178	940	98	1228	488	1814	82	37	101	220	131	1037	50	1218	4192
% of Total	16.9%	1.3%	4.2%		2.3%	29.3%	11.6%		2.0%	.9%	2.4%		3.1%	24.7%	1.2%		
Approch %				22.4%				43.3%				5.2%					29.1%
% of Approach	75.3%	5.7%	18.9%		5.4%	67.7%	26.9%		37.3%	16.8%	45.9%		10.8%	85.1%	4.1%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	04:00pm	.862	376	28	82	486	77.3	5.7	16.8
Westbound	GRAVENSTEIN HWY (SR 116)		.924	53	663	249	965	5.4	68.7	25.0
Northbound			.853	48	22	63	133	36.0	16.5	47.3
Eastbound			.902	78	525	32	635	12.2	82.6	5.0

REDWOOD DRIVE

82 | 28 | 376 | 78

22

249

=====  
349

Inbound 486

Outbound 349

Total 835

249

48

793 663

82

78

663

Inbound 635

Outbound 793

525 Total 1428

Inbound 965

Outbound 964 53

Total 1929

32

376

525 964

63

Inbound 133

Outbound 113

Total 246

53 | 48 | 22

28

32

=====  
113

GRAVENSTEIN HWY (SR 116)

63

Start Time	SR 101 SB OFF RAMP Southbound				GRAVENSTEIN HWY (SR 116) Westbound				SR 101 SB ON RAMP Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	66	0	47	113	51	106	0	157	0	0	0	0	0	65	62	127	397
7:15	48	0	59	107	45	105	0	150	0	0	0	0	0	91	66	157	414
7:30	78	0	37	115	48	126	0	174	0	0	0	0	0	115	57	172	461
7:45	73	0	51	124	47	143	0	190	0	0	0	0	0	115	73	188	502
Hour Total	265	0	194	459	191	480	0	671	0	0	0	0	0	386	258	644	1774
9:00am	52	0	52	104	55	130	0	185	0	0	0	0	0	85	76	161	430
9:15	65	0	49	114	51	116	0	167	0	0	0	0	0	105	62	167	448
9:30	72	0	40	112	47	110	0	157	0	0	0	0	0	110	57	167	436
9:45	89	0	42	131	31	123	0	154	0	0	0	0	0	112	49	161	446
Hour Total	278	0	183	461	184	479	0	663	0	0	0	0	0	412	244	656	1780
Grand	543	0	377	920	375	959	0	1334	0	0	0	0	0	798	502	1300	3554
% of Total	15.3%	0.0%	10.6%		10.6%	27.0%	0.0%		0.0%	0.0%	0.0%		0.0%	22.5%	14.1%		
Approch %				25.9%			37.5%										36.6%
% of Approch	59.0%	0.0%	41.0%		28.1%	71.9%	0.0%		0.0%	0.0%	0.0%		0.0%	61.4%	38.6%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 SB OFF RAMP	07:30am	.921	268	0	189	457	58.6	.0	41.3
Westbound	GRAVENSTEIN HWY (SR 116)		.942	201	515	0	716	28.0	71.9	.0
Northbound	SR 101 SB ON RAMP		.0	0	0	0	0	0.0	0.0	0.0
Eastbound			.915	0	420	268	688	.0	61.0	38.9

SR 101 SB OFF RAMP

189	0	268	0
			0
			0
			=====
			0
Inbound		457	
Outbound		0	
Total		457	

	0
704	515
	189
<hr/>	
	0

	0
<hr/>	
	0

	Inbound	688
	Outbound	704
420	Total	1392

Inbound	716	
Outbound	688	201
Total	1404	

268
-----

268	
420	688
0	

	Inbound	0
	Outbound	469
	Total	469
201		0
0		
268		
=====		
469		

SR 101 SB ON RAMP

GRAVENSTEIN HWY (SR 116)

		0
		0
		0

Start Time	SR 101 SB OFF RAMP Southbound				GRAVENSTEIN HWY (SR 116) Westbound				SR 101 SB ON RAMP Northbound				Eastbound				
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
4:00pm	124	0	53	177	26	201	0	227	0	0	0	0	0	142	76	218	622
4:15	125	0	57	182	38	156	0	196	0	0	0	0	0	154	80	234	612
4:30	156	0	47	203	30	214	0	244	0	0	0	0	0	198	82	280	727
4:45	152	0	48	200	23	187	0	210	0	0	0	0	0	154	78	232	642
Hour Total	557	0	205	762	117	760	0	877	0	0	0	0	0	648	316	964	2603
5:00pm	157	0	43	200	24	189	0	213	0	0	0	0	0	160	68	228	641
5:15	152	0	44	196	22	177	0	199	0	0	0	0	0	175	57	232	627
5:30	172	0	34	206	34	155	0	189	0	0	0	0	0	179	75	254	649
5:45	166	0	47	213	31	160	0	191	0	0	0	0	0	108	60	168	572
Hour Total	647	0	168	815	111	681	0	792	0	0	0	0	0	622	260	882	2489
Grand	1204	0	373	1577	228	1441	0	1669	0	0	0	0	0	1270	576	1846	5092
% of Total	23.6%	0.0%	7.3%		4.5%	28.3%	0.0%		0.0%	0.0%	0.0%		0.0%	24.9%	11.3%		
Approch %				31.0%				32.0%									36.3%
% of Approch	76.3%	0.0%	23.7%		13.7%	86.3%	0.0%		0.0%	0.0%	0.0%		0.0%	68.8%	31.2%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	SR 101 SB OFF RAMP	04:30pm	.984	517	0	182	799	77.2	.0	22.7
Westbound	GRAVENSTEIN HWY (SR 116)		.887	99	767	0	866	11.4	88.5	.0
Northbound	SR 101 SB ON RAMP		.0	0	0	0	0	0.0	0.0	0.0
Eastbound			.868	0	687	285	972	.0	70.6	29.3





GRAVENSTEIN HWY (SR 116) SR 101 NB OFF RAMP

Start Time	Southbound				Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	0	0	0	0	0	123	0	123	34	0	13	47	0	131	0	131	301
7:15	0	0	0	0	0	118	0	118	32	0	12	44	0	139	0	139	331
7:30	0	0	0	0	0	122	0	122	52	0	10	62	0	193	0	193	377
7:45	0	0	0	0	0	135	0	135	55	0	73	68	0	188	0	188	391
Hour Total	0	0	0	0	0	498	0	498	173	0	46	221	0	651	0	651	1370
8:00am	0	0	0	0	0	127	0	127	58	0	14	72	0	137	0	137	336
8:15	0	0	0	0	0	113	0	113	54	0	17	71	0	170	0	170	354
8:30	0	0	0	0	0	107	0	107	50	0	21	71	0	182	0	182	360
8:45	0	0	0	0	0	96	0	96	56	0	16	74	0	201	0	201	373
Hour Total	0	0	0	0	0	445	0	445	218	0	70	288	0	690	0	690	1423
Grand	0	0	0	0	0	943	0	943	391	0	118	509	0	1341	0	1341	2793
% of Total	0.0%	0.0%	0.0%		0.0%	33.6%	0.0%		14.0%	0.0%	4.2%		0.0%	48.0%	0.0%		
Approch %								33.8%				18.2%					48.0%
% of Approach	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		76.8%	0.0%	23.2%		0.0%	100.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound		07:30am	.0	0	0	0	0	0.0	0.0	0.0
Westbound	GRAVENSTEIN HWY (SR 116)		.920	0	497	0	497	.0	100.0	.0
Northbound	SR 101 NB OFF RAMP		.948	219	0	54	273	80.2	.0	19.7
Eastbound			.891	0	688	0	688	.0	100.0	.0



GRAVENSTEIN HWY (SR 116) SR 101 NB OFF RAMP

Start Time	Southbound				Westbound				Northbound				Eastbound				
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	0	0	0	0	0	137	0	137	90	0	42	132	0	266	0	266	535
4:15	0	0	0	0	0	114	0	114	82	0	41	123	0	279	0	279	516
4:30	0	0	0	0	0	153	0	153	91	0	49	140	0	354	0	354	647
4:45	0	0	0	0	0	133	0	133	77	0	57	134	0	305	0	305	572
Hour Total	0	0	0	0	0	537	0	537	340	0	189	529	0	1204	0	1204	2270
5:00pm	0	0	0	0	0	137	0	137	76	0	50	126	0	317	0	317	580
5:15	0	0	0	0	0	122	0	122	77	0	43	120	0	327	0	327	569
5:30	0	0	0	0	0	136	0	136	53	0	36	89	0	351	0	351	576
5:45	0	0	0	0	0	118	0	118	73	0	40	113	0	274	0	274	505
Hour Total	0	0	0	0	0	513	0	513	279	0	169	448	0	1269	0	1269	2230
Grand	0	0	0	0	0	1050	0	1050	619	0	358	977	0	2473	0	2473	4500
% of Total	0.0%	0.0%	0.0%		0.0%	23.3%	0.0%		13.8%	0.0%	8.0%		0.0%	55.0%	0.0%		
Approch %								23.3%				21.7%					55.0%
% of Approch	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		63.4%	0.0%	36.6%		0.0%	100.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound		04:30pm	.0	0	0	0	0	0.0	0.0	0.0
Westbound	GRAVENSTEIN HWY (SR 116)		.891	0	545	0	545	.0	100.0	.0
Northbound	SR 101 NB OFF RAMP		.929	321	0	199	520	61.7	.0	38.2
Eastbound			.920	0	1303	0	1303	.0	100.0	.0



Start Time	REDWOOD DRIVE Southbound				COMMERCE BLVD. Westbound				Northbound				SHOPPING Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	20	5	1	26	59	25	17	101	3	7	69	79	0	8	1	9	215
7:15	22	15	1	38	74	30	13	97	2	2	90	94	0	7	2	9	230
7:30	34	21	1	56	83	21	35	139	1	10	100	111	1	9	2	12	310
7:45	46	13	2	61	84	19	43	146	0	9	158	167	1	8	3	12	380
Hour Total	122	54	5	181	300	75	108	483	6	28	417	451	2	32	8	42	1157
8:00am	25	8	1	34	73	24	35	132	6	7	120	133	0	7	2	9	308
8:15	32	8	3	43	64	19	41	124	6	11	97	114	1	13	3	17	298
8:30	34	14	0	48	71	16	18	105	4	16	91	111	2	9	0	11	275
8:45	13	23	2	38	54	31	18	103	3	10	103	116	0	15	4	19	276
Hour Total	104	53	6	163	262	90	112	464	19	44	411	474	3	44	9	56	1157
Grand	226	107	11	344	562	165	220	947	25	72	628	925	5	76	17	98	2314
% of Total	9.8%	4.6%	.5%		24.3%	7.1%	9.5%		1.1%	3.1%	35.8%		.2%	3.3%	.7%		
Approch %				14.9%				40.9%				40.0%					4.2%
% of Approch	65.7%	31.1%	3.2%		59.3%	17.4%	23.2%		2.7%	7.8%	89.5%		5.1%	77.6%	17.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start	Peak Hr	Factor	Volumes				Percentages		
					Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	07:30am		.795	137	50	7	194	70.6	25.7	3.6
Westbound	COMMERCE BLVD.			.926	304	83	154	541	56.1	15.3	28.4
Northbound				.786	13	37	475	525	2.4	7.0	90.4
Eastbound	SHOPPING			.735	3	37	10	50	6.0	74.0	20.0

REDWOOD DRIVE

7	50	137	
			3
			37
			154
			=====
			194

Inbound	194
Outbound	194
Total	388

SHOPPING

	13
103	83
	7

3

Inbound	50
Outbound	103
Total	153

37

10

154

83

Inbound	541	
Outbound	649	304
Total	1190	

137

37

649

475

COMMERCE BLVD.

Inbound	525
Outbound	364
Total	889

304

13

37

475

50

10

=====

364

Start Time	REDWOOD DRIVE Southbound				COMMERCE BLVD. Westbound				Northbound				SHOPPING Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	46	45	2	93	59	47	39	145	10	26	183	219	3	34	9	46	503
4:15	70	29	1	100	59	37	45	141	4	28	148	180	2	29	7	38	459
4:30	56	34	3	93	55	59	62	176	15	32	164	211	3	46	7	56	536
4:45	64	32	0	96	63	47	36	146	8	27	173	208	0	35	8	43	493
Hour Total	236	140	6	382	236	190	182	608	37	113	668	818	8	144	31	183	1991
5:00pm	74	31	0	105	57	64	61	182	16	36	163	215	1	39	9	49	551
5:15	71	44	1	116	68	60	65	193	7	28	132	167	0	29	12	41	517
5:30	50	38	2	90	72	44	66	182	10	27	170	207	2	32	6	40	519
5:45	66	36	0	102	71	67	52	190	7	30	153	190	1	27	9	37	519
Hour Total	261	149	3	413	268	235	244	747	40	121	618	779	4	127	36	167	2106
Grand	497	289	9	795	504	425	426	1355	77	234	1286	1597	12	271	67	350	4097
% of Total	12.1%	7.1%	.2%		12.3%	10.4%	10.4%		1.9%	5.7%	31.4%		.3%	6.6%	1.6%		
Approch %				19.4%				33.1%				39.0%					8.5%
% of Approch	62.5%	36.4%	1.1%		37.2%	31.4%	31.4%		4.8%	14.7%	80.5%		3.4%	77.4%	19.1%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hr	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	05:00pm	.890	261	149	3	413	63.1	36.0	.7
Westbound	COMMERCE BLVD.		.968	268	235	244	747	35.8	31.4	32.6
Northbound			.906	40	121	618	779	5.1	15.5	79.3
Eastbound	SHOPPING		.852	4	127	36	167	2.3	76.0	21.5

REDWOOD DRIVE

3	149	261	4
			121
			244
			=====
			369

Inbound	413
Outbound	369
Total	782

244

SHOPPING

	40
278	235
	3

4

235

Inbound	167
Outbound	278
Total	445

36

Inbound	747	
Outbound	1006	268
Total	1753	

261	
127	1006
618	

Inbound	779
Outbound	453
Total	1232

268	40	121	618
149			
36			
=====			
453			

COMMERCE BLVD.



All Traffic Data  
 5098 Foothills Blvd. 3-302  
 Roseville, CA. 95678  
 (916)771-8700

Site Code : 00000000  
 Start Date: 08/24/05  
 File I.D. : R22  
 Page : 1

CITY OF ROHNERT PARK

Start	ROBERTS LAKE ROAD Southbound				GOLF COURSE DRIVE Westbound				Northbound				Eastbound				
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	2	0	13	15	0	149	5	154	0	0	0	0	8	26	0	34	203
7:15	3	0	11	14	0	152	8	160	0	0	0	0	10	26	0	36	212
7:30	5	0	13	18	0	223	18	241	0	0	0	0	13	55	0	68	327
7:45	9	0	21	30	0	343	23	266	0	0	0	0	17	62	0	79	375
Hour Total	19	0	58	77	0	767	54	821	0	0	0	0	48	171	0	219	1117
8:00am	9	0	17	26	0	179	3	182	0	0	0	0	21	65	0	86	294
8:15	8	0	20	28	0	151	10	161	0	0	0	0	16	84	0	100	269
8:30	5	0	9	14	0	133	10	143	0	0	0	0	24	74	0	98	255
8:45	4	0	11	15	0	127	7	134	0	0	0	0	20	70	0	90	239
Hour Total	26	0	57	83	0	590	30	620	0	0	0	0	81	293	0	374	1077
Grand	45	0	115	160	0	1357	84	1441	0	0	0	0	129	464	0	593	2196
% of Total	2.1%	0.0%	5.2%		0.0%	61.9%	5.8%		0.0%	0.0%	0.0%		5.9%	21.1%	0.0%		
Approch %				7.3%				65.7%									27.0%
% of Approch	28.1%	0.0%	71.9%		0.0%	94.2%	5.8%		0.0%	0.0%	0.0%		21.8%	78.2%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 08/24/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages				
				Left	Thru	Right	Total	Left	Thru	Right	Total	
Southbound	ROBERTS LAKE ROAD	07:30am	.850	31	0	71	0	102	30.3	.0	69.6	.0
Westbound	GOLF COURSE DRIVE		.799	0	796	54	0	850	.0	93.6	6.3	.0
Northbound			.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Eastbound			.832	67	266	0	0	333	20.1	79.0	.0	.0

CITY OF ROHMERT PARK

All Traffic Data  
5098 Foothills Blvd. 3-302  
Roseville, CA. 95678  
(916) 771-8700

Site Code : 00000000  
Start Date: 08/24/05  
File I.D. : R22  
Page : 2

ROBERTS LAKE ROAD		
71	0	31
		67
		0
		54
		====
		121
Inbound		102
Outbound		121
Total		223

0
867
796
71
====
67

Inbound	333
Outbound	867
Total	1200

0

Inbound	0
Outbound	0
Total	0
0	0
0	0
0	0
====	
0	

54
====
796

Inbound	850
Outbound	297
Total	1147

31
266
0
297

GOLF COURSE DRIVE

0

All Traffic Data  
 5098 Foothills Blvd. 3-302  
 Roseville, CA. 95678  
 (916)771-8700

Site Code : 00000000  
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CITY OF ROHNERT PARK

Start Time	ROBERTS LAKE ROAD Southbound				GOLF COURSE DRIVE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	19	0	42	61	0	95	15	110	0	0	0	0	16	191	0	227	398
4:15	24	0	48	72	0	117	19	136	0	0	0	0	33	203	0	236	449
4:30	22	0	53	75	0	122	15	137	0	0	0	0	55	191	0	246	458
4:45	16	0	48	64	0	129	10	139	0	0	0	0	41	203	0	244	467
Hour Total	101	0	191	292	0	463	59	522	0	0	0	0	165	786	0	953	1767
5:00pm	21	0	29	50	0	124	10	134	0	0	0	0	53	245	0	298	682
5:15	37	0	42	79	0	106	12	120	0	0	0	0	40	247	0	287	486
5:30	23	0	47	70	0	109	11	120	0	0	0	0	29	218	0	247	417
5:45	24	0	42	66	0	102	10	112	0	0	0	0	24	197	0	221	399
Hour Total	105	0	160	265	0	443	43	486	0	0	0	0	146	907	0	1053	1804
Grand	206	0	351	557	0	906	102	1008	0	0	0	0	311	1695	0	2006	3571
% of Total	5.8%	0.0%	9.8%		0.0%	25.4%	2.9%		0.0%	0.0%	0.0%		8.7%	47.5%	0.0%		
Approach %				15.6%				28.2%								56.2%	
% of Approach	27.0%	0.0%	63.0%		0.0%	89.9%	10.1%		0.0%	0.0%	0.0%		15.5%	84.5%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 08/24/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes			Total	Percentages				
				Left	Thru	Right		Left	Thru	Right		
Southbound	ROBERTS LAKE ROAD	04:30pm	.857	118	0	172	0	286	40.2	.0	59.7	.0
Westbound	GOLF COURSE DRIVE		.953	0	483	47	0	530	.0	91.1	8.8	.0
Northbound			.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Eastbound			.902	189	886	0	0	1075	17.5	82.4	.0	.0

All Traffic Data  
5092 Foothills Blvd. 3-302  
Roseville, CA. 95678  
(916) 771-8700

Site Code : 00000000  
Start Date: 08/24/05  
File I.D. : R22  
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CITY OF ROHNERT PARK

ROBERTS LAKE ROAD			
172	0	116	189
			0
			47
			====
			236
Inbound		288	
Outbound		236	
Total		524	

47

0	
655	483
	172
====	
189	

483

Inbound	1075
Outbound	655
886	Total 1730

Inbound	530	
Outbound	1002	0
Total	1532	

0

116	
886	1002
0	

Inbound	0
Outbound	0
Total	0
0	0
0	0
0	0
====	
0	

GOLF COURSE DRIVE

0

Start Time	REDWOOD DRIVE Southbound				Westbound				Northbound				BUSINESS PARK DRIVE Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	0	29	36	65	0	0	0	0	3	17	0	20	3	0	0	3	88
7:15	0	31	39	70	0	0	0	0	2	20	0	22	13	0	2	15	107
7:30	0	59	25	84	0	0	0	0	3	21	0	24	4	0	2	6	114
7:45	0	49	53	102	0	0	0	0	3	30	0	33	11	0	2	13	148
Hour Total	0	168	153	321	0	0	0	0	11	88	0	99	31	0	6	37	457
8:00am	0	48	49	97	0	0	0	0	5	26	0	31	13	0	4	17	145
8:15	0	36	29	65	0	0	0	0	3	28	0	31	3	0	3	6	102
8:30	0	54	17	71	0	0	0	0	3	36	0	39	13	0	1	14	124
8:45	0	46	15	61	0	0	0	0	1	51	0	52	11	0	3	14	127
Hour Total	0	184	110	294	0	0	0	0	12	141	0	153	40	0	11	51	498
Grand	0	352	263	615	0	0	0	0	23	229	0	252	71	0	17	88	955
% of Total	0.0%	36.9%	27.5%		0.0%	0.0%	0.0%		2.4%	24.0%	0.0%		7.4%	0.0%	1.8%		
Approach %				64.4%								26.4%					9.2%
% of Approach	0.0%	57.2%	42.8%		0.0%	0.0%	0.0%		9.1%	90.9%	0.0%		80.7%	0.0%	19.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	07:45am	.821	0	187	148	335	.0	55.8	44.1
Westbound			.0	0	0	0	0	0.0	0.0	0.0
Northbound			.859	14	120	0	134	10.4	89.5	.0
Eastbound	BUSINESS PARK DRIVE		.735	40	0	10	50	80.0	.0	20.0

REDWOOD DRIVE	
148	187
	0
	40
	120
	0
	====
	160
Inbound	335
Outbound	160
Total	495

BUSINESS PARK DRIVE	
	14
162	0
	148
====	
	40

Inbound	50
Outbound	162
0 Total	212

10
----

Inbound	0
Outbound	0
Total	0

0
0
0

Inbound	134	
Outbound	197	
Total	331	
0	14	120
187		
10		
====		
197		

Start Time	REDWOOD DRIVE				Westbound				Northbound				BUSINESS PARK DRIVE				Total
	Southbound	Left	Thru	Right	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	0	99	11	110	0	0	0	0	4	101	0	105	36	0	13	49	264
4:15	0	115	11	126	0	0	0	0	6	102	0	108	30	0	6	36	270
4:30	0	143	11	154	0	0	0	0	3	110	0	113	42	0	10	52	319
4:45	0	135	15	150	0	0	0	0	3	116	0	119	23	0	3	26	295
Hour Total	0	492	48	540	0	0	0	0	16	429	0	445	131	0	32	163	1148
5:00pm	0	103	4	107	0	0	0	0	2	124	0	126	43	0	3	46	279
5:15	0	123	13	136	0	0	0	0	2	85	0	87	21	0	2	23	246
5:30	0	107	10	117	0	0	0	0	3	99	0	102	27	0	4	31	250
5:45	0	115	8	123	0	0	0	0	0	101	0	101	15	0	3	18	242
Hour Total	0	448	35	483	0	0	0	0	7	409	0	416	106	0	12	118	1017
Grand	0	940	83	1023	0	0	0	0	23	838	0	861	237	0	44	281	2165
% of Total	0.0%	43.4%	3.8%		0.0%	0.0%	0.0%		1.1%	38.7%	0.0%		10.9%	0.0%	2.0%		
Approch %				47.3%								39.8%				13.0%	
% of Approach	0.0%	91.9%	8.1%		0.0%	0.0%	0.0%		2.7%	97.3%	0.0%		84.3%	0.0%	15.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	04:15pm	.872	0	496	47	537	.0	92.3	7.6
Westbound			.0	0	0	0	0	0.0	0.0	0.0
Northbound			.925	14	452	0	466	3.0	96.9	.0
Eastbound	BUSINESS PARK DRIVE		.769	138	0	22	160	86.2	.0	13.7

BUSINESS PARK DRIVE	
14	
55	0
	41
<hr/>	
138	

	Inbound	160
	Outbound	55
0	Total	215
<hr/>		
22		

--	--

REDWOOD DRIVE			
41	496	0	138
			452
			0
			====
			590
	Inbound	537	
	Outbound	590	
	Total	1127	

0	
<hr/>	
0	

	Inbound	0
	Outbound	0
	Total	0

<hr/>	
0	
0	
0	

	Inbound	466
	Outbound	518
	Total	984
0	14	452
496		
22		
====		
518		

0	



Start Time	REDWOOD DRIVE Southbound				SR 101 SB RAMPS Westbound				Northbound				WILFRED AVENUE Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	52	22	1	75	43	3	77	123	1	17	5	23	0	1	5	6	227
7:15	63	42	4	109	38	0	100	138	2	29	2	33	3	0	2	5	285
7:30	73	53	2	128	46	0	123	169	2	26	1	29	0	5	0	5	331
7:45	59	49	6	114	59	3	163	225	0	41	3	44	4	1	5	10	393
Hour Total	247	166	13	426	186	6	463	655	5	113	11	129	7	7	12	25	1236
8:00am	57	38	1	96	50	0	120	170	0	32	3	35	1	3	2	6	307
8:15	61	42	2	105	32	1	111	144	1	38	4	43	2	1	4	7	299
8:30	64	49	4	117	21	1	99	121	1	43	8	52	1	1	1	3	293
8:45	54	39	3	96	34	1	115	150	1	50	4	55	0	2	0	2	303
Hour Total	236	168	10	414	137	3	445	585	3	163	19	185	4	7	7	18	1202
Grand	483	334	23	840	323	9	908	1240	8	276	30	314	11	14	19	44	2438
% of Total	19.8%	13.7%	.9%		13.2%	.4%	37.2%		.3%	11.3%	1.2%		.5%	.6%	.8%		
Approch %				34.5%				50.9%				12.9%					1.8%
% of Approch	57.5%	39.8%	2.7%		26.0%	.7%	73.2%		2.5%	87.9%	9.6%		25.0%	31.8%	43.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	07:30am	.865	250	182	11	443	56.4	41.0	2.4
Westbound	SR 101 SB RAMPS		.787	187	4	517	708	26.4	.5	73.0
Northbound			.858	3	137	11	151	1.9	90.7	7.2
Eastbound	WILFRED AVENUE		.700	7	10	11	28	25.0	35.7	39.2

REDWOOD DRIVE

11	182	250	7
			137
			517
			=====
			661

Inbound	443
Outbound	661
Total	1104

517

WILFRED AVENUE

	3
18	4
	11

7

4

Inbound	28
Outbound	18
10 Total	46

Inbound	708
Outbound	271 187
Total	979

11

250
10 271
11

SR 101 SB RAMPS

Inbound	151
Outbound	380
Total	531

187	3	137
182		
11		
=====		
380		

11

Start Time	REDWOOD DRIVE Southbound				SR 101 SB RAMPS Westbound				Northbound				WILFRED AVENUE Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	48	101	6	155	53	2	144	199	14	120	6	140	2	1	6	9	503
4:15	53	74	11	138	60	5	119	184	4	143	9	156	1	3	3	7	485
4:30	56	93	9	158	71	1	160	232	8	158	15	181	1	3	3	7	578
4:45	33	61	5	99	65	3	116	184	4	88	10	102	1	0	8	9	394
Hour Total	190	329	31	550	249	11	539	799	30	509	40	579	5	7	20	32	1960
5:00pm	65	76	9	150	44	2	131	177	10	147	12	169	2	4	5	11	507
5:15	54	108	8	170	53	1	142	196	6	122	15	143	1	1	2	4	513
5:30	58	97	5	160	43	1	140	184	9	137	18	164	1	1	4	6	514
5:45	44	83	13	140	47	5	157	209	10	109	14	133	0	3	2	5	487
Hour Total	221	364	35	620	187	9	570	766	35	515	59	609	4	9	13	26	2021
Grand	411	693	66	1170	436	20	1109	1565	65	1024	99	1188	9	16	33	58	3981
% of Total	10.3%	17.4%	1.7%		11.0%	.5%	27.9%		1.6%	25.7%	2.5%		.2%	.4%	.8%		
Approch %				29.4%				39.3%				29.8%					7.5%
% of Approach	35.1%	59.2%	5.6%		27.9%	1.3%	70.9%		5.5%	86.2%	8.3%		15.5%	27.6%	56.9%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	REDWOOD DRIVE	05:00pm	.912	221	364	35	620	35.6	58.7	5.6
Westbound	SR 101 SB RAMPS		.916	187	9	570	766	24.4	1.1	74.4
Northbound			.901	35	515	59	609	5.7	84.5	9.6
Eastbound	WILFRED AVENUE		.591	4	9	13	26	15.3	34.6	50.0

REDWOOD DRIVE

35	364	221	4
			515
			570
			=====
			1089

Inbound	620
Outbound	1089
Total	1709

WILFRED AVENUE

35
79 9
35

4

Inbound	26
Outbound	79
9 Total	105

13

570

9

Inbound	766	
Outbound	289	187
Total	1055	

221

9

289

59

SR 101 SB RAMPS

Inbound	609
Outbound	564
Total	1173

187	35	515
364		
13		
=====		
564		

59

Start Time	STONY POINT ROAD Southbound				GRAVENSTEIN HWY (SR 116) Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	4	66	3	73	37	53	9	99	11	29	19	59	21	68	54	143	374
7:15	9	60	14	83	26	63	10	99	16	45	18	79	24	75	69	168	429
7:30	13	83	14	110	22	38	14	74	16	54	22	92	19	61	77	177	453
7:45	12	53	11	76	49	77	20	146	26	51	23	100	31	117	66	214	536
Hour Total	38	262	42	342	134	231	53	418	69	179	82	330	95	341	266	702	1792
8:00am	12	69	16	97	37	63	7	107	33	42	17	92	32	82	63	177	473
8:15	21	60	12	93	28	69	5	102	22	53	20	95	23	93	79	195	485
8:30	11	69	11	91	42	74	12	128	35	46	23	104	28	97	68	193	516
8:45	15	61	10	86	34	69	11	114	36	39	21	96	32	101	59	192	468
Hour Total	59	259	49	367	141	275	35	451	126	180	81	387	115	373	269	757	1962
Grand	97	521	91	709	275	506	88	869	195	359	163	717	210	714	535	1459	3754
% of Total	2.6%	13.9%	2.4%		7.3%	13.5%	2.3%		5.2%	9.6%	4.3%		5.6%	19.0%	14.3%		
Approch %				18.9%				23.1%				19.1%				38.9%	
% of Approch	13.7%	73.5%	12.8%		31.6%	58.2%	10.1%		27.2%	50.1%	22.7%		14.4%	48.9%	36.7%		

Peak Hour Analysis by Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages .....		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	STONY POINT ROAD	07:45am	.920	56	251	50	357	15.6	70.3	14.0
Westbound	GRAVENSTEIN HWY (SR 116)		.827	156	283	44	483	32.2	58.5	9.1
Northbound			.940	116	192	83	391	29.6	49.1	21.2
Eastbound			.910	114	369	276	779	14.6	49.9	35.4

STONY POINT ROAD

50	251	56	114
			192
			44
			=====
			350
	Inbound	357	
	Outbound	350	
	Total	707	

44

116  
 449 283  
 50

114

283

Inbound 779  
 Outbound 449  
 389 Total 1228

276

Inbound 483  
 Outbound 528 156  
 Total 1011

56  
 389 528  
 83

Inbound 391  
 Outbound 683  
 Total 1074

GRAVENSTEIN HWY (SR 116)

156	116	192
251		
276		
=====		
683		

83

Start Time	STONY POINT ROAD Southbound				GRAVENSTEIN HWY (SR 116) Westbound				Northbound				Eastbound			
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total
4:00pm	21	77	52	150	21	124	28	173	79	135	32	246	36	94	31	161
4:15	25	74	41	140	17	118	31	166	88	132	29	249	39	89	27	155
4:30	18	83	55	156	20	131	18	169	67	125	30	222	28	117	39	164
4:45	19	78	49	146	32	119	13	164	88	120	38	246	20	73	49	142
Hour Total	83	312	197	592	90	492	90	672	322	512	129	963	123	373	146	642
5:00pm	22	83	53	158	26	134	29	189	67	107	13	187	27	107	39	173
5:15	26	94	52	174	32	125	26	183	94	133	20	247	40	82	36	158
5:30	14	71	47	132	25	132	25	182	70	149	30	249	26	111	48	185
5:45	24	61	24	109	21	108	22	151	105	98	25	228	12	93	43	148
Hour Total	88	309	176	573	104	499	102	705	336	487	88	911	105	393	166	664
Grand	171	621	373	1165	194	991	192	1377	658	999	217	1874	228	766	312	1306
% of Total	3.0%	10.9%	6.5%		3.4%	17.3%	3.4%		11.5%	17.5%	3.8%		4.0%	13.4%	5.5%	
Approach %				20.4%				24.1%				32.8%				22.8%
% of Approach	14.7%	53.3%	32.0%		14.1%	72.0%	13.9%		35.1%	53.3%	11.6%		17.5%	58.7%	23.9%	

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start	Peak Hr	Volumes				Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	STONY POINT ROAD	04:45pm	.876	83	326	201	610	13.6	53.4	32.9
Westbound	GRAVENSTEIN HWY (SR 116)		.950	115	570	93	778	16.0	71.0	12.9
Northbound			.933	319	509	101	929	34.3	54.7	10.8
Eastbound			.889	113	373	172	658	17.1	56.6	26.1

STONY POINT ROAD

201	326	83	113
			509
			93
			====
			715
Inbound		610	
Outbound		715	
Total		1325	

93

	319
1030	510
	201

113

510

	Inbound	658
	Outbound	1030
373	Total	1688

Inbound	718	
Outbound	557	115
Total	1275	

172

83
373 557
101

GRAVENSTEIN HWY (SR 116)

Inbound	929
Outbound	613
Total	1542

115	319	509
326		
172		
====		
613		

101



Start Time	LABATH AVENUE Southbound				WILFRED AVENUE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	0	0	0	0	0	5	0	5	1	1	0	2	2	4	0	6	13
7:15	1	0	0	1	2	4	0	6	0	0	1	1	0	3	0	3	11
7:30	0	0	0	0	0	5	0	5	0	0	0	0	0	4	1	5	10
7:45	2	0	0	2	0	5	0	5	0	0	0	0	0	6	0	6	13
Hour Total	3	0	0	3	2	19	0	21	1	1	1	3	2	17	1	20	47
8:00am	0	0	1	1	0	1	1	2	0	0	0	0	0	4	0	4	7
8:15	1	0	0	1	0	4	0	4	0	0	1	1	0	4	0	4	10
8:30	0	0	0	0	0	6	0	6	0	0	0	0	0	0	0	0	6
8:45	1	0	0	1	0	8	0	8	0	0	0	0	0	2	0	2	11
Hour Total	2	0	1	3	0	19	1	20	0	0	1	1	0	10	0	10	34
Grand	5	0	1	6	2	38	1	41	1	1	2	4	2	27	1	30	81
% of Total	6.2%	0.0%	1.2%		2.5%	46.9%	1.2%		1.2%	1.2%	2.5%		2.5%	33.3%	1.2%		
Apprch %				7.4%				50.6%				4.9%					37.0%
% of Apprch	83.3%	0.0%	16.7%		4.9%	92.7%	2.4%		25.0%	25.0%	50.0%		6.7%	90.0%	3.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages .....		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	LABATH AVENUE	07:00am	.375	3	0	0	3	100.0	.0	.0
Westbound	WILFRED AVENUE		.875	2	19	0	21	9.5	90.4	.0
Northbound			.375	1	1	1	3	33.3	33.3	33.3
Eastbound			.833	2	17	1	20	10.0	85.0	5.0

LABATH AVENUE

0	0	3	
			2
			1
			0
			=====
			3
	Inbound	3	
	Outbound	3	
	Total	6	

	1
20	19
	0
=====	
	2

	0
=====	
	19

	Inbound	20
	Outbound	20
17	Total	40

	Inbound	21
	Outbound	21
	Total	42

	1
--	---

	3
	17
	1
	21

	Inbound	3
	Outbound	3
	Total	6

WILFRED AVENUE

2	1	1
0		
1		
=====		
3		

	1
--	---

Start Time	LABATH AVENUE Southbound				WILFRED AVENUE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	0	0	0	0	0	19	0	19	0	0	0	0	0	6	0	6	25
4:15	1	0	0	1	1	17	2	20	0	0	0	0	0	4	0	4	25
4:30	1	0	0	1	2	16	0	18	0	0	1	1	0	4	0	4	24
4:45	2	1	0	3	0	10	1	11	0	0	0	0	0	2	0	2	16
Hour Total	4	1	0	5	3	62	3	68	0	0	1	1	0	16	0	16	90
5:00pm	0	1	0	1	0	18	1	19	0	0	1	1	0	4	0	4	25
5:15	3	0	0	3	0	15	1	16	0	0	0	0	0	0	0	0	19
5:30	1	0	0	1	0	16	0	16	1	0	0	1	0	3	0	3	21
5:45	2	0	0	2	0	22	2	24	0	0	1	1	0	1	0	1	28
Hour Total	6	1	0	7	0	71	4	75	1	0	2	3	0	8	0	8	93
Grand	10	2	0	12	3	133	7	143	1	0	3	4	0	24	0	24	183
% of Total	5.5%	1.1%	0.0%		1.6%	72.7%	3.8%		.5%	0.0%	1.6%		0.0%	13.1%	0.0%		
Approch %				6.6%			78.1%					2.2%				13.1%	
% of Approach	83.3%	16.7%	0.0%		2.1%	93.0%	4.9%		25.0%	0.0%	75.0%		0.0%	100.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	LABATH AVENUE	05:00pm	.583	6	1	0	7	85.7	14.2	.0
Westbound	WILFRED AVENUE		.781	0	71	4	75	.0	94.6	5.3
Northbound			.750	1	0	2	3	33.3	.0	66.6
Eastbound			.500	0	8	0	8	.0	100.0	.0

LABATH AVENUE

0	1	6	0
			0
			4
			====
			4
Inbound		7	
Outbound		4	
Total		11	

4

	1
72	71
	0

0

71

Inbound	8
Outbound	72
Total	80

0

Inbound	75
Outbound	16
Total	91

6

8

16

2

WILFRED AVENUE

Inbound	3
Outbound	1
Total	4

0

1

0

====

1

0

2

Start Time	DOWDELL AVENUE Southbound				WILFRED AVENUE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	4	0	0	4	0	5	0	5	0	0	0	0	0	3	0	3	12
7:15	3	0	2	2	0	4	1	5	0	0	0	0	1	5	0	6	13
7:30	1	0	0	1	0	5	0	5	0	0	0	0	0	4	0	4	10
7:45	2	1	0	3	2	5	2	9	0	0	0	0	0	0	0	0	20
Hour Total	7	1	2	10	2	19	3	24	0	0	0	0	1	20	0	21	55
8:00am	3	1	1	5	0	1	0	1	0	1	0	1	1	3	0	4	11
8:15	0	0	1	1	1	3	0	4	0	0	1	1	0	6	0	6	12
8:30	2	0	0	2	0	6	0	6	0	0	1	1	0	0	0	0	9
8:45	0	0	2	2	0	5	0	5	0	0	0	0	0	3	0	3	10
Hour Total	5	1	4	10	1	15	0	16	0	1	2	3	1	12	0	13	42
Grand	12	2	6	20	3	34	3	40	0	1	2	3	2	32	0	34	97
% of Total	12.4%	2.1%	6.2%		3.1%	35.1%	3.1%		0.0%	1.0%	2.1%		2.1%	33.0%	0.0%		
Approach %	20.6%				41.2%				3.1%				35.1%				
% of Approach	60.0%	10.0%	30.0%		7.5%	85.0%	7.5%		0.0%	33.3%	66.7%		5.9%	94.1%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	DOWDELL AVENUE	07:00am	.625	7	1	2	10	70.0	10.0	20.0
Westbound	WILFRED AVENUE		.667	2	19	3	24	8.3	79.1	12.5
Northbound			.0	0	0	0	0	0.0	0.0	0.0
Eastbound			.656	1	20	0	21	4.7	95.2	.0

DOWDELL AVENUE

2	1	7	1
			0
			3
			=====
			4
Inbound			10
Outbound			4
Total			14

21	0
	19
	2
=====	
	1

3
---

19
----

Inbound	21
Outbound	21
Total	42

Inbound	24
Outbound	27
Total	51

0
---

7	27
20	
0	

Inbound	0
Outbound	3
Total	3

WILFRED AVENUE

2	0	0
1		
0		
=====		
3		

0
---

0
---

Start Time	DOWDELL AVENUE Southbound				WILFRED AVENUE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	3	0	0	3	0	19	3	22	0	0	0	0	0	6	0	6	31
4:15	1	2	2	5	0	18	2	20	1	1	2	4	1	4	0	5	34
4:30	0	0	2	2	0	16	2	18	0	1	1	2	0	6	0	6	28
4:45	5	0	0	5	0	11	1	12	0	0	0	0	0	4	0	4	21
Hour Total	9	2	4	15	0	64	8	72	1	2	3	6	1	20	0	21	114
5:00pm	5	0	2	7	0	17	4	21	0	1	2	3	0	4	1	5	36
5:15	1	0	2	3	0	14	1	15	0	0	0	0	0	3	0	3	21
5:30	2	0	2	4	0	14	1	15	0	0	0	0	0	4	0	4	23
5:45	3	0	0	3	2	24	2	28	0	0	0	0	2	2	0	4	35
Hour Total	11	0	6	17	2	69	8	79	0	1	2	3	2	13	1	16	115
Grand	20	2	10	32	2	133	16	151	1	3	5	9	3	33	1	37	229
% of Total	8.7%	.9%	4.4%		.9%	58.1%	7.0%		.4%	1.3%	2.2%		1.3%	14.4%	.4%		
Approch %	14.0%				65.9%				3.9%				16.2%				
% of Approach	62.5%	6.2%	31.2%		1.3%	88.1%	10.6%		11.1%	33.3%	55.6%		8.1%	89.2%	2.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	DOWDELL AVENUE	04:15pm	.679	11	2	6	19	57.8	10.5	31.5
Westbound	WILFRED AVENUE		.845	0	62	9	71	.0	87.3	12.6
Northbound			.562	1	3	5	9	11.1	33.3	55.5
Eastbound			.833	1	18	1	20	5.0	90.0	5.0

DOWDELL AVENUE

6	2	11	1
			3
			9
			=====
			13
Inbound			19
Outbound			13
Total			32

	1
69	62
	6
=====	
	1

	9
=====	
	62

Inbound	20
Outbound	69
18	Total
	89
=====	
	1

Inbound	71
Outbound	34
	0
Total	105
=====	

	11
	18
	5
	34

Inbound	9
Outbound	3
Total	12
0	1
2	3
1	
=====	
3	

WILFRED AVENUE

	5
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Start Time	COMMERCE BLVD. Southbound				AUTO CENTER Westbound				Northbound				SR 101 NB RAMPS Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	0	83	84	167	0	0	0	0	93	29	0	122	37	0	5	42	331
7:15	2	90	90	182	0	0	0	0	123	25	1	149	31	0	7	38	369
7:30	0	131	105	236	0	0	0	0	146	46	0	192	20	0	11	31	459
7:45	2	198	99	300	0	0	0	0	97	41	1	139	31	0	14	45	684
Hour Total	5	502	378	885	0	0	0	0	459	141	2	602	119	0	37	156	1643
8:00am	2	119	89	210	1	0	0	1	118	49	2	169	22	0	8	30	410
8:15	1	114	92	207	2	2	2	6	104	51	4	159	36	0	8	44	416
8:30	2	96	88	186	3	1	2	6	110	42	2	154	23	0	13	36	382
8:45	1	101	81	183	0	0	1	1	85	46	2	133	35	0	8	43	366
Hour Total	6	430	350	786	6	3	5	14	417	188	10	615	116	0	37	153	1568
Grand	11	932	728	1671	6	3	5	14	876	329	12	1217	235	0	74	309	3211
% of Total	.3%	29.0%	22.7%		.2%	.1%	.2%		27.3%	10.2%	.4%		7.3%	0.0%	2.3%		
Approch %				52.0%				.4%				37.9%					9.6%
% of Approch	.7%	55.8%	43.6%		42.9%	21.4%	35.7%		72.0%	27.0%	1.0%		76.1%	0.0%	23.9%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start	Peak Hr	Volumes				Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	07:30am	.794	6	562	385	953	.6	58.9	40.3
Westbound	AUTO CENTER		.292	3	2	2	7	42.8	28.5	28.5
Northbound			.858	465	187	7	659	70.5	28.3	1.0
Eastbound	SR 101 NB RAMPS		.833	109	0	41	150	72.6	.0	27.3

COMMERCE BLVD.		
385	562	6
		109
		187
		2
		=====
		298
Inbound		953
Outbound		298
Total		1251

SR 101 NB RAMPS	
465	
852	2
385	
=====	
109	

2

2

Inbound	150
Outbound	852
0	Total 1002

Inbound	7
Outbound	13
Total	20

41

6	
0	13
7	

AUTO CENTER

Inbound	659
Outbound	606
Total	1265
3	465
562	187
41	
=====	
606	

7

Start Time	COMMERCE BLVD. Southbound				AUTO CENTER Westbound				Northbound				SR 101 NB RAMPS Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	1	120	125	246	4	1	1	6	111	125	1	237	62	1	9	72	561
4:15	3	118	119	240	4	1	2	7	90	131	2	231	68	1	8	77	555
4:30	3	102	125	230	1	0	2	3	143	146	0	289	77	1	5	83	605
4:45	0	102	101	203	1	1	0	2	112	134	0	246	68	0	7	75	526
Hour Total	7	442	470	919	10	3	5	18	464	536	3	1003	275	3	29	307	2247
5:00pm	1	107	123	231	2	1	1	4	148	137	0	285	82	1	9	92	612
5:15	1	90	105	196	0	0	1	1	105	122	1	228	93	0	4	97	522
5:30	1	104	124	229	1	0	0	1	127	130	0	257	78	0	8	86	573
5:45	1	101	97	199	1	0	1	2	84	131	0	215	94	0	5	99	515
Hour Total	4	402	449	855	4	1	3	8	464	520	1	985	347	1	26	374	2222
Grand	11	844	919	1774	14	4	8	26	928	1056	4	1988	622	4	55	681	4469
% of Total	.2%	18.9%	20.6%		.3%	.1%	.2%		20.8%	23.6%	.1%		13.9%	.1%	1.2%		
Approch %			39.7%					.6%				44.5%				15.2%	
% of Approach	.6%	47.6%	51.8%		53.8%	15.4%	30.8%		46.7%	53.1%	.2%		91.3%	.6%	8.1%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages .....		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	04:15pm	.942	7	429	468	904	.7	47.4	51.7
Westbound	AUTO CENTER		.571	8	3	5	16	50.0	18.7	31.2
Northbound			.909	501	548	2	1051	47.6	52.1	.1
Eastbound	SR 101 NB RAMPS		.889	295	3	29	327	90.2	.9	8.0

COMMERCE BLVD.

468	429	7	295
			548
			5
			====
			848
	Inbound	904	
	Outbound	848	
	Total	1752	

SR 101 NB RAMPS

501
972 3
468

295

Inbound	327
Outbound	972
3 Total	1299

29

Inbound	1051
Outbound	466
Total	1517

8	501	548
429		
29		
====		
466		

5
---

3

Inbound	16
Outbound	12 8
Total	28

7

3

12

2

AUTO CENTER

2

Start Time	COMMERCE BLVD. Southbound				GOLF COURSE DRIVE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	19	78	0	97	89	0	65	154	0	36	30	66	0	0	0	0	317
7:15	32	86	0	118	95	0	80	175	0	17	39	56	0	0	0	0	349
7:30	40	105	0	145	131	0	106	237	0	32	34	66	0	0	0	0	448
7:45	59	150	0	209	148	0	117	265	0	31	41	72	0	0	0	0	546
Hour Total	150	419	0	569	463	0	368	831	0	116	144	260	0	0	0	0	1660
8:00am	48	103	0	151	107	0	91	198	0	41	30	71	0	0	0	0	420
8:15	44	97	0	141	112	0	83	195	0	43	43	86	0	0	0	0	422
8:30	44	90	0	134	91	0	73	164	0	32	36	68	0	0	0	0	366
8:45	41	90	0	131	93	0	66	159	0	37	45	82	0	0	0	0	372
Hour Total	177	380	0	557	403	0	313	716	0	153	154	307	0	0	0	0	1580
Grand	327	799	0	1126	866	0	681	1547	0	269	298	567	0	0	0	0	3240
% of Total	10.1%	24.7%	0.0%		26.7%	0.0%	21.0%		0.0%	8.3%	9.2%		0.0%	0.0%	0.0%		
Approch %				34.8%				47.7%				17.5%					
% of Approach	29.0%	71.0%	0.0%		56.0%	0.0%	44.0%		0.0%	47.4%	52.6%		0.0%	0.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	07:30am	.773	191	455	0	646	29.5	70.4	.0
Westbound	GOLF COURSE DRIVE		.844	498	0	397	895	55.6	.0	44.3
Northbound			.858	0	147	148	295	.0	49.8	50.1
Eastbound			.0	0	0	0	0	0.0	0.0	0.0

COMMERCE BLVD.

0	455	191	0
			147
			397
			=====
			544
Inbound		646	
Outbound		544	
Total		1190	

397

0	0
	0
	0

0

Inbound	0
Outbound	0
Total	0

Inbound	895
Outbound	339 498
Total	1234

0

191
0 339
148

Inbound	295
Outbound	953
Total	1248

GOLF COURSE DRIVE

498	0	147	148
455			
0			
=====			
953			

Start Time	COMMERCE BLVD. Southbound				GOLF COURSE DRIVE Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	110	156	0	266	90	0	77	167	0	72	116	168	0	0	0	0	621
4:15	103	144	0	247	96	0	72	168	0	75	128	203	0	0	0	0	618
4:30	125	141	0	266	91	0	78	169	0	98	129	227	0	0	0	0	662
4:45	145	128	0	273	73	0	99	172	0	48	154	202	0	0	0	0	647
Hour Total	483	569	0	1052	350	0	326	676	0	293	527	820	0	0	0	0	2548
5:00pm	147	130	0	277	100	0	103	203	0	80	143	223	0	0	0	0	703
5:15	122	111	0	233	84	0	117	201	0	76	145	221	0	0	0	0	655
5:30	139	115	0	254	114	0	114	228	0	70	140	210	0	0	0	0	692
5:45	139	107	0	246	92	0	113	205	0	83	143	226	0	0	0	0	677
Hour Total	547	463	0	1010	390	0	447	837	0	309	571	880	0	0	0	0	2727
Grand	1030	1032	0	2062	740	0	773	1513	0	602	1098	1700	0	0	0	0	5275
% of Total	19.5%	19.6%	0.0%		14.0%	0.0%	14.7%		0.0%	11.4%	20.8%		0.0%	0.0%	0.0%		
Approch %				39.1%				28.7%				32.2%					
% of Approch	50.0%	50.0%	0.0%		48.9%	0.0%	51.1%		0.0%	35.4%	64.6%		0.0%	0.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/19/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	COMMERCE BLVD.	05:00pm	.912	547	463	0	1010	54.1	45.8	.0
Westbound	GOLF COURSE DRIVE		.918	390	0	447	837	46.5	.0	53.4
Northbound			.973	0	309	571	880	.0	35.1	64.8
Eastbound			.0	0	0	0	0	0.0	0.0	0.0

COMMERCE BLVD.

0	463	547	
			0
			309
			447
			=====
			756
Inbound		1010	
Outbound		756	
Total		1766	

447

0	0
0	0
0	0

0

Inbound	0
Outbound	0
Total	0

Inbound	837
Outbound	1118 390
Total	1955

0

547
0 1118
571

GOLF COURSE DRIVE

Inbound	880
Outbound	853
Total	1733

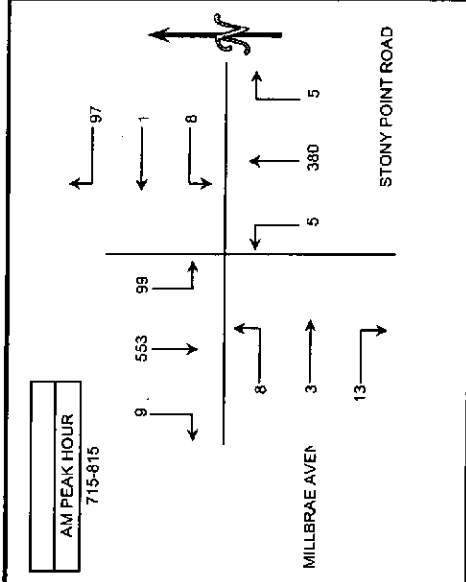
390	0	309	571
463			
0			
=====			
853			



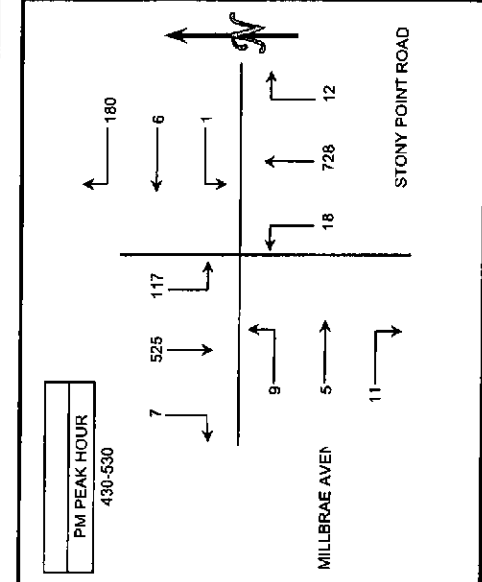
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S STONY POINT ROAD AND E/W MILLBRAE AVENUE

15 MIN COUNTS													
7:00 AM TO 9:00 AM													
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	1	102	27	24	1	4	1	79	1	2	0	0	242
715-730	2	125	26	28	0	3	1	105	2	4	1	1	298
730-745	3	138	27	23	1	3	1	96	0	5	0	4	301
745-800	3	149	22	24	0	1	1	86	2	4	0	1	295
800-815	1	141	24	22	0	1	2	91	1	0	2	2	287
815-830	1	123	21	19	0	1	0	79	0	5	0	1	250
830-845	2	107	22	18	1	2	1	86	1	0	1	0	241
845-900	0	83	18	10	0	1	1	71	0	1	1	1	187
<b>HOUR TOTALS</b>													
TIME	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	9	514	102	99	2	11	4	368	5	15	1	6	1136
715-815	9	553	99	97	1	8	5	380	5	13	3	8	1181
730-830	8	551	94	88	1	6	4	354	3	14	2	8	1133
745-845	7	520	89	83	1	5	4	344	4	9	3	4	1073
800-900	4	454	85	69	1	5	4	327	2	6	4	4	965



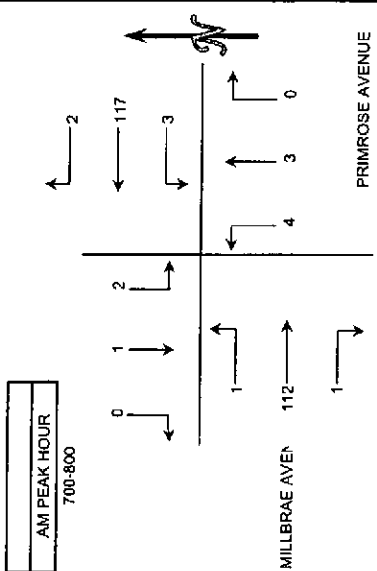
15 MIN COUNTS													
4:00 PM TO 6:00 PM													
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	2	118	20	31	0	2	3	182	7	3	0	0	368
415-430	2	110	21	37	1	1	4	178	3	1	0	1	357
430-445	2	121	31	43	1	0	2	186	4	3	2	3	400
445-500	4	135	30	48	3	0	2	188	6	4	1	1	420
500-515	0	138	30	43	2	0	3	177	3	1	1	2	400
515-530	1	131	26	46	0	1	5	177	5	3	1	3	399
530-545	1	123	28	38	0	1	1	183	4	0	1	1	381
545-600	3	114	26	38	2	2	5	163	5	1	1	0	360
<b>HOUR TOTALS</b>													
TIME	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	10	484	102	159	5	3	11	732	20	11	3	5	1545
415-515	8	504	112	171	7	1	11	727	16	9	4	7	1577
430-530	7	525	117	180	6	1	12	728	18	11	5	9	1619
445-545	6	527	114	175	5	2	11	723	18	8	4	7	1600
500-600	5	506	110	165	4	4	14	700	17	5	4	6	1540



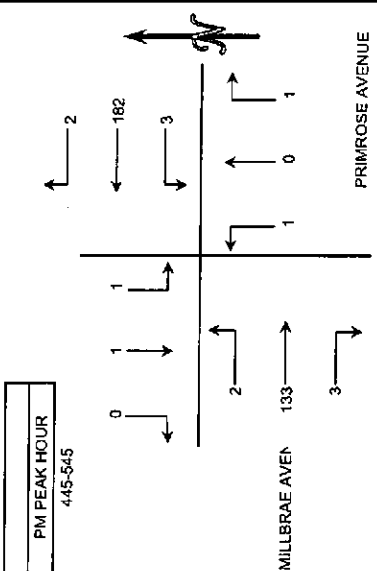
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S PRIMROSE AVENUE AND E/W MILLBRAE AVENUE

15 MIN COUNTS												
PERIOD	7:00 AM TO 9:00 AM											
	1	2	3	4	5	6	7	8	9	10	11	12
	SBLT	SBTH	SBLT	WBRT	WBTH	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	1	2	26	1	0	2	0	0	26	50
715-730	0	0	0	0	35	1	0	1	1	0	34	73
730-745	0	1	1	0	32	1	0	0	1	0	33	69
745-800	0	0	0	0	24	0	0	0	0	1	19	44
800-815	0	1	0	0	19	0	1	1	0	1	23	46
815-830	0	1	0	0	19	0	0	0	0	2	23	45
830-845	0	0	1	0	22	0	0	0	0	0	27	50
845-900	0	0	0	2	15	0	0	0	0	0	23	42
<b>HOUR TOTALS</b>												
TIME	1	2	3	4	5	6	7	8	9	10	11	12
	SBLT	SBTH	SBLT	WBRT	WBTH	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	1	2	2	117	3	0	3	4	1	112	246
715-815	0	2	1	0	110	2	1	2	2	2	109	232
730-830	0	3	1	0	94	1	1	1	1	4	98	204
745-845	0	2	1	0	84	0	1	1	0	4	92	185
800-900	0	2	1	2	75	0	1	1	0	3	96	183



15 MIN COUNTS												
PERIOD	4:00 PM TO 6:00 PM											
	1	2	3	4	5	6	7	8	9	10	11	12
	SBLT	SBTH	SBLT	WBRT	WBTH	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	0	0	0	34	0	0	1	0	1	24	60
415-430	0	0	0	0	47	0	0	0	1	0	30	78
430-445	0	0	0	1	46	0	2	0	0	3	31	84
445-500	0	0	0	1	47	2	0	0	1	0	36	88
500-515	0	0	0	0	48	1	0	0	0	2	25	76
515-530	0	1	1	0	45	0	0	0	0	1	32	80
530-545	0	0	0	1	42	0	1	0	0	0	40	85
545-600	1	0	1	0	33	0	0	0	3	0	27	65
<b>HOUR TOTALS</b>												
TIME	1	2	3	4	5	6	7	8	9	10	11	12
	SBLT	SBTH	SBLT	WBRT <td>WBTH<td>NBRT<td>NBTH<td>NBLT<td>EBRT<td>EBTH<td>EBLT<td>TOTAL</td> </td></td></td></td></td></td></td>	WBTH <td>NBRT<td>NBTH<td>NBLT<td>EBRT<td>EBTH<td>EBLT<td>TOTAL</td> </td></td></td></td></td></td>	NBRT <td>NBTH<td>NBLT<td>EBRT<td>EBTH<td>EBLT<td>TOTAL</td> </td></td></td></td></td>	NBTH <td>NBLT<td>EBRT<td>EBTH<td>EBLT<td>TOTAL</td> </td></td></td></td>	NBLT <td>EBRT<td>EBTH<td>EBLT<td>TOTAL</td> </td></td></td>	EBRT <td>EBTH<td>EBLT<td>TOTAL</td> </td></td>	EBTH <td>EBLT<td>TOTAL</td> </td>	EBLT <td>TOTAL</td>	TOTAL
400-500	0	0	0	2	174	2	2	1	2	4	121	310
415-515	0	0	0	2	188	3	2	0	2	5	122	326
430-530	0	1	1	2	186	3	2	0	1	6	124	328
445-545	0	1	1	2	162	3	1	0	1	3	133	328
500-600	1	1	2	1	168	1	1	0	3	3	124	308



## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S WHISTLER AVENUE  
 E/W MILLBRAE AVENUE

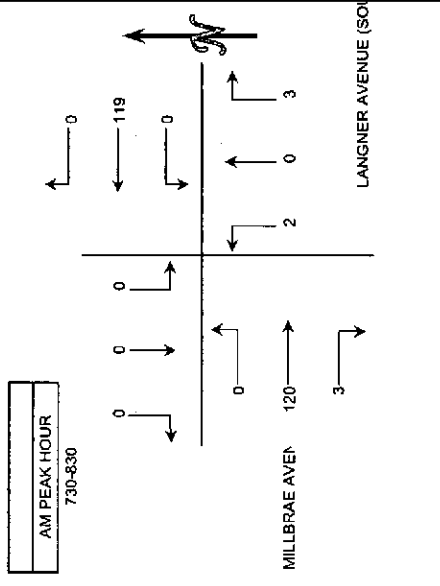
15 MIN COUNTS		7:00 AM TO 9:00 AM											
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
	SBRT	SBTH	SBLT	SBLT	WBRT	WBTH	WBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	19	0	0	0	1	0	0	0	38
715-730	0	1	0	0	34	0	1	0	0	0	0	27	63
730-745	0	1	0	0	27	0	0	0	0	0	33	0	61
745-800	0	0	0	0	24	0	0	0	1	0	21	0	46
800-815	0	1	0	3	23	0	1	0	0	0	20	0	48
815-830	0	0	0	0	20	1	0	0	0	0	24	1	46
830-845	0	0	1	1	22	0	1	0	0	1	12	0	38
845-900	0	0	0	0	16	0	0	0	1	0	19	0	36
<b>HOUR TOTALS</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>TOTAL</b>
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL	
700-800	0	2	0	0	104	0	1	1	2	0	98	0	208
715-815	0	3	0	3	108	0	2	0	1	0	101	0	218
730-830	0	2	0	3	94	1	0	0	1	0	98	1	201
745-845	0	1	1	4	89	1	1	1	1	1	77	1	178
800-900	0	1	1	4	81	1	1	1	1	1	75	1	168

15 MIN COUNTS		4:00 PM TO 6:00 PM											
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
	SBRT	SBTH	SBLT	SBLT	WBRT	WBTH	WBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	0	0	3	38	1	0	0	0	0	16	0	58
415-430	0	0	1	1	41	1	0	8	0	1	32	0	85
430-445	0	0	2	2	43	3	0	2	0	1	34	1	88
445-500	0	0	1	1	49	0	0	0	0	0	31	0	82
500-515	1	1	0	4	58	0	0	0	1	1	21	1	88
515-530	0	0	0	5	41	1	0	0	0	0	36	0	83
530-545	2	1	1	0	37	0	2	2	0	0	37	0	82
545-600	0	0	3	0	40	0	0	2	0	0	25	0	70
<b>HOUR TOTALS</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>TOTAL</b>
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL	
400-500	0	0	4	7	171	5	0	10	0	2	113	1	313
415-515	1	1	4	8	191	4	0	10	1	3	118	2	343
430-530	1	1	3	12	191	4	0	2	1	2	122	2	341
445-545	3	2	2	10	185	1	2	2	1	1	125	1	335
500-600	3	2	4	9	176	1	2	4	1	1	119	1	323

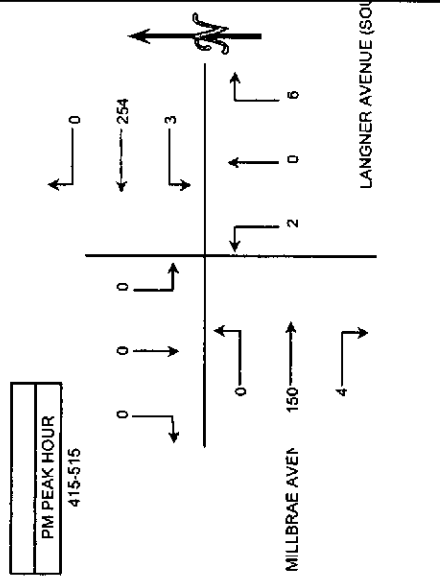
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S LANGNER AVENUE (SOUTH)  
 E/W MILLBRAE AVENUE

15 MIN PERIOD	7:00 AM TO 9:00 AM											
	1	2	3	4	5	6	7	8	9	10	11	12
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
700-715	0	0	0	0	13	0	0	0	0	1	0	0
715-730	0	0	0	0	20	0	2	0	0	0	29	0
730-745	0	0	0	0	33	0	2	0	1	0	29	0
745-800	0	0	0	0	33	0	1	0	0	1	34	0
800-815	0	0	0	0	29	0	0	0	1	0	29	0
815-830	0	0	0	0	24	0	0	0	0	2	26	0
830-845	0	0	0	0	19	1	0	0	0	2	27	0
845-900	0	0	0	0	18	1	1	0	0	4	25	0
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>181</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>25</b>	<b>0</b>
<b>TIME</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
700-800	0	0	0	0	98	0	5	0	2	1	108	0
715-815	0	0	0	0	115	0	5	0	2	1	121	0
730-830	0	0	0	0	119	0	3	0	2	3	120	0
745-845	0	0	0	0	105	1	1	0	1	5	118	0
800-900	0	0	0	0	90	2	1	0	1	8	109	0
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>527</b>	<b>3</b>	<b>16</b>	<b>0</b>	<b>8</b>	<b>18</b>	<b>576</b>	<b>0</b>



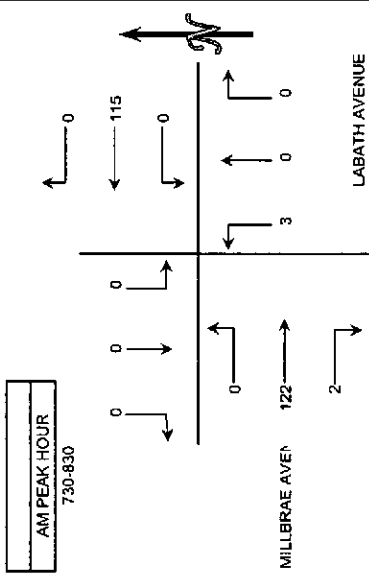
15 MIN PERIOD	4:00 PM TO 6:00 PM											
	1	2	3	4	5	6	7	8	9	10	11	12
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
400-415	0	0	0	0	54	0	0	0	0	1	0	0
415-430	0	0	0	0	60	0	2	0	0	2	36	0
430-445	0	0	0	0	65	1	1	0	0	1	36	0
445-500	0	0	0	0	66	1	3	0	0	1	41	0
500-515	0	0	0	0	63	1	0	0	2	0	37	0
515-530	0	0	0	0	59	0	2	0	2	1	33	0
530-545	0	0	0	0	55	0	0	0	0	0	41	0
545-600	0	0	0	0	51	0	0	0	0	2	32	0
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>511</b>	<b>3</b>	<b>11</b>	<b>0</b>	<b>8</b>	<b>18</b>	<b>322</b>	<b>0</b>
<b>TIME</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
400-500	0	0	0	0	245	2	6	0	1	4	131	0
415-515	0	0	0	0	254	3	6	0	2	4	150	0
430-530	0	0	0	0	253	3	6	0	4	3	147	0
445-545	0	0	0	0	243	2	5	0	4	2	152	0
500-600	0	0	0	0	228	1	2	0	4	3	143	0
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1533</b>	<b>11</b>	<b>36</b>	<b>0</b>	<b>14</b>	<b>17</b>	<b>673</b>	<b>0</b>



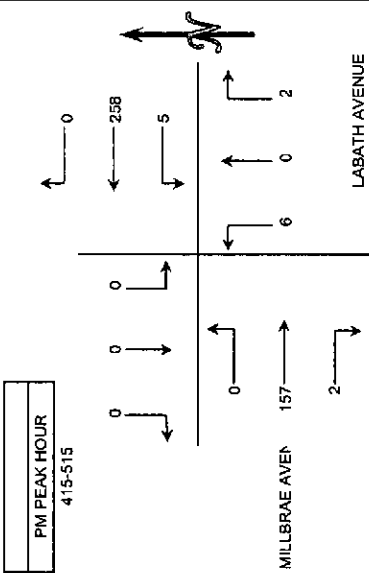
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S LABATH AVENUE  
 E/W MILLBRAE AVENUE

15 MIN COUNTS	7:00 AM TO 9:00 AM												
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBRT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	16	0	0	0	2	0	13	0	31
715-730	0	0	0	0	20	1	0	0	0	0	25	0	46
730-745	0	0	0	0	35	0	0	0	0	1	34	0	70
745-800	0	0	0	0	28	0	0	0	0	1	36	0	67
800-815	0	0	0	0	25	0	0	0	3	0	23	0	51
815-830	0	0	0	0	27	0	0	0	0	0	27	0	54
830-845	0	0	0	0	21	0	0	0	0	1	28	0	50
845-900	0	0	0	0	28	0	2	0	0	2	29	0	61
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>122</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>107</b>	<b>0</b>	<b>216</b>
TIME	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
700-800	0	0	0	0	93	1	0	0	2	2	110	0	214
715-815	0	0	0	0	108	1	0	0	3	2	120	0	234
730-830	0	0	0	0	115	0	0	0	3	2	122	0	242
745-845	0	0	0	0	101	0	0	0	3	2	116	0	222
800-900	0	0	0	0	101	0	2	0	3	3	107	0	216



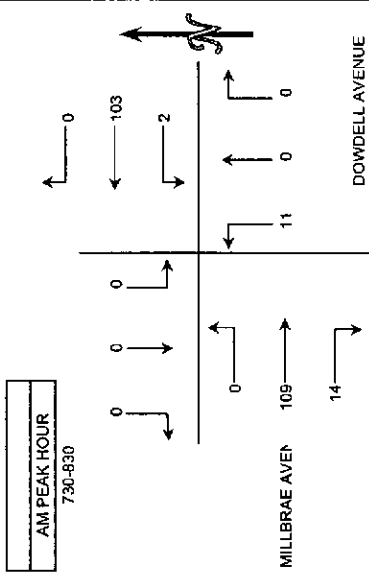
15 MIN COUNTS	4:00 PM TO 6:00 PM												
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBRT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	0	0	0	0	52	5	1	0	0	2	26	0	86
415-430	0	0	0	0	58	1	0	0	1	0	38	0	98
430-445	0	0	0	0	69	1	0	0	2	0	42	0	114
445-500	0	0	0	0	53	0	0	0	1	2	40	0	96
500-515	0	0	0	0	78	3	2	0	2	0	37	0	122
515-530	0	0	0	0	50	0	1	0	1	0	33	0	85
530-545	0	0	0	0	50	0	0	0	1	4	39	0	94
545-600	0	0	0	0	48	1	0	0	3	0	39	0	91
<b>HOUR TOTALS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>445</b>	<b>15</b>	<b>6</b>	<b>0</b>	<b>13</b>	<b>10</b>	<b>148</b>	<b>0</b>	<b>392</b>
TIME	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
400-500	0	0	0	0	232	7	1	0	4	4	146	0	394
415-515	0	0	0	0	258	5	2	0	6	2	157	0	430
430-530	0	0	0	0	250	4	3	0	6	2	152	0	417
445-545	0	0	0	0	231	3	3	0	5	6	149	0	397
500-600	0	0	0	0	226	4	3	0	7	4	148	0	392



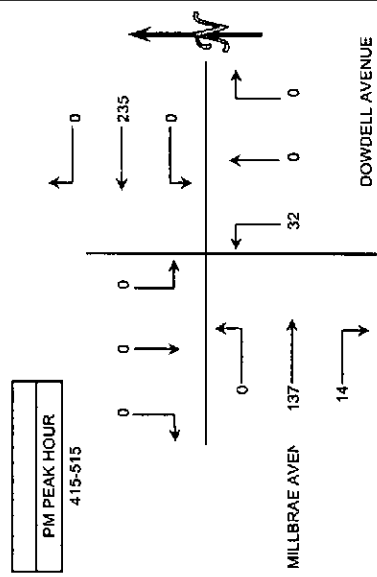
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: KIMLEY-HORN AND ASSOCIATES  
 PROJECT: ROHNERT PARK  
 DATE: WEDNESDAY, NOVEMBER 8TH 2006  
 PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM  
 INTERSECTION: N/S DOWDELL AVENUE  
 E/W MILLBRAE AVENUE

15 MIN COUNTS												
PERIOD	7:00 AM TO 9:00 AM											
	1	2	3	4	5	6	7	8	9	10	11	12
	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
700-715	0	0	0	0	16	0	0	0	2	14	0	34
715-730	0	0	0	0	25	1	1	0	3	1	24	0
730-745	0	0	0	0	31	0	0	0	2	28	0	64
745-800	0	0	0	0	27	1	0	0	1	4	30	0
800-815	0	0	0	0	22	0	0	0	1	3	24	0
815-830	0	0	0	0	23	1	0	0	7	5	26	0
830-845	0	0	0	0	22	0	0	0	1	5	15	0
845-900	0	0	0	0	20	0	1	0	2	19	0	44
<b>HOURLY TOTALS</b>												
TIME	1	2	3	4	5	6	7	8	9	10	11	12
	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
700-800	0	0	0	0	98	2	1	0	8	9	97	0
715-815	0	0	0	0	105	2	1	0	7	10	107	0
730-830	0	0	0	0	103	2	0	0	11	14	109	0
745-845	0	0	0	0	94	2	0	0	10	17	95	0
800-900	0	0	0	0	87	1	1	0	11	15	84	0



15 MIN COUNTS												
PERIOD	4:00 PM TO 6:00 PM											
	1	2	3	4	5	6	7	8	9	10	11	12
	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
400-415	0	0	0	0	51	1	1	0	7	25	0	87
415-430	0	0	0	0	50	0	0	0	9	30	0	96
430-445	0	0	0	0	62	0	0	0	6	35	0	106
445-500	0	0	0	0	64	0	0	0	6	35	0	108
500-515	0	0	0	0	59	0	0	0	11	1	37	0
515-530	0	0	0	0	38	2	0	0	6	4	37	0
530-545	0	0	0	0	46	2	0	0	8	4	36	0
545-600	0	0	0	0	42	0	1	0	9	32	0	87
<b>HOURLY TOTALS</b>												
TIME	1	2	3	4	5	6	7	8	9	10	11	12
	SBRT	SBTH	SBLT	WBRT	WBTH	WBTL	NBRT	NBTH	NBLT	EBRT	EBTH	EBTL
400-500	0	0	0	0	227	1	1	0	28	15	125	0
415-515	0	0	0	0	235	0	0	0	32	14	137	0
430-530	0	0	0	0	223	2	0	0	29	11	144	0
445-545	0	0	0	0	207	4	0	0	31	12	145	0
500-600	0	0	0	0	186	4	1	0	34	12	142	0



**EXISTING CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations												
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	4	11	63	5	54	10	852	46	53	523	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	4	12	66	5	57	11	897	48	56	551	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1612	1629	552	1618	1606	921	553					945
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1612	1629	552	1618	1606	921	553					945
vCU, unblocked vol	7.1	8.5	6.2	7.1	6.5	6.2	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	95	98	10	95	83	99					92
cM capacity (veh/h)	62	93	534	73	96	328	1017					726
Direction, Lane #												
Volume Total	16	128	11	945	56	553						
Volume Left	0	66	11	0	56	0						
Volume Right	12	57	0	48	0	2						
cSH	236	118	1017	1700	726	1700						
Volume to Capacity	0.07	1.09	0.01	0.56	0.08	0.33						
Queue Length 95th (ft)	5	191	1	0	6	0						
Control Delay (s)	21.4	180.8	8.6	0.0	10.4	0.0						
Lane LOS	C	F	A	B	B	B						
Approach Delay (s)	21.4	180.8	0.1		1.0							
Approach LOS	C	F	A		A							
Intersection Summary												
Average Delay												14.2
Intersection Capacity Utilization												64.7%
Analysis Period (min)												15
											ICU Level of Service	C

2: Wilfred Ave & Primrose Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations												
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	17	10	10	10	10	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	18	11	11	11	11	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64			28			140	129	23	140	129	59
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	64			28			140	129	23	140	129	59
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	99	99	99	99	99
cM capacity (veh/h)	1538			1585			804	761	1054	805	751	1007
Direction, Lane #												
Volume Total	39	75	32	32								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	1538	1585	851	841								
Volume to Capacity	0.01	0.01	0.04	0.04								
Queue Length 95th (ft)	1	1	3	3								
Control Delay (s)	2.0	1.1	9.4	9.4								
Lane LOS	A	A	A	A								
Approach Delay (s)	2.0	1.1	9.4	9.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Average Delay												4.3
Intersection Capacity Utilization												14.4%
Analysis Period (min)												15
											ICU Level of Service	A



3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	17	10	10	51	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	18	11	11	54	11	11	11	11	11	11
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
px, platoon unblocked											
vc, conflicting volume	64						140	129	23	140	129
vc1, stage 1 conf vol											
vc2, stage 2 conf vol	64						140	129	23	140	129
vcu, unblocked vol	4.1						7.1	6.5	6.2	7.1	6.5
ic, 2 stage (s)											
if (s)	2.2						3.5	4.0	3.3	3.5	4.0
pl queue free %	99						99	98	99	99	99
pl capacity (veh/h)	1538						804	751	1054	805	751
cm capacity (veh/h)											
Direction, Lane #	EBT	WBT	NBT	SBT	EBT	WBT	NBT	SBT	EBT	WBT	NBT
Volume Total	39	75	32	32							
Volume Left	11	11	11	11							
Volume Right	11	11	11	11							
csh	1538	1585	851	841							
Volume to Capacity	0.01	0.01	0.04	0.04							
Queue Length 95th (ft)	1	1	3	3							
Control Delay (s)	2.0	1.1	9.4	9.4							
Lane LOS	A	A	A	A							
Approach Delay (s)	2.0	1.1	9.4	9.4							
Approach LOS	A	A	A	A							
Intersection Summary											
Average Delay	4.3										
Intersection Capacity Utilization	14.4%										
Analysis Period (min)	15										
ICU Level of Service	A										

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	17	10	10	51	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	18	11	11	54	11	11	11	11	11	11
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
px, platoon unblocked											
vc, conflicting volume	64						140	129	23	140	129
vc1, stage 1 conf vol											
vc2, stage 2 conf vol	64						140	129	23	140	129
vcu, unblocked vol	4.1						7.1	6.5	6.2	7.1	6.5
ic, 2 stage (s)											
if (s)	2.2						3.5	4.0	3.3	3.5	4.0
pl queue free %	99						99	98	99	99	99
pl capacity (veh/h)	1538						804	751	1054	805	751
cm capacity (veh/h)											
Direction, Lane #	EBT	WBT	NBT	SBT	EBT	WBT	NBT	SBT	EBT	WBT	NBT
Volume Total	39	75	32	32							
Volume Left	11	11	11	11							
Volume Right	11	11	11	11							
csh	1538	1585	851	841							
Volume to Capacity	0.01	0.01	0.04	0.04							
Queue Length 95th (ft)	1	1	3	3							
Control Delay (s)	2.0	1.1	9.4	9.4							
Lane LOS	A	A	A	A							
Approach Delay (s)	2.0	1.1	9.4	9.4							
Approach LOS	A	A	A	A							
Intersection Summary											
Average Delay	4.3										
Intersection Capacity Utilization	14.4%										
Analysis Period (min)	15										
ICU Level of Service	A										

5: Wilfred Ave & Labath Ave  
Graton Rancheria Casino & Hotel

6: Wilfred Ave &  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	79	8	8	86	87	8	87	85	77			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	79	8	8	86	87	8	87	85	77			
vCU, unblocked vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
IC, 2 stage (s)												
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	100	100	100	100	100	99	100	100	100			
CM capacity (veh/h)	1519	1612	1612	899	803	1073	896	805	994			
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	8	79	3	7								
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
Volume Right	0	4	2	0	0	0	0	0	0	0	0	0
cSH	1519	1612	1008	882								
Volume to Capacity	0.00	0.00	0.00	0.00	0.01							
Queue Length 95th (ft)	0	0	0	0	1							
Control Delay (s)	0.0	0.0	0.0	8.6	9.1							
Lane LOS	A	A	A	A	A							
Approach Delay (s)	0.0	0.0	0.0	8.6	9.1							
Approach LOS	A	A	A	A	A							
Intersection Summary												
Average Delay	1.0											
Intersection Capacity Utilization	14.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	18	1	0	62	9	1	3	5	11	2	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	19	1	0	65	9	1	3	5	12	2	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)						630						
pX, platoon unblocked												
vC, conflicting volume	75	20	20	99	96	19	98	92	70			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	75	20	20	99	96	19	98	92	70			
vCU, unblocked vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
IC, 2 stage (s)												
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	100	100	100	100	100	99	100	100	99			
CM capacity (veh/h)	1525	1596	1596	875	783	1059	876	797	993			
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	21	75	9	20								
Volume Left	1	0	1	12								
Volume Right	1	9	5	6								
cSH	1525	1596	933	800								
Volume to Capacity	0.00	0.00	0.01	0.02								
Queue Length 95th (ft)	0	0	0	1								
Control Delay (s)	0.4	0.0	8.9	9.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	0.4	0.0	8.9	9.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Average Delay	2.2											
Intersection Capacity Utilization	14.2%											
Analysis Period (min)	15											
ICU Level of Service	A											

7: Wilfred Ave & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1720	1778	2787	1770	3539	1583	1770	3492				
Satd. Flow (prot)	1720	1778	2787	1770	3539	1583	1770	3492				
Fit Permitted	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1720	1778	2787	1770	3539	1583	1770	3492				
Volume (vph)	4	9	13	187	9	570	35	515	59	221	364	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	9	14	197	9	600	37	542	62	233	383	37
RTOR Reduction (vph)	0	13	0	0	0	373	0	0	50	0	0	0
Lane Group Flow (vph)	0	14	0	206	227	37	542	12	293	412	0	0
Turn Type	Split	Split	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	5	2	1	6			
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	2.9	29.8	29.8	4.8	15.2	15.2	14.1	24.5				
Effective Green, g (s)	3.4	30.3	30.3	5.3	15.7	15.7	14.6	25.0				
Actuated g/C Ratio	0.04	0.38	0.38	0.07	0.20	0.20	0.18	0.31				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	73	673	1056	117	695	311	323	1091				
v/s Ratio Prot	<0.01	<0.12	0.08	0.02	<0.15	0.01	<0.13	0.12				
v/s Ratio Perm	0.19	0.31	0.22	0.32	0.78	0.04	0.72	0.38				
Uniform Delay, d1	37.0	17.5	16.8	35.6	30.5	26.0	30.8	21.4				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.62				
Incremental Delay, d2	1.2	1.2	0.5	1.6	5.5	0.1	4.4	0.1				
Delay (s)	38.2	18.6	17.3	37.2	36.1	26.1	26.6	13.5				
Level of Service	D	B	B	D	D	C	C	B				
Approach Delay (s)	38.2	17.6	17.6	35.2	35.2	26.1	26.6	13.5				
Approach LOS	D	B	B	D	D	C	C	B				
Intersection Summary												
HCM Average Control Delay	23.3											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	54.0%											
Analysis Period (min)	15											
Critical Lane Group	c											

8: Commerce Boulevard & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	0.92	1.00	1.00	0.85	1.00	0.95	1.00
Fit	1.00	1.00	1.00	0.85	1.00	0.92	1.00	1.00	0.85	1.00	0.95	1.00
Fit Protected	1770	1863	1583	1770	3269	1770	3539	1583	1770	3529		
Satd. Flow (prot)	1770	1863	1583	1770	3269	1770	3539	1583	1770	3529		
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3269	1770	3539	1583	1770	3529		
Volume (vph)	4	127	36	268	235	244	40	121	618	261	149	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	134	38	282	247	257	42	127	651	275	157	3
RTOR Reduction (vph)	0	0	0	32	0	197	0	0	352	0	1	0
Lane Group Flow (vph)	4	134	0	262	307	0	42	127	299	275	159	0
Turn Type	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot
Protected Phases	7	4	4	4	4	4	5	2	2	1	6	
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	1.3	12.9	12.9	6.5	18.1	3.5	25.8	25.8	16.8	39.1		
Effective Green, g (s)	1.8	13.4	13.4	7.0	18.6	4.0	26.3	26.3	17.3	39.6		
Actuated g/C Ratio	0.02	0.17	0.17	0.09	0.23	0.05	0.33	0.33	0.22	0.50		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
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)	40	312	285	155	760	89	1163	520	383	1747		
v/s Ratio Prot	0.00	0.07	0.00	<0.16	<0.09	0.02	0.04	<0.19	<0.16	0.05		
v/s Ratio Perm	0.10	0.43	0.02	1.82	0.40	0.47	0.11	0.57	0.72	0.09		
Uniform Delay, d1	38.3	29.9	27.8	36.5	26.0	37.0	18.7	22.2	29.1	10.7		
Progression Factor	1.00	1.00	1.00	1.29	1.20	0.91	0.97	1.99	1.00	1.00		
Incremental Delay, d2	1.1	1.0	0.0	389.0	0.3	3.2	0.2	3.8	6.3	0.1		
Delay (s)	39.4	30.9	27.9	436.0	31.6	36.8	18.3	48.1	35.4	10.8		
Level of Service	D	C	C	F	C	D	B	D	D	B		
Approach Delay (s)	39.4	17.6	17.6	35.2	35.2	26.1	26.6	13.5				
Approach LOS	D	B	B	D	D	C	C	B				
Intersection Summary												
HCM Average Control Delay	86.1											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	69.4%											
Analysis Period (min)	15											
Critical Lane Group	c											

10: Wilfred Avenue & Commerce Boulevard  
Graton Rancheria Casino & Hotel

11: Wilfred Avenue & Robert Lakes Road  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Existing Conditions  
PM PEAK

Movement	WBR	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	1.00	1.00	1.00
Lane Util. Factor	0.97	1.00	1.00	1.00
Flt	0.95	1.00	1.00	1.00
Flt Protected	3433	1583	1583	1770
Sat'd. Flow (prot)	390	471	571	463
Flt Permitted	0.95	1.00	1.00	0.95
Sat'd. Flow (perm)	3433	1583	1583	1770
Volume (vph)	390	471	571	463
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	411	471	601	576
RTOR Reduction (vph)	0	360	0	0
Lane Group Flow (vph)	411	325	270	576
Turn Type	Perm	Perm	Prot	Perm
Protected Phases	3	2	1	6
Permitted Phases	15.0	15.0	35.5	16.0
Actuated Green, G (s)	15.5	15.5	36.0	16.5
Effective Green, g (s)	0.19	0.19	0.45	0.21
Actuated g/C Ratio	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0
Vehicle Extension (s)	665	307	838	712
Lane Grp Cap (vph)	<math>0.12</math>	0.17	0.17	<math>0.33</math>
v/s Ratio Prot	0.06	0.30	0.39	1.58
v/s Ratio Perm	0.62	27.6	14.7	14.6
Uniform Delay, d1	1.31	5.16	0.95	3.74
Progression Factor	1.7	0.5	1.3	1.5
Incremental Delay, d2	40.4	143.0	15.2	56.0
Delay (s)	D	F	E	F
Level of Service	D	F	E	F
Approach Delay (s)	95.2	41.7	164.1	164.1
Approach LOS	F	D	F	F
<b>Intersection Summary</b>				
HCM Average Control Delay	103.4			HCM Level of Service
HCM Volume to Capacity ratio	0.69			F
Actuated Cycle Length (s)	80.0			Sum of lost time (s)
Intersection Capacity Utilization	72.3%			ICU Level of Service
Analysis Period (min)	15			C
c - Critical Lane Group				

Movement	EBT	WBT	WBR	SBR
Lane Configurations	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00
Flt	0.95	1.00	1.00	0.95
Flt Protected	1770	3539	3493	1770
Sat'd. Flow (prot)	0.95	1.00	1.00	0.95
Flt Permitted	1770	3539	3493	1770
Sat'd. Flow (perm)	1770	3539	3493	1770
Volume (vph)	189	896	483	116
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	199	933	508	122
RTOR Reduction (vph)	0	0	8	0
Lane Group Flow (vph)	199	933	549	122
Turn Type	Prot	Perm	Perm	Perm
Protected Phases	7	4	8	6
Permitted Phases	14.2	50.5	31.8	20.5
Actuated Green, G (s)	14.7	51.0	32.3	21.0
Effective Green, g (s)	0.18	0.84	0.40	0.26
Actuated g/C Ratio	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0
Vehicle Extension (s)	325	2256	1410	465
Lane Grp Cap (vph)	<math>0.11</math>	<math>0.26</math>	0.16	<math>0.07</math>
v/s Ratio Prot	0.61	0.41	0.39	0.03
v/s Ratio Perm	30.0	7.1	16.9	23.4
Uniform Delay, d1	1.38	0.60	1.00	1.00
Progression Factor	0.3	0.1	0.8	1.4
Incremental Delay, d2	41.9	4.3	17.7	24.7
Delay (s)	D	A	B	C
Level of Service	D	A	B	C
Approach Delay (s)	10.9	17.7	23.7	23.7
Approach LOS	B	B	B	C
<b>Intersection Summary</b>				
HCM Average Control Delay	14.8			HCM Level of Service
HCM Volume to Capacity ratio	0.40			B
Actuated Cycle Length (s)	80.0			Sum of lost time (s)
Intersection Capacity Utilization	41.7%			ICU Level of Service
Analysis Period (min)	15			A
c - Critical Lane Group				

13: Project Dwy & Stony Point Road  
Graton Rancheria Casino & Hotel

12: US-101 NB Ramps & Commerce Boulevard  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBT	EBT	EBT	WBT	WBT	WBT	NBT	NBT	NBR	SBI	SBI	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
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	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1681	1687	1583	1741	1770	3537	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1681	1687	1583	1741	1770	3537	1770	3539	1583	1770	3539	1583
Volume (vph)	295	3	29	8	3	5	501	548	2	7	429	488
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	311	3	31	8	3	5	527	577	2	7	452	493
RTOR Reduction (vph)	0	0	26	0	5	0	0	0	0	0	0	361
Lane Group Flow (vph)	156	158	5	0	11	0	527	579	0	7	452	132
Turn Type	Split	Split	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	5	2	1	6	6	6	6
Permitted Phases	4	4	4	8	8	5	2	1	6	6	6	6
Actuated Green, G (s)	12.5	12.5	12.5	1.5	1.5	27.1	48.5	1.5	20.9	20.9	20.9	20.9
Effective Green, g (s)	13.0	13.0	13.0	2.0	2.0	27.6	47.0	2.0	21.4	21.4	21.4	21.4
Actuated g/C Ratio	0.16	0.16	0.16	0.02	0.02	0.35	0.59	0.02	0.27	0.27	0.27	0.27
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	273	274	257	44	44	611	2078	44	947	423	423	423
v/s Ratio Prot	0.09	e0.09	0.00	c0.01	c0.30	0.16	0.00	e0.13	0.08	0.08	0.08	0.08
v/s Ratio Perm	0.57	0.58	0.02	0.25	0.86	0.28	0.16	0.48	0.31	0.31	0.31	0.31
Uniform Delay, d1	30.9	31.0	28.1	38.3	24.4	6.1	38.2	24.6	23.4	23.4	23.4	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.81	1.82	1.82	1.82	1.82
Incremental Delay, d2	2.9	2.9	0.0	3.0	12.0	0.3	1.5	1.6	1.7	1.7	1.7	1.7
Delay (s)	33.8	33.9	28.2	41.3	36.4	8.5	47.0	21.4	44.5	44.5	44.5	44.5
Level of Service	C	C	C	D	D	A	D	C	D	D	D	D
Approach Delay (s)	33.3	33.3	28.2	41.3	36.4	8.5	47.0	21.4	44.5	44.5	44.5	44.5
Approach LOS	C	C	C	D	D	A	D	C	D	D	D	D
Intersection Summary	Intersection Summary											
HCM Average Control Delay	28.2 HCM Level of Service C											
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	70.1% ICU Level of Service C											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	WBT	WBT	WBT	NBT	NBT	NBR	SBI	SBI	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	908	0	0	587	0	0	587
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	956	0	0	628	0	0	628
Pedestrians	0	0	0	0	0	0	0	0	0
Lane Width (ft)	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Right turn flare (veh)	None	None	None	None	None	None	None	None	None
Median type	None	None	None	None	None	None	None	None	None
Median storage (veh)	0	0	0	0	0	0	0	0	0
Upstream signal (ft)	1584	1584	1584	1584	1584	1584	1584	1584	1584
pX, platoon unblocked	1584	1584	1584	1584	1584	1584	1584	1584	1584
VC, conflicting volume	1584	1584	1584	1584	1584	1584	1584	1584	1584
VC1, stage 1 cont vol	1584	1584	1584	1584	1584	1584	1584	1584	1584
VC2, stage 2 cont vol	1584	1584	1584	1584	1584	1584	1584	1584	1584
VCu, unblocked vol	6.4	6.2	6.2	6.4	6.2	6.2	6.4	6.2	6.2
IC, single (s)	3.5	3.3	3.3	3.5	3.3	3.3	3.5	3.3	3.3
IC, 2 stage (s)	100	100	100	100	100	100	100	100	100
IF (s)	119	313	313	119	313	313	119	313	313
p0 queue free %	3.5	3.3	3.3	3.5	3.3	3.3	3.5	3.3	3.3
GM capacity (veh/h)	119	313	313	119	313	313	119	313	313
Direction, Lane #	WB 1	NB 1	SB 1	WB 1	NB 1	SB 1	WB 1	NB 1	SB 1
Volume Total	0	956	628	0	956	628	0	956	628
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.58	0.37	0.00	0.58	0.37	0.00	0.58	0.37
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	A	A	A	A	A	A	A	A	A
Intersection Summary	Intersection Summary								
Average Delay	0.0								
Intersection Capacity Utilization	51.1% ICU Level of Service A								
Analysis Period (min)	15								

15: Business Park Drive & Redwood Drive  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Movement	EBL	EBR	NB1	NB2	NB3	SB1	SB2	SB3	
Lane Configurations	Stop	Free	Free	Free	Free	Free	Free	Free	
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	138	22	14	452	496	41			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	145	23	15	476	522	43			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)									
PK platoon unblocked									
VC conflicting volume	811	283	565						
VC1 stage 1 conf vol									
VC2 stage 2 conf vol	811	283	565						
VCU unblocked vol	6.8	6.9	4.1						
IC 2 stage (s)									
IF (s)	3.5	3.3	2.2						
pk queue free %	54	97	99						
cm capacity (veh/h)	313	714	1003						
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	
Volume Total	145	23	15	238	238	348	217		
Volume Left	145	0	15	0	0	0	0		
Volume Right	0	23	0	0	0	0	43		
CSH	313	714	1003	1700	1700	1700	1700		
Volume to Capacity	0.46	0.03	0.01	0.14	0.20	0.13			
Queue Length 95th (ft)	59	3	1	0	0	0			
Control Delay (s)	26.1	10.2	8.6	0.0	0.0	0.0			
Lane LOS	D	B	A	A	A	A			
Approach Delay (s)	23.9		0.3			0.0			
Approach LOS	C		C			B			
<b>Intersection Summary</b>									
Average Delay	3.4			3.4			3.4		
Intersection Capacity Utilization	29.3%			29.3%			29.3%		
Analysis Period (min)	15			15			15		
ICU Level of Service	A			A			A		

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Movement	WBL	WBR	NB1	NB2	NB3	SB1	SB2	SB3	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00	
Flt	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	
Flt Protected	1770	1583	1863	1583	1770	1863	1770	1863	
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863	1770	1863	
Volume (vph)	289	321	523	251	204	340			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	304	338	551	264	215	358			
RTOR Reduction (vph)	0	261	0	151	0	0			
Lane Group Flow (vph)	304	77	551	113	215	358			
Turn Type	Perim	Perim	Perim	Prot	Prot	Prot			
Protected Phases	6	2	2	1	6				
Permitted Phases	8	8	8	2	2				
Actuated Green, G (s)	14.0	14.0	26.7	26.7	9.3	40.5			
Effective Green, g (s)	14.5	14.5	27.2	27.2	9.8	41.0			
Actuated g/C Ratio	0.23	0.23	0.43	0.43	0.15	0.65			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	404	361	798	678	273	1203			
Y/s Ratio Prot	e0.17	e0.30	e0.30	e0.12	e0.19				
Y/s Ratio Perm	0.05	0.05	0.05	0.07	0.07				
Y/C Ratio	0.75	0.21	0.69	0.17	0.79	0.30			
Uniform Delay, d1	22.8	19.9	14.7	11.2	25.8	4.9			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	7.7	0.3	4.9	0.5	13.9	0.6			
Delay (s)	30.6	20.2	19.6	11.7	39.8	5.6			
Level of Service	C	C	B	B	D	A			
Approach Delay (s)	25.1		17.0		18.4				
Approach LOS	C		B		B				
<b>Intersection Summary</b>									
HCM Average Control Delay	20.0			20.0			20.0		
HCM Volume to Capacity ratio	0.73			0.73			0.73		
Actuated Cycle Length (s)	63.5			63.5			63.5		
Intersection Capacity Utilization	64.8%			64.8%			64.8%		
Analysis Period (min)	15			15			15		
ICU Level of Service	C			C			C		
Sum of lost time (s)	12.0			12.0			12.0		

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.88	0.85	1.00	0.90	1.00	0.90
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1504	1770	1669	1669	1669
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1504	1770	1669	1669	1669
Volume (vph)	36	531	44	118	490	51	61	13	123	236	45	101
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	559	46	122	516	54	64	14	129	248	47	106
RTOR Reduction (vph)	0	0	36	0	0	42	0	49	53	0	57	0
Lane Group Flow (vph)	38	569	10	122	516	12	64	27	14	248	96	0
Turn Type	Prot	Prot	Perm	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	5	2	2	2	1	6	6
Permitted Phases	3,3	16,5	16,5	4,4	17,6	17,6	4,5	16,8	16,8	24,3	36,6	36,6
Actuated Green, G (s)	3.8	17.0	17.0	4.9	18.1	18.1	5.0	17.3	17.3	24.8	37.1	37.1
Effective Green, g (s)	0.05	0.21	0.21	0.06	0.23	0.23	0.06	0.22	0.22	0.31	0.46	0.46
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	84	752	336	210	801	358	215	336	325	549	774	774
Lane Grp Cap (vph)	0.02	c0.16	0.01	0.04	c0.15	0.01	0.02	0.02	0.01	c0.14	c0.06	c0.06
v/s Ratio Prot	0.45	0.74	0.03	0.58	0.64	0.03	0.30	0.08	0.04	0.45	0.12	0.12
v/s Ratio Perm	37.1	29.5	25.0	36.6	28.0	24.1	35.8	25.0	24.8	22.1	12.2	12.2
Uniform Delay, d1	1.00	1.00	1.00	0.73	0.58	0.22	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	3.8	4.0	0.0	3.6	1.6	0.0	0.8	0.5	0.3	0.6	0.3	0.3
Incremental Delay, d2	40.9	33.5	25.0	30.3	17.1	5.3	36.6	25.5	25.1	22.7	12.5	12.5
Delay (s)	D	C	C	C	B	A	D	C	C	C	B	B
Level of Service	D	C	C	C	B	A	D	C	C	C	B	B
Approach Delay (s)	33.3			16.5			28.8				16.8	
Approach LOS	C			B			C				B	
Intersection Summary												
HCM Average Control Delay	24.6 HCM Level of Service C											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	47.8% A											
Analysis Period (min)	15											
Critical Lane Group	C											

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.91	0.91	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.92	0.85	1.00	0.95	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3126	1441	3433	1863	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3126	1441	3433	1863	1583
Volume (vph)	203	748	113	317	563	361	89	157	340	432	205	232
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	214	787	119	334	593	380	94	165	358	455	216	244
RTOR Reduction (vph)	0	0	82	0	0	263	0	156	156	0	0	188
Lane Group Flow (vph)	214	787	37	334	593	117	94	188	23	455	216	368
Turn Type	Prot	Prot	Perm	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	2	2	1	6	6
Permitted Phases	12,0	24,6	24,6	11,5	24,1	24,1	8,2	10,0	10,0	15,9	17,7	17,7
Actuated Green, G (s)	12.5	25.1	25.1	12.0	24.6	24.6	8.7	10.5	10.5	16.4	18.2	18.2
Effective Green, g (s)	0.16	0.31	0.31	0.15	0.31	0.31	0.11	0.13	0.13	0.20	0.23	0.23
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	277	1595	497	515	1088	487	192	410	189	704	424	360
Lane Grp Cap (vph)	c0.12	0.15	0.02	0.10	c0.17	0.07	0.05	0.06	0.02	c0.13	c0.12	0.04
v/s Ratio Prot	0.77	0.49	0.08	0.65	0.55	0.24	0.49	0.46	0.12	0.65	0.51	0.15
v/s Ratio Perm	32.4	22.3	19.3	32.0	23.0	20.7	33.6	32.1	30.7	28.1	27.0	24.7
Uniform Delay, d1	0.73	0.62	0.48	0.78	0.67	1.19	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	11.1	1.0	0.3	2.4	1.7	1.0	2.0	0.8	0.3	2.0	1.0	0.2
Incremental Delay, d2	C	B	A	C	B	A	C	D	C	C	C	C
Delay (s)	C	B	A	C	B	A	C	D	C	C	C	C
Level of Service	C	B	A	C	B	A	C	D	C	C	C	C
Approach Delay (s)	18.1			22.2			32.8				28.8	
Approach LOS	B			C			C				B	
Intersection Summary												
HCM Average Control Delay	24.2 HCM Level of Service C											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	60.4% B											
Analysis Period (min)	15											
Critical Lane Group	C											

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.95	1.00	0.85	0.90	1.00	0.95	1.00	0.85	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Flt Protected	4948	4948	4948	4948	4948	4948	4948	4948	4948	4948	4948	4948
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	0	1210	265	68	983	199	6	0	17	692	1	319
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1274	279	72	1036	209	6	0	18	728	1	336
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1513	0	72	1035	209	0	12	0	364	365	280
Turn Type		Prot		Free	Perm					Perm		Perm
Protected Phases		4		3		8		2		6		6
Permitted Phases												
Actuated Green, G (s)		35.8		4.8		45.1		80.0		25.9		25.9
Effective Green, g (s)		36.3		5.3		45.6		80.0		26.4		26.4
Actuated g/C Ratio		0.45		0.07		0.57		1.00		0.33		0.33
Clearance Time (s)		4.5		4.5		4.5		4.5		4.5		4.5
Vehicle Extension (s)		3.0		3.0		3.0		3.0		3.0		3.0
Lane Grp Cap (vph)		2245		117		2017		1583		509		433
v/s Ratio Prot		c0.31		0.04		c0.29		0.13		0.01		0.28
v/s Ratio Perm												
Uniform Delay, d1		0.67		0.62		0.51		0.13		0.02		0.84
Progression Factor		1.72		36.4		10.5		0.0		18.1		24.8
Incremental Delay, d2		0.42		1.05		0.86		1.00		1.00		1.00
Delay (s)		1.4		8.6		0.9		0.2		0.0		13.7
Level of Service		A		D		A		A		B		D
Approach Delay (s)		8.7		46.6		9.9		0.2		16.1		38.5
Approach LOS		A		D		A		A		B		D
Intersection Summary												
HCM Average Control Delay		16.5										B
HCM Volume to Capacity ratio		0.75										B
Actuated Cycle Length (s)		80.0								12.0		
Intersection Capacity Utilization		68.9%										C
Analysis Period (min)		15										
c Critical Lane Group												

20: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	0.85	1.00	1.00	0.85	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Flt Protected	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	15	1657	247	0	985	315	262	0	262	14	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	1744	260	0	1037	332	276	0	276	15	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	1744	260	0	1037	332	276	0	276	137	0	16
Turn Type		Prot		Free	Perm					Perm		Perm
Protected Phases		7		4		8		2		2		6
Permitted Phases												
Actuated Green, G (s)		1.1		51.5		80.0		19.5		19.5		19.5
Effective Green, g (s)		1.6		52.0		80.0		20.0		20.0		20.0
Actuated g/C Ratio		0.02		0.65		1.00		0.58		0.25		0.25
Clearance Time (s)		4.5		4.5		4.5		4.5		4.5		4.5
Vehicle Extension (s)		3.0		3.0		3.0		3.0		3.0		3.0
Lane Grp Cap (vph)		35		4165		1583		2949		1583		347
v/s Ratio Prot		0.01		c0.27		0.16		0.20		0.21		c0.20
v/s Ratio Perm												
Uniform Delay, d1		0.46		0.42		0.16		0.35		0.21		0.80
Progression Factor		1.07		1.09		1.00		0.86		1.00		1.00
Incremental Delay, d2		6.2		0.2		0.1		0.3		0.2		11.9
Delay (s)		47.7		7.6		0.1		6.1		0.2		40.0
Level of Service		D		A		A		A		D		C
Approach Delay (s)		6.9						4.6				32.7
Approach LOS		A						A		C		C
Intersection Summary												
HCM Average Control Delay		9.8										A
HCM Volume to Capacity ratio		0.52										A
Actuated Cycle Length (s)		80.0								8.0		
Intersection Capacity Utilization		48.2%										A
Analysis Period (min)		15										
c Critical Lane Group												



21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Existing Conditions  
 PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.91	1.00	0.98	1.00	0.91	1.00	0.91	1.00	0.85
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Sat'd Flow (prot)	3433	3539	1583	1770	4968	1610	3327	1583	1610	3390	1583	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Sat'd Flow (perm)	3433	3539	1583	1770	4968	1610	3327	1583	1610	3390	1583	1583
Volume (vph)	268	1120	542	117	766	140	377	275	203	102	230	157
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	282	1179	571	123	806	147	397	289	214	107	242	165
RTOR Reduction (vph)	0	0	383	0	30	0	0	0	172	0	0	140
Lane Group Flow (vph)	282	1179	188	123	923	0	221	465	42	107	242	25
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	4	3	6	2	2	2	2	6	6	6
Permitted Phases												
Actuated Green, G (s)	12.6	25.8	25.8	9.4	22.6	15.3	15.3	15.3	11.5	11.5	11.5	11.5
Effective Green, g (s)	13.1	26.3	26.3	9.9	23.1	15.8	15.8	15.8	12.0	12.0	12.0	12.0
Actuated g/C Ratio	0.16	0.33	0.33	0.12	0.29	0.20	0.20	0.20	0.15	0.15	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	562	1163	520	219	1435	318	657	313	242	509	237	237
v/s Ratio Prot	0.08	c0.33	0.12	0.07	c0.19	0.14	c0.14	0.03	0.07	c0.07	0.02	0.02
v/s Ratio Perm												
v/s Ratio	0.50	1.01	0.36	0.56	0.64	0.69	0.71	0.14	0.44	0.48	0.10	0.10
Uniform Delay, d1	30.5	26.9	20.4	33.0	24.9	29.9	29.9	26.5	31.0	31.1	29.4	29.4
Progression Factor	0.79	0.80	2.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	28.9	1.8	3.3	2.2	6.5	3.5	0.2	1.3	0.7	0.2	0.2
Delay (s)	24.7	50.4	61.8	36.3	27.1	36.3	33.4	26.7	32.2	31.8	29.6	29.6
Level of Service	C	D	E	D	C	D	D	C	C	C	C	C
Approach Delay (s)	50.0				28.1		32.5		31.2			
Approach LOS	D				C		C		C			
<b>Intersection Summary</b>												
HCM Average Control Delay	39.2											
HCM Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	69.5%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	4.0	4.0	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	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Sat'd Flow (prot)	1770	3372	1770	3539	1583	1770	1863	1770	1863	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Sat'd Flow (perm)	1770	3372	1770	3539	1583	1770	1863	1770	1863	1770	1863	1583
Volume (vph)	113	373	172	115	510	93	319	509	101	83	326	201
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	383	181	121	537	98	336	536	106	87	343	212
RTOR Reduction (vph)	0	80	0	0	0	0	77	0	0	65	0	157
Lane Group Flow (vph)	119	494	0	121	537	21	336	536	41	87	343	55
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	7	4	4	3	8	8	5	2	2	1	6	6
Permitted Phases												
Actuated Green, G (s)	5.5	14.5	14.5	5.5	14.5	14.5	13.5	25.9	25.9	5.1	17.5	17.5
Effective Green, g (s)	6.0	15.0	15.0	6.0	15.0	15.0	14.0	26.4	26.4	5.6	18.0	18.0
Actuated g/C Ratio	0.09	0.22	0.22	0.09	0.22	0.22	0.20	0.38	0.38	0.08	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	154	733	344	154	769	344	359	713	806	144	486	473
v/s Ratio Prot	0.07	0.15	0.07	c0.07	c0.15	0.01	c0.19	c0.28	0.03	0.05	0.18	0.03
v/s Ratio Perm												
v/s Ratio	0.77	0.67	0.77	0.79	0.70	0.06	0.94	0.75	0.07	0.60	0.71	0.13
Uniform Delay, d1	30.8	24.8	30.9	24.9	21.4	27.1	18.5	13.5	13.5	30.6	23.1	19.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.0	2.5	22.8	2.6	0.1	31.2	7.2	0.2	7.0	8.4	0.7	0.7
Delay (s)	51.9	27.2	53.5	27.7	21.5	58.3	25.6	13.7	37.6	31.5	20.2	20.2
Level of Service	D	C	D	D	C	C	E	B	D	D	C	C
Approach Delay (s)	31.4			31.0		35.6		28.6				
Approach LOS	C			C		D		C				
<b>Intersection Summary</b>												
HCM Average Control Delay	32.1											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	69.0											
Intersection Capacity Utilization	70.3%											
Analysis Period (min)	15											
c Critical Lane Group												

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.85	1.00	1.00	0.89	1.00	0.89	1.00	0.89
Lane Util. Factor	1.00	0.99	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3508	1770	3539	1583	1770	1656	1770	1654	1770	1654	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3508	1770	3539	1583	1770	1656	1770	1654	1770	1654	1770
Satd. Flow (perm)	1770	3508	1770	3539	1583	1770	1656	1770	1654	1770	1654	1770
Volume (vph)	78	526	32	53	563	249	48	22	63	376	28	82
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	82	553	34	56	698	262	51	23	66	396	29	86
RTOR Reduction (vph)	0	4	0	0	0	101	0	61	0	0	0	58
Lane Group Flow (vph)	82	583	0	56	698	161	51	26	0	396	57	0
Turn Type	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases												
Actuated Green, G (s)	7.2	35.7	4.4	32.9	32.9	3.3	6.2			25.7	28.6	
Effective Green, g (s)	7.7	36.2	4.9	33.4	33.4	3.8	6.7			26.2	29.1	
Actuated g/C Ratio	0.09	0.40	0.05	0.37	0.37	0.04	0.07			0.29	0.32	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5			4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	151	1411	96	1313	587	75	123			515	535	
v/s Ratio Prot	c0.05	0.17	0.03	c0.20	0.10		c0.03	0.02		c0.22	c0.03	
v/s Ratio Perm												
v/c Ratio	0.54	0.41	0.58	0.53	0.27	0.88	0.23			0.77	0.11	
Uniform Delay, d1	39.5	19.3	41.6	22.2	19.8	42.5	39.2			29.1	21.3	
Progression Factor	1.00	1.00	0.68	0.54	0.16	1.00	1.00			1.00	1.00	
Incremental Delay, d2	3.9	0.9	8.3	1.5	1.1	22.4	0.9			6.8	0.1	
Delay (s)	43.4	20.2	36.5	13.5	13.5	42	64.9			35.9	21.4	
Level of Service	D	C	D	D	B	A	D			D	C	
Approach Delay (s)	23.0	C	12.3	B	49.2	D	D			32.7	C	
Approach LOS	C	C	B	B	D	D	D			C	C	
Intersection Summary												
HCM Average Control Delay	22.1											
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	60.1%											
Analysis Period (min)	15											
c - Critical Lane Group												

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.85	1.00	0.85
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	0	687	285	99	767	0	0	0	0	617	0	182
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	723	300	104	807	0	0	0	0	649	0	192
RTOR Reduction (vph)	0	0	90	0	0	0	0	0	0	0	0	123
Lane Group Flow (vph)	0	723	210	104	807	0	0	0	0	649	0	123
Turn Type	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4		3	8						1		6
Permitted Phases												
Actuated Green, G (s)	36.4	36.4	11.6	52.5						28.5		28.5
Effective Green, g (s)	36.9	36.9	12.1	53.0						29.0		29.0
Actuated g/C Ratio	0.41	0.41	0.13	0.59						0.32		0.32
Clearance Time (s)	4.5	4.5	4.5	4.5						4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0						3.0		3.0
Lane Grp Cap (vph)	1451	649	238	2084						1106		510
v/s Ratio Prot	c0.20		0.06	c0.23						c0.18		0.04
v/s Ratio Perm												
v/c Ratio	0.50	0.32	0.44	0.39						0.59		0.14
Uniform Delay, d1	19.7	18.1	35.8	9.9						25.5		21.6
Progression Factor	0.73	0.75	1.28	1.68						1.00		1.00
Incremental Delay, d2	1.0	1.1	1.2	0.5						0.8		0.6
Delay (s)	15.4	14.6	46.9	17.1						26.3		22.2
Level of Service	B	B	D	B						C		C
Approach Delay (s)	15.2	B	20.5	C						25.4		C
Approach LOS	B	B	A	C						C		C
Intersection Summary												
HCM Average Control Delay	20.0											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	60.5%											
Analysis Period (min)	15											
c - Critical Lane Group												

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Movement	EBT	EBR	WBL	WBR	NBL	NBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	3539	3539	1770	1583		
Satd. Flow (prot)	1.00	1.00	0.95	1.00		
Flt Permitted	3539	3539	1770	1583		
Satd. Flow (perm)	1.00	1.00	0.95	1.00		
Volume (vph)	1900	0	545	321	199	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	1372	0	574	338	209	
RTOR Reduction (vph)	0	0	0	0	29	
Lane Group Flow (vph)	1372	0	574	338	180	
Turn Type	Perm					
Protected Phases	4	8	2			
Permitted Phases	2					
Actuated Green, G (s)	59.4	59.4	21.6	21.6		
Effective Green, g (s)	59.9	22.1	22.1			
Actuated g/C Ratio	0.67	0.25	0.25			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	2355	435	389			
v/s Ratio Prot	0.39					
v/s Ratio Perm	0.16	0.19	0.11			
v/s Ratio	0.58	0.24	0.78	0.46		
Uniform Delay, d1	8.2	6.0	31.7	28.9		
Progression Factor	0.71	1.00	1.00	1.00		
Incremental Delay, d2	0.9	0.2	8.5	0.9		
Delay (s)	6.7	6.3	40.1	29.8		
Level of Service	A	A	D	C		
Approach Delay (s)	6.7	6.3	36.2			
Approach LOS	A	A	D			
Intersection Summary						
HCM Average Control Delay	13.1	HCM Level of Service				
HCM Volume to Capacity ratio	0.64	B				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)				
Intersection Capacity Utilization	60.5%	B				
Analysis Period (min)	15	ICU Level of Service				
		A				

26: Millbrae Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	9	5	11	1	6	180	18	728	12	117	525
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Volume (veh/h)	9	5	11	1	6	180	18	728	12	117	525
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	5	12	1	6	189	19	766	13	123	553
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)						5					
Median type						None					
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	1322	1619	280	1341	1611	363	560				779
vC1, stage 1 conf vol											
vC2, stage 2 conf vol	1322	1619	280	1341	1611	363	560				779
vCU, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1
IC, single (s)											
IC, 2 stage (s)											
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2
p0 queue free %	86	94	98	99	93	69	98				85
p0 capacity (veh/h)	65	85	717	91	87	615	1007				834
Direction, Lane #	EB1	WB1	NB1	NB2	NB3	NB4	SB1	SB2	SB3		
Volume Total	26	197	19	383	383	13	123	368	192		
Volume Left	9	1	19	0	0	0	123	0	0		
Volume Right	12	189	0	0	0	13	0	0	0		
cSH	118	639	1007	1700	1700	834	1700	1700	1700		
Volume to Capacity	0.22	0.31	0.02	0.23	0.23	0.01	0.15	0.22	0.11		
Queue Length 95th (ft)	20	33	1	0	0	0	13	0	0		
Control Delay (s)	43.9	14.8	8.6	0.0	0.0	0.0	10.1	0.0	0.0		
Lane LOS	E	B	A	A	A	B	B	B	B		
Approach Delay (s)	43.9	14.8	0.2			1.8					
Approach LOS	E	B									
Intersection Summary											
Average Delay	3.2										
Intersection Capacity Utilization	44.7%										
Analysis Period (min)	15										
	A										

27: Millbrae Ave & Primrose Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	2	133	3	3	182	2	1	0	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	140	3	3	192	2	1	0	1	1	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)							None			None		
Median type												
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
VC, conflicting volume	194	143					345	346	142	346	346	193
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	194	143					345	346	142	346	346	193
VCU, unblocked vol	4.1	4.1					7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2	2.2					3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100	100					100	100	100	100	100	100
GM capacity (veh/h)	1380	1439					606	575	606	606	575	849
Direction: Lane #												
Volume Total	145	197	2	2	2	2	345	346	142	346	346	193
Volume Left	2	3	1	1	1	1						
Volume Right	3	2	1	0	0	0						
cSH	1380	1439	727	590								
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.1	0.1	10.0	11.1								
Lane LOS	A	A	A	B								
Approach Delay (s)	0.1	0.1	10.0	11.1								
Approach LOS	A	B	A	B								
Intersection Summary												
Average Delay	0.3			21.4%			ICU Level of Service			A		
Intersection Capacity Utilization	21.4%			15			Analysis Period (min)			15		

28: Millbrae Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	2	116	3	4	191	8	1	10	0	4	4	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	123	3	4	201	8	1	11	0	4	4	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)							None			None		
Median type												
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
VC, conflicting volume	209	127					345	348	126	349	345	205
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	209	127					345	348	126	349	345	205
VCU, unblocked vol	4.1	4.1					7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2	2.2					3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100	100					100	98	100	99	100	100
GM capacity (veh/h)	1361	1459					605	573	625	595	575	835
Direction: Lane #												
Volume Total	129	214	12	6			345	348	126	349	345	205
Volume Left	2	4	1	4								
Volume Right	3	8	0	1								
cSH	1361	1459	576	621								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (ft)	0	0	2	1								
Control Delay (s)	0.1	0.2	11.4	10.9								
Lane LOS	A	A	A	B								
Approach Delay (s)	0.1	0.2	11.4	10.9								
Approach LOS	A	B	A	B								
Intersection Summary												
Average Delay	0.7			22.7%			ICU Level of Service			A		
Intersection Capacity Utilization	22.7%			15			Analysis Period (min)			15		

29: Millbrae Ave & Langner Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	W	Y
Lane Configurations	EBL EBT EBR WBL WBT NBL NBR								
Sign Control	Free 0% 0% 0% 0% 0% 0%								
Grade	0%								
Volume (veh/h)	150	4	3	254	2	6	6		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	158	4	3	267	2	6	6		
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)	None								
Median type									
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, conflicting volume	162								
vC1, stage 1 cont vol	162								
vC2, stage 2 cont vol	162								
vCu, unblocked vol	4.1								
IC, 2 stage (s)	2.2								
IF (s)	3.5								
p0 queue free %	100								
qM capacity (veh/h)	1417								
Direction, Lane #	EB	WB	NB	1					
Volume Total	162	271	8						
Volume Left	0	3	2						
Volume Right	4	0	6						
cSH	1700	1417	781						
Volume to Capacity	0.10	0.00	0.01						
Queue Length 95th (ft)	0	0	1						
Control Delay (s)	0.0	0.1	9.7						
Lane LOS	A	A	A						
Approach Delay (s)	0.0	0.1	9.7						
Approach LOS	A	A	A						
<b>Intersection Summary</b>									
Average Delay	0.3								
Intersection Capacity Utilization	25.8%								
ICU Level of Service	A								
Analysis Period (min)	15								

30: Millbrae Ave & Labath Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	W	Y
Lane Configurations	EBL EBT EBR WBL WBT NBL NBR								
Sign Control	Free 0% 0% 0% 0% 0% 0%								
Grade	0%								
Volume (veh/h)	0	157	2	5	258	0	6	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	165	2	5	272	0	6	2	0
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)	None								
Median type									
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, conflicting volume	272								
vC1, stage 1 cont vol	272								
vC2, stage 2 cont vol	272								
vCu, unblocked vol	4.1								
IC, 2 stage (s)	2.2								
IF (s)	3.5								
p0 queue free %	100								
qM capacity (veh/h)	1292								
Direction, Lane #	EB	WB	NB	1	SB	1	SB	1	SB
Volume Total	167	277	8	0	0	0	0	0	0
Volume Left	0	5	6	0	0	0	0	0	0
Volume Right	2	0	2	0	0	0	0	0	0
cSH	1292	1410	578	1700					
Volume to Capacity	0.00	0.00	0.01	0.00					
Queue Length 95th (ft)	0	0	1	0					
Control Delay (s)	0.0	0.2	11.3	0.0					
Lane LOS	A	A	B	A					
Approach Delay (s)	0.0	0.2	11.3	0.0					
Approach LOS	B	B	A	A					
<b>Intersection Summary</b>									
Average Delay	0.3								
Intersection Capacity Utilization	27.6%								
ICU Level of Service	A								
Analysis Period (min)	15								

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	137	14	0	235	32	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	144	15	0	247	34	0
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pK, platoon unblocked				159	399	152
YC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
IC, unblocked vol				159	399	152
IC, single (s)				4.1	6.4	6.2
IC, 2 stage (s)						
IF (s)				2.2	3.5	3.3
p0 queue free %				100	94	100
CM capacity (veh/h)				1420	607	895
Direction Lane #	EBT	EBR	WBL	WBT	NBL	NBR
Volume Total	159	247	34			
Volume Left	0	0	0	34		
Volume Right	15	0	0			
GSH	1700	1420	607			
Volume to Capacity	0.09	0.00	0.06			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	0.0	11.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.3			
Approach LOS			B			
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	22.4%					
ICU Level of Service	A					
Analysis Period (min)	15					

7: Wilfred Ave & Redwood Drive  
Graton Rancheria Casino & Hotel

8: Commerce Boulevard & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Existing Conditions  
PM PEAK

Lane Group	EBT	WBT	WBR	NBT	NBT	NBR	SBU	SBU
Lane Group Flow (vph)	27	205	600	37	542	62	233	420
v/c Ratio	0.17	0.27	0.39	0.22	0.78	0.17	0.82	0.38
Control Delay	24.6	17.9	2.7	36.0	39.1	9.0	39.8	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	17.9	2.7	36.0	39.1	9.0	39.8	14.4
Queue Length 50th (ft)	6	57	0	17	134	0	125	54
Queue Length 95th (ft)	29	134	36	44	189	30	m136	m55
Internal Link Dist (ft)	550	220			110			270
Turn Bay Length (ft)				150		100	275	
Base Capacity (vph)	366	772	1550	266	730	376	750	1099
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.27	0.39	0.14	0.74	0.16	0.80	0.38

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	134	38	282	504	42	127	651	160
v/c Ratio	0.03	0.46	0.14	1.82	0.53	0.25	0.10	0.71	0.72
Control Delay	34.2	36.0	10.4	418.1	16.3	33.2	16.0	13.0	46.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	36.0	10.4	418.1	16.3	33.2	16.0	13.0	46.7
Queue Length 50th (ft)	2	63	0	223	37	18	27	173	132
Queue Length 95th (ft)	11	103	23	m372	82	m25	m44	m259	#342
Internal Link Dist (ft)		180		140		120			130
Turn Bay Length (ft)	75	75	100	150		150	150	200	200
Base Capacity (vph)	155	442	405	155	1046	398	1327	922	362
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.30	0.09	1.82	0.48	0.11	0.10	0.71	0.72

Intersection Summary  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

Intersection Summary  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

10: Wilfred Avenue & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	411	471	325	601	576	487
v/c Ratio	0.62	0.69	0.39	0.58	1.58	0.37
Control Delay	42.2	20.5	15.6	7.7	295.2	4.0
Queue Delay	0.0	0.1	0.0	0.3	0.0	0.0
Total Delay	42.2	20.7	15.6	8.0	295.2	4.0
Queue Length 50th (ft)	109	91	133	103	399	56
Queue Length 95th (ft)	153	198	104	93	646	96
Internal Link Dist (ft)	345		380		270	
Turn Bay Length (ft)	150				200	
Base Capacity (vph)	901	763	838	1043	365	1316
Starvation Cap Reductn	0	20	0	97	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.63	0.39	0.64	1.58	0.37

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # .95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	199	933	557	122	181
v/c Ratio	0.61	0.41	0.39	0.26	0.33
Control Delay	41.2	4.4	18.4	25.3	5.8
Queue Delay	0.0	0.3	0.0	0.0	0.0
Total Delay	41.2	4.7	18.4	25.3	5.8
Queue Length 50th (ft)	105	52	98	48	0
Queue Length 95th (ft)	m123	m74	157	93	46
Internal Link Dist (ft)	345	164	232		
Turn Bay Length (ft)	80		200		
Base Capacity (vph)	465	2256	1417	465	549
Starvation Cap Reductn	0	652	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.43	0.58	0.39	0.26	0.33

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.



12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	156	158	31	16	527	579	7	452	483
v/c Ratio	0.57	0.58	0.11	0.11	0.95	0.24	0.05	0.36	0.56
Control Delay	38.5	38.6	10.7	29.3	67.7	8.0	40.3	18.4	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	38.5	38.6	10.7	29.3	67.7	8.0	40.3	18.4	8.1
Queue Length 50th (ft)	76	77	0	5	261	37	3	87	66
Queue Length 95th (ft)	127	128	21	23	4461	157	m9	#176	148
Internal Link Dist (ft)	284			118	214		100	380	175
Turn Bay Length (ft)	250			438	179	531	2397	177	1266
Base Capacity (vph)	441			0	0	0	0	0	30
Starvation Cap Reductn	0			0	0	0	0	0	0
Spillback Cap Reductn	0			0	0	0	0	0	0
Storage Cap Reductn	0			0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.36	0.07	0.09	0.99	0.24	0.04	0.36	0.58

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	304	338	551	264	215	358
v/c Ratio	0.75	0.84	0.69	0.32	0.78	0.30
Control Delay	36.2	6.5	20.9	3.1	48.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	6.5	20.9	3.1	48.9	6.0
Queue Length 50th (ft)	110	0	174	0	83	56
Queue Length 95th (ft)	#210	57	282	38	#185	89
Internal Link Dist (ft)	480		3920		2550	
Turn Bay Length (ft)	175		450		700	
Base Capacity (vph)	436	644	798	829	278	1204
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.52	0.69	0.32	0.77	0.30

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Group Flow (vph)	38	559	46	122	516	54	64	76	67	248	153	
v/c Ratio	0.28	0.78	0.13	0.47	0.64	0.13	0.24	0.18	0.16	0.47	0.17	
Control Delay	40.8	38.8	8.4	31.7	19.3	2.4	37.3	11.0	8.4	26.3	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.8	38.8	8.4	31.7	19.3	2.4	37.3	11.0	8.4	26.3	5.7	
Queue Length 50th (ft)	18	138	0	15	95	0	15	6	0	100	13	
Queue Length 95th (ft)	47	194	26	43	141	m1	34	41	32	168	45	
Internal Link Dist (ft)	1540							1010			520	
Turn Bay Length (ft)	160	200	250	170	130	170	130	100	130	100		
Base Capacity (vph)	134	752	373	257	834	415	263	432	424	531	882	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.74	0.12	0.47	0.62	0.13	0.24	0.18	0.16	0.47	0.17	

Intersection Summary  
m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

Existing Conditions  
PM PEAK

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Group Flow (vph)	214	787	119	334	593	380	94	344	179	485	216	244
v/c Ratio	0.78	0.48	0.20	0.65	0.53	0.50	0.43	0.61	0.52	0.68	0.51	0.44
Control Delay	42.2	14.4	2.7	30.6	16.7	5.2	39.3	19.6	10.8	38.3	33.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	14.4	2.7	30.6	16.7	5.2	39.3	19.6	10.8	38.3	33.2	6.8
Queue Length 50th (ft)	60	64	2	30	127	45	43	42	0	108	101	0
Queue Length 95th (ft)	m137	76	m16	134	162	60	91	79	56	165	165	56
Internal Link Dist (ft)	320							554			480	
Turn Bay Length (ft)	200	250	350	155	250	155	250	175	250	175	175	
Base Capacity (vph)	288	1653	595	515	1129	764	229	805	447	666	457	572
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.48	0.20	0.65	0.53	0.50	0.41	0.43	0.40	0.68	0.47	0.43

Intersection Summary  
# 95th percentile volume exceeds capacity, queue may be longer.  
m Queue shown is maximum after two cycles.  
m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Existing Conditions  
 PM PEAK

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1553	72	1035	209	24	364	365	336	
v/c Ratio	0.66	0.51	0.51	0.13	0.05	0.84	0.88	0.58	
Control Delay	8.6	49.9	10.5	0.2	9.4	43.0	48.8	20.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.6	49.9	10.5	0.2	9.4	43.0	48.8	20.2	
Queue Length 50th (ft)	133	39	152	0	2	165	169	96	
Queue Length 95th (ft)	168	m#56	220	m0	17	#311	#323	175	
Internal Link Dist (ft)	520	960			420		378	400	
Turn Bay Length (ft)		225				400		400	
Base Capacity (vph)	2341	142	2017	1583	572	476	455	527	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.51	0.51	0.13	0.04	0.76	0.80	0.54	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	16	1744	260	1037	332	276	138	138
v/c Ratio	0.12	0.42	0.16	0.33	0.21	0.79	0.37	0.37
Control Delay	38.7	8.6	0.1	6.1	0.2	43.7	25.3	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	8.6	0.1	6.1	0.2	43.7	25.3	25.3
Queue Length 50th (ft)	8	167	0	68	0	131	60	60
Queue Length 95th (ft)	m11	m202	m0	121	m0	183	93	93
Internal Link Dist (ft)		960		360		386		420
Turn Bay Length (ft)		190				225		
Base Capacity (vph)	133	4162	1583	3178	1563	730	791	813
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.42	0.16	0.33	0.21	0.38	0.17	0.17

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

Existing Conditions  
 PM PEAK

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SNR
Lane Group Flow (vph)	282	1179	571	123	853	221	465	214	107	242	165
v/c Ratio	0.51	1.01	0.63	0.56	0.65	0.69	0.71	0.44	0.44	0.48	0.44
Control Delay	27.4	54.4	10.4	46.1	27.7	42.1	36.3	7.4	35.9	33.6	8.8
Queue Delay	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	54.4	10.8	46.1	27.7	42.1	36.3	7.4	35.9	33.6	8.8
Queue Length 50th (ft)	70	386	116	56	146	112	117	0	54	62	0
Queue Length 95th (ft)	106	504	279	152	234	196	170	53	98	91	47
Internal Link Dist (ft)	360			1350			601			660	
Turn Bay Length (ft)	250			200			250			150	
Base Capacity (vph)	558	1166	905	218	1472	342	707	505	342	720	466
Starvation Cap Reductn	0	0	76	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.01	0.69	0.56	0.65	0.65	0.66	0.42	0.31	0.34	0.35

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SNR
Lane Group Flow (vph)	119	574	121	537	98	336	536	106	87	343	212
v/c Ratio	0.78	0.70	0.78	0.89	0.23	0.92	0.74	0.16	0.51	0.74	0.38
Control Delay	63.8	24.8	65.4	29.3	6.8	61.6	28.2	4.6	40.4	35.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.8	24.8	65.4	29.3	6.8	61.6	28.2	4.6	40.4	35.5	5.9
Queue Length 50th (ft)	51	95	52	108	0	141	204	0	36	135	0
Queue Length 95th (ft)	135	146	138	157	33	284	375	29	78	256	48
Internal Link Dist (ft)	350	689	500	6630		734				960	
Turn Bay Length (ft)	350			500		150	550	675	500	625	
Base Capacity (vph)	156	896	156	859	364	721	677	177	485	555	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.64	0.78	0.83	0.21	0.92	0.74	0.16	0.49	0.74	0.38

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

23: Gravenstien Hwy & Redwood Drive  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	587	56	698	262	51	89	396
v/c Ratio	0.47	0.39	0.47	0.49	0.36	0.43	0.44	0.80
Control Delay	48.8	21.8	40.4	14.4	3.0	52.2	21.4	41.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	21.8	40.4	14.4	3.0	52.2	21.4	41.7
Queue Length 50th (ft)	44	122	33	56	2	28	13	210
Queue Length 95th (ft)	#118	212	#76	272	12	65	55	273
Internal Link Dist (ft)	6630		350		200		236	
Turn Bay Length (ft)	225	150		80	50		225	
Base Capacity (vph)	175	1520	118	1420	731	118	366	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.39	0.47	0.49	0.36	0.43	0.24	0.69

Intersection Summary  
 # 95th percentile volume exceeds capacity, queues may be longer.  
 Queue shown is maximum after two cycles.

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	723	300	104	807	649	192		
v/c Ratio	0.49	0.40	0.40	0.39	0.59	0.30		
Control Delay	16.0	8.8	47.6	17.3	28.1	5.6		
Queue Delay	0.1	0.0	0.0	0.0	0.0	0.0		
Total Delay	16.0	8.8	47.6	17.3	28.1	5.6		
Queue Length 50th (ft)	205	102	59	188	157	4		
Queue Length 95th (ft)	134	m67	m99	242	213	50		
Internal Link Dist (ft)	350		50	100	425			
Turn Bay Length (ft)	1486	753	295	2084	1106	633		
Base Capacity (vph)	0	0	0	0	0	0		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	78	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.51	0.40	0.35	0.39	0.59	0.30		

Intersection Summary  
 # 95th percentile volume exceeds capacity, queues may be longer.  
 Queue shown is maximum after two cycles.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

Existing Conditions  
 PM PEAK

	EBT	WBT	NBL	NBR
Lane Group	574	338	209	
Lane Group Flow (vph)	1372	574	338	209
v/c Ratio	0.58	0.24	0.78	0.50
Control Delay	7.6	7.1	43.6	26.5
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	7.7	7.1	43.6	26.5
Queue Length 50th (ft)	192	59	181	83
Queue Length 95th (ft)	246	110	244	132
Internal Link Dist (ft)	370	312	431	275
Turn Bay Length (ft)				
Base Capacity (vph)	2355	2355	629	588
Starvation Cap Reductn	188	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.24	0.54	0.36

Intersection Summary

**NEAR-TERM 2008 NO ACTION  
TRAFFIC CONDITIONS  
(SYNCHRO)**

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SB1	SB2	SB3	SB4
Sign Control	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	8	14	106	13	97	12	758	62	75	514	3				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95				
Hourly flow rate (vph)	0	8	15	112	14	102	13	798	65	79	541	3				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None				None											
Median storage (veh)																
Upstream signal (ft)																
pX, platoon unblocked																
pX, conflicting volume	1582	1589	543	1574	1558	831	544									863
vC1, stage 1 conf vol																
vC2, stage 2 conf vol																
vCU, unblocked vol	1582	1589	543	1574	1558	831	544									863
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1									4.1
IC, 2 stage (s)																
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2									2.2
p0 queue free %	100	91	97	0	86	72	99									90
p0 capacity (veh/h)	52	96	540	74	100	370	1025									779
Direction Lane	EB1	WB1	NB1	WB2	SB1	SB2										
Volume Total	23	227	13	863	79	544										
Volume Left	0	112	13	0	79	0										
Volume Right	15	102	0	65	0	3										
cSH	201	120	1025	1700	779	1700										
Volume to Capacity	0.12	1.90	0.01	0.51	0.10	0.32										
Queue Length 95th (ft)	10	454	1	0	8	0										
Control Delay (s)	25.3	495.5	8.6	0.0	10.1	0.0										
Lane LOS	D	F	A	B	B	B										
Approach Delay (s)	25.3	495.5	0.1		1.3											
Approach LOS	D	F	F		B											
Intersection Summary																
Average Delay	65.3															
Intersection Capacity Utilization	71.0%															
Analysis Period (min)	15															
ICU Level of Service	C															

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SB1	SB2	SB3	SB4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	131	10	201	10	10	10	10	10	10	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	138	11	212	11	11	11	11	11	11	11	11	11	11	11	11
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None				None											
Median storage (veh)																
Upstream signal (ft)																
pX, platoon unblocked																
pX, conflicting volume	222	222	148	418	407	143	418	407	217							
vC1, stage 1 conf vol																
vC2, stage 2 conf vol																
vCU, unblocked vol	222	222	148	418	407	143	418	407	217							
IC, single (s)	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2							
IC, 2 stage (s)																
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3							
p0 queue free %	99	99	99	98	98	99	98	98	99							
p0 capacity (veh/h)	1347	1347	1483	524	525	904	525	525	823							
Direction Lane	EB1	WB1	NB1	WB2	SB1	SB2										
Volume Total	159	233	32	32	11	11										
Volume Left	11	11	11	11	11	11										
Volume Right	11	11	11	11	11	11										
cSH	1347	1433	610	597												
Volume to Capacity	0.01	0.01	0.05	0.05												
Queue Length 95th (ft)	1	1	4	4												
Control Delay (s)	0.6	0.4	11.2	11.4												
Lane LOS	A	A	B	B												
Approach Delay (s)	0.6	0.4	11.2	11.4												
Approach LOS	B	B	B	B												
Intersection Summary																
Average Delay	2.0															
Intersection Capacity Utilization	24.0%															
Analysis Period (min)	15															
ICU Level of Service	A															



3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

2008  
PM Peak

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	131	10	10	200	20	10	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	138	11	11	211	21	11	11	11	11	11	11
Hourly flow rate (vph)	11	138	11	11	211	21	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
PX, platoon unblocked												
VC, conflicting volume	232		148				422	417	143	422	412	221
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	232		148				422	417	143	422	412	221
vCU, unblocked vol	4.1		4.1				7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0	3.3
IF (s)	99		99				98	98	98	98	98	98
p0 queue free %	1336		1433				521	519	804	521	522	819
GM capacity (veh/h)												
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	159	242	32	32	32	32	422	417	143	422	412	221
Volume Left	11	11	11	11	11	11						
Volume Right	11	21	11	11	11	11						
CSH	1336	1433	606	593								
Volume to Capacity	0.01	0.01	0.05	0.05								
Queue Length 95th (ft)	1	1	4	4								
Control Delay (s)	0.6	0.4	11.3	11.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.4	11.3	11.4								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	1.9											
Intersection Capacity Utilization	24.6%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	130	10	10	200	10	10	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	137	11	11	211	11	11	11	11	11	11	11
Hourly flow rate (vph)	11	137	11	11	211	11	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
PX, platoon unblocked												
VC, conflicting volume	221		147				416	405	142	416	405	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	221		147				416	405	142	416	405	216
vCU, unblocked vol	4.1		4.1				7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0	3.3
IF (s)	99		99				98	98	98	98	98	98
p0 queue free %	1348		1434				526	527	906	526	527	824
GM capacity (veh/h)												
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	158	232	32	32	32	32	416	405	142	416	405	216
Volume Left	11	11	11	11	11	11						
Volume Right	11	21	11	11	11	11						
CSH	1348	1434	612	599								
Volume to Capacity	0.01	0.01	0.05	0.05								
Queue Length 95th (ft)	1	1	4	4								
Control Delay (s)	0.6	0.4	11.2	11.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.4	11.2	11.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	2.0											
Intersection Capacity Utilization	24.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	60	13	77	116	139	99	35	6	266	112	21	14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	14	81	122	167	104	37	6	280	118	22	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC, conflicting volume	272											
vC1, stage 1 cont vol												
vC2, stage 2 cont vol												
vCU, unblocked vol	272											
IC, single (s)	4.1											
IC, 2 stage (s)												
IF (s)	2.2											
p0 queue free %	95											
pM capacity (veh/h)	1292											
Direction, Lane #	EBL	WBL	NBL	SBL	EBT	WBT	NBT	SBT	EBR	WBR	NBR	SBR
Volume Total	158	394	323	155	63	122	37	118	81	104	280	15
Volume Left	63	122	37	118	1292	1499	780	188	81	104	280	15
Volume Right	95	272	272	272	1292	1499	780	188	81	104	280	15
CSH	0.05	0.08	0.41	0.82	0.05	0.08	0.41	0.82	0.05	0.08	0.41	0.82
Volume to Capacity	4	7	51	145	4	7	51	145	4	7	51	145
Queue Length 95th (ft)	3.4	2.9	12.8	77.4	3.4	2.9	12.8	77.4	3.4	2.9	12.8	77.4
Control Delay (s)	A	A	B	F	A	A	B	F	A	A	B	F
Lane LOS	A	A	B	F	A	A	B	F	A	A	B	F
Approach Delay (s)	3.4	2.9	12.8	77.4	3.4	2.9	12.8	77.4	3.4	2.9	12.8	77.4
Approach LOS	B	B	F	F	B	B	F	F	B	B	F	F
Intersection Summary												
Average Delay	17.3											
Intersection Capacity Utilization	61.7%											
ICU Level of Service	B											
Analysis Period (min)	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	52	191	148	187	247	89	80	45	222	88	13	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	201	156	197	260	94	84	47	234	93	14	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)	630											
pX platoon unblocked												
vC, conflicting volume	0.91											
vC1, stage 1 cont vol												
vC2, stage 2 cont vol												
vCU, unblocked vol	287											
IC, single (s)	4.1											
IC, 2 stage (s)												
IF (s)	2.2											
p0 queue free %	95											
pM capacity (veh/h)	1156											
Direction, Lane #	EBL	WBL	NBL	SBL	EBT	WBT	NBT	SBT	EBR	WBR	NBR	SBR
Volume Total	412	551	355	156	55	191	84	93	156	1202	265	75
Volume Left	55	191	84	93	1156	1202	265	75	55	191	84	93
Volume Right	95	287	287	287	1156	1202	265	75	95	287	287	287
CSH	0.05	0.16	1.38	2.09	0.05	0.16	1.38	2.09	0.05	0.16	1.38	2.09
Volume to Capacity	4	15	489	356	4	15	489	356	4	15	489	356
Queue Length 95th (ft)	1.5	4.2	229.1	623.3	1.5	4.2	229.1	623.3	1.5	4.2	229.1	623.3
Control Delay (s)	A	A	F	F	A	A	F	F	A	A	F	F
Lane LOS	A	A	F	F	A	A	F	F	A	A	F	F
Approach Delay (s)	1.5	4.2	229.1	623.3	1.5	4.2	229.1	623.3	1.5	4.2	229.1	623.3
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
Average Delay	123.9											
Intersection Capacity Utilization	81.4%											
ICU Level of Service	D											
Analysis Period (min)	15											

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBR	SBB
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.97	1.00	1.00	0.94
Lane Util. Factor	1.00	0.99	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00	0.95
Flt Protected	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Satd. Flow (prot)	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Satd. Flow (perm)	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Volume (vph)	94	240	166	181	219	540	204	155	265	451	131	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	253	175	191	231	568	215	163	279	475	138	105
RTOR Reduction (vph)	0	11	0	0	0	376	0	0	256	0	17	0
Lane Group Flow (vph)	0	516	0	191	231	192	215	163	223	475	226	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	
Permitted Phases												
Actuated Green, G (s)	47.3	53.7	53.7	53.7	19.5	12.7	12.7	28.3	21.5			
Effective Green, g (s)	47.8	54.2	54.2	54.2	20.0	13.2	13.2	28.8	22.0			
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	527	569	500	536	221	292	131	618	240			
v/s Ratio Prot	c0.29	0.11	c0.13	0.12	c0.12	0.06	0.14	c0.13				
w/s Ratio Perm												
v/c Ratio	0.98	0.34	0.39	0.36	0.97	0.58	0.18	0.77	0.94			
Uniform Delay, d1	55.6	39.5	40.2	39.8	69.7	70.6	68.3	62.4	68.4			
Progression Factor	1.00	0.92	0.92	2.03	1.00	1.00	1.00	0.96	0.96			
Incremental Delay, d2	33.4	1.4	1.7	1.7	52.5	2.3	0.6	5.7	41.8			
Delay (s)	99.0	37.6	38.5	82.4	122.2	72.9	69.0	65.7	107.4			
Level of Service	F	D	D	F	F	F	E	E	F			
Approach Delay (s)	89.0	63.5	63.5	87.4	87.4	87.4	87.4	79.8	87.4			
Approach LOS	F	E	E	F	F	F	E	E	E			

Intersection Summary	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBR	SBB
HCM Average Control Delay	77.6											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	77.1%											
Analysis Period (min)	15											
c - Critical Lane Group												

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBR	SBB
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.97	1.00	1.00	0.94
Lane Util. Factor	1.00	0.99	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00	0.95
Flt Protected	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Satd. Flow (prot)	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Satd. Flow (perm)	1763	1681	1770	1583	1770	3539	1583	3433	1742			
Volume (vph)	94	240	166	181	219	540	204	155	265	451	131	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	253	175	191	231	568	215	163	279	475	138	105
RTOR Reduction (vph)	0	11	0	0	0	376	0	0	256	0	17	0
Lane Group Flow (vph)	0	516	0	191	231	192	215	163	223	475	226	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	
Permitted Phases												
Actuated Green, G (s)	47.3	53.7	53.7	53.7	19.5	12.7	12.7	28.3	21.5			
Effective Green, g (s)	47.8	54.2	54.2	54.2	20.0	13.2	13.2	28.8	22.0			
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	527	569	500	536	221	292	131	618	240			
v/s Ratio Prot	c0.29	0.11	c0.13	0.12	c0.12	0.06	0.14	c0.13				
w/s Ratio Perm												
v/c Ratio	0.98	0.34	0.39	0.36	0.97	0.58	0.18	0.77	0.94			
Uniform Delay, d1	55.6	39.5	40.2	39.8	69.7	70.6	68.3	62.4	68.4			
Progression Factor	1.00	0.92	0.92	2.03	1.00	1.00	1.00	0.96	0.96			
Incremental Delay, d2	33.4	1.4	1.7	1.7	52.5	2.3	0.6	5.7	41.8			
Delay (s)	99.0	37.6	38.5	82.4	122.2	72.9	69.0	65.7	107.4			
Level of Service	F	D	D	F	F	F	E	E	F			
Approach Delay (s)	89.0	63.5	63.5	87.4	87.4	87.4	87.4	79.8	87.4			
Approach LOS	F	E	E	F	F	F	E	E	E			

Intersection Summary	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBR	SBB
HCM Average Control Delay	77.6											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	77.1%											
Analysis Period (min)	15											
c - Critical Lane Group												

9: Wilfred Ave & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBR	EBL	WBL	WBR	NBL	NBR	NBL	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	1.00	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	3539	1583	3433	3539	1610	3092	1610	3092	1610	3092	1610	3092
Satd. Flow (prot)	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	3539	1583	3433	3539	1610	3092	1610	3092	1610	3092	1610	3092
Satd. Flow (perm)	0.737	219	69	476	0	0	0	328	324	459	0	0
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.776	231	94	501	0	0	0	345	341	483	0	0
Adj. Flow (vph)	0	124	0	0	0	0	0	0	238	0	0	0
RTOR Reduction (vph)	0	776	107	501	0	0	0	345	341	483	0	0
Lane Group Flow (vph)	0	776	107	501	0	0	0	345	341	483	0	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	4		3	8		6		6		6		6
Permitted Phases		4										
Actuated Green, G (s)	36.6	36.6	4.4	45.5		25.5		25.5		25.5		25.5
Effective Green, g (s)	37.1	37.1	4.9	46.0		26.0		26.0		26.0		26.0
Actuated g/C Ratio	0.45	0.46	0.06	0.58		0.32		0.32		0.32		0.32
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5		4.5		4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0		3.0
Lane Grp Cap (vph)	1641	734	210	2035		523		1005		1005		1005
v/s Ratio Prot	c0.22	0.07	c0.03	0.14		c0.21		0.19		0.19		0.19
v/s Ratio Perm												
v/c Ratio	0.47	0.15	0.45	0.25		0.66		0.58		0.58		0.58
Uniform Delay, d1	14.7	12.3	36.2	8.4		23.2		22.5		22.5		22.5
Progression Factor	1.27	3.97	0.99	0.84		1.00		1.00		1.00		1.00
Incremental Delay, d2	0.5	0.2	1.4	0.3		6.4		2.5		2.5		2.5
Delay (s)	19.3	49.2	37.4	7.3		29.6		25.0		25.0		25.0
Level of Service	B	D	D	A		C		C		C		C
Approach Delay (s)	26.1			12.1		26.3		26.3		26.3		26.3
Approach LOS	C			B		C		C		C		C
<b>Intersection Summary</b>												
HCM Average Control Delay	23.2											
HCM Volume to Capacity ratio	0.54											
HCM Level of Service	C											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	12.0											
Intersection Capacity Utilization	55.9%											
ICU Level of Service	B											
Analysis Period (min)	15											
c Critical Lane Group												

10: Wilfred Ave & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBR	EBL	WBL	WBR	NBL	NBR	NBL	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	1.00	0.88	1.00	0.88	1.00	0.88	1.00	0.88
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	5085	1583	3433	3405	1681	1738	2787	1770	1814	1681	1738	2787
Satd. Flow (prot)	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	5085	1583	3433	3405	1681	1738	2787	1770	1814	1681	1738	2787
Satd. Flow (perm)	0.558	507	413	344	117	222	108	569	42	41	9	9
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.587	534	435	362	123	234	114	599	44	43	9	9
Adj. Flow (vph)	0	414	0	34	0	0	0	475	0	7	0	0
RTOR Reduction (vph)	0	587	120	435	451	0	170	178	124	44	45	45
Lane Group Flow (vph)	0	587	120	435	451	0	170	178	124	44	45	45
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6		6
Permitted Phases												
Actuated Green, G (s)	17.5	17.5	12.5	34.5		16.0		16.0		16.0		16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0		16.5		16.5		16.5		16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44		0.21		0.21		0.21		0.21
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5		4.5		4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0		3.0
Lane Grp Cap (vph)	1144	356	558	1490		347		358		365		374
v/s Ratio Prot	c0.12	0.08	c0.13	0.13		0.10		c0.10		c0.02		0.02
v/s Ratio Perm												
v/c Ratio	0.51	0.34	0.78	0.30		0.49		0.50		0.21		0.12
Uniform Delay, d1	27.2	26.0	32.1	14.6		28.0		28.1		26.4		25.8
Progression Factor	1.45	9.38	1.18	1.22		0.87		0.86		1.58		0.86
Incremental Delay, d2	1.4	2.2	6.3	0.5		4.6		4.5		0.8		0.7
Delay (s)	40.7	246.1	44.2	18.3		28.8		28.8		42.4		22.3
Level of Service	D	F	D	B		C		C		D		C
Approach Delay (s)	138.6			30.5		37.4		37.4		22.6		22.6
Approach LOS	F			C		D		D		C		C
<b>Intersection Summary</b>												
HCM Average Control Delay	71.7											
HCM Volume to Capacity ratio	0.46											
HCM Level of Service	E											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	16.0											
Intersection Capacity Utilization	56.5%											
ICU Level of Service	B											
Analysis Period (min)	15											
c Critical Lane Group												

11: Wilfred Ave & Robert Lakes Road  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EET	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	3513	1770	1583	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	3513	1770	1583	1770
Volume (vph)	195	970	637	33	92	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	1021	671	35	97	248
RTOR Reduction (vph)	0	0	4	0	0	183
Lane Group Flow (vph)	205	1021	702	0	97	65
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	9.9	50.5	36.1	20.5	20.5	20.5
Effective Green, g (s)	10.4	51.0	36.6	21.0	21.0	21.0
Actuated g/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	446	2256	1607	463	416	416
v/s Ratio Prot	0.06	c0.29	0.20	c0.05		
v/s Ratio Perm						
w/c Ratio	0.46	0.45	0.44	0.21	0.16	0.04
Uniform Delay, d1	32.2	7.4	14.7	23.0	22.7	1.00
Progression Factor	0.94	2.06	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.9	1.0	0.8	0.8
Delay (s)	30.8	15.8	15.6	24.0	23.5	23.5
Level of Service	C	B	B	B	C	C
Approach Delay (s)	18.3	15.6	23.6			
Approach LOS	B	B	B			
Intersection Summary						
HCM Average Control Delay	18.3					
HCM Volume to Capacity ratio	0.38					
Actuated Cycle Length (s)	80.0					
Intersection Capacity Utilization	39.9%					
Analysis Period (min)	15					
c Critical Lane Group						

12: US-101 NB Ramps & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EET	EBR	WBT	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	0.85	0.96	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00	0.98	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1681	1687	1583	1741	1770	3537	1770	3539	1583
Flt Permitted	0.95	0.95	1.00	0.96	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1687	1583	1741	1770	3537	1770	3539	1583
Volume (vph)	387	3	40	8	3	5	514	489	2
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	407	3	42	8	3	5	541	515	2
RTOR Reduction (vph)	0	0	34	0	5	0	0	0	0
Lane Group Flow (vph)	204	206	8	0	11	0	541	517	0
Turn Type	Split	Perm	Split	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	8	8	5	2	1	6
Permitted Phases									
Actuated Green, G (s)	14.6	14.6	14.6	15.5	27.1	44.4	1.5	18.8	18.8
Effective Green, g (s)	15.1	15.1	15.1	2.0	27.6	44.9	2.0	19.3	19.3
Actuated g/C Ratio	0.19	0.19	0.19	0.02	0.35	0.56	0.02	0.24	0.24
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	318	299	44	611	1985	44	854	382
v/s Ratio Prot	0.12	c0.12		c0.01	c0.31	0.15	0.00	c0.13	0.08
v/s Ratio Perm									
w/c Ratio	0.64	0.65	0.63	0.25	0.89	0.26	0.16	0.54	0.34
Uniform Delay, d1	30.0	30.0	26.5	38.3	24.7	9.0	38.2	26.5	25.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.31	1.17	4.44
Incremental Delay, d2	4.4	4.5	0.0	3.0	14.4	0.3	1.2	1.7	1.7
Delay (s)	34.4	34.5	26.5	41.3	39.1	9.3	51.1	32.6	113.2
Level of Service	C	C	C	D	D	A	D	C	F
Approach Delay (s)	33.7			41.3	24.6				
Approach LOS	C			D	C				
Intersection Summary									
HCM Average Control Delay	45.7								
HCM Volume to Capacity ratio	0.70								
Actuated Cycle Length (s)	80.0								
Intersection Capacity Utilization	73.5%								
Analysis Period (min)	15								
c Critical Lane Group									

Movement	WB	WBR	NBT	NBR	SBL	SBT
Sign Control	Stop	0%	Free	0%	Free	0%
Grade	0	0	832	0	0	634
Volume (veh/h)	0	0	0.95	0.95	0.95	0.95
Peak Hour Factor	0	0	0.876	0	0	0.667
Hourly flow rate (vph)	0	0	876	0	0	667
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked			1543	876		876
vC conflicting volume						
vC1 stage 1 conf vol						
vC2 stage 2 conf vol			1543	876		876
vCU unblocked vol			6.4	6.2		4.1
IC single (s)						
IC 2 stage (s)			3.5	3.3		2.2
pf queue free %			100	100		100
sv capacity (veh/h)			126	348		771
Direction Lane #	WB	WBR	NBT	NBR	SBL	SBT
Volume Total	0	876	667	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	876	667	0	0	0
CSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.52	0.39	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	A	A	A	A	A	A

Intersection Summary		
Average Delay	0.0	
Intersection Capacity Utilization	47.1%	ICU Level of Service A
Analysis Period (min)	15	

Movement	EBU	EBR	NBL	NBT	SBL	SBT
Sign Control	Stop	0%	Free	0%	Free	0%
Grade	0	0	172	89	33	464
Volume (veh/h)	0	0	0.95	0.95	0.95	0.95
Peak Hour Factor	0	0	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	94	94	35	488
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked			850	279	558	
vC conflicting volume						
vC1 stage 1 conf vol						
vC2 stage 2 conf vol			850	279	558	
vCU unblocked vol			6.8	6.9	4.1	
IC single (s)						
IC 2 stage (s)			3.5	3.3	2.2	
pf queue free %			37	87	97	
sv capacity (veh/h)			289	718	1009	
Direction Lane #	EBU	EBR	NBL	NBT	SBL	SBT
Volume Total	181	94	35	244	244	343
Volume Left	181	0	0	0	0	0
Volume Right	0	94	0	0	0	43
CSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.20	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A	A	A	A
Approach Delay (s)	27.5	0.6	0.6	0.0	0.0	0.0
Approach LOS	D	D	D	A	A	A

Intersection Summary		
Average Delay	5.8	
Intersection Capacity Utilization	37.7%	ICU Level of Service A
Analysis Period (min)	15	

2008 PM Peak  
16: Rohnert Park Expy & Stony Point Road  
Graton Rancheria Casino & Hotel

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1770	1863	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	257	286	546	251	272	421
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	301	575	264	293	443
RTOR Reduction (vph)	0	235	0	150	0	0
Lane Group Flow (vph)	271	66	575	114	223	443
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	2	2	1	6	6
Permitted Phases	8	2	2	1	6	6
Actuated Green, G (s)	13.3	26.7	26.7	9.4	40.6	40.6
Effective Green, g (s)	13.8	27.2	27.2	9.9	41.1	41.1
Actuated g/C Ratio	0.22	0.43	0.43	0.16	0.65	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	388	477	806	685	279	1217
v/s Ratio Prot	c0.15	c0.31	c0.13	c0.13	0.24	0.24
v/s Ratio Perm	0.04	0.07	0.07	0.00	0.36	0.36
Uniform Delay, d1	22.6	20.0	14.7	10.9	25.5	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	0.3	5.3	0.5	14.7	0.8
Delay (s)	28.0	20.3	20.0	11.4	40.3	5.8
Level of Service	C	C	B	B	D	A
Approach Delay (s)	24.0	17.3	17.3	17.3	17.3	17.3
Approach LOS	C	B	B	B	C	B
<b>Intersection Summary</b>						
HCM Average Control Delay	19.1					HCM Level of Service B
HCM Volume to Capacity ratio	0.73					
Actuated Cycle Length (s)	62.9					Sum of lost time (s) 12.0
Intersection Capacity Utilization	64.7%					ICU Level of Service C
Analysis Period (min)	15					
c Critical Lane Group						

2008 PM Peak  
17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1504	1770	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	3539	1504	1770	1583
Volume (vph)	50	600	36	202	575	154	64	19	154	270	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	632	38	213	605	162	67	20	162	284	45
RTOR Reduction (vph)	0	0	29	0	0	120	0	63	69	0	59
Lane Group Flow (vph)	53	632	9	213	605	42	67	34	16	284	90
Turn Type	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	3	3	8	8	2	2	1	6	6
Permitted Phases	7	4	3	3	8	8	2	2	1	6	6
Actuated Green, G (s)	3.3	18.0	18.0	5.5	20.2	20.2	4.4	14.1	14.1	24.4	34.1
Effective Green, g (s)	3.8	18.5	18.5	6.0	20.7	20.7	4.9	14.6	14.6	24.9	34.6
Actuated g/C Ratio	0.05	0.23	0.23	0.08	0.26	0.26	0.06	0.18	0.18	0.31	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	818	366	257	916	410	210	285	274	551	721
v/s Ratio Prot	0.03	c0.18	c0.06	0.17	0.03	c0.02	c0.02	c0.16	0.05	0.01	0.01
v/s Ratio Perm	0.63	0.77	0.02	0.83	0.66	0.10	0.32	0.12	0.06	0.32	0.12
Uniform Delay, d1	37.4	28.8	23.8	36.5	26.5	22.6	36.0	27.3	27.0	22.6	13.6
Progression Factor	1.00	1.00	1.00	0.80	0.56	0.27	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	4.6	0.0	16.3	1.5	0.1	0.9	0.9	0.4	0.8	0.4
Delay (s)	51.8	33.3	23.8	45.5	16.4	6.1	36.8	28.2	27.4	23.4	14.0
Level of Service	D	C	C	D	B	A	D	C	C	C	B
Approach Delay (s)	34.2	34.2	34.2	21.0	21.0	21.0	30.2	30.2	30.2	20.2	20.2
Approach LOS	C	C	C	C	C	C	C	C	C	C	C
<b>Intersection Summary</b>											
HCM Average Control Delay	25.8										HCM Level of Service C
HCM Volume to Capacity ratio	0.54										
Actuated Cycle Length (s)	80.0										Sum of lost time (s) 16.0
Intersection Capacity Utilization	54.8%										ICU Level of Service A
Analysis Period (min)	15										
c Critical Lane Group											

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.94	0.91	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Satd. Flow (perm)	233	701	146	371	656	358	137	252	422	364	264	243
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	738	154	391	691	377	144	265	444	383	278	255
RTOR Reduction (vph)	0	0	103	0	0	255	0	117	227	0	0	208
Lane Group Flow (vph)	245	738	51	391	691	122	144	318	47	383	278	30
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	8	5	2	1	6	6	6
Permitted Phases	12.1	26.0	26.0	11.5	25.4	25.4	9.5	13.1	13.1	11.4	15.0	15.0
Actuated Green, G (s)	12.6	26.5	26.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	15.5	15.5
Effective Green, g (s)	0.18	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19	0.19
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	279	1884	524	515	1146	512	221	542	245	511	361	307
Lane Grp Cap (vph)	c0.14	0.15	0.03	c0.11	c0.20	0.08	0.10	0.03	0.03	c0.11	c0.15	0.03
w/s Ratio Prot	0.68	0.44	0.10	0.76	0.60	0.24	0.65	0.59	0.19	0.75	0.77	0.16
w/s Ratio Perm	32.9	20.9	18.5	32.6	22.7	19.8	33.3	30.6	28.5	32.6	30.6	26.8
Uniform Delay, d1	0.76	0.54	0.46	0.79	0.69	1.06	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	20.5	0.6	0.3	5.4	2.0	0.9	6.7	1.6	0.4	6.0	9.7	0.2
Incremental Delay, d2	45.6	12.0	8.7	31.2	17.8	21.9	40.1	32.2	28.9	38.6	40.3	27.1
Delay (s)	D	B	A	C	B	C	D	C	C	D	D	C
Level of Service	D	B	A	C	B	C	D	C	C	D	D	C
Approach Delay (s)	18.8			22.4			32.5			35.9		
Approach LOS	B			C			C			D		
<b>Intersection Summary</b>												
HCM Average Control Delay	26.3											
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	66.2%											
Analysis Period (min)	15											
c - Critical Lane Group	C											

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.95	1.00	1.00	0.94	0.91	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Satd. Flow (perm)	233	701	146	371	656	358	137	252	422	364	264	243
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	738	154	391	691	377	144	265	444	383	278	255
RTOR Reduction (vph)	0	0	103	0	0	255	0	117	227	0	0	208
Lane Group Flow (vph)	245	738	51	391	691	122	144	318	47	383	278	30
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	3	8	5	8	5	2	1	6	6	6
Permitted Phases	35.4	35.4	35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3	26.3
Actuated Green, G (s)	35.9	35.9	35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8	26.8
Effective Green, g (s)	0.45	0.45	0.45	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34	0.34
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	2218	177	2000	1583			512			439	420	530
Lane Grp Cap (vph)	c0.31	0.04	c0.30				0.01			0.28	c0.30	0.20
w/s Ratio Prot	0.69	0.62	0.54	0.13	0.13	0.03	0.03	0.03	0.03	0.84	0.88	0.60
w/s Ratio Perm	17.6	36.4	10.9	0.0	0.0	17.8	24.6	25.1	22.2	24.6	25.1	22.2
Uniform Delay, d1	0.44	1.09	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.5	8.4	0.9	0.2	0.2	0.2	0.0	0.0	0.0	13.7	18.9	1.9
Incremental Delay, d2	9.1	47.9	10.2	0.2	0.2	0.2	17.9			38.4	44.0	24.1
Delay (s)	A	D	B	A	A	A	B			D	D	C
Level of Service	A	D	B	A	A	A	B			D	D	C
Approach Delay (s)	9.1			10.7			17.9			35.5		
Approach LOS	A			B			B			D		
<b>Intersection Summary</b>												
HCM Average Control Delay	16.9											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	69.4%											
Analysis Period (min)	15											
c - Critical Lane Group	C											



20: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Lane Util. Factor	0.91	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt	0.95	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	1770	6408	1583	5085	1583	1770	1504	1504	1748	1748	1748
Satd. Flow (prot)	0.95	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Permitted	1770	6408	1583	5085	1583	1770	1504	1504	1748	1748	1748
Satd. Flow (perm)	1770	6408	1583	5085	1583	1770	1504	1504	1748	1748	1748
Volume (vph)	17	1631	273	0	985	350	303	0	306	14	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1717	287	0	1037	368	319	0	322	15	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	18	1717	287	0	1037	368	319	180	180	0	16
Turn Type	Prot	Free	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	2	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	2	2	2	6	6	6
Actuated Green, G (s)	2.2	48.9	80.0	42.2	80.0	22.1	22.1	22.1	22.1	22.1	22.1
Effective Green, g (s)	2.7	49.4	80.0	42.7	80.0	22.6	22.6	22.6	22.6	22.6	22.6
Actuated g/C Ratio	0.03	0.62	1.00	0.53	1.00	0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	3957	1583	2714	1583	392	425	425	417	417	417
v/s Ratio Prot	0.01	c0.27	0.18	0.20	0.23	c0.23	0.11	0.11	0.11	0.01	0.01
v/s Ratio Perm	0.30	0.43	0.18	0.38	0.23	0.81	0.38	0.38	0.38	0.04	0.04
Uniform Delay, d1	37.7	8.0	0.0	10.9	0.0	26.7	23.0	23.0	23.0	20.8	20.8
Progression Factor	1.08	1.10	1.00	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.2	0.2	0.3	0.3	1.22	0.8	0.6	0.6	0.0	0.0
Delay (s)	42.5	9.0	0.2	7.1	0.3	38.9	23.8	23.6	23.6	20.9	20.9
Level of Service	D	A	A	A	A	D	C	C	C	C	C
Approach Delay (s)	8.1	5.3	31.2	5.3	31.2	20.9	20.9	20.9	20.9	20.9	20.9
Approach LOS	A	A	A	A	A	B	B	B	B	B	B
Intersection Summary											
HCM Average Control Delay	10.8										
HCM Volume to Capacity ratio	0.55										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	49.6%										
Analysis Period (min)	15										
Critical Lane Group	C										

21: Rohnert Park Expy & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.91	0.91	1.00	0.91	1.00	0.91	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.85
Flt	1.00	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	3433	3539	1583	1770	4948	1610	3329	1583	1610	3390	1583
Satd. Flow (prot)	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85
Flt Permitted	3433	3539	1583	1770	4948	1610	3329	1583	1610	3390	1583
Satd. Flow (perm)	3433	3539	1583	1770	4948	1610	3329	1583	1610	3390	1583
Volume (vph)	270	1138	545	141	771	170	380	206	224	102	230
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1198	574	148	812	179	400	301	236	107	242
RTOR Reduction (vph)	0	0	395	0	40	0	0	0	189	0	164
Lane Group Flow (vph)	284	1198	179	148	951	0	226	475	47	107	242
Turn Type	Prot	Prot	Perm	Prot	Prot	Split	Split	Perm	Split	Perm	Perm
Protected Phases	7	4	4	3	8	2	2	2	6	6	6
Permitted Phases	12.5	24.5	24.5	10.6	22.6	15.4	15.4	15.4	11.5	11.5	11.5
Actuated Green, G (s)	13.0	25.0	25.0	11.1	23.1	15.9	15.9	15.9	12.0	12.0	12.0
Effective Green, g (s)	0.16	0.31	0.31	0.14	0.29	0.20	0.20	0.20	0.15	0.15	0.15
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	588	1106	495	246	1429	320	662	315	242	509	237
Lane Grp Cap (vph)	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	0.03	0.07	c0.07	0.02
v/s Ratio Prot	0.51	1.08	0.36	0.60	0.67	0.71	0.72	0.15	0.44	0.48	0.12
v/s Ratio Perm	30.6	27.5	21.3	32.4	25.0	29.9	30.0	28.5	31.0	31.1	29.4
Uniform Delay, d1	0.75	0.77	2.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.7	51.6	1.9	4.1	2.5	6.9	3.7	0.2	1.3	0.7	0.2
Incremental Delay, d2	23.8	72.9	60.0	36.5	27.5	36.8	33.7	26.7	32.2	31.8	29.7
Delay (s)	C	E	E	D	C	D	C	C	C	C	C
Level of Service	E	E	E	D	C	D	C	C	C	C	C
Approach Delay (s)	62.5	28.7	32.7	28.7	32.7	31.1	31.1	31.1	31.1	31.1	31.1
Approach LOS	E	E	E	C	C	C	C	C	C	C	C
Intersection Summary											
HCM Average Control Delay	44.6										
HCM Volume to Capacity ratio	0.82										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	71.6%										
Analysis Period (min)	15										
Critical Lane Group	C										

22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (perm)	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Volume (vph)	133	484	202	128	589	103	321	494	108	56	342	219
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	509	213	135	620	108	338	520	114	101	360	231
RTOR Reduction (vph)	0	67	0	0	83	0	0	71	0	0	0	172
Lane Group Flow (vph)	140	655	0	135	620	25	338	520	43	101	360	39
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	5	2	1	6	6	6
Permitted Phases	5.5	15.8	5.5	15.8	15.8	13.5	25.8	25.8	5.2	17.5	17.5	17.5
Actuated Green, G (s)	6.0	16.3	6.0	16.3	16.3	14.0	26.3	26.3	5.7	18.0	18.0	18.0
Effective Green, g (s)	0.09	0.23	0.09	0.23	0.23	0.20	0.37	0.37	0.08	0.26	0.26	0.26
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	151	821	367	352	697	592	144	477	405	0.06	0.19	0.04
Lane Grp Cap (vph)	c0.08	c0.19	0.08	0.18	0.02	c0.19	c0.28	0.03	0.03	0.06	0.19	0.04
w/s Ratio Prot	0.93	0.94	0.89	0.76	0.07	0.96	0.75	0.07	0.70	0.75	0.75	0.15
w/s Ratio Perm	31.9	25.7	31.8	25.1	21.1	27.9	19.1	14.2	31.5	24.1	20.2	20.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	51.5	7.7	43.4	4.0	0.1	37.4	7.1	0.2	14.3	10.5	0.8	0.8
Incremental Delay, d2	83.4	33.4	75.2	29.1	21.2	65.3	26.2	14.4	45.8	34.7	21.0	21.0
Delay (s)	F	C	E	C	C	E	C	B	D	C	C	C
Level of Service	F	C	E	C	C	E	C	B	D	C	C	C
Approach Delay (s)	41.5	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	37.1											
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	70.3											
Intersection Capacity Utilization	76.0%											
Analysis Period (min)	15											
Critical Lane Group	C											

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3513	1770	3539	1583	1770	1660	1583	1770	1660	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3513	1770	3539	1583	1770	1660	1583	1770	1660	1583	1770
Satd. Flow (perm)	1770	3513	1770	3539	1583	1770	1660	1583	1770	1660	1583	1770
Volume (vph)	102	625	32	53	738	333	48	24	63	485	29	96
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	650	34	56	777	351	51	25	66	511	31	101
RTOR Reduction (vph)	0	4	0	0	0	139	0	61	0	0	60	0
Lane Group Flow (vph)	107	688	0	56	777	212	51	30	66	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	5	2	1	6	6	6
Permitted Phases	5.5	15.8	5.5	15.8	15.8	13.5	25.8	25.8	5.2	17.5	17.5	17.5
Actuated Green, G (s)	6.0	16.3	6.0	16.3	16.3	14.0	26.3	26.3	5.7	18.0	18.0	18.0
Effective Green, g (s)	0.09	0.23	0.09	0.23	0.23	0.20	0.37	0.37	0.08	0.26	0.26	0.26
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	159	821	367	352	697	592	144	477	405	0.06	0.19	0.04
Lane Grp Cap (vph)	c0.06	c0.20	0.06	0.20	0.03	c0.22	0.13	0.13	0.03	0.03	0.02	0.02
w/s Ratio Prot	0.67	0.61	0.67	0.61	0.58	0.77	0.47	0.68	0.24	0.78	0.11	0.11
w/s Ratio Perm	39.7	25.9	39.7	25.9	41.6	29.5	26.6	42.5	39.2	24.9	16.6	16.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	51.5	7.7	43.4	4.0	0.1	37.4	7.1	0.2	14.3	10.5	0.8	0.8
Incremental Delay, d2	83.4	33.4	75.2	29.1	21.2	65.3	26.2	14.4	45.8	34.7	21.0	21.0
Delay (s)	F	C	E	C	C	E	C	B	D	C	C	C
Level of Service	F	C	E	C	C	E	C	B	D	C	C	C
Approach Delay (s)	31.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	26.2											
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	71.4%											
Analysis Period (min)	15											
Critical Lane Group	C											

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008 PM Peak

Movement	EBT	EBL	WBT	WBL	NBT	NBL	NBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	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
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.85
Friction	1.00	0.85	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3539	1583	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3539	1583	3539
Volume (vph)	0	819	361	99	900	0	0	639	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	380	104	947	0	0	673	0
RTOR Reduction (vph)	0	0	95	0	0	0	0	0	89
Lane Group Flow (vph)	0	862	265	104	947	0	0	673	134
Turn Type		Perm	Prot	Prot	Prot			Prot	
Protected Phases	4		3	8	6			1	6
Permitted Phases		4							
Actuated Green, G (s)	36.4	36.4	11.6	52.5	28.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	36.9	36.9	12.1	53.0	29.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.41	0.41	0.13	0.39	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1451	649	238	2084	1106	510	510	510	510
v/s Ratio Prot	c0.24		0.06	c0.27	c0.20	0.08	0.08	0.08	0.08
v/s Ratio Perm		0.18							
w/C Ratio	0.59	0.44	0.44	0.45	0.61	0.26	0.26	0.26	0.26
Uniform Delay, d1	20.7	19.1	35.8	10.4	25.7	22.6	22.6	22.6	22.6
Progression Factor	0.60	0.54	1.33	1.85	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.6	1.2	0.7	1.0	1.3	1.3	1.3	1.3
Delay (s)	13.7	11.9	48.6	19.9	26.7	23.8	23.8	23.8	23.8
Level of Service	B	B	D	B	C	C	C	C	C
Approach Delay (s)	13.1		22.8		0.0	26.0	26.0	26.0	26.0
Approach LOS	B		C		A	C	C	C	C
<b>Intersection Summary</b>									
HCM Average Control Delay	19.9								
HCM Volume to Capacity ratio	0.56								
Actuated Cycle Length (s)	90.0								
Intersection Capacity Utilization	61.7%								
Analysis Period (min)	15								
c Critical Lane Group									

25: Gravenstien Hwy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel

2008 PM Peak

Movement	EBT	EBL	WBT	WBL	NBT	NBL	NBR		
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑		
Ideal Flow (vphpl)	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		
Lane Util. Factor	0.95	1.00	1.00	0.97	1.00	1.00	0.85		
Friction	1.00	0.85	1.00	1.00	1.00	1.00	0.95		
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3539		
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3539		
Volume (vph)	1461	0	617	351	236	236	236		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	1538	0	649	369	248	248	248		
RTOR Reduction (vph)	0	0	0	0	0	0	21		
Lane Group Flow (vph)	1538	0	649	369	227	227	227		
Turn Type		Perm	Prot	Prot	Prot				
Protected Phases	4		8	2	2				
Permitted Phases		4							
Actuated Green, G (s)	63.2	63.2	17.8	17.8	17.8	17.8	17.8		
Effective Green, g (s)	63.7	63.7	18.3	18.3	18.3	18.3	18.3		
Actuated g/C Ratio	0.71	0.71	0.20	0.20	0.20	0.20	0.20		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	2505	698	322	322	322	322	322		
v/s Ratio Prot	c0.43		0.18	0.11	0.11	0.11	0.11		
v/s Ratio Perm		0.18							
w/C Ratio	0.61	0.26	0.53	0.71	0.71	0.71	0.71		
Uniform Delay, d1	6.8	4.7	32.0	33.3	33.3	33.3	33.3		
Progression Factor	0.53	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.9	0.3	0.7	6.9	6.9	6.9	6.9		
Delay (s)	4.5	4.5	5.0	32.7	40.2	40.2	40.2		
Level of Service	A	A	C	C	D	D	D		
Approach Delay (s)	4.5		5.0	35.7	35.7	35.7	35.7		
Approach LOS	A		A	D	D	D	D		
<b>Intersection Summary</b>									
HCM Average Control Delay	11.5								
HCM Volume to Capacity ratio	0.63								
Actuated Cycle Length (s)	90.0								
Intersection Capacity Utilization	61.7%								
Analysis Period (min)	15								
c Critical Lane Group									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																																							
Lane Configurations	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%													
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Sign Control	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%													
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Grade	0%																																																		
Volume (veh/h)	7	6	11	2	7	194	19	713	20	116	546	4																																							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																																							
Hourly flow rate (vph)	7	6	12	2	7	204	20	753	21	122	575	4																																							
Pedestrians	0																																																		
Lane Width (ft)	12																																																		
Walking Speed (ft/s)	4.0																																																		
Percent Blockage	0%																																																		
Right turn flare (veh)	5																																																		
Median type	None																																																		
Median storage (veh)	0																																																		
Upstream signal (ft)	0																																																		
pX platoon unblocked	0																																																		
vC conflicting volume	1343	1635	289	1339	1616	376	579	774	774	774	774	774																																							
vC1 stage 1 cont vol	0																																																		
vC2 stage 2 cont vol	0																																																		
vCu unblocked vol	1343	1635	289	1339	1616	376	579	774	774	774	774	774																																							
IC single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1	4.1	4.1	4.1	4.1																																							
IC 2 stage (s)	0																																																		
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2																																							
p0 queue free %	88	92	98	98	91	67	98	85	85	85	85	85																																							
cM capacity (veh/h)	61	84	707	90	86	621	991	838	838	838	838	838																																							
Direction Lane	EBL	WBL	NBL	NBR	NBT	WBR	SBR	SBR	SBR	SBR	SBR	SBR																																							
Volume Total	25	214	20	376	376	21	122	383	196	0	0	0																																							
Volume Left	7	2	0	0	0	0	122	0	0	0	0	0																																							
Volume Right	18	204	0	0	0	21	0	0	4	0	0	0																																							
CSH	118	650	991	1700	1700	838	1700	1700	1700	1700	1700	1700																																							
Volume to Capacity	0.21	0.33	0.02	0.22	0.22	0.01	0.15	0.23	0.12	0.00	0.00	0.00																																							
Queue Length 95th (ft)	19	36	2	0	0	0	13	0	0	0	0	0																																							
Control Delay (s)	E	C	A	C	A	B	B	B	B	B	B	B																																							
Lane LOS	E	C	A	C	A	B	B	B	B	B	B	B																																							
Approach Delay (s)	43.5	15.3	87	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0																																							
Approach LOS	E	C	C	E	C	C	C	C	C	C	C	C																																							
Intersection Summary	<table border="0"> <tr> <td>Average Delay</td> <td>3.3</td> <td colspan="11"></td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>45.1%</td> <td colspan="11">ICU Level of Service: A</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td colspan="11"></td> </tr> </table>												Average Delay	3.3												Intersection Capacity Utilization	45.1%	ICU Level of Service: A											Analysis Period (min)	15											
Average Delay	3.3																																																		
Intersection Capacity Utilization	45.1%	ICU Level of Service: A																																																	
Analysis Period (min)	15																																																		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																																							
Lane Configurations	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%													
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Sign Control	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%													
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																							
Grade	0%																																																		
Volume (veh/h)	1	139	3	4	199	2	0	0	1	0	1	0																																							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																																							
Hourly flow rate (vph)	1	146	3	4	209	2	0	0	1	0	1	0																																							
Pedestrians	0																																																		
Lane Width (ft)	12																																																		
Walking Speed (ft/s)	4.0																																																		
Percent Blockage	0%																																																		
Right turn flare (veh)	0																																																		
Median type	None																																																		
Median storage (veh)	0																																																		
Upstream signal (ft)	0																																																		
pX platoon unblocked	0																																																		
vC conflicting volume	212	149	149	149	369	370	148	370	371	211	211	211																																							
vC1 stage 1 cont vol	0																																																		
vC2 stage 2 cont vol	0																																																		
vCu unblocked vol	212	149	149	149	369	370	148	370	371	211	211	211																																							
IC single (s)	4.1	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2	6.5	6.2																																							
IC 2 stage (s)	0																																																		
IF (s)	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	4.0	3.3																																							
p0 queue free %	100	100	100	100	100	100	100	100	100	100	100	100																																							
cM capacity (veh/h)	1359	1432	899	557	585	557	899	584	557	830	830	830																																							
Direction Lane	EBL	WBL	NBL	NBR	NBT	WBR	SBR	SBR	SBR	SBR	SBR	SBR																																							
Volume Total	151	216	1	1	1	1	1	1	1	1	1	1																																							
Volume Left	1	4	0	0	0	0	0	0	0	0	0	0																																							
Volume Right	3	2	1	0	0	0	0	0	0	0	0	0																																							
CSH	1359	1432	899	557	557	899	557	899	557	899	557	899																																							
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																																							
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0	0	0	0																																							
Control Delay (s)	0.1	0.2	9.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5																																							
Lane LOS	A	A	A	B	B	B	B	B	B	B	B	B																																							
Approach Delay (s)	0.1	0.2	9.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5																																							
Approach LOS	A	A	A	B	B	B	B	B	B	B	B	B																																							
Intersection Summary	<table border="0"> <tr> <td>Average Delay</td> <td>0.2</td> <td colspan="11"></td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>23.3%</td> <td colspan="11">ICU Level of Service: A</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td colspan="11"></td> </tr> </table>												Average Delay	0.2												Intersection Capacity Utilization	23.3%	ICU Level of Service: A											Analysis Period (min)	15											
Average Delay	0.2																																																		
Intersection Capacity Utilization	23.3%	ICU Level of Service: A																																																	
Analysis Period (min)	15																																																		

Movement	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBT	SB	SBR
Lane Configurations	Free											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	1	123	2	4	208	8	1	9	0	4	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	129	2	4	219	8	1	9	0	4	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	227		132				365	368	131	368	365	223
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	227		132				365	368	131	368	365	223
vCu, unblocked vol	4.1		4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0	3.3
po queue free %	100		100				100	98	100	99	100	100
pl capacity (veh/h)	1341		1464				588	559	919	578	561	816
Direction Lane #	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBT	SB	SBR
Volume Total	133	232	11	5								
Volume Left	1	4										
Volume Right	2	8	0	1								
cSH	1341	1464	561	614								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (ft)	0	0	1	1								
Control Delay (s)	0.1	0.2	11.5	10.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	11.5	10.9								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	24.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBT	SB	SBR
Lane Configurations	Free											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	149	9	4	270	5	11						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95						
Hourly flow rate (vph)	157	9	4	284	5	12						
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume			166				454	162				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol			166				454	162				
tC, 2 stage (s)			4.1				6.4	6.2				
tF (s)			2.2				3.5	3.3				
po queue free %			100				99	99				
pl capacity (veh/h)			1412				562	883				
Direction Lane #	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBT	SB	SBR
Volume Total	166	288	17									
Volume Left	0	4	5									
Volume Right	9	0	12									
cSH	1700	1412	749									
Volume to Capacity	0.10	0.00	0.02									
Queue Length 95th (ft)	0	0	2									
Control Delay (s)	0.0	0.1	9.9									
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.1	9.9									
Approach LOS	A	A	A									
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	27.4%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←			←			←			←		
Sign Control	Free			Free			Free			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	155	9	11	260	0	25	0	8	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0	8	0	0	0
Pedestrians	0											
Lane Width (ft)	11											
Walking Speed (ft/s)	3.5											
Percent Blockage	0											
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)	None											
pX, platoon unblocked	0											
vC, conflicting volume	263	173	173	454	454	168	463	459	263	263	263	263
vC1, stage 1 conf vol	0											
vC2, stage 2 conf vol	0											
vCu, unblocked vol	263	173	173	454	454	168	463	459	263	263	263	263
tC, single (s)	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2	6.5	6.2	6.2
tC, 2 stage (s)	0											
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	4.0	3.3	3.3
p0 queue free %	100	100	99	95	100	99	100	100	100	100	100	100
gM capacity (veh/h)	1301	1404	1404	513	488	876	501	495	775	775	775	775
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	173	275	35	0	0	0	0	0	0	0	0	0
Volume Left	0	12	26	0	0	0	0	0	0	0	0	0
Volume Right	9	0	8	0	0	0	0	0	0	0	0	0
CSH	1301	1404	570	1700	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	1	5	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	A	B	A	A	A	A	A	A	A	A
Intersection Summary												
Average Delay	11.1											
Intersection Capacity Utilization	32.1%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	←			←			←		
Sign Control	Free			Free			Stop		
Grade	0%			0%			0%		
Volume (veh/h)	135	22	0	235	37	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	142	23	0	247	39	0	0	0	0
Pedestrians	0								
Lane Width (ft)	11								
Walking Speed (ft/s)	3.5								
Percent Blockage	0								
Right turn flare (veh)	None								
Median type	None								
Median storage (veh)	None								
Upstream signal (ft)	None								
pX, platoon unblocked	0								
vC, conflicting volume	165	247	39	165	401	154	165	401	154
vC1, stage 1 conf vol	0								
vC2, stage 2 conf vol	0								
vCu, unblocked vol	165	247	39	165	401	154	165	401	154
tC, single (s)	4.1	4.1	4.1	4.1	6.4	6.2	4.1	6.4	6.2
tC, 2 stage (s)	0								
IF (s)	2.2	2.2	2.2	3.5	3.5	3.3	2.2	3.5	3.3
p0 queue free %	100	100	99	95	100	99	100	100	100
gM capacity (veh/h)	1413	1413	1413	606	606	882	1413	606	882
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Volume Total	165	247	39	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	23	0	0	0	0	0	0	0	0
CSH	1700	1413	606	1700	1413	606	1700	1413	606
Volume to Capacity	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	B	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0
Approach LOS	B	B	A	B	A	B	A	A	A
Intersection Summary									
Average Delay	10								
Intersection Capacity Utilization	22.4%								
Analysis Period (min)	15								
ICU Level of Service	A								

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	527	191	231	568	215	163	279	475	243
v/c Ratio	0.98	0.34	0.39	0.62	0.97	0.56	0.72	0.77	0.95
Control Delay	87.1	38.1	39.1	8.7	122.0	77.8	18.3	68.2	103.3
Queue Delay	9.9	4.8	7.3	1.2	0.0	0.0	0.3	1.7	0.0
Total Delay	97.0	42.9	46.4	10.0	122.0	77.8	18.5	70.9	103.3
Queue Length 50th (ft)	536	153	192	85	228	87	0	246	237
Queue Length 95th (ft)	#781	215	262	142	#402	127	95	#350	#420
Internal Link Dist (ft)	550		220		150	110	100	275	270
Turn Bay Length (ft)									
Base Capacity (vph)	440	589	599	912	221	376	418	618	257
Starvation Cap Reductn	0	307	317	163	0	0	0	0	0
Spillback Cap Reductn	22	0	0	0	0	0	0	10	49
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.73	0.82	0.76	0.97	0.43	0.68	0.83	0.95

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	32	147	5	200	173	158	5	32	216	
v/c Ratio	0.04	0.15	0.48	0.04	0.44	0.54	0.06	0.00	0.20	0.12	
Control Delay	34.4	32.8	11.5	28.0	25.6	35.2	5.3	4.6	35.8	11.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.4	32.8	11.5	28.0	25.6	35.2	5.3	4.6	35.8	11.9	
Queue Length 50th (ft)	2	15	0	2	19	80	6	0	15	24	
Queue Length 95th (ft)	13	39	49	m6	72	m114	m34	m1	40	63	
Internal Link Dist (ft)		180		140	120				150	130	
Turn Bay Length (ft)		75	100		150				150	200	
Base Capacity (vph)		155	442	488	155	854	399	2462	1102	184	1871
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.30	0.03	0.23	0.43	0.06	0.00	0.17	0.12	

Intersection Summary  
 # Volume for 95th percentile queue is metored by upstream signal.

Lane Group	EBT	EBR	WBT	WBL	SBL	SBT
Lane Group Flow (vph)	776	231	94	501	345	824
v/c Ratio	0.46	0.26	0.37	0.25	0.66	0.66
Control Delay	19.2	6.1	38.8	7.4	30.4	15.8
Queue Delay	2.5	0.6	0.0	0.0	0.0	0.1
Total Delay	21.5	6.7	38.8	7.4	30.4	15.9
Queue Length 50th (ft)	268	94	21	32	161	107
Queue Length 95th (ft)	m342	m110	37	52	261	173
Internal Link Dist (ft)	220		466			348
Turn Bay Length (ft)		300			250	
Base Capacity (vph)	1681	873	257	2035	523	1243
Storage Cap Reductn	740	345	0	0	0	0
Spillback Cap Reductn	0	0	0	2	0	40
Storage Cap Reductm	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.44	0.37	0.25	0.66	0.68

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	WBL	SBL	SBT
Lane Group Flow (vph)	597	534	435	485	170	178
v/c Ratio	0.51	0.69	0.78	0.32	0.49	0.50
Control Delay	40.8	23.4	48.2	16.2	29.4	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	23.4	48.2	16.2	29.4	29.4
Queue Length 50th (ft)	155	220	120	105	56	58
Queue Length 95th (ft)	186	268	#181	142	m120	82
Internal Link Dist (ft)	466			345		380
Turn Bay Length (ft)		150			150	
Base Capacity (vph)	1144	770	558	1524	347	358
Storage Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductm	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.69	0.78	0.32	0.49	0.50

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBT	WBL	SBL	SBR
Lane Group Flow (vph)	205	1021	706	97	248	
v/c Ratio	0.46	0.45	0.44	0.21	0.41	
Control Delay	32.7	15.9	16.0	24.5	5.8	
Queue Delay	0.0	0.5	0.0	0.0	0.0	
Total Delay	32.7	16.4	16.0	24.5	5.8	
Queue Length 50th (ft)	65	239	120	38	0	
Queue Length 95th (ft)	92	274	175	76	53	
Internal Link Dist (ft)	80	345	164	232	200	
Turn Bay Length (ft)	80	345	164	232	200	
Base Capacity (vph)	901	2256	1610	465	598	
Starvation Cap Reductn	0	742	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.67	0.44	0.21	0.41	

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBL	SBL	SBR
Lane Group Flow (vph)	204	206	42	16	541	517
v/c Ratio	0.65	0.65	0.13	0.11	1.02	0.22
Control Delay	38.9	39.1	9.0	29.3	74.3	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	39.1	9.0	29.3	74.3	8.9
Queue Length 50th (ft)	100	101	0	5	278	37
Queue Length 95th (ft)	156	157	23	23	478	147
Internal Link Dist (ft)	250	284	118	214	380	175
Turn Bay Length (ft)	250	284	118	214	380	175
Base Capacity (vph)	441	443	447	179	531	2306
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.47	0.09	0.09	1.02	0.22

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NB	NBR	SB	SBT
Lane Group Flow (vph)	271	301	575	264	223	443
v/c Ratio	0.70	0.52	0.71	0.32	0.80	0.36
Control Delay	32.9	6.5	21.7	3.0	50.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	6.5	21.7	3.0	50.2	6.4
Queue Length 50th (ft)	96	0	182	0	86	70
Queue Length 95th (ft)	168	54	305	38	194	119
Internal Link Dist (ft)	480	175	3820	450	700	2550
Turn Bay Length (ft)	436	617	805	834	281	1217
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.49	0.71	0.32	0.79	0.36

Intersection Summary  
 # .95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WB	WBT	NBT	NBR	SB	SBT
Lane Group Flow (vph)	53	632	38	213	605	162	57	97
v/c Ratio	0.40	0.86	0.11	0.93	0.66	0.31	0.26	0.24
Control Delay	44.6	43.6	9.9	53.4	19.7	2.8	37.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	43.6	9.9	53.4	19.7	2.8	37.7	11.2
Queue Length 50th (ft)	26	160	0	37	120	0	16	8
Queue Length 95th (ft)	61	245	23	105	223	0	36	48
Internal Link Dist (ft)	1540	200	250	170	130	1010	130	100
Turn Bay Length (ft)	133	752	366	257	915	529	257	398
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.84	0.10	0.83	0.66	0.31	0.26	0.24

Intersection Summary  
 # .95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m . Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	245	738	154	391	691	377	144	435	274	383	278	256
v/c Ratio	0.88	0.44	0.25	0.76	0.60	0.49	0.65	0.66	0.58	0.75	0.77	0.50
Control Delay	52.7	12.1	2.4	35.4	18.2	4.7	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	12.1	2.4	35.4	18.2	4.7	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	72	55	4	107	165	38	71	74	0	95	129	0
Queue Length 95th (ft)	m64	m8	#167	200	52	#157	118	65	#188	#230	58	
Internal Link Dist (ft)	320			520			554				480	
Turn Bay Length (ft)	200	250	350	155	250	155	250	250	175	175	175	175
Base Capacity (vph)	288	1665	627	515	1147	768	221	789	522	511	396	538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.44	0.25	0.76	0.60	0.49	0.65	0.55	0.52	0.75	0.70	0.48

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1565	72	1078	209	25	209	25	370	370	370	370	369
v/c Ratio	0.68	0.51	0.54	0.13	0.05	0.84	0.88	0.84	0.88	0.88	0.88	0.84
Control Delay	9.0	51.0	10.9	0.2	9.8	43.2	48.5	48.5	48.5	48.5	48.5	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	51.0	10.9	0.2	9.8	43.2	48.5	48.5	48.5	48.5	48.5	22.7
Queue Length 50th (ft)	135	38	166	0	2	169	172	172	172	172	172	116
Queue Length 95th (ft)	172	m#64	235	m0	18	#318	#329	#329	#329	#329	#329	205
Internal Link Dist (ft)	520		960		428						378	
Turn Bay Length (ft)	225		225		400						400	
Base Capacity (vph)	2318	142	2000	1583	568	475	455	622	622	622	622	622
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.51	0.54	0.13	0.04	0.78	0.81	0.81	0.81	0.81	0.81	0.59

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	18	1717	287	1037	368	319	161	161	18		
v/c Ratio	0.14	0.43	0.18	0.36	0.23	0.81	0.38	0.38	0.04		
Control Delay	39.2	10.2	0.2	7.6	0.3	42.1	23.5	23.5	15.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	39.2	10.2	0.2	7.6	0.3	42.1	23.5	23.5	15.1		
Queue Length 50th (ft)	10	166	0	73	0	148	67	67	5		
Queue Length 95th (ft)	m13	m216	m0	125	m0	201	98	98	17		
Internal Link Dist (ft)		960		360			386	420			
Turn Bay Length (ft)	190					225					
Base Capacity (vph)	133	3957	1583	2886	1583	730	791	791	807		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.14	0.43	0.18	0.36	0.23	0.44	0.20	0.20	0.02		

Intersection Summary  
 m Volume for 95th-percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	284	1198	574	148	991	226	475	236	107	242	193
v/c Ratio	0.51	1.08	0.64	0.60	0.67	0.71	0.72	0.47	0.44	0.48	0.48
Control Delay	26.4	76.0	10.1	46.8	28.0	42.9	36.7	7.4	35.9	33.6	8.9
Queue Delay	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	76.0	10.6	46.8	28.0	42.9	36.7	7.4	35.9	33.6	8.9
Queue Length 50th (ft)	70	396	125	69	151	114	120	0	54	62	0
Queue Length 95th (ft)	107	4515	269	187	246	210	173	56	98	91	51
Internal Link Dist (ft)		360			1350		601		175	150	660
Turn Bay Length (ft)	250			200		250			175		150
Base Capacity (vph)	558	1107	890	246	1471	342	707	522	342	720	488
Starvation Cap Reductn	0	0	77	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.08	0.71	0.60	0.67	0.66	0.67	0.45	0.31	0.34	0.40

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # .95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	140	722	135	620	108	338	520	114	101	360	231
v/c Ratio	0.92	0.84	0.88	0.74	0.24	0.95	0.74	0.17	0.59	0.79	0.41
Control Delay	89.3	32.4	82.8	30.8	6.5	66.8	28.3	4.4	45.9	39.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.5	66.8	28.3	4.4	45.9	39.5	6.0
Queue Length 50th (ft)	61	136	59	128	0	145	201	0	42	146	0
Queue Length 95th (ft)	#162	#221	#155	184	35	#296	#368	30	#100	#275	49
Internal Link Dist (ft)	589	6630	500	500	150	550	675	500	980	625	625
Turn Bay Length (ft)	153	887	153	859	466	357	706	671	173	456	562
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.23	0.95	0.74	0.17	0.58	0.79	0.41

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	107	692	56	777	351	51	91	511	132	132	0.18
v/c Ratio	0.67	0.56	0.47	0.72	0.57	0.43	0.44	0.80	0.18	0.18	5.8
Control Delay	64.2	28.7	38.7	22.1	6.4	52.2	21.8	35.9	5.8	5.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	28.7	38.7	22.1	6.4	52.2	21.8	35.9	5.8	5.8	0.0
Queue Length 50th (ft)	61	186	33	235	10	28	14	237	10	10	0
Queue Length 95th (ft)	#161	255	75	325	23	65	57	388	43	43	0
Internal Link Dist (ft)	589	6630	500	500	150	550	675	500	980	625	625
Turn Bay Length (ft)	153	887	153	859	466	357	706	671	173	456	562
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.56	0.47	0.72	0.57	0.43	0.25	0.78	0.17	0.17	0.0

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBT	EBL	WB	WBL	SB	SBT
Lane Group Flow (vph)	862	380	104	947	673	223
v/c Ratio	0.58	0.50	0.40	0.45	0.61	0.37
Control Delay	14.2	8.3	49.5	20.2	28.6	11.9
Queue Delay	0.3	0.2	0.0	0.4	0.0	0.0
Total Delay	14.4	8.5	49.5	20.6	28.6	11.9
Queue Length 50th (ft)	130	61	59	225	164	37
Queue Length 95th (ft)	160	m98	111	283	222	55
Internal Link Dist (ft)	350			370		585
Turn Bay Length (ft)	50	100		425		
Base Capacity (vph)	1486	758	295	2084	1108	599
Starvation Cap Reductn	167	61	0	553	0	0
Spillback Cap Reductn	43	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.55	0.35	0.62	0.61	0.37

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WB	NBL	NBR
Lane Group Flow (vph)	1538	649	369	248
v/c Ratio	0.61	0.26	0.53	0.72
Control Delay	5.2	5.7	33.8	41.3
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	5.3	5.7	33.8	41.3
Queue Length 50th (ft)	190	58	97	119
Queue Length 95th (ft)	252	112	123	178
Internal Link Dist (ft)	370	312	431	
Turn Bay Length (ft)			395	275
Base Capacity (vph)	2505	2505	1221	580
Starvation Cap Reductn	188	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.26	0.30	0.43

Intersection Summary

**CUMULATIVE 2020 No ACTION  
TRAFFIC CONDITIONS  
(SYNCHRO)**

2020 PM Peak  
 1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	Free	Stop	Stop	Free	Stop	Stop	Free	Stop	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	13	16	143	22	134	14	677	74	102	508	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	14	17	151	23	141	15	713	78	107	535	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type				None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unlocked												
vC, conflicting volume	1575	1571	536	1554	1534	752	538	791	791			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1575	1571	536	1554	1534	752	538	791	791			
vCU, unblocked vol	7.1	6.5	6.2	7.1	5.5	6.2	4.1	4.1	4.1			
tC, single (s)												
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2			
p0 queue free %	100	86	97	0	77	66	99	87	87			
pM capacity (veh/h)	43	95	544	71	100	410	1030	830	830			
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	31	315	15	791	107	538	0	0	0	0	0	0
Volume Left	0	151	15	0	107	0	0	0	0	0	0	0
Volume Right	17	141	0	78	0	3	0	0	0	0	0	0
cSH	174	117	1030	1700	830	1700	0	0	0	0	0	0
Volume to Capacity	0.18	2.69	0.01	0.47	0.13	0.32	0	0	0	0	0	0
Queue Length 95th (ft)	15	720	1	0	11	0	0	0	0	0	0	0
Control Delay (s)	30.0	841.3	8.5	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	F	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	30.0	841.3	0.2	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Approach LOS	D	F	A	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	148.5											
Intersection Capacity Utilization	71.5%											
ICU Level of Service	C											
Analysis Period (min)	15											

2020 PM Peak  
 2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	170	10	9	280	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	11	9	295	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unlocked												
vC, conflicting volume	304	189	189	539	528	184	539	529	299			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	304	189	189	539	528	184	539	529	299			
vCU, unblocked vol	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1			
tC, single (s)												
tC, 2 stage (s)												
tF (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
p0 queue free %	99	99	99	99	99	99	99	99	99			
pM capacity (veh/h)	1257	1384	1384	433	449	858	434	448	740			
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	200	314	32	32	32	32	32	32	32	32	32	32
Volume Left	11	9	11	11	11	11	11	11	11	11	11	11
Volume Right	11	9	11	11	11	11	11	11	11	11	11	11
cSH	1257	1384	526	510	510	510	510	510	510	510	510	510
Volume to Capacity	0.01	0.01	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Queue Length 95th (ft)	1	1	5	5	5	5	5	5	5	5	5	5
Control Delay (s)	0.5	0.3	12.3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Lane LOS	A	A	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	0.5	0.3	12.3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	17											
Intersection Capacity Utilization	28.2%											
ICU Level of Service	A											
Analysis Period (min)	15											



3: Wilfred Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel

2020  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	170	10	9	280	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	11	9	295	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304			189			539		528	184	539	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	304			189			539		528	184	539	299
vCu, unblocked vol	4.1			4.1			7.1		6.5	6.2	7.1	6.5
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5		4.0	3.3	3.5	4.0
p0 queue free %	99			99			98		98	98	98	98
CM capacity (veh/h)	1257			1384			433		449	858	434	448
Direction Lane #	EB1	WB1	NB1	SB1	EB2	WB2	NB2	SB2	EB3	WB3	NB3	SB3
Volume Total	200	314	32	32	11	9	11	11	11	11	11	11
Volume Left												
Volume Right												
CSH	1257	1384	526	510	0.01	0.01	0.06	0.06	0.06	0.06	0.06	0.06
Volume to Capacity												
Queue Length 95th (ft)	1	1	5	5	0.5	0.3	12.3	12.5	12.5	12.5	12.5	12.5
Control Delay (s)	A	A	B	B	A	A	B	B	B	B	B	B
Lane LOS	A	A	B	B	A	A	B	B	B	B	B	B
Approach Delay (s)	0.5	0.3	12.3	12.5	0.5	0.3	12.3	12.5	12.3	12.5	12.5	12.5
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	1.7											
Intersection Capacity Utilization	28.2%											
Analysis Period (min)	15											
ICU Level of Service	A											

4: Wilfred Ave & Langner Ave  
 Graton Rancheria Casino & Hotel

2020  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	170	10	9	280	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	11	9	295	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304			189			535		528	184	535	285
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	304			189			535		528	184	535	285
vCu, unblocked vol	4.1			4.1			7.1		6.5	6.2	7.1	6.5
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5		4.0	3.3	3.5	4.0
p0 queue free %	99			99			98		98	98	98	98
CM capacity (veh/h)	1257			1384			437		449	858	438	451
Direction Lane #	EB1	WB1	NB1	SB1	EB2	WB2	NB2	SB2	EB3	WB3	NB3	SB3
Volume Total	200	314	32	32	11	9	11	11	11	11	11	11
Volume Left												
Volume Right												
CSH	1257	1384	526	510	0.01	0.01	0.06	0.06	0.06	0.06	0.06	0.06
Volume to Capacity												
Queue Length 95th (ft)	1	1	5	5	0.5	0.3	12.3	12.5	12.5	12.5	12.5	12.5
Control Delay (s)	A	A	B	B	A	A	B	B	B	B	B	B
Lane LOS	A	A	B	B	A	A	B	B	B	B	B	B
Approach Delay (s)	0.5	0.3	12.3	12.5	0.5	0.2	12.3	12.5	12.3	12.5	12.5	12.5
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	1.6											
Intersection Capacity Utilization	27.8%											
Analysis Period (min)	15											
ICU Level of Service	A											

5: Wilfred Ave & Labath Ave  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	40	109	41	188	245	189	44	14	396	180	31	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	115	43	198	258	199	46	15	417	189	33	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked												
vc. conflicting volume	457			158			773	1073	79	1319	995	228
vc1. stage 1 cont vol												
vc2. stage 2 cont vol												
vcu. unblocked vol	457			158			773	1073	79	1319	995	228
tc. single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tc. 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pl queue free %	95			86			79	92	57	0	84	99
cm capacity (veh/h)	1100			1419			217	181	866	53	201	774
Direction, Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	42	76	81	198	172	285	478	234				
Volume Left	0	0	0	198	0	0	46	189				
Volume Right	0	0	0	0	0	199	417	172				
CSH	1100	1700	1700	1419	1700	1700	658	63				
Volume to Capacity	0.04	0.04	0.05	0.14	0.10	0.17	0.73	3.74				
Queue Length 95th (ft)	3	0	0	12	0	0	156	Err				
Control Delay (s)	8.4	0.0	0.0	7.9	0.0	0.0	23.6	Err				
Lane LOS	A	A	A	C	C	C	F	F				
Approach Delay (s)	1.8			2.4			23.6	Err				
Approach LOS				C			C	F				
<b>Intersection Summary</b>												
Average Delay	1500.2											
Intersection Capacity Utilization	69.4%											
ICU Level of Service	C											
Analysis Period (min)	15											

6: Wilfred Avenue & Dowdell Ave  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	53	359	273	509	360	273	143	105	559	217	41	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	378	287	536	379	287	151	111	588	228	43	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked												
vc. conflicting volume	666			665			2041	2371	333	2538	2371	333
vc1. stage 1 cont vol												
vc2. stage 2 cont vol												
vcu. unblocked vol	666			665			2041	2371	333	2538	2371	333
tc. single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tc. 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pl queue free %	94			42			0	0	11	0	0	81
cm capacity (veh/h)	919			920			0	13	663	0	13	663
Direction, Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	56	252	413	536	253	414	649	397				
Volume Left	56	0	0	536	0	0	151	228				
Volume Right	0	0	0	0	0	287	888	125				
CSH	919	1700	1700	920	1700	1700	0	0				
Volume to Capacity	0.06	0.15	0.24	0.58	0.15	0.24	Err	Err				
Queue Length 95th (ft)	5	0	0	97	0	0	Err	Err				
Control Delay (s)	9.2	0.0	0.0	14.2	0.0	0.0	Err	Err				
Lane LOS	A	A	A	B	B	B	F	F				
Approach Delay (s)	0.7			6.3			Err	Err				
Approach LOS				F			F	F				
<b>Intersection Summary</b>												
Average Delay	Err											
Intersection Capacity Utilization	112.3%											
ICU Level of Service	H											
Analysis Period (min)	15											

2020 PM Peak  
 7: Wilfred Avenue & Redwood Drive  
 Graton Rancheria Casino & Hotel

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.91	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.89	0.89
Flt. Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1650	1650
Flt. Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1650	1650
Volume (vph)	146	734	255	73	364	730	586	103	350	453	70	222
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	773	268	77	383	768	585	108	368	477	74	234
RTOR, Reduction (vph)	0	0	104	0	0	405	0	0	342	0	71	0
Lane Group Flow (vph)	154	773	164	77	383	363	585	108	26	477	237	0
Turn Type	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm
Protected Phases	4	4	4	8	8	8	5	2	2	1	1	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	1	6
Actuated Green, G (s)	42.2	42.2	42.2	58.8	58.8	58.8	19.5	10.9	10.9	30.1	21.5	21.5
Effective Green, g (s)	42.7	42.7	42.7	59.3	59.3	59.3	20.0	11.4	11.4	30.6	22.0	22.0
Actuated g/C Ratio	0.27	0.27	0.27	0.37	0.37	0.37	0.12	0.07	0.07	0.19	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	472	905	385	623	656	587	221	252	113	657	227	227
v/s Ratio Prot	0.09	c0.23	0.11	0.05	0.22	c0.33	0.03	0.02	0.14	c0.14	c0.14	c0.14
v/s Ratio Perm	0.33	0.85	0.43	0.12	0.58	0.62	2.65	0.43	0.23	0.73	1.06	1.06
Uniform Delay, d1	47.1	55.7	48.5	33.2	40.4	41.1	70.0	71.2	70.2	60.8	69.0	69.0
Progression Factor	1.00	1.00	1.00	0.87	0.87	0.87	1.41	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	7.9	0.8	0.4	3.3	4.3	754.0	1.2	1.1	4.0	72.1	72.1
Delay (s)	47.5	63.6	49.3	29.3	38.6	46.4	824.0	72.4	71.2	64.8	141.1	141.1
Level of Service	D	E	D	C	C	D	E	F	E	E	F	F
Approach Delay (s)	58.3	58.3	58.3	52.9	52.9	486.4	486.4	486.4	486.4	94.7	94.7	94.7
Approach LOS	E	E	E	D	D	F	F	F	F	F	F	F
<b>Intersection Summary</b>												
HCM Average Control Delay	169.9											
HCM Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	103.6%											
Analysis Period (min)	15											
Critical Lane Group	15											

2020 PM Peak  
 9: Wilfred Avenue & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	0.97	0.95	1.00	0.95	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.91	0.91
Flt. Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	3539	1583	3433	3539	3539	1610	3072	1610	3072	1610	3072
Flt. Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	3539	1583	3433	3539	3539	1610	3072	1610	3072	1610	3072
Volume (vph)	0	1257	283	77	682	0	0	0	0	355	288	482
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1323	298	81	718	0	0	0	0	374	303	507
RTOR, Reduction (vph)	0	0	160	0	0	0	0	0	0	0	0	144
Lane Group Flow (vph)	0	1323	138	81	718	0	0	0	0	374	303	507
Turn Type	Perm	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm
Protected Phases	4	4	4	3	3	8	0	0	0	6	6	6
Permitted Phases	4	4	4	3	3	8	0	0	0	6	6	6
Actuated Green, G (s)	36.6	36.6	36.6	4.4	45.5	45.5	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	37.1	4.9	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.46	0.06	0.58	0.58	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	210	2035	2035	523	998	998	998	523	998	998
v/s Ratio Prot	c0.37	c0.37	c0.37	0.02	c0.20	c0.20	c0.23	c0.23	c0.23	c0.23	c0.23	c0.23
v/s Ratio Perm	0.81	0.19	0.39	0.35	0.35	0.35	0.72	0.72	0.72	0.72	0.72	0.72
Uniform Delay, d1	18.4	12.6	36.1	9.1	9.1	9.1	23.7	23.7	23.7	23.7	23.7	23.7
Progression Factor	1.53	3.53	1.01	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.3	1.1	0.5	0.5	0.5	8.1	8.1	8.1	8.1	8.1	8.1
Delay (s)	30.5	14.8	37.7	8.2	8.2	8.2	31.9	31.9	31.9	31.9	31.9	31.9
Level of Service	C	D	D	A	A	A	C	C	C	C	C	C
Approach Delay (s)	33.2	33.2	33.2	11.2	11.2	11.2	28.4	28.4	28.4	28.4	28.4	28.4
Approach LOS	C	C	C	B	B	B	C	C	C	C	C	C
<b>Intersection Summary</b>												
HCM Average Control Delay	26.9											
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	63.9%											
Analysis Period (min)	15											
Critical Lane Group	15											

10: Wilfred Ave & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	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
Lane Util. Factor	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00	0.93
Fr	1.00	0.85	1.00	0.99	1.00	1.00	0.85	1.00	0.93
Fl Protected	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	5085	1583	3433	3519	1681	1694	2787	1770	1723
Fl Permitted	1.00	1.00	0.95	1.00	0.95	0.96	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3519	1681	1694	2787	1770	1723
Volume (vph)	0	755	854	499	443	17	319	18	571
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	799	899	525	466	18	336	19	601
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477
Lane Group Flow (vph)	0	799	305	525	481	0	173	182	124
Turn Type	Prot	Perm	Prot	Split	Split	Perm	Split	Split	Perm
Protected Phases	7	4	4	3	2	2	2	6	6
Permitted Phases									
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	16.0	16.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	558	1540	347	349	575	365	355
v/s Ratio Prot	0.16	c0.19	c0.15	0.14	0.10	c0.11	0.04	0.01	c0.01
v/s Ratio Perm									
v/c Ratio	0.70	0.86	0.94	0.31	0.50	0.52	0.22	0.02	0.03
Uniform Delay, d1	28.5	29.8	33.1	14.7	28.1	28.2	26.4	25.3	25.4
Progression Factor	1.46	5.62	1.23	1.25	-0.89	-0.88	1.37	1.00	1.00
Incremental Delay, d2	2.2	14.9	21.7	0.5	4.6	5.0	0.8	0.1	0.2
Delay (s)	43.8	182.1	62.3	18.8	29.4	29.9	36.8	25.5	25.5
Level of Service	D	F	E	B	C	C	D	C	C
Approach Delay (s)	117.0	F	E	B	C	C	34.2	C	25.5
Approach LOS	F								

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	74.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

11: Wilfred Avenue & Robert Lakes Road  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	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
Lane Util. Factor	0.97	0.95	0.95	0.95	1.00	1.00	1.00	0.85	1.00
Fr	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.85	1.00
Fl Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	3502	1770	1583				
Fl Permitted	0.95	1.00	1.00	0.95	1.00				
Satd. Flow (perm)	3433	3539	3502	1770	1583				
Volume (vph)	137	1205	855	64	102	103			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	144	1268	900	67	107	108			
RTOR Reduction (vph)	0	0	5	0	0	0			
Lane Group Flow (vph)	144	1268	962	0	107	28			
Turn Type	Prot	Perm	Prot	Perm	Perm	Perm			
Protected Phases	7	4	8	8	6	6			
Permitted Phases									
Actuated Green, G (s)	8.6	50.5	37.4	20.5	20.5	20.5			
Effective Green, g (s)	9.1	51.0	37.9	21.0	21.0	21.0			
Actuated g/C Ratio	0.11	0.64	0.47	0.26	0.26	0.26			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	391	2256	1659	465	416	416			
v/s Ratio Prot	0.04	c0.36	0.27	c0.06	c0.06	c0.06			
v/s Ratio Perm									
v/c Ratio	0.37	0.56	0.58	0.23	0.23	0.23			
Uniform Delay, d1	32.8	8.2	15.3	23.2	22.2	22.2			
Progression Factor	0.83	2.24	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.5	0.8	1.5	1.2	0.3	0.3			
Delay (s)	27.6	19.1	16.8	24.3	22.5	22.5			
Level of Service	C	B	B	C	C	C			
Approach Delay (s)	20.0	16.8	23.4	B	B	B			
Approach LOS	B	B	B	B	B	B			

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

12: US-101 NB Ramps & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (veh/pl)	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	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fr	1.00	1.00	0.85	0.96	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Flt Protected	0.95	0.95	1.00	0.98	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1681	1686	1583	1741	1770	3537	1770	3537	1770	3539	1583	1683
Flt Permitted	0.95	0.95	1.00	0.98	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1681	1686	1583	1741	1770	3537	1770	3537	1770	3539	1583	1683
Volume (vph)	473	3	47	8	3	51	532	413	2	7	516	732
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	498	3	49	8	3	5	581	435	2	7	548	771
RTOR Reduction (vph)	0	0	39	0	5	0	0	0	0	0	0	0
Lane Group Flow (vph)	249	252	10	0	11	0	581	437	0	7	548	242
Turn Type	Split	Split	Perm	Split	Split	Perm	Prot	Prot	Prot	Prot	Perm	Perm
Protected Phases	4	4	8	8	8	5	2	2	1	1	6	6
Permitted Phases	4	4	8	8	8	5	2	2	1	1	6	6
Actuated Green, G (s)	16.4	16.4	16.4	1.5	1.5	27.1	42.6	42.6	1.5	1.5	17.0	17.0
Effective Green, g (s)	15.9	16.9	16.9	2.0	2.0	27.6	43.1	43.1	2.0	2.0	17.5	17.5
Actuated g/C Ratio	0.21	0.21	0.21	0.02	0.02	0.35	0.54	0.54	0.02	0.02	0.22	0.22
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	355	356	334	44	44	611	1906	1906	44	44	774	346
v/s Ratio Prot	0.15	c0.15	0.01	c0.01	c0.33	0.12	0.00	c0.18	0.00	c0.18	0.15	0.15
v/s Ratio Perm	0.70	0.71	0.03	0.25	0.25	0.95	0.23	0.16	0.16	0.84	0.70	0.70
Uniform Delay, d1	29.2	29.3	25.0	36.3	36.3	25.5	9.7	38.2	29.9	28.8	29.3	28.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.15	1.15	1.00	1.00
Incremental Delay, d2	6.2	6.3	0.0	3.0	3.0	24.8	0.3	0.6	3.9	4.1	6.2	6.2
Delay (s)	35.4	35.6	25.1	41.3	41.3	50.3	10.0	48.5	38.3	39.1	35.5	35.0
Level of Service	D	D	C	D	D	D	A	D	D	D	D	F
Approach Delay (s)	34.5	34.5	25.1	41.3	41.3	50.3	10.0	48.5	38.3	39.1	35.5	35.0
Approach LOS	C	C	C	D	D	D	C	D	D	D	D	E
<b>Intersection Summary</b>												
HCM Average Control Delay	51.4											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	89.2%											
Analysis Period (min)	15											
Critical Lane Group	C											
HCM Level of Service	D											
Sum of lost time (s)	16.0											
ICU Level of Service	E											

13: Project Dwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	WFB	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	765	0	0	664	0	664
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	805	0	0	699	0	699
Pedestrians	0	0	0	0	0	0	0	0
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right Turn Flare (veh)								
Median Type	None							
Median storage (veh)								
Upstream Signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	1504	805	805	805	805	805	805	805
vC1, stage 1 conf vol	1504	805	805	805	805	805	805	805
vC2, stage 2 conf vol	1504	805	805	805	805	805	805	805
vCU, unblocked vol	6.4	6.2	4.1	4.1	4.1	4.1	4.1	4.1
IC, single (s)	3.5	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IC, 2 stage (s)	100	100	100	100	100	100	100	100
pQ queue free %	134	382	819	819	819	819	819	819
CM capacity (veh/h)	1504	805	805	805	805	805	805	805
Direction, Lane #	WBT	NBT	SBT	SBT	SBT	SBT	SBT	SBT
Volume Total	0	805	699	0	0	0	0	0
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.47	0.41	0.41	0.41	0.41	0.41	0.41
Cue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	A	A	A	A	A	A	A	A
<b>Intersection Summary</b>								
Average Delay	0.0							
Intersection Capacity Utilization	43.6%							
Analysis Period (min)	15							
ICU Level of Service	A							

Movement	EBL	EBR	NBL	NBR	SBL	SBR	Free	0%	
Sign Configurations								Free	0%
Sign Control								Free	0%
Grade								0%	0%
Volume (veh/h)	144	31	12	359	363	25			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	152	33	13	378	382	26			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type									
Median storage (veh)									
Upstream signal (ft)									
pX: platoon unblocked									
vc: conflicting volume	609	204		408					
vc1: stage 1 conf vol									
vc2: stage 2 conf vol	609	204		408					
vcu: unblocked vol	6.8	5.9		4.1					
tc: single (s)									
tc: 2 stage (s)									
tf (s)	3.5	3.3		2.2					
p0 queue free %	64	96		99					
cM capacity (veh/h)	422	803		1147					
Direction Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	
Volume Total	152	33	13	169	189	255	154		
Volume Left	152	0	13	0	0	0	0		
Volume Right	0	33	0	0	0	0	26		
cSH	422	803	1147	1700	1700	1700	1700		
Volume to Capacity	0.36	0.04	0.01	0.11	0.11	0.15	0.09		
Queue Length 95th (ft)	40	3	1	0	0	0	0		
Control Delay (s)	18.2	9.7	8.2	0.0	0.0	0.0	0.0		
Lane LOS	C	A	A	A	A	A	A		
Approach Delay (s)	16.7	0.3		0.0					
Approach LOS	C	A		A					
<b>Intersection Summary</b>									
Average Delay	3.2							A	
Intersection Capacity Utilization	25.5%							A	
Analysis Period (min)	15								

Movement	WBL	WBR	NBL	NBR	SBL	SBT	Permitted	Prot	
Lane Configurations									
Ideal Flow (vphpl)	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	1.00	1.00	1.00	1.00			
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863			
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863			
Volume (vph)	253	217	547	253	205	460			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	266	228	576	266	216	484			
RTOR Reduction (vph)	0	178	0	190	0	0			
Lane Group Flow (vph)	266	50	576	116	216	484			
Turn Type	Permitted		Permitted		Permitted	Prot			
Protected Phases	8	2		2		6			
Permitted Phases									
Actuated Green, G (s)	13.2	13.2	26.8	26.8	9.3	40.8			
Effective Green, g (s)	13.7	13.7	27.3	27.3	9.8	41.1			
Actuated G/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	386	345	810	688	276	1219			
y/s Ratio Prot								c0.12	0.26
y/s Ratio Perm								c0.31	0.07
v/c Ratio	0.69	0.14	0.71	0.17	0.78	0.40			
Uniform Delay, d1	22.6	19.8	14.5	10.8	25.5	5.1			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	5.1	0.2	5.3	0.5	13.5	1.0			
Delay (s)	27.7	20.0	19.8	11.4	38.9	6.0			
Level of Service	C	C	B	B	D	A			
Approach Delay (s)	24.1		17.1		16.2				
Approach LOS	C		B		B				
<b>Intersection Summary</b>									
HCM Average Control Delay	18.5							B	
HCM Volume to Capacity Ratio	0.72							B	
Actuated Cycle Length (s)	62.8							Sum of lost time (s)	
Intersection Capacity Utilization	64.2%							12.0	
Analysis Period (min)	15							C	
c Critical Lane Group									

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

2020 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.85	1.00	0.95	1.00	1.00	0.85
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665	1583
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665	1583
Volume (vph)	83	585	53	116	492	92	69	26	153	281	40	97
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	616	58	122	518	97	73	27	161	296	42	102
RTOR Reduction (vph)	0	0	44	0	0	77	0	56	69	0	54	0
Lane Group Flow (vph)	87	616	32	122	518	20	73	43	20	296	90	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	3	8	3	8	5	2	1	1	6	5
Permitted Phases	4	4	4	15.8	15.8	4.4	17.1	17.1	24.4	37.1	6	6
Actuated Green, G (s)	4.7	16.1	16.1	4.4	15.8	15.8	4.4	17.1	17.1	24.4	37.1	6
Effective Green, g (s)	5.2	16.6	16.6	4.9	16.3	16.3	4.9	17.6	17.6	24.9	37.6	6
Actuated g/C Ratio	0.07	0.21	0.21	0.06	0.20	0.20	0.06	0.22	0.22	0.31	0.47	0.07
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	115	734	328	210	721	323	210	347	331	551	783	321
v/s Ratio Prot	0.05	c0.17	0.01	0.04	c0.15	0.01	c0.02	c0.03	c0.17	0.05	0.05	0.05
v/s Ratio Perm	0.76	0.84	0.04	0.58	0.72	0.06	0.35	0.12	0.06	0.54	0.11	0.11
Uniform Delay, d1	36.8	30.4	25.3	36.6	29.7	25.7	36.0	25.0	24.7	22.8	11.9	11.9
Progression Factor	1.00	1.00	1.00	0.77	0.58	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.3	8.4	0.0	3.3	2.8	0.1	1.0	0.7	0.3	1.0	0.3	0.3
Delay (s)	61.1	38.8	25.4	31.6	19.9	8.6	37.0	25.7	25.0	23.8	12.2	12.2
Level of Service	F	D	C	C	B	A	D	C	C	C	B	B
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	28.2											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	52.9%											
Analysis Period (min)	15											
c Critical Lane Group												

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.85	1.00	0.91	0.97	1.00	0.85
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	1770	3224	1441	3433	1863
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	1770	3224	1441	3433	1863
Volume (vph)	216	700	163	377	603	318	173	326	510	339	301	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	737	172	397	635	335	182	343	537	357	317	248
RTOR Reduction (vph)	0	0	115	0	0	227	0	68	271	0	0	198
Lane Group Flow (vph)	227	737	57	397	635	108	182	442	99	357	317	50
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	3	8	3	8	5	2	1	1	6	5
Permitted Phases	4	4	4	15.8	15.8	4.4	17.1	17.1	24.4	37.1	6	6
Actuated Green, G (s)	12.1	25.8	25.8	11.5	25.2	25.2	9.0	15.0	15.0	9.7	15.7	15.7
Effective Green, g (s)	12.6	26.3	26.3	12.0	25.7	25.7	9.5	15.5	15.5	10.2	16.2	16.2
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.19	0.19	0.13	0.20	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1672	520	515	1137	509	210	625	279	438	377	321
v/s Ratio Prot	c0.13	0.14	0.04	c0.12	c0.18	0.07	0.10	0.14	0.07	c0.10	c0.17	0.03
v/s Ratio Perm	0.81	0.44	0.11	0.77	0.55	0.21	0.87	0.71	0.36	0.82	0.84	0.16
Uniform Delay, d1	32.6	21.1	18.7	32.7	22.5	19.8	34.6	30.1	27.9	34.0	30.7	26.3
Progression Factor	0.74	0.59	0.52	0.87	0.80	1.13	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	0.7	0.3	6.0	1.7	0.8	29.1	3.7	0.8	11.1	15.4	0.2
Delay (s)	37.3	13.0	10.1	34.6	19.7	23.1	63.7	33.8	28.7	45.1	46.1	26.5
Level of Service	D	B	B	C	B	C	E	C	C	D	D	C
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	29.1											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	67.4%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4939	1770	3539	1583	1681	1686	1583	1681	1686	1583	1681	1686
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	4939	1770	3539	1583	1681	1686	1583	1681	1686	1583	1681	1686
Volume (vph)	0	1252	297	68	862	256	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1318	313	72	907	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1586	0	72	907	268	0	12	0	322	322	369
Turn Type		Prot	Free	Perm	Free	Perm		Free	Perm	Free	Perm	
Protected Phases		4	3	6	2	6		2	6	6	6	6
Permitted Phases		37.0	5.5	47.0	80.0	25.0		24.5	24.5	24.5	24.5	24.5
Actuated Green, G (s)		37.0	5.5	47.0	80.0	25.0		24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0		25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31		0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5
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)		2315	122	2079	1583	484		484	410	392	495	495
w/s Ratio Prot		c0.32	c0.04	c0.26	0.17	0.01		0.25	c0.26	0.23	0.23	0.23
w/s Ratio Perm		0.69	0.59	0.44	0.17	0.02		0.79	0.82	0.74	0.74	0.74
v/c Ratio		16.6	36.2	9.2	0.0	19.0		25.1	25.4	24.6	24.6	24.6
Uniform Delay, d1		0.47	1.08	0.90	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Progression Factor		1.3	6.7	0.6	0.2	0.0		9.5	13.0	6.0	6.0	6.0
Incremental Delay, d2		9.2	45.6	8.8	0.2	19.1		34.6	38.4	30.6	30.6	30.6
Delay (s)		A	D	A	A	B		C	D	C	D	C
Level of Service		A	D	A	A	B		C	D	C	D	C
Approach Delay (s)		9.2	9.1	9.1	18.1	18.1		18.1	34.1	34.1	34.1	34.1
Approach LOS		A	A	A	B	B		B	C	C	C	C

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	16.0	B
HCM Volume to Capacity ratio	0.73	B
Actuated Cycle Length (s)	80.0	
Sum of lost time (s)	12.0	
Intersection Capacity Utilization	68.2%	C
Analysis Period (min)	15	
Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4939	1770	3539	1583	1681	1686	1583	1681	1686	1583	1681	1686
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	4939	1770	3539	1583	1681	1686	1583	1681	1686	1583	1681	1686
Volume (vph)	0	1252	297	68	862	256	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1318	313	72	907	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1586	0	72	907	268	0	12	0	322	322	369
Turn Type		Prot	Free	Perm	Free	Perm		Free	Perm	Free	Perm	
Protected Phases		4	3	6	2	6		2	6	6	6	6
Permitted Phases		37.0	5.5	47.0	80.0	25.0		24.5	24.5	24.5	24.5	24.5
Actuated Green, G (s)		37.0	5.5	47.0	80.0	25.0		24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0		25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31		0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5
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)		2315	122	2079	1583	484		484	410	392	495	495
w/s Ratio Prot		c0.32	c0.04	c0.26	0.17	0.01		0.25	c0.26	0.23	0.23	0.23
w/s Ratio Perm		0.69	0.59	0.44	0.17	0.02		0.79	0.82	0.74	0.74	0.74
v/c Ratio		16.6	36.2	9.2	0.0	19.0		25.1	25.4	24.6	24.6	24.6
Uniform Delay, d1		0.47	1.08	0.90	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Progression Factor		1.3	6.7	0.6	0.2	0.0		9.5	13.0	6.0	6.0	6.0
Incremental Delay, d2		9.2	45.6	8.8	0.2	19.1		34.6	38.4	30.6	30.6	30.6
Delay (s)		A	D	A	A	B		C	D	C	D	C
Level of Service		A	D	A	A	B		C	D	C	D	C
Approach Delay (s)		9.2	9.1	9.1	18.1	18.1		18.1	34.1	34.1	34.1	34.1
Approach LOS		A	A	A	B	B		B	C	C	C	C

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	16.0	B
HCM Volume to Capacity ratio	0.73	B
Actuated Cycle Length (s)	80.0	
Sum of lost time (s)	12.0	
Intersection Capacity Utilization	68.2%	C
Analysis Period (min)	15	
Critical Lane Group		



22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

21: Rohnert Park Expwy & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020  
PM Peak

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	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3539	1583	1770	4911	1610	3330	1583	1610	3387	1583	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4911	1610	3330	1583	1610	3387	1583	1583
Volume (vph)	235	1221	462	165	682	202	384	293	241	179	354	152
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1285	486	174	718	213	408	308	254	188	373	160
RTOR Reduction (vph)	0	0	346	0	63	0	0	0	204	0	0	131
Lane Group Flow (vph)	247	1285	140	174	868	0	229	483	50	181	380	29
Turn Type	Prot	Perm	Prot	Perm	Split	Split	Perm	Split	Split	Perm	Split	Perm
Protected Phases	7	4	4	3	6	2	2	6	6	6	6	6
Permitted Phases												
Actuated Green, G (s)	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	14.0	14.0	14.0	14.0
Effective Green, g (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	14.5	14.5	14.5	14.5
Actuated g/C Ratio	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.18	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	562	1022	457	232	1258	320	662	315	292	614	287	287
v/s Ratio Prot	0.07	c0.36	0.09	0.10	c0.18	0.14	c0.15	0.03	c0.11	0.11	0.11	0.11
v/s Ratio Perm												
v/c Ratio	0.44	1.26	0.31	0.75	0.69	0.72	0.73	0.15	0.62	0.62	0.10	0.02
Uniform Delay, d1	30.1	28.4	22.2	33.5	26.9	29.9	30.0	26.5	30.2	30.2	27.3	27.3
Progression Factor	0.72	0.77	2.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	123.3	1.6	12.8	3.1	7.4	4.0	0.2	3.9	1.9	0.2	0.2
Delay (s)	22.2	145.1	46.6	46.2	30.0	37.4	34.1	26.8	34.1	32.1	27.5	27.5
Level of Service	C	F	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)												
Approach LOS												
Intersection Summary	Intersection Summary											
HCM Average Control Delay	63.4											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	79.1%											
Analysis Period (min)	15											
Critical Lane Group	C											

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	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.91	1.00
Flt Protected	1.00	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Satd. Flow (prot)	3433	3539	1583	1770	4911	1610	3330	1583	1610	3387	1583	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4911	1610	3330	1583	1610	3387	1583	1583
Volume (vph)	235	1221	462	165	682	202	384	293	241	179	354	152
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1285	486	174	718	213	408	308	254	188	373	160
RTOR Reduction (vph)	0	0	346	0	63	0	0	0	204	0	0	131
Lane Group Flow (vph)	247	1285	140	174	868	0	229	483	50	181	380	29
Turn Type	Prot	Perm	Prot	Perm	Split	Split	Perm	Split	Split	Perm	Split	Perm
Protected Phases	7	4	4	3	6	2	2	6	6	6	6	6
Permitted Phases												
Actuated Green, G (s)	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	14.0	14.0	14.0	14.0
Effective Green, g (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	14.5	14.5	14.5	14.5
Actuated g/C Ratio	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.18	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	562	1022	457	232	1258	320	662	315	292	614	287	287
v/s Ratio Prot	0.07	c0.36	0.09	0.10	c0.18	0.14	c0.15	0.03	c0.11	0.11	0.11	0.11
v/s Ratio Perm												
v/c Ratio	0.44	1.26	0.31	0.75	0.69	0.72	0.73	0.15	0.62	0.62	0.10	0.02
Uniform Delay, d1	30.1	28.4	22.2	33.5	26.9	29.9	30.0	26.5	30.2	30.2	27.3	27.3
Progression Factor	0.72	0.77	2.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	123.3	1.6	12.8	3.1	7.4	4.0	0.2	3.9	1.9	0.2	0.2
Delay (s)	22.2	145.1	46.6	46.2	30.0	37.4	34.1	26.8	34.1	32.1	27.5	27.5
Level of Service	C	F	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)												
Approach LOS												
Intersection Summary	Intersection Summary											
HCM Average Control Delay	63.4											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	79.1%											
Analysis Period (min)	15											
Critical Lane Group	C											

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.90	1.00	0.88	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	3516	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	3516	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Volume (vph)	122	708	32	53	797	406	48	28	59	592	28	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	745	34	56	839	427	51	29	62	623	29	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	128	775	0	56	839	260	51	34	0	623	84	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8	5	2		1	6		
Permitted Phases												
Actuated Green, G (s)	5.5	21.8		4.4	20.7	3.3	6.4		39.4	42.5		
Effective Green, g (s)	6.0	22.3		4.9	21.2	3.8	6.9		39.9	43.0		
Actuated g/C Ratio	0.07	0.25		0.05	0.24	0.04	0.08		0.44	0.48		
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	118	871		96	834	373	75	128	785	783		
v/s Ratio Prot	0.07	c0.22		0.03	c0.24	0.16	c0.03	0.02	c0.35	c0.05		
v/s Ratio Perm												
v/c Ratio	1.08	0.89		0.58	1.01	0.70	0.68	0.26	0.79	0.11		
Uniform Delay, d1	42.0	32.7		41.6	34.4	31.5	42.5	39.2	21.5	12.9		
Progression Factor	1.00	1.00		0.68	0.61	0.24	1.00	1.00	1.00	1.00		
Incremental Delay, d2	107.4	13.2		7.7	30.7	9.2	22.4	1.1	5.5	0.1		
Delay (s)	149.4	45.9		35.8	51.6	16.9	64.9	40.3	27.1	13.0		
Level of Service	F	D		D	D	B	E	D	C	B		
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	42.4											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	78.7%											
Analysis Period (min)	15											
c - Critical Lane Group												

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1593	1583	1770	3539	1770	3539	1770	3539	1770	3539	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1583	1770	3539	1770	3539	1770	3539	1770	3539	1583
Volume (vph)	0	953	412	66	998	0	0	0	0	640	0	258
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1003	434	69	1051	0	0	0	0	674	0	272
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1003	340	69	1051	0	0	0	0	674	0	203
Turn Type	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3	8					1		6
Permitted Phases												
Actuated Green, G (s)	36.4	36.4		11.6	52.5					28.5		28.5
Effective Green, g (s)	36.9	36.9		12.1	53.0					29.0		29.0
Actuated g/C Ratio	0.41	0.41		0.13	0.59					0.32		0.32
Clearance Time (s)	4.5	4.5		4.5	4.5					4.5		4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)	1451	649		238	2084					1106		510
v/s Ratio Prot	c0.28			0.04	c0.30					c0.20		0.13
v/s Ratio Perm												
v/c Ratio	0.69	0.52		0.29	0.56					0.61		0.40
Uniform Delay, d1	21.9	20.0		35.1	10.8					25.7		23.7
Progression Factor	0.49	0.44		1.21	1.53					1.00		1.00
Incremental Delay, d2	1.6	1.8		0.6	0.8					1.0		2.3
Delay (s)	12.4	10.5		43.0	17.4					26.7		26.0
Level of Service	B	B		D	B					C		C
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	18.1											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	67.7%											
Analysis Period (min)	15											
c - Critical Lane Group												

25: Gravenstien Hwy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel

2020 PM Peak

Movement	EBL	EBR	WBL	WBR	NBL	NBR	Free
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	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	0.95	0.95	0.97	1.00	1.00	1.00	
Fr	1.00	1.00	1.00	0.85	1.00	1.00	
Flt Protected	3539	3539	3433	1583	3539	3433	
Satd. Flow (prot)	1.00	1.00	0.95	1.00	1.00	0.95	
Flt Permitted	3539	3433	1583	3539	3433	1583	
Satd. Flow (perm)	1586	0	0	683	375	273	
Volume (vph)	1586	0	0	683	375	273	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	1680	0	0	719	395	287	
RTOR Reduction (vph)	0	0	0	0	0	14	
Lane Group Flow (vph)	1680	0	0	719	395	273	
Turn Type	Perm						
Protected Phases	4	8	2	2	2	2	
Permitted Phases	60.8	20.2	20.2	20.2	20.2	20.2	
Actuated Green, G (s)	61.3	20.7	20.7	20.7	20.7	20.7	
Effective Green, g (s)	0.68	0.23	0.23	0.23	0.23	0.23	
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Vehicle Extension (s)	2410	790	364	60.17	60.17	60.17	
Lane Grn Cap (vph)	60.17	0.20	0.12	0.30	0.50	0.75	
v/s Ratio Prgt	0.70	5.7	30.1	32.2	1.00	1.00	
v/s Ratio Perm	8.7	1.00	1.00	1.00	0.3	0.5	
Uniform Delay, d1	1.3	6.1	30.6	40.7	A	C	
Progression Factor	4.3	A	C	D	A	C	
Incremental Delay, d2	A	A	A	A	A	A	
Delay (s)	4.3	6.1	34.9	44.9	A	C	
Level of Service	A	A	A	A	A	A	
Approach Delay (s)	4.3	6.1	34.9	44.9	A	C	
Approach LOS	A	A	A	A	A	A	
<b>Intersection Summary</b>							
HCM Average Control Delay	11.5		HCM Level of Service		B		
HCM Volume to Capacity ratio	0.71						
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				
Intersection Capacity Utilization	67.7%		ICU Level of Service				
Analysis Period (min)	15		C				
c Critical Lane Group							

26: Millbrae Ave & Stony Point Road  
Graton Rancheria Casino & Hotel

2020 PM Peak

Movement	EBL	EBR	WBL	WBR	NBL	NBR	Free
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	0%	0%	0%	0%	0%	0%	
Grade	11	5	8	23	25	219	7
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	12	5	8	24	28	231	7
Hourly flow rate (vph)	12	5	8	24	28	231	7
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC1, conflicting volume	1424	1705	3123	1378	1682	383	623
vC1, stage 1 conf vol							
vC2, stage 2 conf vol	1424	1705	3123	1378	1682	383	623
vCu, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1
tC, 2 stage (s)							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2
p0 queue free %	70	93	99	71	66	63	99
GM capacity (veh/h)	39	75	684	84	77	615	954
Direction Lane #	EB	WB	NB	EB	WB	NB	EB
Volume Total	25	281	7	363	383	27	139
Volume Left	12	24	7	0	0	0	139
Volume Right	8	231	0	0	0	27	0
cSH	66	448	954	1700	1700	823	1700
Volume to Capacity	0.38	0.63	0.01	0.23	0.23	0.02	0.17
Queue Length 95th (ft)	36	105	1	0	0	0	15
Control Delay (s)	90.2	30.8	8.8	0.0	0.0	0.0	10.3
Lane LOS	F	D	A	A	A	B	B
Approach Delay (s)	90.2	30.8	0.1				1.9
Approach LOS	F	D	D				
<b>Intersection Summary</b>							
Average Delay	6.7						
Intersection Capacity Utilization	47.0%		ICU Level of Service				
Analysis Period (min)	15		A				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	161	5	7	265	2	1	0	2	0	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	169	5	7	279	2	1	0	2	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	281			175			469	470	172	471	472	280
vC1, stage 1 cont vol												
vC2, stage 2 cont vol	281			175			469	470	172	471	472	280
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	100	100	100
p0 queue free %	100			99			100	100	100	100	100	100
CM capacity (veh/h)	1281			1402			501	488	672	499	488	759
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	176	288	3	1								
Volume Left	1	7	1	0								
Volume Right	5	2	2	0								
cSH	1281	1402	699	488								
Volume to Capacity	0.00	0.01	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.1	0.2	10.2	12.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	10.2	12.4								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	28.9%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	146	2	4	279	8	1	9	0	4	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	154	2	4	294	8	1	9	0	4	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	302			156			464	467	155	468	464	298
vC1, stage 1 cont vol												
vC2, stage 2 cont vol	302			156			464	467	155	468	464	298
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	98	100	99	100	100
p0 queue free %	100			100			100	98	100	99	100	100
CM capacity (veh/h)	1259			1424			506	491	891	497	493	742
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	157	306	11	5								
Volume Left	1	4	1	4								
Volume Right	2	8	0	1								
cSH	1259	1424	493	532								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.1	0.1	12.5	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.1	12.5	11.8								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	27.8%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EBR	WB	WB1	NBL	NBR	Free	Stop	0%	
Sign Control	4	4	4	4	4	4	0%	0%	0%	
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	154	27	7	331	21	25	0.95	0.95	0.95	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	162	28	7	348	28	26				
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type									None	
Median storage (veh)										
Upstream signal (ft)										
pX, platoon unblocked										
vC, conflicting volume						191			539	
vC1, stage 1 conf vol									176	
vC2, stage 2 conf vol									539	
vCu, unblocked vol									191	
tC, single (s)									4.1	
tC, 2 stage (s)									6.2	
tF (s)									2.2	
p0 queue free %									3.5	
p0 queue free %									3.3	
CM capacity (veh/h)									99	
CM capacity (veh/h)									94	
CM capacity (veh/h)									97	
Direction, Lane #	EB	WB	NB	EB	WB	NB	1383	500	867	
Volume Total	191	356	65	191	356	65				
Volume Left	0	7	28	0	7	28				
Volume Right	28	0	26	28	0	26				
cSH	1700	1383	628	1700	1383	628				
Volume to Capacity	0.11	0.01	0.09	0.11	0.01	0.09				
Queue Length 95th (ft)	0	0	7	0	0	7				
Control Delay (s)	0.0	0.2	11.3	0.0	0.2	11.3				
Lane LOS	A	B	B	A	B	B				
Approach Delay (s)	0.0	0.2	11.3	0.0	0.2	11.3				
Approach LOS	B	B	B	B	B	B				
<b>Intersection Summary</b>										
Average Delay							1.2			
Intersection Capacity Utilization							33.0%	ICU Level of Service		
Analysis Period (min)							15	A		

Movement	EB	EB1	EB2	WB	WB1	WB2	NB	NB1	NB2	NBR	Free	Stop	0%	
Sign Control	4	4	4	4	4	4	4	4	4	4	0%	0%	0%	
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	0	160	23	36	225	0	114	0	26	0	0.95	0.95	0.95	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	168	24	38	237	0	120	0	27	0				
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type													None	
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume										493			181	
vC1, stage 1 conf vol													505	
vC2, stage 2 conf vol													237	
vCu, unblocked vol													493	
tC, single (s)													7.1	
tC, 2 stage (s)													6.5	
tF (s)													5.2	
p0 queue free %													3.3	
p0 queue free %													4.0	
CM capacity (veh/h)													100	
CM capacity (veh/h)													97	
CM capacity (veh/h)													100	
Direction, Lane #	EB	WB	NB	EB	WB	NB	1330	475	464	862	442	457	802	
Volume Total	193	275	147	193	275	147								
Volume Left	0	38	120	0	38	120								
Volume Right	24	0	27	24	0	27								
cSH	1330	1381	519	1330	1381	519								
Volume to Capacity	0.00	0.03	0.28	0.00	0.03	0.28								
Queue Length 95th (ft)	0	2	29	0	2	29								
Control Delay (s)	0.0	1.3	14.7	0.0	1.3	14.7								
Lane LOS	A	B	B	A	B	B								
Approach Delay (s)	0.0	1.3	14.7	0.0	1.3	14.7								
Approach LOS	B	B	B	B	B	B								
<b>Intersection Summary</b>														
Average Delay														4.1
Intersection Capacity Utilization														41.6%
Analysis Period (min)														15
													ICU Level of Service	A

Movement	EBT	EBR	WBL	WBR	NBL	NBR
Lane Configurations	1					
Sign Control	Free	Free	Stop	Stop	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	51	0	235	55	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	138	54	247	58	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
px. platoon unblocked			192	412	165	
vc. conflicting volume						
vC1, stage 1 conf vol			192	412	165	
vC2, stage 2 conf vol			41	165	62	
vCu, unblocked vol						
IC, single (s)			2.2	3.5	3.3	
IC, 2 stage (s)			100	90	100	
f (s)			1382	596	880	
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB	WB	1	NB	1	
Volume Total	192	247	58			
Volume Left	0	0	58			
Volume Right	54	0	0			
CSH	1700	1382	596			
Volume to Capacity	0.11	0.00	0.10			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.0	0.0	11.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.7			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			22.4%			A
Analysis Period (min)			15			

7: Wilfred Avenue & Redwood Drive  
 Graton Rancheria Casino & Hotel

2020  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	154	173	268	77	383	768	565	108	368	477	308
v/c Ratio	0.33	0.85	0.95	0.12	0.58	0.77	2.65	0.43	0.81	0.73	1.03
Control Delay	48.0	65.4	26.4	31.1	40.3	16.2	778.1	75.6	20.8	68.1	108.5
Queue Delay	0.0	4.8	0.0	0.0	22.2	1.5	0.0	0.0	5.1	172.0	0.0
Total Delay	48.0	70.0	26.4	31.1	62.4	17.8	778.1	75.6	25.8	240.0	108.5
Queue Length 50th (ft)	129	421	121	52	328	182	1028	58	0	243	267
Queue Length 95th (ft)	191	489	220	m82	413	257	#1271	89	110	#350	#4771
Internal Link Dist (ft)	150	550	220	220	220	220	110	110	100	275	270
Turn Bay Length (ft)	150	150	150	150	150	150	150	100	100	275	275
Base Capacity (vph)	531	1017	532	623	656	992	221	376	497	656	298
Starvation Cap Reductn	0	0	0	0	270	94	0	0	0	0	0
Spillback Cap Reductn	0	176	0	0	0	0	0	0	78	309	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.92	0.50	0.12	0.99	0.86	2.65	0.29	0.88	1.37	1.03

Intersection Summary:  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

9: Wilfred Avenue & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel

2020  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	1323	298	81	718	374	810					
v/c Ratio	0.79	0.33	0.32	0.35	0.72	0.71					
Control Delay	30.3	5.1	38.9	8.3	32.9	21.2					
Queue Delay	43.3	0.6	0.0	0.1	0.0	0.8					
Total Delay	73.6	5.7	38.9	8.4	32.9	22.0					
Queue Length 50th (ft)	675	55	18	42	179	141					
Queue Length 95th (ft)	741	m50	m40	78	#292	210					
Internal Link Dist (ft)	220			466		348					
Turn Bay Length (ft)	300			250		250					
Base Capacity (vph)	1681	908	257	2035	523	1142					
Starvation Cap Reductn	465	311	0	0	0	0					
Spillback Cap Reductn	0	0	0	258	0	117					
Storage Cap Reductn	0	0	0	0	0	0					
Reduced v/c Ratio	1.09	0.50	0.32	0.40	0.72	0.79					

Intersection Summary:  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	799	899	525	484	173	182	601	9
v/c Ratio	0.70	0.95	0.94	0.31	0.50	-0.52	0.57	0.02
Control Delay	43.9	36.0	65.1	18.8	30.1	30.5	5.7	25.7
Queue Delay	0.0	44.0	0.0	0.0	0.0	0.0	0.4	0.0
Total Delay	43.9	80.0	65.1	18.8	30.1	30.5	6.1	25.7
Queue Length 50th (ft)	185	345	148	123	53	56	0	4
Queue Length 95th (ft)	0	488	239	170	109	115	61	21
Internal Link Dist (ft)	466		345		380			270
Turn Bay Length (ft)	150		150		150			200
Base Capacity (vph)	1144	951	558	1542	347	349	1052	365
Starvation Cap Reductn	0	134	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	118	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	1.10	0.94	0.31	0.50	0.52	0.64	0.02

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	144	1268	967	107	108			
v/c Ratio	0.37	0.56	0.58	0.23	0.22			
Control Delay	28.9	19.3	17.2	24.8	5.3			
Queue Delay	0.0	1.7	0.0	0.0	0.0			
Total Delay	28.9	21.0	17.2	24.8	5.3			
Queue Length 50th (ft)	43	303	174	42	0			
Queue Length 95th (ft)	ms6	323	246	83	36			
Internal Link Dist (ft)		345	164	232				
Turn Bay Length (ft)	80	2256	1665	465	495			
Base Capacity (vph)	901	762	0	0	0			
Starvation Cap Reductn	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0			
Reduced v/c Ratio	0.16	0.85	0.58	0.23	0.22			

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	252	49	16	581	437	7	648	171	
v/c Ratio	0.70	0.71	0.33	0.11	1.09	0.20	0.05	0.59	0.81	
Control Delay	39.6	39.9	8.2	29.3	96.8	9.3	42.0	30.7	13.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	
Total Delay	39.6	39.9	8.2	29.3	96.8	9.3	42.0	30.7	15.2	
Queue Length 50th (ft)	121	123	0	5	333	34	4	171	180	
Queue Length 95th (ft)	190	192	25	23	4524	124	m4	m#367	m#195	
Internal Link Dist (ft)	284		118		214		100		380	
Turn Bay Length (ft)	250	250			200				175	
Base Capacity (vph)	441	443	452	179	531	2224	177	1094	957	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	65
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.57	0.11	0.09	1.09	0.20	0.04	0.59	0.85	

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	266	228	576	266	216	484	
v/c Ratio	0.69	0.44	0.71	0.32	0.78	0.40	
Control Delay	32.6	6.3	21.6	3.1	48.1	6.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.6	6.3	21.6	3.1	48.1	6.7	
Queue Length 50th (ft)	94	0	180	0	82	78	
Queue Length 95th (ft)	164	47	307	38	186	134	
Internal Link Dist (ft)	460		3920		700	2550	
Turn Bay Length (ft)	175				450	700	
Base Capacity (vph)	436	562	809	838	281	1219	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.41	0.71	0.32	0.77	0.40	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	87	616	56	122	518	97	73	99	89	296	144	
v/c Ratio	0.61	0.84	0.15	0.47	0.72	0.24	0.28	0.23	0.21	0.86	0.17	
Control Delay	56.3	42.3	8.9	32.8	22.2	3.3	38.1	11.9	7.7	28.4	5.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	56.3	42.3	8.9	32.8	22.2	3.3	38.1	11.9	7.7	28.4	5.5	
Queue Length 50th (ft)	43	155	0	18	98	0	18	11	0	123	12	
Queue Length 95th (ft)	#111	#236	29	m42	m135	m4	38	52	37	202	43	
Internal Link Dist (ft)	1540			220			1010				520	
Turn Bay Length (ft)	160	200	200	250	170	130	130	130	130	100	100	
Base Capacity (vph)	142	752	380	257	752	413	257	437	433	531	872	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.82	0.15	0.47	0.69	0.23	0.28	0.23	0.21	0.86	0.17	
<b>Intersection Summary</b>												
# - 95th percentile volume exceeds capacity; queue may be longer.												
Queue shown is maximum after two cycles.												
m - Volume for 95th percentile queue is metered by upstream signal.												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	227	737	172	397	635	335	182	510	370	357	317	248
v/c Ratio	0.81	0.44	0.27	0.77	0.56	0.46	0.87	0.74	0.67	0.81	0.84	0.48
Control Delay	44.1	13.2	2.7	38.7	20.2	4.9	73.5	32.0	11.7	51.7	51.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	13.2	2.7	38.7	20.2	4.9	73.5	32.0	11.7	51.7	51.3	7.3
Queue Length 50th (ft)	67	57	5	109	137	37	92	107	15	92	151	0
Queue Length 95th (ft)	m67	m139	m67	m109	m202	m46	#210	162	104	#172	#279	57
Internal Link Dist (ft)	320			520			554				480	
Turn Bay Length (ft)	200	250	250	350	155	250	210	751	571	439	396	532
Base Capacity (vph)	288	1669	636	515	1134	735	210	751	571	439	396	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.44	0.27	0.77	0.56	0.46	0.87	0.68	0.65	0.81	0.80	0.47
<b>Intersection Summary</b>												
# - 95th percentile volume exceeds capacity; queue may be longer.												
Queue shown is maximum after two cycles.												
m - Volume for 95th percentile queue is metered by upstream signal.												

Lane Group	EBL	WBL	WBT	WBR	NBT	SBE	SBT	SBR
Lane Group Flow (vph)	1631	72	907	268	24	322	322	449
v/c Ratio	0.68	0.49	0.44	0.17	0.05	0.78	0.92	0.78
Control Delay	8.3	49.5	9.7	0.2	9.3	38.5	42.5	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	49.5	9.7	0.2	9.3	38.5	42.5	27.8
Queue Length 50th (ft)	147	31	153	0	2	143	146	142
Queue Length 95th (ft)	223	m70	m94	m0	17	238	#267	247
Internal Link Dist (ft)	520		960		428		378	
Turn Bay Length (ft)		225			400		400	
Base Capacity (vph)	2413	147	2078	1583	576	476	455	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.49	0.44	0.17	0.04	0.68	0.71	0.69

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	22	1638	314	885	403	357	181	182
v/c Ratio	0.17	0.44	0.20	0.32	0.25	0.82	0.36	0.39
Control Delay	40.7	13.1	0.2	9.5	0.3	40.0	21.7	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	13.1	0.2	9.5	0.3	40.0	21.7	21.8
Queue Length 50th (ft)	12	170	0	69	0	165	73	73
Queue Length 95th (ft)	m16	234	m0	116	m0	213	102	103
Internal Link Dist (ft)		960		360		366		420
Turn Bay Length (ft)	190				225			
Base Capacity (vph)	133	3762	1563	2731	1583	730	791	801
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.44	0.20	0.32	0.25	0.49	0.23	0.23

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	1265	486	174	931	229	483	254	181	380	150
v/c Ratio	0.44	1.26	0.61	0.75	0.70	0.71	0.73	0.49	0.62	0.62	0.38
Control Delay	24.3	148.2	8.4	60.0	29.0	43.2	36.9	7.4	39.4	34.4	7.7
Queue Delay	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	148.2	8.8	60.0	29.0	43.2	36.9	7.4	39.4	34.4	7.7
Queue Length 50th (ft)	63	447	114	68	145	116	123	0	91	96	0
Queue Length 95th (ft)	80	571	6	222	213	214	176	58	158	138	47
Internal Link Dist (ft)	360			1350			601		660		
Turn Bay Length (ft)	250			200			250		175		150
Base Capacity (vph)	558	1020	802	231	1323	342	707	536	342	720	462
Starvation Cap Reductn	0	0	63	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.26	0.66	0.75	0.70	0.67	0.68	0.47	0.53	0.53	0.35

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	157	864	147	695	119	340	508	119	113	377	247
v/c Ratio	1.03	0.97	0.97	0.81	0.25	0.96	0.73	0.18	0.66	0.83	0.44
Control Delay	118.8	49.3	102.1	34.1	6.3	70.2	28.0	4.4	50.7	43.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	118.8	49.3	102.1	34.1	6.3	70.2	28.0	4.4	50.7	43.6	6.5
Queue Length 50th (ft)	-72	-176	65	148	0	146	194	0	48	154	3
Queue Length 95th (ft)	#183	#295	#170	#230	36	#298	#346	31	#115	#292	54
Internal Link Dist (ft)	689			6630		734			980		
Turn Bay Length (ft)	350			500		150	550		675		625
Base Capacity (vph)	152	863	152	859	475	354	698	667	172	452	565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.97	0.97	0.81	0.25	0.96	0.73	0.18	0.66	0.83	0.44

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

Lane Group	EBT	EBL	WBT	WBL	NBT	NBL	SBT	SBL
Lane Group Flow (vph)	128	779	56	839	427	51	91	623
v/c Ratio	1.08	0.79	0.47	0.93	0.75	0.43	0.44	0.81
Control Delay	150.1	38.1	39.4	37.0	12.3	52.2	22.9	34.4
Queue Delay	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0
Total Delay	150.1	38.4	39.4	37.0	12.8	52.2	22.9	34.4
Queue Length 50th (ft)	82	221	32	242	5	28	16	310
Queue Length 95th (ft)	194	4321	m60	4353	#103	65	59	4566
Internal Link Dist (ft)	6630			350		200		236
Turn Bay Length (ft)	225	150	118	904	567	118	366	767
Base Capacity (vph)	118	980	0	0	17	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	24	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.81	0.47	0.93	0.78	0.43	0.25	0.81

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m. Volume for 95th percentile queue is metered by upstream signal.

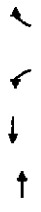
24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

Lane Group	EBT	EBL	WBT	WBL	NBT	NBL	SBT	SBL
Lane Group Flow (vph)	1003	434	69	1051	674	272		
v/c Ratio	0.67	0.57	0.27	0.50	0.61	0.47		
Control Delay	12.7	8.0	42.4	17.7	28.6	17.9		
Queue Delay	0.4	0.3	0.0	0.3	0.0	0.0		
Total Delay	13.1	8.3	42.4	18.0	28.6	17.9		
Queue Length 50th (ft)	155	61	37	246	164	73		
Queue Length 95th (ft)	191	m118	m79	307	222	147		
Internal Link Dist (ft)	350			370		585		
Turn Bay Length (ft)		50	100		425			
Base Capacity (vph)	1486	757	295	2084	1106	579		
Starvation Cap Reductn	137	63	0	404	0	0		
Spillback Cap Reductn	34	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.74	0.63	0.23	0.63	0.61	0.47		

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

2020  
 PM Peak



Lane Group	EB	WB	NB	NBR
Lane Group Flow (vph)	1680	719	395	287
v/c Ratio	0.70	0.30	0.50	0.76
Control Delay	4.9	7.0	31.3	42.5
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	4.9	7.0	31.3	42.5
Queue Length 50th (ft)	189	75	100	143
Queue Length 95th (ft)	250	137	125	205
Internal Link Dist (ft)	370	312	43	
Turn Bay Length (ft)	2409	2409	1221	574
Base Capacity (vph)	61	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.30	0.32	0.50

Intersection Summary

## **TRIP GENERATION – ALTERNATIVES A, B, & C**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Casino 450,000 s.f.	17,744	930	398	1,328	1,181	1,047	2,228
Hotel 300 Room*	817	34	22	56	31	28	59
Net New Vehicle Trips	18,261	964	420	1,384	1,212	1,075	2,287

\*Trip rate is ITE Land Use Code 310 – Hotel. Rate reduced by 2/3 to account for internal capture to/from casino.



## **TRIP GENERATION – ALTERNATIVES D & H**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Casino 315,100 s.f.	12,424	651	279	930	827	733	1,560
Hotel 100 Room*	272	12	7	19	11	9	20
Net New Vehicle Trips	12,696	663	286	949	838	742	1,580

\*Trip rate is ITE Land Use Code 310 – Hotel. Rate reduced by 2/3 to account for internal capture to/from casino.

## **TRIP GENERATION – ALTERNATIVE E**

LAND USE	Trips						
	Daily	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting	Total
Light Industrial 400,000 s.f.	2,788	324	44	368	47	345	392
Commercial 100,000 s.f.	4,294	63	40	103	180	195	375
Subtotal	7,082	387	84	471	227	540	767
Commercial Pass-by Reduction	N/A	N/A	N/A	N/A	-70	-76	-146
Net New Vehicle Trips	7,082	387	84	471	157	464	621

**NEAR-TERM 2008 + ALTERNATIVE A  
TRAFFIC CONDITIONS  
(SYNCHRO)**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	
Lane Configurations	4											
Sign Control	Stop											
Grade	0%											
Volume (veh/h)	0	14	139	11	155	11	754	116	185	514	6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	15	146	12	163	12	794	122	195	541	6	
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage	1											
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	1838	1873	544	1827	1815	855	547	916				
vC, conflicting volume												
vC1, stage 1 conf vol	1838	1873	544	1827	1815	855	547	916				
vC2, stage 2 conf vol												
vCU, unblocked vol	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	84	97	0	80	54	99	74				
CM capacity (veh/h)	21	53	539	40	57	358	1022	745				
Direction, Lane #	EBT	WB1	NB1	NB2	SB1	SB2						
Volume Total	23	321	12	916	195	547						
Volume Left	0	146	12	0	195	0						
Volume Right	15	163	0	122	0	6						
cSH	123	75	1022	1700	745	1700						
Volume to Capacity	0.19	4.29	0.01	0.54	0.26	0.32						
Queue Length 95th (ft)	16	Err	1	0	26	0						
Control Delay (s)	40.8	Err	8.6	0.0	11.5	0.0						
Lane LOS	E	F	A	B	B							
Approach Delay (s)	40.8	Err	0.1	3.0								
Approach LOS	E	F	F									

Intersection Summary	
Average Delay	1595.8
Intersection Capacity Utilization	61.9%
Analysis Period (min)	15
ICU Level of Service	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	
Lane Configurations	4											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	10	289	10	8	284	8	10	10	10	10	10	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	11	304	11	8	299	8	11	11	11	11	11	
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	307			315			666	655	309	666	656	
vC, conflicting volume												
vC1, stage 1 conf vol	307			315			666	655	309	666	656	
vC2, stage 2 conf vol												
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	
p0 queue free %	99			99			97	97	99	97	97	
CM capacity (veh/h)	1253			1245			356	360	731	355	379	
Direction, Lane #	EB1	WB1	NB1	SB1								
Volume Total	325	316	32	32								
Volume Left	11	8	11	11								
Volume Right	11	8	11	11								
cSH	1253	1245	440	441								
Volume to Capacity	0.01	0.01	0.07	0.07								
Queue Length 95th (ft)	1	1	6	6								
Control Delay (s)	0.3	0.3	13.8	13.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.3	13.8	13.8								
Approach LOS	B	B	B	B								

Intersection Summary	
Average Delay	1.5
Intersection Capacity Utilization	30.4%
Analysis Period (min)	15
ICU Level of Service	A

3: Wilfred Avenue & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EB	EBT	EBL	WB	WBL	WBR	NBL	NB	NBR	SBL	SBR
Sign Control	Free	0%	Stop	0%	Stop	0%	Stop	0%	Stop	0%	Stop
Volume (veh/h)	10	288	10	7	200	15	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	303	11	7	285	16	11	11	11	11	11
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
Pk platoon unblocked											
Pk platoon unblocked											
vC, conflicting volume	311		314				663	955	308	663	303
vC1, stage 1 conf vol											
vC2, stage 2 conf vol	311		314				663	955	308	663	303
vCU, unblocked vol	4.1		4.1				7.1	6.5	6.2	7.1	6.5
IC, single (s)											
IC, 2 stage (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0
pl queue free %	99		99				97	97	99	97	99
pl queue free %	1250		1247				358	380	732	358	382
CM capacity (veh/h)											
Direction, Lane #	EB	EBT	EBL	WB	WBL	WBR	NB	NB	NBR	SBL	SBR
Volume Total	324	318	32	32							
Volume Left	11	7	11	11							
Volume Right	1250	1247	442	443							
cSH	0.01	0.01	0.07	0.07							
Volume to Capacity	1	0	6	6							
Queue Length 95th (ft)	0.3	0.2	13.8	13.7							
Control Delay (s)	A	A	B	B							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.3	0.2	13.8	13.7							
Approach LOS	B	B	B	B							
<b>Intersection Summary</b>											
Average Delay	1.5										
Intersection Capacity Utilization	30.6%										
Analysis Period (min)	15										
ICU Level of Service	A										

4: Wilfred Avenue & Langner Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EB	EBT	EBL	WB	WBL	WBR	NBL	NB	NBR	SBL	SBR
Sign Control	Free	0%	Stop	0%	Stop	0%	Stop	0%	Stop	0%	Stop
Volume (veh/h)	10	138	159	194	185	8	118	21	160	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	145	167	204	195	8	124	22	168	11	11
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
Pk platoon unblocked											
Pk platoon unblocked											
vC, conflicting volume	203		313				873	862	229	1037	941
vC1, stage 1 conf vol											
vC2, stage 2 conf vol	203		313				873	862	229	1037	941
vCU, unblocked vol	4.1		4.1				7.1	6.5	6.2	7.1	6.5
IC, single (s)											
IC, 2 stage (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0
pl queue free %	99		99				45	91	79	92	95
pl queue free %	1369		1248				224	243	810	134	218
CM capacity (veh/h)											
Direction, Lane #	EB	EBT	EBL	WB	WBL	WBR	NB	NB	NBR	SBL	SBR
Volume Total	323	407	315	32							
Volume Left	11	204	124	11							
Volume Right	167	8	168	11							
cSH	1389	1248	369	227							
Volume to Capacity	0.01	0.16	0.85	0.14							
Queue Length 95th (ft)	1	15	200	12							
Control Delay (s)	0.3	5.0	51.3	23.4							
Lane LOS	A	A	F	C							
Approach Delay (s)	0.3	5.0	51.3	23.4							
Approach LOS	F	F	F	C							
<b>Intersection Summary</b>											
Average Delay	17.7										
Intersection Capacity Utilization	72.6%										
Analysis Period (min)	15										
ICU Level of Service	C										

5: Wilfred Avenue & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade											
Volume (veh/h)	15	229	63	591	361	25	26	24	532	17	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	241	66	622	380	26	27	25	560	18	3
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	406			307			1946		1956	274	2516
vC1, stage 1 conf vol											1976
vC2, stage 2 conf vol	406			307			1946		1956	274	2516
vC, unblocked vol	41			41			7.1		6.3	6.2	7.1
IC, single (s)											6.5
IC, 2 stage (s)											6.2
pl queue free %	2.2			2.2			3.5		4.0	3.3	4.0
pl queue free %	99			50			0		20	27	0
pl queue free %	1152			1253			27		32	765	1
pl queue free %											31
pl queue free %											666
Direction, Lane #	EBL	WBL	NBL	SBT	EBT	WBT	NBT	SBR	EBR	WBR	NBR
Volume Total	323	1028	613	22	16	622	27	18			
Volume Left											
Volume Right											
cSH	1152	1253	242	1							
Volume to Capacity	0.01	0.50	2.53	15.89							
Queue Length 95th (ft)	1	71	1271	Err							
Control Delay (s)	0.5	9.2	733.2	Err							
Lane LOS	A	A	F	F							
Approach Delay (s)	0.5	9.2	733.2	Err							
Approach LOS	F	F	F	F							
Intersection Summary											
Average Delay	342.3										
Intersection Capacity Utilization	114.9%										
ICU Level of Service	H										
Analysis Period (min)	15										

6: Wilfred Avenue & Dowdell Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade											
Volume (veh/h)	11	708	59	82	950	23	21	14	75	14	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	745	62	86	1000	24	22	15	79	15	2
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	0.67			807			1992		1996	776	2071
vC1, stage 1 conf vol											1012
vC2, stage 2 conf vol											1018
vC, unblocked vol	1036			807			2480		2487	776	2598
IC, single (s)	4.1			4.1			7.1		6.5	6.2	7.1
IC, 2 stage (s)											6.2
pl queue free %	2.2			2.2			3.5		4.0	3.3	4.0
pl queue free %	97			89			0		14	80	0
pl queue free %	449			818			11		17	397	2
pl queue free %											16
pl queue free %											193
Direction, Lane #	EBL	WBL	NBL	SBT	EBT	WBT	NBT	SBR	EBR	WBR	NBR
Volume Total	819	1111	116	23	12	86	22	15			
Volume Left											
Volume Right											
cSH	62	24	79	6							
Volume to Capacity	0.03	0.11	3.14	76.84							
Queue Length 95th (ft)	2	9	Err	Err							
Control Delay (s)	0.8	3.2	Err	Err							
Lane LOS	A	A	F	F							
Approach Delay (s)	0.8	3.2	Err	Err							
Approach LOS	F	F	F	F							
Intersection Summary											
Average Delay	673.7										
Intersection Capacity Utilization	113.3%										
ICU Level of Service	H										
Analysis Period (min)	15										



7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2008

Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.97	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	1.00	0.93	1.00
Fr	0.95	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Fl Protected	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Fl Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836
Volume (vph)	50	681	67	780	778	341	172	154	267	425	128	104
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	717	71	789	819	369	181	162	281	447	135	109
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	839	0	189	819	397	181	162	23	447	226	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	Per	Prot	Prot	Prot
Permitted Phases	4	4	4	8	8	8	5	2	Per	Prot	Prot	Prot
Actuated Green, G (s)	48.3	53.6	53.6	53.6	53.6	53.6	18.6	12.6	12.6	27.5	21.5	21.5
Effective Green, g (s)	46.8	54.1	54.1	54.1	54.1	54.1	19.1	13.1	13.1	28.0	22.0	22.0
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	560	568	598	535	211	290	130	601	239	601	239	239
v/s Ratio Prot	c0.46	0.11	c0.46	c0.10	0.05	0.01	0.05	0.13	c0.13	0.13	c0.13	0.13
v/s Ratio Perm	0.33	1.37	0.74	0.86	0.56	0.18	0.74	0.74	0.74	0.74	0.95	0.95
Uniform Delay, d1	55.6	39.5	53.0	46.8	69.1	70.7	68.4	62.6	68.4	62.6	68.4	68.4
Progression Factor	1.00	0.76	0.78	0.82	1.00	1.00	1.00	0.85	0.85	0.85	0.95	0.95
Incremental Delay, d2	233.4	1.2	174.4	6.9	27.4	2.3	0.7	4.9	42.7	4.9	42.7	42.7
Delay (s)	289.0	31.1	215.5	45.4	96.5	73.0	69.1	64.6	107.9	64.6	107.9	107.9
Level of Service	F	C	F	D	F	E	E	E	E	E	F	F
Approach Delay (s)	289.0	31.1	215.5	45.4	96.5	73.0	69.1	64.6	107.9	64.6	107.9	107.9
Approach LOS	F	C	F	D	F	E	E	E	E	E	F	F
Intersection Summary												
HCM Average Control Delay	148.7											
HCM Volume to Capacity ratio	1.28											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	114.0%											
Analysis Period (min)	15											
c Critical Lane Group												

8: Commerce Boulevard & Redwood Drive  
Graton Rancheria Casino & Hotel

2008

Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	0.93	1.00	1.00	0.85	1.00	0.95	1.00
Fr	0.95	1.00	1.00	0.85	1.00	0.93	1.00	1.00	0.85	1.00	0.95	1.00
Fl Protected	1770	1863	1683	1770	3274	1770	3539	1583	1770	3529	1770	3529
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Fl Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1683	1770	3274	1770	3539	1583	1770	3529	1770	3529
Volume (vph)	5	30	138	5	95	95	164	151	5	30	237	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	32	145	5	100	100	173	159	5	32	249	5
RTOR Reduction (vph)	0	0	130	0	89	0	0	0	0	0	2	0
Lane Group Flow (vph)	5	32	15	5	111	0	173	159	3	32	253	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	2	5	2	2	1	1	6
Permitted Phases	7	4	4	3	8	2	5	2	2	1	1	6
Actuated Green, G (s)	1.3	8.0	8.0	1.3	8.0	12.7	49.4	49.4	3.3	40.0	3.3	40.0
Effective Green, g (s)	1.8	8.5	8.5	1.8	8.5	13.2	49.9	49.9	3.8	40.5	3.8	40.5
Actuated g/C Ratio	0.02	0.11	0.11	0.02	0.11	0.16	0.62	0.62	0.05	0.51	0.05	0.51
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	40	198	168	40	348	292	2207	987	84	1787	84	1787
v/s Ratio Prot	c0.00	0.02	0.01	0.00	c0.03	c0.10	0.04	0.00	0.02	c0.07	0.00	c0.07
v/s Ratio Perm	0.12	0.16	0.09	0.12	0.32	0.59	0.07	0.00	0.38	0.14	0.00	0.14
Uniform Delay, d1	38.3	32.5	32.3	36.3	33.1	30.9	5.9	5.7	37.0	10.5	5.7	37.0
Progression Factor	1.00	1.00	1.00	0.86	0.93	1.02	0.67	0.59	1.00	1.00	0.59	1.00
Incremental Delay, d2	1.4	0.4	0.2	1.0	0.4	1.8	0.0	0.0	2.9	0.2	1.8	0.0
Delay (s)	39.7	32.9	32.5	33.9	31.2	33.3	4.0	3.4	39.8	10.7	3.4	39.8
Level of Service	D	C	C	C	C	C	A	A	D	B	A	B
Approach Delay (s)	39.7	32.9	32.5	33.9	31.2	33.3	4.0	3.4	39.8	10.7	3.4	39.8
Approach LOS	D	C	C	C	C	C	A	A	D	B	A	B
Intersection Summary												
HCM Average Control Delay	22.5											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	31.5%											
Analysis Period (min)	15											
c Critical Lane Group												

9: Wilfred Avenue & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	1.00	0.97	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	0.90	1.00	0.90	1.00	0.90	1.00	0.97
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	3539	1610	3057	3057	3057	3057	3057	3057
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	3539	1610	3057	3057	3057	3057	3057	3057
Volume (vph)	0	814	557	53	880	0	0	0	0	327	327	619
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	857	586	58	926	0	0	0	0	344	344	652
RTOR Reduction (vph)	0	0	140	0	0	0	0	0	0	0	0	88
Lane Group Flow (vph)	0	857	446	98	926	0	0	0	0	344	344	608
Turn Type	Perm	Perm	Prot	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	8	6	6	6	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	36.6	36.6	4.4	45.5	45.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	4.9	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.06	0.58	0.58	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	210	2035	2035	523	984	984	984	984	984	984
v/s Ratio Prot	0.24	c0.28	0.03	c0.26	c0.26	0.21	0.30	0.30	0.30	0.30	0.30	0.30
v/s Ratio Perm	0.52	0.61	0.47	0.46	0.46	0.66	1.13d	1.13d	1.13d	1.13d	1.13d	1.13d
v/c Ratio	15.2	16.0	36.3	9.8	9.8	23.2	25.9	25.9	25.9	25.9	25.9	25.9
Uniform Delay, d1	1.17	1.69	1.42	2.06	2.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.1	0.3	0.8	0.3	0.3	6.4	14.1	14.1	14.1	14.1	14.1	14.1
Incremental Delay, d2	17.8	27.5	52.4	20.5	20.5	29.5	40.0	40.0	40.0	40.0	40.0	40.0
Delay (s)	B	C	D	C	C	C	D	D	D	D	D	D
Level of Service	B	C	D	C	C	C	D	D	D	D	D	D
Approach Delay (s)	21.7	C	D	23.6	C	37.3	D	D	D	D	D	D
Approach LOS	C	C	C	C	C	A	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	27.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	73.5% ICU Level of Service D											
Analysis Period (min)	15											
dr Defacto Right Lane - Recode with 1 though lane as a right lane.												
c Critical Lane Group												

10: Wilfred Avenue & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	1.00	0.96	0.95	0.95	0.88	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.96	1.00	0.96	1.00	1.00	0.85	1.00	0.97	1.00
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3393	3393	1681	1708	1708	1770	1814	1814	1814
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3393	3393	1681	1708	1708	1770	1814	1814	1814
Volume (vph)	0	499	643	409	305	116	659	707	572	42	41	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	525	677	431	321	122	694	744	602	44	43	9
RTOR Reduction (vph)	0	0	516	0	50	0	0	0	478	0	7	0
Lane Group Flow (vph)	0	525	161	431	394	0	383	414	124	44	45	0
Turn Type	Perm	Perm	Prot	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	8	6	6	6	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	18.5	18.5	11.5	34.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	19.0	19.0	12.0	35.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.24	0.24	0.15	0.44	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1208	376	515	1484	1484	347	352	352	575	365	374	374
v/s Ratio Prot	c0.10	c0.10	c0.13	0.12	0.12	0.23	c0.24	c0.24	0.04	c0.02	0.02	0.02
v/s Ratio Perm	0.43	0.43	0.84	0.27	0.27	1.13	1.18	1.18	0.22	0.12	0.12	0.12
v/c Ratio	25.9	25.9	33.0	14.3	14.3	31.8	31.8	31.8	26.4	25.8	25.8	25.8
Uniform Delay, d1	0.88	5.42	1.42	1.88	1.88	0.64	0.64	0.64	1.12	1.12	1.12	1.12
Progression Factor	1.0	3.0	10.5	0.4	0.4	80.8	97.3	97.3	0.6	0.7	0.7	0.7
Incremental Delay, d2	23.7	143.3	57.4	27.4	27.4	101.2	117.7	117.7	18.0	29.7	30.3	30.3
Delay (s)	C	F	E	C	C	F	F	F	B	C	C	C
Level of Service	C	F	E	C	C	F	F	F	B	C	C	C
Approach Delay (s)	91.1	F	42.2	D	D	70.5	E	E	30.0	C	C	C
Approach LOS	F	F	D	D	D	E	E	E	E	C	C	C
Intersection Summary												
HCM Average Control Delay	69.4 HCM Level of Service E											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	64.8% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00	0.85	1.00
Fr	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	3433	3539	3510	1770	1583	
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	
Flt Permitted	3433	3539	3510	1770	1583	
Satd. Flow (perm)	187	926	614	35	93	217
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	197	975	646	37	98	228
Adj. Flow (vph)	0	0	4	0	0	168
RTOR Reduction (vph)	197	975	679	0	98	60
Lane Group Flow (vph)	Prot	4	8	8	6	6
Turn Type	Prot	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	6	6
Permitted Phases	9.7	50.5	36.3	20.5	20.5	20.5
Actuated Green, G (s)	10.2	51.0	36.8	21.0	21.0	21.0
Effective Green, g (s)	0.13	0.64	0.46	0.26	0.26	0.26
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	4.38	2256	1615	465	416	
Lane Grp Cap (vph)	0.06	c0.28	0.19	c0.06	0.04	
w/s Ratio Prot	0.45	0.43	0.42	0.21	0.14	
w/s Ratio Perm	32.3	7.3	14.5	23.0	22.6	
Uniform Delay, d1	0.79	1.15	1.00	1.00	1.00	
Progression Factor	0.7	0.5	0.8	1.0	0.7	
Incremental Delay, d2	26.2	8.9	15.3	24.1	23.3	
Delay (s)	C	A	B	C	C	C
Level of Service	C	A	B	C	C	C
Approach Delay (s)	11.8	15.3	23.6			
Approach LOS	B	B	B			
<b>Intersection Summary</b>						
HCM Average Control Delay	14.6	HCM Level of Service B				
HCM Volume to Capacity ratio	0.37					
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0				
Intersection Capacity Utilization	38.6%	ICU Level of Service A				
Analysis Period (min)	15					
c Critical Lane Group						

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	0.85	0.96	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fr	0.95	0.95	1.00	0.88	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	1681	1686	1583	1741	1770	3537				1770	3539	1583
Satd. Flow (prot)	0.95	0.95	1.00	0.96	1.00	1.00				0.95	1.00	1.00
Flt Permitted	1681	1686	1583	1741	1770	3537				1770	3539	1583
Satd. Flow (perm)	1681	1686	1583	1741	1770	3537				1770	3539	1583
Volume (vph)	858	3	40	8	3	5	514	475	2	7	408	679
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	903	3	42	8	3	5	541	500	2	7	429	715
RTOR Reduction (vph)	0	0	31	0	5	0	0	0	0	0	0	569
Lane Group Flow (vph)	452	454	11	0	11	0	541	501	0	7	429	146
Turn Type	Split	Split	Perm	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	8	8	8	5	2	1	1	6	6
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	27.1	38.5	1.5	1.5	12.9	12.9
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	27.6	39.0	2.0	2.0	13.4	13.4
Effective Green, g (s)	0.26	0.26	0.26	0.26	0.26	0.26	0.35	0.49	0.02	0.02	0.17	0.17
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	4.41	443	416	44	44	611	1724	0.14	0.00	c0.12	0.09	0.09
Lane Grp Cap (vph)	0.27	c0.27	0.01	0.01	0.01	0.89	0.29	0.25	0.25	0.16	0.72	0.55
w/s Ratio Prot	1.02	1.02	0.03	0.03	0.03	24.7	12.2	38.3	24.7	38.2	31.5	30.5
w/s Ratio Perm	29.5	29.5	21.9	38.3	38.3	1.00	1.00	1.00	1.00	1.24	0.96	0.90
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	49.4	49.2	0.0	0.0	0.0	14.4	0.4	3.0	14.4	0.4	1.1	4.8
Incremental Delay, d2	78.9	78.7	21.9	41.3	41.3	39.1	12.7	48.6	35.2	124.0	16.0	16.0
Delay (s)	E	E	E	C	C	D	D	D	D	D	D	D
Level of Service	E	E	E	C	C	D	D	D	D	D	D	D
Approach Delay (s)	76.3	76.3	26.4	41.3	41.3	26.4	16.0	90.4	90.4	90.4	90.4	90.4
Approach LOS	E	E	C	D	D	C	C	D	D	D	D	D
<b>Intersection Summary</b>												
HCM Average Control Delay	64.9	HCM Level of Service E										
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 16.0										
Intersection Capacity Utilization	83.9%	ICU Level of Service E										
Analysis Period (min)	15											
c Critical Lane Group												

Movement	WBL	WBR	NB	NBR	SB	SBR
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	891	0	0	686
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	938	0	0	722
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1660	938		938
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			1660	938		938
vCU, unblocked vol			6.4	6.2		4.1
IC, single (s)			3.5	3.3		2.2
IC, 2 stage (s)			100	100		100
pl queue free %			107	321		731
pl capacity (veh/h)						
Direction, Lane #	WBL	WBR	NB	NBR	SB	SBR
Volume Total	0	938	1722	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	0	0	0
Volume to Capacity	0.00	0.55	0.42	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS						
<b>Intersection Summary</b>						
Average Delay						0.0
Intersection Capacity Utilization						50.2%
Analysis Period (min)						15
						ICU Level of Service
						A

Movement	EBL	EBT	WBL	WBR	SB	SBR
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	305	105	0	0	0	322
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	321	111	78	0	0	339
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			78			831
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			78			78
vCU, unblocked vol			4.1			6.4
IC, single (s)			2.2			3.5
IC, 2 stage (s)			78			100
pl queue free %			1521			268
pl capacity (veh/h)						983
Direction, Lane #	EBL	EBT	WBL	WBR	SB	SBR
Volume Total	432	78	339	0	0	0
Volume Left	321	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1521	1700	983			
Volume to Capacity	0.21	0.05	0.34			
Queue Length 95th (ft)	20	0	39			
Control Delay (s)	6.4	0.0	10.6			
Lane LOS	A	A	B			
Approach Delay (s)	6.4	0.0	10.6			
Approach LOS						
<b>Intersection Summary</b>						
Average Delay						7.5
Intersection Capacity Utilization						55.7%
Analysis Period (min)						15
						ICU Level of Service
						B

15: Business Park Drive & Redwood Drive  
 Graton Rancheria Casino & Hotel

2008 Alternative A  
 PM Peak

Movement	EBL	EBR	NBL	NBR	SBL	SBR
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	172	89	33	464	489	41
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	181	94	35	488	515	43
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	None					
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	850	279	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	850	279	558			
vCu, unblocked vol	6.9	6.9	4.1			
tC, single (s)						
tC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
10 queue free %	37	87	97			
EM capacity (veh/h)	289	718	1009			
Direction	EBL	EBR	NBL	NBR	SBL	SBR
Volume: Total	181	94	35	244	244	343
Volume Left	181	0	35	0	0	0
Volume Right	0	94	0	0	0	43
cSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.83	0.13	0.03	0.14	0.20	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A			
Approach Delay (s)	27.5		0.6			0.0
Approach LOS	D					
<b>Intersection Summary</b>						
Average Delay	5.8					
Intersection Capacity Utilization	37.7%					
Analysis Period (min)	15					
						ICU Level of Service
						A

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2008 Alternative A  
 PM Peak

Movement	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Grade	4.0	4.0	4.0	4.0	4.0	4.0
Volume (veh/h)	1.00	1.00	1.00	1.00	1.00	1.00
Peak Hour Factor	1.00	0.85	1.00	0.85	1.00	1.00
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1770	1583	1883	1583	1770	1863
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	1770	1583	1883	1583	1770	1863
vCu, unblocked vol	257	286	605	251	212	473
tC, single (s)	0.95	0.95	0.95	0.95	0.95	0.95
tC, 2 stage (s)	271	301	637	284	223	498
IF (s)	0	235	0	150	0	0
10 queue free %	271	56	637	114	223	498
EM capacity (veh/h)						
Direction	WBL	WBR	NBL	NBR	SBL	SBR
Volume: Total	388	347	806	685	279	1217
Volume Left	388	0	0	0	0	0
Volume Right	0	347	0	0	0	0
cSH	388	347	806	685	279	1217
Volume to Capacity	0.15	0.04	0.70	0.19	0.17	0.80
Queue Length 95th (ft)	0	0	22.6	20.0	15.4	10.9
Control Delay (s)	0.07	0.07	1.00	1.00	1.00	1.00
Lane LOS	C	C	C	C	B	D
Approach Delay (s)	24.0		19.7		16.7	
Approach LOS	C		B		B	
<b>Intersection Summary</b>						
Average Delay	19.8					
Intersection Capacity Utilization	67.8%					
Analysis Period (min)	15					
						ICU Level of Service
						B
						Sum of lost time (s)
						62.9
						12.0
						ICU Level of Service
						C
						C
						C
						C

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative A  
PM Peak

2008 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.85	1.00	0.88	0.85	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1668
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1668
Volume (vph)	50	600	36	202	575	459	64	19	154	592	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	632	38	213	605	483	67	20	162	623	45
RTOR Reduction (vph)	0	0	29	0	0	358	0	63	69	0	59
Lane Group Flow (vph)	53	632	9	213	605	125	57	34	16	623	90
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	8	5	2	2	1	6
Permitted Phases	3, 4	3, 4	3, 4	3, 8	3, 8	3, 8	3, 8	3, 8	3, 8	3, 4	3, 4
Actuated Green, G (s)	3.3	18.0	18.0	5.5	20.2	20.2	4.4	14.1	14.1	24.4	34.1
Effective Green, g (s)	3.8	18.5	18.5	6.0	20.7	20.7	4.9	14.6	14.6	24.9	34.6
Actuated g/C Ratio	0.05	0.23	0.23	0.08	0.26	0.26	0.06	0.18	0.18	0.31	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	818	366	257	916	410	210	285	274	551	721
v/s Ratio Prot	0.03	c0.18	0.01	c0.06	0.17	0.08	c0.02	c0.02	c0.02	c0.35	0.05
v/s Ratio Perm	0.63	0.77	0.02	0.83	0.66	0.30	0.32	0.12	0.06	1.13	0.12
Uniform Delay, d1	37.4	28.8	23.8	36.5	26.5	23.9	36.0	27.3	27.0	27.6	13.6
Progression Factor	1.00	1.00	1.00	0.96	0.52	1.01	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	4.6	0.0	12.2	1.1	0.2	0.9	0.9	0.4	79.7	0.4
Delay (s)	51.8	33.3	23.8	47.9	14.7	24.3	36.8	28.2	27.4	107.2	14.0
Level of Service	D	C	C	D	B	C	D	D	C	F	B
Approach Delay (s)	34.2	C	C	23.7	C	C	30.2	C	C	89.2	F
Approach LOS	C	C	C	C	C	C	C	C	C	C	F
<b>Intersection Summary</b>											
HCM Average Control Delay	43.3										
HCM Volume to Capacity ratio	0.78										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	71.8%										
Analysis Period (min)	15										
c. Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.85	1.00	0.91	0.97	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	1770	3191	1441	1441
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	1770	3191	1441	1441
Volume (vph)	233	1023	146	371	961	358	137	252	422	384	264
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	1077	154	391	1012	377	144	265	444	383	278
RTOR Reduction (vph)	0	0	103	0	0	226	0	117	227	0	206
Lane Group Flow (vph)	245	1077	51	391	1012	151	144	318	47	383	278
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	3	8	5	2	1	6
Permitted Phases	3, 4	3, 4	3, 4	3, 8	3, 8	3, 8	3, 8	3, 8	3, 8	3, 4	3, 4
Actuated Green, G (s)	12.2	26.0	26.0	11.5	25.3	25.3	9.5	13.1	13.1	11.4	15.0
Effective Green, g (s)	12.7	26.5	26.5	12.0	25.8	25.8	10.0	13.6	13.6	11.9	15.5
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	1684	524	515	1141	511	221	542	245	511	361
v/s Ratio Prot	c0.14	c0.21	0.03	0.11	c0.29	0.10	0.08	0.10	c0.11	c0.15	0.03
v/s Ratio Perm	0.87	0.84	0.10	0.76	0.89	0.30	0.65	0.59	0.19	0.75	0.77
Uniform Delay, d1	32.9	22.7	18.5	32.6	25.7	20.3	33.3	30.6	28.5	32.6	30.6
Progression Factor	0.77	0.73	1.09	0.71	0.64	0.44	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.8	0.2	4.6	7.7	1.1	6.7	1.6	0.4	6.0	9.7
Delay (s)	37.7	17.4	20.3	27.7	24.2	10.1	40.1	32.2	28.9	38.6	40.3
Level of Service	D	B	C	C	C	B	D	D	C	C	D
Approach Delay (s)	21.1	C	C	22.0	C	C	32.5	C	C	35.9	D
Approach LOS	C	C	C	C	C	C	C	C	C	C	D
<b>Intersection Summary</b>											
HCM Average Control Delay	26.0										
HCM Volume to Capacity ratio	0.80										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	74.7%										
Analysis Period (min)	15										
c. Critical Lane Group											

19: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel  
2008 Alternative A  
PM Peak

Movement	EB	EBL	EBR	WB	WBL	WBR	NBL	NBR	SBL	SBR		
Lane Configurations	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111		
Total Flow (vph)	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	0.91	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95		
Fit Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00		
Satd. Flow (prot)	4837	1770	3539	1583	1681	1686	1583	1681	1686	1583		
Satd. Flow (perm)	4837	1770	3539	1583	1681	1686	1583	1681	1686	1583		
Volume (vph)	0	1219	590	68	1329	199	7	0	17	702	1	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	0	1283	621	72	1395	209	7	0	18	739	1	
RTOR Reduction (vph)	0	103	0	0	0	0	0	12	0	0	21	
Lane Group Flow (vph)	0	1801	0	72	1398	209	0	13	0	370	348	
Turn Type		Prot	Free	Perm	Free	Perm	Prot	Free	Perm	Perm	Perm	
Protected Phases		4	3	8	2	2	6	2	6	6	6	
Permitted Phases		Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	
Actuated Green, G (s)		35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3	26.3	
Effective Green, g (s)		35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8	26.8	
Actuated g/C Ratio		0.45	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34	0.34	
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
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)		2171	117	2000	1583	512	439	420	530	420	530	
v/s Ratio Prot		c0.37	0.04	c0.40	0.13	0.01	0.28	c0.30	0.22	0.22	0.22	
v/s Ratio Perm		0.83	0.62	0.70	0.13	0.03	0.84	0.68	0.66	0.66	0.66	
Uniform Delay, d1		19.4	36.4	12.5	0.0	17.8	24.5	25.1	22.7	22.7	22.7	
Progression Factor		0.32	1.26	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.9	6.6	1.5	0.1	0.0	13.7	18.9	2.9	2.9	2.9	
Delay (s)		9.1	52.5	10.6	0.1	17.9	38.4	44.0	25.6	25.6	25.6	
Level of Service		A	D	B	A	B	D	D	D	D	D	
Approach Delay (s)		9.1	11.1	11.1	17.9	17.9	36.0	36.0	12.0	12.0	12.0	
Approach LOS		A	B	B	B	B	D	D	D	D	D	
<b>Intersection Summary</b>												
HCM Average Control Delay	16.2										HCM Level of Service	B
HCM Volume to Capacity ratio	0.86										Sum of lost time (s)	12.0
Actuated Cycle Length (s)	80.0										ICU Level of Service	D
Intersection Capacity Utilization	76.7%										Analysis Period (min)	15
c Critical Lane Group												

20: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel  
2008 Alternative A  
PM Peak

Movement	EB	EBL	EBR	WB	WBL	WBR	NBL	NBR	SBL	SBR		
Lane Configurations	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111		
Total Flow (vph)	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	0.91	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95		
Fit Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00		
Satd. Flow (prot)	4837	1770	3539	1583	1681	1686	1583	1681	1686	1583		
Satd. Flow (perm)	4837	1770	3539	1583	1681	1686	1583	1681	1686	1583		
Volume (vph)	0	1219	590	68	1329	199	7	0	17	702		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	0	1283	621	72	1395	209	7	0	18	739		
RTOR Reduction (vph)	0	103	0	0	0	0	0	12	0	0		
Lane Group Flow (vph)	0	1801	0	72	1398	209	0	13	0	370		
Turn Type		Prot	Free	Perm	Free	Perm	Prot	Free	Perm	Perm		
Protected Phases		4	3	8	2	2	6	2	6	6		
Permitted Phases		Free	Free	Free	Free	Free	Free	Free	Free	Free		
Actuated Green, G (s)		35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3		
Effective Green, g (s)		35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8		
Actuated g/C Ratio		0.45	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34		
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2171	117	2000	1583	512	439	420	530	420		
v/s Ratio Prot		c0.37	0.04	c0.40	0.13	0.01	0.28	c0.30	0.22	0.22		
v/s Ratio Perm		0.83	0.62	0.70	0.13	0.03	0.84	0.68	0.66	0.66		
Uniform Delay, d1		19.4	36.4	12.5	0.0	17.8	24.5	25.1	22.7	22.7		
Progression Factor		0.32	1.26	0.73	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.9	6.6	1.5	0.1	0.0	13.7	18.9	2.9	2.9		
Delay (s)		9.1	52.5	10.6	0.1	17.9	38.4	44.0	25.6	25.6		
Level of Service		A	D	B	A	B	D	D	D	D		
Approach Delay (s)		9.1	11.1	11.1	17.9	17.9	36.0	36.0	12.0	12.0		
Approach LOS		A	B	B	B	B	D	D	D	D		
<b>Intersection Summary</b>												
HCM Average Control Delay	16.2										HCM Level of Service	B
HCM Volume to Capacity ratio	0.86										Sum of lost time (s)	12.0
Actuated Cycle Length (s)	80.0										ICU Level of Service	D
Intersection Capacity Utilization	76.7%										Analysis Period (min)	15
c Critical Lane Group												

21: Rohnert Park Expy & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2008 Alternative A  
PM Peak

Movement	EBT	EBT	EBR	WBL	WBL	NBR	NBR	SBL	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.97	1.00	0.91	1.00	0.91	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.95	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	1770	4949	1610	3329	1583	1610	3390
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4949	1610	3329	1583	1610	3390
Volume (vph)	270	1149	545	141	783	170	380	286	224	102
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1209	574	148	824	179	400	301	236	107
RTOR Reduction (vph)	0	0	395	0	38	0	0	0	169	0
Lane Group Flow (vph)	284	1209	179	148	965	0	226	475	47	107
Turn Type	Prot	Perm	Prot	Split	Split	Perm	Split	Split	Perm	Perm
Protected Phases	7	4		3	8	2	2	2	6	6
Permitted Phases			4							
Actuated Green, G (s)	12.5	24.5	24.5	10.6	22.6	15.4	15.4	15.4	11.5	11.5
Effective Green, g (s)	13.0	25.0	25.0	11.1	23.1	15.9	15.9	15.9	12.0	12.0
Actuated g/C Ratio	0.16	0.31	0.31	0.14	0.29	0.20	0.20	0.20	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	558	1106	495	246	1429	320	662	315	242	509
v/s Ratio Prot	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	0.03	0.07	c0.07
v/s Ratio Perm										
v/c Ratio	0.51	1.09	0.36	0.60	0.68	0.71	0.72	0.15	0.44	0.48
Uniform Delay, d1	30.6	27.5	21.3	32.4	25.1	29.9	30.0	26.5	31.0	31.1
Progression Factor	0.49	0.43	1.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	54.1	1.7	4.1	2.6	6.9	3.7	0.2	1.3	0.7
Delay (s)	15.6	65.8	31.2	36.5	27.7	36.8	33.7	26.7	32.2	31.8
Level of Service	B	E	C	D	C	D	C	C	C	C
Approach Delay (s)	49.3				28.8			32.7	31.1	
Approach LOS	D				C			C	C	
Intersection Summary										
HCM Average Control Delay	38.9									
HCM Volume to Capacity ratio	0.83									
Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	71.9%									
Analysis Period (min)	15									
Critical Lane Group	C									

22: Gravensten Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative A  
PM Peak

Movement	EBT	EBT	EBR	WBL	WBL	NBR	NBR	SBL	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.85
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3383	1583	1770	4949	1610	3329	1583	1610	3390
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3383	1583	1770	4949	1610	3329	1583	1610	3390
Volume (vph)	133	484	202	128	589	162	321	494	108	148
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	509	213	135	620	171	338	520	114	156
RTOR Reduction (vph)	0	67	0	0	131	0	0	0	75	0
Lane Group Flow (vph)	140	655	0	135	620	40	338	520	39	156
Turn Type	Prot	Perm	Prot	Split	Split	Perm	Split	Split	Perm	Perm
Protected Phases	7	4		3	8	2	2	2	6	6
Permitted Phases			4							
Actuated Green, G (s)	5.5	15.8	15.8	5.5	15.8	13.5	23.5	23.5	6.5	16.5
Effective Green, g (s)	6.0	16.3	16.3	6.0	16.3	14.0	24.0	24.0	7.0	17.0
Actuated g/C Ratio	0.09	0.24	0.24	0.09	0.24	0.20	0.35	0.35	0.10	0.25
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	153	796	372	358	645	548	179	457	388	457
v/s Ratio Prot	c0.08	c0.19	0.08	0.08	0.18	c0.19	c0.28	0.02	0.09	0.19
v/s Ratio Perm										
v/c Ratio	0.92	0.82	0.68	0.75	0.11	0.94	0.81	0.07	0.87	0.79
Uniform Delay, d1	31.4	25.1	31.3	24.6	20.8	27.3	20.5	15.2	30.7	24.5
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	48.1	6.9	40.4	3.7	0.1	33.1	10.4	0.3	34.0	12.9
Delay (s)	79.5	32.0	71.7	28.2	20.9	60.4	30.9	15.4	64.7	21.3
Level of Service	E	C	E	C	C	C	C	B	E	D
Approach Delay (s)	39.7				39.4			38.1		
Approach LOS	D				D			D		
Intersection Summary										
HCM Average Control Delay	37.6									
HCM Volume to Capacity ratio	0.84									
Actuated Cycle Length (s)	89.3									
Intersection Capacity Utilization	76.0%									
Analysis Period (min)	15									
Critical Lane Group	C									



23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.85	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3515	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Sat'd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	102	577	32	53	797	333	48	24	63	485	29	96
Sat'd. Flow (perm)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Volume (vph)	7.6	28.3	4.4	25.1	25.1	3.3	6.3	33.0	36.0	33.0	36.0	36.0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	713	34	56	839	351	51	25	66	511	31	101
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	107	744	0	56	839	223	51	30	0	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	8	3	8	5	2	1	6	3	1	6
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	7.6	28.3	4.4	25.1	25.1	3.3	6.3	33.0	36.0	33.0	36.0	36.0
Effective Green, g (s)	8.1	28.8	4.9	25.6	25.6	3.8	6.8	33.5	36.5	33.5	36.5	36.5
Actuated g/C Ratio	0.09	0.32	0.05	0.28	0.28	0.04	0.09	0.37	0.41	0.37	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1125	96	1007	450	75	125	659	669	659	669	669
v/s Ratio Prot	0.06	c0.21	0.03	c0.24	0.14	c0.03	0.02	c0.29	c0.04	c0.29	c0.04	c0.04
v/s Ratio Perm	0.67	0.66	0.58	0.83	0.50	0.68	0.24	0.78	0.11	0.78	0.11	0.11
Uniform Delay, d1	39.7	26.4	41.6	30.2	26.8	42.5	39.2	24.8	16.6	24.8	16.6	16.6
Progression Factor	1.00	1.00	0.66	0.57	0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	3.1	7.9	7.3	3.5	22.4	1.0	5.7	0.1	5.7	0.1	0.1
Delay (s)	50.4	29.4	35.3	24.6	30.0	64.9	40.2	30.6	16.7	30.6	16.7	16.7
Level of Service	D	C	D	C	A	E	D	C	B	C	B	B
Approach Delay (s)	32.1	C	20.7	C	49.1	D	D	27.8	C	27.8	C	C
Approach LOS	C	C	C	C	D	D	D	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	27.0											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	73.0%											
Analysis Period (min)	15											
Critical Lane Group	C											

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.85	1.00	1.00	1.00	0.89	1.00	1.00	0.89
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3515	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Sat'd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	102	577	32	53	797	333	48	24	63	485	29	96
Sat'd. Flow (perm)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Volume (vph)	0	819	413	99	959	0	0	0	0	639	0	212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	852	435	104	1009	0	0	0	0	673	0	223
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	852	435	104	1009	0	0	0	0	673	0	223
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	3	4	3	3	1	6	4	1	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	36.4	36.4	36.4	11.6	52.5	11.6	52.5	28.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	36.9	36.9	36.9	12.1	53.0	12.1	53.0	29.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.41	0.41	0.41	0.13	0.59	0.13	0.59	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1451	649	238	2084	0	0	0	1106	510	1106	510	510
v/s Ratio Prot	c0.24	c0.24	c0.24	0.06	c0.29	0.06	c0.29	c0.20	0.09	c0.20	0.09	0.09
v/s Ratio Perm	0.21	0.21	0.21	0.44	0.48	0.44	0.48	0.61	0.29	0.61	0.29	0.29
Uniform Delay, d1	20.7	19.7	19.7	35.8	10.6	35.8	10.6	25.7	22.8	25.7	22.8	22.8
Progression Factor	0.53	0.48	0.48	1.28	1.72	1.28	1.72	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	2.0	2.0	1.2	0.8	1.2	0.8	1.0	1.4	1.0	1.4	1.4
Delay (s)	12.4	11.5	11.5	47.0	19.1	47.0	19.1	26.7	24.2	26.7	24.2	24.2
Level of Service	B	B	B	D	B	D	B	C	C	C	C	C
Approach Delay (s)	12.1	B	21.7	C	0.0	A	0.0	26.1	C	26.1	C	C
Approach LOS	B	B	B	C	A	C	A	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	19.1											
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	61.7%											
Analysis Period (min)	15											
Critical Lane Group	C											

MOVEMENT	EB	EBR	EBL	WB	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Ideal Flow (vph)	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	
Lane Util. Factor	0.95	0.97	1.00	0.95	0.97	1.00	0.95	0.97	
Flt. Protected	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Satd. Flow (prot)	3539	3539	3433	3539	3539	3433	3539	3539	
Flt. Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3539	3539	3433	3539	3539	3433	3539	3539	
Volume (vph)	1461	0	0	617	410	236	0	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	1538	0	0	649	432	248	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	1538	0	0	649	432	227	0	0	
Turn Type	Perm								
Protected Phases	4	8	2	2	2	2	2	2	
Permitted Phases									
Actuated Green, G (s)	63.0	18.0	18.0	63.0	18.0	18.0	63.0	18.0	
Effective Green, g (s)	63.5	18.5	18.5	63.5	18.5	18.5	63.5	18.5	
Actuated g/C Ratio	0.71	0.21	0.21	0.71	0.21	0.21	0.71	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	2497	706	325	2497	706	325	2497	706	
v/s Ratio Prot	60.43	0.18	0.13	60.43	0.18	0.13	60.43	0.18	
v/s Ratio Perm	0.62	0.26	0.61	0.70	0.26	0.61	0.70	0.26	
Uniform Delay, d1	6.9	4.8	32.5	33.2	4.8	32.5	33.2	4.8	
Progression Factor	0.32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.3	1.6	6.4	0.3	1.6	6.4	0.3	
Delay (s)	3.2	5.0	34.1	39.6	5.0	34.1	39.6	5.0	
Level of Service	A	A	C	D	A	C	D	A	
Approach Delay (s)	3.2	5.0	36.1	41.6	5.0	36.1	41.6	5.0	
Approach LOS	A	A	A	D	A	A	D	A	
<b>Intersection Summary</b>									
HCM Average Control Delay	11.4			11.4			HCM Level of Service		B
HCM Volume to Capacity ratio	0.63			0.63			Sum of lost time (s)		8.0
Actuated Cycle Length (s)	80.0			80.0			ICU Level of Service		B
Intersection Capacity Utilization	61.7%			61.7%			Analysis Period (min)		15
C Critical Lane Group									

MOVEMENT	EB	EBR	EBL	WB	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Sign Control	4	4	4	4	4	4	4	4	
Grade	0%	0%	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	8	5	10	1	6	221	19	793	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	8	5	11	1	6	233	20	835	
Pedestrians	0	0	0	0	0	0	0	0	
Lane Width (ft)	12	12	12	12	12	12	12	12	
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Percent Blockage	0	0	0	0	0	0	0	0	
Right turn flare (veh)	0	0	0	0	0	0	0	0	
Median type	None	None	None	None	None	None	None	None	
Median storage (veh)	0	0	0	0	0	0	0	0	
Upstream signal (ft)	0	0	0	0	0	0	0	0	
px. platoon unblocked	0	0	0	0	0	0	0	0	
v/c, conflicting volume	1520	1836	354	1477	1820	417	707	853	
v/c, stage 1 conf vol	1520	1836	354	1477	1820	417	707	853	
v/c, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1	
tc, single (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	
tc, 2 stage (s)	79	92	98	98	90	60	98	85	
pf queue free %	39	82	643	70	64	584	887	782	
pm capacity (veh/h)	24	240	20	417	417	18	119	469	
Direction Lane	EB	EBR	EBL	WB	WBL	WBT	NBL	NBR	
Volume Total	8	1	20	0	0	0	119	239	
Volume Left	11	233	0	0	0	18	0	0	
Volume Right	77	603	887	1700	1700	782	1700	1700	
c/sH	0.31	0.40	0.02	0.25	0.25	0.01	0.15	0.28	
Volume to Capacity	29	48	2	0	0	0	13	0	
Queue Length 95th (ft)	72.0	16.8	9.2	0.0	0.0	0.0	10.4	0.0	
Control Delay (s)	F	C	A	A	A	B	B	1.5	
Lane LOS	F	C	A	A	A	B	B	1.5	
Approach Delay (s)	72.0	16.8	9.2	0.2	0.2	0.2	0.2	0.0	
Approach LOS	F	C	A	A	A	B	B	1.5	
<b>Intersection Summary</b>									
Average Delay	3.7			3.7			ICU Level of Service		A
Intersection Capacity Utilization	48.9%			48.9%			Analysis Period (min)		15

27: Millbrae Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel

2008 Alternative A  
 PM Peak

Movement	EBT	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free										
Sign Control	0%										
Grade	0%										
Volume (veh/h)	1	134	3	3	226	2	1	0	1	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	141	3	3	238	2	1	0	1	0	1
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None										
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	240		144			391	391	143	391	392	239
vC1, stage 1 conf vol											
vC2, stage 2 conf vol	240		144			391	391	143	391	392	239
vCu, unblocked vol	4.1		4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2		2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100		100			100	100	100	100	100	100
pM capacity (veh/h)	1327		1438			566	543	905	566	543	800
Direction Lane #	EBT	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	145	243	2	1	0	391	391	143	391	392	239
Volume Left	1	3	1	0	0	0	0	0	0	0	0
Volume Right	3	2	1	0	0	0	0	0	0	0	0
cSH	1327	1438	697	543	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.1	0.1	10.2	11.6							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.1	0.1	10.2	11.6							
Approach LOS	B	B	B	B							
<b>Intersection Summary</b>											
Average Delay	0.2										
Intersection Capacity Utilization	24.0%										
ICU Level of Service	A										
Analysis Period (min)	15										

28: Millbrae Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel

2008 Alternative A  
 PM Peak

Movement	EBT	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free										
Sign Control	0%										
Grade	0%										
Volume (veh/h)	1	119	2	4	235	8	1	9	0	14	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	125	2	4	247	8	1	9	0	14	0
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None										
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	256		127			389	383	126	383	389	252
vC1, stage 1 conf vol											
vC2, stage 2 conf vol	256		127			389	383	126	383	389	252
vCu, unblocked vol	4.1		4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)											
tF (s)	2.2		2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100		100			100	100	100	100	100	100
pM capacity (veh/h)	1309		1459			567	541	924	557	544	787
Direction Lane #	EBT	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	128	260	11	5		389	383	126	383	389	252
Volume Left	1	4	0	1	0	0	0	0	0	0	0
Volume Right	2	8	0	1	0	0	0	0	0	0	0
cSH	1309	1459	544	592	0.00	0.00	0.02	0.01	0.00	0.00	0.01
Volume to Capacity	0.00	0.00	0.00	0.02	0.01						
Queue Length 95th (ft)	0	0	0	1	1						
Control Delay (s)	0.1	0.1	11.7	11.1							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.1	0.1	11.7	11.1							
Approach LOS	B	B	B	B							
<b>Intersection Summary</b>											
Average Delay	0.6										
Intersection Capacity Utilization	25.4%										
ICU Level of Service	A										
Analysis Period (min)	15										

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	4	4	4	4	4	4
Sign Control	Free	Stop	Free	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	150	5	2	287	14	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	158	5	2	302	15	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
px, platoon unblocked						
vC, conflicting volume		153			467	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol		163			467	161
vCu, unblocked vol		4.1			6.4	6.2
tC, 2 stage (s)		2.2			3.5	3.3
tF (s)		100			97	99
p0 queue free %		1415			553	885
cm capacity (veh/h)						
Direction, Lane #	EBL	WBL	NBL	NBR		
Volume Total	153	304	21			
Volume Left	0	2	15			
Volume Right	5	0	6			
cSH	1700	1415	623			
Volume to Capacity	0.10	0.00	0.03			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	0.0	0.1	11.0			
Lane LOS	A	A	B			
Approach Delay (s)	0.0	0.1	11.0			
Approach LOS	B	B	B			
<b>Intersection Summary</b>						
Average Delay					0.5	
Intersection Capacity Utilization					26.7%	ICU Level of Service A
Analysis Period (min)					15	

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	4	4	4	4	4	4
Sign Control	Free	Stop	Free	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	155	4	10	252	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	4	11	265	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
px, platoon unblocked						
vC, conflicting volume		265		167	452	462
vC1, stage 1 conf vol						
vC2, stage 2 conf vol		265		167	452	452
vCu, unblocked vol		4.1		4.1	7.1	6.5
tC, 2 stage (s)		2.2		2.2	3.5	4.0
tF (s)		100		99	92	100
p0 queue free %		1299		1410	515	500
cm capacity (veh/h)						
Direction, Lane #	EBL	WBL	NBL	NBR		
Volume Total	167	276	52	0		
Volume Left	0	11	40	0		
Volume Right	4	0	12	0		
cSH	1299	1410	568	1700		
Volume to Capacity	0.00	0.01	0.09	0.00		
Queue Length 95th (ft)	0	1	7	0		
Control Delay (s)	0.0	0.4	12.0	0.0		
Lane LOS	A	A	B	A		
Approach Delay (s)	0.0	0.4	12.0	0.0		
Approach LOS	B	B	B	A		
<b>Intersection Summary</b>						
Average Delay					1.4	
Intersection Capacity Utilization					31.4%	ICU Level of Service A
Analysis Period (min)					15	

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Free						
Sign Control	Free	Stop	Free	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	143	20	0	235	32	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	151	21	0	247	34	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Backlog						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
Platoon unblocked						
vC, conflicting volume			172		408	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			172		408	161
vCU, unblocked vol			4.1		6.4	6.2
tC, single (s)						
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		94	100
cM capacity (veh/h)			1405		599	884
Direction Lane #	EB	WBT	NBR			
Volume Total	172	247	34			
Volume Left	0	0	34			
Volume Right	21	0	0			
CSH	1700	1405	589			
Volume to Capacity	0.10	0.00	0.06			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.4			
Approach LOS			B			

Intersection Summary	
Average Delay	0.8
Intersection Capacity Utilization	22.4%
Analysis Period (min)	15
ICU Level of Service	A

7: Wilfred Avenue & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Lane Group	EB	WB	MB	WB	MB	NB	NB	NB	NB	SBI	SBI
Lane Group Flow (vph)	841	189	819	569	181	162	281	447	244		
v/c Ratio	1.49	0.33	1.37	0.80	0.85	0.56	0.72	0.74	0.95		
Control Delay	270.0	31.6	209.1	28.6	101.7	77.7	18.3	88.0	102.8		
Queue Delay	339.6	4.9	100.6	21.4	0.0	0.0	0.5	5.3	0.0		
Total Delay	1229	124	1214	274	188	87	0	230	237		
Queue Length 50th (ft)	#1190	m165m	#1402	m353	#317	126	97	#318	#419		
Queue Length 95th (ft)	550	220	220	110	110	110	100	275	270		
Turn Bay Length (ft)	565	567	597	707	221	376	419	601	257		
Base Capacity (vph)	0	308	84	146	0	0	0	0	0		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	53	0	0	0	0	0	19	103	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	1.65	0.73	1.60	1.01	0.82	0.43	0.70	0.80	0.95		

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

8: Commerce Boulevard & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Lane Group	EB	WB	MB	WB	MB	NB	NB	NB	NB	SBI	SBI
Lane Group Flow (vph)	5	32	145	5	200	173	159	5	32	254	
v/c Ratio	0.04	0.16	0.49	0.04	0.46	0.59	0.06	0.00	0.20	0.13	
Control Delay	34.4	33.2	11.9	29.4	18.1	35.7	4.0	3.4	35.8	11.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.4	33.2	11.9	29.4	18.1	35.7	4.0	3.4	35.8	11.2	
Queue Length 50th (ft)	2	15	0	2	7	107	3	0	15	25	
Queue Length 95th (ft)	13	38	48	m4	m43	m107	m38	m1	40	74	
Internal Link Dist (ft)	180	180	140	140	120	150	200	150	200	130	
Turn Bay Length (ft)	75	75	100	75	100	150	400	2485	1113	184	1946
Base Capacity (vph)	155	442	487	155	854	400	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.30	0.03	0.23	0.43	0.05	0.00	0.17	0.13	

Intersection Summary  
 - Volume for 95th percentile queue is metered by upstream signal.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBT	SBT
Lane Group Flow (vph)	857	586	98	926	344	996
v/c Ratio	0.51	0.56	0.38	0.46	0.66	1.13
Control Delay	17.8	15.4	52.3	20.7	30.3	37.7
Queue Delay	3.8	12.5	0.0	0.2	0.0	28.4
Total Delay	21.6	27.9	52.3	20.8	30.3	66.0
Queue Length 50th (ft)	187	189	27	194	160	230
Queue Length 95th (ft)	m185	m177	m30	m183	261	#363
Internal Link Dist (ft)	220		300	466		348
Turn Bay Length (ft)	1681	898	257	2035	523	1082
Base Capacity (vph)	717	283	0	0	0	0
Starvation Cap Reductn	0	0	0	333	0	139
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.97	0.38	0.54	0.66	1.06

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Recode with 1 through lane as a right lane.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	525	677	431	443	393	414	602	44	52
v/c Ratio	0.43	0.76	0.84	0.29	1.13	1.18	0.57	0.12	0.14
Control Delay	23.7	14.8	61.4	22.2	105.3	121.5	32	29.9	25.6
Queue Delay	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	17.5	61.4	22.2	105.3	121.5	32	29.9	25.6
Queue Length 50th (ft)	88	118	120	100	227	248	0	22	23
Queue Length 95th (ft)	124	343	#191	136	m#284	m#304	m20	44	45
Internal Link Dist (ft)	466		345		380				270
Turn Bay Length (ft)	1208	892	515	1534	347	352	1053	365	381
Base Capacity (vph)	0	118	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.87	0.84	0.29	1.13	1.18	0.57	0.12	0.14

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 # Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

2008

Alternative A  
 PM Peak

EBL	EBT	WBT	SBL	SBR
197	975	683	98	228
0.45	0.43	0.42	0.21	0.39
28.1	9.0	15.7	24.5	5.8
0.0	0.2	0.0	0.0	0.0
28.1	9.2	15.7	24.5	5.8
53	198	114	38	0
77	231	168	77	51
345	164	232	200	
60				
901	2256	1619	465	584
0	555	0	0	0
0	0	0	0	0
0	0	0	0	0
0.22	0.57	0.42	0.21	0.39

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 Volume for 95th percentile queue is metered by upstream signal.

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2008

Alternative A  
 PM Peak

EBL	EBT	WBT	SBL	SBR
452	454	42	16	541
1.02	1.02	0.09	0.11	1.02
81.3	81.2	8.3	29.3	74.3
0.0	0.0	0.0	0.0	0.0
81.3	81.2	8.3	29.3	74.3
-247	-249	0	5	-278
#442	#443	23	23	#478
284	284	118	214	142
250	250	200	100	380
441	443	447	179	531
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1.02	1.02	0.09	0.09	1.02

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 Volume for 95th percentile queue is metered by upstream signal.



Lane Group	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane Group Flow (vph)	271	301	637	264	223	498			
v/c Ratio	0.70	0.82	0.79	0.32	0.80	0.41			
Control Delay	32.9	6.5	25.6	3.0	50.2	6.8			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	32.9	6.5	25.6	3.0	50.2	6.8			
Queue Length 50th (ft)	96	0	211	0	86	82			
Queue Length 95th (ft)	168	54	394	38	194	139			
Internal Link Dist (ft)	480		3920			2550			
Turn Bay Length (ft)	175		450		700				
Base Capacity (vph)	436	617	806	394	281	1217			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.62	0.49	0.79	0.32	0.79	0.41			

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	WB	WB	WB	NB	NB	NB	SB	SB	SB
Lane Group Flow (vph)	53	632	38	213	605	483	67	97	85
v/c Ratio	0.40	0.86	0.11	0.83	0.66	0.83	0.26	0.24	0.22
Control Delay	44.6	43.6	9.9	54.1	17.5	5.5	37.7	11.2	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	43.6	9.9	54.1	17.5	5.5	37.7	11.2	8.0
Queue Length 50th (ft)	26	180	0	43	75	0	16	8	0
Queue Length 95th (ft)	61	724	23	124	124	36	48	36	36
Internal Link Dist (ft)	1540								
Turn Bay Length (ft)	160		200		250		170		130
Base Capacity (vph)	133	752	366	257	915	767	257	398	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.84	0.10	0.83	0.66	0.83	0.26	0.24	0.22

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1904	72	1399	209	25	370	370	369	
v/c Ratio	0.82	0.51	0.70	0.13	0.05	0.84	0.88	0.67	
Control Delay	9.3	54.8	11.2	0.1	9.8	43.2	48.5	27.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.3	54.8	11.2	0.1	9.8	43.2	48.5	27.0	
Queue Length 50th (ft)	121	38	150	0	2	169	172	136	
Queue Length 95th (ft)	415	m56	m173	m0	18	#318	#329	228	
Internal Link Dist (ft)	520		960		428		378		
Turn Bay Length (ft)	225					400		400	
Base Capacity (vph)	2326	142	2000	1583	568	475	455	594	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.82	0.51	0.70	0.13	0.04	0.78	0.81	0.62	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m. Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative A  
 PM Peak

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	245	1077	154	391	1012	377	144	435	274
v/c Ratio	0.87	0.64	0.25	0.76	0.89	0.51	0.55	0.66	0.58
Control Delay	43.3	17.6	4.6	31.5	25.9	3.7	50.0	25.3	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	17.6	4.6	31.5	25.9	3.7	50.0	25.3	9.2
Queue Length 50th (ft)	87	131	11	100	255	26	71	74	0
Queue Length 95th (ft)	m109	m130	m14	#154	#354	36	#157	118	65
Internal Link Dist (ft)	320			520		554		188	
Turn Bay Length (ft)	200		250	350	155	250		250	175
Base Capacity (vph)	288	1685	627	515	1142	737	221	789	522
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.64	0.25	0.76	0.89	0.51	0.55	0.52	0.75

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m. Volume for 95th percentile queue is metered by upstream signal.

EBL	EBT	EBR	WBT	WBR	NBT	NBR	SBT
18	1728	287	1049	368	627	161	18
0.14	0.65	0.18	0.56	0.23	0.93	0.22	0.02
36.9	21.1	0.1	16.2	0.3	42.0	11.7	8.3
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.9	21.1	0.1	16.2	0.3	42.0	11.7	8.3
10	247	0	94	0	254	42	3
m12	m273	m0	131	m0	#473	76	13
190	960	360	360	225	386	420	
133	2672	1583	1866	1583	730	791	807
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0.14	0.65	0.18	0.56	0.23	0.86	0.20	0.02

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.

EBL	EBT	EBR	WBT	WBR	NBT	NBR	SBT
284	1209	574	148	1003	226	475	236
0.51	1.09	0.64	0.60	0.68	0.71	0.72	0.47
17.9	71.4	6.4	46.8	28.3	42.9	36.7	7.4
0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
17.9	71.4	6.4	46.8	28.3	42.9	36.7	7.4
34	-373	25	69	154	114	120	0
69	#487	90	#187	#252	#210	173	56
360	360	1350	200	250	601	860	
250	1107	890	246	1470	342	707	522
0	0	171	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0.51	1.09	0.80	0.60	0.68	0.66	0.67	0.45

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 m Queue shown is maximum after two cycles.  
 n 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	140	722	135	620	171	338	520	114	156
v/c Ratio	0.92	0.84	0.88	0.74	0.34	0.95	0.81	0.18	0.87
Control Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	76.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	76.0
Queue Length 50th (ft)	61	136	58	128	0	145	201	0	68
Queue Length 95th (ft)	#162	#221	#155	184	43	#296	#358	30	#169
Internal Link Dist (ft)	689	500	500	6630	734	734	980	980	625
Turn Bay Length (ft)	153	887	153	859	514	357	845	623	179
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.33	0.95	0.81	0.18	0.87

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	747	56	839	351	51	91	132
v/c Ratio	0.67	0.61	0.47	0.78	0.58	0.43	0.44	0.80
Control Delay	64.2	29.9	39.0	24.2	6.6	52.2	21.8	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	29.9	39.0	24.2	6.6	52.2	21.8	35.9
Queue Length 50th (ft)	61	205	32	251	4	28	14	237
Queue Length 95th (ft)	#161	#299	m63	#356	19	65	57	#388
Internal Link Dist (ft)	6630	350	350	200	200	236	236	43
Turn Bay Length (ft)	225	1232	118	1077	607	118	367	683
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.61	0.47	0.78	0.58	0.43	0.25	0.78

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

	EB	EBR	WBL	WBLT	SBL	SBLT
Lane Group	862	435	104	1009	673	223
Lane Group Flow (vph)	0.58	0.56	0.40	0.48	0.61	0.38
v/c Ratio	12.8	8.2	47.7	19.4	28.6	13.6
Control Delay	0.2	0.3	0.0	0.3	0.0	0.0
Queue Delay	13.0	8.5	47.7	19.7	28.6	13.6
Total Delay	124	65	58	241	164	45
Queue Length 50th (ft)	153	m101	m104	301	222	105
Queue Length 95th (ft)	350			370		585
Internal Link Dist (ft)	50	100		425		
Turn Bay Length (ft)	1466	772	295	2084	1106	587
Base Capacity (vph)	140	67	0	491	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.62	0.35	0.63	0.61	0.38

Intersection Summary  
 m Volume for 99th percentile queue is metered by upstream signal.

	EBT	EBT	WBT	NBL	NBR
Lane Group	1538	649	432	248	
Lane Group Flow (vph)	0.62	0.26	0.61	0.71	
v/c Ratio	3.6	5.8	35.5	40.6	
Control Delay	0.0	0.0	0.0	0.0	
Queue Delay	3.6	5.8	35.5	40.6	
Total Delay	0	58	118	119	
Queue Length 50th (ft)	243	112	144	178	
Queue Length 95th (ft)	370	312	431		
Internal Link Dist (ft)	2495	2495	1221	580	
Turn Bay Length (ft)	65	0	0	0	
Base Capacity (vph)	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	
Storage Cap Reductn	0	0	0	0	
Reduced v/c Ratio	0.63	0.26	0.35	0.43	

Intersection Summary

**CUMULATIVE 2020 + ALTERNATIVE A  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBE	WBT	WBR	NBT	NBR	NBT	NBR	SBT	SBR																																																																	
Lane Configurations	<table border="0"> <tr> <td>Sign Control</td> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Grade</td> <td>0</td> <td>12</td> <td>17</td> <td>145</td> <td>23</td> <td>153</td> <td>14</td> <td>740</td> <td>203</td> <td>214</td> <td>922</td> <td>6</td> </tr> <tr> <td>Volume (veh/h)</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> </tr> <tr> <td>Peak Hour Factor</td> <td>0</td> <td>13</td> <td>18</td> <td>153</td> <td>24</td> <td>161</td> <td>15</td> <td>779</td> <td>214</td> <td>225</td> <td>549</td> <td>6</td> </tr> <tr> <td>Hourly flow rate (vph)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												Sign Control	Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Grade	0	12	17	145	23	153	14	740	203	214	922	6	Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	Peak Hour Factor	0	13	18	153	24	161	15	779	214	225	549	6	Hourly flow rate (vph)												
Sign Control	Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																																																	
Grade	0	12	17	145	23	153	14	740	203	214	922	6																																																																	
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																																																																	
Peak Hour Factor	0	13	18	153	24	161	15	779	214	225	549	6																																																																	
Hourly flow rate (vph)																																																																													
Pedestrians	None																																																																												
Lane Width (ft)	1																																																																												
Walking Speed (ft/s)	None																																																																												
Percent Blockage	None																																																																												
Right turn flare (veh)	None																																																																												
Median type	None																																																																												
Median storage (veh)	None																																																																												
Upstream signal (ft)	None																																																																												
pX, platoon unblocked	None																																																																												
vC, conflicting volume	1904	2025	553	1939	1922	866	556					993																																																																	
vC1, stage 1 cont vol																																																																													
vC2, stage 2 cont vol																																																																													
vCU, unblocked vol	1904	2025	553	1939	1922	866	556					993																																																																	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1																																																																	
tC, 2 stage (s)																																																																													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2																																																																	
p0 queue free %	100	67	97	0	46	53	99					66																																																																	
cM capacity (veh/h)	12	38	533	27	45	344	1015					667																																																																	
Direction, Lane #	EBL	EBT	EBR	WBE	WBT	WBR	NBT	NBR	NBT	NBR	SBT	SBR																																																																	
Volume Total	31	338	15	993	225	556																																																																							
Volume Left	0	153	15	0	225	0																																																																							
Volume Right	18	161	0	214	0	6																																																																							
cSH	64	50	1015	1700	697	1700																																																																							
Volume to Capacity	0.95	6.70	0.01	0.58	0.32	0.33																																																																							
Queue Length 95th (ft)	35	Err	1	0	35	0																																																																							
Control Delay (s)	70.1	Err	8.6	0.0	12.6	0.0																																																																							
Lane LOS	F	F	A	F	B	B																																																																							
Approach Delay (s)	70.1	Err	0.1		3.6																																																																								
Approach LOS	F	F	F		B																																																																								

Intersection Summary		
Average Delay	1366.8	
Intersection Capacity Utilization	89.1%	ICU Level of Service E
Analysis Period (min)	15	

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Movement	EBL	EBT	EBR	WBE	WBT	WBR	NBT	NBR	NBT	NBR	SBT	SBR																																																																	
Lane Configurations	<table border="0"> <tr> <td>Sign Control</td> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Grade</td> <td>25</td> <td>384</td> <td>20</td> <td>8</td> <td>302</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>9</td> <td>9</td> <td>10</td> </tr> <tr> <td>Volume (veh/h)</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> </tr> <tr> <td>Peak Hour Factor</td> <td>26</td> <td>404</td> <td>21</td> <td>8</td> <td>318</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>9</td> <td>9</td> <td>11</td> </tr> <tr> <td>Hourly flow rate (vph)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												Sign Control	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Grade	25	384	20	8	302	10	10	10	10	9	9	10	Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	Peak Hour Factor	26	404	21	8	318	11	11	11	11	9	9	11	Hourly flow rate (vph)												
Sign Control	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																																																																	
Grade	25	384	20	8	302	10	10	10	10	9	9	10																																																																	
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																																																																	
Peak Hour Factor	26	404	21	8	318	11	11	11	11	9	9	11																																																																	
Hourly flow rate (vph)																																																																													
Pedestrians	None																																																																												
Lane Width (ft)	None																																																																												
Walking Speed (ft/s)	None																																																																												
Percent Blockage	None																																																																												
Right turn flare (veh)	None																																																																												
Median type	None																																																																												
Median storage (veh)	None																																																																												
Upstream signal (ft)	None																																																																												
pX, platoon unblocked	None																																																																												
vC, conflicting volume	328			425			823	813	415	823	618	323																																																																	
vC1, stage 1 cont vol																																																																													
vC2, stage 2 cont vol																																																																													
vCU, unblocked vol	328			425			823	813	415	823	618	323																																																																	
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2																																																																	
tC, 2 stage (s)																																																																													
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3																																																																	
p0 queue free %	98			99			96	97	98	97	97	99																																																																	
cM capacity (veh/h)	1231			1134			275	304	638	274	302	718																																																																	
Direction, Lane #	EBL	EBT	EBR	WBE	WBT	WBR	NBT	NBR	NBT	NBR	SBT	SBR																																																																	
Volume Total	452	337	32	29																																																																									
Volume Left	26	8	11	9																																																																									
Volume Right	21	11	11	11																																																																									
cSH	1231	1134	353	385																																																																									
Volume to Capacity	0.02	0.01	0.09	0.08																																																																									
Queue Length 95th (ft)	2	1	7	7																																																																									
Control Delay (s)	0.7	0.3	16.2	15.7																																																																									
Lane LOS	A	A	C	C																																																																									
Approach Delay (s)	0.7	0.3	16.2	15.7																																																																									
Approach LOS	C	C	C	C																																																																									

Intersection Summary		
Average Delay	16	
Intersection Capacity Utilization	43.5%	ICU Level of Service A
Analysis Period (min)	15	

3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	391	11	11	302	25	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	401	12	12	318	26	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC, conflicting volume	344			413			800	797	407	800	790	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	344			413			800	797	407	800	790	331
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.3	6.2
tC, single (s)												
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	97	98	96	97	99
cM capacity (veh/h)	1215			1145			287	313	644	286	316	711
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	424	356	32	32								
Volume Left	12	12	11	11								
Volume Right	12	25	11	11								
CSH	1215	1148	384	372								
Volume to Capacity	0.01	0.01	0.09	0.08								
Queue Length 95th (ft)	1	1	7	7								
Control Delay (s)	0.3	0.4	15.8	15.6								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.4	15.8	15.6								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	35.3%											
Analysis Period (min)	15											
ICU Level of Service	A											

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	44	196	160	195	205	32	116	19	158	23	10	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	205	168	205	216	34	122	20	166	24	11	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC, conflicting volume	249			375			1033	1043	291	1186	1094	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	249			375			1033	1043	291	1186	1094	216
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, single (s)												
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			83			27	89	78	76	94	98
cM capacity (veh/h)	1316			1184			166	183	749	100	171	624
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	421	205	216	34	308	53						
Volume Left	46	205	0	0	122	24						
Volume Right	168	0	0	34	166	18						
CSH	1316	1184	1700	289	162							
Volume to Capacity	0.04	0.17	0.13	0.02	1.07	0.33						
Queue Length 95th (ft)	3	15	0	0	300	33						
Control Delay (s)	1.2	8.7	0.0	0.0	111.1	37.7						
Lane LOS	A	A	A	F	F	E						
Approach Delay (s)	1.2	3.9			111.1	37.7						
Approach LOS	F	F			F	E						
Intersection Summary												
Average Delay	31.1											
Intersection Capacity Utilization	64.0%											
Analysis Period (min)	15											
ICU Level of Service	B											



5: Wilfred Ave & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EB1	EB2	EB3	EB4	EB5	EB6	WB1	WB2	WB3	WB4	WB5	NB1	NB2	NB3	NB4	NB5	SBR	SBL	SBL1	SBL2	SBR												
Lane Configurations	↑↑																																
Sign Control	Free																																
Grade	0%																																
Volume (veh/h)	20	288	69	653	373	75	55	31	695	65	11	4										Stop	0%										
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95												
Hourly flow rate (vph)	21	303	73	687	393	79	58	33	732	68	12	4										Stop	0%										
Pedestrians																																	
Lane Width (ft)																																	
Walking Speed (ft/s)																																	
Percent Blockage																																	
Right turn flare (veh)																																	
Median type	None																																
Median storage (veh)																																	
Upstream signal (ft)																																	
pX platoon unblocked																																	
vC1 stage 1 conf vol	472																					376	1963	2228	188	2748	2225	236					
vC2 stage 2 conf vol	472																					376	1963	2228	188	2748	2225	236					
vCu, unblocked vol	4.1																					4.1	7.5	6.5	6.9	7.5	6.5	6.9					
tC, 2 stage (s)	2.2																					2.2	3.5	4.0	3.3	3.5	4.0	3.3					
p0 queue free %	98																					42	0	0	11	0	34	99					
pm capacity (veh/h)	1087																					1179	10	17	822	0	17	766					
Direction Lane #	EB1	EB2	EB3	EB4	EB5	EB6	WB1	WB2	WB3	WB4	WB5	NB1	NB2	NB3	NB4	NB5	SBR	SBL	SBL1	SBL2	SBR												
Volume Total	21	202	174	687	262	210	822	84																									
Volume Left	0	0	0	687	0	0	58	68																									
Volume Right	0	0	0	73	0	0	79	732	4																								
CSH	1087	1700	1700	1179	1700	1700	96	0																									
Volume to Capacity	0.02	0.12	0.10	0.58	0.15	0.12	8.53	Err																									
Queue Length 95th (ft)	1	0	0	98	0	0	Err	Err																									
Control Delay (s)	8.4	0.0	0.0	12.2	0.0	0.0	Err	Err																									
Lane LOS	A	B	B	F	F	F	F	F																									
Approach Delay (s)	0.4																					7.3											
Approach LOS	F																					F											

Intersection Summary	
Average Delay	Err
Intersection Capacity Utilization	102.8%
ICU Level of Service	G
Analysis Period (min)	15

6: Wilfred Avenue & Dowdell Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EB1	EB2	EB3	EB4	EB5	EB6	WB1	WB2	WB3	WB4	WB5	NB1	NB2	NB3	NB4	NB5	SBR	SBL	SBL1	SBL2	SBR												
Lane Configurations	↑↑																																
Sign Control	Free																																
Grade	0%																																
Volume (veh/h)	23	843	182	327	956	98	98	67	352	76	15	46										Stop	0%										
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95												
Hourly flow rate (vph)	24	887	192	344	1006	103	103	71	371	80	16	48										Stop	0%										
Pedestrians																																	
Lane Width (ft)																																	
Walking Speed (ft/s)																																	
Percent Blockage																																	
Right turn flare (veh)																																	
Median type	None																																
Median storage (veh)																																	
Upstream signal (ft)																																	
pX platoon unblocked																																	
vC1 stage 1 conf vol	1109																					1079	2279	2829	539	2644	2874	555					
vC2 stage 2 conf vol	1109																					1079	2279	2829	539	2644	2874	555					
vCu, unblocked vol	4.1																					4.1	7.5	6.5	6.9	7.5	6.5	6.9					
tC, 2 stage (s)	2.2																					2.2	3.5	4.0	3.3	3.5	4.0	3.3					
p0 queue free %	96																					46	0	0	24	0	0	90					
pm capacity (veh/h)	625																					642	0	8	486	0	7	475					
Direction Lane #	EB1	EB2	EB3	EB4	EB5	EB6	WB1	WB2	WB3	WB4	WB5	NB1	NB2	NB3	NB4	NB5	SBR	SBL	SBL1	SBL2	SBR												
Volume Total	24	592	487	344	671	439	544	144																									
Volume Left	24	0	0	344	0	0	103	80																									
Volume Right	0	0	0	192	0	0	103	371	48																								
CSH	625	1700	1700	642	1700	1700	0	0																									
Volume to Capacity	0.04	0.35	0.29	0.54	0.39	0.26	Err	Err																									
Queue Length 95th (ft)	3	0	0	80	0	0	Err	Err																									
Control Delay (s)	11.0	0.0	0.0	16.9	0.0	0.0	Err	Err																									
Lane LOS	B																					C											
Approach Delay (s)	0.2																					4.0											
Approach LOS	F																					F											

Intersection Summary	
Average Delay	Err
Intersection Capacity Utilization	88.3%
ICU Level of Service	E
Analysis Period (min)	15

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EB	EBT	EBL	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.91	1.00
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.91
Flt Protected	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1702	1702
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.91
Flt Permitted	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1702	1702
Satd. Flow (perm)	79	1038	156	235	1127	529	184	40	350	553	52	71
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.83	1093	164	247	1186	557	194	42	368	582	55	75
Adj. Flow (vph)	0	0	43	0	0	116	0	0	345	0	31	0
RTOR Reduction (vph)	83	1093	121	247	1186	441	194	42	223	582	99	0
Lane Group Flow (vph)	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm
Turn Type	4	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.0	9.5	9.5	31.5	22.0	22.0
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	19.5	10.0	10.0	32.0	22.5	22.5
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.08	0.06	0.20	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	531	1017	432	567	597	534	216	221	99	687	239	239
v/s Ratio Prot	0.05	c0.32	0.08	0.15	c0.67	0.28	c0.11	0.01	0.01	c0.17	0.06	0.06
v/s Ratio Perm	0.16	1.07	0.28	0.44	1.99	0.83	0.90	0.19	0.23	0.85	0.41	0.41
Uniform Delay, d1	41.1	56.0	42.8	41.2	53.0	48.7	69.3	71.2	71.3	61.6	62.7	62.7
Progression Factor	1.00	1.00	1.00	0.84	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	50.6	0.4	1.4	447.4	8.2	34.5	0.4	1.2	9.5	1.2	1.2
Delay (s)	41.3	106.6	43.2	35.8	482.6	49.4	103.8	71.6	72.6	71.7	63.9	63.9
Level of Service	D	F	D	D	F	D	F	E	E	E	E	E
Approach Delay (s)	F	F	F	F	F	F	F	F	F	F	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Intersection Summary	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3
HCM Average Control Delay	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3	182.3
HCM Volume to Capacity ratio	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Actuated Cycle Length (s)	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0
Intersection Capacity Utilization	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EB	EBT	EBL	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.91	0.91	1.00
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.91	1.00
Flt Protected	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.91
Flt Permitted	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433
Satd. Flow (perm)	0	1276	563	85	1123	0	0	0	0	424	338	769
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0	1343	598	89	1182	0	0	0	0	446	357	809
Adj. Flow (vph)	0	0	137	0	0	0	0	0	0	0	0	47
RTOR Reduction (vph)	0	1343	561	89	1182	0	0	0	0	446	357	809
Lane Group Flow (vph)	0	1343	561	89	1182	0	0	0	0	446	357	809
Turn Type	4	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	36.6	36.6	36.6	4.4	45.5	36.6	4.4	45.5	36.6	4.4	45.5	36.6
Effective Green, g (s)	37.1	37.1	37.1	4.9	46.0	37.1	4.9	46.0	37.1	4.9	46.0	37.1
Actuated g/C Ratio	0.45	0.45	0.45	0.06	0.58	0.45	0.06	0.58	0.45	0.06	0.58	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	210	2035	1641	734	210	2035	1641	734	210	2035
v/s Ratio Prot	c0.38	c0.38	c0.38	0.03	c0.33	c0.38	0.03	c0.33	c0.38	0.03	c0.33	c0.38
v/s Ratio Perm	0.82	0.76	0.42	0.58	0.82	0.76	0.42	0.58	0.82	0.76	0.42	0.58
Uniform Delay, d1	18.5	17.8	36.2	10.8	18.5	17.8	36.2	10.8	18.5	17.8	36.2	10.8
Progression Factor	1.42	1.79	1.25	1.89	1.42	1.79	1.25	1.89	1.42	1.79	1.25	1.89
Incremental Delay, d2	1.4	2.3	0.6	0.5	1.4	2.3	0.6	0.5	1.4	2.3	0.6	0.5
Delay (s)	27.8	34.1	45.7	21.0	27.8	34.1	45.7	21.0	27.8	34.1	45.7	21.0
Level of Service	C	C	D	C	C	C	D	C	C	C	D	C
Approach Delay (s)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C

Intersection Summary	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7
HCM Average Control Delay	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7	45.7
HCM Volume to Capacity ratio	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Actuated Cycle Length (s)	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%	85.3%
Intersection Capacity Utilization	15	15	15	15	15	15	15	15	15	15	15	15
Analysis Period (min)												
c Critical Lane Group												

Movement	EBL	EBT	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.93
Fit Protected	5085	1583	3433	3518	1681	1689	2787	1770
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	5085	1583	3433	3518	1681	1689	2787	1770
Satd. Flow (perm)	3433	3539	3503	3503	3433	3539	3503	3503
Volume (vph)	180	1218	770	57	137	91		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	189	1282	811	60	144	96		
RTOR Reduction (vph)	0	0	0	0	0	0		
Lane Group Flow (vph)	189	1282	866	0	144	25		
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot		
Protected Phases	7	4	8	6	6	6		
Permitted Phases								
Actuated Green, G (s)	9.6	50.5	36.4	20.5	20.5	20.5		
Effective Green, g (s)	10.1	51.0	36.9	21.0	21.0	21.0		
Actuated g/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	433	2236	1816	465	416			
v/s Ratio Prot	0.06	c0.36	0.25	c0.08				
v/c Ratio	0.44	0.57	0.54	0.31	0.06			
Uniform Delay, d1	32.3	8.2	15.4	23.7	22.1			
Progression Factor	0.80	232	1.00	1.00	1.00			
Incremental Delay, d2	0.5	0.8	1.3	1.7	0.3			
Delay (s)	26.5	19.9	16.7	25.4	22.4			
Level of Service	C	B	B	C	C			
Approach Delay (s)	20.8	16.7	24.2					
Approach LOS	C	B	B					

**Intersection Summary**

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

C. Critical Lane Group

Movement	EBL	EBT	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.93
Fit Protected	5085	1583	3433	3518	1681	1689	2787	1770
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	5085	1583	3433	3518	1681	1689	2787	1770
Satd. Flow (perm)	3433	3539	3503	3503	3433	3539	3503	3503
Volume (vph)	0	819	882	411	17	788	18	571
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	928	433	18	829	19	601
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	862	290	448	0	415	433	124
Turn Type	Prot	Prot	Prot	Prot	Split	Split	Perm	Split
Protected Phases	4	4	3	8	2	2	2	6
Permitted Phases								
Actuated Green, G (s)	18.5	18.5	11.5	34.5	16.0	16.0	16.0	16.0
Effective Green, g (s)	19.0	19.0	12.0	35.0	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.24	0.24	0.15	0.44	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1208	376	515	1539	347	348	575	365
v/s Ratio Prot	0.17	c0.18	c0.05	0.13	0.25	c0.26	0.04	c0.01
v/c Ratio	0.71	0.77	0.36	0.29	1.20	1.24	0.22	0.02
Uniform Delay, d1	28.0	28.5	30.6	14.5	31.8	31.8	26.4	25.3
Progression Factor	1.42	5.82	1.21	1.23	1.03	1.03	2.34	1.00
Incremental Delay, d2	2.0	8.3	0.4	0.4	104.4	124.1	0.5	0.1
Delay (s)	41.8	174.1	37.2	18.2	137.0	158.6	62.2	25.5
Level of Service	D	F	D	B	F	F	E	C
Approach Delay (s)	110.4		23.8		111.8		25.5	
Approach LOS	F		C		F		C	

**Intersection Summary**

HCM Average Control Delay	96.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

C. Critical Lane Group

Movement	WB	WB	NBT	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	961	0	0	684
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1012	0	0	720
Pedestrians	0	0	0	0	0	0
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1732	1012		1012
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol			1732	1012		1012
tC, single (s)			6.4	6.2		4.1
tC, 2 stage (s)						
tF (s)			3.5	3.3		2.2
p0 queue free %			100	100		100
cM capacity (veh/h)			97	291		685
Direction, Lane #	WB 1	NB 1	SBL 1	SBR 1		
Volume Total	0	1012	720			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH		1700	1700	1700		
Volume to Capacity		0.00	0.60	0.42		
Queue Length 95th (ft)		0.0	0.0	0.0		
Control Delay (s)		0.0	0.0	0.0		
Lane LOS	A	A	A	A		
Approach LOS	A	A	A	A		
<b>Intersection Summary</b>						
Average Delay					0.0	
Intersection Capacity Utilization					53.9%	
Analysis Period (min)					15	
ICU Level of Service					A	

Movement	EBL	EBT	EBR	WB	WBT	WBR	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	1583	1745	1745	1770	3527	1770	3539	1583
Flt Permitted	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1686	1583	1745	1745	1770	3527	1770	3539	1583
Volume (vph)	884	5	108	15	6	9	557	483	11	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	931	5	114	16	6	9	586	508	12	9
RTOR Reduction (vph)	0	0	84	0	0	0	0	0	0	0
Lane Group Flow (vph)	466	470	30	0	22	0	586	518	0	9
Turn Type	Split	Split	Prot	Split	Split	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	5	2	2	1	6	6		
Permitted Phases	4	4	5	2	2	1	6	6		
Actuated Green, G (s)	20.5	20.5	20.5	3.0	3.0	27.1	37.0	1.5	11.4	11.4
Effective Green, g (s)	21.0	21.0	21.0	3.5	3.5	27.6	37.5	2.0	11.9	11.9
Actuated g/C Ratio	0.26	0.26	0.26	0.04	0.04	0.35	0.47	0.02	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	441	443	416	76	76	611	1653	44	526	235
v/s Ratio Prot	0.28	0.28	0.33	0.15	0.15	0.01	0.12	0.01	0.12	0.08
v/s Ratio Perm	1.06	1.06	0.07	0.29	0.29	0.96	0.31	0.20	0.79	0.58
Uniform Delay, d1	29.5	29.5	22.2	37.1	37.1	25.6	13.2	38.2	32.8	31.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.14	3.27
Incremental Delay, d2	58.6	59.8	0.1	2.2	2.2	26.2	0.5	1.3	6.6	5.2
Delay (s)	88.1	89.3	22.2	39.2	39.2	51.9	13.7	41.7	40.0	108.6
Level of Service	F	F	C	D	D	D	B	D	D	F
Approach Delay (s)	81.5	F	F	39.2	D	33.9	C	84.3	F	F
Approach LOS	F	F	C	D	D	B	C	D	D	F
<b>Intersection Summary</b>										
HCM Average Control Delay									66.2	
HCM Volume to Capacity ratio									0.92	
Actuated Cycle Length (s)									80.0	
Intersection Capacity Utilization									85.5%	
Analysis Period (min)									15	
Critical Lane Group									E	

14: Business Park Drive & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Sign Control	4	Free	Free	Stop	0	0
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	305	73	45	0	322	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	321	77	47	0	339	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	47				766	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	47				766	47
vCU, unblocked vol	47				6.4	6.2
IC, 2 stage (s)						
IC, 2 stage (s)	2.2				3.5	3.3
IC, 2 stage (s)	79				100	67
p0 queue free %						
CM capacity (veh/h)	1560				294	1022
Direction Lane #	EBL	EBT	WBT	WBR	SBL	SBR
Volume Total	398	47	339			
Volume Left	321	0	0			
Volume Right	0	0	339			
cSH	1560	1700	1022			
Volume to Capacity	0.21	0.03	0.33			
Queue Length 95th (ft)	19	0	37			
Control Delay (s)	6.7	0.0	10.3			
Lane LOS	A	B	B			
Approach Delay (s)	6.7	0.0	10.3			
Approach LOS	B	B	B			
Intersection Summary						
Average Delay	7.8					
Intersection Capacity Utilization	54.0%					
Analysis Period (min)	15					
ICU Level of Service	A					

15: Business Park Drive & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBR	NBL	NBR	SBL	SBR
Sign Control	0	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	197	32	13	429	373	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	207	34	14	452	393	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	663	213	426			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	663	213	426			
vCU, unblocked vol	8.8	6.9	4.1			
IC, 2 stage (s)						
IC, 2 stage (s)	3.5	3.3	2.2			
IC, 2 stage (s)	47	96	99			
p0 queue free %						
CM capacity (veh/h)	390	792	1129			
Direction Lane #	EBL	EBR	NBL	NBR	SBL	SBR
Volume Total	207	34	14	226	226	165
Volume Left	207	0	14	0	0	0
Volume Right	0	34	0	0	0	34
cSH	390	792	1129	1700	1700	1700
Volume to Capacity	0.53	0.04	0.01	0.13	0.13	0.15
Queue Length 95th (ft)	75	3	1	0	0	0
Control Delay (s)	24.3	9.7	8.2	0.0	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	22.2	0.2	0.2			
Approach LOS	C	C	C			
Intersection Summary						
Average Delay	4.8					
Intersection Capacity Utilization	29.4%					
Analysis Period (min)	15					
ICU Level of Service	A					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1770	1863	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1770	1863	1770
Volume (vph)	299	372	589	285	228	463
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	315	392	620	300	240	487
RTOR Reduction (vph)	0	302	0	173	0	0
Lane Group Flow (vph)	315	90	620	127	240	487
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot
Protected Phases	B	2	2	1	6	6
Permitted Phases	8	14.2	14.2	26.5	9.5	40.5
Actuated Green, G (s)	14.7	14.7	27.0	27.0	10.0	41.0
Effective Green, g (s)	0.23	0.23	0.42	0.42	0.16	0.64
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	408	365	780	671	278	1199
Lane Grp Cap (vph)	c0.18	c0.33	c0.14	c0.14	0.26	0.26
v/s Ratio Prot	0.77	0.25	0.78	0.19	0.86	0.41
v/s Ratio Perm	22.9	20.0	15.8	11.5	26.2	5.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	8.8	0.4	7.7	0.6	23.1	1.0
Incremental Delay, d2	31.7	20.3	23.5	12.1	49.3	6.3
Delay (s)	C	C	C	B	D	A
Level of Service	C	C	C	B	D	A
Approach Delay (s)	25.4	19.8	20.6	20.6	20.6	20.6
Approach LOS	C	B	C	C	C	C
<b>Intersection Summary</b>						
HCM Average Control Delay	21.7					
HCM Volume to Capacity ratio	0.80					
Actuated Cycle Length (s)	63.7					
Intersection Capacity Utilization	70.2%					
Analysis Period (min)	15					
c Critical Lane Group						

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	1.00	0.85	1.00	0.88	1.00	0.95	1.00
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.88	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.88	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1583	3433	1583	3433
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1583	3433	1583	3433
Volume (vph)	58	539	45	122	584	410	69	17	123	570	48
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	567	47	128	615	432	73	18	129	600	51
RTOR Reduction (vph)	0	37	0	0	342	0	47	54	0	58	0
Lane Group Flow (vph)	61	567	10	128	615	30	73	31	15	600	102
Turn Type	Prot	Perm	Prot	Perm	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	2	1	6	6
Permitted Phases	4.4	16.1	16.1	4.4	16.1	16.1	4.4	17.1	17.1	24.4	37.1
Actuated Green, G (s)	4.9	16.6	16.6	4.9	16.6	16.6	4.9	17.6	17.6	24.9	37.6
Effective Green, g (s)	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.22	0.22	0.31	0.47
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	108	734	328	210	734	328	210	344	331	551	786
Lane Grp Cap (vph)	0.03	c0.16	0.04	c0.17	0.06	c0.02	0.02	0.01	0.01	c0.34	c0.06
v/s Ratio Prot	0.56	0.77	0.03	0.61	0.84	0.27	0.35	0.09	0.05	1.09	0.13
v/s Ratio Perm	36.5	29.9	25.3	36.6	30.4	26.6	36.0	24.8	24.6	27.6	12.0
Uniform Delay, d1	1.00	1.00	1.00	0.92	0.48	0.92	1.00	1.00	1.00	1.00	1.00
Progression Factor	6.6	5.1	0.0	3.8	6.4	0.3	1.0	0.5	0.3	64.7	0.3
Incremental Delay, d2	43.1	35.0	25.3	37.4	21.1	22.3	37.0	25.4	24.8	92.3	12.3
Delay (s)	D	C	C	D	C	C	D	C	C	F	B
Level of Service	D	C	C	D	C	C	D	C	C	F	B
Approach Delay (s)	35.0	35.0	25.3	37.4	21.1	22.3	37.0	25.4	24.8	92.3	12.3
Approach LOS	D	D	C	D	C	C	D	C	C	F	B
<b>Intersection Summary</b>											
HCM Average Control Delay	40.6										
HCM Volume to Capacity ratio	0.78										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	67.7%										
Analysis Period (min)	15										
c Critical Lane Group											

18: Rohnert Park Expy & Redwood Drive  
Graton Rancharia Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3145	1441	3433	1663	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3145	1441	3433	1663	1583
Volume (vph)	209	905	118	448	766	408	122	228	464	439	210	228
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	220	953	124	472	806	429	128	240	488	462	221	240
RTOR Reduction (vph)	0	0	84	0	0	285	0	187	224	0	0	197
Lane Group Flow (vph)	220	953	40	472	806	144	128	273	42	462	221	43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	7	4	3	3	8	5	2	2	1	6	6	6
Permitted Phases	4	4	4	4	4	8	8	2	2	2	2	2
Actuated Green, G (s)	12.0	25.5	11.5	25.0	25.0	11.3	12.2	12.2	12.8	13.7	13.7	13.7
Effective Green, g (s)	12.5	26.0	12.0	25.5	25.5	11.8	12.7	12.7	13.3	14.2	14.2	14.2
Actuated g/C Ratio	0.16	0.32	0.32	0.15	0.32	0.15	0.16	0.16	0.17	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	1653	514	515	1128	505	261	499	229	571	331	281
v/s Ratio Prot	<0.12	0.19	<0.14	<0.23	0.09	0.07	0.09	0.03	<0.13	<0.12	0.03	0.03
v/s Ratio Perm	0.79	0.58	0.08	0.92	0.71	0.28	0.49	0.55	0.18	0.81	0.67	0.15
Uniform Delay, d1	32.5	22.4	18.7	33.5	24.0	20.4	31.3	31.0	29.2	32.1	30.7	27.8
Progression Factor	0.72	0.76	1.17	0.71	0.60	0.69	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	0.7	0.1	16.9	2.9	1.1	1.5	1.3	0.4	8.3	5.0	0.3
Delay (s)	30.5	17.8	22.1	40.8	17.3	15.2	32.8	32.3	29.6	40.4	35.7	28.1
Level of Service	C	B	C	D	B	B	C	C	C	D	D	C
Approach Delay (s)	20.3			23.3			31.5			36.1		
Approach LOS	C			C			C			D		

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	26.4			26.4			16.0			16.0	
HCM Volume to Capacity ratio	0.77			0.77			0.83			0.83	
Actuated Cycle Length (s)	80.0			80.0			80.0			80.0	
Intersection Capacity Utilization	69.9%			69.9%			77.0%			77.0%	
Analysis Period (min)	15			15			15			15	
Critical Lane Group											

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancharia Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3145	1441	3433	1663	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3145	1441	3433	1663	1583
Volume (vph)	0	1169	639	78	1293	234	6	0	17	692	0	323
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1231	673	82	1361	246	6	0	18	728	0	340
RTOR Reduction (vph)	0	114	0	0	0	0	0	0	12	0	0	24
Lane Group Flow (vph)	0	1790	0	82	1361	246	0	12	0	364	0	316
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	6
Actuated Green, G (s)	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	25.5
Effective Green, g (s)	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	26.0
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2203	119	2035	1583	1583	1583	501	501	426	428	514	514
v/s Ratio Prot	<0.37			0.05	<0.38		0.16	0.01	0.28	0.28	0.20	0.20
v/s Ratio Perm	0.81			0.69	0.67	0.16	0.02	0.02	0.85	0.85	0.61	0.61
Uniform Delay, d1	18.7			36.5	11.7	0.0	18.4	25.2	25.2	25.2	22.8	22.8
Progression Factor	0.40			1.25	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6			10.8	1.2	0.1	0.0	0.0	15.3	15.3	2.2	2.2
Delay (s)	10.0			56.4	9.4	0.1	18.4	40.5	40.5	40.5	25.0	25.0
Level of Service	B			E	A	A	B	D	D	D	C	C
Approach Delay (s)	10.0			10.4			18.4			35.6		
Approach LOS	B			B			B			D		

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	16.0			16.0			16.0			16.0	
HCM Volume to Capacity ratio	0.83			0.83			0.83			0.83	
Actuated Cycle Length (s)	80.0			80.0			80.0			80.0	
Intersection Capacity Utilization	77.0%			77.0%			77.0%			77.0%	
Analysis Period (min)	15			15			15			15	
Critical Lane Group											

20: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1770	6408	1583	5085	1583	1770	1504	1504	1748			
Satd. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.83			
Fit Permitted	1770	6408	1583	5085	1583	1369	1504	1504	1509			
Satd. Flow (perm)	19	1356	504	988	343	614	0	376	14	0	3	3
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor	2.2	32.1	80.0	25.4	80.0	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Adj. Flow (vph)	2.7	32.6	80.0	25.9	80.0	39.4	39.4	39.4	39.4	39.4	39.4	39.4
RTOR Reduction (vph)	0.03	0.41	1.00	0.32	1.00	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Lane Group Flow (vph)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Protected Phases	7	4		6		2	2	6		6		6
Permitted Phases												
Actuated Green, G (s)	2.2	32.1	80.0	25.4	80.0	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Effective Green, g (s)	2.7	32.6	80.0	25.9	80.0	39.4	39.4	39.4	39.4	39.4	39.4	39.4
Actuated g/C Ratio	0.03	0.41	1.00	0.32	1.00	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2611	1583	1646	1583	684	741	741	743			
v/s Ratio Prot	0.01	c0.22		c0.20		0.13	0.13	0.13	0.13			
v/s Ratio Perm												
v/c Ratio	0.33	0.55	0.34	0.63	0.23	0.94	0.26	0.26	0.26	0.01		
Uniform Delay, d1	37.8	18.1	0.0	23.0	0.0	19.3	11.8	11.8	11.8	10.4		
Progression Factor	1.02	1.02	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.8	0.5	0.3	1.2	0.2	21.7	0.2	0.2	0.2	0.0		
Delay (s)	40.3	18.8	0.3	17.3	0.2	40.9	12.0	12.0	12.0	10.4		
Level of Service	D	B	A	B	A	D	B	B	B	B		
Approach Delay (s)				14.1		12.9	29.9					
Approach LOS				B		C	C					
<b>Intersection Summary</b>												
HCM Average Control Delay	17.4											
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	64.5%											
Analysis Period (min)	15											
c Critical Lane Group												

21: Rohnert Park Expy & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3433	3539	1583	1770	4888	1610	3339	1583	1610	3380	1563	1563
Satd. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Fit Permitted	3433	3539	1583	1770	4888	1610	3339	1583	1610	3380	1563	1563
Satd. Flow (perm)	269	931	547	195	768	268	380	348	317	180	313	173
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor	283	980	576	205	808	282	411	366	334	189	329	182
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	283	980	203	205	1015	0	250	527	83	167	351	32
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Protected Phases	7	4		3		2	2	6		6		6
Permitted Phases												
Actuated Green, G (s)	12.5	22.5	22.5	9.8	19.8	16.0	16.0	16.0	16.0	13.7	13.7	13.7
Effective Green, g (s)	13.0	23.0	23.0	10.3	20.3	16.5	16.5	16.5	16.5	14.2	14.2	14.2
Actuated g/C Ratio	0.16	0.29	0.29	0.13	0.25	0.21	0.21	0.21	0.21	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	1017	455	228	1240	332	689	326	286	600	281	281
v/s Ratio Prot	0.08	c0.28		0.13		0.12	c0.21	0.16	c0.15	0.05	c0.10	
v/s Ratio Perm												
v/c Ratio	0.51	0.86	0.45	0.50	0.82	0.75	0.75	0.75	0.75	0.26	0.58	0.11
Uniform Delay, d1	30.6	28.1	23.3	34.3	28.1	29.8	29.9	26.6	30.2	30.2	27.6	27.6
Progression Factor	0.52	0.49	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	19.2	2.8	33.4	6.1	9.3	5.1	0.4	3.0	1.5	0.2	0.2
Delay (s)	16.5	33.1	27.3	67.7	34.2	39.1	35.0	27.0	33.2	31.7	27.8	27.8
Level of Service	B	C	C	E	C	D	C	C	C	C	C	C
Approach Delay (s)				39.5		33.5						
Approach LOS				D		D						
<b>Intersection Summary</b>												
HCM Average Control Delay	33.0											
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	73.1%											
Analysis Period (min)	15											
c Critical Lane Group												



22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

2020 Alternative A  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3516	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (perm)	1770	3516	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Volume (vph)	150	774	324	115	510	152	316	511	102	292	529	230
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	815	341	121	537	160	333	538	107	307	557	242
RTOR Reduction (vph)	0	66	0	0	121	0	0	70	0	0	0	183
Lane Group Flow (vph)	158	1050	0	121	537	39	333	538	37	307	557	242
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8			8			8			8		
Actuated Green, G (s)	5.5	16.5	16.5	13.5	13.5	23.5	23.5	23.5	6.5	16.5	16.5	6
Effective Green, g (s)	6.0	17.0	17.0	14.0	14.0	24.0	24.0	24.0	7.0	17.0	17.0	7.0
Actuated g/C Ratio	0.09	0.24	0.24	0.24	0.20	0.34	0.34	0.34	0.10	0.24	0.24	0.24
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	822	384	354	539	543	543	543	177	452	384	384
v/s Ratio Prot	c0.09	c0.32		c0.19	c0.19	c0.29	c0.19	c0.29	c0.17	c0.30	c0.30	0.04
v/s Ratio Perm	1.04	1.33		0.80	0.63	0.10	0.94	0.84	0.07	1.73	1.23	0.15
Uniform Delay, d1	32.0	26.5		31.4	23.7	20.6	27.6	21.2	15.5	31.5	26.5	20.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	83.8	155.2		24.3	1.4	0.1	32.7	12.7	0.2	353.0	122.6	0.8
Delay (s)	115.8	181.7		55.7	25.1	20.7	60.3	34.0	15.7	384.5	149.1	21.7
Level of Service	F	F		E	C	C	E	C	B	F	F	C
Approach Delay (s)	173.9			288			41.0			186.5		
Approach LOS	F			C			D			F		
<b>Intersection Summary</b>												
HCM Average Control Delay	118.2											
HCM Volume to Capacity ratio	1.24											
Actuated Cycle Length (s)	70.0											
Intersection Capacity Utilization	96.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3516	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3516	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (perm)	1770	3516	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Volume (vph)	107	736	33	62	909	320	48	23	63	562	35	105
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	775	35	65	957	337	51	24	66	592	37	111
RTOR Reduction (vph)	0	4	0	0	0	0	115	0	61	0	0	58
Lane Group Flow (vph)	113	806	0	65	957	222	51	29	0	592	0	50
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8			8			8			8		
Actuated Green, G (s)	5.6	21.9		4.4	20.7	20.7	3.3	6.3		39.4	42.4	
Effective Green, g (s)	6.1	22.4		4.9	21.2	21.2	3.8	6.8		39.9	42.9	
Actuated g/C Ratio	0.07	0.25		0.05	0.24	0.24	0.04	0.08		0.44	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	120	875		96	834	373	75	125		785	788	
v/s Ratio Prot	0.06	c0.23		0.04	c0.27	c0.03	0.02			c0.33	c0.05	
v/s Ratio Perm	1.04	1.33		0.80	0.63	0.10	0.94	0.84		1.73	1.23	0.15
Uniform Delay, d1	41.8	32.9		41.8	34.4	30.6	42.5	39.1		20.9	13.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	63.8	16.5		15.3	78.7	6.0	22.4	1.0		4.1	0.1	
Delay (s)	105.6	49.4		42.9	99.3	13.9	64.9	40.1		25.1	13.1	
Level of Service	F	F		D	F	B	E	D		C	B	
Approach Delay (s)	56.3			75.4			49.1			22.7		
Approach LOS	E			E			D			C		
<b>Intersection Summary</b>												
HCM Average Control Delay	56.3											
HCM Volume to Capacity ratio	-0.92											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	80.6%											
Analysis Period (min)	15											
c Critical Lane Group												

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Movement	EBT	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.95	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583	1583
Volume (vph)	0	969	392	119	1023	0	0	626	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1020	413	125	1077	0	0	659	0
RTOR Reduction (vph)	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	0	1020	321	325	1077	0	0	689	217
Turn Type		Perm	Prot	Prot	Prot			Prot	
Protected Phases	4		3	8		1	6		
Permitted Phases		4							
Actuated Green, G (s)	33.5	33.5	14.5	52.5		28.5	28.5		
Effective Green, g (s)	34.0	34.0	15.0	53.0		29.0	29.0		
Actuated g/C Ratio	0.38	0.38	0.17	0.59		0.32	0.32		
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	1337	598	295	2084		1105	510		
v/s Ratio Prot	c0.29		0.07	c0.30		c0.19	0.14		
v/s Ratio Perm		0.20				0.60	0.43		
w/c Ratio	0.76	0.54	0.42	0.52		0.56	0.43		
Uniform Delay, d1	24.5	21.9	33.6	10.9		25.6	24.0		
Progression Factor	0.50	0.43	1.25	1.63		1.00	1.00		
Incremental Delay, d2	2.5	2.1	0.9	0.9		0.9	2.6		
Delay (s)	14.8	11.5	42.5	18.7		26.5	26.5		
Level of Service	B	B	D	B		C	C		
Approach Delay (s)	13.9			21.2		0.0	26.5		
Approach LOS	B			C		A	C		
Intersection Summary									
HCM Average Control Delay	19.6								
HCM Volume to Capacity ratio	0.64								
Actuated Cycle Length (s)	90.0								
Intersection Capacity Utilization	66.5%								
Analysis Period (min)	15								
Critical Lane Group	C								

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Movement	EBT	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.95	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583	1583
Volume (vph)	0	1594	0	0	700	442	265	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1678	0	0	737	465	269	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1678	0	0	737	465	254	0	0
Turn Type		Perm			Perm				
Protected Phases	4		6	2					
Permitted Phases		4							
Actuated Green, G (s)	61.2	61.2	19.8	19.8		61.2	19.8		
Effective Green, g (s)	61.7	61.7	20.3	20.3		61.7	20.3		
Actuated g/C Ratio	0.69	0.69	0.23	0.23		0.69	0.23		
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	2426	2426	774	357		2426	774		
v/s Ratio Prot	c0.47		0.21	0.14		c0.16	0.16		
v/s Ratio Perm		0.69				0.30	0.60		
w/c Ratio	0.69	0.56	0.31	0.32		0.56	0.32		
Uniform Delay, d1	8.5	8.5	31.2	32.2		1.00	1.00		
Progression Factor	0.29	0.29	1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.2	1.2	0.3	0.3		1.2	0.3		
Delay (s)	3.6	3.6	32.5	36.7		3.6	36.7		
Level of Service	A	A	C	C		A	C		
Approach Delay (s)	3.6		5.9	34.8		3.6	34.8		
Approach LOS	A		A	C		A	C		
Intersection Summary									
HCM Average Control Delay	11.4								
HCM Volume to Capacity ratio	0.70								
Actuated Cycle Length (s)	90.0								
Intersection Capacity Utilization	66.5%								
Analysis Period (min)	15								
Critical Lane Group	C								

Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3	SBR																											
Lane Configurations	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																											
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																											
Grade	0%																																							
Volume (veh/h)	11	27	0	18	24	232	8	303	24	119	714	87																												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																											
Hourly flow rate (vph)	12	4	9	19	25	244	8	345	25	125	752	7																												
Pedestrians	0																																							
Lane Width (ft)	12																																							
Walking Speed (ft/s)	5																																							
Percent Blockage	None																																							
Right turn flare (veh)	None																																							
Median type	None																																							
Median storage (veh)	None																																							
Upstream signal (ft)	None																																							
pX, platoon unblocked	0																																							
vC, conflicting volume	580	1893	379	1500	1872	423	759	871																																
vC1, stage 1 conf vol	0																																							
vC2, stage 2 conf vol	0																																							
vCU, unblocked vol	1580	1893	379	1500	1872	423	759	871																																
IC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1																																
IC, 2 stage (s)	0																																							
fF (s)	3.5	4.0	3.9	3.5	4.0	3.3	2.2	2.2																																
p0 queue free %	53	93	98	72	57	58	99	84																																
cM capacity (veh/h)	25	57	618	768	59	580	848	770																																
Direction-Lane	EB1	WB1	NB1	EB2	WB2	NB2	EB3	WB3	NB3	SB1	SB2	SB3	SBR																											
Volume Total	25	288	8	423	423	25	125	501	258	0	0	0	0																											
Volume Left	12	19	0	0	0	0	0	125	0	0	0	0	0																											
Volume Right	9	244	8	423	423	25	100	376	77	0	0	0	0																											
cSH	46	411	848	1700	1700	1700	770	1700	1700	1700	1700	1700	1700																											
Volume to Capacity	0.55	0.01	0.01	0.25	0.25	0.01	0.16	0.29	0.15	0	0	0	0																											
Queue Length 95th (ft)	52	132	1	0	0	0	14	0	0	0	0	0	0																											
Control Delay (s)	156.3	35.5	9.3	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0																											
Lane LOS	F	F	E	A	A	B	B	B	B	B	B	B	B																											
Approach Delay (s)	156.3	35.5	0.1	0.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6																											
Approach LOS	F	E	E	B	B	B	B	B	B	B	B	B	B																											
Intersection Summary																																								
Average Delay	7.5																																							
Intersection Capacity Utilization	49.9%																																							
ICU Level of Service	A																																							
Analysis Period (min)	15																																							

Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3	SBR																											
Lane Configurations	<table border="0"> <tr> <td>Stop</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Free</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </table>												Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																											
Free	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%																											
Grade	0%																																							
Volume (veh/h)	142	142	4	271	271	2	2	2	2	2	2	2	2																											
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																											
Hourly flow rate (vph)	149	149	4	285	285	2	2	2	2	2	2	2	2																											
Pedestrians	0																																							
Lane Width (ft)	12																																							
Walking Speed (ft/s)	5																																							
Percent Blockage	None																																							
Right turn flare (veh)	None																																							
Median type	None																																							
Median storage (veh)	None																																							
Upstream signal (ft)	None																																							
pX, platoon unblocked	0																																							
vC, conflicting volume	287	154	154	455	455	152	457	457	286																															
vC1, stage 1 conf vol	0																																							
vC2, stage 2 conf vol	0																																							
vCU, unblocked vol	287	154	154	455	455	152	457	457	286																															
IC, single (s)	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2																															
IC, 2 stage (s)	0																																							
fF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3																															
p0 queue free %	100	99	99	100	100	100	100	100	100																															
cM capacity (veh/h)	1275	1427	1427	512	498	895	510	497	753																															
Direction-Lane	EB1	WB1	NB1	EB2	WB2	NB2	EB3	WB3	NB3	SB1	SB2	SB3	SBR																											
Volume Total	155	295	4	412	412	2	2	2	2	2	2	2	2																											
Volume Left	1	7	0	0	0	0	0	0	0	0	0	0	0																											
Volume Right	4	2	2	412	412	2	2	2	2	2	2	2	2																											
cSH	1275	1427	651	504	504	504	504	504	504	504	504	504	504																											
Volume to Capacity	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																											
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0																											
Control Delay (s)	0.1	0.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6																											
Lane LOS	A	A	B	B	B	B	B	B	B	B	B	B	B																											
Approach Delay (s)	0.1	0.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6	12.2	10.6																											
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B																											
Intersection Summary																																								
Average Delay	0.3																																							
Intersection Capacity Utilization	29.1%																																							
ICU Level of Service	A																																							
Analysis Period (min)	15																																							

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	2	129	2	4	285	8	1	10	0	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	136	2	4	300	8	1	11	0	3	1
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											None
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
VC, conflicting volume											
VC1, stage 1 conf vol	308			138			455	458	137	459	455
VC2, stage 2 conf vol	308			138			455	458	137	459	455
VCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5
IC, single (s)											
IC, 2 stage (s)											
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
pl queue free %	100			100			100	98	100	99	100
pl capacity (veh/h)	1252			1445			512	497	912	502	499
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Volume Total	140	313	12	5							
Volume Left	2	4	0	1							
Volume Right	2	8	0	1							
cSH	1252	1446	498	536							
Volume to Capacity	0.00	0.00	0.02	0.01							
Queue Length 95th (ft)	0	0	2	1							
Control Delay (s)	0.1	0.1	12.4	11.8							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.1	0.1	12.4	11.8							
Approach LOS	B	B	B	B							
Intersection Summary											
Average Delay	0.9										
Intersection Capacity Utilization	27.7%										
Analysis Period (min)	15										
ICU Level of Service	A										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	←	←	←	←	←	←	←	←	←
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	153	10	4	343	17	9			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	161	11	4	361	18	9			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type									None
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
VC, conflicting volume									
VC1, stage 1 conf vol									
VC2, stage 2 conf vol									
VCU, unblocked vol									
IC, single (s)									
IC, 2 stage (s)									
IF (s)	2.2			2.2			3.5	3.3	
pl queue free %	100			100			100	95	
pl capacity (veh/h)	1405			1405			504	478	
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Volume Total	172	365	27						
Volume Left	0	4	18						
Volume Right	11	0	9						
cSH	1700	1405	591						
Volume to Capacity	0.10	0.00	0.05						
Queue Length 95th (ft)	0	0	4						
Control Delay (s)	0.0	0.0	11.4						
Lane LOS	A	A	B						
Approach Delay (s)	0.0	0.1	11.4						
Approach LOS	B	B	B						
Intersection Summary									
Average Delay	0.6								
Intersection Capacity Utilization	31.2%								
Analysis Period (min)	15								
ICU Level of Service	A								

Movement	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBR	SBL	SBL	SBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	150	16	17	244	0	107	0	29	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	158	17	18	257	0	113	0	31	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px, platoon unblocked												
vc, conflicting volume	257		175			459		459	166	489	467	257
vc1, stage 1 conf vol												
vc2, stage 2 conf vol	257		175			459		459	166	489	467	257
vcu, unblocked vol	4.1		4.1			7.1		6.5	6.2	7.1	6.5	6.2
tc, single (s)												
tc, 2 stage (s)	2.2		2.2			3.5		4.0	3.3	3.5	4.0	3.3
pf (s)	100		99			78		100	97	100	100	100
pc queue free %	1308		1402			507		492	878	467	487	782
cm capacity (veh/h)												
Direction, Lane #	EBT, WB1, NBR	EBT, WB1, NBR	EBR, WBL, WBR	EBR, WBL, WBR	EBR, WBL, WBR	NBL, NBR, SBR	NBL, NBR, SBR	NBL, NBR, SBR	NBL, NBR, SBR	NBL, NBR, SBR	NBL, NBR, SBR	NBL, NBR, SBR
Volume Total	175	275	143	0	0	0	0	0	0	0	0	0
Volume Left	0	16	113	0	0	0	0	0	0	0	0	0
Volume Right	17	0	31	0	0	0	0	0	0	0	0	0
CSH	1308	1402	558	1700	0	0	0	0	0	0	0	0
Volume to Capacity	0.00	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	1	25	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.6	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.6	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
Average Delay	3.6											
Intersection Capacity Utilization	40.3%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBR
Lane Configurations	↕	↕	↕	↕	↕	↕	↕	↕	↕
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	137	32	0	235	32	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	144	34	0	247	34	0	0	0
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type									
Median storage (veh)									
Upstream signal (ft)									
px, platoon unblocked									
vc, conflicting volume									
vc1, stage 1 conf vol									
vc2, stage 2 conf vol									
vcu, unblocked vol									
tc, single (s)									
tc, 2 stage (s)									
pf (s)									
pc queue free %									
cm capacity (veh/h)									
Direction, Lane #	EBT, WB1, NBR	EBT, WB1, NBR	EBR, WBL, WBR	EBR, WBL, WBR	NBL, NBR	NBL, NBR	NBL, NBR	NBL, NBR	NBL, NBR
Volume Total	178	247	34	0	0	0	0	0	0
Volume Left	0	0	34	0	0	0	0	0	0
Volume Right	34	0	0	0	0	0	0	0	0
CSH	1700	1398	599	0	0	0	0	0	0
Volume to Capacity	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	4	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	B	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	A	A	A	A	A	A	A
Intersection Summary									
Average Delay	0.8								
Intersection Capacity Utilization	22.4%								
Analysis Period (min)	15								
ICU Level of Service	A								

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	83	1083	164	247	186	557	194	42
v/c Ratio	0.16	1.07	0.35	0.44	1.99	0.86	0.90	0.19
Control Delay	42.2	102.6	29.2	36.3	473.9	37.0	108.2	71.1
Queue Delay	0.0	128.0	0.0	15.5	114.9	61.2	0.0	0.0
Total Delay	42.2	230.6	29.2	51.8	588.8	118.2	108.2	71.1
Queue Length 50th (ft)	64	696	91	185	2073	351	203	22
Queue Length 95th (ft)	111	842	168	222	2070	427	270	27
Internal Link Dist (ft)	550		220		435		110	474
Turn Bay Length (ft)	150		150		150		100	275
Base Capacity (vph)	531	1017	475	567	597	650	221	376
Starvation Cap Reductn	0	0	0	299	68	176	0	0
Spillback Cap Reductn	0	218	0	0	0	0	0	121
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	1.37	0.35	0.92	2.24	1.18	0.88	0.11

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	1343	698	89	1182	446	1166		
v/c Ratio	0.90	0.79	0.35	0.58	0.85	1.51		
Control Delay	27.6	22.7	45.8	21.4	43.0	96.0		
Queue Delay	81.9	30.4	0.0	0.4	0.0	141.9		
Total Delay	109.5	53.1	45.8	21.8	43.0	237.9		
Queue Length 50th (ft)	399	287	21	284	226	364		
Queue Length 95th (ft)	483	497	25	233	405	496		
Internal Link Dist (ft)	220		466		348			
Turn Bay Length (ft)	300		250		250			
Base Capacity (vph)	1681	885	257	2035	523	1035		
Starvation Cap Reductn	541	219	0	0	0	0		
Spillback Cap Reductn	0	0	0	339	0	229		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	1.18	1.05	0.35	0.70	0.85	1.45		

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	862	928	187	451	415	433	601	9
v/c Ratio	0.71	0.82	0.36	0.29	0.26	1.24	0.57	0.02
Control Delay	42.0	26.5	38.0	18.2	136.4	155.3	7.7	25.7
Queue Delay	0.0	35.2	0.0	0.0	0.0	0.0	0.4	0.0
Total Delay	42.0	61.7	38.0	18.2	136.4	155.3	8.1	25.7
Queue Length 50th (ft)	195	281	52	114	252	271	36	4
Queue Length 95th (ft)	186	435	85	158	m/300	m/318	m/30	16
Internal Link Dist (ft)	466	345	345	380	380	380	270	200
Turn Bay Length (ft)	150	150	150	150	150	150	200	200
Base Capacity (vph)	1208	1044	515	347	348	652	365	363
Starvation Cap Reductn	0	149	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	130	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.07	0.36	0.29	0.26	1.24	0.65	0.02

Intersection Summary  
 Volume exceeds capacity, queues theoretically infinite.  
 Queue shown is maximum after two cycles.  
 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	189	1292	871	144	96			
v/c Ratio	0.43	0.57	0.54	0.31	0.20			
Control Delay	28.0	20.2	17.1	25.9	6.6			
Queue Delay	0.0	1.9	0.0	0.0	0.0			
Total Delay	28.0	22.1	17.1	25.9	6.6			
Queue Length 50th (ft)	56	322	155	58	0			
Queue Length 95th (ft)	172	329	223	106	34			
Internal Link Dist (ft)	345	164	232	200	200			
Turn Bay Length (ft)	80	80	80	80	80			
Base Capacity (vph)	901	2256	1621	465	486			
Starvation Cap Reductn	0	772	0	0	0			
Spillback Cap Reductn	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0			
Reduced v/c Ratio	0.21	0.86	0.54	0.31	0.20			

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EB	EBT	EBR	WB	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	466	470	114	31	586	520	9	415	702	
v/c Ratio	1.06	1.06	0.23	0.20	1.10	0.27	0.06	0.51	0.80	
Control Delay	90.1	91.3	6.3	29.4	99.9	12.2	35.8	34.0	13.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
Total Delay	90.1	91.3	6.3	29.4	99.9	12.2	35.8	34.0	13.9	
Queue Length 50th (ft)	272	276	0	10	338	51	4	106	36	
Queue Length 95th (ft)	460	463	37	35	531	147	m5	m127	m82	
Internal Link Dist (ft)	284				118	214		380		
Turn Bay Length (ft)	250	250	0	0	200	100	100	175		
Base Capacity (vph)	441	443	500	183	531	1935	177	807	878	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	38	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.06	1.06	0.23	0.17	1.10	0.27	0.05	0.51	0.84	

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	315	392	420	300	240	487
v/c Ratio	0.77	0.99	0.78	0.36	0.86	0.41
Control Delay	37.5	6.7	25.5	3.1	58.8	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	6.7	25.5	3.1	58.8	7.0
Queue Length 50th (ft)	115	0	207	0	95	82
Queue Length 95th (ft)	221	60	378	40	213	135
Internal Link Dist (ft)	480	3920			450	700
Turn Bay Length (ft)	175				844	278
Base Capacity (vph)	436	685	790	0	0	1199
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.57	0.78	0.36	0.86	0.41

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Lane Group	EBE	EBT	EBR	WBL	WBR	NBE	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	61	567	47	128	615	432	73	78	69	600	160
v/c Ratio	0.46	0.77	0.13	0.50	0.84	0.64	0.28	0.18	0.17	1.13	0.18
Control Delay	47.1	36.0	9.3	38.1	24.4	6.3	38.1	11.7	8.3	109.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	36.0	9.3	38.1	24.4	6.3	38.1	11.7	8.3	109.2	5.8
Queue Length 50th (ft)	30	141	0	21	95	0	18	7	0	353	14
Queue Length 95th (ft)	67	197	26	m41	#187	6	38	43	33	#547	48
Internal Link Dist (ft)	1540	200	250	220	170	130	1010	130	100	520	100
Turn Bay Length (ft)	133	752	373	257	752	677	257	25	417	531	879
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.75	0.13	0.50	0.82	0.64	0.28	0.18	0.17	1.13	0.18

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative A  
PM Peak

Lane Group	EBE	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	220	953	124	472	806	429	128	462	266	462	240
v/c Ratio	0.79	0.58	0.21	0.92	0.72	0.54	0.49	0.67	0.59	0.81	0.67
Control Delay	35.5	17.9	5.3	45.5	17.7	4.0	40.8	20.8	9.6	48.0	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	17.9	5.3	45.5	17.7	4.0	40.8	20.8	9.6	48.0	8.0
Queue Length 50th (ft)	73	106	10	131	163	31	60	60	0	116	103
Queue Length 95th (ft)	m88	m109	m14	#204	195	41	#136	104	64	#237	169
Internal Link Dist (ft)	320	320	250	350	520	155	250	554	250	175	175
Turn Bay Length (ft)	200	268	1653	598	515	1126	790	843	516	572	396
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.58	0.21	0.92	0.72	0.54	0.49	0.65	0.52	0.81	0.66

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Lane Group	EBL	WBE	WBR	NBT	SBL	SBR
Lane Group Flow (vph)	1904	82	1361	246	364	340
v/c Ratio	0.80	0.56	0.67	0.16	0.85	0.85
Control Delay	10.1	56.3	10.2	0.1	9.5	44.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	56.3	10.2	0.1	9.5	44.6
Queue Length 50th (ft)	142	44	150	0	2	165
Queue Length 95th (ft)	#411	m63	m172	m0	#311	#203
Internal Link Dist (ft)	520	960		428	378	400
Turn Bay Length (ft)	225				400	400
Base Capacity (vph)	2368	146	2034	1583	572	476
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.56	0.67	0.16	0.85	0.85

Intersecting Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative A  
 PM Peak

Lane Group	EBL	EBT	EBR	WBT	WBR	NBT	NBR	SBR
Lane Group Flow (vph)	20	1427	531	1040	361	846	198	18
v/c Ratio	0.15	0.55	0.34	0.57	0.23	0.94	0.27	0.02
Control Delay	37.1	19.6	0.3	17.1	0.2	43.4	11.8	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	19.6	0.3	17.1	0.2	43.4	11.8	8.3
Queue Length 50th (ft)	11	187	0	86	0	268	51	3
Queue Length 95th (ft)	m12	213	m0	134	m0	#495	92	13
Internal Link Dist (ft)	960	360		386		420		
Turn Bay Length (ft)	190					225		
Base Capacity (vph)	133	2613	1583	1819	1583	730	792	795
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.55	0.34	0.57	0.23	0.88	0.25	0.02

Intersecting Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2020 Alternative A  
 PM Peak

Lane Group	EBL	EBT	EBL	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	283	980	576	205	1090	250	527	334	167	351
v/c Ratio	0.51	0.86	0.70	0.90	0.83	0.76	0.77	0.58	0.58	0.42
Control Delay	19.0	35.8	8.4	78.6	33.8	45.9	38.3	8.8	38.3	33.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	35.8	8.4	78.6	33.8	45.9	38.3	8.8	38.3	33.9
Queue Length 50th (ft)	44	67	45	104	175	128	136	7	84	89
Queue Length 95th (ft)	69	370	90	264	276	245	193	75	147	128
Internal Link Dist (ft)	360	1350	200	200	250	601	175	150	150	150
Turn Bay Length (ft)	558	1017	828	229	1317	342	710	585	342	718
Base Capacity (vph)	0	0	72	0	0	0	0	0	0	0
Sanctuary Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.86	0.76	0.90	0.83	0.73	0.74	0.57	0.49	0.39

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative A  
 PM Peak

Lane Group	EBL	EBT	EBL	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	158	1156	121	537	160	333	538	107	307	557
v/c Ratio	1.04	1.30	0.80	0.63	0.32	0.94	0.84	0.17	1.73	1.23
Control Delay	120.6	169.6	69.1	27.4	6.0	66.0	35.8	4.6	378.4	150.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	120.6	169.6	69.1	27.4	6.0	66.0	35.8	4.6	378.4	150.1
Queue Length 50th (ft)	-75	-331	52	106	0	142	210	0	-200	-303
Queue Length 95th (ft)	#183	#452	#138	157	42	#290	#370	29	#344	#482
Internal Link Dist (ft)	689	6630	734	150	550	675	500	625	568	625
Turn Bay Length (ft)	152	887	152	859	506	354	639	613	177	452
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0
Sanctuary Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	1.30	0.80	0.63	0.32	0.94	0.84	0.17	1.73	1.23

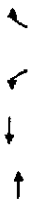
Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBT	EBL	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	113	810	65	957	337	51	90	592
v/c Ratio	0.93	0.82	0.55	1.06	0.65	0.43	0.44	0.77
Control Delay	111.2	38.5	43.8	67.5	9.8	52.2	21.6	31.9
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.2	40.0	43.8	67.5	9.8	52.2	21.6	31.9
Queue Length 50th (ft)	65	233	37	324	7	28	13	286
Queue Length 95th (ft)	#171	#342	m#79	#424	32	65	56	#513
Internal Link Dist (ft)	6630			350		200		236
Turn Bay Length (ft)	225	150		80	50			225
Base Capacity (vph)	121	986	118	904	517	118	367	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	28	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.85	0.55	1.06	0.65	0.43	0.25	0.77

Intersection Summary  
 Volume exceeds capacity; queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity; queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBL	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1020	413	125	1077	659			282
v/c Ratio	0.76	0.60	0.42	0.52	0.60			0.49
Control Delay	15.0	8.5	46.9	19.0	28.3			19.2
Queue Delay	1.1	0.5	0.0	0.3	0.0			0.0
Total Delay	16.2	9.0	46.9	19.3	28.3			19.2
Queue Length 50th (ft)	151	71	70	260	160			82
Queue Length 95th (ft)	182	m102	m124	322	216			157
Internal Link Dist (ft)	350			370				585
Turn Bay Length (ft)	50	100		425				425
Base Capacity (vph)	1337	690	295	2084	1106			575
Starvation Cap Reductn	135	62	0	426	0			0
Spillback Cap Reductn	21	0	0	0	0			0
Storage Cap Reductn	0	0	0	0	0			0
Reduced v/c Ratio	0.85	0.66	0.42	0.65	0.60			0.49

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.



Group	EB	WB	NBL	NBR
Lane Group Flow (vph)	1678	737	465	268
v/c Ratio	0.69	0.30	0.60	0.72
Control Delay	4.0	6.8	33.7	40.4
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	4.1	6.8	33.7	40.4
Queue Length 50th (ft)	35	74	123	133
Queue Length 95th (ft)	240	138	150	191
Internal Link Dist (ft)	370	312	431	275
Turn Bay Length (ft)	2425	2425	1221	574
Base Capacity (vph)	61	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.30	0.38	0.47

Intersection Summary

**NEAR-TERM 2008 + ALTERNATIVE B  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Lane Configurations	<table border="0" style="width:100%; text-align:center;"> <tr> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> </tr> <tr> <td>Stop</td> <td>0</td> <td>14</td> <td>280</td> <td>13</td> <td>97</td> <td>12</td> <td>844</td> <td>62</td> <td>196</td> <td>514</td> <td>3</td> <td>3</td> </tr> <tr> <td>Grade</td> <td colspan="12">0%</td> </tr> <tr> <td>Volume (veh/h)</td> <td>0</td> <td>13</td> <td>280</td> <td>13</td> <td>97</td> <td>12</td> <td>844</td> <td>62</td> <td>196</td> <td>514</td> <td>3</td> <td>3</td> </tr> <tr> <td>Peak Hour Factor</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> <td>0.95</td> </tr> <tr> <td>Hourly flow rate (vph)</td> <td>0</td> <td>15</td> <td>285</td> <td>14</td> <td>102</td> <td>13</td> <td>888</td> <td>65</td> <td>206</td> <td>541</td> <td>3</td> <td>3</td> </tr> <tr> <td>Pedestrians</td> <td colspan="12">None</td> </tr> <tr> <td>Walking Speed (ft/s)</td> <td colspan="12">None</td> </tr> <tr> <td>Percent Blockage</td> <td colspan="12">None</td> </tr> <tr> <td>Right turn flare (veh)</td> <td colspan="12">None</td> </tr> <tr> <td>Median type</td> <td colspan="12">None</td> </tr> <tr> <td>Median storage (veh)</td> <td colspan="12">None</td> </tr> <tr> <td>Upstream signal (ft)</td> <td colspan="12">None</td> </tr> <tr> <td>PX, platoon unblocked</td> <td colspan="12">None</td> </tr> <tr> <td>vC, conflicting volume</td> <td>1927</td> <td>1934</td> <td>543</td> <td>1919</td> <td>1903</td> <td>921</td> <td>544</td> <td>954</td> <td colspan="4"></td> </tr> <tr> <td>vC1, stage 1 cont vol</td> <td colspan="12"></td> </tr> <tr> <td>vC2, stage 2 cont vol</td> <td colspan="12"></td> </tr> <tr> <td>vCU, unblocked vol</td> <td>1927</td> <td>1934</td> <td>543</td> <td>1919</td> <td>1903</td> <td>921</td> <td>544</td> <td>954</td> <td 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<td>23</td> <td>411</td> <td>13</td> <td>954</td> <td>206</td> <td>544</td> <td colspan="6"></td> </tr> <tr> <td>Volume Left</td> <td>0</td> <td>295</td> <td>13</td> <td>0</td> <td>206</td> <td>0</td> <td colspan="6"></td> </tr> <tr> <td>Volume Right</td> <td>15</td> <td>102</td> <td>0</td> <td>65</td> <td>0</td> <td>3</td> <td colspan="6"></td> </tr> <tr> <td>CSH</td> <td>111</td> <td>43</td> <td>1025</td> <td>1700</td> <td>721</td> <td>1700</td> <td colspan="6"></td> </tr> <tr> <td>Volume to Capacity</td> <td>0.21</td> <td>9.48</td> <td>0.01</td> <td>0.56</td> <td>0.29</td> <td>0.32</td> <td colspan="6"></td> </tr> <tr> <td>Queue Length 95th (ft)</td> <td>19</td> <td>Err</td> <td>1</td> <td>0</td> <td>30</td> <td>0</td> <td colspan="6"></td> </tr> <tr> <td>Control Delay (s)</td> <td>45.8</td> <td>Err</td> <td>8.6</td> <td>0.0</td> <td>12.0</td> <td>0.0</td> <td colspan="6"></td> </tr> <tr> <td>Lane LOS</td> <td>E</td> <td>F</td> <td>A</td> <td>B</td> <td>B</td> <td>B</td> <td 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unblocked vol	1927	1934	543	1919	1903	921	544	954					IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					IC, 2 stage (s)													IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					p0 queue free %	100	82	97	0	72	69	99	71					p0 queue free (s)	21	46	540	33	49	328	1025	721					cM capacity (veh/h)													Direction Lane #	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Volume Total	23	411	13	954	206	544							Volume Left	0	295	13	0	206	0							Volume Right	15	102	0	65	0	3							CSH	111	43	1025	1700	721	1700							Volume to Capacity	0.21	9.48	0.01	0.56	0.29	0.32							Queue Length 95th (ft)	19	Err	1	0	30	0							Control Delay (s)	45.8	Err	8.6	0.0	12.0	0.0							Lane LOS	E	F	A	B	B	B							Approach Delay (s)	45.8	Err	0.1	3.3	3.3	3.3							Approach LOS	E	F	F	F	F	F						
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Intersection Summary	
Average Delay	1910.5
Intersection Capacity Utilization	91.9%
Analysis Period (min)	15
ICU Level of Service	F

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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<td>2613</td> <td>1819</td> <td>217</td> <td colspan="3"></td> </tr> <tr> <td>IC, single (s)</td> <td>4.1</td> <td>4.1</td> <td>4.1</td> <td>7.1</td> <td>6.5</td> <td>6.2</td> <td>7.1</td> <td>6.5</td> <td>5.2</td> <td colspan="3"></td> </tr> <tr> <td>IC, 2 stage (s)</td> <td colspan="12"></td> </tr> <tr> <td>IF (s)</td> <td>2.2</td> <td>2.2</td> <td>2.2</td> <td>3.5</td> <td>4.0</td> <td>3.3</td> <td>3.5</td> <td>4.0</td> <td>3.3</td> <td colspan="3"></td> </tr> <tr> <td>p0 queue free %</td> <td>99</td> <td>49</td> <td>49</td> <td>0</td> <td>19</td> <td>0</td> <td>0</td> <td>0</td> <td>72</td> <td colspan="3"></td> </tr> <tr> <td>p0 queue free (s)</td> <td>1347</td> <td>1287</td> <td>1287</td> <td>31</td> <td>42</td> <td>834</td> <td>0</td> <td>38</td> <td>823</td> <td colspan="3"></td> </tr> <tr> <td>cM capacity (veh/h)</td> <td colspan="12"></td> </tr> <tr> <td>Direction Lane #</td> <td>EB</td> <td>EBT</td> <td>EBR</td> <td>WBL</td> <td>WBT</td> <td>WBR</td> <td>NBL</td> <td>NBT</td> <td>NBR</td> <td>SBL</td> <td>SBT</td> <td>SBR</td> </tr> <tr> <td>Volume Total</td> <td>286</td> <td>875</td> <td>1074</td> <td>32</td> <td colspan="8"></td> </tr> <tr> <td>Volume Left</td> <td>11</td> <td>633</td> <td>194</td> <td>11</td> <td colspan="8"></td> </tr> <tr> <td>Volume Right</td> <td>138</td> <td>11</td> <td>846</td> <td>11</td> <td colspan="8"></td> </tr> <tr> <td>CSH</td> <td>1347</td> <td>1287</td> <td>133</td> <td>0</td> <td colspan="8"></td> </tr> <tr> <td>Volume to Capacity</td> <td>0.01</td> <td>0.51</td> <td>8.06</td> <td>Err</td> <td colspan="8"></td> </tr> <tr> <td>Queue Length 95th (ft)</td> <td>1</td> <td>74</td> <td>Err</td> <td>Err</td> <td colspan="8"></td> </tr> <tr> <td>Control Delay (s)</td> <td>0.4</td> <td>9.5</td> <td>Err</td> <td>Err</td> <td colspan="8"></td> </tr> <tr> <td>Lane LOS</td> <td>A</td> <td>A</td> <td>F</td> <td>F</td> <td colspan="8"></td> </tr> <tr> <td>Approach Delay (s)</td> <td>0.4</td> <td>9.5</td> <td>Err</td> <td>Err</td> <td colspan="8"></td> </tr> <tr> <td>Approach LOS</td> <td>F</td> <td>F</td> <td>F</td> <td>F</td> <td colspan="8"></td> </tr> </table>												↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	Stop	10	131	131	620	201	10	184	32	804	10	10	10	Grade	0%												Volume (veh/h)	10	131	131	620	201	10	184	32	804	10	10	10	Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	Hourly flow rate (vph)	11	138	138	653	212	11	194	34	846	11	11	11	Pedestrians	None												Walking Speed (ft/s)	None												Percent Blockage	None												Right turn flare (veh)	None												Median type	None												Median storage (veh)	None												Upstream signal (ft)	None												PX, platoon unblocked	None												vC, conflicting volume	222	276	276	1766	1755	207	2613	1819	217				vC1, stage 1 cont vol													vC2, stage 2 cont vol													vCU, unblocked vol	222	276	276	1766	1755	207	2613	1819	217				IC, single (s)	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	5.2				IC, 2 stage (s)													IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3				p0 queue free %	99	49	49	0	19	0	0	0	72				p0 queue free (s)	1347	1287	1287	31	42	834	0	38	823				cM capacity (veh/h)													Direction Lane #	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Volume Total	286	875	1074	32									Volume Left	11	633	194	11									Volume Right	138	11	846	11									CSH	1347	1287	133	0									Volume to Capacity	0.01	0.51	8.06	Err									Queue Length 95th (ft)	1	74	Err	Err									Control Delay (s)	0.4	9.5	Err	Err									Lane LOS	A	A	F	F									Approach Delay (s)	0.4	9.5	Err	Err									Approach LOS	F	F	F	F								
↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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vCU, unblocked vol	222	276	276	1766	1755	207	2613	1819	217																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
IC, single (s)	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	5.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Queue Length 95th (ft)	1	74	Err	Err																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Intersection Summary	
Average Delay	Err
Intersection Capacity Utilization	139.1%
Analysis Period (min)	15
ICU Level of Service	H

3: Wilfred Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBT	WB	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Free			Stop		
Grade	0%											
Volume (veh/h)	10	925	10	10	810	20	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	974	11	11	853	21	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
Pk. platoon unblocked	874	964	874	1900	1895	979	1900	1889	863			
Vc1, stage 1 conf vol	874	964	874	1900	1895	979	1900	1889	863			
Vc2, stage 2 conf vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
Vcu, unblocked vol	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
IC, 2 stage (s)	99	99	99	76	84	97	76	85	97			
IC, single (s)	772	702	702	44	68	303	44	68	354			
IC, 2 stage (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	99	99	99	76	84	97	76	85	97			
ICM capacity (veh/h)	772	702	702	44	68	303	44	68	354			
Direction/Lane #	EB 1	WB 1	NB 1	SB 1	EB 1	WB 1	NB 1	SB 1	EB 1	WB 1	NB 1	SB 1
Volume Total	995	804	32	32								
Volume Left	11	11	11	11								
Volume Right	11	21	11	11								
CSH	772	702	74	74								
Volume to Capacity	0.01	0.01	0.43	0.42								
Queue Length 95th (ft)	1	1	43	42								
Control Delay (s)	0.4	0.4	86.6	85.3								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.4	0.4	86.6	85.3								
Approach LOS	F	F	F	F								

Intersection Summary		
Average Delay	3.2	
Intersection Capacity Utilization	65.2%	ICU Level of Service C
Analysis Period (min)	15	

4: Wilfred Ave & Langner Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBT	WB	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Free			Stop		
Grade	0%											
Volume (veh/h)	10	924	10	10	810	10	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	973	11	11	853	11	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
Pk. platoon unblocked	863	983	863	1884	1883	978	1884	1883	858			
Vc1, stage 1 conf vol	863	983	863	1884	1883	978	1884	1883	858			
Vc2, stage 2 conf vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
Vcu, unblocked vol	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
IC, 2 stage (s)	99	99	99	75	85	97	75	85	97			
IC, single (s)	779	702	702	45	69	304	44	69	357			
IC, 2 stage (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	99	99	99	75	85	97	75	85	97			
ICM capacity (veh/h)	779	702	702	45	69	304	44	69	357			
Direction/Lane #	EB 1	WB 1	NB 1	SB 1	EB 1	WB 1	NB 1	SB 1	EB 1	WB 1	NB 1	SB 1
Volume Total	994	874	32	32								
Volume Left	11	11	11	11								
Volume Right	11	21	11	11								
CSH	779	702	74	75								
Volume to Capacity	0.01	0.01	0.42	0.42								
Queue Length 95th (ft)	1	1	42	42								
Control Delay (s)	0.4	0.4	85.0	83.9								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.4	0.4	85.0	83.9								
Approach LOS	F	F	F	F								

Intersection Summary		
Average Delay	3.2	
Intersection Capacity Utilization	65.1%	ICU Level of Service C
Analysis Period (min)	15	



5: Wilfred Ave & Labath Ave  
Graton Rancheria Casino & Hotel

6: Wilfred Avenue & Dowdell Ave  
Graton Rancheria Casino & Hotel

2008 Alternative B  
PM Peak

2008 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	60	807	77	116	769	99	35	6	266	112	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	848	81	122	809	104	37	6	280	118	22
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	914			931			2148	2174	890	2405	2163
vC1, stage 1 cont vol											
vC2, stage 2 cont vol	914			931			2148	2174	890	2405	2163
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	92			83			0	82	18	0	39
cM capacity (veh/h)	746			735			14	35	342	3	36
Direction, Lane #	EBT	WBT	NBT	NBT	SBT	SBT					
Volume Total	994	1036	323	155							
Volume Left	63	122	37	178							
Volume Right	91	104	280	15							
cSH	746	735	91	4							
Volume to Capacity	0.08	0.17	3.56	40.92							
Queue Length 95th (ft)	7	15	Err	Err							
Control Delay (s)	2.5	4.7	Err	Err							
Lane LOS	A	A	F	F							
Approach Delay (s)	2.5	4.7	Err	Err							
Approach LOS	F	F	F	F							
<b>Intersection Summary</b>											
Average Delay	1908.7										
Intersection Capacity Utilization	120.0%										
Analysis Period (min)	15										
ICU Level of Service	H										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	52	985	148	187	857	89	80	45	222	88	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	1037	156	197	902	94	84	47	234	93	14
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	996			1193			2623	2614	1115	2824	2645
vC1, stage 1 cont vol											
vC2, stage 2 cont vol	994			1193			3421	3407	1115	3721	3453
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)											
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	88			66			0	0	8	0	0
cM capacity (veh/h)	467			585			0	3	253	0	3
Direction, Lane #	EBT	WBT	NBT	NBT	SBT	SBT					
Volume Total	1247	1193	365	196							
Volume Left	55	197	84	93							
Volume Right	156	94	234	49							
cSH	467	585	0	0							
Volume to Capacity	0.12	0.34	Err	Err							
Queue Length 95th (ft)	10	37	Err	Err							
Control Delay (s)	5.8	12.0	Err	Err							
Lane LOS	A	B	F	F							
Approach Delay (s)	5.8	12.0	Err	Err							
Approach LOS	F	F	F	F							
<b>Intersection Summary</b>											
Average Delay	Err										
Intersection Capacity Utilization	153.9%										
Analysis Period (min)	15										
ICU Level of Service	H										

Movement	E	B	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E				
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Total Lost time (s)	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85				
Frt	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85				
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95				
Satd. Flow (prot)	1823	1661	1770	1583	1770	3539	1583	3433	1734	1823	1661	1770	1583	1770	3539	1583	3433	1734				
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00				
Satd. Flow (perm)	1823	1661	1770	1583	1770	3539	1583	3433	1734	1823	1661	1770	1583	1770	3539	1583	3433	1734				
Volume (vph)	105	1023	166	817	540	204	155	265	451	131	112	105	1023	166	817	540	204	155	265	451		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	111	1077	175	860	568	215	163	279	475	138	118	111	1077	175	860	568	215	163	279	475		
RTOR Reduction (vph)	0	4	0	0	0	164	0	0	256	0	19	0	4	0	0	0	0	164	0	19		
Lane Group Flow (vph)	0	1360	0	1812	860	404	215	163	23	475	237	0	1360	0	1812	860	404	215	163	23	475	
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	28.3	21.5	47.5	53.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	28.8	22.0	48.0	54.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.18	0.14	0.30	0.34	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	547	567	597	534	221	282	131	618	238	618	238	547	567	597	534	221	282	131	618	238	618	
v/s Ratio Prot	c0.75	0.11	c0.49	0.26	c0.12	0.05	0.14	c0.14	0.01	c0.14	0.01	c0.75	0.11	c0.49	0.26	c0.12	0.05	0.14	c0.14	0.01	c0.14	
w/s Ratio Perm	2.49	3.34	3.34	3.34	0.97	0.56	0.18	0.77	1.00	0.77	1.00	2.49	3.34	3.34	3.34	0.97	0.56	0.18	0.77	1.00	0.77	1.00
Uniform Delay, d1	56.0	39.6	53.0	47.2	69.7	70.6	68.3	62.4	69.0	68.3	62.4	56.0	39.6	53.0	47.2	69.7	70.6	68.3	62.4	69.0	68.3	62.4
Progression Factor	1.00	0.87	0.80	0.94	1.00	1.00	1.00	0.96	0.96	0.96	0.96	1.00	0.87	0.80	0.94	1.00	1.00	1.00	0.96	0.96	0.96	0.96
Incremental Delay, d2	673.9	1.2	205.2	7.2	525.5	2.3	0.6	5.7	56.7	5.7	56.7	673.9	1.2	205.2	7.2	525.5	2.3	0.6	5.7	56.7	5.7	56.7
Delay (s)	729.9	35.5	293.0	51.3	122.2	72.9	69.0	65.7	122.9	65.7	122.9	729.9	35.5	293.0	51.3	122.2	72.9	69.0	65.7	122.9	65.7	122.9
Level of Service	F	D	F	D	F	D	F	E	F	E	F	F	D	F	D	F	E	F	E	F	E	F
Approach Delay (s)	729.9	156.6	313.1	160.0	87.4	85.8	85.8	85.8	85.8	85.8	85.8	729.9	156.6	313.1	160.0	87.4	85.8	85.8	85.8	85.8	85.8	85.8
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
<b>Intersection Summary</b>																						
HCM Average Control Delay																313.1		160.0		85.8		
HCM Volume to Capacity ratio																151.1%		16.0		15		
Actuated Cycle Length (s)																151.1%		16.0		15		
Intersection Capacity Utilization																151.1%		16.0		15		
Analysis Period (min)																15		16.0		15		
Critical Lane Group																c		d		e		

HCM Average Control Delay: 313.1  
 HCM Volume to Capacity ratio: 151.1%  
 Actuated Cycle Length (s): 151.1%  
 Intersection Capacity Utilization: 151.1%  
 Analysis Period (min): 15  
 Critical Lane Group: c

Movement	E	B	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E			
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Total Lost time (s)	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85			
Frt	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85			
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95			
Satd. Flow (prot)	1823	1661	1770	1583	1770	3539	1583	3433	1734	1823	1661	1770	1583	1770	3539	1583	3433	1734			
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (perm)	1823	1661	1770	1583	1770	3539	1583	3433	1734	1823	1661	1770	1583	1770	3539	1583	3433	1734			
Volume (vph)	105	1023	166	817	540	204	155	265	451	131	112	105	1023	166	817	540	204	155	265	451	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	111	1077	175	860	568	215	163	279	475	138	118	111	1077	175	860	568	215	163	279	475	
RTOR Reduction (vph)	0	4	0	0	0	164	0	0	256	0	19	0	4	0	0	0	0	164	0	19	
Lane Group Flow (vph)	0	1360	0	1812	860	404	215	163	23	475	237	0	1360	0	1812	860	404	215	163	23	475
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	28.3	21.5	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	28.3
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	28.8	22.0	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	28.8
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.18	0.14	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	547	567	597	534	221	282	131	618	238	618	238	547	567	597	534	221	282	131	618	238	618
v/s Ratio Prot	c0.75	0.11	c0.49	0.26	c0.12	0.05	0.14	c0.14	0.01	c0.14	0.01	c0.75	0.11	c0.49	0.26	c0.12	0.05	0.14	c0.14	0.01	c0.14
w/s Ratio Perm	2.49	3.34	3.34	3.34	0.97	0.56	0.18	0.77	1												

10: Wilfred Ave & Commerce Boulevard  
Graton Rancheria Casino & Hotel

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

Movement	EBL	EET	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.97
Fit Protected	3639	1583	3433	3539	1610	3046					
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00					
Fit Permitted	5085	1583	3433	3408	1681	1710					
Satd. Flow (perm)	5085	1583	3433	3408	1681	1710					
Volume (vph)	0	569	701	413	356	117	590	108	569	42	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	599	738	435	375	123	621	114	599	44	43
RTOR Reduction (vph)	0	0	543	0	33	0	0	0	475	0	7
Lane Group Flow (vph)	0	595	195	435	465	0	358	377	124	44	45
Turn Type	Prot	Perm	Prot	Perm	Prot	Split	Perm	Split	Perm	Split	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6	6
Permitted Phases											
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	558	1491	347	353	575	365	374	c0.02	0.02
v/s Ratio Prot	0.12		c0.12		0.21	c0.22					
v/s Ratio Perm											
w/c Ratio	0.52	0.55	0.78	0.31	1.03	1.07	0.21	0.12	0.12	0.12	0.12
Uniform Delay, d1	27.2	27.4	32.1	14.7	31.8	31.8	26.4	25.8	25.8	25.8	25.8
Progression Factor	1.49	7.15	1.18	1.22	1.00	1.00	2.29	0.87	0.84	0.84	0.84
Incremental Delay, d2	1.4	4.7	6.3	0.5	50.4	61.0	0.6	0.7	0.7	0.7	0.7
Delay (s)	41.8	200.6	44.1	18.4	82.3	92.8	60.9	23.0	22.5	22.5	22.5
Level of Service	D	F	D	B	F	F	F	E	E	C	C
Approach Delay (s)	129.5			30.4							
Approach LOS	F			C							

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	82.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2008 Alternative B  
PM Peak

Movement	EBL	EET	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.97
Fit Protected	3639	1583	3433	3539	1610	3046					
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00					
Fit Permitted	5085	1583	3433	3539	1610	3046					
Satd. Flow (perm)	5085	1583	3433	3539	1610	3046					
Volume (vph)	0	941	798	89	856	0	0	0	328	324	677
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	991	840	94	901	0	0	0	345	341	713
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	93
Lane Group Flow (vph)	0	991	697	94	901	0	0	0	345	341	961
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	6	6	6					
Permitted Phases											
Actuated Green, G (s)	36.6	36.6	4.4	45.5	25.5	25.5					
Effective Green, g (s)	37.1	37.1	4.9	46.0	26.0	26.0					
Actuated g/C Ratio	0.46	0.46	0.06	0.58	0.32	0.32					
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	1641	734	210	2035	523	990					
v/s Ratio Prot	0.28		c0.44		0.21	0.32					
v/s Ratio Perm					0.66	1.23dr					
w/c Ratio	0.60	0.95	0.45	0.44	23.2	26.6					
Uniform Delay, d1	16.0	20.5	36.2	9.7	1.00	1.00					
Progression Factor	1.13	1.92	1.21	1.68	6.4	22.3					
Incremental Delay, d2	0.2	3.6	0.9	0.4	29.6	48.9					
Delay (s)	18.2	43.1	44.8	16.7							
Level of Service	B	D	D	B	C	D					
Approach Delay (s)	29.6			19.4							
Approach LOS	C			B							

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	E
Analysis Period (min)	15		
dr Detour Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1500	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.99	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.95	0.95	1.00	0.95	1.00	0.85
Fr Protected	3433	3539	3513	1770	1583	
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	
Fr Permitted	3433	3539	3513	1770	1583	
Satd. Flow (perm)	1957	1981	649	33	92	236
Volume (vph)	10.0	50.5	36.0	20.5	20.5	20.5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	1033	683	35	97	248
RTOR Reduction (vph)	0	0	4	0	0	183
Lane Group Flow (vph)	205	1033	714	0	97	165
Turn Type	Prot	Prot	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	6	6	6
Permitted Phases						
Actuated Green, G (s)	10.0	50.5	36.0	20.5	20.5	20.5
Effective Green, g (s)	10.5	51.0	36.5	21.0	21.0	21.0
Actuated g/C Ratio	0.13	0.84	0.46	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	451	2256	1603	465	416	
v/s Ratio Prot	0.06	c0.29	0.20	c0.05	0.04	
v/s Ratio Perm						
v/c Ratio	0.45	0.46	0.45	0.21	0.16	
Uniform Delay, d1	32.1	7.4	14.8	23.0	22.7	
Progression Factor	0.92	2.12	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.9	1.0	0.8	
Delay (s)	30.1	15.3	15.7	24.0	23.5	
Level of Service	C	B	B	C	C	
Approach Delay (s)	18.6	15.7	23.6			
Approach LOS	B	B	B			
<b>Intersection Summary</b>						
HCM Average Control Delay	18.5		18.5		HCM Level of Service B	
HCM Volume to Capacity ratio	0.39		0.39		E	
Actuated Cycle Length (s)	80.0		80.0		Sum of lost time (s) 6.0	
Intersection Capacity Utilization	40.3%		40.3%		ICU Level of Service A	
Analysis Period (min)	15		15		c Critical Lane Group	

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.95	0.95	1.00	0.98	1.00	1.00
Fr Protected	1681	1686	1583	1741	1770	3537
Satd. Flow (prot)	0.95	0.95	1.00	0.98	1.00	1.00
Fr Permitted	1681	1686	1583	1741	1770	3537
Satd. Flow (perm)	1681	1686	1583	1741	1770	3537
Volume (vph)	755	3	40	8	3	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	795	3	42	8	3	5
RTOR Reduction (vph)	0	0	31	0	5	0
Lane Group Flow (vph)	398	400	11	0	11	0
Turn Type	Split	Split	Perm	Split	Prot	Prot
Protected Phases	4	4	4	8	5	2
Permitted Phases						
Actuated Green, G (s)	20.0	20.0	20.0	1.5	27.1	39.0
Effective Green, g (s)	20.5	20.5	20.5	2.0	27.6	39.5
Actuated g/C Ratio	0.26	0.26	0.26	0.02	0.35	0.49
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	431	432	406	44	611	1746
v/s Ratio Prot	0.24	c0.24	0.01	c0.01	c0.31	0.15
v/s Ratio Perm						
v/c Ratio	0.92	0.93	0.03	0.25	0.89	0.30
Uniform Delay, d1	29.0	29.0	22.3	38.3	24.7	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.3	25.7	0.0	3.0	14.4	0.4
Delay (s)	54.3	54.7	22.3	41.3	39.1	12.4
Level of Service	D	D	C	D	D	B
Approach Delay (s)	52.9			41.3	26.1	
Approach LOS	D	D	D	D	D	C
<b>Intersection Summary</b>						
HCM Average Control Delay	60.5		60.5		HCM Level of Service E	
HCM Volume to Capacity ratio	0.85		0.85		E	
Actuated Cycle Length (s)	80.0		80.0		Sum of lost time (s) 16.0	
Intersection Capacity Utilization	85.5%		85.5%		ICU Level of Service E	
Analysis Period (min)	15		15		c Critical Lane Group	

Movement	WB	WB	NBT	NBR	SB	SB
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Stop	0%	Free	0%	Free	0%
Grade	0%	86	832	480	0	808
Volume (veh/h)	0	86	832	480	0	808
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	91	876	505	0	851
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		1979	1128			1381
vC1, stage 1 conf vol						
vC2, stage 2 conf vol		1979	1128			1381
vCU, unblocked vol		6.4	6.2			4.1
IC, single (s)						
IC, 2 stage (s)		3.5	3.3			2.2
pf queue free %		100	64			100
cm capacity (veh/h)		68	248			496
Direction, Lane #	WB	NB	NB	SB	SB	SB
Volume Total	91	1381	851			
Volume Left	0	0	0			
Volume Right	91	505	0			
CSH	248	1700	1700			
Volume to Capacity	0.36	0.81	0.50			
Queue Length 95th (ft)	40	0	0			
Control Delay (s)	27.6	0.0	0.0			
Lane LOS	D	D	D			
Approach Delay (s)	27.6	0.0	0.0			
Approach LOS	D	D	D			

Intersection Summary	
Average Delay	1.1
Intersection Capacity Utilization	85.1%
Analysis Period (min)	15
ICU Level of Service	E

Movement	EB	EB	NBL	NBT	SB	SB
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Stop	0%	Free	0%	Free	0%
Grade	0%	172	89	33	464	489
Volume (veh/h)	0	172	89	33	464	489
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	181	94	35	488	515
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		850	279			558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol		850	279			558
vCU, unblocked vol		6.8	6.9			4.1
IC, single (s)						
IC, 2 stage (s)		3.5	3.3			2.2
pf queue free %		37	87			97
cm capacity (veh/h)		289	718			1009
Direction, Lane #	EB	EB	NB	NB	SB	SB
Volume Total	181	94	35	244	244	343
Volume Left	181	0	35	0	0	0
Volume Right	0	94	0	0	0	43
CSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.14	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	B	A	A	A
Approach Delay (s)	27.5	0.6	0.6			
Approach LOS	D	D	D			

Intersection Summary	
Average Delay	5.8
Intersection Capacity Utilization	37.7%
Analysis Period (min)	15
ICU Level of Service	A

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	WB	WBR	NB	NBR	SB	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00
Fit Protected	1.770	1583	1863	1583	1770	1863
Sat. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00
Fit Permitted	1.770	1583	1863	1583	1770	1863
Sat. Flow (perm)	1.770	1583	1863	1583	1770	1863
Volume (vph)	257	649	663	251	275	532
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	683	698	264	288	560
RTOR Reduction (vph)	0	283	0	154	0	0
Lane Group Flow (vph)	271	400	686	130	288	560
Turn Type	Per	Per	Per	Per	Per	Per
Protected Phases	8	2	1	6	1	6
Permitted Phases	8	2	1	6	1	6
Actuated Green, G (s)	15.5	15.5	26.5	9.5	40.5	40.5
Effective Green, g (s)	16.0	16.0	27.0	10.0	41.0	41.0
Actuated g/C Ratio	0.25	0.25	0.42	0.15	0.63	0.63
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	436	390	774	658	212	1175
v/s Ratio Prot	0.15	0.37	0.16	0.16	0.30	0.30
v/s Ratio Perm	0.62	1.03	0.90	0.17	1.06	0.48
Uniform Delay, d1	21.8	24.5	17.8	11.9	27.5	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	52.5	15.7	0.5	72.0	1.4
Delay (s)	24.5	77.0	33.5	12.5	99.5	7.7
Level of Service	C	E	C	B	F	A
Approach Delay (s)	62.1	27.7	39.0	39.0	20.2	20.2
Approach LOS	E	C	C	D	D	D
Intersection Summary						
HCM Average Control Delay	43.0					
HCM Volume to Capacity ratio	0.97					
Actuated Cycle Length (s)	65.0					
Sum of lost time (s)	12.0					
Intersection Capacity Utilization	81.7%					
Analysis Period (min)	15					
Critical Lane Group	15					

17: Rohnert Park Expy & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.770	3539	1583	3433	3539	1583	3433	3539	1583	1770	1668	1770
Sat. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Fit Permitted	1.770	3539	1583	3433	3539	1583	3433	3539	1583	1770	1668	1770
Sat. Flow (perm)	1.770	3539	1583	3433	3539	1583	3433	3539	1583	1770	1668	1770
Volume (vph)	50	663	336	3202	338	154	64	19	154	270	43	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	698	353	338	353	162	67	20	162	284	45	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	698	353	338	353	162	67	20	162	284	45	104
Turn Type	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per
Protected Phases	7	4	3	8	5	2	1	6	1	6	1	6
Permitted Phases	7	4	3	8	5	2	1	6	1	6	1	6
Actuated Green, G (s)	3.3	18.3	18.3	20.5	20.5	4.4	11.8	13.8	24.4	33.8	33.8	33.8
Effective Green, g (s)	3.8	18.8	18.8	21.0	21.0	4.9	14.3	14.3	24.9	34.3	34.3	34.3
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.26	0.06	0.18	0.18	0.31	0.43	0.43	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	832	372	257	929	416	210	279	269	551	715	715
v/s Ratio Prot	0.03	0.20	0.01	0.06	0.28	0.04	0.02	0.02	0.16	0.05	0.05	0.05
v/s Ratio Perm	0.63	0.84	0.02	0.83	1.06	0.14	0.32	0.12	0.06	0.32	0.13	0.13
Uniform Delay, d1	37.4	29.2	23.5	38.5	29.5	22.6	36.0	27.6	27.3	22.6	13.8	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	7.4	0.0	11.1	40.2	0.1	0.9	0.9	0.4	0.8	0.4	0.4
Delay (s)	51.8	36.6	23.6	47.5	56.4	4.1	36.8	28.5	27.7	23.4	14.2	14.2
Level of Service	D	D	C	D	E	A	D	C	C	C	B	B
Approach Delay (s)	37.0	27.7	30.4	48.8	30.4	30.4	20.2	20.2	20.2	20.2	20.2	20.2
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	39.5											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	12.0											
Intersection Capacity Utilization	61.7%											
Analysis Period (min)	15											
Critical Lane Group	15											

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancharia Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863
Fit Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	233	764	146	371	1019	358	137	752	422	364	264
Volume (vph)	0.1219	330	68	387	199	7	0	17	702	1	351
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1283	347	72	160	209	7	0	78	739	369
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	12	0	19
Lane Group Flow (vph)	0	1573	0	372	460	209	0	13	0	370	350
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	3	6	6	2	2	2	6	6
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, C (s)	12	26.0	26.0	11.5	25.4	25.4	9.5	13.0	13.1	11.4	15.0
Effective Green, G (s)	12.6	26.5	26.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	15.5
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1684	524	515	1146	512	221	542	245	511	361
v/s Ratio Prot	0.14	0.16	0.16	0.11	0.30	0.30	0.08	0.10	0.10	0.11	0.15
v/s Ratio Perm	0.88	0.48	0.10	0.76	0.94	0.32	0.85	0.59	0.39	0.75	0.77
Uniform Delay, d1	32.9	21.2	18.5	32.6	26.2	20.4	33.3	30.6	28.5	32.6	26.8
Progression Factor	0.81	0.91	0.38	0.70	0.63	0.35	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.2	0.7	0.3	4.4	11.3	1.1	6.7	1.6	0.4	6.0	9.7
Delay (s)	45.8	11.5	7.2	27.1	27.8	8.3	40.1	32.2	28.9	38.6	40.3
Level of Service	D	B	A	C	C	A	D	C	C	D	C
Approach Delay (s)	17.9	17.9	23.7	17.9	17.9	32.5	17.9	17.9	17.9	35.9	17.9
Approach LOS	B	B	C	B	B	C	B	B	B	C	B
Intersection Summary	HCM Average Control Delay: 26.1 HCM Volume to Capacity Ratio: 0.82 Actuated Cycle Length (s): 80.0 Intersection Capacity Utilization: 76.3% Analysis Period (min): 15 C - Critical Lane Group										

Intersection Summary

HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity Ratio	0.82	Sum of lost time (s)	12.0
Actuated Cycle Length (s)	80.0	ICU Level of Service	D
Intersection Capacity Utilization	76.3%		
Analysis Period (min)	15		
C - Critical Lane Group			

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancharia Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863
Fit Permitted	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	233	764	146	371	1019	358	137	752	422	364	264
Volume (vph)	0.1219	330	68	387	199	7	0	17	702	1	351
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1283	347	72	160	209	7	0	78	739	369
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	12	0	19
Lane Group Flow (vph)	0	1573	0	372	460	209	0	13	0	370	350
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	3	6	6	2	2	2	6	6
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, C (s)	12	26.0	26.0	11.5	25.4	25.4	9.5	13.0	13.1	11.4	15.0
Effective Green, G (s)	12.6	26.5	26.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	15.5
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1684	524	515	1146	512	221	542	245	511	361
v/s Ratio Prot	0.14	0.16	0.16	0.11	0.30	0.30	0.08	0.10	0.10	0.11	0.15
v/s Ratio Perm	0.88	0.48	0.10	0.76	0.94	0.32	0.85	0.59	0.39	0.75	0.77
Uniform Delay, d1	32.9	21.2	18.5	32.6	26.2	20.4	33.3	30.6	28.5	32.6	26.8
Progression Factor	0.81	0.91	0.38	0.70	0.63	0.35	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.2	0.7	0.3	4.4	11.3	1.1	6.7	1.6	0.4	6.0	9.7
Delay (s)	45.8	11.5	7.2	27.1	27.8	8.3	40.1	32.2	28.9	38.6	40.3
Level of Service	D	B	A	C	C	A	D	C	C	D	C
Approach Delay (s)	17.9	17.9	23.7	17.9	17.9	32.5	17.9	17.9	17.9	35.9	17.9
Approach LOS	B	B	C	B	B	C	B	B	B	C	B
Intersection Summary	HCM Average Control Delay: 26.1 HCM Volume to Capacity Ratio: 0.82 Actuated Cycle Length (s): 80.0 Intersection Capacity Utilization: 76.3% Analysis Period (min): 15 C - Critical Lane Group										

Intersection Summary

HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity Ratio	0.82	Sum of lost time (s)	12.0
Actuated Cycle Length (s)	80.0	ICU Level of Service	D
Intersection Capacity Utilization	76.3%		
Analysis Period (min)	15		
C - Critical Lane Group			

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.88	1.00	0.91	1.00	1.00	0.95	0.95	0.98	1.00	1.00	0.98
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.88	1.00	1.00	0.96
Flt Protected	1770	6408	583	5085	1583	1770	1504	1504	1504	1504	1504	1748
Stand. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.96
Flt Permitted	1770	6408	583	5085	1583	1770	1504	1504	1504	1504	1504	1748
Stand. Flow (perm)	1770	6408	583	5085	1583	1389	1504	1504	1504	1504	1504	1531
Volume (vph)	17	1642	273	0	987	350	654	0	306	14	0	3
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1728	287	0	1049	368	688	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	0	1	0
Lane Group Flow (vph)	18	1728	287	0	1049	368	688	160	160	0	17	0
Turn Type	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		8	2	2	6					6
Permitted Phases		Free	Free	Free	2	2	6					6
Actuated Green, G (s)	2.2	30.6	80.0	23.9	80.0	40.4	40.4	40.4	40.4	40.4	40.4	40.4
Effective Green, g (s)	2.7	31.1	80.0	24.4	80.0	40.9	40.9	40.9	40.9	40.9	40.9	40.9
Actuated g/C Ratio	0.03	0.39	1.00	0.30	1.00	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2481	1583	1551	1583	710	769	769	769	783		
v/s Ratio Prot	0.01	c0.27	0.18	0.21	0.23	c0.50	0.11	0.11	0.11	0.01		
v/s Ratio Perm			0.68	0.23	0.97	0.21	0.21	0.21	0.21	0.02		
Uniform Delay, d1	37.7	20.5	0.0	24.3	0.0	18.9	10.7	10.7	10.7	9.7		
Progression Factor	1.06	1.09	1.00	0.69	1.06	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.8	1.0	0.2	1.6	0.3	25.9	0.1	0.1	0.1	0.0		
Delay (s)	41.8	23.4	0.2	26.5	0.3	44.9	10.8	10.8	10.8	9.7		
Level of Service	D	C	A	B	A	D	B	B	B	A		
Approach Delay (s)	20.3			13.8		34.0				9.7		
Approach LOS	C			B		C				A		

Intersection Summary	20: Rohnert Park Expy & US-101 NB Ramps											
HCM Average Control Delay	21.3											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	71.2%											
Analysis Period (min)	15											
Critical Lane Group	C											

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.91	1.00	1.00	0.95	0.95	0.98	1.00	1.00	0.98
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.88	1.00	1.00	0.96
Flt Protected	1770	6408	583	5085	1583	1770	1504	1504	1504	1504	1504	1748
Stand. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.96
Flt Permitted	1770	6408	583	5085	1583	1770	1504	1504	1504	1504	1504	1748
Stand. Flow (perm)	1770	6408	583	5085	1583	1389	1504	1504	1504	1504	1504	1531
Volume (vph)	17	1642	273	0	987	350	654	0	306	14	0	3
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1728	287	0	1049	368	688	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	0	1	0
Lane Group Flow (vph)	18	1728	287	0	1049	368	688	160	160	0	17	0
Turn Type	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		8	2	2	6					6
Permitted Phases		Free	Free	Free	2	2	6					6
Actuated Green, G (s)	2.2	30.6	80.0	23.9	80.0	40.4	40.4	40.4	40.4	40.4	40.4	40.4
Effective Green, g (s)	2.7	31.1	80.0	24.4	80.0	40.9	40.9	40.9	40.9	40.9	40.9	40.9
Actuated g/C Ratio	0.03	0.39	1.00	0.30	1.00	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2481	1583	1551	1583	710	769	769	769	783		
v/s Ratio Prot	0.01	c0.27	0.18	0.21	0.23	c0.50	0.11	0.11	0.11	0.01		
v/s Ratio Perm			0.68	0.23	0.97	0.21	0.21	0.21	0.21	0.02		
Uniform Delay, d1	37.7	20.5	0.0	24.3	0.0	18.9	10.7	10.7	10.7	9.7		
Progression Factor	1.06	1.09	1.00	0.69	1.06	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.8	1.0	0.2	1.6	0.3	25.9	0.1	0.1	0.1	0.0		
Delay (s)	41.8	23.4	0.2	26.5	0.3	44.9	10.8	10.8	10.8	9.7		
Level of Service	D	C	A	B	A	D	B	B	B	A		
Approach Delay (s)	20.3			13.8		34.0				9.7		
Approach LOS	C			B		C				A		

Intersection Summary	21: Rohnert Park Expy & Commerce Boulevard											
HCM Average Control Delay	21.3											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	71.2%											
Analysis Period (min)	15											
Critical Lane Group	C											



22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Fr	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3383	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3383	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Satd. Flow (perm)	1770	3383	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Volume (vph)	133	484	202	128	589	220	321	494	108	207	342	219
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	509	213	135	620	232	338	520	114	218	360	231
RTOR Reduction (vph)	0	67	0	0	177	0	0	75	0	0	0	174
Lane Group Flow (vph)	140	555	0	135	620	55	338	520	39	218	360	57
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	7	4	3	8	5	2	5	2	2	1	6	6
Permitted Phases												
Actuated Green, G (s)	5.5	15.8	15.8	13.5	23.5	23.5	23.5	23.5	6.5	15.5	15.5	16.5
Effective Green, g (s)	6.0	16.3	16.3	14.0	24.0	24.0	24.0	24.0	7.0	17.0	17.0	17.0
Actuated g/C Ratio	0.09	0.24	0.24	0.20	0.35	0.35	0.35	0.35	0.10	0.25	0.25	0.25
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	796	0	153	832	372	358	645	548	179	457	388
v/s Ratio Prot	c0.08	c0.19	0.08	0.18	0.03	c0.19	c0.28	0.02	0.02	c0.12	0.19	0.04
v/s Ratio Perm												
v/s Ratio	0.92	0.82	0.75	0.15	0.94	0.81	0.81	0.81	1.22	0.79	0.79	0.15
Uniform Delay, d1	31.4	25.1	24.6	21.0	27.3	20.5	15.2	31.1	24.5	20.5	20.5	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.1	6.9	40.4	3.7	0.2	33.1	10.4	0.3	138.0	12.9	0.8	0.8
Delay (s)	79.5	32.0	71.7	28.2	21.2	80.4	30.9	15.4	169.1	37.3	21.3	21.3
Level of Service	E	C	E	C	C	E	C	B	F	D	D	C
Approach Delay (s)	39.7	32.5	39.7	32.5	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4
Approach LOS	D	C	D	C	C	D	D	D	D	D	D	E
<b>Intersection Summary</b>												
HCM Average Control Delay	44.0											
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	89.3											
Intersection Capacity Utilization	77.7%											
Analysis Period (min)	15											
Critical Lane Group	c											

23: Gravenstien Hwy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.89
Fr	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3517	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3517	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Satd. Flow (perm)	1770	3517	1583	1770	1863	1583	1770	1863	1770	1863	1583	1770
Volume (vph)	102	736	32	53	855	333	48	24	63	485	29	96
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	775	34	56	900	351	51	25	56	511	31	101
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	60
Lane Group Flow (vph)	107	806	0	56	900	232	51	30	0	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	5	2	2	1	6	6
Permitted Phases												
Actuated Green, G (s)	7.6	28.3	7.6	28.3	28.3	28.3	28.3	28.3	7.6	28.3	28.3	28.3
Effective Green, g (s)	8.1	28.8	8.1	28.8	28.8	28.8	28.8	28.8	8.1	28.8	28.8	28.8
Actuated g/C Ratio	0.09	0.32	0.09	0.32	0.32	0.32	0.32	0.32	0.09	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1125	0	96	1007	450	75	125	659	669	0	669
v/s Ratio Prot	0.06	c0.23	0.06	c0.23	0.03	c0.25	0.15	0.02	c0.29	c0.04	0.06	c0.23
v/s Ratio Perm												
v/s Ratio	0.67	0.72	0.67	0.72	0.58	0.89	0.51	0.68	0.24	0.78	0.11	0.72
Uniform Delay, d1	39.7	27.0	39.7	27.0	41.6	30.9	27.0	42.5	39.2	24.9	16.6	16.6
Progression Factor	1.00	1.00	1.00	1.00	0.62	0.53	0.18	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	3.9	10.7	3.9	7.8	0.9	3.7	22.4	1.0	5.7	0.1	0.1
Delay (s)	50.4	30.9	50.4	30.9	33.6	27.2	8.5	64.9	40.2	30.6	16.7	16.7
Level of Service	D	C	D	C	C	C	A	E	D	C	B	B
Approach Delay (s)	33.2	33.2	33.2	33.2	22.4	22.4	49.1	49.1	49.1	27.8	27.8	27.8
Approach LOS	C	C	C	C	C	C	D	D	D	C	C	C
<b>Intersection Summary</b>												
HCM Average Control Delay	28.1											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	74.6%											
Analysis Period (min)	15											
Critical Lane Group	c											

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.85
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	0.95	1.00	0.85
Fr	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Fr Protected	0	0	0	0	0	0	0	0
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3539	1583
Fr Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3539	1583
Volume (vph)	0	819	472	99	1017	0	639	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	497	104	1071	0	673	0
RTOR Reduction (vph)	0	0	124	0	0	0	0	0
Lane Group Flow (vph)	0	862	373	104	1071	0	673	157
Turn Type		Per	Prot	Prot	Prot		Prot	
Protected Phases	4		3	8		1	6	
Permitted Phases		4						
Actuated Green, G (s)	36.4	36.4	11.6	52.5		28.5	28.5	
Effective Green, g (s)	36.9	36.9	12.1	53.0		29.0	29.0	
Actuated g/C Ratio	0.41	0.41	0.13	0.99		0.32	0.32	
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1451	649	238	2084		1106	510	
v/s Ratio Prot	c0.24		0.06	c0.30		c0.20	0.10	
v/s Ratio Perm		0.24						
v/c Ratio	0.89	0.57	0.44	0.51		0.61	0.31	
Uniform Delay, d1	20.7	20.5	35.8	10.9		25.7	22.9	
Progression Factor	0.53	0.50	1.38	2.00		1.00	1.00	
Incremental Delay, d2	1.3	2.6	1.2	0.8		1.0	1.6	
Delay (s)	12.3	12.8	50.7	22.7		26.7	24.5	
Level of Service	B	B	D	C		C	C	
Approach Delay (s)	12.5				0.0		26.1	
Approach LOS	B				A		C	
Intersection Summary								
HCM Average Control Delay	20.4		HCM Level of Service		C			
HCM Volume to Capacity ratio	0.57		Sum of lost time (s)		8.0			
Actuated Cycle Length (s)	90.0		ICU Level of Service		B			
Intersection Capacity Utilization	62.9%		Analysis Period (min)		15			
Analysis Period (min)	15		Critical Lane Group		c			

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.97	1.00	0.95	0.97	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.85
Fr	1.00	1.00	1.00	1.00	1.00	0.85
Fr Protected	0	0	0	0	0	0
Satd. Flow (prot)	3539	3433	1583	3539	3433	1583
Fr Permitted	1.00	1.00	0.95	1.00	1.00	0.85
Satd. Flow (perm)	3539	3433	1583	3539	3433	1583
Volume (vph)	0	1461	0	617	468	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1538	0	649	493	248
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1538	0	0	649	493	226
Turn Type		Per		Prot	Prot	
Protected Phases	4		8	2		2
Permitted Phases		4				
Actuated Green, G (s)	62.0	62.0	19.0	19.0		19.0
Effective Green, g (s)	62.5	62.5	19.5	19.5		19.5
Actuated g/C Ratio	0.69	0.69	0.22	0.22		0.22
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	2458	2458	744	343		343
v/s Ratio Prot	c0.43		0.18	0.14		c0.14
v/s Ratio Perm		0.43				
v/c Ratio	0.83	0.26	0.66	0.66		0.66
Uniform Delay, d1	7.4	5.1	32.2	32.2		32.2
Progression Factor	0.56	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.0	0.3	2.2	4.8		4.8
Delay (s)	5.2	5.4	34.5	37.0		37.0
Level of Service	A	A	C	D		D
Approach Delay (s)	5.2				5.4	35.3
Approach LOS	A				A	D
Intersection Summary						
HCM Average Control Delay	12.8		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.63		Sum of lost time (s)		8.0	
Actuated Cycle Length (s)	90.0		ICU Level of Service		B	
Intersection Capacity Utilization	62.9%		Analysis Period (min)		15	
Analysis Period (min)	15		Critical Lane Group		c	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign/Control	Stop			Free			Free			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	7	6	11	2	7	216	19	201	20	116	667	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	6	12	2	7	227	20	204	21	122	702	4
Pedestrians												
Lane Width (ft)	12											
Walking Speed (ft/s)	5											
Percent Blockage	None											
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)	None											
pX, platoon unblocked												
VC, conflicting volume	1527	1853	353	1493	1834	422	706					864
VC1, stage 1 conf vol												864
VC2, stage 2 conf vol												84
VCU, unblocked vol	7.5	6.5	6.9	7.5	6.9	4.1						4.1
IC, single (s)												
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
pl queue free %	81	90	98	97	88	61	98					84
pl capacity (veh/h)	35	60	643	67	62	581	888					774
Direction Lane #												
Volume Total	25	237	20	422	422	21	122	468	238	0	0	0
Volume Left	7	2	20	0	0	0	122	0	0	0	0	0
Volume Right	12	227	0	0	0	21	0	0	0	0	0	0
cSH	80	605	888	1700	1700	774	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.38	0.02	0.25	0.25	0.07	0.16	0.28	0.14			
Queue Length 95th (ft)	29	46	2	0	0	0	14	0	0			
Control Delay (s)	69.0	17.4	9.1	0.0	0.0	0.0	10.5	0.0	0.0			
Lane LOS	F	C	A	A	A	B	B	B	B			
Approach Delay (s)	59.0	17.4	0.2				1.6					
Approach LOS	F	C	C									
Intersection Summary												
Average Delay	3.7											
Intersection Capacity Utilization	48.8%											
Analysis Period (min)	15											
ICU Level of Service												
A												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign/Control	Free			Free			Free			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	139	3	4	189	2	22	0	1	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	146	3	4	209	2	23	0	1	0	0	0
Pedestrians												
Lane Width (ft)	12											
Walking Speed (ft/s)	5											
Percent Blockage	None											
Right turn flare (veh)	None											
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)	None											
pX, platoon unblocked												
VC, conflicting volume	212			149			369	370	148	370	371	211
VC1, stage 1 conf vol												211
VC2, stage 2 conf vol												211
VCU, unblocked vol	212			149			369	370	148	370	371	211
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pl queue free %	100			100			95	100	100	100	100	100
pl capacity (veh/h)	1359			1432			585	557	584	557	584	557
Direction Lane #												
Volume Total	151	216	24	23	0							
Volume Left	3	2	23	0								
Volume Right	1359	1432	594	557								
cSH	0.00	0.00	0.04	0.00								
Volume to Capacity	0	0	3	0								
Queue Length 95th (ft)	0	0	3	0								
Control Delay (s)	0.1	0.2	11.3	11.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	11.3	11.5								
Approach LOS	A	A	B	B								
Intersection Summary												
Average Delay	0.8											
Intersection Capacity Utilization	27.9%											
Analysis Period (min)	15											
ICU Level of Service												
A												

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free											
Grade	0%											
Volume (veh/h)	1	23	2	4	208	0	1	0	0	4	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	219	2	4	219	0	0	0	0	4	0	0
Pedestrians	-											
Lane Width (ft)	-											
Walking Speed (ft/s)	-											
Percent Blockage	-											
Right turn flare (veh)	-											
Median type	None											
Median storage (veh)	-											
Upstream signal (ft)	-											
pX, platoon unblocked	-											
VC, conflicting volume	227	132	2	4	365	0	1	31	369	365	0	223
VC1, stage 1 cont vol	-											
VC2, stage 2 cont vol	227	132	2	4	365	0	1	31	369	365	0	223
VCU, unblocked vol	4	4	4	4	4	4	4	4	4	4	4	4
IC, single (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
IC, 2 stage (s)	-											
IF (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
pl queue free %	100	100	100	100	100	100	100	100	100	100	100	100
pl capacity (veh/h)	1341	1454	1454	1454	1454	1454	1454	1454	1454	1454	1454	1454
Direction Lane 7												
Volume Total	133	232	11	5	5	5	5	5	5	5	5	5
Volume Left	1	4	1	1	1	1	1	1	1	1	1	1
Volume Right	132	228	0	4	4	4	4	4	4	4	4	4
cSH	1341	1454	561	614	614	614	614	614	614	614	614	614
Volume to Capacity	0.00	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.1	0.2	11.5	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Lane LOS	A	A	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	0.1	0.2	11.5	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	24.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free											
Grade	0%											
Volume (veh/h)	149	19	4	270	5	11	0	0	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	157	9	4	284	5	12	0	0	0	0	0	0
Pedestrians	-											
Lane Width (ft)	-											
Walking Speed (ft/s)	-											
Percent Blockage	-											
Right turn flare (veh)	-											
Median type	None											
Median storage (veh)	-											
Upstream signal (ft)	-											
pX, platoon unblocked	-											
VC, conflicting volume	166	22	4	166	4	162	0	0	0	0	0	0
VC1, stage 1 cont vol	-											
VC2, stage 2 cont vol	166	22	4	166	4	162	0	0	0	0	0	0
VCU, unblocked vol	4	4	4	4	4	4	4	4	4	4	4	4
IC, single (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
IC, 2 stage (s)	-											
IF (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
pl queue free %	100	100	100	100	100	100	100	100	100	100	100	100
pl capacity (veh/h)	1312	1412	1412	1412	1412	1412	1412	1412	1412	1412	1412	1412
Direction Lane 7												
Volume Total	166	288	17	5	5	5	5	5	5	5	5	5
Volume Left	0	4	1	1	1	1	1	1	1	1	1	1
Volume Right	166	284	0	4	4	4	4	4	4	4	4	4
cSH	1700	1412	749	749	749	749	749	749	749	749	749	749
Volume to Capacity	0.10	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.1	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Lane LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.1	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	27.4%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBT	EBT	WBL	WBL	WBL	NBR	NBR	NBR	SBL	SBL	SBL	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	155	9	11	250	0	25	0	8	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0	8	0	0	0	0
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
VC, conflicting volume		263			173		454		454		168		459
VC1, stage 1 conf vol													
VC2, stage 2 conf vol													
VCu, unblocked vol		263			173		454		454		168		459
IC, single (s)		4.1			4.1		7.1		6.5		6.2		6.5
IC, 2 stage (s)													
IF (s)		2.2			2.2		3.5		4.0		3.3		4.0
p0 queue free %		100			99		95		100		98		100
GM capacity (veh/h)		1301			1404		513		498		876		495
Direction, Lane #	EBT	WBL	NBR	T	SBL	SBR							
Volume Total	173	275	35	0	0	0							
Volume Left	0	12	26	0	0	0							
Volume Right	9	0	8	0	0	0							
cSH	1301	1404	570	1700									
Volume to Capacity	0.00	0.01	0.06	0.00									
Queue Length 95th (ft)	0	1	5	0									
Control Delay (s)	0.0	0.4	11.7	0.0									
Lane LOS	A	A	B	A									
Approach Delay (s)	0.0	0.4	11.7	0.0									
Approach LOS	B	A	B	A									

Intersection Summary	
Average Delay	1.1
Intersection Capacity Utilization	32.1%
Analysis Period (min)	15
ICU Level of Service	A

Movement	EBT	EBT	EBT	WBL	WBL	WBL	NBR	NBR	NBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	135	22	0	235	37	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	142	23	0	247	39	0	0	0
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type									
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
VC, conflicting volume									
VC1, stage 1 conf vol									
VC2, stage 2 conf vol									
VCu, unblocked vol									
IC, single (s)									
IC, 2 stage (s)									
IF (s)									
p0 queue free %									
GM capacity (veh/h)									
Direction, Lane #	EBT	WBL	NBR	T	SBL	SBR			
Volume Total	165	247	39	0	0	0			
Volume Left	0	0	39	0	0	0			
Volume Right	23	0	0	0	0	0			
cSH	1700	1413	605						
Volume to Capacity	0.10	0.00	0.06						
Queue Length 95th (ft)	0	0	5						
Control Delay (s)	0.0	0.0	11.4						
Lane LOS	A	A	B						
Approach Delay (s)	0.0	0.0	11.4						
Approach LOS	B	A	B						

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	22.4%
Analysis Period (min)	15
ICU Level of Service	A

Lane Group	EBT	EBL	WBT	WBL	NBT	NBL	NBR	SBI	SBL
Lane Group Flow (vph)	1363	191	860	568	215	163	279	475	256
v/c Ratio	2.47	0.34	1.44	0.81	0.97	0.56	0.72	0.77	1.00
Control Delay	692.1	36.0	241.0	32.9	122.0	77.8	18.3	69.2	114.2
Queue Delay	10.2	5.3	102.9	30.4	0.0	0.0	2.5	355.3	0.0
Total Delay	702.3	41.3	343.9	63.3	122.0	77.8	20.8	424.5	114.2
Queue Length 50th (ft)	-2376	138	1311	281	228	87	0	246	250
Queue Length 95th (ft)	#2846	m178m1491	m379	#402	127	95	#350	#448	
Internal Link Dist (ft)	550	220			110		100	275	
Turn Bay Length (ft)	551	587	597	698	221	376	418	619	257
Base Capacity (vph)	0	310	82	154	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	77	0	0	0	0	0	60	353	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.88	0.74	1.67	1.04	0.97	0.43	0.78	1.79	1.00

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m. Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBL	WBT	WBL	NBT	NBL	NBR	SBI	SBL
Lane Group Flow (vph)	5	32	147	5	200	173	169	5	32
v/c Ratio	0.04	0.15	0.48	0.04	0.44	0.44	0.07	0.00	0.20
Control Delay	34.4	32.8	11.5	28.4	24.1	33.4	4.1	3.4	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	32.8	11.5	28.4	24.1	33.4	4.1	3.4	35.8
Queue Length 50th (ft)	2	15	0	2	27	99	4	0	15
Queue Length 95th (ft)	13	39	49	m4	m46	m93	m36	m1	40
Internal Link Dist (ft)	180		75	100	140	120	150	200	130
Turn Bay Length (ft)	155	442	468	155	854	400	2462	1102	184
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.30	0.03	0.23	0.43	0.07	0.00	0.17

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

EBT	EBR	WBT	WBR	SBT	SBR
991	840	94	901	345	1054
Lane Group Flow (vph)					
1059	094	1033	044	066	2300
v/c Ratio					
18.1	29.5	45.2	16.8	30.4	46.2
Control Delay					
210	169.3	0.0	0.1	0.0	73.4
Queue Delay					
49.2	189.8	45.2	17.0	30.4	119.6
Queue Length 50th (ft)					
197	830	22	356	161	252
Queue Length 95th (ft)					
131	m163	m26	m144	261	#397
Internal Link Dist (ft)					
220	466	466	466	466	348
Turn Bay Length (ft)					
1881	1892	257	2035	523	1084
Base Capacity (vph)					
738	277	0	0	0	0
Starvation Cap Reductn					
0	0	0	339	0	188
Spillback Cap Reductn					
0	0	0	0	0	0
Storage Cap Reductn					
1.05	1.37	0.37	0.53	0.66	1.18
Reduced v/c Ratio					
Intersection Summary					
# 59th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					
Volume for 95th percentile queue is metered by upstream signal.					
Dr Defacto Right Lane. Recode with 1 through lane as a right lane.					

EBT	EBR	WBT	WBR	SBT	SBR
599	738	435	468	358	377
Lane Group Flow (vph)					
0.52	0.82	0.78	0.33	1.03	1.07
v/c Ratio					
42.0	26.0	48.2	16.5	84.7	95.5
Control Delay					
0.0	6.8	0.0	0.0	0.0	0.0
Queue Delay					
42.0	32.8	48.2	16.5	84.7	95.5
Total Delay					
Queue Length 50th (ft)					
142	210	120	110	149	174
Queue Length 95th (ft)					
162	312	180	177	m718	m300
Internal Link Dist (ft)					
466	466	345	466	466	270
Turn Bay Length (ft)					
150	150	150	150	150	200
Base Capacity (vph)					
1144	898	558	524	347	352
Starvation Cap Reductn					
0	123	0	0	0	0
Spillback Cap Reductn					
0	0	0	0	0	0
Storage Cap Reductn					
0.52	0.95	0.78	0.33	1.03	1.07
Reduced v/c Ratio					
Intersection Summary					
# Volume exceeds capacity, queue is theoretically infinite.					
Queue shown is maximum after two cycles.					
95th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					
Volume for 95th percentile queue is metered by upstream signal.					

Lane Group	EBL	EBT	WBT	WBL	SBL	SBR
Lane Group Flow (vph)	205	1033	718	67	248	
v/c Ratio	0.46	0.45	0.45	0.21	0.41	
Control Delay	32.0	16.5	16.1	24.5	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.0	17.0	16.1	24.5	5.8	
Queue Length 50th (ft)	62	235	122	38	0	
Queue Length 95th (ft)	84	260	178	76	53	
Internal Link Dist (ft)	80	345	164	232		
Turn Bay Length (ft)	901	2256	1609	465	598	
Base Capacity (vph)	0	741	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.68	0.45	0.21	0.41	

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 - # - 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.  
 - m - Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	398	400	42	15	541	517	7	458
v/c Ratio	0.92	0.92	0.10	0.11	1.02	0.25	0.05	0.49
Control Delay	58.7	58.8	8.3	29.3	74.3	70.6	41.7	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	58.8	8.3	29.3	74.3	70.6	41.7	30.9
Queue Length 50th (ft)	202	203	0	5	278	51	4	127
Queue Length 95th (ft)	372	435	23	23	478	147	m4	m220
Internal Link Dist (ft)	250	284		118	200	214		380
Turn Bay Length (ft)	441	443	447	179	531	2064	177	932
Base Capacity (vph)	0	0	0	0	0	0	0	70
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.90	0.09	0.09	1.02	0.25	0.04	0.49

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 - # - 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.  
 - m - Volume for 95th percentile queue is metered by upstream signal.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	271	683	698	264	289	560
v/c Ratio	0.62	1.02	0.90	0.33	1.05	0.48
Control Delay	29.1	53.4	35.9	3.1	103.5	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	53.4	35.9	3.1	103.5	8.0
Queue Length 50th (ft)	96	144	248	0	130	101
Queue Length 95th (ft)	168	#359	#451	38	#264	163
Internal Link Dist (ft)	480	175	3920	450	700	2550
Turn Bay Length (ft)	0	0	0	0	0	0
Base Capacity (vph)	436	672	774	812	272	1175
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	1.02	0.90	0.33	1.05	0.48

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	698	38	213	987	162	67	97	85	284	149	
v/c Ratio	0.40	0.93	0.10	0.83	1.06	0.31	0.26	0.25	0.22	0.53	0.18	
Control Delay	44.6	51.8	9.9	53.3	63.9	2.1	37.7	11.2	8.1	27.8	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.6	51.8	9.9	53.3	63.9	2.1	37.7	11.2	8.1	27.8	5.7	
Queue Length 50th (ft)	26	181	0	44	320	0	16	8	0	118	13	
Queue Length 95th (ft)	61	#288	23	m57	m380	m1	36	48	36	193	45	
Internal Link Dist (ft)	160	1540	200	250	170	130	1010	130	100	100		
Turn Bay Length (ft)	133	752	366	257	929	518	257	392	387	531		
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.40	0.93	0.10	0.83	1.06	0.31	0.26	0.25	0.22	0.53		

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Lane Group	EBT	EBL	EBR	WBT	WBL	WBR	NBT	NBL	NBR	SBT	SBL	SBR
Lane Group Flow (vph)	245	804	154	391	1073	377	144	435	274	383	278	256
v/c Ratio	0.88	0.48	0.25	0.76	0.94	0.52	0.65	0.66	0.56	0.75	0.77	0.50
Control Delay	52.1	11.6	2.1	30.8	30.4	3.6	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	11.6	2.1	30.8	30.4	3.6	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	76	57	4	96	271	25	71	74	0	95	129	0
Queue Length 95th (ft)	m#136	m#148	m#148	#402	m#33	#157	118	65	#188	#230	58	
Internal Link Dist (ft)	320	250	350	520	155	250	554	250	175	250	480	
Turn Bay Length (ft)	200	288	685	627	515	1145	725	221	789	522	511	396
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.48	0.25	0.76	0.94	0.52	0.65	0.55	0.52	0.75	0.70	0.48

**Intersection Summary**  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Lane Group	EBT	EBL	EBR	WBT	WBL	WBR	NBT	NBL	NBR	SBT	SBL	SBR
Lane Group Flow (vph)	1630	72	1460	209	25	370	370	370	370	370	370	369
v/c Ratio	0.70	0.51	0.73	0.13	0.05	0.84	0.88	0.88	0.88	0.88	0.88	0.87
Control Delay	8.6	52.9	12.0	0.1	9.8	43.2	48.5	48.5	48.5	48.5	48.5	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	52.9	12.0	0.1	9.8	43.2	48.5	48.5	48.5	48.5	48.5	27.4
Queue Length 50th (ft)	132	37	169	0	2	189	172	172	172	172	172	138
Queue Length 95th (ft)	169	m#1	m#188	m#0	18	#318	#329	230				
Internal Link Dist (ft)	520	225	960	428	378	400	400	400	400	400	400	400
Turn Bay Length (ft)	2322	142	2000	1583	568	475	455	592				
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.51	0.73	0.13	0.04	0.78	0.81	0.81	0.81	0.81	0.81	0.62

**Intersection Summary**  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	18	1728	287	1049	368	688	161	161	18
v/c Ratio	0.14	0.69	0.18	0.61	0.23	0.97	0.21	0.21	0.02
Control Delay	38.5	23.9	0.2	17.8	0.3	47.6	11.0	11.0	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	23.9	0.2	17.8	0.3	47.6	11.0	11.0	8.3
Queue Length 50th (ft)	10	250	0	94	0	303	42	42	3
Queue Length 95th (ft)	m13	m275	m0	131	m0	#543	76	76	13
Internal Link Dist (ft)	190	960		360		366		420	
Turn Bay Length (ft)	133	2401	1583	1722	1583	730	791	791	807
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.69	0.18	0.61	0.23	0.94	0.20	0.20	0.02

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative B  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	284	1209	574	148	1003	226	475	236	107
v/c Ratio	0.51	1.09	0.64	0.60	0.68	0.71	0.72	0.47	0.44
Control Delay	16.9	70.0	6.0	46.8	28.3	42.9	36.7	7.4	35.9
Queue Delay	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	70.0	7.8	46.8	28.3	42.9	36.7	7.4	35.9
Queue Length 50th (ft)	33	372	24	69	154	114	120	0	54
Queue Length 95th (ft)	m65	#467	90	#187	#252	#210	173	56	98
Internal Link Dist (ft)	250	360		200	1350	601		175	150
Turn Bay Length (ft)	558	1107	890	246	1470	342	707	522	342
Base Capacity (vph)	0	0	171	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.09	0.80	0.60	0.68	0.65	0.67	0.45	0.31

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	140	722	135	620	232	338	520	114	210
v/c Ratio	0.92	0.84	0.88	0.74	0.43	0.95	0.81	0.18	1.22
Control Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	171.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	171.4
Queue Length 50th (ft)	61	136	59	128	0	145	201	0	119
Queue Length 95th (ft)	#162	#221	#155	184	0	#296	#358	30	#243
Internal Link Dist (ft)	688	6630	734	6630	150	550	675	500	980
Turn Bay Length (ft)	350	500	150	550	150	357	645	623	178
Base Capacity (vph)	153	987	153	859	580	357	645	623	178
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.41	0.95	0.81	0.18	1.22

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	107	809	56	900	351	51	91	511	132
v/c Ratio	0.67	0.66	0.47	0.84	0.59	0.43	0.44	0.80	0.18
Control Delay	64.2	31.2	37.2	26.0	6.5	52.2	21.8	35.9	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	31.2	37.2	26.0	6.5	52.2	21.8	35.9	5.8
Queue Length 50th (ft)	61	227	31	282	9	28	14	237	10
Queue Length 95th (ft)	#161	#342	m57	#386	25	65	57	#386	43
Internal Link Dist (ft)	6630	6630	350	6630	150	500	675	500	980
Turn Bay Length (ft)	225	225	150	500	150	357	645	623	178
Base Capacity (vph)	153	987	153	859	580	357	645	623	178
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.66	0.47	0.84	0.59	0.43	0.25	0.78	0.17

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBT	SBT
Lane Group Flow (vph)	862	497	104	1071	673	223
v/c Ratio	0.58	0.63	0.39	0.51	0.61	0.39
Control Delay	12.7	9.2	51.2	23.1	28.6	15.2
Queue Delay	10.3	0.5	0.0	0.5	0.0	0.0
Total Delay	13.0	9.7	51.2	23.6	28.6	15.2
Queue Length 50th (ft)	118	70	60	273	184	52
Queue Length 95th (ft)	146	m111	m103	337	222	113
Internal Link Dist (ft)	350			370		585
Turn Bay Length (ft)	50	100		425		
Base Capacity (vph)	1486	787	295	2084	1106	577
Starvation Cap Reductn	171	88	0	548	0	0
Spillback Cap Reductn	52	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.69	0.35	0.70	0.61	0.39

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBT	NEL	NBR
Lane Group Flow (vph)	1538	649	493	248
v/c Ratio	0.63	0.26	0.66	0.66
Control Delay	5.8	6.2	36.0	37.9
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	6.0	6.2	36.0	37.9
Queue Length 50th (ft)	191	59	135	119
Queue Length 95th (ft)	252	115	162	176
Internal Link Dist (ft)	370		312	431
Turn Bay Length (ft)			395	275
Base Capacity (vph)	2456	2456	1221	580
Starvation Cap Reductn	188	0	0	0
Spillback Cap Reductn	0	49	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.88	0.27	0.40	0.43

Intersection Summary

**CUMULATIVE 2020 + ALTERNATIVE B  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR
Sign Control	Stop	Free	Free	Stop	Free	Free	Stop	Free	Free	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	13	16	317	22	134	14	763	74	223	508	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	14	17	334	23	141	15	803	78	235	535	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	1921	916	536	1899	1879	842	538					881
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1921	1916	536	1899	1879	842	538					881
vCU, unblocked vol												
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
pU queue free %	100	70	97	0	53	61	99					89
cM capacity (veh/h)	15	46	544	30	49	364	1030					767
Erection Lane #	EB	WBL	NB	1	NB	2	SB	SB	2			
Volume Total	31	498	15	881	235	538						
Volume Left	0	334	15	0	235	0						
Volume Right	17	141	0	76	0	3						
cSH	93	42	1030	1700	767	1700						
Volume to Capacity	0.33	11.94	0.01	0.52	0.31	0.32						
Queue Length 95th (ft)	31	Err	1	0	32	0						
Control Delay (s)	61.3	Err	8.5	0.0	11.7	0.0						
Lane LOS	F	F	A	B	B	B						
Approach Delay (s)	51.3	Err	0.1		3.6							
Approach LOS	F	F	F		F							
<b>Intersection Summary</b>												
Average Delay	2268.3											Err
Intersection Capacity Utilization	92.4%											ICU Level of Service
Analysis Period (min)	15											15

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBR
Sign Control	Stop	Free	Free	Stop	Free	Free	Stop	Free	Free	Stop	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	170	131	619	280	9	184	32	804	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	138	652	295	9	194	34	846	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pK, platoon unblocked												
vC, conflicting volume	304			317			1887	1876	248	2735	1941	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	304			317			1887	1876	248	2735	1941	299
vCU, unblocked vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pU queue free %	99			48			0	0	0	0	66	99
cM capacity (veh/h)	1257			1243			23	34	791	0	31	740
Erection Lane #	EB	WBL	NB	1	NB	2	SB	SB	1			
Volume Total	327	956	1074	32								
Volume Left	11	652	194	11								
Volume Right	138	9	846	11								
cSH	1257	1243	104	0								
Volume to Capacity	0.01	0.52	10.35	Err								
Queue Length 95th (ft)	1	79	Err	Err								
Control Delay (s)	0.3	9.8	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.3	9.8	Err	Err								
Approach LOS	F	F	F	F								
<b>Intersection Summary</b>												
Average Delay	145.2%											Err
Intersection Capacity Utilization	145.2%											ICU Level of Service
Analysis Period (min)	15											15

3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	Free														
Sign Control	4														
Grade	0%														
Volume (veh/h)	10	964	10	9	890	9	10	10	10	10	10	10			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	11	1015	11	9	937	9	11	11	11	11	11	11			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type	None														
Median storage (veh)															
Upstream signal (ft)															
pX, platoon unblocked															
vC, conflicting volume	946						1025			2017	2006	1020	2017	2007	942
vC1, stage 1 conf vol															
vC2, stage 2 conf vol	946						1025			2017	2006	1020	2017	2007	942
vCU, unblocked vol	4.1						4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)															
tF (s)	2.2						2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99						99			70	82	96	70	82	97
cM capacity (veh/h)	725						677			35	58	287	35	58	319
Direction, Lane #	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR			
Volume Total	1036	956	32	32	11	11	11	11	11	11	11	11			
Volume Left	11	9	11	11	11	11	11	11	11	11	11	11			
Volume Right	725	677	61	61	61	61	61	61	61	61	61	61			
cSH	0.01	0.01	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52			
Volume to Capacity	1	1	1	1	1	1	1	1	1	1	1	1			
Queue Length 95th (ft)	1	1	52	51	51	51	51	51	51	51	51	51			
Control Delay (s)	0.5	0.4	115.2	114.4	114.4	114.4	114.4	114.4	114.4	114.4	114.4	114.4			
Lane LOS	A	A	F	F	F	F	F	F	F	F	F	F			
Approach Delay (s)	0.5	0.4	115.2	114.4	114.4	114.4	114.4	114.4	114.4	114.4	114.4	114.4			
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F			
Intersection Summary															
Average Delay	4.0														
Intersection Capacity Utilization	67.5%												ICU Level of Service		
Analysis Period (min)	15												C		

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EB	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	Free														
Sign Control	4														
Grade	0%														
Volume (veh/h)	10	964	10	9	890	9	10	10	10	10	10	10			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	11	1015	11	9	937	9	11	11	11	11	11	11			
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type	None														
Median storage (veh)															
Upstream signal (ft)															
pX, platoon unblocked															
vC, conflicting volume	946						1025			2013	2006	1020	2013	2002	937
vC1, stage 1 conf vol															
vC2, stage 2 conf vol	946						1025			2013	2006	1020	2013	2002	937
vCU, unblocked vol	4.1						4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)															
tF (s)	2.2						2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99						99			70	82	96	70	82	97
cM capacity (veh/h)	725						677			36	58	287	35	58	321
Direction, Lane #	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR			
Volume Total	1036	937	9	32	32	32	32	32	32	32	32	32			
Volume Left	11	9	0	0	0	0	0	0	0	0	0	0			
Volume Right	725	677	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700			
cSH	0.01	0.01	0.55	0.01	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51			
Volume to Capacity	1	1	1	1	1	1	1	1	1	1	1	1			
Queue Length 95th (ft)	1	1	0	0	0	0	0	0	0	0	0	0			
Control Delay (s)	0.5	10.4	0.0	0.0	114.3	113.0	113.0	113.0	113.0	113.0	113.0	113.0			
Lane LOS	A	B	F	F	F	F	F	F	F	F	F	F			
Approach Delay (s)	0.5	0.1			114.3	113.0	113.0	113.0	113.0	113.0	113.0	113.0			
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F			
Intersection Summary															
Average Delay	3.8														
Intersection Capacity Utilization	69.3%												ICU Level of Service		
Analysis Period (min)	15												C		



5: Wilfred Ave & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SB	SBT	SBR
Volume (veh/h)	40	903	41	188	855	189	44	14	396	180	31	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	951	43	198	900	189	46	15	417	189	33	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
vC, conflicting volume	1099			994			1930	2551	497	2379	2473	549
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1099			994			1930	2551	497	2379	2473	549
vCu, unblocked vol	41			41			7.5	6.5	6.9	7.5	6.5	6.9
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pd queue free %	93			71			0	16	20	0	0	98
cdM capacity (veh/h)	631			692			0	18	519	1	20	479
Direction, Lane #	EB-1	EB-2	EB-3	WB-1	WB-2	WB-3	NB-1	NB-2	NB-3	SB-1	SB-2	SB-3
Volume Total	42	634	360	198	600	499	478	234				
Volume Left	42	0	0	198	0	0	46	189				
Volume Right	0	0	43	0	0	0	199	417				
CSH	631	1700	1700	892	1700	1700	0	1				
Volume to Capacity	0.07	0.37	0.21	0.29	0.35	0.29	Err	233.78				
Queue Length 95th (ft)	5	0	0	29	0	0	Err	Err				
Control Delay (s)	11.1	0.0	0.0	12.3	0.0	0.0	Err	Err				
Lane LOS	B	B	B	F	F	F	F	F				
Approach Delay (s)	0.5			1.9			Err	Err				
Approach LOS	F	F	F	F	F	F	F	F				
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	89.9%											
ICU Level of Service	E											
Analysis Period (min)	15											

6: Wilfred Avenue & Dowdell Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SB	SBT	SBR
Volume (veh/h)	53	1153	273	509	970	273	143	105	559	217	41	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	1214	287	536	1021	287	151	111	588	228	43	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
vC, conflicting volume	1308			1501			3198	3849	751	3598	3849	654
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1308			1501			3198	3849	751	3598	3849	654
vCu, unblocked vol	41			41			7.5	6.5	6.9	7.5	6.5	6.9
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pd queue free %	89			0			0	0	0	0	0	89
cdM capacity (veh/h)	525			442			0	0	354	0	0	409
Direction, Lane #	EB-1	EB-2	EB-3	WB-1	WB-2	WB-3	NB-1	NB-2	NB-3	SB-1	SB-2	SB-3
Volume Total	56	809	692	536	681	628	849	397				
Volume Left	56	0	0	536	0	0	151	228				
Volume Right	0	0	287	0	0	0	287	588				
CSH	525	1700	1700	442	1700	1700	0	0				
Volume to Capacity	0.11	0.48	0.41	1.21	0.40	0.37	Err	Err				
Queue Length 95th (ft)	9	0	0	529	0	0	Err	Err				
Control Delay (s)	12.7	0.0	0.0	142.4	0.0	0.0	Err	Err				
Lane LOS	B	B	B	F	F	F	F	F				
Approach Delay (s)	0.5			41.4			Err	Err				
Approach LOS	F	F	F	F	F	F	F	F				
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	134.2%											
ICU Level of Service	H											
Analysis Period (min)	15											

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.91	0.95	1.00	0.85	1.00	1.00	0.95	1.00	0.97	1.00	0.88	
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	
Fit Protected	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648	
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Fit Permitted	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648	
Satd. Flow (perm)	157	1517	255	73	962	730	556	103	350	453	70	234	
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Peak-hour factor, PHF	165	1597	268	77	1013	768	565	108	368	477	74	246	
Adj. Flow (vph)	0	0	48	0	0	187	0	0	342	0	75	0	
RTOR Reduction (vph)	165	1597	220	77	1013	581	585	108	25	477	245	0	
Lane Group Flow (vph)	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	
Turn Type	4	4	4	8	8	8	5	2	1	1	6	6	
Protected Phases	4	4	4	8	8	8	5	2	1	1	6	6	
Permitted Phases	4	4	4	8	8	8	5	2	1	1	6	6	
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5	21.5	
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0	22.0	
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14	0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	262	113	657	227	227	
v/s Ratio Prot	0.09	c0.47	0.15	0.05	c0.57	0.37	c0.33	0.03	0.14	c0.15	0.14	c0.15	
v/s Ratio Perm	0.31	1.57	0.51	0.14	1.70	1.09	2.65	0.43	0.23	0.73	1.08	1.08	
Uniform Delay, d1	43.2	56.0	46.3	36.8	53.0	53.0	70.0	71.2	70.2	60.8	69.0	69.0	
Progression Factor	1.00	1.00	1.00	0.83	0.86	0.90	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	261.4	0.9	0.3	318.4	58.2	754.0	1.2	1.1	4.0	82.4	82.4	
Delay (s)	43.6	317.4	47.2	30.9	363.8	108.0	824.0	72.4	71.2	64.8	151.4	151.4	
Level of Service	D	F	D	C	F	F	F	F	E	E	F	F	
Approach Delay (s)	259.5	F	F	243.4	F	F	486.4	F	F	99.5	F	F	
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	274.0											HCM Level of Service	F
HCM Volume to Capacity ratio	1.69												
Actuated Cycle Length (s)	160.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	197.5%											ICU Level of Service	H
Analysis Period (min)	15												
c. Critical Lane Group													

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.88	
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	
Fit Protected	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648	
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Fit Permitted	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648	
Satd. Flow (perm)	157	1517	255	73	962	730	556	103	350	453	70	234	
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Peak-hour factor, PHF	165	1597	268	77	1013	768	565	108	368	477	74	246	
Adj. Flow (vph)	0	0	48	0	0	187	0	0	342	0	75	0	
RTOR Reduction (vph)	165	1597	220	77	1013	581	585	108	25	477	245	0	
Lane Group Flow (vph)	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	
Turn Type	4	4	4	8	8	8	5	2	1	1	6	6	
Protected Phases	4	4	4	8	8	8	5	2	1	1	6	6	
Permitted Phases	4	4	4	8	8	8	5	2	1	1	6	6	
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5	21.5	
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0	22.0	
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14	0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	262	113	657	227	227	
v/s Ratio Prot	0.09	c0.47	0.15	0.05	c0.57	0.37	c0.33	0.03	0.14	c0.15	0.14	c0.15	
v/s Ratio Perm	0.31	1.57	0.51	0.14	1.70	1.09	2.65	0.43	0.23	0.73	1.08	1.08	
Uniform Delay, d1	43.2	56.0	46.3	36.8	53.0	53.0	70.0	71.2	70.2	60.8	69.0	69.0	
Progression Factor	1.00	1.00	1.00	0.83	0.86	0.90	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	261.4	0.9	0.3	318.4	58.2	754.0	1.2	1.1	4.0	82.4	82.4	
Delay (s)	43.6	317.4	47.2	30.9	363.8	108.0	824.0	72.4	71.2	64.8	151.4	151.4	
Level of Service	D	F	D	C	F	F	F	F	E	E	F	F	
Approach Delay (s)	259.5	F	F	243.4	F	F	486.4	F	F	99.5	F	F	
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	36.7											HCM Level of Service	D
HCM Volume to Capacity ratio	0.94												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.9%											ICU Level of Service	F
Analysis Period (min)	15												
d. Defacto Right Lane, Recode with 1 through lane as a right lane.													
c. Critical Lane Group													

10: Wilfred Ave & Commerce Boulevard  
Graton Rancheria Casino & Hotel  
2020 Alternative B  
PM Peak

Movement	EBL	EB	EBE	WB	WBL	WBT	WBR	NBL	NBT	NBR	NBL	NBT	SBL	SBL	SBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	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	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.91	1.00	0.97	0.95	0.95	0.95	0.88	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	
Fr	1.00	0.95	1.00	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.85	
Flt. Protected	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5085	1583	3433	3520	1681	1689	2787	1770	1723	1770	1770	1583	1770	1583	1583	
Flt. Permitted	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	5085	1583	3433	3520	1681	1689	2787	1770	1723	1770	1770	1583	1770	1583	1583	
Volume (vph)	0	770	1048	499	455	17	687	18	571	9	9	9	9	9	9	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	811	1103	525	479	18	723	19	601	9	9	9	9	9	9	
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477	0	0	0	0	0	0	
Lane Group Flow (vph)	0	811	509	525	494	0	362	380	124	9	11	0	0	0	0	
Turn Type	Prot	Prot	Perm	Prot	Prot	Split	Split	Perm	Split	Split	Perm	Split	Split	Perm	Split	
Protected Phases	7	4	4	3	8	2	2	2	6	6	6	6	6	6	6	
Permitted Phases																
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1144	358	558	1540	347	348	575	365	355	355	355	355	355	355	355	
v/s Ratio Prot	0.16	0.32	0.15	0.14	0.22	0.22	0.22	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
v/s Ratio Perm																
v/c Ratio	0.71	1.43	0.94	0.32	1.04	1.09	0.22	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	
Uniform Delay, d1	28.6	31.0	33.1	14.7	31.8	31.8	26.4	25.3	25.4	25.4	25.4	25.4	25.4	25.4	25.4	
Progression Factor	1.47	4.11	1.22	1.25	1.03	1.03	2.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	200.3	21.6	0.5	51.1	66.7	0.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Delay (s)	43.7	327.6	62.1	18.8	83.8	98.2	66.6	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	
Level of Service	D	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Approach Delay (s)	207.3	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Approach LOS	F	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Intersection Summary																
HCM Average Control Delay					127.2											
HCM Volume to Capacity Ratio					0.88											
Actuated Cycle Length (s)					80.0											
Intersection Capacity Utilization					92.5%											
Analysis Period (min)					15											
c Critical Lane Group																

11: Wilfred Avenue & Robert Lakes Road  
Graton Rancheria Casino & Hotel  
2020 Alternative B  
PM Peak

Movement	EBL	EB	EBE	WB	WBL	WBT	WBR	NBL	NBT	NBR	NBL	NBT	SBL	SBL	SBR	
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	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	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.91	1.00	0.97	0.95	0.95	0.95	0.88	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	
Fr	1.00	0.95	1.00	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.85	
Flt. Protected	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5085	1583	3433	3520	1681	1689	2787	1770	1723	1770	1770	1583	1770	1583	1583	
Flt. Permitted	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	5085	1583	3433	3520	1681	1689	2787	1770	1723	1770	1770	1583	1770	1583	1583	
Volume (vph)	0	770	1048	499	455	17	687	18	571	9	9	9	9	9	9	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	811	1103	525	479	18	723	19	601	9	9	9	9	9	9	
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477	0	0	0	0	0	0	
Lane Group Flow (vph)	0	811	509	525	494	0	362	380	124	9	11	0	0	0	0	
Turn Type	Prot	Prot	Perm	Prot	Prot	Split	Split	Perm	Split	Split	Perm	Split	Split	Perm	Split	
Protected Phases	7	4	4	3	8	2	2	2	6	6	6	6	6	6	6	
Permitted Phases																
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1144	358	558	1540	347	348	575	365	355	355	355	355	355	355	355	
v/s Ratio Prot	0.16	0.32	0.15	0.14	0.22	0.22	0.22	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
v/s Ratio Perm																
v/c Ratio	0.71	1.43	0.94	0.32	1.04	1.09	0.22	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	
Uniform Delay, d1	28.6	31.0	33.1	14.7	31.8	31.8	26.4	25.3	25.4	25.4	25.4	25.4	25.4	25.4	25.4	
Progression Factor	1.47	4.11	1.22	1.25	1.03	1.03	2.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	200.3	21.6	0.5	51.1	66.7	0.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Delay (s)	43.7	327.6	62.1	18.8	83.8	98.2	66.6	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	
Level of Service	D	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Approach Delay (s)	207.3	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Approach LOS	F	F	E	B	F	F	E	C	C	C	C	C	C	C	C	
Intersection Summary																
HCM Average Control Delay					127.2											
HCM Volume to Capacity Ratio					0.88											
Actuated Cycle Length (s)					80.0											
Intersection Capacity Utilization					92.5%											
Analysis Period (min)					15											
c Critical Lane Group																

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EB	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (veh/h)	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	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00	0.85	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1881	1886	1583	1741	1770	3537	1770	3537	1770	3539	1583	1583
Flt Permitted	0.95	0.95	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1881	1886	1583	1741	1770	3537	1770	3539	1583	1583	1583	1583
Volume (veh/h)	841	13	47	3	5	552	413	2	7	616	926	6
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (veh/h)	835	3	49	3	5	581	435	2	7	648	975	6
RTOR Reduction (vph)	0	0	36	0	5	0	0	0	0	0	0	564
Lane Group Flow (vph)	443	445	13	0	11	0	581	436	0	7	648	411
Turn Type	Split	Split	Permit	Split	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit
Protected Phases	4	4		8	8	5	2	1	1	6		6
Permitted Phases			4									
Actuated Green, G (s)	20.5	20.5	20.5	1.5	27.1	38.5	1.5	12.9	12.9	12.9	12.9	12.9
Effective Green, g (s)	21.0	21.0	21.0	2.0	27.6	39.0	2.0	13.4	13.4	13.4	13.4	13.4
Actuated g/C Ratio	0.26	0.26	0.26	0.02	0.35	0.49	0.02	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	441	443	416	44	611	1724	44	593	265	593	265	265
v/s Ratio Prot	0.26	0.26	0.01	0.01	0.33	0.12	0.00	0.18	0.00	0.18	0.00	0.18
v/s Ratio Perm	1.00	1.00	0.03	0.25	0.95	0.25	0.16	1.09	1.55	1.09	1.55	1.55
Uniform Delay, d1	29.5	29.5	21.9	38.3	25.5	12.0	36.2	33.3	33.3	33.3	33.3	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.15	1.99	1.15	1.99	1.99
Incremental Delay, d2	44.0	43.9	0.0	3.0	24.8	0.4	0.2	44.7	250.3	44.7	250.3	250.3
Delay (s)	73.5	73.4	22.0	41.3	50.3	12.3	45.7	83.1	316.6	83.1	316.6	316.6
Level of Service	E	E	E	C	D	B	D	F	F	D	F	F
Approach Delay (s)	70.7	70.7	22.0	41.3	34.0	12.3	45.7	83.1	316.6	83.1	316.6	316.6
Approach LOS	E	E	E	C	D	B	D	F	F	D	F	F
Intersection Summary												
HCM Average Control Delay	129.0											
HCM Volume to Capacity ratio	1.07											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	101.3%											
Analysis Period (min)	15											
Critical Lane Group	c											

13: Project Dwy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	86	765	480	0	838
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	91	805	505	0	882
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream Signal (ft)						
pX, platoon unblocked						
VC, conflicting volume		1940	1058			1311
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol		1940	1058			1311
IC, single (s)		6.4	6.2			4.1
IC, 2 stage (s)						
IF (s)		3.5	3.3			2.2
pl queue free %		100	67			100
GM capacity (veh/h)		72	273			528
Direction Lane #	WB	NB	SB	WB	NB	SB
Volume Total	91	1311	882	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	91	505	0	0	0	0
GSH	273	1700	1700	0	0	0
Volume to Capacity	0.33	0.77	0.52	0	0	0
Queue Length 95th (ft)	35	0	0	0	0	0
Control Delay (s)	24.6	0.0	0.0	0	0	0
Lane LOS	C	C	C	C	C	C
Approach Delay (s)	24.6	0.0	0.0	0	0	0
Approach LOS	C	C	C	C	C	C
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	81.5%					
Analysis Period (min)	15					
ICU Level of Service	D					

15: Business Park Drive & Redwood Drive  
 Graton Rancheria Casino & Hotel

2020 Alternative B  
 PM Peak

Movement	WBL	EBR	NBI	NBT	SBT	SBR
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	14.4	31	12	35.9	36.3	25
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	152	33	13	378	382	26
Hourly Flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pK platoon unblocked						
vC1 conflicting volume	809	204	408			
vC1 stage 1 cont vol						
vC2 stage 2 cont vol	609	204	408			
vCU unblocked vol	6.8	6.9	4.1			
IC 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	64	96	99			
pM capacity (veh/h)	422	803	1147			
Direction Lane	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1
Volume Total	152	33	13	189	189	255
Volume Left	152	0	13	0	0	0
Volume Right	0	33	0	0	0	26
C/S/H	422	803	1147	1700	1700	1700
Volume to Capacity	0.36	0.04	0.01	0.11	0.15	0.09
Queue Length 95th (ft)	40	3	1	0	0	0
Control Delay (s)	18.2	9.7	8.2	0.0	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	16.7	0.3				0.0
Approach LOS	C					C
<b>Intersection Summary</b>						
Average Delay						3.2
Intersection Capacity Utilization						25.5%
Analysis Period (min)						15
						ICU Level of Service
						A

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative B  
 PM Peak

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	900	1900	1900	1900
Initial Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	0.85	1.00	0.85	1.00	1.00
Flt						
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	253	580	664	253	268	571
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	266	611	699	266	282	601
RTOR Reduction (vph)	0	289	0	153	0	0
Lane Group Flow (vph)	266	322	699	113	282	601
Turn Type	Permt	Permt	Permt	Permt	Prot	Prot
Protected Phases	8	2	2	1	6	
Permitted Phases	8	2	2	1	6	
Actuated Green, G (s)	14.2	14.2	26.6	26.6	9.5	40.6
Effective Green, g (s)	14.7	14.7	27.1	27.1	10.0	41.1
Actuated g/C Ratio	0.23	0.23	0.42	0.42	0.16	0.64
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	408	365	791	672	277	1200
v/s Ratio Prot	0.15	c0.38	c0.16	c0.16	0.32	
v/s Ratio Perm	c0.20					
v/c Ratio	0.65	0.88	0.88	0.17	1.02	0.50
Uniform Delay d1	22.2	23.7	16.9	11.4	26.9	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay d2	3.7	21.4	13.7	0.5	58.8	1.5
Delay (s)	25.9	45.1	30.6	11.9	85.7	7.5
Level of Service	C	D	C	B	F	A
Approach Delay (s)	39.3		25.4		32.4	
Approach LOS	D		C		C	
<b>Intersection Summary</b>						
HCM Average Control Delay						32.2
HCM Volume to Capacity ratio						0.91
Actuated Cycle Length (s)						53.8
Intersection Capacity Utilization						77.5%
Analysis Period (min)						15
						ICU Level of Service
						D
						Sum of lost time (s)
						120
						ICU Level of Service
						D
						Critical Lane Group
						C

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665	1665
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665	1665
Volume (vph)	83	648	53	116	855	92	69	26	153	281	40	97
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	682	56	122	900	97	73	27	161	286	42	102
RTOR Reduction (vph)	0	0	44	0	0	72	0	57	70	0	55	0
Lane Group Flow (vph)	87	682	12	122	900	25	73	42	19	286	89	10
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	4	4	4	3	8	8	8	8	8	2	8	8
Actuated Green, G (s)	4.4	16.6	16.6	4.4	16.6	16.6	4.4	16.6	16.6	4.4	16.6	16.6
Effective Green, g (s)	4.9	17.1	17.1	4.9	17.1	17.1	4.9	17.1	17.1	4.9	17.1	17.1
Actuated g/C Ratio	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	108	756	338	210	756	338	210	337	321	551	772	772
v/s Ratio Prot	0.05	c0.19	0.01	0.04	c0.25	0.02	c0.02	c0.03	0.01	c0.17	0.05	0.05
v/s Ratio Perm	0.81	0.90	0.04	0.58	1.19	0.08	0.35	0.13	0.06	0.54	0.12	0.12
Uniform Delay, d1	37.1	30.6	24.9	36.6	31.4	25.1	36.0	25.4	25.0	22.8	12.2	12.2
Progression Factor	1.00	1.00	1.00	1.01	0.51	0.21	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.9	14.0	0.0	2.2	83.1	0.1	1.0	0.8	0.4	1.0	0.3	0.3
Delay (s)	70.9	44.6	25.0	39.2	109.3	5.2	37.0	26.2	25.4	23.8	12.5	12.5
Level of Service	E	D	C	D	F	A	D	C	C	C	B	B
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	39.8											
HCM Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	61.6%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.91	0.91	1.00	0.97	1.00	1.00
Lane Util. Factor	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	1770	3222	1441	3433	1863
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	1770	3222	1441	3433	1863
Volume (vph)	216	763	163	377	966	318	173	326	510	339	301	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	803	172	397	1017	335	182	343	537	357	317	248
RTOR Reduction (vph)	0	0	115	0	0	200	0	70	265	0	198	0
Lane Group Flow (vph)	227	803	57	397	1017	135	182	443	102	357	317	50
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	4	4	4	3	8	8	8	8	8	2	8	8
Actuated Green, G (s)	12.1	25.8	25.8	11.5	25.2	25.2	9.0	15.0	5.0	9.7	15.7	15.7
Effective Green, g (s)	12.6	26.3	26.3	12.0	25.7	25.7	9.5	15.5	5.5	10.2	16.2	16.2
Actuated g/C Ratio	0.18	0.33	0.33	0.15	0.32	0.32	0.12	0.19	0.19	0.13	0.20	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1672	520	515	1137	509	210	624	279	438	377	321
v/s Ratio Prot	c0.13	0.16	0.04	0.12	c0.29	0.10	0.10	0.14	0.07	c0.10	c0.17	0.03
v/s Ratio Perm	0.81	0.48	0.11	0.77	0.89	0.26	0.87	0.71	0.36	0.82	0.84	0.16
Uniform Delay, d1	32.6	21.4	18.7	32.7	25.9	20.1	34.6	30.1	28.0	34.0	30.7	26.3
Progression Factor	0.78	0.65	0.43	0.75	0.70	0.43	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.7	0.3	5.2	8.3	0.9	29.1	3.7	0.8	11.1	15.4	0.2
Delay (s)	37.7	12.5	8.3	28.9	26.4	9.5	63.7	33.9	28.8	45.1	46.1	26.5
Level of Service	D	B	A	C	C	A	E	C	C	D	D	C
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay	28.1											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	77.4%											
Analysis Period (min)	15											
c Critical Lane Group												

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EBL	EET	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	4920	4920	4920	4920	4920	4920	4920	4920	4920	4920
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	21	1567	298	0	853	383	690	0	345	14
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1649	314	0	898	403	726	0	363	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1649	314	0	898	403	726	180	181	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm
Protected Phases	7	4	4	9	9	9	9	2	2	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	2	2	6
Actuated Green, G (s)	2.2	29.5	80.0	22.8	80.0	41.5	41.5	41.5	41.5	41.5
Effective Green, g (s)	2.7	30.0	80.0	23.3	80.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.03	0.38	1.00	0.28	1.00	0.52	0.52	0.52	0.52	0.52
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	60	2403	1583	1481	1583	729	790	790	790	799
v/s Ratio Prot	0.01	0.26	0.20	0.18	0.20	0.25	0.52	0.12	0.12	0.01
v/s Ratio Perm	0.37	0.69	0.20	0.61	0.25	1.00	0.23	0.23	0.23	0.02
Uniform Delay, d1	37.8	21.0	0.0	24.4	0.0	18.9	10.3	10.3	10.3	9.1
Progression Factor	1.10	1.19	1.00	0.73	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	1.1	0.2	1.4	0.3	32.1	0.1	0.1	0.1	0.0
Delay (s)	44.3	26.1	0.2	19.1	0.3	51.0	10.4	10.4	10.4	9.1
Level of Service	D	C	A	B	A	D	B	B	B	A
Approach Delay (s)	22.2	C	C	13.3	B	37.5	D	D	D	A
Approach LOS	C	C	C	B	B	D	D	D	D	A
<b>Intersection Summary</b>										
HCM Average Control Delay	23.3									
HCM Volume to Capacity ratio	0.87									
Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	72.3%									
Analysis Period (min)	15									
c Critical Lane Group	C									

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Movement	EBL	EET	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	4920	4920	4920	4920	4920	4920	4920	4920	4920	4920
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	0	263	349	68	1225	255	6	0	17	611
Peak-hour factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	329	367	72	1289	268	6	0	18	643
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1639	0	72	1289	268	0	12	0	322
Turn Type	Prot	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm
Protected Phases	4	3	8	2	2	2	6	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	25.0	25.0	25.0	25.0
Actuated Green, G (s)	36.7	4.8	46.0	80.0	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	37.2	5.3	46.5	80.0	25.5	25.5	25.5	25.5	25.5	25.5
Actuated g/C Ratio	0.47	0.07	0.58	1.00	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	2288	117	2057	1583	484	484	418	400	505	505
v/s Ratio Prot	0.033	0.04	0.36	0.17	0.01	0.01	0.25	0.26	0.27	0.27
v/s Ratio Perm	0.72	0.62	0.63	0.17	0.02	0.02	0.77	0.81	0.83	0.83
Uniform Delay, d1	17.2	36.4	11.0	0.0	18.7	24.6	25.0	25.3	25.3	25.3
Progression Factor	0.45	1.17	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	6.1	0.9	0.2	0.0	0.0	8.5	11.2	11.1	11.1
Delay (s)	9.2	48.8	10.0	0.2	8.7	33.1	36.2	36.4	36.4	36.4
Level of Service	A	D	B	A	B	C	D	D	D	D
Approach Delay (s)	9.2	10.1	18.7	B	B	35.4	D	D	D	D
Approach LOS	A	B	B	B	B	D	D	D	D	D
<b>Intersection Summary</b>										
HCM Average Control Delay	16.0									
HCM Volume to Capacity ratio	0.77									
Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	73.6%									
Analysis Period (min)	15									
c Critical Lane Group	D									

21: Robinson Park Expy & Commerce Boulevard  
Graton Rancheria Casino & Hotel  
2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (Vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95
Satd. Flow (prot)	3433	3539	1583	1770	4913	1610	3330	1583	3387
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95
Satd. Flow (perm)	3433	3539	1583	1770	4913	1610	3330	1583	3387
Volume (vph)	235	1232	462	165	694	202	384	293	241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1297	466	174	731	213	404	308	254
RTOR Reduction (vph)	0	0	346	0	62	0	0	204	0
Lane Group Flow (vph)	247	1297	140	174	882	0	229	483	50
Lane Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Perm
Protected Phases	7	4	3	8	3	2	2	6	6
Permitted Phases	4	2	2	2	2	2	2	2	2
Actuated Green, G (s)	12.6	22.6	22.6	10.0	20.0	15.4	15.4	14.0	14.0
Effective Green, g (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	14.5	14.5
Actuated g/C Ratio	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	562	1022	457	232	1259	320	662	315	292
W/S Ratio Prot	0.07	c0.37	0.09	0.10	c0.18	0.14	c0.15	0.11	0.11
W/S Ratio Perm	0.44	1.27	0.31	0.75	0.70	0.72	0.73	0.62	0.62
Uniform Delay, d1	30.1	28.4	22.2	33.5	27.0	29.9	30.0	26.5	30.2
Progression Factor	0.43	0.38	0.39	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	127.4	1.4	12.8	3.3	7.4	4.0	0.2	3.9
Delay (s)	13.6	138.2	10.1	45.2	30.2	37.4	34.1	28.6	32.1
Level of Service	B	F	B	D	C	D	C	C	C
Approach Delay (s)	92.4	F	D	327	C	32.9	C	31.5	C
Approach LOS	F	F	D	C	C	C	C	C	C
<b>Intersection Summary</b>									
HCM Average Control Delay	57.6								
HCM Volume to Capacity ratio	0.91								
Actuated Cycle Length (s)	80.0								
Intersection Capacity Utilization	79.4%								
Analysis Period (min)	15								
c - Critical Lane Group	E								

22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel  
2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (Vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.85
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1770	3539	1583	1770	1863	1770	1863
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1770	3539	1583	1770	1863	1770	1863
Volume (vph)	149	583	228	140	661	230	323	483	113
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	614	240	147	696	242	340	508	119
RTOR Reduction (vph)	0	59	0	0	183	0	0	78	0
Lane Group Flow (vph)	157	795	0	147	696	59	340	508	41
Lane Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	7	4	3	8	3	2	2	6	6
Permitted Phases	4	2	2	2	2	2	2	2	2
Actuated Green, G (s)	5.5	16.5	16.5	5.5	16.5	13.5	23.5	23.5	6.5
Effective Green, g (s)	6.0	17.0	17.0	6.0	17.0	14.0	24.0	24.0	7.0
Actuated g/C Ratio	0.09	0.24	0.24	0.09	0.24	0.20	0.34	0.34	0.10
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	823	152	859	384	354	639	543	177
W/S Ratio Prot	c0.09	c0.23	0.08	0.20	0.19	c0.27	c0.13	0.20	0.04
W/S Ratio Perm	1.03	0.97	0.97	0.81	0.15	0.96	0.79	0.08	1.29
Uniform Delay, d1	32.0	26.2	31.9	25.0	20.8	27.7	20.8	15.5	31.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	82.0	23.1	62.4	5.8	0.2	37.3	9.9	0.3	167.5
Delay (s)	114.0	49.3	94.3	30.8	21.0	65.0	30.6	15.8	199.0
Level of Service	F	D	F	C	C	E	C	B	F
Approach Delay (s)	59.4	E	D	37.2	D	40.9	D	79.2	E
Approach LOS	E	E	D	D	D	D	D	D	E
<b>Intersection Summary</b>									
HCM Average Control Delay	52.8								
HCM Volume to Capacity ratio	0.90								
Actuated Cycle Length (s)	70.0								
Intersection Capacity Utilization	82.0%								
Analysis Period (min)	15								
c - Critical Lane Group	D								



23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900											
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.90	1.00	1.00	1.00	0.88
Lane Util. Factor	1.00	0.99	1.00	1.00	0.95	1.00	0.90	1.00	0.95	1.00	1.00	0.95
Fit Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Fit Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Volume (vph)	122	819	32	53	914	406	48	28	59	592	28	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	862	34	56	962	427	51	29	62	623	29	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	128	893	0	56	962	282	51	34	0	623	84	0
Turn Type	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	5.5	21.8	4.4	20.7	20.7	3.3	6.4	39.4	42.5			
Effective Green, g (s)	6.0	22.3	4.9	21.2	21.2	3.8	6.9	39.9	43.0			
Actuated g/C Ratio	0.07	0.25	0.05	0.24	0.24	0.04	0.08	0.41	0.48			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	118	872	96	834	373	75	128	785	783			
v/s Ratio Prot	0.07	c0.25	0.03	c0.27	0.18	c0.03	0.02	c0.35	c0.05			
v/s Ratio Perm												
v/s Ratio	1.06	1.02	0.58	1.15	0.76	0.68	0.26	0.79	0.11			
Uniform Delay, d1	42.0	33.9	41.6	34.4	32.0	42.5	36.2	21.5	12.9			
Progression Factor	1.00	1.00	0.67	0.59	0.27	1.00	1.00	1.00	1.00			
Incremental Delay, d2	107.4	36.7	7.4	80.8	11.4	22.4	1.1	5.5	0.1			
Delay (s)	149.4	70.6	35.4	100.9	20.1	64.9	48.3	27.1	13.0			
Level of Service	F	E	D	F	C	E	D	C	B			
Approach Delay (s)	F	E	D	F	C	E	D	C	B			
Approach LOS	F	E	D	F	C	E	D	C	B			
Intersection Summary												
HCM Average Control Delay	63.8											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	81.9%											
Analysis Period (min)	15											
c - Critical Lane Group												

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative B  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900											
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.85
Lane Util. Factor	1.00	0.99	1.00	1.00	0.95	1.00	0.90	1.00	0.95	1.00	1.00	0.95
Fit Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Fit Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Volume (vph)	0	953	523	68	1115	0	0	0	0	640	0	258
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1003	551	68	1174	0	0	0	0	674	0	272
RTOR Reduction (vph)	0	0	119	0	0	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	1003	432	68	1174	0	0	0	0	674	0	272
Turn Type	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8									
Permitted Phases												
Actuated Green, G (s)	36.7	36.4	11.6	52.5						28.5		28.5
Effective Green, g (s)	36.9	36.9	12.1	53.0						29.0		29.0
Actuated g/C Ratio	0.41	0.41	0.13	0.59						0.32		0.32
Clearance Time (s)	4.5	4.5	4.5	4.5						4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0						3.0		3.0
Lane Grp Cap (vph)	1451	649	238	2084						1106		510
v/s Ratio Prot	c0.28		0.04	c0.33						c0.20		0.14
v/s Ratio Perm												
v/s Ratio	0.68	0.67	0.29	0.56						0.61		0.43
Uniform Delay, d1	21.9	21.6	35.1	11.4						25.7		24.0
Progression Factor	0.44	0.42	1.26	1.68						1.00		1.00
Incremental Delay, d2	1.4	2.7	0.6	1.0						1.0		2.6
Delay (s)	11.0	11.8	44.9	20.1						26.7		26.7
Level of Service	B	B	D	C						C		C
Approach Delay (s)	B	B	D	C						C		C
Approach LOS	B	B	D	C						C		C
Intersection Summary												
HCM Average Control Delay	18.6											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	67.7%											
Analysis Period (min)	15											
c - Critical Lane Group												

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	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	0.95	0.95	0.97	1.00	0.85	0.85
Flt. Protected	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	3539	3433	1583	3539	3539
Flt. Permitted	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	3539	3433	1583	3539	3539
Volume (vph)	1596	0	883	492	273	273
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1660	0	719	518	287	287
RTOR Reduction (vph)	0	0	0	0	14	14
Lane Group Flow (vph)	1660	0	719	518	273	273
Turn Type					Perm	
Protected Phases	4		8	2	2	
Permitted Phases						2
Actuated Green, G (s)	60.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)	60.5	21.5	21.5	21.5	21.5	21.5
Actuated g/C Ratio	0.67	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2379	820	378			
v/s Ratio Prot	0.47	0.20	0.15			
v/s Ratio Perm			0.17			
v/C Ratio	0.71	0.30	0.63	0.72		
Uniform Delay, d1	9.2	6.1	30.7	31.5		
Progression Factor	0.37	1.00	1.00	1.00		
Incremental Delay, d2	1.4	0.3	1.6	6.7		
Delay (s)	4.8	6.4	32.3	38.2		
Level of Service	A	A	C	D		
Approach Delay (s)	4.8	6.4	34.4			
Approach LOS	A	A	C			
<b>Intersection Summary</b>						
HCM Average Control Delay	12.6		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.71		Sum of lost time (s)		8.0	
Actuated Cycle Length (s)	90.0		ICU Level of Service		C	
Intersection Capacity Utilization	67.7%		Analysis Period (min)		15	
Analysis Period (min)	15		Critical Lane Group		C	

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	0%	0%	0%	0%	0%	0%
Grade	11	5	8	23	25	241
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	12	5	8	24	26	254
Hourly flow rate (vph)	12	5	8	24	26	254
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type						None
Median storage (veh)						
Upstream Signal (ft)						
pX, platoon unblocked						
vC1, conflicting volume	1608	1924	375	1532	1900	428
vC1, stage 1 conf vol						884
vC2, stage 2 conf vol						884
vC1, unblocked vol	1608	1924	375	1532	1900	428
IC, single (s)	7.5	6.5	6.9	7.3	6.5	6.9
IC, 2 stage (s)						4.1
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3
pl queue free %	46	90	99	61	53	99
pl capacity (veh/h)	21	54	622	62	55	855
CM capacity (veh/h)						761
<b>Direction Lane #</b>						
Volume Total	25	304	7	428	428	27
Volume Left	12	24	7	0	0	139
Volume Right	8	254	0	0	0	139
cSH	38	354	855	1700	1700	761
Volume to Capacity	0.66	0.86	0.01	0.25	0.25	0.02
Queue Length 95th (ft)	59	201	1	0	0	0
Control Delay (s)	204.7	43.4	9.2	0.0	0.0	10.8
Lane LOS	F	E	A	A	B	B
Approach delay (s)	204.7	45.4	0.1			1.7
Approach LOS	F	E	A			
<b>Intersection Summary</b>						
Average Delay	9.7		ICU Level of Service		A	
Intersection Capacity Utilization	50.8%		Analysis Period (min)		15	
Analysis Period (min)	15		Critical Lane Group		A	

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
Lane Configurations	↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔																	
Sign Control	Free Free Free Free Free Free																	
Grade	0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%																	
Volume (veh/h)	1	161	5	7	265	2	23	0	2	0	1	0						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95						
Hourly flow rate (vph)	1	159	5	7	279	2	24	0	2	0	1	0						
Pedestrians	-																	
Lane Width (ft)	-																	
Walking Speed (ft/s)	-																	
Percent Blockage	-																	
Right turn flare (veh)	-																	
Median type	None																	
Median storage (veh)	-																	
Upstream signal (ft)	-																	
pX, platoon unblocked	-																	
vC, conflicting volume	281	-																
vC1, stage 1 conf vol	175	-																
vC2, stage 2 conf vol	175	-																
vCU, unblocked vol	4.1	-																
IC, 2 stage (s)	4.1	-																
IF (s)	2.2	-																
p0 queue free %	100	-																
pl capacity (veh/h)	1281	-																
Direction Lane #	EB	WB	NB	T	SB							EB	WB	NB	T	SB		
Volume Total	176	288	26	1	24	1							469	470	172	471	472	280
Volume Left	1	7	24	0	0	0							7.1	6.5	6.2	7.1	6.5	6.2
Volume Right	5	2	2	0	0	0							3.5	4.0	3.3	3.5	4.0	3.3
cSH	1281	1402	519	488	0	0							469	470	172	471	472	280
Volume to Capacity	0.00	0.01	0.05	0.00	0.00	0.00							0.95	0.95	0.95	0.95	0.95	0.95
Queue Length 95th (ft)	0	0	4	0	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Control Delay (s)	0.1	0.2	12.3	12.4	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Lane LOS	A	A	B	B	B	B							0.95	0.95	0.95	0.95	0.95	0.95
Approach Delay (s)	0.1	0.2	12.3	12.4	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Approach LOS	B	B	B	B	B	B							0.95	0.95	0.95	0.95	0.95	0.95
<b>Intersection Summary</b>																		
Average Delay	0.8																	
Intersection Capacity Utilization	33.6%																	
ICU Level of Service	A																	
Analysis Period (min)	15																	

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR							
Lane Configurations	↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔																	
Sign Control	Free Free Free Free Free Free																	
Grade	0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%																	
Volume (veh/h)	1	146	2	4	279	8	1	9	0	4	0							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95							
Hourly flow rate (vph)	1	154	2	4	294	8	1	9	0	4	0							
Pedestrians	-																	
Lane Width (ft)	-																	
Walking Speed (ft/s)	-																	
Percent Blockage	-																	
Right turn flare (veh)	-																	
Median type	None																	
Median storage (veh)	-																	
Upstream signal (ft)	-																	
pX, platoon unblocked	-																	
vC, conflicting volume	302	-																
vC1, stage 1 conf vol	302	-																
vC2, stage 2 conf vol	4.1	-																
vCU, unblocked vol	4.1	-																
IC, 2 stage (s)	4.1	-																
IF (s)	2.2	-																
p0 queue free %	100	-																
pl capacity (veh/h)	1259	-																
Direction Lane #	EB	WB	NB	T	SB							EB	WB	NB	T	SB		
Volume Total	157	306	11	5	4	1							464	467	155	468	464	298
Volume Left	1	4	1	4	1	4							4.1	4.1	6.5	6.2	7.1	6.5
Volume Right	2	8	0	1	1	1							2.2	2.2	4.0	3.3	3.5	4.0
cSH	1259	1424	493	532	0	0							464	467	155	468	464	298
Volume to Capacity	0.00	0.00	0.02	0.01	0.00	0.00							0.95	0.95	0.95	0.95	0.95	0.95
Queue Length 95th (ft)	0	0	2	1	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Control Delay (s)	0.1	0.1	12.5	11.8	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Lane LOS	A	A	B	B	B	B							0.95	0.95	0.95	0.95	0.95	0.95
Approach Delay (s)	0.1	0.1	12.5	11.8	0	0							0.95	0.95	0.95	0.95	0.95	0.95
Approach LOS	B	B	B	B	B	B							0.95	0.95	0.95	0.95	0.95	0.95
<b>Intersection Summary</b>																		
Average Delay	0.5																	
Intersection Capacity Utilization	27.8%																	
ICU Level of Service	A																	
Analysis Period (min)	15																	

Movement	EB1	EBR	WB1	WB2	NB1	NB2	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%
Grade	154	27	7	331	27	25	25
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	182	28	7	348	28	26	26
Hourly flow rate (vph)							
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	191				539		176
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCU, unblocked vol	191				539		176
tC, single (s)	4.1				6.4		6.2
tC, 2 stage (s)							
TF (s)	2.2				3.5		3.3
p0 queue free %	99				94		97
p0 queue free %							
GM capacity (veh/h)	1383				500		867
Direction Lane #	EB1	WB1	NB1	NB2	NBR		
Volume Total	191	356	155				
Volume Left	0	7	28				
Volume Right	28	0	26				
cSH	1700	1383	828				
Volume to Capacity	0.11	0.01	0.09				
Queue Length 95th (ft)	0	0	7				
Control Delay (s)	0.0	0.2	11.3				
Lane LOS	A	A	B				
Approach Delay (s)	0.0	0.2	11.3				
Approach LOS	B	B	B				
<b>Intersection Summary</b>							
Average Delay	1.2						
Intersection Capacity Utilization	33.0%						
ICU Level of Service	A						
Analysis Period (min)	15						

Movement	EB1	EBR	WB1	WB2	NB1	NB2	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%
Grade	0	160	23	36	225	0	114
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0	168	24	38	237	0	120
Hourly flow rate (vph)							
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							None
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	237				193		493
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCU, unblocked vol	237				193		493
tC, single (s)	4.1				4.1		7.1
tC, 2 stage (s)							
TF (s)	2.2				2.2		3.5
p0 queue free %	100				97		75
p0 queue free %							
GM capacity (veh/h)	1330				1381		476
Direction Lane #	EB1	WB1	NB1	NB2	NBR		
Volume Total	193	275	147	0			
Volume Left	0	38	120	0			
Volume Right	24	0	27	0			
cSH	1330	1381	519	1700			
Volume to Capacity	0.00	0.03	0.28	0.00			
Queue Length 95th (ft)	0	2	29	0			
Control Delay (s)	0.0	1.3	14.7	0.0			
Lane LOS	A	A	B	A			
Approach Delay (s)	0.0	1.3	14.7	0.0			
Approach LOS	B	B	B	A			
<b>Intersection Summary</b>							
Average Delay	4.1						
Intersection Capacity Utilization	41.6%						
ICU Level of Service	A						
Analysis Period (min)	15						

Movement	EB	EB	WB	WB	NB	NB
Lane Configurations	Free	Free	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	131	51	0	235	55	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	138	54	0	247	58	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median storage (veh)						
Upstream signal (ft)						
pK, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
IC, unblocked vol						
IC, 2 stage (s)						
IF (s)						
p0 queue free %						
gM capacity (veh/h)						
Direction	EB	WB	WB	NB	NB	
Volume Total	192	247	58	192	165	
Volume Left	0	0	58	412	165	
Volume Right	54	0	0	6.4	6.2	
CSH	1700	1382	596			
Volume to Capacity	0.11	0.00	0.10			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.0	0.0	11.7			
Lane LOS	B	B	B			
Approach Delay (s)	0.0	0.0	11.7			
Approach LOS	B	B	B			
Intersection Summary						
Average Delay	1.4					
Intersection Capacity Utilization	22.4%					
Analysis Period (min)	15					
ICU Level of Service	A					

Lane Group	EBT	EBL	EBR	WBT	WBL	WBR	NBT	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	165	1597	268	77	1013	768	585	108	368	477	320
v/c Ratio	0.31	1.57	0.56	0.14	1.70	1.06	2.65	0.43	0.81	0.73	1.06
Control Delay	45.2	298.0	39.4	31.2	348.7	74.9	778.1	75.6	20.8	68.1	114.2
Queue Delay	0.0	364.3	0.0	0.0	103.0	67.6	0.0	0.0	27.1	421.4	0.0
Total Delay	45.2	662.3	39.4	31.2	451.7	142.5	778.1	75.6	47.8	489.4	114.2
Queue Length 50th (ft)	134	1296	194	49	1670	2707	1028	58	0	243	284
Queue Length 95th (ft)	203	1442	304	73	1795	2707	1028	89	110	350	490
Internal Link Dist (ft)	150	550	150	220	220	220	220	110	110	270	270
Turn Bay Length (ft)	150	550	150	220	220	220	220	110	110	270	270
Base Capacity (vph)	537	1017	481	567	597	722	221	376	497	656	302
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	346	0	0	0	0	0	0	135	409	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	2.38	0.56	0.14	1.93	1.22	2.65	0.29	1.02	1.93	1.06

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBL	EBR	WBT	WBL	WBR	SBL	SBR
Lane Group Flow (vph)	1538	907	81	1118	374	1040		
v/c Ratio	0.91	0.99	0.32	0.55	0.72	1.35dr		
Control Delay	29.2	32.6	44.9	18.5	32.9	54.6		
Queue Delay	162.2	118.6	0.0	0.3	0.0	92.5		
Total Delay	191.3	151.2	44.9	18.8	32.9	147.1		
Queue Length 50th (ft)	850	925	19	269	179	264		
Queue Length 95th (ft)	m260	m111	m26	m233	#292	#413		
Internal Link Dist (ft)	220	220	466	466	250	250		
Turn Bay Length (ft)	220	220	466	466	250	250		
Base Capacity (vph)	1681	918	257	2035	523	1040		
Starvation Cap Reductn	553	213	0	0	0	0		
Spillback Cap Reductn	0	0	0	339	0	196		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	1.36	1.29	0.32	0.66	0.72	1.23		

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 n Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Record with 1 though lane as a right lane.

Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	811	1103	525	497	362	380	601	9	18
v/c Ratio	0.71	1.16	0.94	0.32	1.04	1.09	0.57	0.02	0.05
Control Delay	43.8	102.5	64.9	18.9	85.9	99.4	6.3	25.7	18.8
Queue Delay	0.0	84.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Total Delay	43.8	186.7	64.9	18.9	85.9	99.4	6.7	25.7	18.8
Queue Length 50th (ft)	0	106.0	148	127	153	212	35	4	4
Queue Length 95th (ft)	m#1434	#240	175	m#251	m#269	m34	16	21	21
Internal Link Dist (ft)	-466		345		380			270	
Turn Bay Length (ft)	150		150		200			200	
Base Capacity (vph)	1144	951	558	1544	347	349	1052	365	363
Starvation Cap Reductn	0	134	0	0	0	0	0	0	0
Spillback Cap Reductn	0	21	0	0	0	0	124	0	7
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.35	0.94	0.32	1.04	1.09	0.65	0.02	0.05

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m. Queue shown is maximum after two cycles.  
 m. Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	144	1280	390	107	108			107	108
v/c Ratio	0.37	0.57	0.59	0.23	0.22			0.23	0.22
Control Delay	28.0	19.8	17.4	24.8	6.3			24.8	6.3
Queue Delay	0.0	1.8	0.0	0.0	0.0			0.0	0.0
Total Delay	28.0	21.6	17.4	24.8	6.3			24.8	6.3
Queue Length 50th (ft)	40	289	177	42	0			42	0
Queue Length 95th (ft)	m56	323	251	63	35			63	35
Internal Link Dist (ft)		345	164	232				232	
Turn Bay Length (ft)	80		2256	1663	465			200	
Base Capacity (vph)	901	762	0	0	0			495	
Starvation Cap Reductn	0	0	0	0	0			0	
Spillback Cap Reductn	0	0	0	0	0			0	
Storage Cap Reductn	0	0	0	0	0			0	
Reduced v/c Ratio	0.16	0.86	0.59	0.23	0.22			0.23	0.22

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	443	445	49	16	581	437	7	648
v/c Ratio	1.00	1.00	0.11	0.11	1.09	0.21	0.05	0.71
Control Delay	76.2	76.1	7.9	29.3	96.8	10.5	39.9	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.2	76.1	7.9	29.3	96.8	10.5	39.9	33.6
Queue Length 50th (ft)	-234	-236	0	5	333	42	3	168
Queue Length 95th (ft)	#430	#432	25	23	#524	124	m3	#267 m#496
Internal Link Dist (ft)	284	118	200	214	380			
Turn Bay Length (ft)	250	250	179	531	2044	177	912	910
Base Capacity (vph)	441	443	452	0	0	0	0	60
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	1.00	0.11	0.09	1.09	0.21	0.04	0.71

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	266	611	659	266	282	601
v/c Ratio	0.65	0.94	0.88	0.32	1.01	0.50
Control Delay	30.5	34.2	33.6	3.1	90.2	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	34.2	33.6	3.1	90.2	8.1
Queue Length 50th (ft)	94	89	249	0	-124	111
Queue Length 95th (ft)	164	#289	#453	38	#257	180
Internal Link Dist (ft)	480	3920				2550
Turn Bay Length (ft)	175	450	700			
Base Capacity (vph)	436	672	790	824	278	1199
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.91	0.88	0.32	1.01	0.50

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



17: Rohnert Park Expy & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	87	682	56	122	900	97	73	99	89	286	144	
v/c Ratio	0.85	0.90	0.15	0.47	1.19	0.24	0.28	0.23	0.21	0.56	0.17	
Control Delay	60.6	48.3	8.8	39.7	114.5	2.3	38.1	12.0	7.8	28.4	5.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.6	48.3	8.8	39.7	114.5	2.3	38.1	12.0	7.8	28.4	5.5	
Queue Length 50th (ft)	43	176	0	23	272	1	18	11	0	123	12	
Queue Length 95th (ft)	#111	#278	29	m31	m345	m1	38	52	37	202	43	
Internal Link Dist (ft)	1540				220		1010				520	
Turn Bay Length (ft)	160	200	250	170	130	408	257	428	424	531	863	
Base Capacity (vph)	133	755	381	257	755	408	257	428	424	531	863	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.90	0.15	0.47	1.19	0.24	0.28	0.23	0.21	0.56	0.17	

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 # Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 # Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2020 Alternative B  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	227	803	172	397	1017	335	182	513	367	357	317	248
v/c Ratio	0.81	0.48	0.27	0.77	0.90	0.47	0.87	0.74	0.67	0.81	0.84	0.48
Control Delay	44.4	12.7	2.3	33.7	28.3	3.5	73.5	31.9	12.0	51.7	51.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	12.7	2.3	33.7	28.3	3.5	73.5	31.9	12.0	51.7	51.3	7.3
Queue Length 50th (ft)	70	56	4	110	290	24	92	108	16	92	151	0
Queue Length 95th (ft)	m#113	m66	m8	m#150	m#373	m29	#210	163	106	#172	#279	57
Internal Link Dist (ft)	320			520			554				480	
Turn Bay Length (ft)	200	250	350	155	250	709	210	753	565	439	396	532
Base Capacity (vph)	288	1669	636	515	1135	709	210	753	565	439	396	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.48	0.27	0.77	0.90	0.47	0.87	0.68	0.65	0.81	0.80	0.47

Intersection Summary  
 # Volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue is metered by upstream signal.

Lane Group	EBT	WBT	WBR	NB	SBT	SBR
Lane Group Flow (vph)	1696	72	1289	268	24	322
v/c Ratio	0.71	0.50	0.63	0.17	0.05	0.77
Control Delay	9.1	50.8	10.9	0.1	9.5	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	50.8	10.9	0.1	9.5	37.1
Queue Length 50th (ft)	145	36	187	0	2	141
Queue Length 95th (ft)	182	m53	m185	m0	17	238
Internal Link Disk (ft)	520		960		428	378
Turn Bay Length (ft)	225				400	400
Base Capacity (vph)	2398	143	2057	1583	576	455
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.50	0.63	0.17	0.04	0.68

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBT	EBR	WBT	WBR	NB	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	22	1549	314	898	403	726	181	182	18	18
v/c Ratio	0.17	0.89	0.20	0.54	0.25	0.99	0.23	0.23	0.02	0.02
Control Delay	40.6	26.4	0.2	17.9	0.3	53.5	11.1	11.1	8.3	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	26.4	0.2	17.9	0.3	53.5	11.1	11.1	8.3	8.3
Queue Length 50th (ft)	12	250	0	76	0	338	47	47	3	3
Queue Length 95th (ft)	m16	265	m0	119	m0	7587	85	86	13	13
Internal Link Disk (ft)		960		360		386			420	420
Turn Bay Length (ft)	190					225			801	801
Base Capacity (vph)	133	2403	1583	1653	1583	730	791	791	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.89	0.20	0.54	0.25	0.99	0.23	0.23	0.02	0.02

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative B  
 PM Peak

2020 Alternative B  
 PM Peak

Lane Group	EBT	EBF	EBR	WBE	WBT	NBE	NBT	NBR	SBE	SBT	SBR
Lane Group Flow (vph)	247	1297	486	174	944	229	483	254	181	380	160
v/c Ratio	0.44	1.27	0.61	0.75	0.71	0.71	0.73	0.49	0.62	0.62	0.38
Control Delay	15.3	145.6	3.8	60.0	29.4	43.2	36.9	7.4	39.4	34.4	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	145.6	4.7	60.0	29.4	43.2	36.9	7.4	39.4	34.4	7.7
Queue Length 50th (ft)	30	434	0	68	148	116	123	0	91	96	0
Queue Length 95th (ft)	m55	#536	19	#222	#219	#214	176	58	158	138	47
Internal Link Dist (ft)	360			1350			601			660	
Turn Bay Length (ft)	250			200			250			150	150
Base Capacity (vph)	558	1020	802	231	1322	342	707	536	342	720	462
Starvation Cap Reductn	0	0	121	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.27	0.71	0.75	0.71	0.67	0.68	0.47	0.53	0.53	0.35

**Intersection Summary**  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBF	EBR	WBE	WBT	NBE	NBT	NBR	SBE	SBT	SBR
Lane Group Flow (vph)	157	854	147	686	242	340	508	119	229	377	247
v/c Ratio	1.03	0.97	0.97	0.81	0.43	0.96	0.79	0.19	1.29	0.83	0.44
Control Delay	118.8	49.3	102.1	34.1	6.0	70.2	32.2	4.5	168.5	43.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	118.8	49.3	102.1	34.1	6.0	70.2	32.2	4.5	168.5	43.6	6.5
Queue Length 50th (ft)	72	176	65	148	0	146	194	0	129	154	3
Queue Length 95th (ft)	#183	#295	#170	#230	51	#298	#346	31	#255	#292	54
Internal Link Dist (ft)	685			6630		734				960	
Turn Bay Length (ft)	350			500		150	550		675	500	625
Base Capacity (vph)	152	863	152	859	568	354	639	621	177	452	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.97	0.97	0.81	0.43	0.96	0.79	0.19	1.29	0.83	0.44

**Intersection Summary**  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.

Lane Group	SBL	EBT	WBL	WBR	NBL	NBT	SBL	SRT
Lane Group Flow (vph)	128	896	56	962	427	51	91	623
v/c Ratio	1.08	0.91	0.47	1.06	0.78	0.43	0.44	0.81
Control Delay	150.1	47.7	36.9	68.6	15.0	52.2	22.9	34.4
Queue Delay	0.0	1.2	0.0	0.0	0.6	0.0	0.0	0.0
Total Delay	150.1	48.9	36.9	68.6	15.6	52.2	22.9	34.4
Queue Length 50th (ft)	82	266	29	327	8	28	16	310
Queue Length 95th (ft)	#194	#401	m54	#430	#261	65	59	#556
Internal Link Dist (ft)	6630	350		200				236
Turn Bay Length (ft)	225	150		80		50		225
Base Capacity (vph)	118	980	118	904	546	118	366	767
Starvation Cap Reductn	0	0	0	0	15	0	0	0
Spillback Cap Reductn	0	19	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.93	0.47	1.06	0.80	0.43	0.25	0.81

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1003	551	69	1174	574	272
v/c Ratio	0.67	0.71	0.27	0.56	0.61	0.48
Control Delay	11.3	9.3	44.1	20.5	28.6	20.6
Queue Delay	0.4	0.9	0.0	0.4	0.0	0.0
Total Delay	11.8	10.2	44.1	20.9	28.6	20.6
Queue Length 50th (ft)	144	93	38	286	164	89
Queue Length 95th (ft)	m165	m123	m72	362	222	161
Internal Link Dist (ft)	350			370		585
Turn Bay Length (ft)	50	100		425		425
Base Capacity (vph)	1486	781	295	2084	1106	562
Starvation Cap Reductn	141	70	0	399	0	0
Spillback Cap Reductn	47	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.77	0.23	0.70	0.61	0.48

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

2020

Alternative B  
 PM Peak

	EB	WB	NB	NBR
Lane Group Flow (vph)	1680	719	518	287
v/c Ratio	0.71	0.30	0.63	0.73
Control Delay	5.4	7.3	33.4	39.9
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	5.4	7.4	33.4	39.9
Queue Length 50ft (ft)	189	75	138	143
Queue Length 95ft (ft)	250	142	162	201
Internal Link Length (ft)	370	312	431	
Turn Bay Length (ft)		395	275	
Base Capacity (vph)	2378	2378	1221	574
Starvation Cap Reductn	60	0	0	0
Spillback Cap Reductn	0	143	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.32	0.42	0.50

Intersection Summary

**NEAR-TERM 2008 + ALTERNATIVE C  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EBL	EBT	EBK	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (veh/h)	0	8	14	332	13	172	12	758	317	196	196	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	8	15	349	14	181	13	798	334	206	206	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
p.x. platoon unblocked												
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol												
IC, single (s)												
IC, 2 stage (s)												
IF (s)												
p0 queue free %												
p0 queue free %												
CM capacity (veh/h)												
Direction Lane #	EBL	EBT	EBK	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	23	544	13	1132	206	544						
Volume Left	0	349	13	0	206	0						
Volume Right	15	181	0	334	0	3						
cSH	83	40	1025	1700	617	1700						
Volume to Capacity	0.28	13.53	0.01	0.67	0.33	0.32						
Queue Length 95th (ft)	26	Err	1	0	37	0						
Control Delay (s)	64.3	Err	8.6	0.0	13.7	0.0						
Lane LOS	F	F	F	A	B	B						
Approach Delay (s)	64.3	Err	0.1		3.8							
Approach LOS	F	F	F									
<b>Intersection Summary</b>												
Average Delay	2211.9											
Intersection Capacity Utilization	105.8%											
Analysis Period (min)	15											
ICU Level of Service	G											

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EBL	EBT	EBK	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (veh/h)	10	507	10	10	502	10	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	534	11	11	528	11	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
p.x. platoon unblocked												
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol												
IC, single (s)												
IC, 2 stage (s)												
IF (s)												
p0 queue free %												
p0 queue free %												
CM capacity (veh/h)												
Direction Lane #	EBL	EBT	EBK	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	555	549	43	32								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	1029	1025	225	229								
Volume to Capacity	0.01	0.01	0.19	0.14								
Queue Length 95th (ft)	1	1	17	12								
Control Delay (s)	0.3	0.3	24.7	23.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.3	24.7	23.2								
Approach LOS	C	C	C	C								
<b>Intersection Summary</b>												
Average Delay	1.8											
Intersection Capacity Utilization	42.4%											
Analysis Period (min)	15											
ICU Level of Service	A											

3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel  
2008 Alternative C  
PM Peak

Direction	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBB	SBT	SBR
Volume (veh/h)	10	131	386	846	200	20	313	332	752	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	113	138	408	891	211	21	327	344	782	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
Px, platoon unblocked												
vc1, conflicting volume	232						2380	2375	341	3173	2567	221
vc2, stage 1 conf vol	232						2380	2375	341	3173	2567	221
vcu, unblocked vol	43						71	63	62	71	63	62
tc, 2 stage (s)												
tc, 2 stage (s)												
pf queue free %	99						0	0	0	0	0	99
pf queue free %	99						0	0	0	0	0	99
em capacity (veh/h)	1336						1025	1025	701	0	3	819
Direction	EB	WB	NB	SB								
Volume Total	555	1122	1153	32								
Volume Left	11	891	327	11								
Volume Right	406	231	796	11								
C/S/H	1336	1025	0	0								
Volume to Capacity	0.01	0.87	Err	Err								
Queue Length 95th (ft)	1	293	Err	Err								
Control Delay (s)	0.2	26.4	Err	Err								
Lane LOS	A	D	F	F								
Approach Delay (s)	0.2	26.4	Err	Err								
Approach LOS	A	D	F	F								
<b>Intersection Summary</b>												
Average Delay	Err											
Intersection Capacity Utilization	171.6%											
Analysis Period (min)	15											
ICU Level of Service	H											

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel  
2008 Alternative C  
PM Peak

Direction	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SBB	SBT	SBR
Volume (veh/h)	10	872	10	1036	10	10	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	918	11	1091	11	11	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
Px, platoon unblocked												
vc1, conflicting volume	1101						2071	2066	923	2077	2066	1096
vc2, stage 1 conf vol	1101						2071	2066	923	2077	2066	1096
vcu, unblocked vol	1101						2071	2066	923	2077	2066	1096
tc, single (s)	2.2						7.1	6.5	6.2	7.1	6.5	6.2
tc, 2 stage (s)												
pf queue free %	98						35	40	33	35	40	33
pf queue free %	98						35	40	33	35	40	33
em capacity (veh/h)	634						66	80	97	67	80	96
Direction	EB	WB	NB	SB								
Volume Total	939	1112	32	32								
Volume Left	11	11	11	11								
Volume Right	634	737	55	55								
C/S/H	634	737	55	55								
Volume to Capacity	0.02	0.07	0.57	0.57								
Queue Length 95th (ft)	1	1	56	57								
Control Delay (s)	0.5	0.5	134.2	136.3								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.5	0.5	134.2	136.3								
Approach LOS	A	A	F	F								
<b>Intersection Summary</b>												
Average Delay	4.5											
Intersection Capacity Utilization	71.1%											
Analysis Period (min)	15											
ICU Level of Service	C											



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBB
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	60	755	77	116	995	99	35	6	266	112	21	14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	795	81	122	1047	104	37	6	280	118	22	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1152			876			2331	2357	835	2588	2346	1089
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	1152			876			2331	2357	835	2588	2346	1089
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			84			0	76	24	0	19	94
CM capacity (veh/h)	607			771			7	27	367	3	27	258
Direction, Lane #	EBT	WBT	NBT	SBT								
Volume Total	939	1274	323	155								
Volume Left	63	122	37	118								
Volume Right	81	104	280	15								
CSH	607	771	50	3								
Volume to Capacity	0.10	0.16	6.52	44.91								
Queue Length 95th (ft)	9	14	Err	Err								
Control Delay (s)	3.1	5.7	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	3.1	5.7	Err	Err								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	1779.8											
Intersection Capacity Utilization	129.0%											
Analysis Period (min)	15											
ICU Level of Service	H											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	SBB
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	52	933	148	187	1063	89	80	45	222	88	13	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	982	156	197	1140	94	84	47	234	93	14	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1234			1138			2806	2797	1060	3007	2828	1187
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	1234			1138			2806	2797	1060	3007	2828	1187
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	84			68			0	0	14	0	0	64
CM capacity (veh/h)	342			614			0	2	272	0	2	136
Direction, Lane #	EBT	WBT	NBT	SBT								
Volume Total	1193	1431	365	166								
Volume Left	55	197	84	93								
Volume Right	156	94	234	49								
CSH	342	614	0	0								
Volume to Capacity	0.16	0.32	Err	Err								
Queue Length 95th (ft)	14	34	Err	Err								
Control Delay (s)	8.9	15.6	Err	Err								
Lane LOS	A	C	F	F								
Approach Delay (s)	8.9	15.6	Err	Err								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	162.2%											
Intersection Capacity Utilization	162.2%											
Analysis Period (min)	15											
ICU Level of Service	H											

7: Wilfred Avenue & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.93	1.00	0.93
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1821	1881	1710	1583	1770	3539	1583	1770	3539	1583	1770	3539
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1821	1770	1583	1770	3539	1583	1770	3539	1583	1770	3539	1770
Volume (vph)	105	971	168	181	1043	540	204	155	265	451	131	112
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	1022	175	191	1098	568	215	163	279	475	138	118
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1305	0	191	1098	440	215	163	23	475	237	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	8	8	8	8	5	2	2	1	6	
Permitted Phases												
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	21.5	39.7	
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	22.0	40.2	
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.14	0.50	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	546	567	597	534	221	292	131	618	238	238	1773	
v/s Ratio Prot	c0.72	0.11	c0.62	0.28	c0.12	0.05	0.14	c0.14				
v/s Ratio Perm												
v/c Ratio	2.39	0.34	1.84	0.82	0.97	0.56	0.18	0.77	1.00	1.00	0.06	
Uniform Delay, d1	56.0	39.6	53.0	48.6	69.7	70.6	68.3	62.4	69.0	69.0	10.6	
Progression Factor	1.00	0.83	0.86	0.85	1.00	1.00	1.00	0.96	0.96	0.96	1.00	
Incremental Delay, d2	630.8	1.1	382.0	94	52.5	2.3	0.6	5.7	56.7	56.7	0.1	
Delay (s)	586.8	34.1	427.4	50.7	122.2	72.9	69.0	65.7	125.9	125.9	0.1	
Level of Service	F	C	F	D	F	E	E	E	F	F	F	
Approach Delay (s)	886.8						87.4					
Approach LOS	F						F					
<b>Intersection Summary</b>												
HCM Average Control Delay	334.5											
HCM Volume to Capacity ratio	1.77											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	160.3%											
Analysis Period (min)	15											
c Critical Lane Group												

8: Commerce Boulevard & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.93	1.00	0.93
Flt Protected	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3274	1770	3539	1583	1770	3528	1770	3528
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3274	1770	3539	1583	1770	3528	1770	3528
Volume (vph)	5	30	140	5	95	95	164	161	5	30	212	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	32	147	5	100	100	173	169	5	32	223	5
RTOR Reduction (vph)	0	0	130	0	89	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	32	17	5	111	0	173	169	3	32	227	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	5	2	2	1	6		
Permitted Phases												
Actuated Green, G (s)	1.3	8.5	8.5	1.3	8.5	12.5	48.9	48.9	3.3	39.7		
Effective Green, g (s)	1.8	9.0	9.0	1.8	9.0	13.0	49.4	49.4	3.8	40.2		
Actuated g/C Ratio	0.02	0.11	0.11	0.02	0.11	0.16	0.62	0.62	0.05	0.50		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
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)	40	210	178	40	368	288	2185	978	84	1773		
v/s Ratio Prot	c0.00	0.02	0.00	c0.03	0.00	c0.10	0.05	0.00	c0.06			
v/s Ratio Perm												
v/c Ratio	0.12	0.15	0.09	0.12	0.30	0.60	0.08	0.00	0.38	0.13		
Uniform Delay, d1	38.3	32.1	31.8	38.3	32.6	31.1	5.1	5.9	37.0	10.6		
Progression Factor	1.00	1.00	1.00	0.83	1.31	1.05	0.66	0.58	1.00	1.00		
Incremental Delay, d2	1.4	0.3	0.2	0.7	0.2	0.3	0.0	0.0	2.9	0.1		
Delay (s)	39.7	32.4	32.1	32.3	42.9	32.9	4.1	3.4	39.8	10.7		
Level of Service	D	C	C	C	D	C	A	A	D	B		
Approach Delay (s)	32.3					42.7						
Approach LOS	C					D						
<b>Intersection Summary</b>												
HCM Average Control Delay	24.9											
HCM Volume to Capacity ratio	0.25											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	30.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EET	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	3433	3539	1610	3045	1610	3045	1610	3045
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	3433	3539	1610	3045	1610	3045	1610	3045
Volume (vph)	0	941	746	89	1082	0	0	0	328	324	677	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	991	785	94	1139	0	0	0	345	341	713	0
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	991	642	94	1139	0	0	0	345	341	1001	0
Turn Type		Permt	Permt	Prot	Prot		Permt	Permt		Permt		Permt
Protected Phases		4	4	3	8		6	6		6		6
Permitted Phases		36.6	36.6	4.4	45.5		25.5	25.5		25.5		25.5
Actuated Green, G (s)		37.1	37.1	4.9	45.0		26.0	26.0		26.0		26.0
Effective Green, g (s)		0.46	0.46	0.06	0.58		0.32	0.32		0.32		0.32
Actuated g/C Ratio		4.5	4.5	4.5	4.5		4.5	4.5		4.5		4.5
Clearance Time (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Vehicle Extension (s)		1641	734	210	2035		523	990		523		990
Lane Grp Cap (vph)		0.28	0.41	0.03	0.32		0.21	0.33		0.21		0.33
v/s Ratio Prot		0.60	0.87	0.45	0.56		0.66	1.32dr		0.66		1.32dr
v/s Ratio Perm		16.0	19.3	36.2	10.7		23.2	27.0		23.2		27.0
Uniform Delay, d1		1.13	1.91	1.27	2.01		1.00	1.00		1.00		1.00
Progression Factor		0.2	1.5	0.1	0.1		6.4	31.5		6.4		31.5
Incremental Delay, d2		18.3	38.4	46.1	21.6		29.6	58.5		29.6		58.5
Delay (s)		B	D	D	C		C	E		C		E
Level of Service		27.2	C	23.4	C		0.0	A		0.0		A
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay							33.8	HCM Level of Service		C		
HCM Volume to Capacity ratio							0.87					
Actuated Cycle Length (s)							80.0	Sum of lost time (s)		8.0		
Intersection Capacity Utilization							86.4%	ICU Level of Service		E		
Analysis Period (min)							15					
dr Defacto Right Lane, Recode with 1 though lane as a right lane.												
c Critical Lane Group												

Movement	EBL	EET	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3408	3408	5085	1681	1704	1781	1770	1814	1814
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3408	3408	5085	1681	1704	1781	1770	1814	1814
Volume (vph)	0	569	701	413	356	117	816	108	569	42	41	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	599	738	435	375	123	859	114	598	44	43	9
RTOR Reduction (vph)	0	0	543	0	33	0	0	0	0	475	0	7
Lane Group Flow (vph)	0	599	195	435	465	0	474	499	124	44	45	0
Turn Type		Prot	Permt	Prot	Prot		Split	Permt	Split	Permt	Split	Permt
Protected Phases		7	4	3	8		2	2		2		6
Permitted Phases		17.5	17.5	12.5	34.5		16.0	16.0		16.0		16.0
Actuated Green, G (s)		18.0	18.0	13.0	35.0		16.5	16.5		16.5		16.5
Effective Green, g (s)		0.22	0.22	0.16	0.44		0.21	0.21		0.21		0.21
Actuated g/C Ratio		4.5	4.5	4.5	4.5		4.5	4.5		4.5		4.5
Clearance Time (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Vehicle Extension (s)		1144	356	558	1491		347	351		575		365
Lane Grp Cap (vph)		0.12	0.12	0.13	0.14		0.28	0.29		0.02		0.02
v/s Ratio Prot		0.52	0.55	0.78	0.31		1.37	1.42		0.21		0.12
v/s Ratio Perm		27.2	27.4	32.1	14.7		31.8	31.6		26.4		25.8
Uniform Delay, d1		1.49	1.19	1.18	1.22		1.06	1.06		2.58		0.87
Progression Factor		1.4	4.7	6.3	0.5		173.7	187.9		0.4		0.7
Incremental Delay, d2		41.8	201.8	44.1	18.4		207.4	231.6		68.5		23.1
Delay (s)		D	F	D	B		F	E		C		C
Level of Service		130.1	F	30.4	C		162.2	F		22.7		C
Approach Delay (s)												
Approach LOS												
Intersection Summary												
HCM Average Control Delay							116.7	HCM Level of Service		F		
HCM Volume to Capacity ratio							0.71					
Actuated Cycle Length (s)							80.0	Sum of lost time (s)		16.0		
Intersection Capacity Utilization							68.5%	ICU Level of Service		C		
Analysis Period (min)							15					
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph/ft)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	0.99	1.00	0.99	1.00	0.85
Fit	0.95	0.95	0.95	1.00	0.95	1.00	0.85
Fit Protected	0.95	0.95	0.95	1.00	0.95	1.00	0.85
Satd. Flow (prot)	3433	3539	3513	1770	1583	1770	1583
Fit Permitted	0.95	0.95	0.95	1.00	0.95	1.00	0.85
Satd. Flow (perm)	3433	3539	3513	1770	1583	1770	1583
Volume (vph)	195	981	1649	33	92	235	16
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	1033	1683	35	97	248	16
RTOR Reduction (vph)	0	0	0	0	0	0	183
Lane Group Flow (vph)	205	1033	1683	35	97	248	16
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	8	8	6	6	6
Permitted Phases	10.0	50.5	36.0	20.5	20.5	20.5	20.5
Effective Green, g (s)	10.5	51.0	36.5	21.0	21.0	21.0	21.0
Effective Green, g (s)	10.5	51.0	36.5	21.0	21.0	21.0	21.0
Actuated G/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	451	2256	1603	465	416	465	416
v/s Ratio Prot	0.06	0.28	0.20	0.05	0.04	0.05	0.04
v/s Ratio Perm	0.45	0.46	0.45	0.21	0.16	0.21	0.16
Uniform Delay, d1	32.1	7.4	14.8	23.0	22.7	23.0	22.7
Progression Factor	0.91	2.15	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.9	1.0	0.8	1.0	0.8
Delay (s)	29.7	16.5	15.7	24.0	23.5	24.0	23.5
Level of Service	C	B	B	C	C	C	C
Approach Delay (s)	18.7	15.7	23.6				
Approach LOS	B	B	B				
<b>Intersection Summary</b>							
HCM Average Control Delay	18.5		18.5		18.5		HCM Level of Service
HCM Volume to Capacity ratio	0.39		0.39		0.39		B
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)
Intersection Capacity Utilization	40.9%		40.9%		40.9%		A
Analysis Period (min)	15		15		15		Critical Lane Group

Movement	EBL	EBT	EBR	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph/ft)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	0.85	1.00	0.96	1.00	0.85
Fit	0.95	0.95	0.85	1.00	0.96	1.00	0.85
Fit Protected	0.95	0.95	0.85	1.00	0.96	1.00	0.85
Satd. Flow (prot)	1681	1686	1583	1741	1770	1770	1583
Fit Permitted	0.95	0.95	0.95	1.00	0.96	1.00	0.85
Satd. Flow (perm)	1681	1686	1583	1741	1770	1770	1583
Volume (vph)	981	3	140	8	3	514	489
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1033	3	142	8	3	541	515
RTOR Reduction (vph)	0	0	31	0	5	0	0
Lane Group Flow (vph)	517	519	11	0	11	541	515
Turn Type	Split	Split	Split	Split	Split	Prot	Prot
Protected Phases	4	4	4	8	8	5	2
Permitted Phases	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated G/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	441	443	416	44	611	1724	44
v/s Ratio Prot	0.31	0.31	0.31	0.01	0.01	0.15	0.01
v/s Ratio Perm	1.17	1.17	1.17	0.25	0.25	0.89	0.30
Uniform Delay, d1	29.5	29.5	21.9	38.3	24.7	12.3	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	99.2	99.2	99.2	0.0	14.4	0.4	99.1
Delay (s)	128.7	128.7	121.9	41.3	39.1	12.7	48.4
Level of Service	F	F	C	D	D	B	D
Approach Delay (s)	121.4	121.4	141.3				
Approach LOS	F	F	F				
<b>Intersection Summary</b>							
HCM Average Control Delay	83.8		83.8		83.8		HCM Level of Service
HCM Volume to Capacity ratio	0.94		0.94		0.94		F
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)
Intersection Capacity Utilization	85.5%		85.5%		85.5%		E
Analysis Period (min)	15		15		15		Critical Lane Group

13: Project Dwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative C  
PM Peak

Movement	WBL	WBR	NBT	NBR	SBT	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	0	3087	0	0	860
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1134	0	0	905
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked						
vC1, conflicting volume	2049	1144				1144
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	2049	1144				1144
vCU, unblocked vol	6.4	6.2				4.1
IC, single (s)						
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	100	100				100
cM capacity (veh/h)	61	243				611
Direction/Lane #	WBL	WBR	NBT	NBR	SBT	SBT
Volume Total	0	1144	905			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.67	0.53			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	60.5%					
Analysis Period (min)	15					
ICU Level of Service	B					

15: Business Park Drive & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative C  
PM Peak

Movement	FBL	FBR	NBT	NBR	SBT	SBT
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	172	89	33	464	489	41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	181	94	35	488	515	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked						
vC1, conflicting volume	850	279	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	850	279	558			
vCU, unblocked vol	6.8	6.9	4.1			
IC, single (s)						
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	37	87	97			
cM capacity (veh/h)	289	718	1009			
Direction/Lane #	EB1	EB2	NBT	NBR	SBT1	SB2
Volume Total	181	94	35	244	244	215
Volume Left	181	0	0	0	0	0
Volume Right	0	94	0	0	0	43
cSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.14	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A	A	A	A
Approach Delay (s)	27.5	0.6	0.6			
Approach LOS	D	D	D			
Intersection Summary						
Average Delay	5.8					
Intersection Capacity Utilization	37.7%					
Analysis Period (min)	15					
ICU Level of Service	A					

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	WB	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Flt	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	1770	1583	1863	1583	1770	1863
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	1770	1583	1863	1583	1770	1863
Satd. Flow (perm)	0.95	1.00	1.00	0.95	1.00	1.00
Volume (vph)	257	424	663	251	334	525
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	446	698	264	352	553
RTOR Reduction (vph)	0	292	0	150	0	0
Lane Group Flow (vph)	271	154	698	114	352	553
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	8	2	2	1	6	6
Permitted Phases	8	2	2	1	6	6
Actuated Green, G (s)	13.4	13.4	26.5	26.5	31.5	40.6
Effective Green, g (s)	13.9	13.9	27.1	27.1	32.1	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	391	348	801	681	281	1215
v/s Ratio Prot	c0.15	c0.37	c0.20	c0.20	c0.30	c0.30
v/s Ratio Perm	0.10	0.07	0.07	0.07	0.07	0.07
w/c Ratio	0.69	0.44	0.87	0.17	1.25	0.46
Uniform Delay, d1	22.6	21.2	16.4	11.0	26.5	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.9	12.5	0.5	139.6	1.2
Delay (s)	27.8	22.1	28.9	11.5	166.1	6.6
Level of Service	C	C	C	B	F	A
Approach Delay (s)	24.3	24.1	24.1	24.1	66.7	66.7
Approach LOS	C	C	C	C	E	E

Intersection Summary	
HCM Average Control Delay	39.8
HCM Volume to Capacity ratio	0.90
Actuated Cycle Length (s)	63.0
Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

17: Rohnert Park Expy & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	WB	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00
Flt	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	1770	1583	1863	1583	1770	1863
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	1770	1583	1863	1583	1770	1863
Satd. Flow (perm)	0.95	1.00	1.00	0.95	1.00	1.00
Volume (vph)	50	722	36	202	713	154
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	760	38	213	751	162
RTOR Reduction (vph)	0	29	0	0	119	0
Lane Group Flow (vph)	53	760	38	213	751	162
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	4	3	8	2
Permitted Phases	7	4	4	3	8	2
Actuated Green, G (s)	3.3	18.3	18.3	5.5	20.5	4.4
Effective Green, g (s)	3.8	18.8	18.8	6.0	21.0	4.9
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.26	0.06
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	832	372	257	929	416
v/s Ratio Prot	0.03	c0.21	0.06	c0.21	0.03	c0.02
v/s Ratio Perm	0.03	c0.21	0.06	c0.21	0.03	c0.02
w/c Ratio	0.63	0.91	0.02	0.83	0.81	0.10
Uniform Delay, d1	37.4	29.8	23.5	36.5	27.6	22.4
Progression Factor	1.00	1.00	1.00	0.91	0.54	0.22
Incremental Delay, d2	14.4	14.3	0.0	14.8	3.9	0.1
Delay (s)	51.8	44.1	23.6	47.9	18.9	5.0
Level of Service	D	D	C	D	B	A
Approach Delay (s)	43.7	43.7	22.4	22.4	30.4	30.4
Approach LOS	D	D	C	C	C	C

Intersection Summary	
HCM Average Control Delay	29.6
HCM Volume to Capacity ratio	0.80
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.2%
ICU Level of Service	B
Analysis Period (min)	15
c Critical Lane Group	

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative C  
PM Peak

2008 Alternative C  
PM Peak

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	0	1219	389	68	1162	199	7	0	17	702	1	351
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1283	409	72	1223	209	7	0	18	739	1	369
RTOR Reduction (vph)	0	67	0	0	0	0	0	0	12	0	0	35
Lane Group Flow (vph)	0	1625	0	72	1223	209	0	13	0	370	0	334
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	4		3	8	2	2			6		6	
Permitted Phases					Free	Free						
Actuated Green, G (s)			35.4	4.8	44.7	80.0			26.3	26.3	26.3	26.3
Effective Green, g (s)			35.9	5.3	45.2	80.0			26.8	26.8	26.8	26.8
Actuated g/C Ratio			0.45	0.07	0.57	1.00			0.34	0.34	0.34	0.34
Clearance Time (s)			4.5	4.5	4.5	4.5			4.5	4.5	4.5	4.5
Vehicle Extension (s)			3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2199			117	2000	1583			512	439	420	530
v/s Ratio Prot	c0.33			0.04	c0.35				0.13	0.01	0.28	c0.30
v/s Ratio Perm										0.03	0.84	0.88
Uniform Delay, d1	0.74			0.62	0.61	0.13			0.03	0.03	0.84	0.88
Progression Factor	0.39			35.4	11.6	0.0			17.8	24.6	25.1	22.4
Incremental Delay, d2	1.8			1.23	0.78	1.00			1.00	1.00	1.00	1.00
Delay (s)	8.9			7.8	1.2	0.1			0.0	13.7	18.9	2.4
Level of Service	A			D	B	A			B	D	D	C
Approach Delay (s)	8.9			10.8	17.9				17.9		35.8	
Approach LOS	A			B	B				B		D	
<b>Intersection Summary</b>												
HCM Average Control Delay	16.5											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	72.1%											
Analysis Period (min)	15											
C Critical Lane Group												

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901	4901
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	233	823	146	371	794	358	137	252	422	364	264	243
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	866	154	391	836	377	144	265	444	383	278	256
RTOR Reduction (vph)	0	0	103	0	0	235	0	117	227	0	0	206
Lane Group Flow (vph)	245	866	51	391	836	122	144	318	47	383	278	50
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	2	1	6	6	6
Permitted Phases												
Actuated Green, G (s)	12.1	26.0	26.0	11.5	25.4	25.4	9.5	13.1	13.1	11.4	15.0	15.0
Effective Green, g (s)	12.6	26.5	26.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	15.5	15.5
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1684	524	515	1146	512	221	542	245	511	361	307
v/s Ratio Prot	c0.14	0.17	0.17	0.11	c0.24	0.08	0.10	0.10	0.03	0.11	c0.15	0.15
v/s Ratio Perm												
Uniform Delay, d1	0.88	0.51	0.10	0.76	0.73	0.24	0.65	0.59	0.19	0.75	0.77	0.16
Progression Factor	0.83	0.48	0.31	0.75	0.66	0.77	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.6	0.7	0.2	5.1	3.2	0.9	6.7	1.6	0.4	6.0	9.7	0.2
Delay (s)	45.1	11.1	6.0	29.4	19.1	16.1	40.1	32.2	28.9	38.6	40.3	27.1
Level of Service	D	B	A	C	B	B	D	C	C	D	D	C
Approach Delay (s)	17.0			20.9	32.5				35.9			
Approach LOS	B			C	C				D			
<b>Intersection Summary</b>												
HCM Average Control Delay	24.9											
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	70.0%											
Analysis Period (min)	15											
C Critical Lane Group												

20: Rohnert Park Expwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	0.95	0.95	0.95	0.95	1.00	0.98	0.96
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.85	1.00	0.96	0.96
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	6408	1583	5085	1583	1770	1504	1504	1504	1748	1748	1748
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	1.00	0.83	0.83	0.83
Satd. Flow (perm)	1770	6408	1583	5085	1583	1389	1504	1504	1504	1508	1508	1508
Volume (vph)	17	1642	273	0	997	350	428	0	306	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1728	287	0	1049	368	451	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	1	0	2
Lane Group Flow (vph)	18	1728	287	0	1049	368	451	160	160	0	16	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	8	8	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	2	2	6	6	6
Actuated Green, G (s)	2.2	41.0	80.0	84.3	80.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Effective Green, g (s)	2.7	41.5	80.0	34.8	80.0	30.5	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.03	0.52	1.00	0.43	1.00	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	3324	1583	2212	1583	530	573	573	573	575	575	575
v/s Ratio Prot	0.01	c0.27	0.18	0.21	0.23	c0.32	0.11	0.11	0.11	0.01	0.01	0.01
v/s Ratio Perm	0.30	0.52	0.18	0.47	0.23	0.85	0.28	0.28	0.28	0.03	0.03	0.03
Uniform Delay, d1	37.7	12.7	0.0	16.1	0.0	22.7	17.1	17.1	17.1	15.5	15.5	15.5
Progression Factor	1.05	1.07	1.00	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	0.2	0.5	0.3	12.4	0.3	0.3	0.3	0.0	0.0	0.0
Delay (s)	41.4	13.9	0.2	16.7	0.3	35.1	17.4	17.4	17.4	15.5	15.5	15.5
Level of Service	D	B	A	B	A	D	B	B	B	B	B	B
Approach Delay (s)	12.2	8.0	27.7	8.0	27.7	27.7	15.3	15.3	15.3	15.3	15.3	15.3
Approach LOS	B	B	A	B	A	D	B	B	B	B	B	B

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	13.6	B
HCM Volume to Capacity ratio	0.66	B
Actuated Cycle Length (s)	80.0	B
Intersection Capacity Utilization	57.1%	B
Analysis Period (min)	15	
c Critical Lane Group		

21: Rohnert Park Expwy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.97	1.00	0.91	1.00	0.91	0.91	0.91	0.91	1.00	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.97	0.95	0.98	1.00	0.96	0.96
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.98	1.00	0.96	0.96
Satd. Flow (prot)	3433	3539	1583	1770	4949	1610	3329	1983	1610	3390	1583	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.96	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4949	1610	3329	1583	1610	3390	1583	1583
Volume (vph)	270	1149	545	141	783	170	380	286	224	102	230	183
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1209	574	148	824	179	400	301	236	107	242	193
RTOR Reduction (vph)	0	0	395	0	38	0	0	0	189	0	0	164
Lane Group Flow (vph)	284	1209	574	148	824	179	400	301	236	107	242	193
Turn Type	Prot	Perm	Perm	Prot	Prot	Prot	Split	Split	Perm	Split	Split	Perm
Protected Phases	7	4	4	3	8	8	2	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	2	2	2	6	6	6
Actuated Green, G (s)	12.5	24.5	24.5	10.6	22.6	15.4	15.4	15.4	15.4	11.5	11.5	11.5
Effective Green, g (s)	13.0	25.0	25.0	11.1	23.1	15.9	15.9	15.9	15.9	12.0	12.0	12.0
Actuated g/C Ratio	0.16	0.31	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	1106	495	246	1429	320	662	315	242	509	237	237
v/s Ratio Prot	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	0.07	c0.07	0.03	0.03	0.03
v/s Ratio Perm	0.51	1.09	0.36	0.60	0.68	0.71	0.72	0.15	0.44	0.48	0.48	0.48
Uniform Delay, d1	30.6	27.5	21.3	32.4	25.1	29.9	30.0	26.5	31.0	31.1	28.4	28.4
Progression Factor	0.63	0.63	2.22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	54.9	1.8	4.1	2.6	6.9	3.7	0.2	1.3	0.7	0.2	0.2
Delay (s)	20.0	72.2	49.2	36.5	27.7	36.8	33.7	26.7	32.2	31.8	28.7	28.7
Level of Service	C	E	D	D	D	D	D	C	C	C	C	C
Approach Delay (s)	58.7	28.8	32.7	28.8	32.7	32.7	31.1	31.1	31.1	31.1	31.1	31.1
Approach LOS	E	C	C	C	C	C	C	C	C	C	C	C

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	43.0	D
HCM Volume to Capacity ratio	0.83	D
Actuated Cycle Length (s)	80.0	C
Intersection Capacity Utilization	71.9%	C
Analysis Period (min)	15	
c Critical Lane Group		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1770	3383	1770	3539	1583	1770	1663	1583	1770	1649	1583	1583
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	1770	3383	1770	3539	1583	1770	1663	1583	1770	1649	1583	1583
Satd. Flow (perm)	102	729	32	53	855	333	48	24	63	485	29	96
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	107	767	34	56	900	351	51	25	68	511	31	101
Adj. Flow (vph)	0	3	0	0	0	119	0	61	0	0	0	60
RTOR Reduction (vph)	0	3	0	0	0	119	0	61	0	0	0	60
Lane Group Flow (vph)	107	798	0	56	900	232	51	30	0	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Projected Phases	7	4		3	8	8	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.6	28.3		4.4	25.1	25.1	3.3	6.3		33.0	36.0	
Effective Green, g (s)	8.1	28.8		4.9	25.6	25.6	3.8	6.8		33.5	36.5	
Actuated g/C Ratio	0.09	0.32		0.05	0.28	0.28	0.04	0.08		0.37	0.41	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	159	1125		96	1007	450	75	125		659	669	
v/s Ratio Prot	0.06	c0.23		0.03	c0.25	0.15				c0.29	c0.04	
v/s Ratio Perm												
v/c Ratio	0.67	0.71		0.59	0.89	0.51	0.68	0.24		0.78	0.11	
Uniform Delay, d1	39.7	26.9		41.6	30.9	27.0	42.5	39.2		24.9	16.6	
Progression Factor	1.00	1.00		0.63	0.55	0.19	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.7	3.8		7.8	10.9	3.7	22.4	1.0		5.7	0.1	
Delay (s)	50.4	30.7		34.2	27.8	8.8	64.9	40.2		30.6	16.7	
Level of Service	D	C		C	C	C	A	D		C	B	
Approach Delay (s)	33.0	C		23.0	C	C	49.1	D		27.8	C	
Approach LOS	D	C		C	C	C	D	D		C	C	
Intersection Summary												
HCM Average Control Delay	28.3											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	74.6%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1770	3383	1770	3539	1583	1770	1663	1583	1770	1649	1583	1583
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	1770	3383	1770	3539	1583	1770	1663	1583	1770	1649	1583	1583
Satd. Flow (perm)	133	484	202	128	589	220	321	494	108	200	342	219
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	140	509	213	135	620	232	338	520	114	211	360	231
Adj. Flow (vph)	0	67	0	0	177	0	0	75	0	0	0	174
RTOR Reduction (vph)	0	67	0	0	177	0	0	75	0	0	0	174
Lane Group Flow (vph)	140	665	0	135	820	35	338	520	39	211	360	57
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Projected Phases	7	4		3	8	8	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.5	15.8		5.5	15.8	13.5	23.5	23.5	6.5	16.5	16.5	16.5
Effective Green, g (s)	6.0	16.3		6.0	16.3	14.0	24.0	24.0	7.0	17.0	17.0	17.0
Actuated g/C Ratio	0.09	0.24		0.09	0.24	0.20	0.35	0.35	0.10	0.25	0.25	0.25
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	796		153	832	372	358	645	548	179	457	388
v/s Ratio Prot	c0.08	c0.19		0.08	0.18	0.03	c0.19	c0.28	0.02	c0.12	0.19	0.04
v/s Ratio Perm												
v/c Ratio	0.92	0.82		0.88	0.75	0.15	0.94	0.81	0.07	1.18	0.79	0.15
Uniform Delay, d1	31.4	25.1		31.3	24.6	21.0	27.3	20.5	15.2	31.1	24.5	20.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.1	6.9		40.4	3.7	0.2	33.1	10.4	0.3	123.6	12.9	0.8
Delay (s)	79.5	32.0		71.7	28.2	21.2	60.4	30.9	15.4	154.8	37.3	21.3
Level of Service	E	C		E	C	C	E	C	B	F	D	C
Approach Delay (s)	39.7	D		32.5	C	C	39.4	D		63.6	E	
Approach LOS	D	C		C	C	C	D	D		E	E	
Intersection Summary												
HCM Average Control Delay	43.0											
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	69.3											
Intersection Capacity Utilization	77.3%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EB	EB	WB	WB	NBL	NBL	NBR	NBR	SBL	SBL	SBR
Lane Configurations	1800	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	3539	1583	1770	3539	3433	1583	3433	1583	3539	1583	1770
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Permitted	3539	1583	1770	3539	3433	1583	3433	1583	3539	1583	1770
Satd. Flow (perm)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Volume (vph)	0	818	465	99	1017	0	0	0	639	0	212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	489	104	1071	0	0	0	673	0	223
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	0	0	66
Lane Group Flow (vph)	0	862	366	104	1071	0	0	0	673	157	0
Turn Type		Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted
Protected Phases	4	1	3	8	1	5	1	5	1	5	6
Permitted Phases	4	36.4	36.4	11.6	52.5	28.5	28.5	28.5	28.5	28.5	28.5
Actuated Green, G (s)	36.9	36.9	12.1	53.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
Effective Green, g (s)	0.41	0.41	0.13	0.59	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	1451	649	238	2084	1106	510	1106	510	1106	510	510
Lane Grp Cap (vph)	c0.24	0.23	0.56	0.44	0.51	0.61	0.31	0.31	0.61	0.31	0.31
v/s Ratio Prot	0.59	20.7	20.4	35.8	10.9	25.7	22.9	22.9	25.7	22.9	22.9
v/s Ratio Perm	0.51	0.46	1.30	1.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	1.3	2.5	1.2	0.8	1.0	1.5	1.0	1.5	1.0	1.5	1.5
Progression Factor	11.8	12.0	47.7	20.2	26.7	24.5	26.7	24.5	26.7	24.5	24.5
Incremental Delay, d2	B	B	D	C	C	C	C	C	C	C	C
Delay (s)	B	B	D	C	C	C	C	C	C	C	C
Level of Service	B	B	D	C	C	C	C	C	C	C	C
Approach Delay (s)	11.9			22.6	0.0	26.1	26.1	26.1	22.6	26.1	26.1
Approach LOS	B	B	D	C	A	C	C	C	B	C	C
<b>Intersection Summary</b>											
HCM Average Control Delay	19.3										
HCM Volume to Capacity ratio	0.57										
Actuated Cycle Length (s)	90.0										
Intersection Capacity Utilization	62.5%										
Analysis Period (min)	15										
c Critical Lane Group	B										

Movement	EB	EB	WB	WB	NBL	NBL	NBR	NBR			
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900			
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Total Lost time (s)	0.95	1.00	0.95	1.00	0.97	1.00	1.00	0.95			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Fit Protected	3539	1583	1770	3539	3433	1583	3433	1583			
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00			
Fit Permitted	3539	1583	1770	3539	3433	1583	3433	1583			
Satd. Flow (perm)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00			
Volume (vph)	0	1461	0	0	617	468	238	0			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	0	1538	0	0	649	493	248	0			
RTOR Reduction (vph)	0	0	0	0	0	0	0	0			
Lane Group Flow (vph)	1538	0	0	0	649	493	228	0			
Turn Type		Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted			
Protected Phases	4	1	3	8	1	5	1	5			
Permitted Phases	4	36.4	36.4	11.6	52.5	28.5	28.5	28.5			
Actuated Green, G (s)	62.0	62.0	19.0	19.0	19.0	19.0	19.0	19.0			
Effective Green, g (s)	62.5	62.5	19.5	19.5	19.5	19.5	19.5	19.5			
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Vehicle Extension (s)	1458	744	343	343	1106	510	1106	510			
Lane Grp Cap (vph)	c0.43	0.18	0.14	0.14	0.14	0.14	0.14	0.14			
v/s Ratio Prot	0.63	7.4	5.1	32.2	32.2	32.2	32.2	32.2			
v/s Ratio Perm	0.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay, d1	1.0	0.3	2.2	4.8	1.0	1.5	1.0	1.5			
Progression Factor	3.6	5.4	34.5	37.0	3.6	3.6	3.6	3.6			
Incremental Delay, d2	A	A	C	D	A	C	D	D			
Delay (s)	A	A	C	D	A	C	D	D			
Level of Service	A	A	C	D	A	C	D	D			
Approach Delay (s)	3.6	5.4	35.3	35.3	3.6	3.6	3.6	3.6			
Approach LOS	A	A	C	D	A	C	D	D			
<b>Intersection Summary</b>											
HCM Average Control Delay	12.1										
HCM Volume to Capacity ratio	0.63										
Actuated Cycle Length (s)	90.0										
Intersection Capacity Utilization	62.5%										
Analysis Period (min)	15										
c Critical Lane Group	B										

Movement	EB	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBT	NBR	SBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	6	11	2	7	226	19	790	20	116	667	4		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	6	12	2	7	238	20	832	21	122	702	4		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type														
Median storage (veh)														
Upstream signal (ft)														
p.k. platoon unblocked														
v/c conflicting volume	1527	1841	353	1482	1822	416	706							853
v/c1 stage 1 conf vol														853
v/c2 stage 2 conf vol														4.1
v/cu unblocked vol														
tc single (s)														
tc 2 stage (s)														
tf (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2							2.2
pl queue free %	80	90	98	97	88	59	98							84
pm capacity (veh/h)	38	61	543	68	63	586	888							782
Direction, Lane #	EB	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBT	NBR	SBT	SBT	SBR
Volume Total	25	247	20	416	416	21	122	468	238					
Volume Left	7	2	20	0	0	0	122	0	0					
Volume Right	12	238	0	0	0	21	0	0	4					
CSH	80	609	888	1700	1700	782	1700	1700	1700					
Volume to Capacity	0.32	0.41	0.02	0.24	0.24	0.01	0.16	0.28	0.14					
Queue Length 95th (ft)	30	49	2	0	0	0	14	0	0					
Control Delay (s)	66.6	17.4	9.1	0.0	0.0	0.0	10.5	0.0	0.0					
Lane LOS	F	F	C	A	A	B	B	B	B					
Approach Delay (s)	66.6	17.4	0.2				1.5							
Approach LOS	F	F	C				B							
Intersection Summary														
Average Delay	3.8													
Intersection Capacity Utilization	49.2%													
Analysis Period (min)	15													
ICU Level of Service	A													

Movement	EB	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBT	NBR	SBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	139	3	4	221	2	11	0						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	146	3	4	233	2	12	0						
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type														
Median storage (veh)														
Upstream signal (ft)														
p.k. platoon unblocked														
v/c conflicting volume	235	1482	393	393	148	393	393	148	393	394	234			
v/c1 stage 1 conf vol														
v/c2 stage 2 conf vol														
v/cu unblocked vol														
tc single (s)														
tc 2 stage (s)														
tf (s)	2.2	2.2	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3		
pl queue free %	100	100	100	100	100	100	98	100	100	100	100	100		
pm capacity (veh/h)	1333	1432	564	541	1432	564	541	899	564	541	899	564		
Direction, Lane #	EB	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBT	NBR	SBT	SBT	SBR
Volume Total	151	239	13	1										
Volume Left	1	4	12	0										
Volume Right	3	2	1	0										
CSH	1333	1432	582	541										
Volume to Capacity	0.00	0.00	0.02	0.00										
Queue Length 95th (ft)	0	0	2	0										
Control Delay (s)	0.1	0.2	11.3	11.7										
Lane LOS	A	A	B	B										
Approach Delay (s)	0.1	0.2	11.3	11.7										
Approach LOS	B	B	B	B										
Intersection Summary														
Average Delay	0.5													
Intersection Capacity Utilization	28.4%													
Analysis Period (min)	15													
ICU Level of Service	A													

Movement	EBT	EBT	EBT	EBT	WBT	WBT	WBT	WBT	NBT	NBT	NBT	NBT	SBT	SBT	SBT	SBT
Lane Configurations	1	2	4	208	0	23	9	0	4	0	1	1	123	2	4	208
Sign Control	Free	0%	Free	0%	Stop	0%	Stop	0%	Free	0%	Stop	0%	Free	0%	Free	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	123	2	4	208	0	23	9	0	4	0	1	123	2	4	208
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	129	2	4	219	0	24	9	0	4	0	1	129	2	4	219
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type																
Median storage (veh)																
Upstream signal (ft)																
px platoon unblocked																
vc conflicting volume	227												365	368	131	369
vc1 stage 1 cont vol																
vc2 stage 2 cont vol																
vcu unblocked vol	4.1												7.1	6.5	6.2	7.1
tc single (s)																
tc 2 stage (s)																
tf (s)	2.2												3.5	4.0	3.3	3.5
p0 queue free %	100												96	98	100	99
cm capacity (veh/h)	1341												588	559	619	578
cm capacity (veh/h)	1341												588	559	619	578
Direction Lane #	EBT	WBT	NBT	NBT	WBT	WBT	NBT	NBT	SBT	SBT	SBT	SBT	EBT	WBT	NBT	NBT
Volume Total	133	232	34	5									365	368	131	369
Volume Left	1	4	24	4									7.1	6.5	6.2	7.1
Volume Right	2	8	0	1												
CSH	1341	1454	580	614												
Volume to Capacity	0.00	0.00	0.06	0.01												
Queue Length 95th (ft)	0	0	5	1												
Control Delay (s)	0.1	0.2	11.6	10.9												
Lane LOS	A	A	B	B												
Approach Delay (s)	0.1	0.2	11.6	10.9												
Approach LOS	B	B	B	B												
Intersection Summary																
Average Delay	1.2															
Intersection Capacity Utilization	24.0%															
ICU Level of Service	A															
Analysis Period (min)	15															

Movement	EBT	EBT	EBT	EBT	WBT	WBT	WBT	WBT	NBT	NBT	NBT	NBT	SBT	SBT	SBT	SBT
Lane Configurations	1	2	4	270	0	9	4	270	0	5	11	1	149	9	4	270
Sign Control	Free	0%	Free	0%	Stop	0%	Stop	0%	Free	0%	Stop	0%	Free	0%	Free	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	149	2	4	270	0	9	4	270	0	5	11	149	9	4	270
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	157	2	4	284	0	9	4	284	0	5	12	157	9	4	284
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type																
Median storage (veh)																
Upstream signal (ft)																
px platoon unblocked																
vc conflicting volume	227												365	368	131	369
vc1 stage 1 cont vol																
vc2 stage 2 cont vol																
vcu unblocked vol	4.1												7.1	6.5	6.2	7.1
tc single (s)																
tc 2 stage (s)																
tf (s)	2.2												3.5	4.0	3.3	3.5
p0 queue free %	100												96	98	100	99
cm capacity (veh/h)	1341												588	559	619	578
cm capacity (veh/h)	1341												588	559	619	578
Direction Lane #	EBT	WBT	NBT	NBT	WBT	WBT	NBT	NBT	SBT	SBT	SBT	SBT	EBT	WBT	NBT	NBT
Volume Total	133	232	34	5									365	368	131	369
Volume Left	1	4	24	4									7.1	6.5	6.2	7.1
Volume Right	2	8	0	1												
CSH	1341	1454	580	614												
Volume to Capacity	0.00	0.00	0.06	0.01												
Queue Length 95th (ft)	0	0	5	1												
Control Delay (s)	0.1	0.2	11.6	10.9												
Lane LOS	A	A	B	B												
Approach Delay (s)	0.1	0.2	11.6	10.9												
Approach LOS	B	B	B	B												
Intersection Summary																
Average Delay	0.4															
Intersection Capacity Utilization	27.4%															
ICU Level of Service	A															
Analysis Period (min)	15															

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0	155	9	11	250	0	25	0
Volume (veh/h)	0	155	9	11	250	0	25	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0
Pedestrians	0	0	0	0	0	0	0	0
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type					None			
Median storage (veh)								
Upstream signal (ft)								
Px, platoon unblocked								
vC, conflicting volume	263	173			454	454	168	463
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	263	173			454	454	168	463
IC, single (s)	4.1	4.1			7.1	6.5	6.2	7.1
IC, 2 stage (s)								
tF (s)	2.2	2.2			3.5	4.0	3.3	3.5
p0 queue free %	100	99			95	100	99	100
cM capacity (veh/h)	1301	1404			513	498	876	501
Direction Lane #	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBR
Volume Total	173	215	35	0				
Volume Left	0	12	26	0				
Volume Right	9	0	8	0				
CSH	1301	1404	570	1700				
Volume to Capacity	0.00	0.01	0.06	0.00				
Queue Length 95th (ft)	0	1	5	0				
Control Delay (s)	0.0	0.4	11.7	0.0				
Lane LOS	A	B	A	A				
Approach Delay (s)	0.0	0.4	11.7	0.0				
Approach LOS	B	B	A	A				
<b>Intersection Summary</b>								
Average Delay	1.1							
Intersection Capacity Utilization	32.1%							
Analysis Period (min)	15							
ICU Level of Service	A							

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	135	22	0	235	37
Volume (veh/h)	0	135	22	0	235	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	142	23	0	247	39
Pedestrians	0	0	0	0	0	0
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
Px, platoon unblocked						
vC, conflicting volume					165	401
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol					165	401
IC, single (s)					4.1	6.4
IC, 2 stage (s)						
tF (s)					2.2	3.5
p0 queue free %					100	94
cM capacity (veh/h)					1413	605
Direction Lane #	EBT	EBR	WBT	WBR	NBT	NBR
Volume Total	165	247	39	0		
Volume Left	0	0	39	0		
Volume Right	23	0	0	0		
CSH	1700	1413	605			
Volume to Capacity	0.10	0.00	0.06			
Queue Length 95th (ft)	0	0	5			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS	A	B	B			
Approach Delay (s)	0.0	0.0	11.4			
Approach LOS	B	B	B			
<b>Intersection Summary</b>						
Average Delay	1.0					
Intersection Capacity Utilization	22.4%					
Analysis Period (min)	15					
ICU Level of Service	A					

EBT	W/BF	W/BT	WBR	NBL	NBT	NBR	SBL	SBT
1308	191	1098	568	215	163	279	475	256
2.38	0.34	1.84	0.86	0.97	0.56	0.72	0.77	1.00
660.2	34.5	410.3	37.2	122.0	77.8	183	89.2	114.2
53.1	5.9	108.1	62.7	0.0	0.0	2.5	340.5	0.0
703.3	40.2	518.4	99.9	122.0	77.8	20.8	409.7	114.2
2256	136	1867	323	228	87	0	247	251
#2526	m178m	#1983	m295	#402	127	95	#350	#448
550	220			150	110	100	275	270
550	567	597	652	221	376	418	619	257
0	313	69	150	0	0	0	0	0
75	0	0	0	0	0	60	348	0
0	0	0	0	0	0	0	0	0
2.75	0.75	2.08	1.13	0.97	0.43	0.78	1.75	1.00

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

EBT	EBT	EBR	W/BT	W/BT	NBR	NBR	SBL	SBL
32	147	5	200	173	169	5	32	228
0.04	0.15	0.48	0.44	0.60	0.07	0.00	0.20	0.12
34.4	32.8	11.5	28.2	32.7	4.0	3.4	35.8	11.3
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.4	32.8	11.5	28.2	32.7	4.0	3.4	35.8	11.3
2	15	0	27	104	3	0	15	24
13	39	49	m4	m36	m120	m1	40	66
180			140	150	150	150	200	130
75	75	100	854	400	2462	102	184	1931
155	442	488	155	400	2462	102	184	1931
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0.03	0.07	0.30	0.03	0.23	0.43	0.07	0.17	0.12

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	991	785	94	1139	345	1054
v/c Ratio	0.59	0.88	0.37	0.56	0.66	1.32dr
Control Delay	18.2	26.0	45.2	21.8	30.4	57.2
Queue Delay	30.2	128.8	0.0	0.3	0.0	108.6
Total Delay	48.4	154.8	45.2	22.1	30.4	165.8
Queue Length 50th (ft)	194	767	21	267	161	275
Queue Length 95th (ft)	m133	m151	m21	m171	261	#422
Internal Link Dist (ft)	220	465		465	348	
Turn Bay Length (ft)		300		2035	523	1043
Base Capacity (vph)	1691	892	257	2035	523	1043
Starvation Cap Reductn	736	282	0	0	0	0
Spillback Cap Reductn	0	0	0	339	0	216
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.29	0.37	0.67	0.66	1.27

**Intersection Summary**  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	559	738	435	498	474	499
v/c Ratio	0.52	0.82	0.78	0.33	1.37	1.42
Control Delay	42.0	26.2	48.2	16.4	203.9	227.3
Queue Delay	0.0	6.8	0.0	0.0	0.0	0.0
Total Delay	42.0	32.9	48.2	16.4	203.9	227.3
Queue Length 50th (ft)	142	212	120	110	317	342
Queue Length 95th (ft)	162	312	#180	147	m#330	m#362
Internal Link Dist (ft)	466	345		345	380	
Turn Bay Length (ft)		150		150	200	270
Base Capacity (vph)	1144	899	558	1524	347	351
Starvation Cap Reductn	0	123	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.95	0.78	0.33	1.37	1.42

**Intersection Summary**  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	205	1033	718	97	248
v/c Ratio	0.45	0.46	0.45	0.21	0.41
Control Delay	31.6	16.6	16.2	24.5	5.8
Queue Delay	0.0	0.6	0.0	0.0	0.0
Total Delay	31.6	17.2	16.2	24.5	5.8
Queue Length 50th (ft)	62	238	122	38	0
Queue Length 95th (ft)	84	260	178	76	53
Internal Link Dist (ft)	345	164		232	
Turn Bay Length (ft)	80			200	
Base Capacity (vph)	901	2256	1607	485	598
Starvation Cap Reductn	0	741	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.66	0.45	0.21	0.41

Intersections Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m - Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	517	519	42	541	517
v/c Ratio	1.17	1.17	0.09	1.02	0.25
Control Delay	129.2	128.8	8.3	29.3	74.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	129.2	128.8	8.3	29.3	74.3
Queue Length 50th (ft)	329	330	0	5	278
Queue Length 95th (ft)	523	524	23	23	478
Internal Link Dist (ft)	284	118		214	
Turn Bay Length (ft)	250	250		200	
Base Capacity (vph)	441	443	447	179	531
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.17	1.17	0.09	1.02	0.25

Intersections Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m - Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	271	446	698	264	352	553						
v/c Ratio	0.69	0.70	0.87	0.32	1.25	0.46						
Control Delay	32.6	11.2	32.0	3.1	167.8	7.4						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	32.6	11.2	32.0	3.1	167.8	7.4						
Queue Length 50th (ft)	96	22	248	0	183	99						
Queue Length 95th (ft)	168	104	445	38	329	160						
Internal Link Dist (ft)	480		3920			2350						
Turn Bay Length (ft)		175		450	700							
Base Capacity (vph)	736	672	800	830	781	1215						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.62	0.66	0.87	0.32	1.25	0.46						

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	760	38	213	751	162	67	87	85	284	149	
v/c Ratio	0.40	1.01	0.10	0.83	0.81	0.36	0.26	0.25	0.22	0.53	0.18	
Control Delay	44.6	68.8	9.9	55.1	24.7	2.2	37.7	11.2	8.1	27.8	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.6	68.8	9.9	55.1	24.7	2.2	37.7	11.2	8.1	27.8	5.7	
Queue Length 50th (ft)	26	204	0	40	153	0	16	6	0	118	13	
Queue Length 95th (ft)	61	4323	23	m/90	#301	m3	36	48	36	193	45	
Internal Link Dist (ft)		1940			220			1010				
Turn Bay Length (ft)	160		200	250		170	130		130	100		
Base Capacity (vph)	133	752	366	257	829	535	257	382	387	531	827	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	1.01	0.10	0.83	0.81	0.30	0.26	0.25	0.22	0.53	0.18	

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.

Lane Group	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	245	866	154	391	836	377	144	435	274	383	278	256
v/c Ratio	0.58	0.51	0.25	0.76	0.73	0.49	0.65	0.66	0.58	0.75	0.77	0.50
Control Delay	50.8	11.2	1.8	33.4	19.6	3.8	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	11.2	1.8	33.4	19.6	3.8	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	78	58	3	107	208	30	71	74	0	95	129	0
Queue Length 95th (ft)	m#107	m#60	m#4	#159	223	28	#157	118	65	#168	#230	58
Internal Link Dist (ft)	320	250	350	520	520	155	250	554	250	175	460	175
Turn Bay Length (ft)	200	250	350	520	520	155	250	554	250	175	460	175
Base Capacity (vph)	288	1685	527	515	1144	767	221	789	322	511	396	598
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.51	0.25	0.76	0.73	0.49	0.65	0.66	0.52	0.75	0.70	0.48

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	1692	72	1223	208	25	370	370	369
v/c Ratio	0.73	0.51	0.61	0.13	0.05	0.84	0.88	0.65
Control Delay	8.5	55.2	10.8	0.1	9.8	43.2	48.5	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	55.2	10.8	0.1	9.8	43.2	48.5	24.9
Queue Length 50th (ft)	130	29	203	0	2	169	172	127
Queue Length 95th (ft)	166	m70	m121	m0	18	#316	#329	217
Internal Link Dist (ft)	520	960	428	400	400	400	400	400
Turn Bay Length (ft)	225	225	2000	1583	568	475	455	607
Base Capacity (vph)	2323	142	2000	1583	568	475	455	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.51	0.61	0.13	0.04	0.78	0.81	0.61

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	18	1728	287	1049	368	451	161	161	18
v/c Ratio	0.14	0.52	0.18	0.44	0.23	0.85	0.28	0.29	0.03
Control Delay	38.2	15.7	0.2	11.9	0.3	37.1	16.2	16.2	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	15.7	0.2	11.9	0.3	37.1	16.2	16.2	10.1
Queue Length 50th (ft)	10	170	0	77	0	203	56	56	5
Queue Length 95th (ft)	m13	m275	m0	131	m0	247	76	76	13
Internal Link Dist (ft)	190	960		360		386		420	
Turn Bay Length (ft)	133	3321	1583	2381	1583	730	791	791	607
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.52	0.18	0.44	0.23	0.62	0.20	0.20	0.02

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	284	1208	574	148	1003	226	475	236	107
v/c Ratio	0.51	1.08	0.64	0.60	0.68	0.71	0.72	0.47	0.44
Control Delay	22.5	76.4	8.7	46.8	28.3	42.9	35.7	7.4	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	76.4	8.7	46.8	28.3	42.9	35.7	7.4	35.9
Queue Length 50th (ft)	70	403	179	69	154	114	120	0	54
Queue Length 95th (ft)	69	487	60	187	252	210	173	56	98
Internal Link Dist (ft)	360			1350		601			660
Turn Bay Length (ft)	250		200			250		175	150
Base Capacity (vph)	558	1107	890	246	1470	342	707	522	342
Starvation Cap Reductn	0	0	118	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.09	0.74	0.60	0.68	0.66	0.67	0.45	0.31

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # : 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	NBL	NBT	SBL	SBL	SBR
Lane Group Flow (vph)	140	722	135	620	232	338	520	114	211	114	211	360
v/c Ratio	0.92	0.84	0.86	0.74	0.42	0.95	0.81	0.18	1.18	0.79	0.79	0.41
Control Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	167.7	39.5	39.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	167.7	39.5	39.5	6.0
Queue Length 50th (ft)	61	136	59	128	0	145	201	0	-112	146	146	0
Queue Length 95th (ft)	#162	#221	#155	#184	50	#296	#358	30	#234	#275	#275	49
Internal Link Dist (ft)	689	689	500	6530	734	734	734	675	500	980	980	625
Turn Bay Length (ft)	350	887	153	859	580	357	645	623	179	456	562	625
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.86	0.72	0.41	0.95	0.81	0.18	1.18	0.79	0.41	0.41

**Intersection Summary**  
 # Volume exceeds capacity, queue is theoretically infinite.  
 # Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	NBL	NBT	SBL	SBL	SBR
Lane Group Flow (vph)	107	801	56	900	351	51	91	51	511	132	132	132
v/c Ratio	0.67	0.65	0.47	0.84	0.59	0.43	0.44	0.44	0.80	0.80	0.18	0.18
Control Delay	64.2	31.0	37.8	26.5	6.7	52.2	21.8	21.8	35.9	5.8	5.8	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	31.0	37.8	26.5	6.7	52.2	21.8	21.8	35.9	5.8	5.8	5.8
Queue Length 50th (ft)	61	224	31	274	4	28	14	237	10	10	10	10
Queue Length 95th (ft)	#161	#336	#156	#384	21	65	57	#388	43	43	43	43
Internal Link Dist (ft)	6630	6630	350	350	350	350	200	200	236	236	236	236
Turn Bay Length (ft)	225	1234	150	80	80	50	50	50	225	782	782	782
Base Capacity (vph)	159	1234	118	1077	598	118	367	653	653	653	653	653
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.65	0.47	0.84	0.59	0.43	0.25	0.78	0.78	0.17	0.17	0.17

**Intersection Summary**  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 # Volume for 95th percentile queue is metered by upstream signal.

	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group	862	489	104	1071	673	223
Lane Group Flow (vph)	0.58	0.62	0.39	0.51	0.61	0.39
v/c Ratio	12.2	8.6	48.3	20.5	28.6	15.2
Control Delay	0.2	0.5	0.0	0.4	0.0	0.0
Queue Delay	12.4	9.1	48.3	20.9	28.6	15.2
Total Delay	118	59	58	264	164	52
Queue Length 50th (ft)	146	m110	m101	327	222	113
Queue Length 95th (ft)	350	50	100	370	425	585
Internal Link Dist (ft)	1486	795	295	2084	1106	577
Turn Bay Length (ft)	142	70	0	487	0	0
Base Capacity (vph)	11	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0.64	0.68	0.35	0.57	0.61	0.39
Reduced v/c Ratio	Intersection Summary					

m. Volume for 95th percentile queue is metered by upstream signal.

	EBT	WBT	NBL	NBR
Lane Group	1538	549	493	248
Lane Group Flow (vph)	0.63	0.26	0.66	0.68
v/c Ratio	4.1	6.2	36.0	37.9
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	4.1	6.2	36.0	37.9
Total Delay	0	69	135	119
Queue Length 50th (ft)	246	115	162	176
Queue Length 95th (ft)	370	312	431	395
Internal Link Dist (ft)	2456	2456	1221	580
Turn Bay Length (ft)	64	0	0	0
Base Capacity (vph)	0	8	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0.64	0.27	0.40	0.43
Reduced v/c Ratio	Intersection Summary			

**CUMULATIVE 2020 + ALTERNATIVE C  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations												
Sign Control	Stop			Free			Free			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	13	16	369	22	209	14	67	329	223	508	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	14	17	368	23	220	15	713	346	235	535	
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	1											
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC1 conflicting volume	1869	2094	8538	1943	1923	886	548	1059	1059			
vC2 stage 1 conf vol												
vC2 stage 2 conf vol	1869	2094	536	1943	1923	886	538	1059	1059			
vCU unblocked vol	71	5.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1			
IC 2 stage (s)	3.5	4.0	8.3	3.5	4.0	3.3	2.2	2.2	2.2			
IF (s)	100	59	97	0	45	36	99	64	64			
p0 queue free %	6	33	544	24	42	344	1030	658	658			
EM capacity (veh/h)												
Direction Lane 2												
Volume Total	31	632	15	1059	235	538	548	1059	1059			
Volume Left	0	368	15	0	235	0	235	0	235			
Volume Right	17	270	0	346	0	3	0	3	0			
CSH	69	36	1030	1700	658	1700						
Volume to Capacity	0.44	17.64	0.01	0.62	0.36	0.32						
Queue Length 95th (ft)	44	Err	1	0	40	0						
Control Delay (s)	93.9	Err	8.5	0.0	13.5	0.0						
Lane LOS	F	F	A	B	B	B						
Approach Delay (s)	93.9	Err	0.1	0.1	0.1	0.1						
Approach LOS	F	F	F	F	F	F						
Intersection Summary												
Average Delay	2520.0											
Intersection Capacity Utilization	106.3%											
Analysis Period (min)	15											
ICU Level of Service	G											

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations												
Sign Control	Stop			Free			Free			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	10	546	10	581	9	10	21	10	10	10	10	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	11	575	11	612	9	11	22	11	11	11	11	
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC1 conflicting volume	621	585	1252	1241	580	1258	1242	616	616			
vC2 stage 1 conf vol												
vC2 stage 2 conf vol	621	585	1252	1241	580	1258	1242	616	616			
vCU unblocked vol	341	4.1	4.1	4.1	6.5	6.2	7.1	6.5	6.2	7.1	6.5	
IC 2 stage (s)	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	3.5	4.0	3.3	
IF (s)	99	99	92	87	98	92	94	98	94	98	98	
p0 queue free %	860	989	137	171	514	128	171	490	490			
EM capacity (veh/h)												
Direction Lane 2												
Volume Total	596	631	43	32								
Volume Left	11	9	11	11								
Volume Right	960	989	191	191								
CSH	0.01	0.01	0.23	0.16								
Volume to Capacity	1	1	21	14								
Queue Length 95th (ft)	0.3	0.3	29.3	27.5								
Control Delay (s)	A	A	D	D								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.3	0.3	29.3	27.5								
Approach LOS	D	D	D	D								
Intersection Summary												
Average Delay	1.9											
Intersection Capacity Utilization	45.9%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Lane Configurations	Free								
Sign Control	0%								
Grade	0%								
Volume (veh/h)	10	170	386	845	290	32	752	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	406	889	295	34	792	11	11
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)									
Pk. Platoon unblocked	304								
Vc1, stage 1 conf vol	2497								
Vc2, stage 2 conf vol	2497								
Vcu, unblocked vol	304								
tc, single (s)	4.1								
tc, 2 stage (s)	2.2								
pf queue free %	99								
pk capacity (veh/h)	1257								
Direction Lane #	EB	WB	NB	SB	EB	WB	NB	SB	SB
Volume Total	596	1194	1153	32	889	327	11		
Volume Left	11	889	327	11					
Volume Right	406	99	792	11					
CSH	1257	989	0	0					
Volume to Capacity	0.01	0.90	Err	Err					
Queue Length 95th (ft)	1	326	Err	Err					
Control Delay (s)	0.2	31.2	Err	Err					
Lane LOS	A	D	F	F					
Approach Delay (s)	0.2	31.2	Err	Err					
Approach LOS	F	F	F	F					
Intersection Summary									
Average Delay	Err								
Intersection Capacity Utilization	77.3%								
Analysis Period (min)	15								
ICU Level of Service	H								

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Lane Configurations	Free								
Sign Control	0%								
Grade	0%								
Volume (veh/h)	10	912	10	9	1116	9	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	960	11	9	1175	9	11	11	11
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)									
Pk. Platoon unblocked	1184								
Vc1, stage 1 conf vol	971								
Vc2, stage 2 conf vol	971								
Vcu, unblocked vol	41								
tc, single (s)	4.1								
tc, 2 stage (s)	2.2								
pf queue free %	98								
pk capacity (veh/h)	590								
Direction Lane #	EB	WB	NB	WB	NB	SB	EB	WB	SB
Volume Total	981	9	1175	9	32	32			
Volume Left	11	9	0	0	0	11			
Volume Right	590	710	1700	1700	45	45			
CSH	1700	1700	1700	1700	1700	1700			
Volume to Capacity	0.02	0.01	0.69	0.01	0.70	0.71			
Queue Length 95th (ft)	1	1	0	0	0	67			
Control Delay (s)	0.8	10.1	0.0	0.0	189.7	192.1			
Lane LOS	A	B	F	F	F	F			
Approach Delay (s)	0.6	10.1	0.0	0.0	189.7	192.1			
Approach LOS	F	F	F	F	F	F			
Intersection Summary									
Average Delay	5.7								
Intersection Capacity Utilization	68.7%								
Analysis Period (min)	15								
ICU Level of Service	C								



Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑											
Signal Control	Free Free Stop											
Grade	0% 0% 0%											
Volume (veh/h)	40	851	41	188	1087	189	44	14	366	180	31	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	895	43	198	1138	199	46	15	417	189	33	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
VC conflicting volume	1337											
VC1 stage 1 conf vol												
VC2 stage 2 conf vol	1337											
VCU unblocked vol	41											
IC single (s)	22											
IC 2 stage (s)	92											
pl queue free %	512											
pl capacity (veh/h)	42	597	342	198	759	578	478	234	46	189	0	0
Direction Lane	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	42	597	342	198	759	578	478	234	46	189	0	0
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0	0	0	0
CSH	512	1700	1700	726	1700	1700	0	0	0	0	0	0
Volume to Capacity	0.08	0.35	0.20	0.27	0.45	0.34	Err	Err	Err	Err	Err	Err
Queue Length 95th (ft)	7	0	0	28	0	0	0	0	0	0	0	0
Control Delay (s)	12.7	0.0	0.0	11.8	0.0	0.0	Err	Err	Err	Err	Err	Err
Lane LOS	B	B	B	B	B	B	F	F	F	F	F	F
Approach Delay (s)	0.5											
Approach LOS	B											
Intersection Summary	Err											
Average Delay	92.5%											
Intersection Capacity Utilization	15											
Analysis Period (min)	H											

Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑											
Signal Control	Free Free Stop											
Grade	0% 0% 0%											
Volume (veh/h)	53	1101	273	509	1196	273	143	105	559	217	41	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	1159	287	536	1259	287	151	111	588	228	43	126
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
VC conflicting volume	1546											
VC1 stage 1 conf vol												
VC2 stage 2 conf vol	1546											
VCU unblocked vol	41											
IC single (s)	22											
IC 2 stage (s)	92											
pl queue free %	512											
pl capacity (veh/h)	42	597	342	198	759	578	478	234	46	189	0	0
Direction Lane	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	56	773	674	536	839	707	849	397	151	228	0	0
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0	0	0	0
CSH	425	1700	1700	464	1700	1700	0	0	0	0	0	0
Volume to Capacity	0.13	0.45	0.40	1.15	0.49	0.42	Err	Err	Err	Err	Err	Err
Queue Length 95th (ft)	11	0	0	483	0	0	0	0	0	0	0	0
Control Delay (s)	14.7	0.0	0.0	119.5	0.0	0.0	Err	Err	Err	Err	Err	Err
Lane LOS	B	B	B	B	B	B	F	F	F	F	F	F
Approach Delay (s)	0.5											
Approach LOS	B											
Intersection Summary	Err											
Average Delay	132.7%											
Intersection Capacity Utilization	15											
Analysis Period (min)	H											

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

Movement	EB1	EB2	EB3	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	0.91	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.97	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	1.00
Fr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1648	1648
Volume (vph)	157	1485	255	73	1188	730	556	103	350	453	70	234
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	165	1542	268	77	1251	768	585	108	368	477	74	246
RTOR Reduction (vph)	0	0	50	0	152	0	0	0	342	0	75	0
Lane Group Flow (vph)	165	1542	218	77	1251	616	585	108	26	477	245	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5	21.5
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0	22.0
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	252	113	657	227	227
v/s Ratio Prot	0.08	c0.45	0.15	0.05	c0.71	0.39	c0.33	0.03	0.02	0.14	c0.15	0.15
v/s Ratio Perm	0.31	1.52	0.51	0.14	2.10	1.15	2.65	0.43	0.23	0.73	1.08	1.08
Uniform Delay, d1	43.2	56.0	46.2	36.8	53.0	53.0	70.0	71.2	70.2	60.8	69.0	69.0
Progression Factor	1.00	1.00	1.00	0.86	0.84	0.84	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	237.4	0.9	0.3	496.3	81.9	754.0	1.2	1.1	4.0	82.4	82.4
Delay (s)	43.6	293.4	47.1	31.8	541.0	126.1	824.0	72.4	71.2	64.8	151.4	151.4
Level of Service	D	F	D	C	F	F	F	F	E	E	F	F
Approach Delay (s)	239.1			370.3			486.4			99.5		
Approach LOS	F			F			F			F		

Intersection Summary	EB1	EB2	EB3	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	311.0											
HCM Volume to Capacity ratio	1.82											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	168.0%											
Analysis Period (min)	15											
Critical Lane Group												

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

Movement	EB1	EB2	EB3	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.89
Fr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1583	3433	3539	3539	3539	3539	3539	1610	3030	3030
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1583	3433	3539	3539	3539	3539	3539	1610	3030	3030
Volume (vph)	0	1461	810	77	1288	0	0	0	0	355	288	700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1538	853	81	1356	0	0	0	0	374	303	737
RTOR Reduction (vph)	0	0	169	0	0	0	0	0	0	0	0	31
Lane Group Flow (vph)	0	1538	684	81	1356	0	0	0	0	374	303	700
Turn Type	Perm	Perm	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	4	4	4	3	8	4	3	8	4	6	6	6
Permitted Phases	4	4	4	3	8	4	3	8	4	6	6	6
Actuated Green, G (s)	36.6	36.6	36.6	4.4	45.5	36.6	4.4	45.5	36.6	25.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	37.1	4.9	46.0	37.1	4.9	46.0	37.1	26.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.46	0.06	0.58	0.46	0.06	0.58	0.46	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	734	210	2035	1641	210	2035	1641	523	985	985
v/s Ratio Prot	c0.43			0.02	c0.38	0.43	0.02	c0.38	0.43	0.23	0.33	0.33
v/s Ratio Perm	0.94	0.93	0.93	0.39	0.67	0.94	0.39	0.67	0.94	0.72	1.42dr	1.42dr
Uniform Delay, d1	20.3	20.3	20.3	36.1	11.7	20.3	36.1	11.7	20.3	23.7	27.0	27.0
Progression Factor	1.39	1.83	1.83	1.25	1.97	1.39	1.25	1.97	1.39	1.00	1.00	1.00
Incremental Delay, d2	1.4	2.8	2.8	0.1	0.2	1.4	0.1	0.2	1.4	8.1	35.0	35.0
Delay (s)	29.7	39.9	39.9	45.2	23.3	29.7	45.2	23.3	29.7	31.9	62.0	62.0
Level of Service	C	D	D	D	C	C	D	C	C	C	E	E
Approach Delay (s)	33.3			24.5		33.3	24.5		33.3	54.0		
Approach LOS	C			C		C	C		A	D		

Intersection Summary	EB1	EB2	EB3	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	36.5											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	90.7%											
Analysis Period (min)	15											
Default Right Lane	Record with 1 through lane as a right lane.											
Critical Lane Group												

10: Wilfred Ave & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	0.85	1.00	0.99	1.00	1.00	0.85	1.00	0.93	1.00	1.00
Fr	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Flt Protected	5085	1583	3433	3520	1681	1688	2787	1770	1723		
Satd. Flow (prot)	5085	1583	3433	3520	1681	1688	2787	1770	1723		
Flt Permitted	0	770	1048	499	455	17	913	18	571	9	9
Satd. Flow (perm)	0	770	1048	499	455	17	913	18	571	9	9
Volume (vph)	0	811	1103	525	478	18	961	19	601	9	9
Peak-hour factor, PHF	0	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	811	1103	525	478	18	961	19	601	9	9
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477	0	7
Lane Group Flow (vph)	0	811	509	525	494	0	481	459	124	9	11
Turn Type	Prot	Perm	Prot	Prot	Split	Split	Perm	Split	Perm	Split	Split
Protected Phases	7	4		3	8	2	2	2	2	6	6
Permitted Phases			4						2		
Actuated Green, G (s)	17.5	17.5	12.5	34.5		16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0		16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44		0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
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)	1144	356	558	1540		347	348	575	365	355	
v/s Ratio Prot	0.16		c0.15	0.14		0.29	c0.30	0.01	c0.01		
v/s Ratio Perm											
v/c Ratio	0.71	1.43	0.94	0.32		1.39	1.43	0.22	0.02	0.03	
Uniform Delay, d1	28.6	31.0	33.1	14.7		31.8	31.8	26.4	25.3	25.4	
Progression Factor	1.47	4.11	1.22	1.25		1.07	1.07	2.69	1.00	1.00	
Incremental Delay, d2	1.7	200.3	21.6	0.5		179.1	200.2	0.3	0.1	0.2	
Delay (s)	43.7	327.8	62.1	15.8		213.1	234.1	71.2	25.5	25.5	
Level of Service	D	F	E	B		F	F	E	C	C	
Approach Delay (s)	207.4			41.1			165.8		25.5		
Approach LOS	F			D			F		C		
Intersection Summary											
HCM Average Control Delay	154.4										
HCM Volume to Capacity ratio	0.97										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	92.5%										
Analysis Period (min)	15										
c Critical Lane Group											

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	1.00	0.95	1.00
Fr	1.00	1.00	0.95	1.00	0.99	1.00	0.95	1.00
Flt Protected	3433	3538	3503				1770	1583
Satd. Flow (prot)	3433	3538	3503				1770	1583
Flt Permitted	0.95	1.00	1.00				0.95	1.00
Satd. Flow (perm)	0.95	1.00	1.00				0.95	1.00
Volume (vph)	137	1216	867	64	102	103		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	144	1280	913	67	107	108		
RTOR Reduction (vph)	0	0	5	0	0	0		
Lane Group Flow (vph)	144	1280	975	0	107	28		
Turn Type	Prot	Prot	Prot	Prot	Prot	Perm		
Protected Phases	7	4	8	6	6	6		
Permitted Phases								
Actuated Green, G (s)	8.7	50.5	37.3	20.5	20.5	20.5		
Effective Green, g (s)	9.2	51.0	37.8	21.0	21.0	21.0		
Actuated g/C Ratio	0.11	0.64	0.47	0.26	0.26	0.26		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	395	2258	1655	465	416			
v/s Ratio Prot	0.04	c0.36	0.28	c0.06	0.02			
v/s Ratio Perm								
v/c Ratio	0.36	0.57	0.59	0.23	0.07			
Uniform Delay, d1	32.7	8.2	15.4	23.2	22.2			
Progression Factor	0.80	2.28	1.00	1.00	1.00			
Incremental Delay, d2	0.4	0.8	1.5	1.2	0.3			
Delay (s)	26.5	19.6	17.0	24.3	22.5			
Level of Service	C	B	B	C	C			
Approach Delay (s)	20.3	17.0		23.4				
Approach LOS	C	B		B				
Intersection Summary								
HCM Average Control Delay	19.3							
HCM Volume to Capacity ratio	0.47							
Actuated Cycle Length (s)	80.0							
Intersection Capacity Utilization	45.9%							
Analysis Period (min)	15							
c Critical Lane Group								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
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	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1681	1686	1583	1741	1770	3537	1770	3537	1770	3539	1583	1583
Flt Permitted	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1681	1686	1583	1741	1770	3537	1770	3539	1770	3539	1583	1583
Volume (vph)	1067	3	47	8	3	5	552	413	2	7	616	926
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1123	3	49	8	3	5	501	435	2	7	648	975
RTOR Reduction (vph)	0	0	36	0	5	0	0	1	0	0	0	564
Lane Group Flow (vph)	562	564	13	0	11	0	581	436	0	7	648	411
Turn Type	Split	Split	Perm	Split	Split	Perm	Split	Split	Perm	Split	Perm	Perm
Protected Phases	4	4	4	4	4	4	5	2	2	1	6	6
Permitted Phases	4	4	4	4	4	4	5	2	2	1	6	6
Actuated Green, G (s)	20.5	20.5	20.5	1.5	27.1	38.5	27.1	38.5	12.9	12.9	12.9	12.9
Effective Green, g (s)	21.0	21.0	21.0	2.0	27.6	39.0	27.6	39.0	13.4	13.4	13.4	13.4
Actuated g/C Ratio	0.26	0.26	0.26	0.02	0.35	0.49	0.35	0.49	0.02	0.17	0.17	0.17
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	441	443	416	44	611	1724	611	1724	44	593	265	265
v/s Ratio Prot	0.33	0.33	0.01	0.01	0.33	0.12	0.33	0.12	0.00	0.18	0.26	0.26
v/s Ratio Perm	1.27	1.27	0.03	0.03	0.95	0.25	0.95	0.25	0.16	1.09	1.55	1.55
Uniform Delay, d1	29.5	29.5	21.9	38.3	25.5	12.0	25.5	12.0	38.2	33.3	33.3	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.15	1.99	1.99
Incremental Delay, d2	140.2	139.6	0.0	3.0	24.8	0.4	24.8	0.4	0.2	44.7	250.3	250.3
Delay (s)	169.7	169.1	22.0	41.3	50.3	12.3	50.3	12.3	45.7	83.1	316.7	316.7
Level of Service	F	F	C	D	D	B	D	B	D	F	F	F
Approach Delay (s)	163.2	163.2	22.0	41.3	50.3	12.3	50.3	12.3	45.7	83.1	316.7	316.7
Approach LOS	F	F	C	D	D	B	D	B	D	F	F	F
Intersection Summary												
HCM Average Control Delay	153.7 HCM Level of Service F											
HCM Volume to Capacity ratio	1.16											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	107.3% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%
Grade	0	0	1020	0	0	890	0
Volume (veh/h)	0	0	1020	0	0	890	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1074	0	0	937	0
Pedestrians	0	0	0	0	0	0	0
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
VC, conflicting volume	2011	1074					1074
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCU, unblocked vol	2011	1074					1074
TC, single (s)	6.4	6.2					4.1
TC, 2 stage (s)							
tF (s)	3.5	3.3					2.2
p0 queue free %	100	100					100
cM capacity (veh/h)	65	267					649
Direction, Lane #	WB	RB	SB	WB	RB	SB	WB
Volume Total	0	1074	937	0	1074	937	0
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0
CSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.63	0.55	0.00	0.63	0.55	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	A	A	A	A	A	A	A
Intersection Summary							
Average Delay	0.0						
Intersection Capacity Utilization	57.0%						
Analysis Period (min)	15						
ICU Level of Service	B						

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	144	31	12	359	363	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	152	33	13	378	382	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
PK platoon unblocked						
VC conflicting volume	609	204	408			
VC1 stage 1 conf vol						
VC2 stage 2 conf vol	609	204	408			
VCU unblocked vol	68	69	41			
IC single (s)						
IC 2 stage (s)						
IC (s)	3.5	3.3	2.2			
pd queue free %	64	96	99			
CM capacity (veh/h)	422	803	1147			
Direction	EB	EB 2	NB 1	NB 2	NB 3	SB 1
Volume Total	152	33	13	189	189	255
Volume Left	152	0	13	0	0	0
Volume Right	0	33	0	0	0	26
cSH	422	803	1147	1700	1700	1700
Volume to Capacity	0.36	0.04	0.01	0.11	0.15	0.09
Queue Length 85th (ft)	40	3	1	0	0	0
Control Delay (s)	18.2	9.7	8.2	0.0	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	16.7		0.3			0.0
Approach LOS	C					E
<b>Intersection Summary</b>						
Average Delay	3.2			ICU Level of Service		
Intersection Capacity Utilization	25.5%			15		
Analysis Period (min)	15			15		

Movement	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	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	1.00	1.00	1.00	1.00
Fr.	1.00	0.85	1.00	0.85	1.00	1.00
Fr Protected	0.95	1.00	1.00	0.85	1.00	1.00
Satd. Flow (vph)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	253	355	664	253	327	564
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	266	374	699	266	344	594
RTOR Reduction (vph)	0	292	0	161	0	0
Lane Group Flow (vph)	266	82	699	115	344	594
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	2	2	1	6	
Permitted Phases						
Actuated Green, G (s)	13.3	19.3	26.6	26.6	9.5	40.6
Effective Green, g (s)	13.8	13.8	27.1	27.1	10.0	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	388	347	803	682	281	1217
v/s Ratio Prot	0.15	0.05	0.38	0.19	0.32	
w/C Ratio	0.69	0.24	0.87	0.17	1.22	0.49
Uniform Delay, d1	22.6	20.2	16.3	11.0	26.4	5.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.4	12.4	0.5	128.4	1.4
Delay (s)	27.5	20.6	28.7	11.5	154.8	6.9
Level of Service	C	C	C	B	F	A
Approach Delay (s)	23.5		24.0		61.2	
Approach LOS	C		C		E	
<b>Intersection Summary</b>						
HCM Average Control Delay	37.6			HCM Level of Service		
HCM Volume to Capacity ratio	0.89			12.0		
Actuated Cycle Length (s)	62.9			Sum of lost time (s)		
Intersection Capacity Utilization	77.1%			ICU Level of Service		
Analysis Period (min)	15			15		
c Critical Lane Group						

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

2020 Alternative C  
PM Peak

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	83	707	53	116	630	92	69	28	153	281	40	97
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	744	56	122	663	97	73	27	161	296	42	102
RTOR Reduction (vph)	0	0	43	0	0	75	0	58	71	0	56	0
Lane Group Flow (vph)	87	744	13	122	663	22	73	41	18	296	88	102
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm
Protected Phases	4	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	4.4	17.6	4.4	17.6	17.6	4.4	15.6	15.6	15.6	24.4	35.6	35.6
Effective Green, g (s)	4.9	18.1	4.9	18.1	18.1	4.9	16.1	16.1	16.1	24.9	36.1	36.1
Actuated g/C Ratio	0.06	0.23	0.23	0.06	0.23	0.23	0.06	0.20	0.20	0.31	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	108	801	358	210	801	358	210	317	303	551	751	751
v/s Ratio Prot	0.95	c0.21	0.01	0.04	c0.19	0.01	c0.02	c0.03	0.01	c0.17	0.05	0.05
v/s Ratio Perm	0.81	0.93	0.04	0.58	0.83	0.06	0.35	0.13	0.06	0.54	0.12	0.12
Uniform Delay, d1	37.1	30.3	24.1	36.6	29.5	24.3	36.0	26.2	25.8	22.8	12.7	12.7
Progression Factor	1.00	1.00	0.90	0.53	0.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.9	16.8	0.0	3.0	5.3	0.1	1.0	0.9	0.4	1.0	0.3	0.3
Delay (s)	70.9	47.1	24.2	35.9	20.9	5.6	37.0	27.1	26.2	23.8	13.0	13.0
Level of Service	E	D	C	D	C	A	D	C	C	C	B	B
Approach Delay (s)	48.0			21.3			29.6				20.3	
Approach LOS	D			C			C				C	
<b>Intersection Summary</b>												
HCM Average Control Delay	31.6											
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	58.3%											
Analysis Period (min)	15											
c Critical Lane Group	C											

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.91	1.00	0.91	0.97	1.00	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	216	822	163	377	741	318	326	510	339	301	236	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	865	172	397	780	335	182	343	357	317	248	248
RTOR Reduction (vph)	0	0	115	0	0	227	0	72	261	0	188	0
Lane Group Flow (vph)	227	865	57	397	780	108	182	443	104	357	317	50
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Actuated Green, G (s)	12.1	25.8	25.8	11.5	25.2	25.2	9.0	15.0	15.0	9.7	15.7	15.7
Effective Green, g (s)	12.6	26.3	26.3	12.0	25.7	25.7	9.5	15.5	15.5	10.2	16.2	16.2
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.19	0.19	0.13	0.20	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1672	520	515	1137	509	210	624	279	438	377	321
v/s Ratio Prot	c0.13	0.17	0.04	0.12	c0.22	0.07	0.10	0.14	0.07	c0.10	c0.17	0.03
v/s Ratio Perm	0.81	0.52	0.11	0.77	0.69	0.21	0.87	0.71	0.37	0.82	0.84	0.16
Uniform Delay, d1	32.6	21.7	18.7	32.7	23.6	19.8	34.6	30.2	28.0	34.0	30.7	26.3
Progression Factor	0.80	0.52	0.36	0.85	0.79	0.88	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.9	0.8	0.3	5.7	2.7	0.8	2.91	3.8	0.8	11.1	15.4	0.2
Delay (s)	38.0	12.2	7.0	33.4	21.4	18.2	63.7	34.0	28.9	45.1	46.1	26.5
Level of Service	D	B	A	C	C	B	E	C	C	D	D	C
Approach Delay (s)	16.1			23.8			37.3				40.4	
Approach LOS	B			C			D				D	
<b>Intersection Summary</b>												
HCM Average Control Delay	28.0											
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	71.2%											
Analysis Period (min)	15											
c Critical Lane Group	C											

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.96	1.00	1.00	0.90	1.00	0.85	1.00	0.95	0.95	1.00	0.95	1.00
Fit Protected	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Fit Permitted	4899	1770	3539	1583	1653	1681	1686	1583	1583	1681	1686	1583
Satd. Flow (perpm)	1.00	0.95	1.00	1.00	1.00	0.92	0.74	0.71	1.00	0.92	0.74	0.71
Satd. Flow (perpm)	4899	1770	3539	1583	1653	1681	1686	1583	1583	1681	1686	1583
Volume (vph)	0	1263	408	68	1000	255	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1329	429	72	1053	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	66	0	0	0	0	0	0	12	0	0	55
Lane Group Flow (vph)	0	1692	0	72	1053	268	0	12	0	322	322	394
Turn Type	Prot	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	6	2	6	6	6	6	6	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	37.0	5.0	46.5	80.0	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	37.5	5.5	47.0	80.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.47	0.07	0.59	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2295	122	2079	1583	484	410	392	495	495	410	392	495
v/s Ratio Prot	c0.35	0.04	c0.30	0.17	0.01	0.25	c0.26	0.25	0.25	c0.26	0.25	0.25
v/s Ratio Perm	0.74	0.59	0.51	0.17	0.02	0.79	0.82	0.80	0.80	0.79	0.82	0.80
Uniform Delay, d1	17.2	36.2	9.7	0.0	19.0	25.1	25.4	25.2	25.2	25.1	25.4	25.2
Progression Factor	0.43	1.21	0.71	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	6.3	0.7	0.2	0.0	9.5	13.0	8.6	8.6	9.5	13.0	8.6
Delay (s)	9.0	50.0	8.2	0.2	19.1	34.6	38.4	33.8	33.8	34.6	38.4	33.8
Level of Service	A	D	A	A	B	C	D	C	C	D	D	C
Approach Delay (s)	9.0	8.8	8.8	8.8	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
Approach LOS	A	A	A	A	B	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	15.7
HCM Level of Service	B
HCM Volume to Capacity ratio	0.76
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.9%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.96	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.85	1.00	0.95	0.95	1.00	0.95	1.00
Fit Protected	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Fit Permitted	1770	6408	1583	5085	1583	1770	1504	1504	1504	1770	1504	1748
Satd. Flow (perpm)	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (perpm)	1770	6408	1583	5085	1583	1770	1504	1504	1504	1770	1504	1748
Volume (vph)	21	1567	298	0	853	383	464	0	345	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1649	314	0	898	403	488	0	363	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	1	0	2
Lane Group Flow (vph)	22	1649	314	0	898	403	488	180	181	0	16	0
Turn Type	Prot	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	2	8	2	2	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	2.2	39.0	80.0	32.3	80.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	2.7	39.5	80.0	32.8	80.0	32.5	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.03	0.49	1.00	0.41	1.00	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	3164	1583	2095	1583	564	611	611	611	564	611	610
v/s Ratio Prot	0.01	c0.26	0.20	0.18	0.25	c0.35	0.12	0.12	0.12	0.12	0.12	0.01
v/s Ratio Perm	0.37	0.52	0.20	0.43	0.25	0.87	0.29	0.30	0.30	0.29	0.30	0.03
Uniform Delay, d1	37.8	13.8	0.0	16.9	0.0	21.7	16.0	16.0	16.0	16.0	16.0	14.3
Progression Factor	1.09	1.17	1.00	0.71	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.4	0.2	0.5	0.3	13.1	0.3	0.3	0.3	0.3	0.3	0.0
Delay (s)	43.6	16.6	0.2	12.4	0.3	34.8	16.3	16.3	16.3	16.3	16.3	14.3
Level of Service	D	B	A	B	A	C	B	B	B	B	B	B
Approach Delay (s)	14.3	8.7	8.7	26.9	8.7	26.9	26.9	26.9	26.9	26.9	26.9	14.3
Approach LOS	B	A	A	C	A	C	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	15.1
HCM Level of Service	B
HCM Volume to Capacity ratio	0.68
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%
ICU Level of Service	B
Analysis Period (min)	15
c Critical Lane Group	

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	4913	1610	3330	1583	1610	3387	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4913	1610	3330	1583	1610	3387	1583
Volume (vph)	235	1232	462	165	694	202	384	293	241	179	354
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1297	486	174	731	213	404	308	254	188	373
RTOR Reduction (vph)	0	0	346	0	82	0	0	0	204	0	131
Lane Group Flow (vph)	247	1297	140	174	882	0	229	483	50	181	380
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6	5
Permitted Phases	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	15.4	14.0	14.0
Actuated Green, G (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	15.9	14.5	14.5
Effective Green, g (s)	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.20	0.18	0.18
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	562	1022	457	232	1259	320	662	315	292	614	287
Lane Grp Cap (vph)	0.07	c0.37	0.09	0.10	c0.18	0.14	c0.15	0.03	c0.11	0.11	0.11
v/s Ratio Prot	0.44	1.27	0.31	0.75	0.70	0.72	0.73	0.16	0.62	0.62	0.02
v/s Ratio Perm	30.1	28.4	22.2	33.5	27.0	29.9	30.0	26.5	30.2	30.2	27.3
Uniform Delay, d1	0.59	0.62	1.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	128.1	1.6	12.8	3.3	7.4	4.0	0.2	3.9	1.9	0.2
Incremental Delay, d2	18.3	145.8	29.8	46.2	30.2	37.4	34.1	26.8	34.1	32.1	27.5
Delay (s)	B	F	C	D	C	D	C	C	C	C	C
Level of Service	B	F	C	D	C	D	C	C	C	C	C
Approach Delay (s)	102.5	F	C	D	C	32.7	C	32.9	C	31.6	C
Approach LOS	F	C	D	C	C	C	C	C	C	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	61.9										
HCM Volume to Capacity ratio	0.91										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	79.4%										
Analysis Period (min)	15										
Critical Lane Group											

22: Gravensten Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative C  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.91	0.91	1.00	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	0.85	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	4913	1610	3330	1583	1610	3387	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	4913	1610	3330	1583	1610	3387	1583
Volume (vph)	235	1232	462	165	694	202	384	293	241	179	354
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1297	486	174	731	213	404	308	254	188	373
RTOR Reduction (vph)	0	0	346	0	82	0	0	0	204	0	131
Lane Group Flow (vph)	247	1297	140	174	882	0	229	483	50	181	380
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6	5
Permitted Phases	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	15.4	14.0	14.0
Actuated Green, G (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	15.9	14.5	14.5
Effective Green, g (s)	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.20	0.18	0.18
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	562	1022	457	232	1259	320	662	315	292	614	287
Lane Grp Cap (vph)	0.07	c0.37	0.09	0.10	c0.18	0.14	c0.15	0.03	c0.11	0.11	0.11
v/s Ratio Prot	0.44	1.27	0.31	0.75	0.70	0.72	0.73	0.16	0.62	0.62	0.02
v/s Ratio Perm	30.1	28.4	22.2	33.5	27.0	29.9	30.0	26.5	30.2	30.2	27.3
Uniform Delay, d1	0.59	0.62	1.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	128.1	1.6	12.8	3.3	7.4	4.0	0.2	3.9	1.9	0.2
Incremental Delay, d2	18.3	145.8	29.8	46.2	30.2	37.4	34.1	26.8	34.1	32.1	27.5
Delay (s)	B	F	C	D	C	D	C	C	C	C	C
Level of Service	B	F	C	D	C	D	C	C	C	C	C
Approach Delay (s)	102.5	F	C	D	C	32.7	C	32.9	C	31.6	C
Approach LOS	F	C	D	C	C	C	C	C	C	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	61.9										
HCM Volume to Capacity ratio	0.91										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	79.4%										
Analysis Period (min)	15										
Critical Lane Group											



23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

2020 Alternative C  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.85	1.00	0.80	1.00	0.88	1.00	0.88	1.00	0.88
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3519	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Volume (vph)	122	812	32	53	914	406	48	28	59	592	28	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	855	34	56	962	427	51	29	62	623	29	116
RTOR Reduction (vph)	0	0	0	0	0	145	0	57	0	0	0	61
Lane Group Flow (vph)	128	886	0	56	962	282	51	34	0	623	84	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	3	6	5	2	1	6			
Permitted Phases												
Actuated Green, G (s)	5.5	21.8	4.4	20.7	20.7	3.3	6.4	39.4	42.5			
Effective Green, g (s)	6.0	22.3	4.9	21.2	21.2	3.8	6.9	39.9	43.0			
Actuated g/C Ratio	0.07	0.25	0.05	0.24	0.24	0.04	0.08	0.44	0.48			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	118	872	96	834	373	75	128	785	783			
v/s Ratio Prot	0.07	c0.25	0.03	c0.27	0.18	c0.03	0.02	c0.35	c0.05			
v/s Ratio Perm	1.08	1.02	0.58	1.15	0.76	0.68	0.26	0.79	0.11			
Uniform Delay, d1	42.0	33.9	41.6	34.4	32.0	42.5	39.2	21.5	12.9			
Progression Factor	1.00	1.00	0.67	0.59	0.27	1.00	1.00	1.00	1.00			
Incremental Delay, d2	107.4	34.5	7.4	80.8	11.4	22.4	1.1	5.5	0.1			
Delay (s)	149.4	68.4	35.4	100.9	20.1	64.9	40.3	27.1	13.0			
Level of Service	F	E	D	F	C	E	D	C	B			
Approach Delay (s)	78.6	E	74.5	E	48.1	D	D	24.4	C			
Approach LOS	E	E	E	E	E	D	D	D	C			
Intersection Summary												
HCM Average Control Delay	63.3											
HCM Volume to Capacity Ratio	0.95											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	81.9%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	0.85	1.00	0.80	1.00	0.88	1.00	0.88	1.00	0.88
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1639	1770	1639	1770	1639
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3539	1583	1583	1770	3539	1583	1770	1639	3433	1583	3433	1583
Volume (vph)	0	953	516	66	1115	0	0	0	0	640	0	258
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1003	543	69	1174	0	0	0	0	674	0	272
RTOR Reduction (vph)	0	0	117	0	0	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	1003	426	69	1174	0	0	0	0	674	0	220
Turn Type	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	3	3	4	3	3	1	6			
Permitted Phases												
Actuated Green, G (s)	36.4	36.4	11.6	11.6	52.5			28.5	28.5			
Effective Green, g (s)	36.9	36.9	12.1	12.1	53.0			29.0	29.0			
Actuated g/C Ratio	0.41	0.41	0.13	0.13	0.59			0.32	0.32			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5			4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	1451	649	238	2084				1106	510			
v/s Ratio Prot	c0.28		0.04	c0.33				c0.20	0.14			
v/s Ratio Perm	0.27		0.27	0.27				0.61	0.43			
Uniform Delay, d1	21.9	21.4	35.1	11.4				25.7	24.0			
Progression Factor	0.44	0.42	1.26	1.68				1.00	1.00			
Incremental Delay, d2	1.4	2.6	0.6	1.0				1.0	2.6			
Delay (s)	11.1	11.7	44.9	20.1				26.7	26.7			
Level of Service	B	B	D	C				C	C			
Approach Delay (s)	11.3	B	21.5	C				26.7	26.7			
Approach LOS	B	B	D	C				C	C			
Intersection Summary												
HCM Average Control Delay	18.6											
HCM Volume to Capacity Ratio	0.63											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	67.7%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.97	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00
Sat'd. Flow (prot)	3539	3539	3433	1583	3539	3433
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95
Sat'd. Flow (perm)	3539	3539	3433	1583	3539	3433
Volume (vph)	1596	0	663	492	273	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1680	0	719	518	287	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1880	0	719	518	273	0
Turn Type	Perm					
Protected Phases	4					
Permitted Phases	B 2 2					
Actuated Green, G (s)	60.0					
Effective Green, g (s)	60.5					
Actuated g/C Ratio	0.67					
Clearance Time (s)	4.5					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	2379					
v/s Ratio Prot	c0.47					
v/s Ratio Perm	c0.17					
Uniform Delay, d1	9.2					
Progression Factor	0.37					
Incremental Delay, d2	1.4					
Delay (s)	4.8					
Level of Service	A					
Approach Delay (s)	4.8					
Approach LOS	A					
Intersection Summary	A					
HCM Average Control Delay	12.6					
HCM Volume to Capacity ratio	0.71					
Actuated Cycle Length (s)	90.0					
Intersection Capacity Utilization	67.7%					
Analysis Period (min)	15					
Critical Lane Group	c					

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	11	5	8	23	25	251
Signl Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	5	8	23	25	251
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	5	8	24	26	264
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked						
VC conflicting volume	1607	1912	375	1521	1686	423
VC1 stage 1 cont vol						751
VC2 stage 2 cont vol	1607	1912	375	1521	1686	423
VCU unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9
IC single (s)						4.1
IC 2 stage (s)						
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	45	90	99	62	53	54
qM capacity (veh/h)	21	55	672	64	57	580
qM capacity (veh/h)						855
Direction Lane #	EBL	WBL	NBL	EBR	WBR	NBR
Volume Total	25	315	7	423	423	27
Volume Left	12	24	0	0	0	0
Volume Right	8	264	0	0	0	27
cSH	38	374	855	1700	1700	769
Volume to Capacity	0.66	0.84	0.01	0.25	0.25	0.02
Queue Length 95th (ft)	59	195	1	0	0	0
Control Delay (s)	207.1	43.3	9.2	0.0	0.0	10.7
Lane LOS	F	E	A	A	B	B
Approach Delay (s)	207.1	43.3	0.1			1.7
Approach LOS	F	E	E			
Intersection Summary	A					
Average Delay	9.7					
Intersection Capacity Utilization	51.1%					
Analysis Period (min)	15					
ICU Level of Service	A					

27: Millbrae Ave & Primrose Ave  
Graton Rancheria Casino & Hotel  
2020 Alternative C  
PM Peak

Movement	EB	E	EBT	EBR	WB	WB1	WBR	NBU	NBU1	NBR	NBR1	SB	SBI	SBR	SBR1
<b>Lane Configurations</b>															
Sign Control															
Grade															
Volume (veh/h)	1	161	5	7	287	2	2	2	0	2	0	2	0	1	0
Peak Hour Factor		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	169	5	7	302	2	13	0	2	0	2	0	1	0	0
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type															
Median storage (veh)															
Upstream signal (ft)															
p.k. platoon unblocked															
vC, conflicting volume	304				175			493		493		172		494	495
vC1, stage 1 conf vol															
vC2, stage 2 conf vol	304				175			493		493		172		494	495
vCU, unblocked vol															
IC, single (s)	4.1				4.1			7.1		6.5		6.2		7.1	6.5
IC, 2 stage (s)															
IF (s)	2.2				2.2			3.5		4.0		3.3		3.5	4.0
p0 queue free %	100				99			97		100		100		100	100
p0 capacity (veh/h)	1257				1402			484		474		872		482	473
<b>Direction Lane # EB EBT WB1 WBR NBU1 NBR SB SBI SBR</b>															
Volume Total	176				312			15		1					
Volume Left	1				7			13		0					
Volume Right	5				2			0		0					
CSH	1257				1402			516		473					
Volume to Capacity	0.00				0.01			0.03		0.00					
Queue Length 95th (ft)	0				0			0		0					
Control Delay (s)	0.1				0.2			12.2		12.6					
Lane LOS	A				A			B		B					
Approach Delay (s)	0.1				0.2			12.2		12.6					
Approach LOS	B				B			B		B					
<b>Intersection Summary</b>															
Average Delay	0.5														
Intersection Capacity Utilization	34.1%														
ICU Level of Service	A														
Analysis Period (min)	15														

28: Millbrae Ave & Whistler Ave  
Graton Rancheria Casino & Hotel  
2020 Alternative C  
PM Peak

Movement	EB	E	EBT	EBR	WB	WB1	WBR	NBU	NBU1	NBR	NBR1	SB	SBI	SBR	SBR1
<b>Lane Configurations</b>															
Sign Control															
Grade															
Volume (veh/h)	1	146			2			4		279		8		23	9
Peak Hour Factor		0.95			0.95			0.95		0.95		0.95		0.95	0.95
Hourly flow rate (vph)	1	154			2			4		294		8		24	9
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type															
Median storage (veh)															
Upstream signal (ft)															
p.k. platoon unblocked															
vC, conflicting volume	302							156		464		467		155	468
vC1, stage 1 conf vol															
vC2, stage 2 conf vol	302							156		464		467		155	468
vCU, unblocked vol															
IC, single (s)	4.1				4.1			7.1		6.5		6.2		7.1	6.5
IC, 2 stage (s)															
IF (s)	2.2				2.2			3.5		4.0		3.3		3.5	4.0
p0 queue free %	100				100			100		95		98		100	100
p0 capacity (veh/h)	1259				1424			506		491		891		497	493
<b>Direction Lane # EB EBT WB1 WBR NBU1 NBR SB SBI SBR</b>															
Volume Total	157				306			34		5					
Volume Left	1				4			24		4					
Volume Right	2				8			0		1					
CSH	1259				1424			502		532					
Volume to Capacity	0.00				0.00			0.07		0.01					
Queue Length 95th (ft)	0				0			0		5					
Control Delay (s)	0.1				0.1			12.7		11.8					
Lane LOS	A				A			B		B					
Approach Delay (s)	0.1				0.1			12.7		11.8					
Approach LOS	B				B			B		B					
<b>Intersection Summary</b>															
Average Delay	1.1														
Intersection Capacity Utilization	27.8%														
ICU Level of Service	A														
Analysis Period (min)	15														

Movement	EBT	EBR	WBL	WBR	NBL	NBR
Lane Configurations						
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	134	27	7	331	27	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	162	28	7	348	28	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median Type					None	
Median storage (veh)						
Upstream signal (ft)						
px, platoon unblocked						
vc, conflicting volume		191			539	176
vc1, stage 1 conf vol						
vc2, stage 2 conf vol		191			539	176
vcu, unblocked vol		4.1			6.4	6.2
tc, single (s)						
tc, 2 stage (s)		2.2			3.5	3.3
tf (s)					94	97
pl queue free %						
pl capacity (veh/h)		1383			500	867
Direction, Lane #						
Volume Total	191	356			55	
Volume Left	0	7			28	
Volume Right	1700	1383			628	
csh	0.11	0.01			0.09	
Volume to Capacity	0	0			7	
Queue Length 95th (ft)	0.0	0.2			11.3	
Control Delay (s)	0.0	0.2			11.3	
Lane LOS	A	A			B	
Approach Delay (s)	0.0	0.2			11.3	
Approach LOS	B	B			B	
Intersection Summary						
Average Delay					1.2	
Intersection Capacity Utilization					33.0%	A
Analysis Period (min)					15	

Movement	EBT	EBR	WBL	WBR	NBL	NBR
Lane Configurations						
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	160	23	36	225	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	168	24	38	237	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median Type					None	
Median storage (veh)						
Upstream signal (ft)						
px, platoon unblocked						
vc, conflicting volume		237			493	493
vc1, stage 1 conf vol						
vc2, stage 2 conf vol		237			493	493
vcu, unblocked vol		4.1			7.1	6.5
tc, single (s)						
tc, 2 stage (s)		2.2			3.5	4.0
tf (s)					75	100
pl queue free %						
pl capacity (veh/h)		1330			476	464
Direction, Lane #						
Volume Total	193	275	147	0		
Volume Left	0	38	120	0		
Volume Right	24	0	27	0		
csh	1330	1381	519	1700		
Volume to Capacity	0.00	0.03	0.28	0.00		
Queue Length 95th (ft)	0	2	29	0		
Control Delay (s)	0.0	1.3	14.7	0.0		
Lane LOS	A	A	B	A		
Approach Delay (s)	0.0	1.3	14.7	0.0		
Approach LOS	B	B	B	A		
Intersection Summary						
Average Delay					4.1	
Intersection Capacity Utilization					41.6%	A
Analysis Period (min)					15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	131	51	0	235	55	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	138	54	0	247	58	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
px platoon unblocked						
% conflicting volume						192
vc1, stage 1 cont vol						412
vc2, stage 2 cont vol						412
vcu, unblocked vol						41
tc, single (s)						6.4
tc, 2 stage (s)						6.2
lf (s)						2.2
p0 queue free %						3.5
cm capacity (veh/h)						100
						90
						100
						1382
						596
						880
Direction: Lane #	EBT	EBR	WBL	WBT	NBL	NBR
Volume Total	192	247	58			
Volume Left	0	0	58			
Volume Right	54	0	0			
C/S/H	1700	1382	596			
Volume to Capacity	0.11	0.00	0.10			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.0	0.0	11.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.7			
Approach LOS			B			
Intersection Summary						
Average Delay	1.4					
Intersection Capacity Utilization	22.4%					
Analysis Period (min)	15					
	ICU Level of Service A					

Lane Group	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	165	1542	268	77	1251	768	585	108	368	477	320
v/c Ratio	0.31	1.52	0.56	0.14	2.10	1.12	2.65	0.43	0.81	0.73	1.06
Control Delay	45.2	275.2	39.0	32.1	521.5	94.6	78.1	75.6	20.8	68.1	114.2
Queue Delay	0.0	333.5	0.0	0.0	117.2	108.1	0.0	0.0	26.3	421.4	0.0
Total Delay	45.2	608.7	39.0	32.1	638.7	202.9	778.1	75.6	47.1	489.4	114.2
Queue Length 50th (ft)	134	2230	192	49	2169	751	1028	58	0	243	284
Queue Length 95th (ft)	203	#1374	302	m72m#2337	m#648	#1271	89	110	#350	#490	270
Internal Link Dist (ft)	550		220								
Turn Bay Length (ft)	150		150						100	275	
Base Capacity (vph)	531	1017	482	567	597	586	221	375	497	656	302
Starvation Cap Reductn	0	0	0	0	66	124	0	0	0	0	0
Spillback Cap Reductn	0	334	0	0	0	0	0	0	134	408	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	2.26	0.56	0.14	2.36	1.37	2.65	0.79	1.01	1.93	1.06

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1338	853	81	1356	374	1040					
v/c Ratio	0.91	0.93	0.32	0.67	0.72	1.42dr					
Control Delay	29.4	25.9	44.5	23.9	32.9	61.8					
Queue Delay	158.4	98.4	0.0	0.7	0.0	146.5					
Total Delay	187.8	124.2	44.5	24.6	32.9	208.4					
Queue Length 50th (ft)	426	639	19	335	179	286					
Queue Length 95th (ft)	m253	m107	m21	m250	#292	#428					
Internal Link Dist (ft)	220		466								
Turn Bay Length (ft)	300		250								
Base Capacity (vph)	1681	918	257	2035	523	1016					
Starvation Cap Reductn	545	221	0	227	0	0					
Spillback Cap Reductn	0	0	0	341	0	256					
Storage Cap Reductn	0	0	0	0	0	0					
Reduced v/c Ratio	1.36	1.22	0.32	0.80	0.72	1.37					

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 or Defacto Right Lane. Recode with 1 though lane as a right lane.

Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	811	1103	525	487	481	499	601	9	18
v/c Ratio	0.71	1.16	0.94	0.32	1.39	1.43	0.57	0.02	0.05
Control Delay	43.9	102.5	64.9	18.9	209.2	229.6	8.0	23.7	18.8
Queue Delay	0.0	84.2	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	43.9	186.7	64.9	18.9	209.2	229.6	8.3	23.7	18.8
Queue Length 50th (ft)	0	1080	148	127	321	341	40	4	4
Queue Length 95th (ft)	m#1434	#240	175	m#233	m#311	m#27	16	21	21
Internal Link Dist (ft)	466		345		380				270
Turn Bay Length (ft)	150		150		150		200		
Base Capacity (vph)	1144	951	568	1544	347	348	1052	363	363
Starvation Cap Reductn	0	134	0	0	0	0	0	0	0
Spillback Cap Reductn	0	21	0	0	0	0	124	0	7
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.35	0.94	0.32	1.39	1.43	0.65	0.02	0.05

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	144	1280	980	107	108
v/c Ratio	0.37	0.57	0.59	0.23	0.22
Control Delay	27.8	19.8	17.4	24.8	6.3
Queue Delay	0.0	1.8	0.0	0.0	0.0
Total Delay	27.8	21.5	17.4	24.8	6.3
Queue Length 50th (ft)	40	286	177	42	0
Queue Length 95th (ft)	m#56	318	251	83	30
Internal Link Dist (ft)		345	164	232	
Turn Bay Length (ft)	80		2256	1663	465
Base Capacity (vph)	901	762	0	0	0
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.66	0.59	0.23	0.22

**Intersection Summary**  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	562	564	49	16	581	437	7	648
v/c Ratio	1.27	1.27	0.11	0.11	1.09	0.21	0.05	0.71
Control Delay	169.0	168.4	7.9	29.3	98.8	10.5	39.9	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.4
Total Delay	169.0	168.4	7.9	29.3	98.8	10.5	39.9	33.6
Queue Length 50th (ft)	380	361	0	5	333	42	3	168
Queue Length 95th (ft)	#580	#580	25	23	#524	124	m3	m#267
Internal Link Dist (ft)	284	284	118	214	200	100	380	175
Turn Bay Length (ft)	250	250	452	179	531	2044	177	912
Base Capacity (vph)	0	0	0	0	0	0	0	60
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	1.27	0.11	0.09	1.09	0.21	0.04	0.71

Intersection Summary:  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	266	374	699	266	344	594
v/c Ratio	0.68	0.58	0.87	0.32	1.22	0.49
Control Delay	32.2	6.8	32.0	3.1	156.4	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	6.8	32.0	3.1	156.4	7.7
Queue Length 50th (ft)	94	0	249	0	176	109
Queue Length 95th (ft)	164	99	#453	38	#320	176
Internal Link Dist (ft)	480	3920	175	450	700	2550
Turn Bay Length (ft)	436	672	801	832	282	1216
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.56	0.87	0.32	1.22	0.49

Intersection Summary:  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.



17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	87	744	56	122	663	97	73	99	89	296	144	
v/c Ratio	0.65	0.93	0.14	0.47	0.83	0.22	0.28	0.24	0.22	0.56	0.17	
Control Delay	60.0	51.5	8.8	36.9	25.0	2.3	38.1	12.1	7.9	28.4	5.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.0	51.5	8.8	36.9	25.0	2.3	38.1	12.1	7.9	28.4	5.6	
Queue Length 50th (ft)	343	196	0	21	129	1	18	11	0	123	12	
Queue Length 95th (ft)	#111	#314	29	m38	m#242	m3	38	52	37	202	43	
Internal Link Dist (ft)	1540			220			1010				520	
Turn Bay Length (ft)	160	200	250	250	170	130	130	130	100	100	100	
Base Capacity (vph)	134	800	401	257	800	433	237	409	406	531	843	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.93	0.14	0.47	0.83	0.22	0.28	0.24	0.22	0.56	0.17	

Intersection Summary  
# : 95th percentile volume exceeds capacity, queue may be longer.  
m : Queue shown is maximum after two cycles.  
m : Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative C  
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	227	665	172	397	380	335	182	515	365	357	317	248
v/c Ratio	0.81	0.52	0.27	0.77	0.69	0.46	0.87	0.74	0.68	0.81	0.84	0.48
Control Delay	44.4	12.3	2.0	37.4	21.9	4.1	73.5	31.8	12.3	51.7	51.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	12.3	2.0	37.4	21.9	4.1	73.5	31.8	12.3	51.7	51.3	7.3
Queue Length 50th (ft)	73	60	4	109	180	34	92	108	18	92	151	0
Queue Length 95th (ft)	m#98	m66	m6	m#157	m248	m27	#210	163	108	#172	#279	57
Internal Link Dist (ft)	200	320	520	520	520	520	554	554	480	480	480	
Turn Bay Length (ft)	200	250	350	350	250	250	250	250	175	175	175	
Base Capacity (vph)	288	1669	636	515	1134	735	210	755	561	439	396	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.79	0.52	0.27	0.77	0.69	0.46	0.87	0.68	0.65	0.81	0.80	0.47

Intersection Summary  
# : 95th percentile volume exceeds capacity, queue may be longer.  
m : Queue shown is maximum after two cycles.  
m : Volume for 95th percentile queue is metered by upstream signal.

	EBL	WBL	WBR	NBL	SBL	SBT	SBR
Lane Group	72	1053	268	24	322	449	
Lane Group Flow (vph)	1758	0.49	0.51	0.17	0.05	0.78	0.82
v/c Ratio	0.73	0.49	0.51	0.17	0.05	0.78	0.82
Control Delay	9.0	53.4	9.0	0.2	9.5	38.5	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	53.4	9.0	0.2	9.5	38.5	42.5
Queue Length 50th (ft)	143	33	108	0	2	143	146
Queue Length 95th (ft)	179	m67	m123	m0	17	238	#267
Internal Link Dist (ft)	520	960		428	378	400	
Turn Bay Length (ft)	225				400		400
Base Capacity (vph)	2414	147	2078	1583	576	455	625
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.49	0.51	0.17	0.04	0.68	0.71

After Section Summary:  
 #. 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 in Volume for 95th percentile queue is metered by upstream signal.

	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group	22	1849	314	898	403	488	181	182	18
Lane Group Flow (vph)	0.17	0.52	0.20	0.40	0.25	0.86	0.30	0.30	0.03
v/c Ratio	0.17	0.52	0.20	0.40	0.25	0.86	0.30	0.30	0.03
Control Delay	40.0	18.5	0.2	13.2	0.3	36.7	15.4	15.4	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	18.5	0.2	13.2	0.3	36.7	15.4	15.4	9.4
Queue Length 50th (ft)	12	191	0	73	0	212	60	61	4
Queue Length 95th (ft)	m15	264	m0	119	m0	279	85	86	13
Internal Link Dist (ft)	960		360			225	386	420	
Turn Bay Length (ft)	180					730	791	801	
Base Capacity (vph)	133	3152	1583	2255	1583	730	791	801	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.52	0.20	0.40	0.25	0.67	0.23	0.23	0.02

After Section Summary:  
 in Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative C  
 PM Peak

2020 Alternative C  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	1297	486	174	944	229	483	254	181	360	160	
v/c Ratio	0.44	1.27	0.61	0.75	0.71	0.71	0.73	0.49	0.62	0.62	0.39	
Control Delay	20.3	150.5	6.4	50.0	28.4	43.2	36.9	7.4	38.4	34.4	7.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.3	150.5	6.9	50.0	29.4	43.2	36.9	7.4	39.4	34.4	7.7	
Queue Length 50th (ft)	61	455	45	88	148	116	123	0	91	96	0	
Queue Length 95th (ft)	58	536	19	222	219	214	176	58	158	138	47	
Internal Link Dist (ft)	360	1350	200	250	601	601	175	150	660	150		
Turn Bay Length (ft)	538	1020	802	231	1322	342	707	536	342	720	462	
Base Capacity (vph)	0	90	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	1.27	0.68	0.75	0.71	0.67	0.68	0.47	0.53	0.53	0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	157	854	147	696	242	340	508	119	222	377	247	
v/c Ratio	1.03	0.97	0.97	0.81	0.43	0.96	0.79	0.19	1.25	0.83	0.44	
Control Delay	118.8	49.3	102.1	34.1	5.0	70.2	32.2	4.5	183.8	43.6	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	118.8	49.3	102.1	34.1	5.0	70.2	32.2	4.5	183.8	43.6	6.5	
Queue Length 50th (ft)	72	176	65	148	0	146	194	0	122	154	3	
Queue Length 95th (ft)	183	295	170	230	51	298	346	31	247	292	54	
Internal Link Dist (ft)	699	6630	734	6630	150	550	675	500	980	625		
Turn Bay Length (ft)	152	883	152	859	568	354	639	621	177	452	565	
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.03	0.97	0.97	0.81	0.43	0.96	0.79	0.19	1.25	0.83	0.44	

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBT	EBT	WBT	WBT	NBT	NBT	SBL	SBL
Lane Group Flow (vph)	128	889	56	962	427	51	91	623
v/c Ratio	1.08	0.91	0.47	1.06	0.78	0.43	0.44	0.81
Control Delay	150.1	46.8	38.9	68.6	15.0	52.2	22.9	34.4
Queue Delay	0.0	1.2	0.0	0.0	0.6	0.0	0.0	0.0
Total Delay	150.1	48.0	38.9	68.6	15.6	52.2	22.9	34.4
Queue Length 50th (ft)	82	264	29	327	8	28	16	310
Queue Length 95th (ft)	#184	#396	m54	#430	#261	65	59	#556
Internal Link Dist (ft)	6630		350		200		236	
Turn Bay Length (ft)	225	150	80	50	225		225	
Base Capacity (vph)	118	980	118	904	566	118	366	767
Starvation Cap Reductn	0	0	0	0	15	0	0	0
Spillback Cap Reductn	0	21	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.93	0.47	1.06	0.80	0.43	0.25	0.81

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBT	WBT	WBT	SBL	SBL
Lane Group Flow (vph)	1003	543	69	1174	674	272
v/c Ratio	0.67	0.70	0.27	0.56	0.61	0.48
Control Delay	11.4	9.2	44.1	20.5	28.6	20.6
Queue Delay	0.4	0.8	0.0	0.4	0.0	0.0
Total Delay	11.8	10.0	44.1	20.9	28.6	20.6
Queue Length 50th (ft)	144	93	36	286	164	86
Queue Length 95th (ft)	m166	m122	m72	352	222	161
Internal Link Dist (ft)	350		50	100		565
Turn Bay Length (ft)	1486	780	295	2084	1106	562
Base Capacity (vph)	141	70	0	399	0	0
Starvation Cap Reductn	47	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.76	0.23	0.70	0.61	0.48

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

2020 Alternative C  
 PM Peak

	←	←	←	←	←	←	←	←
	EB	WB	NBL	NBL	NBL	NBL	NBL	NBL
Lane Group Flow (vph)	1680	719	518	287				
v/c Ratio	0.71	0.30	0.63	0.73				
Control Delay	5.4	7.3	33.4	39.9				
Queue Delay	0.1	0.0	0.0	0.0				
Total Delay	5.4	7.4	33.4	39.9				
Queue Length 50th (ft)	189	75	138	143				
Queue Length 95th (ft)	250	142	162	201				
Internal Link Dist (ft)	370	312	431					
Turn Bay Length (ft)			395	275				
Base Capacity (vph)	2378	2378	1221	574				
Starvation Cap Reductn	60	0	0	0				
Spillback Cap Reductn	0	143	0	0				
Storage Cap Reductn	0	0	0	0				
Reduced v/c Ratio	0.72	0.32	0.42	0.50				

Intersection Summary

**NEAR-TERM 2008 + ALTERNATIVE D  
TRAFFIC CONDITIONS  
(SYNCHRO)**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	0	8	14	226	13	97	12	817	62	159	514	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	8	15	238	14	102	13	860	65	167	541	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	1											
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1821	1828	543	1813	1797	893	544					925
vC1, stage 1 cont vol												
vC2, stage 2 cont vol												
vCU, unblocked vol	1821	1828	543	1813	1797	893	544					925
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	86	97	0	78	70	99					77
pm capacity (veh/h)	29	59	540	43	61	340	1025					739
Direction, Lane #	EBL	WBL	NBL	NB-1	NB-2	SB-1	SB-2					
Volume Total	23	354	13	925	167	544						
Volume Left	0	238	13	0	167	0						
Volume Right	15	102	0	65	0	3						
cSH	135	59	1025	1700	739	1700						
Volume to Capacity	0.17	6.04	0.01	0.54	0.23	0.32						
Queue Length 95th (ft)	15	Err	1	0	22	0						
Control Delay (s)	37.0	Err	8.6	0.0	11.3	0.0						
Lane LOS	E	F	A	B	B	B						
Approach Delay (s)	37.0	Err	0.1		2.7							
Approach LOS	E	F	F		F							
Intersection Summary												
Average Delay	1746.7											
Intersection Capacity Utilization	85.4%											
ICU Level of Service	E											
Analysis Period (min)	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	10	131	94	432	201	10	130	25	558	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	138	99	455	212	11	137	26	587	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	222						1351	1340	187	1935	1384	217
vC1, stage 1 cont vol												
vC2, stage 2 cont vol												
vCU, unblocked vol	222						1351	1340	187	1935	1384	217
tC, single (s)	4.1						7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2						3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99						0	74	31	0	89	99
pm capacity (veh/h)	1347						85	100	855	9	94	823
Direction, Lane #	EBT	WBT	NBT	SB-1								
Volume Total	247	677	751	32								
Volume Left	11	455	137	11								
Volume Right	99	11	587	11								
cSH	1347	1330	292	25								
Volume to Capacity	0.01	0.34	2.57	1.27								
Queue Length 95th (ft)	1	38	1547	97								
Control Delay (s)	0.4	7.3	743.6	507.5								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.4	7.3	743.6	507.5								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	339.4											
Intersection Capacity Utilization	106.7%											
ICU Level of Service	G											
Analysis Period (min)	15											

3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

2008 Alternative D  
PM Peak

Movement	EBL	EBC	EBR	WBL	WBC	WBR	NBL	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	579	10	10	622	20	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	715	11	11	655	21	11	11	11	11
Hourly flow rate (vph)										
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type										
Median storage (veh)										
Upstream signal (ft)										
pX platoon unblocked										
VC, conflicting volume	676			725			1443	1438	720	1443
VC1, stage 1 conf vol										665
VC2, stage 2 conf vol	676			725			1443	1438	720	1443
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1
IC, 2 stage (s)										
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5
p0 queue free %	99			99			89	92	98	89
cM capacity (veh/h)	916			878			99	130	428	99
Direction Lane #	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR		
Volume Total	736	686	32	32						
Volume Left	11	11	11	11						
Volume Right	11	21	11	11						
cSH	916	878	149	151						
Volume to Capacity	0.01	0.01	0.21	0.21						
Queue Length 95th (ft)	1	1	19	19						
Control Delay (s)	0.3	0.3	35.2	35.2						
Lane LOS	A	A	E	E						
Approach Delay (s)	0.3	0.3	35.2	35.2						
Approach LOS	E	E	E	E						
Intersection Summary										
Average Delay	1.8									
Intersection Capacity Utilization	51.9%									
Analysis Period (min)	15									
ICU Level of Service	A									

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

2008 Alternative D  
PM Peak

Movement	EBL	EBC	EBR	WBL	WBC	WBR	NBL	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	678	10	10	622	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	714	11	11	655	11	11	11	11	11
Hourly flow rate (vph)										
Pedestrians										
Lane Width (ft)										
Walking Speed (ft/s)										
Percent Blockage										
Right turn flare (veh)										
Median type										
Median storage (veh)										
Upstream signal (ft)										
pX platoon unblocked										
VC, conflicting volume	665			724			1437	1426	719	1437
VC1, stage 1 conf vol										660
VC2, stage 2 conf vol	665			724			1437	1426	719	1437
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1
IC, 2 stage (s)										
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5
p0 queue free %	99			99			89	92	98	89
cM capacity (veh/h)	924			878			100	132	428	100
Direction Lane #	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR		
Volume Total	735	676	32	32						
Volume Left	11	11	11	11						
Volume Right	11	21	11	11						
cSH	924	878	151	152						
Volume to Capacity	0.01	0.01	0.21	0.21						
Queue Length 95th (ft)	1	1	19	19						
Control Delay (s)	0.3	0.3	35.1	34.8						
Lane LOS	A	A	E	E						
Approach Delay (s)	0.3	0.3	35.1	34.8						
Approach LOS	E	E	E	E						
Intersection Summary										
Average Delay	1.8									
Intersection Capacity Utilization	51.9%									
Analysis Period (min)	15									
ICU Level of Service	A									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	60	561	77	116	561	99	35	6	266	112	21	14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	591	81	122	612	104	37	6	280	118	22	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	716						672		1991	1717	631	1948
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCU, unblocked vol	716						672		1691	1717	631	1948
tC, single (s)	4.1						4.1		7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2						2.2		3.5	4.0	3.3	3.5
p0 queue free %	93						87		22	91	42	70
pl capacity (veh/h)	885						919		47	72	481	16
Direction: Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	735	838	323	155								
Volume Left	63	122	37	118								
Volume Right	81	104	280	15								
cSH	885	919	222	20								
Volume to Capacity	0.07	0.13	1.45	7.64								
Queue Length 95th (ft)	6	11	475	Err								
Control Delay (s)	1.8	3.3	268.0	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.8	3.3	268.0	Err								
Approach LOS	F	F	F	F								
<b>Intersection Summary</b>												
Average Delay	796.0											
Intersection Capacity Utilization	104.4%											
Analysis Period (min)	15											
ICU Level of Service	G											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	52	739	148	187	668	89	80	45	222	88	13	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	55	718	156	197	704	94	84	47	231	93	14	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	0.67						630		0.67	0.67	0.67	0.67
VC1, stage 1 conf vol									2166	2157	858	2367
VC2, stage 2 conf vol												
vCU, unblocked vol	699						934		934	2726	856	3040
tC, single (s)	4.1						4.1		7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2						2.2		3.5	4.0	3.3	3.5
p0 queue free %	91						73		0	0	35	0
pl capacity (veh/h)	602						733		0	9	358	0
Direction: Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	988	995	363	156								
Volume Left	55	197	84	93								
Volume Right	196	94	234	49								
cSH	602	733	0	0								
Volume to Capacity	0.09	0.27	Err	Err								
Queue Length 95th (ft)	7	27	Err	Err								
Control Delay (s)	2.8	7.1	Err	Err								
Lane LOS	A	A	F	F								
Approach Delay (s)	2.8	7.1	Err	Err								
Approach LOS	F	F	F	F								
<b>Intersection Summary</b>												
Average Delay	Err											
Intersection Capacity Utilization	132.4%											
Analysis Period (min)	15											
ICU Level of Service	H											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1770	1863	1583	1770	3274	1770	3539	1583	1770	3527	1770	3527
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	1863	1583	1770	3274	1770	3539	1583	1770	3527	1770	3527
Volume (vph)	101	780	166	181	633	540	204	159	265	451	131	108
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	821	175	191	666	568	215	163	279	475	138	114
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1098	0	191	666	357	215	163	23	475	233	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	8	8	8	8	5	2	2	1	6	6
Permitted Phases	7	4	4	3	8	4	4	4	2	2	1	6
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	21.5	21.5	21.5
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.14	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	544	567	597	534	221	292	131	618	239	239	239	239
v/s Ratio Prot	<0.61	0.11	<0.38	0.23	<0.12	0.05	0.01	0.14	<0.13	0.13	0.13	0.13
v/s Ratio Perm	2.02	1.12	1.12	0.97	0.97	0.56	0.18	0.77	0.97	0.97	0.97	0.97
Uniform Delay, d1	56.0	39.6	53.0	45.3	69.7	70.6	68.3	62.4	68.7	68.7	68.7	68.7
Progression Factor	1.00	0.88	0.91	1.00	1.00	1.00	1.00	0.96	0.96	0.96	0.96	0.96
Incremental Delay, d2	464.6	1.3	69.4	5.2	52.5	2.3	0.6	5.7	50.6	50.6	50.6	50.6
Delay (s)	520.6	36.1	117.9	50.4	122.2	72.9	69.0	65.5	116.3	116.3	116.3	116.3
Level of Service	F	D	F	D	F	F	E	E	F	F	F	F
Approach Delay (s)	520.6	F	80.0	F	F	F	F	87.4	F	F	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

**Intersection Summary**

HCM Average Control Delay	206.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	128.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1814	1681	1770	1583	1770	3539	1583	1770	3433	1736	1736	1736
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1814	1681	1770	1583	1770	3539	1583	1770	3433	1736	1736	1736
Volume (vph)	101	780	166	181	633	540	204	159	265	451	131	108
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	821	175	191	666	568	215	163	279	475	138	114
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1098	0	191	666	357	215	163	23	475	233	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	8	8	8	8	5	2	2	1	6	6
Permitted Phases	7	4	4	3	8	4	4	4	2	2	1	6
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	28.3	21.5	21.5	21.5	21.5
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	28.8	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.08	0.08	0.18	0.14	0.14	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	544	567	597	534	221	292	131	618	239	239	239	239
v/s Ratio Prot	<0.61	0.11	<0.38	0.23	<0.12	0.05	0.01	0.14	<0.13	0.13	0.13	0.13
v/s Ratio Perm	2.02	1.12	1.12	0.97	0.97	0.56	0.18	0.77	0.97	0.97	0.97	0.97
Uniform Delay, d1	56.0	39.6	53.0	45.3	69.7	70.6	68.3	62.4	68.7	68.7	68.7	68.7
Progression Factor	1.00	0.88	0.91	1.00	1.00	1.00	1.00	0.96	0.96	0.96	0.96	0.96
Incremental Delay, d2	464.6	1.3	69.4	5.2	52.5	2.3	0.6	5.7	50.6	50.6	50.6	50.6
Delay (s)	520.6	36.1	117.9	50.4	122.2	72.9	69.0	65.5	116.3	116.3	116.3	116.3
Level of Service	F	D	F	D	F	F	E	E	F	F	F	F
Approach Delay (s)	520.6	F	80.0	F	F	F	F	87.4	F	F	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

**Intersection Summary**

HCM Average Control Delay	206.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	128.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.91
Lane Util. Factor	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.90
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3433	3539	1610	3058	3539	1583	3433	3539	1610	3058
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3433	3539	1610	3058	3539	1583	3433	3539	1610	3058
Volume (vph)	0	878	918	89	739	0	0	0	0	328	324	610
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	924	951	94	778	0	0	0	0	345	341	642
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	125	0
Lane Group Flow (vph)	0	924	508	94	778	0	0	0	0	345	858	0
Turn Type		Prot	Prot	Prot	Prot					Perm	Perm	
Protected Phases		4	3	8	6					6	5	
Permitted Phases		4	4	4	4					6	6	
Actuated Green, G (s)		36.6	36.6	4.4	45.5					25.5	25.5	
Effective Green, g (s)		37.1	37.1	4.9	46.0					26.0	26.0	
Actuated g/C Ratio		0.46	0.46	0.06	0.58					0.32	0.32	
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1641	734	210	2035					523	994	
v/s Ratio Prot		0.26	c0.32	0.03	c0.22					0.21	0.28	
v/c Ratio		0.56	0.69	0.45	0.38					0.66	1.05	
Uniform Delay, d1		15.6	16.9	36.2	9.3					23.2	25.3	
Progression Factor		1.15	1.80	1.17	1.50					1.00	1.00	
Incremental Delay, d2		0.1	0.5	1.2	0.4					6.4	9.9	
Delay (s)		18.1	30.9	43.6	14.3					29.6	35.2	
Level of Service		B	C	D	B					C	D	
Approach Delay (s)		23.4	C	17.5	B					33.7	C	
Approach LOS		C		B						A		
<b>Intersection Summary</b>												
HCM Average Control Delay	25.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	77.0% ICU Level of Service D											
Analysis Period (min)	15											
d: Derogate Right Lane, Recode with 1 though lane as a right lane.												
c: Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.90
Lane Util. Factor	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.90
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3407	1681	1715	2787	1715	2787	1770	1814	1814
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3407	1681	1715	2787	1715	2787	1770	1814	1814
Volume (vph)	0	565	641	413	352	117	476	108	569	42	41	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	595	675	435	371	123	501	114	599	44	43	9
RTOR Reduction (vph)	0	0	523	0	33	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	595	152	435	461	0	300	315	124	44	45	0
Turn Type		Prot	Prot	Prot	Prot					Split	Split	
Protected Phases		7	4	3	8					2	2	
Permitted Phases		7	4	4	4					2	2	
Actuated Green, G (s)		17.5	17.5	12.5	34.5					16.0	16.0	
Effective Green, g (s)		18.0	18.0	13.0	35.0					16.5	16.5	
Actuated g/C Ratio		0.22	0.22	0.16	0.44					0.21	0.21	
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		1144	356	558	1491					347	354	
v/s Ratio Prot		c0.12	c0.13	c0.14	0.18					c0.02	c0.02	
v/c Ratio		0.52	0.43	0.78	0.31					0.86	0.89	
Uniform Delay, d1		27.2	26.6	32.1	14.6					30.7	30.9	
Progression Factor		1.48	9.49	1.18	1.22					0.97	0.96	
Incremental Delay, d2		1.4	3.1	6.3	0.5					20.5	23.2	
Delay (s)		41.6	255.1	44.2	18.4					50.2	53.0	
Level of Service		D	F	D	B					D	D	
Approach Delay (s)		155.1	F	30.4	C					22.7	C	
Approach LOS		F		C						D		
<b>Intersection Summary</b>												
HCM Average Control Delay	83.0 HCM Level of Service F											
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	64.8% ICU Level of Service C											
Analysis Period (min)	15											
c: Critical Lane Group												

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	11	44	11	44	11	44
Ideal Flow (vphpl)	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	0.97	0.95	0.95	1.00	1.00	0.85
Fit Protected	1.00	1.00	0.99	1.00	1.00	0.85
Satd. Flow (prot)	3433	3539	3513	1770	1583	
Fit Permitted	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3539	3513	1770	1583	
Volume (vph)	1185	977	645	33	92	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	1028	679	35	97	248
RTOR Reduction (vph)	0	0	4	0	0	183
Lane Group Flow (vph)	205	1028	710	0	97	65
Turn Type	Prot	Prot	Prot	Perm	Perm	Perm
Protected Phases	7	4	8	6	6	6
Permitted Phases						
Actuated Green, G (s)	9.9	50.5	36.1	20.5	20.5	20.5
Effective Green, g (s)	10.4	51.0	36.6	21.0	21.0	21.0
Actuated g/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	446	2256	1807	465	416	
V/S Ratio Prot	0.06	0.29	0.20	0.05	0.05	
V/S Ratio Perm						
v/c Ratio	0.46	0.46	0.44	0.21	0.16	
Uniform Delay, d1	32.2	7.4	14.8	23.0	22.7	
Progression Factor	0.93	2.09	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.9	1.0	0.8	
Delay (s)	30.4	16.1	15.6	24.0	23.5	
Level of Service	C	B	B	C	C	C
Approach Delay (s)	18.5	15.6	23.6			
Approach LOS	B	B	C			
<b>Intersection Summary</b>						
HCM Average Control Delay	18.4		18.4		HCM Level of Service B	
HCM Volume to Capacity ratio	0.38		0.38		8.0	
Actuated Cycle Length (s)	80.0		80.0		Sum of lost time (s) A	
Intersection Capacity Utilization	40.2%		40.2%		ICU Level of Service A	
Analysis Period (min)	15		15		c. Critical Lane Group	

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4
Ideal Flow (vphpl)	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	0.95	0.95	1.00	1.00	0.95	1.00
Fit Protected	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	1881	1686	1583	1741	1770	3539
Fit Permitted	0.95	0.95	1.00	0.98	1.00	1.00
Satd. Flow (perm)	1881	1686	1583	1741	1770	3539
Volume (vph)	641	3	40	8	3	514
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	675	3	42	8	3	541
RTOR Reduction (vph)	0	0	32	0	0	0
Lane Group Flow (vph)	338	340	10	0	11	517
Turn Type	Split	Split	Perm	Split	Prot	Perm
Protected Phases	4	4	8	8	5	2
Permitted Phases						
Actuated Green, G (s)	18.8	18.8	18.8	1.5	27.1	40.2
Effective Green, g (s)	19.3	19.3	19.3	2.0	27.6	40.7
Actuated g/C Ratio	0.24	0.24	0.24	0.02	0.35	0.51
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	406	407	382	44	611	1799
V/S Ratio Prot	0.20	0.20	0.01	0.01	0.31	0.15
V/S Ratio Perm						
v/c Ratio	0.83	0.84	0.03	0.03	0.89	0.29
Uniform Delay, d1	28.8	28.8	23.2	24.7	11.3	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	13.8	0.0	3.0	14.4	0.4
Delay (s)	42.4	42.6	23.2	41.3	39.1	11.7
Level of Service	D	D	C	D	D	D
Approach Delay (s)	41.4	41.4	25.7	25.7	108.1	F
Approach LOS	D	D	C	D	D	F
<b>Intersection Summary</b>						
HCM Average Control Delay	61.7		61.7		HCM Level of Service E	
HCM Volume to Capacity ratio	0.80		0.80		Sum of lost time (s) 16.0	
Actuated Cycle Length (s)	80.0		80.0		ICU Level of Service D	
Intersection Capacity Utilization	81.8%		81.8%		c. Critical Lane Group	
Analysis Period (min)	15		15			

Movement	W/B	WBR	NBT	NBR	SBT	SBT
Lane Configurations						
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	59	832	332	0	754
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	62	876	349	0	794
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked	1844	1051			1225	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	1844	1051			1225	
vCU, unblocked vol	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	82	276			569	
Direction Lane #	W/B	NB/1	SB/1	NB/2	SB/2	SB/2
Volume Total	62	1225	794			
Volume Left	0	0	0			
Volume Right	62	349	0			
cSH	276	1700	1700			
Volume to Capacity	0.23	0.72	0.47			
Queue Length 95th (ft)	21	0	0			
Control Delay (s)	21.8	0.0	0.0			
Lane LOS	C	C	C			
Approach Delay (s)	21.8	0.0	0.0			
Approach LOS	C	C	C			
<b>Intersection Summary</b>						
Average Delay	0.7					
Intersection Capacity Utilization	74.3%					
Analysis Period (min)	15					
ICU Level of Service	D					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	172	89	33	464	489	41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	181	94	35	488	515	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked	850	279	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol	850	279	558			
vCU, unblocked vol	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	37	87	97			
cM capacity (veh/h)	289	718	1009			
Direction Lane #	EB/1	EB/2	NB/1	NB/2	SB/1	SB/2
Volume Total	181	94	35	244	244	215
Volume Left	181	0	35	0	0	0
Volume Right	0	94	0	0	0	43
cSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.20	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A	A	A	A
Approach Delay (s)	27.5	0.6	0.6			
Approach LOS	D	D	D			
<b>Intersection Summary</b>						
Average Delay	5.8					
Intersection Capacity Utilization	37.7%					
Analysis Period (min)	15					
ICU Level of Service	A					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Fit Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	257	537	627	257	255	498
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	565	660	264	268	524
RTOR Reduction (vph)	0	301	0	151	0	0
Lane Group Flow (vph)	271	264	660	113	268	524
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	8	2	2	1	6	2
Permitted Phases	8	2	2	1	6	2
Actuated Green, G (s)	13.6	13.6	26.6	9.5	40.5	40.5
Effective Green, g (s)	14.1	14.1	27.1	10.0	41.1	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.16	0.65	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	395	353	799	679	280	1212
v/s Ratio Prot	0.15	c0.35	c0.35	c0.15	0.28	0.28
v/s Ratio Perm	0.69	0.75	0.83	0.07	0.96	0.43
Uniform Delay, d1	22.5	22.9	16.0	11.1	26.4	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	8.4	9.5	0.5	41.7	1.1
Delay (s)	27.4	31.3	25.5	11.6	68.1	6.5
Level of Service	C	C	C	B	E	A
Approach Delay (s)	30.1	21.5	21.5	C	27.4	C
Approach LOS	C	C	C	C	C	C

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c. Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	0.85	1.00	0.90
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1668
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1668
Volume (vph)	50	643	36	202	826	154	64	19	154	270	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	677	38	213	869	162	67	20	162	284	45
RTOR Reduction (vph)	0	0	29	0	0	117	0	63	70	0	59
Lane Group Flow (vph)	53	677	9	213	869	45	67	34	15	284	90
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	7	4	4	3	8	2	5	2	1	1	6
Permitted Phases	7	4	4	3	8	2	5	2	1	1	6
Actuated Green, G (s)	3.3	18.3	18.3	5.5	20.5	4.4	13.8	13.8	24.4	33.8	33.8
Effective Green, g (s)	3.8	18.8	18.8	6.0	21.0	4.9	14.3	14.3	24.9	34.3	34.3
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.26	0.26	0.06	0.18	0.18	0.31	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	832	372	257	929	416	210	279	269	551	715
v/s Ratio Prot	0.03	c0.19	0.01	0.06	c0.25	c0.02	c0.02	c0.02	c0.16	0.05	0.05
v/s Ratio Perm	0.63	0.81	0.02	0.83	0.94	0.11	0.32	0.12	0.06	0.52	0.13
Uniform Delay, d1	37.4	28.9	23.5	36.3	26.8	22.4	36.0	27.6	27.3	22.6	13.8
Progression Factor	1.00	1.00	1.00	0.96	0.54	0.20	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	6.1	0.0	13.2	11.4	0.1	0.9	0.9	0.4	0.8	0.4
Delay (s)	51.8	35.1	23.6	48.2	27.0	4.5	36.8	28.5	27.7	23.4	14.2
Level of Service	D	D	C	D	C	A	D	C	C	C	B
Approach Delay (s)	35.7	D	D	27.7	C	C	30.4	C	C	20.2	C
Approach LOS	D	D	D	C	C	C	C	C	C	C	C

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c. Critical Lane Group			

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008 Alternative D  
PM Peak

2008 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.94	0.85	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.85
Flt. Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Sat'd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Flt. Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Sat'd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Volume (vph)	233	744	146	371	907	358	137	252	422	364	264	243
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	783	154	391	955	377	144	265	444	383	278	256
RTOR Reduction (vph)	0	0	103	0	0	239	0	117	227	0	0	206
Lane Group Flow (vph)	245	783	51	391	955	138	144	318	47	383	278	30
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	4	3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	12.1	26.0	11.5	25.4	25.4	9.5	13.1	13.1	11.4	11.4	15.0	15.0
Effective Green, g (s)	12.6	26.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	11.9	15.5	15.5
Actuated g/C Ratio	0.15	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1884	524	515	1146	512	221	542	245	511	361	307
v/s Ratio Prot	<0.14	0.15	0.11	<0.27	0.08	0.10	0.08	0.10	<0.11	<0.15	0.03	0.03
v/s Ratio Perm	0.88	0.46	0.10	0.76	0.83	0.27	0.65	0.59	0.19	0.75	0.77	0.16
Uniform Delay, d1	32.9	21.1	18.5	32.6	25.1	20.0	33.3	30.6	28.5	32.6	30.6	26.8
Progression Factor	0.80	0.52	0.40	0.71	0.64	0.53	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.7	0.7	0.3	4.8	5.4	1.0	6.7	1.6	0.4	6.0	9.7	0.2
Delay (s)	46.0	11.6	7.7	28.0	21.4	11.7	40.1	32.2	28.9	38.6	40.3	27.1
Level of Service	D	B	A	C	C	B	D	C	C	D	D	C
Approach Delay (s)	18.2											
Approach LOS	B											
Intersection Summary												
HCM Average Control Delay	25.2											
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	73.2%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.94	0.85	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.85
Flt. Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Sat'd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Flt. Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.85
Sat'd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583
Volume (vph)	0	1215	314	68	1275	199	7	0	17	702	1	351
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1279	331	72	1342	209	7	0	18	738	1	369
RTOR Reduction (vph)	0	54	0	0	0	0	0	0	12	0	0	25
Lane Group Flow (vph)	0	1556	0	72	1342	209	0	13	0	370	0	344
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	3	3	3	3	3	3	3	3	3	3	3
Permitted Phases	4	3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)	35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Effective Green, g (s)	35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
Actuated g/C Ratio	0.45	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2211	117	2000	1583	512	439	420	530	439	420	530	530
v/s Ratio Prot	0.32	0.04	<0.38	0.13	0.01	0.28	<0.30	0.22	0.28	<0.30	0.22	0.22
v/s Ratio Perm	0.70	0.62	0.67	0.13	0.03	0.84	0.88	0.65	0.84	0.88	0.65	0.65
Uniform Delay, d1	17.8	35.4	12.2	0.0	17.8	24.6	25.1	22.6	24.6	25.1	22.6	22.6
Progression Factor	0.42	1.28	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	7.0	1.4	0.1	0.0	13.7	18.9	2.7	13.7	18.9	2.7	2.7
Delay (s)	9.0	53.5	10.5	0.1	17.9	38.4	44.0	25.3	38.4	44.0	25.3	25.3
Level of Service	A	D	D	B	A	D	D	C	D	D	D	C
Approach Delay (s)	9.0											
Approach LOS	A											
Intersection Summary												
HCM Average Control Delay	16.6											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	70.4%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	1.00	0.85	0.95	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.98	1.00	1.00	0.95
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	6408	1583	5085	1583	1770	1504	1504	1748	1748	1748	1583
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	1.00	1.00	1.00	0.84
Satd. Flow (perm)	1770	6408	1583	5085	1583	1389	1504	1504	1522	1522	1522	1583
Volume (vph)	17	1638	273	0	993	350	546	0	306	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1724	287	0	1045	368	575	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	1	0	2
Lane Group Flow (vph)	18	1724	287	0	1045	368	575	160	160	0	16	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	8	8	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	2	2	6	6	6
Actuated Green, G (s)	2.2	35.3	80.0	28.6	80.0	35.7	35.7	35.7	35.7	35.7	35.7	35.7
Effective Green, g (s)	2.7	35.8	80.0	29.1	80.0	36.2	36.2	36.2	36.2	36.2	36.2	36.2
Actuated g/C Ratio	0.03	0.45	1.00	0.36	1.00	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2868	1583	1850	1583	629	681	681	689	689	689	689
v/s Ratio Prot	0.01	c0.27	0.21	0.21	0.23	c0.41	0.11	0.11	0.11	0.11	0.01	0.01
v/s Ratio Perm	0.30	0.60	0.18	0.56	0.23	0.91	0.23	0.23	0.23	0.23	0.02	0.02
Uniform Delay, d1	37.7	16.7	0.0	20.4	0.0	20.4	13.4	13.4	12.1	12.1	12.1	12.1
Progression Factor	1.06	1.10	1.00	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.6	0.2	0.9	0.3	17.8	0.2	0.2	0.0	0.0	0.0	0.0
Delay (s)	41.9	19.0	0.2	14.1	0.3	38.3	13.6	13.6	12.1	12.1	12.1	12.1
Level of Service	D	B	A	B	A	D	B	B	B	B	B	B
Approach Delay (s)	16.5	B	B	10.5	B	29.4	C	C	12.1	12.1	12.1	12.1
Approach LOS	B	B	B	B	B	C	C	C	B	B	B	B
Intersection Summary												
HCM Average Control Delay	17.2											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	64.4%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.98	0.95	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3539	1583	1770	1583	1770	1583	1610	3329	1583	1610	3390
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3539	1583	1770	1583	1770	1583	1610	3329	1583	1610	3390
Volume (vph)	270	1145	545	141	779	170	380	285	224	102	230	183
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1205	574	148	820	179	400	301	236	107	242	193
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	284	1205	574	148	820	179	400	301	236	107	242	193
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	2	2	2	6	6	6
Actuated Green, G (s)	12.5	24.5	24.5	10.6	22.6	15.4	15.4	15.4	15.4	11.5	11.5	11.5
Effective Green, g (s)	13.0	25.0	25.0	11.1	23.1	15.9	15.9	15.9	15.9	12.0	12.0	12.0
Actuated g/C Ratio	0.16	0.31	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	1106	495	246	1429	320	662	315	242	509	237	237
v/s Ratio Prot	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	0.07	0.07	c0.07	c0.07	c0.07
v/s Ratio Perm	0.51	1.09	0.36	0.60	0.67	0.71	0.72	0.15	0.15	0.44	0.48	0.12
Uniform Delay, d1	30.6	21.5	21.3	32.4	25.1	29.9	30.0	26.5	31.0	31.1	29.4	29.4
Progression Factor	0.53	0.90	1.68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	5.1	1.7	4.1	2.5	6.9	3.7	0.2	1.3	0.7	0.2	0.2
Delay (s)	16.9	66.7	37.6	36.5	27.6	36.8	33.7	26.7	32.2	31.8	29.7	29.7
Level of Service	B	E	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)	51.7	D	D	28.8	C	32.7	C	C	31.1	C	C	C
Approach LOS	D	D	D	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	39.9											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	71.8%											
Analysis Period (min)	15											
Critical Lane Group	C											



22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative D  
PM Peak

Movement	EBT	EBT	EBT	WBT	WBT	NBT	NBT	SBT	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.96	1.00	0.95	1.00	0.85	1.00	1.00	0.85
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3383	1770	3539	1583	1770	1863	1770	1863
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3383	1770	3539	1583	1770	1863	1770	1863
Volume (vph)	133	484	202	589	184	321	494	108	173
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	509	213	620	194	338	520	114	182
RTOR Reduction (vph)	0	67	0	0	0	148	0	75	0
Lane Group Flow (vph)	140	655	0	135	620	46	338	520	182
Turn Type	Prot	7	4	Prot	3	6	Prot	1	6
Protected Phases									
Permitted Phases									
Actuated Green, G (s)	5.5	15.8	5.5	15.8	13.5	23.5	23.5	6.5	16.5
Effective Green, g (s)	6.0	16.3	6.0	16.3	14.0	24.0	24.0	7.0	17.0
Actuated g/C Ratio	0.09	0.24	0.09	0.24	0.20	0.35	0.35	0.10	0.25
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	796	153	832	372	358	645	548	179
v/s Ratio Prot	c0.08	c0.19	c0.19	c0.28	c0.19	c0.28	c0.19	c0.10	c0.19
v/s Ratio Perm									
v/c Ratio	0.92	0.82	0.88	0.75	0.72	0.94	0.81	0.07	1.02
Uniform Delay, d1	31.4	25.1	31.3	24.6	20.9	27.3	20.5	15.2	31.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.1	6.9	40.4	3.7	0.1	33.1	10.4	0.3	71.7
Delay (s)	79.5	32.0	71.7	28.2	21.0	60.4	30.9	15.4	102.9
Level of Service	E	C	E	C	C	E	C	B	F
Approach Delay (s)	39.7	D	39.7	32.9	C	39.4	D	48.0	D
Approach LOS	D	D	D	D	D	D	D	D	D

Intersection Summary

HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	120
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative D  
PM Peak

Movement	EBT	EBT	EBT	WBT	WBT	NBT	NBT	SBT	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.95	1.00	0.89	1.00	0.95	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3516	1770	3539	1583	1770	1860	1770	1849
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3516	1770	3539	1583	1770	1860	1770	1849
Volume (vph)	102	702	32	53	819	333	48	24	63
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	739	34	56	852	351	51	25	66
RTOR Reduction (vph)	0	3	0	0	0	125	0	61	0
Lane Group Flow (vph)	107	770	0	56	862	226	51	30	0
Turn Type	Prot	7	4	Prot	3	8	Prot	1	6
Protected Phases									
Permitted Phases									
Actuated Green, G (s)	7.6	28.3	4.4	25.1	25.1	3.3	6.3	33.0	36.0
Effective Green, g (s)	8.1	28.8	4.9	25.6	25.6	3.8	6.8	33.5	36.5
Actuated g/C Ratio	0.09	0.32	0.05	0.28	0.28	0.04	0.08	0.37	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1125	96	1007	450	75	125	659	689
v/s Ratio Prot	0.06	c0.22	0.03	c0.24	c0.03	c0.02	c0.29	c0.04	c0.04
v/s Ratio Perm									
v/c Ratio	0.67	0.68	0.58	0.86	0.50	0.68	0.24	0.78	0.11
Uniform Delay, d1	39.7	26.6	41.6	30.5	26.9	42.5	39.2	24.9	16.6
Progression Factor	1.00	1.00	0.68	0.56	0.20	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	3.4	7.9	8.4	3.8	22.4	1.0	5.7	0.1
Delay (s)	50.4	30.0	34.9	25.6	8.9	64.9	40.2	30.6	16.7
Level of Service	D	C	D	C	C	A	E	D	B
Approach Delay (s)	32.5	C	32.5	21.4	C	49.1	D	27.8	C
Approach LOS	C	C	C	C	C	D	D	D	C

Intersection Summary

HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Movement	EBT	EBL	EBR	WBT	WBL	WBR	NBT	NBL	NBR	SBL	SBR
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.85	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583	3539	1583	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583	3539	1583	1583
Volume (vph)	0	819	438	99	981	0	0	0	0	639	0
Peak-hour factor	PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	Adj. Flow (vph)	0	862	461	104	1033	0	0	0	673	0
RTOR Reduction (vph)	RTOR Reduction (vph)	0	0	116	0	0	0	0	0	0	73
Lane Group Flow (vph)	Lane Group Flow (vph)	0	862	345	104	1033	0	0	0	673	150
Turn Type	Turn Type	4	Perm	3	Prot	1	Prot	1	Prot	6	Prot
Protected Phases	Protected Phases	4		3		8		1		6	
Permitted Phases	Permitted Phases										
Actuated Green, G (s)	Actuated Green, G (s)	36.4	36.4	11.6	52.5					28.5	28.5
Effective Green, g (s)	Effective Green, g (s)	36.9	36.9	12.1	53.0					29.0	29.0
Actuated g/C Ratio	Actuated g/C Ratio	0.41	0.41	0.13	0.59					0.32	0.32
Clearance Time (s)	Clearance Time (s)	4.5	4.5	4.5	4.5					4.5	4.5
Vehicle Extension (s)	Vehicle Extension (s)	3.0	3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	Lane Grp Cap (vph)	1451	649	238	2084					1105	510
v/s Ratio Prot	v/s Ratio Prot	c0.24		0.06	c0.29					c0.20	0.10
v/s Ratio Perm	v/s Ratio Perm										
v/c Ratio	v/c Ratio	0.59	0.59	0.44	0.50					0.61	0.30
Uniform Delay, d1	Uniform Delay, d1	20.7	20.0	35.8	10.7					25.7	22.8
Progression Factor	Progression Factor	0.52	0.47	1.29	1.75					1.00	1.00
Incremental Delay, d2	Incremental Delay, d2	1.3	2.3	1.2	0.8					1.0	1.5
Delay (s)	Delay (s)	12.1	11.7	47.3	19.6					26.7	24.3
Level of Service	Level of Service	B	B	D	B					C	C
Approach Delay (s)	Approach Delay (s)	11.9			22.1				0.0		26.1
Approach LOS	Approach LOS	B			C				A		C
<b>Intersection Summary</b>											
HCM Average Control Delay	HCM Average Control Delay	19.2									
HCM Volume to Capacity ratio	HCM Volume to Capacity ratio	0.57									
Actuated Cycle Length (s)	Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	Intersection Capacity Utilization	61.7%									
Analysis Period (min)	Analysis Period (min)	15									
c Critical Lane Group											

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Movement	EBT	EBL	EBR	WBT	WBL	WBR	NBT	NBL	NBR		
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑		
Ideal Flow (vphpl)	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		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.85		
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	0.85		
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583	3539		
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583	3539		
Volume (vph)	Volume (vph)	1461	0	0	617	432	236				
Peak-hour factor	Peak-hour factor	PHF	0.95	0.95	0.95	0.95	0.95				
Adj. Flow (vph)	Adj. Flow (vph)	1538	0	0	649	455	248				
RTOR Reduction (vph)	RTOR Reduction (vph)	0	0	0	0	0	21				
Lane Group Flow (vph)	Lane Group Flow (vph)	1538	0	0	649	455	227				
Turn Type	Turn Type	4	Perm	8	2	Perm	2				
Protected Phases	Protected Phases	4		8		2					
Permitted Phases	Permitted Phases										
Actuated Green, G (s)	Actuated Green, G (s)	62.8		62.8	18.2	18.2					
Effective Green, g (s)	Effective Green, g (s)	63.3		63.3	18.7	18.7					
Actuated g/C Ratio	Actuated g/C Ratio	0.70		0.70	0.21	0.21					
Clearance Time (s)	Clearance Time (s)	4.5		4.5	4.5	4.5					
Vehicle Extension (s)	Vehicle Extension (s)	3.0		3.0	3.0	3.0					
Lane Grp Cap (vph)	Lane Grp Cap (vph)	2489		2489	713	329					
v/s Ratio Prot	v/s Ratio Prot	c0.43		0.18	0.13						
v/s Ratio Perm	v/s Ratio Perm										
v/c Ratio	v/c Ratio	0.62		0.26	0.54	0.69					
Uniform Delay, d1	Uniform Delay, d1	7.0		4.8	32.6	33.0					
Progression Factor	Progression Factor	0.33		1.00	1.00	1.00					
Incremental Delay, d2	Incremental Delay, d2	0.9		0.3	1.9	6.1					
Delay (s)	Delay (s)	3.2		5.1	34.4	39.1					
Level of Service	Level of Service	A		A	C	D					
Approach Delay (s)	Approach Delay (s)	3.2		5.1	36.1						
Approach LOS	Approach LOS	A		A	D						
<b>Intersection Summary</b>											
HCM Average Control Delay	HCM Average Control Delay	11.7								HCM Level of Service	B
HCM Volume to Capacity ratio	HCM Volume to Capacity ratio	0.63									
Actuated Cycle Length (s)	Actuated Cycle Length (s)	90.0								Sum of lost time (s)	8.0
Intersection Capacity Utilization	Intersection Capacity Utilization	61.7%								ICU Level of Service	B
Analysis Period (min)	Analysis Period (min)	15									
c Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	6	11	2	7	209	19	774	20	116	630	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	6	12	2	7	220	20	815	21	122	663	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	1471	1785	334	1445	1766	407	667					836
tC, 1 stage (s)	7.5	5.5	6.9	7.5	6.5	6.9	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	83	91	98	97	89	63	98					85
CM capacity (veh/h)	45	67	662	73	69	593	918					794
Direction, Lane #	EB 1	WB 2	NB 3	NB 2	NB 1	NB 4	SB 1	SB 2	SB 3	SB 3	SB 3	SB 3
Volume Total	25	229	20	407	407	21	122	442	225			
Volume Left	7	2	20	0	0	0	122	0	0			
Volume Right	12	220	0	0	0	21	0	0	4			
cSH	91	619	918	1700	1700	1700	794	1700	1700			
Volume to Capacity	0.28	0.37	0.02	0.24	0.24	0.01	0.15	0.26	0.13			
Queue Length 95th (ft)	26	43	2	0	0	0	14	0	0			
Control Delay (s)	59.1	16.7	9.0	0.0	0.0	0.0	10.4	0.0	0.0			
Lane LOS	F	C	A	A	A	B	B	B	B			
Approach Delay (s)	F	F	C	C	C	B	B	B	B			
Approach LOS	F	F	C	C	C	B	B	B	B			
<b>Intersection Summary</b>												
Average Delay	3.6											
Intersection Capacity Utilization	47.7%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	139	3	4	199	2	15	0	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	146	3	4	209	2	16	0	1	0	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	212				149				359	370	148	370
tC, 1 stage (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	100				100				97	100	100	100
CM capacity (veh/h)	1359				1432				585	567	899	584
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 1	SB 1	SB 1	SB 1	SB 1	SB 1	SB 1	SB 1
Volume Total	151	216	17	1	1							
Volume Left	1	4	16	0	0							
Volume Right	3	2	1	0	0							
cSH	1359	1432	598	557	557							
Volume to Capacity	0.00	0.00	0.03	0.00	0.00							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.1	0.2	11.2	11.5	11.5							
Lane LOS	A	A	B	B	B							
Approach Delay (s)	0.1	0.2	11.2	11.5	11.5							
Approach LOS	B	B	B	B	B							
<b>Intersection Summary</b>												
Average Delay	0.6											
Intersection Capacity Utilization	27.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBR	SBL	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	123	2	4	208	8	1	9	0	4	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	129	2	4	219	8	1	9	0	4	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px, platoon unblocked												
vc, conflicting volume	227		132		365	368	131	369	365	223		
vc1, stage 1 cont vol												
vc2, stage 2 cont vol												
vcu, unblocked vol	227		132		365	368	131	369	365	223		
tc, single (s)	4.1		4.1		7.1	6.5	6.2	7.1	6.5	6.2		
tc, 2 stage (s)												
tf (s)	2.2		2.2		3.5	4.0	3.3	3.5	4.0	3.3		
p0 queue free %	100		100		100	98	100	99	100	100		
p0 queue free %	1341		1494		588	559	919	578	561	816		
cm capacity (veh/h)												
Direction Lane #	EBT	WBL	WBR	NBL	NBR	SBL	SBR					
Volume Total	133	232	11	5								
Volume Left	1	4	1	4								
Volume Right	2	8	0	1								
cSH	1341	1454	561	614								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (ft)	0	0	0	1								
Control Delay (s)	0.1	0.2	11.5	10.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	11.5	10.9								
Approach LOS	B	B	B	B								
<b>Intersection Summary</b>												
Average Delay	0.6											
Intersection Capacity Utilization	24.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBR	WBL	WBL	WBR	NBL	NBR
Lane Configurations	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	149	9	4	270	5	11	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	157	9	4	284	5	12	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							
Median storage (veh)							
Upstream signal (ft)							
px, platoon unblocked							
vc, conflicting volume			166		454	162	
vc1, stage 1 cont vol							
vc2, stage 2 cont vol							
vcu, unblocked vol			166		454	162	
tc, single (s)			4.1		6.4	6.2	
tc, 2 stage (s)							
tf (s)			2.2		3.5	3.3	
p0 queue free %			100		99	99	
p0 queue free %			1412		562	863	
cm capacity (veh/h)							
Direction Lane #	EBT	WBL	WBR	NBL	NBR		
Volume Total	166	288	17				
Volume Left	0	4	5				
Volume Right	9	0	12				
cSH	1700	1412	749				
Volume to Capacity	0.10	0.00	0.02				
Queue Length 95th (ft)	0	0	2				
Control Delay (s)	0.0	0.1	9.9				
Lane LOS	A	A	A				
Approach Delay (s)	0.0	0.1	6.9				
Approach LOS	A	A	A				
<b>Intersection Summary</b>							
Average Delay	0.4						
Intersection Capacity Utilization	27.4%						
Analysis Period (min)	15						
ICU Level of Service	A						

Movement	EB	EBT	EBR	WB	WB	WB	WB	NBL	NBL	NBL	NBR	SBL	SBL	SBR
Lane Configurations	Free													
Sign Control	Free													
Grade	0%													
Volume (veh/h)	0	155	9	11	250	0	25	0	8	0	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0	8	0	0	0	0	0
Pedestrians	0													
Lane Width (ft)	11.4													
Walking Speed (ft/s)	3.5													
Percent Blockage	0													
Right turn flare (veh)	None													
Median type	None													
Median storage (veh)	None													
Upstream signal (ft)	None													
pX, platoon unblocked	263													
vC, conflicting volume	173													
vC1, stage 1 conf vol	454													
vC2, stage 2 conf vol	168													
vCU, unblocked vol	454													
tC, 2 stage (s)	7.1													
tF (s)	6.2													
p0 queue free %	2.2													
p0 queue free %	95													
CM capacity (veh/h)	1301													
Direction Lane #	EB	EBT	EBR	WB	WB	WB	WB	NBL	NBL	NBL	NBR	SBL	SBL	SBR
Volume Total	173	275	35	0	0	0	0	0	0	0	0	0	0	0
Volume Left	0	12	26	0	0	0	0	0	0	0	0	0	0	0
Volume Right	9	0	8	0	0	0	0	0	0	0	0	0	0	0
cSH	1301	1404	570	1700	0	0	0	0	0	0	0	0	0	0
Volume to Capacity	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	1	5	0	0	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary														
Average Delay	11													
Intersection Capacity Utilization	32.1%													
Analysis Period (min)	15													
ICU Level of Service	A													

Movement	EB	EBT	EBR	WB	WB	WB	WB	NBL	NBL	NBL	NBR	SBL	SBL	SBR
Lane Configurations	Free													
Sign Control	Free													
Grade	0%													
Volume (veh/h)	135	22	0	235	37	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	142	23	0	247	39	0	0	0	0	0	0	0	0	0
Pedestrians	0													
Lane Width (ft)	11.4													
Walking Speed (ft/s)	3.5													
Percent Blockage	0													
Right turn flare (veh)	None													
Median type	None													
Median storage (veh)	None													
Upstream signal (ft)	None													
pX, platoon unblocked	165													
vC, conflicting volume	165													
vC1, stage 1 conf vol	4.1													
vC2, stage 2 conf vol	6.4													
vCU, unblocked vol	165													
tC, 2 stage (s)	2.2													
tF (s)	3.3													
p0 queue free %	100													
CM capacity (veh/h)	1413													
Direction Lane #	EB	EBT	EBR	WB	WB	WB	WB	NBL	NBL	NBL	NBR	SBL	SBL	SBR
Volume Total	165	247	39	0	0	0	0	0	0	0	0	0	0	0
Volume Left	0	0	39	0	0	0	0	0	0	0	0	0	0	0
Volume Right	23	0	0	0	0	0	0	0	0	0	0	0	0	0
cSH	1700	1413	605	0	0	0	0	0	0	0	0	0	0	0
Volume to Capacity	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary														
Average Delay	1.0													
Intersection Capacity Utilization	22.4%													
Analysis Period (min)	15													
ICU Level of Service	A													

Lane Group	EBL	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1102	191	666	588	215	163	279	475	252
v/c Ratio	2.01	0.34	1.12	0.76	0.97	0.56	0.72	0.77	0.98
Control Delay	488.5	36.6	113.7	25.9	122.0	77.8	16.3	59.1	109.2
Queue Delay	129.9	5.2	169.0	11.5	0.0	0.0	1.4	179.5	0.0
Total Delay	618.4	41.8	282.7	37.3	122.0	77.8	19.7	248.6	109.2
Queue Length 50th (ft)	180.4	142	-858	216	228	87	0	247	245
Queue Length 95th (ft)	#2074	m188m#1100	m329	#402	127	95	#351	#437	
Internal Link Dist (ft)	550	220			150	110	100	275	270
Turn Bay Length (ft)	549	567	597	746	221	376	418	619	259
Base Capacity (vph)	0	309	153	158	0	0	0	0	0
Starvation Cap Reductn	69	0	0	0	0	0	42	278	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	2.30	0.74	1.50	0.97	0.97	0.43	0.74	1.39	0.98
Reduced v/c Ratio									

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	32	147	5	200	173	165	5	32	224
v/c Ratio	0.04	0.15	0.48	0.04	0.44	0.55	0.07	0.00	0.20	0.12
Control Delay	34.4	32.8	11.5	28.2	24.5	32.2	4.4	3.8	35.8	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	32.8	11.5	28.2	24.5	32.2	4.4	3.8	35.8	11.7
Queue Length 50th (ft)	2	15	0	2	34	84	4	0	15	26
Queue Length 95th (ft)	13	39	49	m5	m53	m96	m38	m1	40	65
Internal Link Dist (ft)	180			140			120		150	200
Turn Bay Length (ft)	75	75	100	155	488	155	854	400	2462	1102
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0.03	0.07	0.30	0.03	0.23	0.43	0.07	0.00	0.17	0.12
Reduced v/c Ratio										

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	924	651	94	778	345	983		
v/c Ratio	0.55	0.73	0.37	0.38	0.66	1.06		
Control Delay	18.0	16.7	44.4	14.4	30.4	31.4		
Queue Delay	10.9	45.9	0.0	0.1	0.0	15.9		
Total Delay	28.9	64.6	44.4	14.5	30.4	47.3		
Queue Length 50th (ft)	195	246	22	96	161	209		
Queue Length 95th (ft)	m163	m160	m30	m119	261	#332		
Internal Link Dist (ft)	220		300	466		348		
Turn Bay Length (ft)						250		
Base Capacity (vph)	1681	892	257	2035	523	1119		
Starvation Cap Reductn	734	292	0	0	0	0		
Spillback Cap Reductn	0	0	0	338	0	149		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.98	1.08	0.37	0.46	0.66	1.01		

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Record with 1 through lane as a right lane.

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	595	675	435	494	300	315	599	44
v/c Ratio	0.52	0.77	0.78	0.32	0.86	0.89	0.57	0.12
Control Delay	41.8	22.9	48.2	16.4	52.6	55.5	7.3	23.2
Queue Delay	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	26.0	48.2	16.4	52.6	55.5	7.3	23.2
Queue Length 50th (ft)	143	188	120	108	114	170	0	22
Queue Length 95th (ft)	0	294	#180	145	m#234	m#260	m53	42
Internal Link Dist (ft)	466		345			380		270
Turn Bay Length (ft)			150		150		200	
Base Capacity (vph)	1144	879	558	1524	347	354	1050	365
Starvation Cap Reductn	0	118	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.89	0.78	0.32	0.86	0.89	0.57	0.12

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBL	SBL	SBR
Lane Group Flow (vph)	205	1028	714	97	248	
v/c Ratio	0.46	0.46	0.44	0.21	0.41	
Control Delay	32.3	16.2	16.1	24.5	5.8	
Queue Delay	0.0	0.6	0.0	0.0	0.0	
Total Delay	32.3	16.8	16.1	24.5	5.8	
Queue Length 50th (ft)	63	232	121	38	0	
Queue Length 95th (ft)	87	268	177	76	53	
Internal Link Dist (ft)	345	164	232			
Turn Bay Length (ft)	80		200			
Base Capacity (vph)	901	2256	1609	465	598	
Starvation Cap Reductn	0	742	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.68	0.44	0.21	0.41	

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 m - Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBL	NBL	NBR	SBL	SBR
Lane Group Flow (vph)	338	340	42	16	541	517	7	458
v/c Ratio	0.83	0.64	0.10	0.11	1.02	0.24	0.05	0.46
Control Delay	47.7	47.8	8.4	29.3	74.3	10.3	42.3	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	47.8	8.4	29.3	74.3	10.3	42.3	29.9
Queue Length 50th (ft)	164	165	0	5	-278	51	4	128
Queue Length 95th (ft)	#295	#297	23	23	#478	147	m4	#224
Internal Link Dist (ft)	284	118			214			380
Turn Bay Length (ft)	250	250			200			100
Base Capacity (vph)	441	443	447	179	531	2119	177	988
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.77	0.09	0.09	1.02	0.24	0.04	0.46

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 m - Volume for 95th percentile queue is metered by upstream signal.



Lane Group	WBL	WBR	NBR	NBL	SBT	SBT
Lane Group Flow (vph)	271	565	660	264	268	524
v/c Ratio	0.59	0.86	0.83	0.32	0.96	0.43
Control Delay	32.1	23.4	28.1	3.1	75.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	23.4	28.1	3.1	75.3	7.2
Queue Length 50th (ft)	95	60	228	0	108	91
Queue Length 95th (ft)	168	#235	4416	38	#242	149
Internal Link Dist (ft)	480		3920			2550
Turn Bay Length (ft)		175		450	700	
Base Capacity (vph)	435	681	797	829	280	1211
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.83	0.83	0.32	0.96	0.43

Intersection Summary:  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBT
Lane Group Flow (vph)	53	677	38	213	869	162	67	97	85	284	149
v/c Ratio	0.40	0.90	0.10	0.83	0.94	0.30	0.26	0.25	0.22	0.53	0.18
Control Delay	44.6	47.9	9.9	54.8	34.9	2.0	37.7	11.2	8.1	27.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	47.9	9.9	54.8	34.9	2.0	37.7	11.2	8.1	27.8	5.7
Queue Length 50th (ft)	26	174	0	42	-260	0	16	8	0	118	13
Queue Length 95th (ft)	61	#273	23	m#716	m#359	m2	36	48	36	193	45
Internal Link Dist (ft)		1540			220			1010			520
Turn Bay Length (ft)	160	200	250	170	130	100	100	100	100	100	100
Base Capacity (vph)	133	752	366	257	929	532	257	382	387	531	827
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.90	0.10	0.83	0.94	0.30	0.26	0.25	0.22	0.53	0.18

Intersection Summary:  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Lane Group	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	245	783	154	391	955	377	144	435	274	383	278	256
v/c Ratio	0.88	0.46	0.25	0.76	0.83	0.50	0.65	0.66	0.58	0.75	0.77	0.50
Control Delay	52.6	11.8	2.2	31.9	22.7	3.6	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	11.8	2.2	31.9	22.7	3.6	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	75	56	4	105	240	26	71	74	0	85	129	0
Queue Length 95th (ft)	m#168	m63	m7	#153	#330	37	#157	118	65	#188	#230	58
Internal Link Dist (ft)	320	320	250	350	520	155	250	554	250	175	175	175
Turn Bay Length (ft)	200	200	200	200	200	200	200	200	200	200	200	200
Base Capacity (vph)	288	1665	627	515	1146	751	221	789	522	511	396	538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.46	0.25	0.76	0.83	0.50	0.65	0.55	0.52	0.75	0.70	0.48

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

Lane Group	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1610	72	1342	208	25	208	25	370	370	370	370	369
v/c Ratio	0.69	0.51	0.67	0.13	0.05	0.84	0.05	0.84	0.88	0.88	0.88	0.86
Control Delay	8.7	55.9	11.2	0.1	9.8	43.2	48.5	26.4	26.4	26.4	26.4	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	55.9	11.2	0.1	9.8	43.2	48.5	26.4	26.4	26.4	26.4	26.4
Queue Length 50th (ft)	133	39	139	0	2	169	172	133	133	133	133	133
Queue Length 95th (ft)	170	m82	m155	m0	18	#318	#329	224	224	224	224	224
Internal Link Dist (ft)	520	520	960	428	428	400	400	400	400	400	400	400
Turn Bay Length (ft)	225	225	225	225	225	225	225	225	225	225	225	225
Base Capacity (vph)	2321	142	2000	1583	568	475	455	598	598	598	598	598
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.51	0.67	0.13	0.04	0.78	0.81	0.62	0.62	0.62	0.62	0.62

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	18	1724	287	1045	368	575	161	161	161	18	18
v/c Ratio	0.14	0.60	0.18	0.52	0.23	0.91	0.24	0.24	0.24	0.03	0.03
Control Delay	38.5	20.4	0.2	14.7	0.3	40.3	12.8	12.8	12.8	8.6	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	20.4	0.2	14.7	0.3	40.3	12.8	12.8	12.8	8.6	8.6
Queue Length 50th (ft)	10	221	0	81	0	245	46	46	46	4	4
Queue Length 95th (ft)	m13	m275	m0	131	m0	413	76	76	76	13	13
Internal Link Dist (ft)	560	360				365				420	
Turn Bay Length (ft)	190					225					
Base Capacity (vph)	133	2866	1583	2020	1583	730	791	791	791	807	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.60	0.18	0.52	0.23	0.79	0.20	0.20	0.20	0.02	0.02

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	284	1705	574	148	999	226	475	475	236	107	242
v/c Ratio	0.51	1.09	0.64	0.60	0.68	0.71	0.72	0.72	0.47	0.44	0.48
Control Delay	19.3	71.8	7.2	46.8	28.1	42.9	36.7	36.7	7.4	35.9	33.6
Queue Delay	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	71.8	8.7	46.8	28.1	42.9	36.7	36.7	7.4	35.9	33.6
Queue Length 50th (ft)	50	401	0	69	153	114	120	120	0	54	62
Queue Length 95th (ft)	69	485	90	187	249	210	173	173	55	98	91
Internal Link Dist (ft)	360	360			1350		601			860	
Turn Bay Length (ft)	250				200		250			150	
Base Capacity (vph)	558	1107	890	246	1470	342	707	707	522	342	720
Starvation Cap Reductn	0	0	155	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.09	0.78	0.60	0.68	0.66	0.67	0.67	0.45	0.31	0.34

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBE	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	140	722	135	620	194	338	520	114	182	360	231
v/c Ratio	0.92	0.64	0.86	0.74	0.37	0.95	0.81	0.18	1.02	0.78	0.41
Control Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	108.8	39.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.1	66.8	32.8	4.5	108.8	39.5	6.0
Queue Length 50th (ft)	61	136	58	128	0	145	201	0	-83	146	0
Queue Length 95th (ft)	#162	#221	#155	184	45	#295	#358	30	#200	#275	49
Internal Link Dist (ft)	689			6630				734		980	
Turn Bay Length (ft)	350	500	500	150	550	500	500	675	500	625	625
Base Capacity (vph)	153	887	153	859	531	357	645	623	779	456	562
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.37	0.95	0.81	0.18	1.02	0.79	0.41

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	773	56	862	351	51	91	511	132
v/c Ratio	0.67	0.63	0.47	0.80	0.58	0.43	0.44	0.80	0.18
Control Delay	64.2	30.5	38.5	25.0	6.6	52.2	21.8	35.9	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	30.5	38.5	25.0	6.6	52.2	21.8	35.9	5.8
Queue Length 50th (ft)	61	215	32	260	4	28	14	237	10
Queue Length 95th (ft)	#161	#317	m60	#365	20	65	57	#388	43
Internal Link Dist (ft)	6630			350			200		236
Turn Bay Length (ft)	225	150	150	80	50	50	225	225	236
Base Capacity (vph)	159	1232	118	1077	603	118	367	653	782
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.63	0.47	0.80	0.58	0.43	0.25	0.78	0.17

Intersection Summary  
 Volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m. Volume for 95th percentile queue is metered by upstream signal.

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group	862	461	104	1033	673	223
Lane Group Flow (vph)	0.58	0.59	0.39	0.50	0.61	0.38
v/c Ratio	12.5	8.4	48.0	19.9	28.6	14.2
Control Delay	0.2	0.4	0.0	0.4	0.0	0.0
Queue Delay	12.7	8.8	48.0	20.2	28.6	14.2
Total Delay	12.9	9.2	48.0	20.6	28.6	14.2
Queue Length 50th (ft)	121	67	56	250	164	48
Queue Length 95th (ft)	150	m106	m102	311	222	108
Internal Link Dist (ft)	350	50	100	370	425	585
Turn Bay Length (ft)	1456	779	295	2084	1106	583
Base Capacity (vph)	141	69	0	490	0	0
Starvation Cap Reductn	1	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.65	0.35	0.65	0.61	0.38

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative D  
 PM Peak

	EBT	WBT	NBT	NBR
Lane Group	1538	649	455	248
Lane Group Flow (vph)	0.62	0.26	0.64	0.71
v/c Ratio	3.6	5.8	36.1	40.3
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	3.6	5.8	36.1	40.3
Total Delay	3.6	5.8	36.1	40.3
Queue Length 50th (ft)	0	56	123	119
Queue Length 95th (ft)	243	112	152	178
Internal Link Dist (ft)	370	312	431	395
Turn Bay Length (ft)	2491	2491	1221	560
Base Capacity (vph)	65	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.26	0.37	0.43

Intersection Summary

**CUMULATIVE 2020 + ALTERNATIVE D  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4			4			4			4		
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	0	13	16	263	22	134	14	736	74	186	508	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	14	17	277	23	141	15	775	78	196	535	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	1											
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1814	1810	536	1793	1773	814	538					853
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1814	1810	536	1793	1773	814	538					853
IC, single (s)	7.5	6.5	6.2	7.1	6.5	6.2	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	77	97	0	62	63	99					75
CM capacity (veh/h)	22	58	544	40	61	378	1030					786
Direction, Lane #	EB1	WB1	NB1	NB2	SB1	SB2	SB1	SB2	SB1	SB2	SB1	SB2
Volume Total	31	441	15	853	196	538						
Volume Left	0	277	15	0	196	0						
Volume Right	17	141	0	78	0	3						
CSH	115	58	1030	1700	786	1700						
Volume to Capacity	0.22	7.66	0.01	0.50	0.25	0.32						
Queue Length 95th (ft)	47.4	Err	1	0	25	0						
Control Delay (s)	E	F	A	8.5	0.0	11.1	0.0					
Lane LOS	E	F	A	B	B	B						
Approach Delay (s)	47.4	Err	0.1	3.0								
Approach LOS	E	F	F	B								
Intersection Summary												
Average Delay	2129.6											
Intersection Capacity Utilization	85.9%											
Analysis Period (min)	15											
ICU Level of Service	E											

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4			4			4			4		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	10	170	94	431	280	9	130	25	558	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	179	99	454	295	9	137	26	587	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)	None											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304			278			1472	1461	228	2057	1506	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			278			1472	1461	228	2057	1506	289
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			65			0	68	28	0	86	99
CM capacity (veh/h)	1257			1285			67	83	811	6	78	740
Direction, Lane #	EB1	WB1	NB1	NB2	SB1	SB2	SB1	SB2	SB1	SB2	SB1	SB2
Volume Total	288	758	751	32								
Volume Left	11	454	137	11								
Volume Right	99	9	587	11								
CSH	1257	1285	244	17								
Volume to Capacity	0.01	0.35	3.07	1.85								
Queue Length 95th (ft)	1	40	Err	112								
Control Delay (s)	0.4	7.2	Err	865.7								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.4	7.2	Err	865.7								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	4122.4											
Intersection Capacity Utilization	112.8%											
Analysis Period (min)	15											
ICU Level of Service	H											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	10	718	10	9	702	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	756	11	9	739	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC1, stage 1 conf vol	748			766			1561	1549	761	1561	1550	744
vC2, stage 2 conf vol	748			766			1561	1549	761	1561	1550	744
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
tF (s)	99			99			87	91	97	87	91	97
p0 queue free %	860			847			81	111	405	81	111	415
cM capacity (veh/h)												
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	777	9	739	9	739	9	32	32	32	32	32	32
Volume Left	11	9	0	0	0	0	11	11	11	11	11	11
Volume Right	11	9	11	11	11	11	11	11	11	11	11	11
cSH	860	847	1700	1700	1700	126	127					
Volume to Capacity	0.01	0.01	0.43	0.01	0.25	0.25						
Queue Length 95th (ft)	1	1	0	0	23	23						
Control Delay (s)	0.3	0.3	42.9	42.8								
Lane LOS	A	A	E	E	E	E	E	E	E	E	E	E
Approach Delay (s)	0.3	0.3	42.9	42.8								
Approach LOS	E	E	E	E								
Intersection Summary												
Average Delay	2.0											
Intersection Capacity Utilization	54.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free											
Sign Control	Free											
Grade	0%											
Volume (veh/h)	10	718	10	9	702	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	756	11	9	739	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC1, stage 1 conf vol	748			766			1556	1549	761	1556	1545	739
vC2, stage 2 conf vol	748			766			1556	1549	761	1556	1545	739
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
tF (s)	99			99			87	91	97	87	91	97
p0 queue free %	860			847			82	111	405	81	112	417
cM capacity (veh/h)												
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	777	9	739	9	739	9	32	32	32	32	32	32
Volume Left	11	9	0	0	0	0	11	11	11	11	11	11
Volume Right	11	9	11	11	11	11	11	11	11	11	11	11
cSH	860	847	1700	1700	1700	126	127					
Volume to Capacity	0.01	0.01	0.43	0.01	0.25	0.25						
Queue Length 95th (ft)	1	1	0	0	23	23						
Control Delay (s)	0.3	0.3	42.7	42.5								
Lane LOS	A	A	E	E	E	E	E	E	E	E	E	E
Approach Delay (s)	0.3	0.3	42.7	42.5								
Approach LOS	E	E	E	E								
Intersection Summary												
Average Delay	1.9											
Intersection Capacity Utilization	55.4%											
ICU Level of Service	B											
Analysis Period (min)	15											



5: Wilfred Ave & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	40	657	41	188	667	189	44	14	396	160	31	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	682	43	198	702	199	46	15	417	189	33	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	901			735			1572	2094	367	2052	2016	451
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	901			735			1572	2094	367	2052	2016	451
vCU, unblocked vol	41			41			7.5	6.5	6.9	7.5	6.5	6.9
tC, single (s)												
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			77			0	61	34	0	22	98
pM capacity (veh/h)	750			866			22	38	630	6	42	356
Direction Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	42	461	274	198	468	433	478	234				
Volume Left	42	0	0	198	0	0	46	189				
Volume Right	0	0	43	0	0	199	417	12				
CSH	750	1700	1700	866	1700	1700	150	7				
Volume to Capacity	0.06	0.27	0.16	0.23	0.28	0.25	3.19	31.91				
Queue Length 95th (ft)	4	0	0	22	0	0	Err	Err				
Control Delay (s)	10.1	0.0	0.0	10.4	0.0	0.0	Err	Err				
Lane LOS	B	B	B	B	B	B	F	F				
Approach Delay (s)	0.5			1.9			Err	Err				
Approach LOS	F			F			F	F				
Intersection Summary												
Average Delay	2750.9											
Intersection Capacity Utilization	83.1%											
ICU Level of Service	E											
Analysis Period (min)	15											

6: Wilfred Avenue & Dowdell Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	53	907	273	509	782	273	143	105	559	217	41	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	933	287	536	823	287	151	111	586	228	43	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1111			1242			2840	3392	621	3271	3392	555
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1111			1242			2840	3392	621	3271	3392	555
vCU, unblocked vol	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, single (s)												
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			4			0	0	0	0	0	74
pM capacity (veh/h)	625			556			0	0	430	0	0	475
Direction Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	56	636	606	536	549	582	849	397				
Volume Left	56	0	0	536	0	0	151	228				
Volume Right	0	0	287	0	0	287	588	125				
CSH	625	1700	1700	556	1700	1700	0	0				
Volume to Capacity	0.09	0.37	0.36	0.96	0.32	0.33	Err	Err				
Queue Length 95th (ft)	7	0	0	324	0	0	Err	Err				
Control Delay (s)	11.3	0.0	0.0	56.8	0.0	0.0	Err	Err				
Lane LOS	B	B	B	F	F	F	F	F				
Approach Delay (s)	0.5			18.5			Err	Err				
Approach LOS	F			F			F	F				
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	127.4%											
ICU Level of Service	H											
Analysis Period (min)	15											

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations																																
Lane Flow (vph)	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	4.0	4.0																				
Lane Util. Factor	1.00	0.91	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.99	1.00																				
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00																				
Satd. Flow (prot)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1649	1649																				
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00																				
Satd. Flow (perm)	153	1214	255	73	778	730	556	103	350	453	70	230																				
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																				
Peak-hour factor, PHF	161	1341	268	77	819	768	585	108	368	477	74	242																				
Adj. Flow (vph)	0	0	57	0	0	232	0	0	342	0	73	0																				
RTOR Reduction (vph)	161	1341	211	77	819	536	585	108	25	477	243	0																				
Lane Group Flow (vph)	161	1341	211	77	819	536	585	108	25	477	243	0																				
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split																				
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4																				
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4																				
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5	21.5																				
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0	22.0																				
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14	0.14																				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5																				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0																				
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	232	113	657	227	227																				
v/s Ratio Prot	0.09	c0.40	0.15	0.05	c0.46	0.34	0.33	0.03	0.02	0.14	c0.15	0.15																				
v/s Ratio Perm	0.30	1.32	0.49	0.14	1.37	1.00	2.65	0.43	0.23	0.73	1.07	1.07																				
Uniform Delay, d1	43.1	56.0	45.9	36.8	53.0	53.0	70.0	71.2	70.2	60.8	69.0	69.0																				
Progression Factor	1.00	1.00	1.00	0.84	0.87	0.95	1.00	1.00	1.00	1.00	1.00	1.00																				
Incremental Delay, d2	0.3	150.3	0.9	0.4	175.3	34.7	754.0	1.2	1.1	4.0	79.2	79.2																				
Delay (s)	43.4	206.3	46.8	31.3	221.4	85.1	824.0	72.4	71.2	64.8	148.2	148.2																				
Level of Service	D	F	D	C	F	F	F	F	E	E	F	F																				
Approach Delay (s)	167.4	F	F	149.7	F	F	486.4	F	F	96.0	F	F																				
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>215.4</td> <td>HCM Level of Service</td> <td>F</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>1.48</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>160.0</td> <td>Sum of lost time (s)</td> <td>16.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>140.8%</td> <td>ICU Level of Service</td> <td>H</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	215.4	HCM Level of Service	F	HCM Volume to Capacity ratio	1.48			Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0	Intersection Capacity Utilization	140.8%	ICU Level of Service	H	Analysis Period (min)	15		
HCM Average Control Delay	215.4	HCM Level of Service	F																													
HCM Volume to Capacity ratio	1.48																															
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0																													
Intersection Capacity Utilization	140.8%	ICU Level of Service	H																													
Analysis Period (min)	15																															
c Critical Lane Group	Critical Lane Group																															

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations																																
Lane Flow (vph)	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	4.0	4.0																				
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.91	0.91	0.91	0.91																				
Fit Protected	1.00	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00																				
Satd. Flow (prot)	3539	1583	3433	3539	3539	3539	3539	3539	1610	3041	1610	3041																				
Fit Permitted	1.00	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00																				
Satd. Flow (perm)	3539	1583	3433	3539	3539	3539	3539	3539	1610	3041	1610	3041																				
Volume (vph)	0	1398	682	77	945	0	0	0	0	355	288	633																				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																				
Adj. Flow (vph)	0	1472	718	81	995	0	0	0	0	374	303	666																				
RTOR Reduction (vph)	0	0	163	0	0	0	0	0	0	0	0	75																				
Lane Group Flow (vph)	0	1472	549	81	995	0	0	0	0	374	894	894																				
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm																				
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4																				
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4																				
Actuated Green, G (s)	36.6	36.6	4.4	45.5	45.5	45.5	45.5	45.5	25.5	25.5	25.5	25.5																				
Effective Green, g (s)	37.1	37.1	4.9	46.0	46.0	46.0	46.0	46.0	26.0	26.0	26.0	26.0																				
Actuated g/C Ratio	0.46	0.46	0.06	0.58	0.58	0.58	0.58	0.58	0.32	0.32	0.32	0.32																				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5																				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0																				
Lane Grp Cap (vph)	1641	734	210	2035	2035	2035	2035	2035	523	988	523	988																				
v/s Ratio Prot	c0.42	0.35	0.02	c0.28	c0.28	c0.28	c0.28	c0.28	0.23	0.29	0.23	0.29																				
v/s Ratio Perm	0.90	0.75	0.39	0.49	0.49	0.49	0.49	0.49	0.72	1.16	0.72	1.16																				
Uniform Delay, d1	19.7	17.6	36.1	10.1	10.1	10.1	10.1	10.1	23.7	25.8	23.7	25.8																				
Progression Factor	1.40	1.75	1.18	1.47	1.47	1.47	1.47	1.47	1.00	1.00	1.00	1.00																				
Incremental Delay, d2	0.8	0.7	0.9	0.6	0.6	0.6	0.6	0.6	8.1	13.2	8.1	13.2																				
Delay (s)	28.4	31.4	43.3	15.4	15.4	15.4	15.4	15.4	31.9	39.1	31.9	39.1																				
Level of Service	C	C	D	B	B	B	B	B	C	C	C	D																				
Approach Delay (s)	29.4	C	D	17.5	B	B	B	B	37.1	A	37.1	D																				
Approach LOS	C	C	D	B	B	B	B	B	A	A	B	D																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>28.9</td> <td>HCM Level of Service</td> <td>C</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>0.84</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>80.0</td> <td>Sum of lost time (s)</td> <td>8.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>81.3%</td> <td>ICU Level of Service</td> <td>D</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	28.9	HCM Level of Service	C	HCM Volume to Capacity ratio	0.84			Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	Intersection Capacity Utilization	81.3%	ICU Level of Service	D	Analysis Period (min)	15		
HCM Average Control Delay	28.9	HCM Level of Service	C																													
HCM Volume to Capacity ratio	0.84																															
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0																													
Intersection Capacity Utilization	81.3%	ICU Level of Service	D																													
Analysis Period (min)	15																															
c Critical Lane Group	Critical Lane Group																															

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	WBEL	WBE	NBL	NBT	NBR	SBEL	SBE	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00	0.93	1.00
Lane Util. Factor	1.00	1.00	1.00	0.99	1.00	0.85	1.00	0.95	1.00	0.85
Flt Protected	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	5085	5833	3433	3520	1661	1690	2787	1770	1723	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	0.96	1.00	0.95	1.00	0.95
Satd. Flow (perm)	5085	5833	3433	3520	1661	1690	2787	1770	1723	1583
Volume (vph)	0	766	988	499	451	17	573	18	571	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	806	1040	525	475	18	603	19	601	9
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477	0
Lane Group Flow (vph)	0	806	446	525	480	0	303	319	1244	9
Turn Type	Prot	Perm	Prot	Perm	Split	Split	Perm	Split	Split	Perm
Protected Phases	7	4	3	8	2	2	2	6	6	6
Permitted Phases	4									
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	1144	356	558	1540	347	349	575	365	355	416
v/s Ratio Prot	0.16	c0.28	c0.15	0.14	0.18	c0.19	0.04	0.01	c0.01	0.02
v/s Ratio Perm	0.70	1.25	0.94	0.32	0.87	0.91	0.22	0.02	0.03	0.07
Uniform Delay, d1	28.6	31.0	33.1	14.7	30.7	31.1	26.4	25.3	25.4	22.2
Progression Factor	1.47	4.29	1.22	1.25	1.00	0.99	2.28	1.00	1.00	1.00
Incremental Delay, d2	1.9	124.8	21.7	0.5	20.2	25.4	0.7	0.1	0.2	0.3
Delay (s)	43.7	257.7	62.2	16.8	50.9	56.2	60.9	25.5	25.5	22.5
Level of Service	D	F	E	B	D	E	E	C	C	C
Approach Delay (s)	164.3	F	E	B	D	E	57.2	23.4	25.5	23.4
Approach LOS	F	F	E	B	D	E	E	C	C	C
Intersection Summary										
HCM Average Control Delay	101.1									
HCM Volume to Capacity ratio	0.79									
Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	88.7%									
Analysis Period (min)	15									
c Critical Lane Group										

10: Wilfred Ave & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	WBEL	WBE	NBL	NBT	NBR	SBEL	SBE	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00	0.93	1.00
Lane Util. Factor	1.00	1.00	1.00	0.99	1.00	0.85	1.00	0.95	1.00	0.85
Flt Protected	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	5085	5833	3433	3520	1661	1690	2787	1770	1723	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	0.96	1.00	0.95	1.00	0.95
Satd. Flow (perm)	5085	5833	3433	3520	1661	1690	2787	1770	1723	1583
Volume (vph)	0	766	988	499	451	17	573	18	571	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	806	1040	525	475	18	603	19	601	9
RTOR Reduction (vph)	0	0	594	0	3	0	0	0	477	0
Lane Group Flow (vph)	0	806	446	525	480	0	303	319	1244	9
Turn Type	Prot	Perm	Prot	Perm	Split	Split	Perm	Split	Split	Perm
Protected Phases	7	4	3	8	2	2	2	6	6	6
Permitted Phases	4									
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	1144	356	558	1540	347	349	575	365	355	416
v/s Ratio Prot	0.16	c0.28	c0.15	0.14	0.18	c0.19	0.04	0.01	c0.01	0.02
v/s Ratio Perm	0.70	1.25	0.94	0.32	0.87	0.91	0.22	0.02	0.03	0.07
Uniform Delay, d1	28.6	31.0	33.1	14.7	30.7	31.1	26.4	25.3	25.4	22.2
Progression Factor	1.47	4.29	1.22	1.25	1.00	0.99	2.28	1.00	1.00	1.00
Incremental Delay, d2	1.9	124.8	21.7	0.5	20.2	25.4	0.7	0.1	0.2	0.3
Delay (s)	43.7	257.7	62.2	16.8	50.9	56.2	60.9	25.5	25.5	22.5
Level of Service	D	F	E	B	D	E	E	C	C	C
Approach Delay (s)	164.3	F	E	B	D	E	57.2	23.4	25.5	23.4
Approach LOS	F	F	E	B	D	E	E	C	C	C
Intersection Summary										
HCM Average Control Delay	101.1									
HCM Volume to Capacity ratio	0.79									
Actuated Cycle Length (s)	80.0									
Intersection Capacity Utilization	88.7%									
Analysis Period (min)	15									
c Critical Lane Group										

Movement	WB1	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	59	765	332	0	784
Volume (veh/h)	0	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0	62	805	349	0	825
Hourly flow rate (vph)	0	0.95	0.95	0.95	0.95	0.95
Pedestrians	0	0	0	0	0	0
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	None					
Median type						
Median storage (veh)						
Upstream signal (ft)						
px. platoon unblocked						
vC. conflicting volume	1805	980				1155
vC1. stage 1 conf vol						
vC2. stage 2 conf vol						
vCu. unblocked vol	1805	980				1155
tC. single (s)	6.4	6.2				4.1
tC. 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	100	80				100
cM capacity (veh/h)	87	303				605
Direction: Lane 1	WB1	NBT	SBL	SBT		
Volume Total	62	1155	825			
Volume Left	0	0	0			
Volume Right	62	349	0			
cSH	303	1700	1700			
Volume to Capacity	0.20	0.68	0.49			
Queue Length 95th (ft)	19	0	0			
Control Delay (s)	19.9	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	19.9	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay						0.6
Intersection Capacity Utilization						70.8%
Analysis Period (min)						15
						ICU Level of Service C

Movement	EB1	EBT	WB1	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
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	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Fit	1.00	1.00	0.85	0.86	1.00	1.00	1.00	1.00	0.85	1.00
Fit Protected	0.95	0.95	1.00	0.98	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1681	1665	1583	1741	1770	3537	1770	3539	1583	1683
Fit Permitted	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1681	1685	1583	1741	1770	3537	1770	3539	1583	1686
Volume (vph)	727	3	47	9	5	552	413	2	7	616
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	765	3	49	8	3	581	435	2	7	648
RTOR Reduction (vph)	0	0	37	0	5	0	1	0	0	558
Lane Group Flow (vph)	383	385	12	0	11	0	581	435	0	7
Turn Type	Split	Split	Split	Split	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	4	5	2	1	6	6	6
Permitted Phases	4	4	4	4	5	2	1	6	6	6
Actuated Green, G (s)	19.8	19.8	19.8	1.5	27.1	39.2	1.5	13.6	13.6	13.6
Effective Green, G (s)	20.3	20.3	20.3	2.0	27.6	39.7	2.0	14	14	14
Actuated g/C Ratio	0.25	0.25	0.25	0.02	0.35	0.50	0.02	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)	427	428	402	44	611	1755	44	624	279	427
v/s Ratio Prot	0.23	0.23	0.01	c0.01	c0.33	0.12	0.00	0.18	c0.22	0.22
v/s Ratio Perm	0.90	0.90	0.03	0.25	0.95	0.25	0.16	1.04	1.27	1.27
Uniform Delay, d1	28.8	28.9	22.5	38.3	25.5	11.6	38.2	33.0	33.0	33.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.15	2.17	2.17
Incremental Delay, d2	20.9	21.1	0.0	3.0	24.8	0.3	0.2	22.7	124.2	124.2
Delay (s)	49.7	50.0	22.5	41.3	50.3	11.9	45.4	60.6	195.7	195.7
Level of Service	D	D	C	D	D	B	D	E	F	F
Approach Delay (s)	48.2	48.2	41.3	41.3	33.8	13.9	41.3	41.3	139.2	139.2
Approach LOS	D	D	D	D	C	C	D	F	F	F
Intersection Summary										
HCM Average Control Delay										85.6
HCM Volume to Capacity ratio										0.98
Actuated Cycle Length (s)										80.0
Intersection Capacity Utilization										97.5%
Analysis Period (min)										15
										ICU Level of Service F

Movement	EB1	EB2	EB3	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations	Stop	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	144	31	12	359	363	25	25	25	25
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	152	33	13	378	382	26	26	26	26
Hourly flow rate (vph)									
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type	None								
Median storage (veh)									
Upstream signal (ft)									
px, plexicon unblocked	609	204	408						
vc, conflicting volume									
vc1, stage 1 conf vol									
vc2, stage 2 conf vol	609	204	408						
vcu, unblocked vol	6.8	6.9	4.1						
tc, single (s)									
tc, 2 stage (s)	3.5	3.3	2.2						
pf queue free %	64	96	99						
cm capacity (veh/h)	422	803	1147						
Direction, Lane #	EB1	EB2	EB3	NB1	NB2	NB3	SB1	SB2	SB3
Volume Total	152	33	13	189	189	255	154	154	154
Volume Left	152	0	13	0	0	0	0	0	0
Volume Right	0	33	0	0	0	0	26	26	26
C/S/H	422	803	1147	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.36	0.04	0.01	0.11	0.11	0.15	0.09	0.09	0.09
Queue Length 95th (ft)	40	3	1	0	0	0	0	0	0
Control Delay (s)	18.2	9.7	8.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	A	A	A	A	A	A	A	A
Approach Delay (s)	16.7		0.3						
Approach LOS	C		C						
Intersection Summary									
Average Delay	3.2								
Intersection Capacity Utilization	25.5%								
ICU Level of Service	A								
Analysis Period (min)	15								

Movement	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00
Flt									
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863	1770	1863	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863	1770	1863	1863
Volume (vph)	253	468	628	253	468	628	253	468	628
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	266	493	661	266	493	661	266	493	661
RTOR Reduction (vph)	0	301	0	0	151	0	0	0	0
Lane Group Flow (vph)	266	192	661	115	261	565	261	565	565
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	8	2	2	1	6				
Permitted Phases									
Actuated Green, G (s)	13.3	13.3	26.6	26.6	26.6	9.5	40.6	40.6	40.6
Effective Green, g (s)	13.8	13.8	27.1	27.1	27.1	10.0	41.1	41.1	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	388	347	803	682	281	1217			
w/s Ratio Prot	c0.15	c0.15	c0.35	c0.15	c0.15	c0.30			
w/s Ratio Perm			0.12			0.07			
w/c Ratio	0.69	0.65	0.82	0.17	0.93	0.46			
Uniform Delay, d1	22.6	21.8	15.8	11.0	26.1	5.4			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	5.0	1.9	9.3	0.3	34.9	1.3			
Delay (s)	27.5	23.7	25.1	11.5	61.0	6.7			
Level of Service	C	C	C	C	B	E			
Approach Delay (s)	25.0		21.2			23.9			
Approach LOS	C		C			C			
Intersection Summary									
HCM Average Control Delay	23.2								
HCM Volume to Capacity ratio	0.81								
Actuated Cycle Length (s)	62.9								
Sum of lost time (s)	12.0								
Intersection Capacity Utilization	70.8%								
ICU Level of Service	C								
Analysis Period (min)	15								
Critical Lane Group	C								

17: Rohnert Park Expy & Labeth Ave  
Graton Rancheria Casino & Hotel  
2020 Alternative D  
PM Peak

Movement	EBL	EBS	EBR	WBL	WBS	WBR	NBL	NBR	SBL	SB	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	1.00	1.00	0.89
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.89	0.85	1.00	0.89	1.00
Fit	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1577	1504	1770	1665
Volume (vph)	89	628	53	116	743	92	69	28	153	281	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	661	56	122	782	97	73	27	161	296	42
RTOR Reduction (vph)	0	0	44	0	0	76	0	67	70	0	35
Lane Group Flow (vph)	87	661	122	782	217	73	42	319	296	89	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	7	4		3	8	5	2	5	1	6	
Permitted Phases	4	16.5	16.5	4.4	15.5	16.5	4.4	16.7	16.7	24.4	36.7
Actuated Green, G (s)	4.9	17.0	17.0	4.9	17.0	17.0	4.9	17.2	17.2	24.9	37.2
Effective Green, g (s)	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.21	0.21	0.31	0.47
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	108	752	335	210	752	336	210	339	323	551	774
Lane Grp Cap (vph)	0.05	c0.19	0.01	0.04	c0.22	0.01	c0.02	c0.03	0.01	c0.17	0.05
v/s Ratio Prot	0.81	0.88	0.04	0.58	1.04	0.06	0.35	0.13	0.06	0.54	0.12
v/s Ratio Perm	37.1	30.5	25.0	36.5	31.5	25.1	36.0	25.3	25.0	22.8	12.1
Uniform Delay, d1	1.00	1.00	0.97	0.51	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	31.9	11.4	0.0	2.6	37.4	0.0	1.0	0.8	0.4	1.0	0.3
Incremental Delay, d2	70.9	41.9	25.0	38.1	53.5	5.7	37.0	26.1	25.3	23.8	12.4
Delay (s)	E	D	C	D	D	D	A	D	C	C	B
Level of Service	D	D	C	D	D	D	A	D	C	C	B
Approach Delay (s)	43.9			47.0			28.9			20.1	
Approach LOS	D			D			C			C	

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	39.4	D
HCM Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	80.0	
Intersection Capacity Utilization	58.5%	B
Analysis Period (min)	15	
c Critical Lane Group		

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel  
2020 Alternative D  
PM Peak

Movement	EBL	EBS	EBR	WBL	WBS	WBR	NBL	NBR	SBL	SB	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.91	0.91	1.00	1.00	0.85
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	1.00	0.85	1.00
Fit	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	1770	3222	1441	3433
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	1770	3222	1441	3433
Volume (vph)	216	743	163	377	854	318	173	326	510	339	301
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	782	172	397	899	335	182	343	537	357	317
RTOR Reduction (vph)	0	0	115	0	0	227	0	69	267	0	198
Lane Group Flow (vph)	227	782	57	397	889	108	182	443	101	357	317
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	7	4		4	3	8	5	2	5	1	6
Permitted Phases	4	25.8	25.8	11.5	25.2	25.2	9.0	15.0	15.0	9.7	15.7
Actuated Green, G (s)	12.1	25.8	25.8	11.5	25.2	25.2	9.0	15.0	15.0	9.7	15.7
Effective Green, g (s)	12.6	26.3	26.3	12.0	25.7	25.7	9.5	15.5	15.5	10.2	16.2
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.19	0.19	0.13	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1672	520	515	1137	509	210	624	279	438	377
v/s Ratio Prot	c0.13	0.15	0.04	0.12	c0.25	0.07	0.10	0.14	c0.10	c0.17	0.03
v/s Ratio Perm	0.81	0.47	0.11	0.77	0.79	0.21	0.87	0.71	0.36	0.82	0.84
Uniform Delay, d1	32.6	21.3	18.7	32.7	24.7	19.8	34.6	30.1	28.0	34.0	30.7
Progression Factor	0.77	0.56	0.46	0.81	0.76	0.69	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.7	0.7	0.3	5.5	4.4	0.7	29.1	3.7	0.8	11.1	15.4
Delay (s)	37.7	12.7	8.9	32.0	23.2	14.3	63.7	33.8	28.8	45.1	46.1
Level of Service	D	B	A	C	C	B	E	C	C	D	C
Approach Delay (s)	16.9			23.5			37.2			40.4	
Approach LOS	B			C			D			D	

Intersection Summary	HCM Level of Service	
HCM Average Control Delay	28.2	C
HCM Volume to Capacity ratio	0.77	
Actuated Cycle Length (s)	80.0	
Intersection Capacity Utilization	74.3%	D
Analysis Period (min)	15	
c Critical Lane Group		

20: Rohnert Park Expy & US-101 NB Ramps  
Graton Rancheria Casino & Hotel  
2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.95	1.00	0.85	0.99	1.00	0.95	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	0	1259	333	68	1113	255	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1325	351	72	1172	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	54	0	0	0	0	0	0	12	0	0	41
Lane Group Flow (vph)	0	1622	30	72	1172	268	0	12	0	322	322	408
Turn Type		Prot	Free	Prot	Free	Prot	Free	Prot	Free	Prot	Free	Prot
Protected Phases		4	3	6	2	2	6	2	6	6	6	6
Permitted Phases		3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)		37.0	5.0	46.5	80.0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2308	122	2079	1583	484	410	392	495	410	392	495
v/s Ratio Prot		c0.33	0.04	c0.33	0.17	0.01	0.25	0.26	c0.26	0.25	0.26	c0.26
v/s Ratio Perm		0.70	0.59	0.56	0.17	0.02	0.79	0.82	0.83	0.79	0.82	0.83
Uniform Delay, d1		16.8	36.2	10.2	0.0	19.0	25.1	25.4	25.5	25.1	25.4	25.5
Progression Factor		0.45	1.23	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4	5.6	0.8	0.2	0.0	9.5	13.0	10.7	9.5	13.0	10.7
Delay (s)		9.1	50.0	8.4	0.2	19.1	34.6	38.4	36.2	34.6	38.4	36.2
Level of Service		A	D	A	A	B	C	D	D	C	D	D
Approach Delay (s)		9.1	50.0	8.4	0.2	19.1	34.6	38.4	36.2	34.6	38.4	36.2
Approach LOS		A	D	A	A	B	C	D	D	C	D	D
Intersection Summary												
HCM Average Control Delay		16.0										
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		80.0										
Intersection Capacity Utilization		70.5%										
Analysis Period (min)		15										
Critical Lane Group		C										

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel  
2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.95	1.00	0.85	0.99	1.00	0.95	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Fit Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Volume (vph)	0	1259	333	68	1113	255	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1325	351	72	1172	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	54	0	0	0	0	0	0	12	0	0	41
Lane Group Flow (vph)	0	1622	30	72	1172	268	0	12	0	322	322	408
Turn Type		Prot	Free	Prot	Free	Prot	Free	Prot	Free	Prot	Free	Prot
Protected Phases		4	3	6	2	2	6	2	6	6	6	6
Permitted Phases		3	3	3	3	3	3	3	3	3	3	3
Actuated Green, G (s)		37.0	5.0	46.5	80.0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2308	122	2079	1583	484	410	392	495	410	392	495
v/s Ratio Prot		c0.33	0.04	c0.33	0.17	0.01	0.25	0.26	c0.26	0.25	0.26	c0.26
v/s Ratio Perm		0.70	0.59	0.56	0.17	0.02	0.79	0.82	0.83	0.79	0.82	0.83
Uniform Delay, d1		16.8	36.2	10.2	0.0	19.0	25.1	25.4	25.5	25.1	25.4	25.5
Progression Factor		0.45	1.23	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4	5.6	0.8	0.2	0.0	9.5	13.0	10.7	9.5	13.0	10.7
Delay (s)		9.1	50.0	8.4	0.2	19.1	34.6	38.4	36.2	34.6	38.4	36.2
Level of Service		A	D	A	A	B	C	D	D	C	D	D
Approach Delay (s)		9.1	50.0	8.4	0.2	19.1	34.6	38.4	36.2	34.6	38.4	36.2
Approach LOS		A	D	A	A	B	C	D	D	C	D	D
Intersection Summary												
HCM Average Control Delay		16.0										
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		80.0										
Intersection Capacity Utilization		70.5%										
Analysis Period (min)		15										
Critical Lane Group		C										

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1770	3539	1770	3539	1770	3539	1770	3539	1770	3539
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1770	3539	1770	3539	1770	3539	1770	3539	1770	3539
Volume (vph)	235	1228	462	165	690	202	364	293	241	179	354	152
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1293	486	174	726	213	404	308	254	188	373	160
RTOR Reduction (vph)	0	0	346	0	62	0	0	0	204	0	0	131
Lane Group Flow (vph)	247	1293	140	174	877	0	229	483	50	181	380	29
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Prot	Split	Prot	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6	6	6
Permitted Phases	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	15.4	14.0	14.0	14.0
Actuated Green, G (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	15.9	14.5	14.5	14.5
Effective Green, g (s)	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	562	1022	457	232	1259	320	662	315	292	614	287	0.07
Lane Grp Cap (vph)	0.07	c0.37	0.09	0.10	c0.18	0.14	c0.15	0.11	0.11	0.11	0.11	0.02
v/s Ratio Prot	0.44	1.27	0.31	0.75	0.70	0.72	0.73	0.16	0.62	0.62	0.10	0.02
v/s Ratio Perm	30.1	28.4	22.2	33.5	26.9	29.9	30.0	26.5	30.2	30.2	27.3	0.10
Uniform Delay, d1	0.48	0.48	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	126.1	1.5	12.8	3.2	7.4	4.0	0.2	3.9	1.9	0.2	0.2
Incremental Delay, d2	15.0	139.6	15.8	46.2	30.1	37.4	34.1	26.8	34.1	32.1	27.5	0.2
Delay (s)	B	F	B	D	C	D	C	C	C	C	C	C
Level of Service	B	F	B	D	C	D	C	C	C	C	C	C
Approach Delay (s)	94.7	F	32.7	D	C	D	C	C	C	C	C	C
Approach LOS	F	F	D	C	C	C	C	C	C	C	C	C
Intersection Summary	Intersection Summary											
HCM Average Control Delay	58.6 HCM Level of Service E											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	79.3%											
Intersection Capacity Utilization	15											
Analysis Period (min)	15											
Critical Lane Group	C											

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3538	1583	1770	4912	1610	3330	1583	1610	3387	1583	1583
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3538	1583	1770	4912	1610	3330	1583	1610	3387	1583	1583
Volume (vph)	235	1228	462	165	690	202	364	293	241	179	354	152
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	1293	486	174	726	213	404	308	254	188	373	160
RTOR Reduction (vph)	0	0	346	0	62	0	0	0	204	0	0	131
Lane Group Flow (vph)	247	1293	140	174	877	0	229	483	50	181	380	29
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Prot	Split	Prot	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	6	6	6
Permitted Phases	12.6	22.6	22.6	10.0	20.0	15.4	15.4	15.4	15.4	14.0	14.0	14.0
Actuated Green, G (s)	13.1	23.1	23.1	10.5	20.5	15.9	15.9	15.9	15.9	14.5	14.5	14.5
Effective Green, g (s)	0.16	0.29	0.29	0.13	0.26	0.20	0.20	0.20	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	562	1022	457	232	1259	320	662	315	292	614	287	0.07
Lane Grp Cap (vph)	0.07	c0.37	0.09	0.10	c0.18	0.14	c0.15	0.11	0.11	0.11	0.11	0.02
v/s Ratio Prot	0.44	1.27	0.31	0.75	0.70	0.72	0.73	0.16	0.62	0.62	0.10	0.02
v/s Ratio Perm	30.1	28.4	22.2	33.5	26.9	29.9	30.0	26.5	30.2	30.2	27.3	0.10
Uniform Delay, d1	0.48	0.48	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	126.1	1.5	12.8	3.2	7.4	4.0	0.2	3.9	1.9	0.2	0.2
Incremental Delay, d2	15.0	139.6	15.8	46.2	30.1	37.4	34.1	26.8	34.1	32.1	27.5	0.2
Delay (s)	B	F	B	D	C	D	C	C	C	C	C	C
Level of Service	B	F	B	D	C	D	C	C	C	C	C	C
Approach Delay (s)	94.7	F	32.7	D	C	D	C	C	C	C	C	C
Approach LOS	F	F	D	C	C	C	C	C	C	C	C	C
Intersection Summary	Intersection Summary											
HCM Average Control Delay	58.6 HCM Level of Service E											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	79.3%											
Intersection Capacity Utilization	15											
Analysis Period (min)	15											
Critical Lane Group	C											



23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.85	1.00	0.90	1.00	0.88	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3518	1770	3519	1583	1770	1672	1770	1639	1770	1639
Fit Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3518	1770	3539	1583	1770	1672	1770	1639	1770	1639
Volume (vph)	122	785	32	53	878	405	48	28	59	592	28
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	826	34	56	924	427	51	29	62	623	29
RTOR Reduction (vph)	0	3	0	0	0	151	0	57	0	0	61
Lane Group Flow (vph)	128	857	0	56	924	276	51	34	0	623	84
Turn Type	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	8	5	2	1	6	1	6
Permitted Phases	5.5	21.8	4.4	20.7	20.7	3.3	6.4	39.4	42.5	39.4	42.5
Actuated Green, G (s)	6.0	22.3	4.9	21.2	21.2	3.8	6.9	39.9	43.0	39.9	43.0
Effective Green, g (s)	0.07	0.25	0.05	0.24	0.24	0.04	0.08	0.44	0.48	0.44	0.48
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	118	872	95	834	373	75	128	785	783	785	783
Lane Grp Cap (vph)	0.07	c0.24	0.03	c0.26	0.17	c0.03	0.02	c0.35	c0.05	c0.35	c0.05
v/s Ratio Prot	1.08	0.98	0.58	1.11	0.74	0.68	0.26	0.79	0.11	0.79	0.11
v/s Ratio Perm	4.20	33.7	41.6	34.4	31.8	42.5	35.2	21.5	12.9	21.5	12.9
Uniform Delay, d1	1.00	1.00	0.67	0.59	0.25	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	107.4	26.6	7.5	63.2	10.7	22.4	1.1	5.5	0.1	5.5	0.1
Incremental Delay, d2	149.4	60.2	35.2	83.4	18.8	64.9	40.3	27.1	13.0	27.1	13.0
Delay (s)	F	E	D	F	B	E	D	C	B	C	B
Level of Service	F	E	D	F	B	E	D	C	B	C	B
Approach Delay (s)	F	E	D	F	B	E	D	C	B	C	B
Approach LOS	F	E	D	F	B	E	D	C	B	C	B
Intersection Summary											
HCM Average Control Delay	55.6										
HCM Volume to Capacity ratio	0.93										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	80.9%										
Analysis Period (min)	15										
c - Critical Lane Group											

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1583	1770	3539	1583	1770	3433	1583
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1583	1770	3539	1583	1770	3433	1583
Volume (vph)	0	953	489	66	1079	0	0	0	0	640	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1003	515	69	1136	0	0	0	0	674	0
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	0	0	57
Lane Group Flow (vph)	0	1003	404	69	1136	0	0	0	0	674	215
Turn Type	Prot	Perm	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	3	8	3	8	1	6	1	6	6
Permitted Phases	36.4	36.4	11.6	52.5	36.4	36.4	28.5	28.5	28.5	28.5	28.5
Actuated Green, G (s)	36.9	36.9	12.1	53.0	36.9	36.9	29.0	29.0	29.0	29.0	29.0
Effective Green, g (s)	0.41	0.41	0.13	0.59	0.41	0.41	0.32	0.32	0.32	0.32	0.32
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	1451	649	238	2084	1451	649	1106	510	1106	510	1106
Lane Grp Cap (vph)	c0.28	0.26	0.04	c0.32	0.26	0.26	c0.20	0.14	c0.20	0.14	c0.20
v/s Ratio Prot	0.69	0.62	0.29	0.55	0.69	0.62	0.61	0.42	0.61	0.42	0.61
v/s Ratio Perm	21.9	21.0	35.1	11.2	21.9	21.0	25.7	23.9	25.7	23.9	25.7
Uniform Delay, d1	0.46	0.42	1.24	1.64	0.46	0.42	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.5	2.4	0.6	1.0	1.5	2.4	1.0	2.5	1.0	2.5	1.0
Incremental Delay, d2	11.4	11.3	44.1	19.3	11.4	11.3	26.7	26.5	26.7	26.5	26.5
Delay (s)	B	B	D	B	B	B	C	C	B	C	C
Level of Service	B	B	D	B	B	B	C	C	B	C	C
Approach Delay (s)	11.4	11.4	20.7	20.7	11.4	11.4	26.6	26.6	11.4	26.6	26.6
Approach LOS	B	B	C	C	B	B	A	A	B	C	C
Intersection Summary											
HCM Average Control Delay	18.4										
HCM Volume to Capacity ratio	0.62										
Actuated Cycle Length (s)	90.0										
Intersection Capacity Utilization	67.7%										
Analysis Period (min)	15										
c - Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	Free	Stop	Free
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	0%	0%	0%
Ideal Flow (veh/h)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	0%	0%	0%
Total Lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Flt Permitted	3539	3539	3433	3583	3583	3433	3583	3433	3583	3583
Stand. Flow (iperm)	3539	3539	3433	3583	3583	3433	3583	3433	3583	3583
Volume (vph)	1595	0	0	683	456	273	273	456	273	273
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1680	0	0	719	480	287	287	480	287	287
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1680	0	0	719	460	273	273	460	273	273
Turn Type	Perm									
Protected Phases	4 8 2									
Permitted Phases	2									
Actuated Green, G (s)	60.1 20.9 20.9									
Effective Green, g (s)	60.6 21.4 21.4									
Actuated g/C Ratio	0.67 0.24 0.24									
Clearance Time (s)	4.5 4.5 4.5									
Vehicle Extension (s)	3.0 3.0 3.0									
Lane Grp Cap (vph)	2383 816 376									
v/s Ratio Prot	0.47 0.20 0.14									
v/s Ratio Perm	0.70 0.30 0.59									
Uniform Delay, d1	9.1 6.0 30.4									
Progression Factor	1.00 1.00 1.00									
Incremental Delay, d2	1.4 0.3 1.1									
Delay (s)	4.7 6.4 31.5									
Level of Service	A A C									
Approach Delay (s)	4.7 6.4 34.1									
Approach LOS	A A C									
<b>Intersection Summary</b>										
HCM Average Control Delay	12.2 HCM Level of Service B									
HCM Volume to Capacity ratio	0.71									
Actuated Cycle Length (s)	90.0									
Intersection Capacity Utilization	67.7%									
Analysis Period (min)	15									
ICU Level of Service	C									
ICU Level of Service	A									
Analysis Period (min)	15									
ICU Level of Service	A									

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	Free	Stop	Free
Lane Configurations	1551	1856	356	1484	1833	414	712	0%	0%	0%
Ideal Flow (veh/h)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	0%	0%	0%
Total Lost time (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	3.3	2.2	2.2
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1.0	1.0	0.95	1.0	1.0	1.0	1.0	0.95	0.95	0.95
Flt Permitted	1551	1856	356	1484	1833	414	712	1551	1856	356
Stand. Flow (iperm)	1551	1856	356	1484	1833	414	712	1551	1856	356
Volume (veh/h)	1551	1856	356	1484	1833	414	712	1551	1856	356
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1628	1959	376	1568	1959	437	767	1628	1959	376
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1628	1959	376	1568	1959	437	767	1628	1959	376
Turn Type	None									
Protected Phases	None									
Permitted Phases	5									
Actuated Green, G (s)	15.5 15.5 15.5									
Effective Green, g (s)	15.5 15.5 15.5									
Actuated g/C Ratio	0.61 0.61 0.61									
Clearance Time (s)	4.5 4.5 4.5									
Vehicle Extension (s)	3.0 3.0 3.0									
Lane Grp Cap (vph)	2587 2587 2587									
v/s Ratio Prot	0.47 0.20 0.14									
v/s Ratio Perm	0.70 0.30 0.59									
Uniform Delay, d1	9.1 6.0 30.4									
Progression Factor	1.00 1.00 1.00									
Incremental Delay, d2	1.4 0.3 1.1									
Delay (s)	4.7 6.4 31.5									
Level of Service	A A C									
Approach Delay (s)	4.7 6.4 34.1									
Approach LOS	A A C									
<b>Intersection Summary</b>										
HCM Average Control Delay	8.5 HCM Level of Service B									
HCM Volume to Capacity ratio	0.71									
Actuated Cycle Length (s)	90.0									
Intersection Capacity Utilization	49.6%									
Analysis Period (min)	15									
ICU Level of Service	A									
ICU Level of Service	A									
Analysis Period (min)	15									
ICU Level of Service	A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	161	5	7	265	2	16	0	2	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	168	5	7	279	2	17	0	2	0	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	281	175	175	469	470	172	471	472	280			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	281	175	175	469	470	172	471	472	280			
vCU, unblocked vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
tC, 2 stage (s)												
tF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	100	99	99	97	100	100	100	100	100			
cM capacity (veh/h)	1281	1402	1402	501	489	672	499	488	759			
Directions Lane #												
Volume Total	176	288	19	1	1	1	1	1	1			
Volume Left	1	7	17	0	0	0	0	0	0			
Volume Right	5	2	2	0	0	0	0	0	0			
CSH	1281	1402	526	488								
Volume to Capacity	0.00	0.01	0.04	0.00								
Queue Length 95th (ft)	0	0	3	0								
Control Delay (s)	0.1	0.2	12.1	12.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	12.1	12.4								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	33.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	146	2	4	279	8	1	9	0	4	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	154	2	4	294	8	1	9	0	4	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	302	156	156	464	467	155	468	464	298			
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	302	156	156	464	467	155	468	464	298			
vCU, unblocked vol	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2			
tC, 2 stage (s)												
tF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3			
p0 queue free %	100	100	100	99	100	100	100	100	100			
cM capacity (veh/h)	1259	1424	1424	506	491	891	497	493	742			
Directions Lane #												
Volume Total	157	306	11	5	5	1	4	4	1			
Volume Left	1	4	1	1	1	1	1	1	1			
Volume Right	2	2	0	0	0	0	0	0	0			
CSH	1259	1424	493	532								
Volume to Capacity	0.00	0.00	0.02	0.01								
Queue Length 95th (ft)	0	0	2	1								
Control Delay (s)	0.1	0.1	12.5	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.1	12.5	11.8								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	27.8%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBT	EBR	WBL	WBT	NBL	NBR	Stop
Lane Configurations	Free	Free	Free	Free	Free	Free	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	154	27	7	331	27	25	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	162	28	7	346	28	26	0
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							None
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	191	539	176				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol	191	539	176				
vCu, unblocked vol	4.1	6.4	0.2				
tC, single (s)							
tC, 2 stage (s)	2.2	3.5	3.3				
p0 queue free %	99	94	97				
cM capacity (veh/h)	1383	500	867				
Direction, Lane #	EBT, WBT, NBT	EBR, WBR, NBR					
Volume Total	181	356	55				
Volume Left	0	7	28				
Volume Right	28	0	26				
CSH	1700	1383	628				
Volume to Capacity	0.11	0.01	0.09				
Queue Length 95th (ft)	0	0	7				
Control Delay (s)	0.0	0.2	11.3				
Lane LOS	A	B	B				
Approach Delay (s)	0.0	0.2	11.3				
Approach LOS	B	B	B				
Intersection Summary							
Average Delay	1.2						
Intersection Capacity Utilization	33.0%						
Analysis Period (min)	15						
ICU Level of Service	A						

Movement	EBT	EBT	EBR	WBL	WBT	NBL	NBR	Stop
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	160	23	36	225	0	114	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	168	24	38	237	0	120	0
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type								None
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	237	493	493	181	521	505	237	
vC1, stage 1 conf vol								
vC2, stage 2 conf vol	237	493	493	181	521	505	237	
vCu, unblocked vol	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2
tC, single (s)								
tC, 2 stage (s)	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100	97	75	100	97	100	100	100
cM capacity (veh/h)	1330	1381	476	464	862	442	457	802
Direction, Lane #	EBT, WBT, NBT	EBT, WBT, NBT	EBR, WBR, NBR	EBR, WBR, NBR	EBR, WBR, NBR	EBR, WBR, NBR	EBR, WBR, NBR	EBR, WBR, NBR
Volume Total	193	275	147	0	0	0	0	0
Volume Left	0	38	120	0	0	0	0	0
Volume Right	24	0	27	0	0	0	0	0
CSH	1330	1381	519	1700	0	0	0	0
Volume to Capacity	0.00	0.03	0.28	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	2	29	0	0	0	0	0
Control Delay (s)	0.0	1.3	14.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	B	B	A	A	A	A	A
Approach Delay (s)	0.0	1.3	14.7	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	B	A	A	A	A	A
Intersection Summary								
Average Delay	4.1							
Intersection Capacity Utilization	41.6%							
Analysis Period (min)	15							
ICU Level of Service	A							

Movement	EB	EB	WB	WB	NB	NB
Lane Configurations	Free	Free	Stop	Stop		
Sign Control	0%	0%	0%	0%		
Grade	131	51	0	235	55	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	138	54	0	247	58	0
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pk platoon unblocked					192	412
vC1, conflicting volume						165
vC1, stage 1 conf vol						412
vC2, stage 2 conf vol						6.4
vCu, unblocked vol						6.2
tC, single (s)						
tC, 2 stage (s)						
tf (s)						
p0 queue free %						
p0 capacity (veh/h)						
Direction, Lane #	EB	WB	NB	T	NB	T
Volume Total	192	247	58			
Volume Left	0	0	58			
Volume Right	54	0	0			
CSH	1700	1382	596			
Volume to Capacity	0.11	0.00	0.10			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.0	0.0	11.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.7			
Approach LOS			B			

Intersection Summary	
Average Delay	1.4
Intersection Capacity Utilization	22.4%
Analysis Period (min)	15
ICU Level of Service	A

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Lane Group	EBT	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	161	1341	268	77	819	768	585	108	368	477	316
v/c Ratio	0.30	1.32	0.55	0.14	1.37	1.00	2.65	0.43	0.81	0.73	1.05
Control Delay	45.1	193.6	36.6	31.6	211.6	55.8	778.1	75.6	20.8	68.1	113.0
Queue Delay	0.0	278.1	0.0	0.0	95.1	44.0	0.0	0.0	25.5	421.4	0.0
Total Delay	45.1	471.7	36.6	31.6	306.7	99.8	778.1	75.6	46.3	480.4	113.0
Queue Length 50th (ft)	130	961	180	50	1215	-427	-1028	58	0	243	-279
Queue Length 95th (ft)	199	#1137	289	m74m	#1436	m#818	#1271	89	110	#350	#485
Internal Link Dist (ft)	550			220				110			270
Turn Bay Length (ft)	150		150		150			100		275	
Base Capacity (vph)	531	1017	490	567	597	766	221	376	487	656	300
Starvation Cap Reductn	0	0	0	0	80	83	0	0	0	0	0
Spillback Cap Reductn	0	325	0	0	0	0	0	0	133	409	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	1.94	0.55	0.14	1.58	1.12	2.65	0.29	1.01	1.93	1.05

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative D  
PM Peak

Lane Group	EBT	EBT	EBR	WBL	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	1472	718	81	995	374	969		
v/c Ratio	0.88	0.78	0.32	0.49	0.72	1.18		
Control Delay	28.3	18.3	44.1	15.7	32.9	37.2		
Queue Delay	126.9	32.0	0.0	0.2	0.0	40.7		
Total Delay	155.2	50.2	44.1	15.9	32.9	77.9		
Queue Length 50th (ft)	383	247	19	150	179	226		
Queue Length 95th (ft)	m283	m190	m29	m221	#292	#356		
Internal Link Dist (ft)	220		466		250			
Turn Bay Length (ft)			300		257	2035	523	1063
Base Capacity (vph)	1681	918	235	0	0	0	0	0
Starvation Cap Reductn	533	235	0	0	339	0	171	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	1.05	0.32	0.59	0.72	1.09		

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Recode with 1 through lane as a right lane.

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	806	1040	525	493	303	319	601	9
v/c Ratio	0.70	1.09	0.94	0.32	0.87	0.91	0.57	0.02
Control Delay	43.9	76.0	65.0	18.8	53.2	58.9	7.9	25.7
Queue Delay	0.0	77.9	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	43.9	153.8	65.0	18.8	53.2	58.9	8.3	25.7
Queue Length 50th (ft)	171	943	148	126	115	122	9	4
Queue Length 95th (ft)	m177	#1289	#239	173	m#213	m#230	m38	16
Internal Link Dist (ft)	466		345		380			270
Turn Bay Length (ft)	150			150				200
Base Capacity (vph)	1144	951	558	1544	347	349	1052	363
Starvation Cap Reductn	0	134	0	0	0	0	0	0
Spillback Cap Reductn	0	24	0	0	0	0	122	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	1.27	0.94	0.32	0.87	0.91	0.55	0.02

**Intersection Summary**

- Volume exceeds capacity, queue is theoretically infinite.  
 # Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 # Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	144	1276	975	107	108			
v/c Ratio	0.37	0.57	0.59	0.23	0.22			
Control Delay	28.4	19.5	17.3	24.8	6.3			
Queue Delay	0.0	1.7	0.0	0.0	0.0			
Total Delay	28.4	21.2	17.3	24.8	6.3			
Queue Length 50th (ft)	41	292	176	42	0			
Queue Length 95th (ft)	m56	324	249	83	36			
Internal Link Dist (ft)		345	164	232				
Turn Bay Length (ft)	80			200				
Base Capacity (vph)	901	2256	1664	465	495			
Starvation Cap Reductn	0	762	0	0	0			
Spillback Cap Reductn	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0			
Reduced v/c Ratio	0.16	0.85	0.59	0.23	0.22			

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	383	385	49	16	581	437	7	648
v/c Ratio	0.90	0.90	0.11	0.11	1.08	0.21	0.05	0.69
Control Delay	55.1	55.2	8.0	29.3	96.8	10.3	39.6	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.9
Total Delay	55.1	55.2	8.0	29.3	96.8	10.3	39.6	33.0
Queue Length 50th (ft)	192	193	0	5	333	42	3	168
Queue Length 95th (ft)	#353	#356	25	23	#524	124	m3	#255 m#423
Internal Link Dist (ft)	284	284	118	118	214	214	100	380
Turn Bay Length (ft)	250	250	0	0	200	0	0	175
Base Capacity (vph)	441	443	452	179	531	2076	177	845
Starvation Cap Reductn	0	0	0	0	0	0	0	63
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.87	0.11	0.09	1.09	0.21	0.04	0.69

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	266	493	661	266	261	565
v/c Ratio	0.68	0.76	0.83	0.32	0.93	0.46
Control Delay	32.2	14.4	27.8	3.1	69.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	14.4	27.8	3.1	69.1	7.5
Queue Length 50th (ft)	94	34	228	0	104	101
Queue Length 95th (ft)	164	#139	#416	38	#235	164
Internal Link Dist (ft)	480	480	3920	450	700	2550
Turn Bay Length (ft)	175	175	0	0	0	0
Base Capacity (vph)	436	681	801	832	282	1216
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.72	0.83	0.32	0.93	0.46

Intersection Summary  
 - Volume exceeds capacity, queue is theoretically infinite.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.



17: Rohmert Park Expy & Labath Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	87	661	56	122	782	97	73	99	89	296	144	
v/c Ratio	0.65	0.88	0.15	0.47	1.04	0.23	0.28	0.23	0.21	0.56	0.17	
Control Delay	60.6	45.5	8.8	38.8	57.3	2.3	38.1	12.0	7.8	28.4	5.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.6	45.5	8.8	38.8	57.3	2.3	38.1	12.0	7.8	28.4	5.5	
Queue Length 50th (ft)	43	169	0	22	221	1	18	11	0	123	12	
Queue Length 95th (ft)	#111	#264	29	m34	m#315	m2	38	52	37	202	43	
Internal Link Dist (ft)	1540			220			1010			520		
Turn Bay Length (ft)	160	200	200	250	170	130	130	100	100	100	100	
Base Capacity (vph)	133	752	380	257	752	413	257	430	425	531	864	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.88	0.15	0.47	1.04	0.23	0.28	0.23	0.21	0.56	0.17	

Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection Summary

Volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

18: Rohmert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	227	782	172	367	899	335	182	512	368	357	317	248
v/c Ratio	0.81	0.47	0.27	0.77	0.79	0.46	0.87	0.74	0.67	0.81	0.84	0.48
Control Delay	44.5	12.8	2.4	36.0	24.1	3.5	73.5	31.9	11.9	51.7	51.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	12.8	2.4	36.0	24.1	3.5	73.5	31.9	11.9	51.7	51.3	7.3
Queue Length 50th (ft)	69	58	5	110	240	19	92	108	16	92	151	0
Queue Length 95th (ft)	m#124	m67	m8	m#156	m287	m30	#210	163	106	#172	#278	57
Internal Link Dist (ft)	320			520			584			480		
Turn Bay Length (ft)	200	250	250	350	155	250	250	175	250	175	175	
Base Capacity (vph)	288	1669	636	515	1135	734	210	752	567	439	396	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.79	0.47	0.27	0.77	0.79	0.46	0.87	0.68	0.65	0.81	0.80	0.47

Volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection Summary

Volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBL	WBT	WBR	NBT	NBL	SBL	SBT	SBR
Lane Group Flow (vph)	1676	72	1172	268	24	322	322	419	419
v/c Ratio	0.69	0.49	0.66	0.17	0.05	0.78	0.82	0.84	0.84
Control Delay	9.1	53.2	9.3	0.2	9.5	38.5	42.5	36.4	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	53.2	9.3	0.2	9.5	38.5	42.5	36.4	36.4
Queue Length 50th (ft)	145	38	133	0	2	143	146	171	171
Queue Length 95th (ft)	183	m62	m155	m0	17	238	#267	#284	#284
Internal Link Dist (ft)	520		980		428		378		400
Turn Bay Length (ft)	225		147	2077	1583	576	476	455	611
Base Capacity (vph)	2415		0	0	0	0	0	0	0
Starvation Cap Reductn	0		0	0	0	0	0	0	0
Spillback Cap Reductn	0		0	0	0	0	0	0	0
Storage Cap Reductn	0		0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.49	0.66	0.17	0.04	0.68	0.71	0.73	0.73

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	22	1645	314	894	403	613	181	182	18
v/c Ratio	0.17	0.61	0.20	0.47	0.25	0.92	0.25	0.25	0.02
Control Delay	40.7	23.4	0.2	15.7	0.3	40.9	12.3	12.3	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	23.4	0.2	15.7	0.3	40.9	12.3	12.3	8.3
Queue Length 50th (ft)	12	240	0	76	0	244	47	47	3
Queue Length 95th (ft)	m16	285	m0	120	m0	#456	85	86	13
Internal Link Dist (ft)		960		360		386		420	
Turn Bay Length (ft)	190					225		791	801
Base Capacity (vph)	133	2714	1583	1899	1583	730	791	791	801
Starvation Cap Reductn	0		0	0	0	0	0	0	0
Spillback Cap Reductn	0		0	0	0	0	0	0	0
Storage Cap Reductn	0		0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.61	0.20	0.47	0.25	0.84	0.23	0.23	0.02

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2020 Alternative D  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	1293	486	174	939	229	483	254	181	380	160
v/c Ratio	0.44	1.27	0.61	0.75	0.71	0.71	0.73	0.49	0.62	0.82	0.38
Control Delay	16.9	145.9	4.5	60.0	23.2	43.2	36.9	7.4	39.4	34.4	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	145.9	4.5	60.0	23.2	43.2	36.9	7.4	39.4	34.4	7.7
Queue Length 50th (ft)	30	431	0	88	146	116	123	0	91	86	0
Queue Length 95th (ft)	58	6534	20	222	2216	2214	176	58	158	138	47
Internal Link Dist (ft)	360			1350			601			660	
Turn Bay Length (ft)	250			200			250			150	
Base Capacity (vph)	558	1020	802	231	1323	342	707	336	342	720	462
Starvation Cap Reductn	0	0	121	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.27	0.71	0.75	0.71	0.67	0.68	0.47	0.53	0.53	0.35

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative D  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	157	854	147	686	204	340	508	119	194	377	247
v/c Ratio	1.03	0.97	0.97	0.81	0.38	0.96	0.79	0.19	1.10	0.83	0.44
Control Delay	118.8	49.3	102.1	34.1	6.0	70.2	32.2	4.5	130.4	43.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	118.8	49.3	102.1	34.1	6.0	70.2	32.2	4.5	130.4	43.6	6.5
Queue Length 50th (ft)	-72	176	65	148	0	146	194	0	-97	154	3
Queue Length 95th (ft)	#183	#295	#170	#230	47	#298	#346	31	#214	#292	54
Internal Link Dist (ft)	689			6630			734			980	
Turn Bay Length (ft)	350			500			150			500	
Base Capacity (vph)	152	883	152	859	539	354	639	621	177	452	565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.97	0.97	0.81	0.38	0.96	0.79	0.19	1.10	0.83	0.44

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

	EBT	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group	EBT	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	860	56	924	427	51	91
v/c Ratio	1.08	0.88	0.47	1.02	0.77	0.43	0.44
Control Delay	150.1	43.8	38.7	55.9	14.1	52.2	22.9
Queue Delay	0.0	0.8	0.0	0.0	0.5	0.0	0.0
Total Delay	150.1	44.6	38.7	55.9	14.6	52.2	22.9
Queue Length 50th (ft)	82	252	29	303	7	28	16
Queue Length 95th (ft)	194	437	65	403	183	65	59
Internal Link Dist (ft)	6630		350		200		236
Turn Bay Length (ft)	225	150	80	50	225		
Base Capacity (vph)	118	980	118	904	552	118	366
Starvation Cap Reductn	0	0	0	0	15	0	0
Spillback Cap Reductn	0	22	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.90	0.47	1.02	0.80	0.43	0.25

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

	EBT	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group	EBT	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1003	515	69	1136	674	272	
v/c Ratio	0.67	0.67	0.27	0.55	0.61	0.48	
Control Delay	11.8	8.6	43.4	19.6	28.6	19.9	
Queue Delay	0.4	0.7	0.0	0.4	0.0	0.0	
Total Delay	12.2	9.3	43.4	20.0	28.6	19.9	
Queue Length 50th (ft)	147	90	38	281	164	83	
Queue Length 95th (ft)	173	122	74	345	222	157	
Internal Link Dist (ft)	350		50	100	425		
Turn Bay Length (ft)	1486	774	295	2084	1106	567	
Base Capacity (vph)	140	68	0	399	0	0	
Starvation Cap Reductn	47	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.75	0.73	0.23	0.67	0.61	0.48	

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative D  
 PM Peak

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1680	719	480	287
v/c Ratio	0.70	0.30	0.59	0.74
Control Delay	5.3	7.3	32.6	40.3
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	5.4	7.3	32.6	40.3
Queue Length 50th (ft)	189	75	126	143
Queue Length 95th (ft)	250	142	150	201
Internal Link Dist (ft)	370	312	431	201
Turn Bay Length (ft)	2384	2384	1221	374
Base Capacity (vph)	60	0	0	0
Starvation Cap Reductn	0	81	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.31	0.39	0.50

Intersection Summary

**NEAR-TERM 2008 + ALTERNATIVE E  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative E  
PM Peak

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SBL	SBR	SBL	SBR
Sign Control	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	8	14	222	13	97	12	785	62	91	514	3				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95				
Hourly flow rate (vph)	0	8	15	234	14	102	13	837	65	96	541	3				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)																
Upstream signal (ft)																
px, platoon unblocked																
vc, conflicting volume	1654	1662	543	1646	1631	869	544					902				
vc1, stage 1 conf vol																
vc2, stage 2 conf vol	1654	1662	543	1646	1631	869	544					902				
vcU, unblocked vol	7	1	6.5	6.2	7.1	6.5	6.2	4.1				4.1				
tC, single (s)																
tC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				2.2				
p0 queue free %	100	90	97	0	84	71	99	87				87				
cM capacity (veh/h)	44	84	540	64	88	351	1025	754				754				
Direction, Lane #	EB1	WB1	NB1	NB2	SB1	SB2										
Volume Total	23	349	13	902	96	544										
Volume Left	0	234	13	0	96	0										
Volume Right	15	102	0	85	0	3										
cSH	181	85	1025	1700	754	1700										
Volume to Capacity	0.13	4.11	0.01	0.53	0.13	0.32										
Queue Length 95th (ft)	11	Err	1	0	11	0										
Control Delay (s)	27.8	Err	8.6	0.0	10.5	0.0										
Lane LOS	D	F	A	B	B											
Approach Delay (s)	27.8	Err	0.1		1.6											
Approach LOS	D	F														
Intersection Summary																
Average Delay	1813.9															
Intersection Capacity Utilization	80.3%															
ICU Level of Service	D															
Analysis Period (min)	15															

2: Wilfred Ave & Primrose Ave  
Graton Rancheria Casino & Hotel

2008 Alternative E  
PM Peak

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SBL	SBR	SBL	SBR
Sign Control	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	131	26	89	201	10	126	19	312	10	10	10				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95				
Hourly flow rate (vph)	11	138	27	94	212	11	133	20	328	11	11	11				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)																
Upstream signal (ft)																
px, platoon unblocked																
vc, conflicting volume	222	222	165	165	593	582	152	915	591	217						
vc1, stage 1 conf vol																
vc2, stage 2 conf vol	222	222	165	165	593	582	152	915	591	217						
vcU, unblocked vol	4.1	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2	7.1	6.5	6.2	7.1	6.5	6.2
tC, single (s)																
tC, 2 stage (s)	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3						
p0 queue free %	99	99	93	93	65	95	63	93	87	98						
cM capacity (veh/h)	1347	1347	1413	1413	381	393	895	146	389	823						
Direction, Lane #	EB1	WB1	NB1	NB2	SB1	SB2										
Volume Total	176	316	481	32												
Volume Left	11	94	133	11												
Volume Right	27	11	328	11												
cSH	1347	1413	628	281												
Volume to Capacity	0.01	0.07	0.77	0.11												
Queue Length 95th (ft)	1	5	177	9												
Control Delay (s)	0.5	2.7	27.0	19.4												
Lane LOS	A	A	D	C												
Approach Delay (s)	0.5	2.7	27.0	19.4												
Approach LOS	D	D	D	C												
Intersection Summary																
Average Delay	14.5															
Intersection Capacity Utilization	68.7%															
ICU Level of Service	C															
Analysis Period (min)	15															

3: Wilfred Ave & Whistler Ave  
Graton Rancheria Casino & Hotel

2008 Alternative E  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	433	10	10	279	20	10	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	456	11	11	294	21	11	11	11	11	11	11
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked	315	466		823	818	461	823	813	304			
vC1, stage 1 conf vol	315	466		823	818	461	823	813	304			
vC2, stage 2 conf vol	4.1	4.1		7.1	6.5	6.2	7.1	6.5	6.2			
vC, single (s)	2.2	2.2		3.5	4.0	3.3	3.5	4.0	3.3			
tC, 2 stage (s)	99	99		96	97	98	96	97	99			
p0 queue free %	1245	1095		277	305	600	276	307	736			
cM capacity (veh/h)												
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	477	325	32	32	32	32	32	32	32	32	32	32
Volume Left	11	11	11	11	11	11	11	11	11	11	11	11
Volume Right	11	21	11	11	11	11	11	11	11	11	11	11
C/S/H	1245	1095	351	364								
Volume to Capacity	0.01	0.01	0.09	0.09								
Queue Length 95th (ft)	1	1	7	7								
Control Delay (s)	0.3	0.4	16.3	15.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.4	16.3	15.8								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	37.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

4: Wilfred Ave & Langner Ave  
Graton Rancheria Casino & Hotel

2008 Alternative E  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	432	10	10	279	10	10	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	455	11	11	294	11	11	11	11	11	11	11
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked	304	455		817	806	460	817	806	299			
vC1, stage 1 conf vol	304	455		817	806	460	817	806	299			
vC2, stage 2 conf vol	4.1	4.1		7.1	6.5	6.2	7.1	6.5	6.2			
vC, single (s)	2.2	2.2		3.5	4.0	3.3	3.5	4.0	3.3			
tC, 2 stage (s)	99	99		96	97	98	96	97	99			
p0 queue free %	1257	1096		280	310	601	279	310	741			
cM capacity (veh/h)												
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	476	315	32	32	32	32	32	32	32	32	32	32
Volume Left	11	11	11	11	11	11	11	11	11	11	11	11
Volume Right	11	21	11	11	11	11	11	11	11	11	11	11
C/S/H	1257	1096	354	367								
Volume to Capacity	0.01	0.01	0.09	0.09								
Queue Length 95th (ft)	1	1	7	7								
Control Delay (s)	0.3	0.4	16.2	15.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.4	16.2	15.7								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	37.4%											
Analysis Period (min)	15											
ICU Level of Service	A											



5: Wilfred Ave & Labath Ave  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Movement	EBT	EBT	EBR	WBT	WBT	WBR	NBT	NBT	NBR	SBL	SBL	SBR	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade													
Volume (veh/h)	80	315	77	116	238	99	35	6	266	112	21	14	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	63	332	81	122	251	104	37	6	280	118	22	15	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage (veh)													
Upstream signal (ft)													
pk platoon unblocked													
vC, conflicting volume	355						1071	1097	372	1328	1086	303	
vC1, stage 1 cont vol													
vC2, stage 2 cont vol	355						1071	1087	372	1328	1086	303	
vCu, unblocked vol	41						71	5.5	6.2	7.1	6.5	6.2	
IC, single (s)													
IC, 2 stage (s)													
IF (s)	2.2						3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	95						76	96	58	0	88	98	
cm capacity (veh/h)	1204						156	180	674	66	183	737	
Direction, Lane #	EBT	WBT	NBT	SBL	SBR								
Volume Total	476	477	323	155									
Volume Left	63	122	37	118									
Volume Right	81	104	280	15									
CSH	1204	1146	471	81									
Volume to Capacity	0.05	0.11	0.68	1.92									
Queue Length 95th (ft)	4	9	128	339									
Control Delay (s)	1.6	3.0	27.8	541.2									
Lane LOS	A	A	D	F									
Approach Delay (s)	1.6	3.0	27.8	541.2									
Approach LOS	D	D	F	F									
Intersection Summary													
Average Delay	66.3												
Intersection Capacity Utilization	80.5%												
Analysis Period (min)	15												
ICU Level of Service	D												

6: Wilfred Avenue & Dowdell Ave  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Movement	EBT	EBT	EBR	WBT	WBT	WBR	NBT	NBT	NBR	SBL	SBL	SBR	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade													
Volume (veh/h)	52	483	148	187	325	89	80	45	222	88	13	47	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	55	519	156	197	343	94	84	47	234	93	14	49	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage (veh)													
Upstream signal (ft)													
pk platoon unblocked													
vC, conflicting volume	0.86						0.86	0.86	0.86	0.86	0.86	0.86	
vC1, stage 1 cont vol	437						675	675	1546	1537	597	1747	1568
vC2, stage 2 cont vol													
vCu, unblocked vol	346						675	675	1634	1623	597	1868	1660
IC, single (s)	4.1						4.1	4.1	7.1	9.5	6.2	7.1	6.5
IC, 2 stage (s)													
IF (s)	2.2						2.2	2.2	3.5	4.0	3.3	3.5	4.0
p0 queue free %	95						79	79	0	28	54	0	78
cm capacity (veh/h)	1044						916	916	43	65	503	9	62
Direction, Lane #	EBT	WBT	NBT	SBL	SBR								
Volume Total	729	634	365	156									
Volume Left	55	197	84	93									
Volume Right	156	94	234	49									
CSH	1044	916	117	14									
Volume to Capacity	0.05	0.21	3.13	10.86									
Queue Length 95th (ft)	4	20	Err	Err									
Control Delay (s)	1.3	5.1	Err	Err									
Lane LOS	A	A	F	F									
Approach Delay (s)	1.3	5.1	Err	Err									
Approach LOS	F	F	F	F									
Intersection Summary													
Average Delay	2767.3												
Intersection Capacity Utilization	101.4%												
Analysis Period (min)	15												
ICU Level of Service	G												

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.97	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.93	1.00	0.95	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1809	1681	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583
Flt Permitted	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1809	1681	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583
Volume (vph)	99	537	166	181	296	540	204	155	265	451	131	102
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	565	175	191	312	568	215	163	279	475	138	107
RTOR Reduction (vph)	0	5	0	0	376	0	0	256	0	17	0	0
Lane Group Flow (vph)	0	838	0	191	312	192	215	163	23	475	228	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	12.7	28.3	21.5	28.3	21.5
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	13.2	28.8	22.0	28.8	22.0
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.09	0.08	0.08	0.18	0.14	0.18	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	540	567	597	534	221	292	131	618	239	131	618	239
v/s Ratio Prot	c0.47	0.11	c0.16	0.12	c0.12	0.05	0.01	0.14	c0.13	0.14	c0.13	0.13
v/s Ratio Perm	1.55	0.34	0.52	0.36	0.97	0.59	0.18	0.77	0.95	0.77	0.95	0.95
Uniform Delay, d1	56.0	39.6	42.6	40.0	69.7	70.5	68.3	62.4	68.5	62.4	68.5	68.5
Progression Factor	1.00	0.91	0.91	2.05	1.00	1.00	1.00	0.96	0.96	0.96	0.96	0.96
Incremental Delay, d2	257.7	1.4	2.9	1.7	52.5	2.3	0.6	5.7	44.8	5.7	44.8	44.8
Delay (s)	313.7	37.5	41.8	33.5	122.2	72.9	69.0	65.7	110.6	65.7	110.6	110.6
Level of Service	F	D	D	D	F	F	E	E	F	E	F	F
Approach Delay (s)	313.7	F	F	63.2	F	F	87.4	F	80.9	F	F	F
Approach LOS	F	F	F	E	F	F	F	F	F	F	F	F
Intersection Summary	Intersection Summary											
HCM Average Control Delay	136.1											
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	97.2%											
Analysis Period (min)	15											
c Critical Lane Group	c											

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.97	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.93	1.00	0.95	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1809	1681	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583
Flt Permitted	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1809	1681	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583
Volume (vph)	99	537	166	181	296	540	204	155	265	451	131	102
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	565	175	191	312	568	215	163	279	475	138	107
RTOR Reduction (vph)	0	5	0	0	376	0	0	256	0	17	0	0
Lane Group Flow (vph)	0	838	0	191	312	192	215	163	23	475	228	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	6	6
Actuated Green, G (s)	47.5	53.5	53.5	53.5	19.5	12.7	12.7	12.7	28.3	21.5	28.3	21.5
Effective Green, g (s)	48.0	54.0	54.0	54.0	20.0	13.2	13.2	13.2	28.8	22.0	28.8	22.0
Actuated g/C Ratio	0.30	0.34	0.34	0.34	0.12	0.09	0.08	0.08	0.18	0.14	0.18	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	540	567	597	534	221	292	131	618	239	131	618	239
v/s Ratio Prot	c0.47	0.11	c0.16	0.12	c0.12	0.05	0.01	0.14	c0.13	0.14	c0.13	0.13
v/s Ratio Perm	1.55	0.34	0.52	0.36	0.97	0.59	0.18	0.77	0.95	0.77	0.95	0.95
Uniform Delay, d1	56.0	39.6	42.6	40.0	69.7	70.5	68.3	62.4	68.5	62.4	68.5	68.5
Progression Factor	1.00	0.91	0.91	2.05	1.00	1.00	1.00	0.96	0.96	0.96	0.96	0.96
Incremental Delay, d2	257.7	1.4	2.9	1.7	52.5	2.3	0.6	5.7	44.8	5.7	44.8	44.8
Delay (s)	313.7	37.5	41.8	33.5	122.2	72.9	69.0	65.7	110.6	65.7	110.6	110.6
Level of Service	F	D	D	D	F	F	E	E	F	E	F	F
Approach Delay (s)	313.7	F	F	63.2	F	F	87.4	F	80.9	F	F	F
Approach LOS	F	F	F	E	F	F	F	F	F	F	F	F
Intersection Summary	Intersection Summary											
HCM Average Control Delay	136.1											
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	97.2%											
Analysis Period (min)	15											
c Critical Lane Group	c											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	0.95	0.95	0.95	0.88	1.00	1.00	0.97	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.96	1.00	1.00	0.85	1.00	0.95	1.00	0.97
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	3539	1583	3433	3539	3409	3409	1681	1734	2787	1770	1814	1814
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3539	1583	3433	3539	3409	3409	1681	1734	2787	1770	1814	1814
Volume (vph)	0	872	381	89	523	0	0	0	328	324	489	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	918	401	94	551	0	0	0	345	341	515	0
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	213	0
Lane Group Flow (vph)	0	918	258	94	551	0	0	0	345	341	515	0
Turn Type		Perm	Perm	Prot	Prot				Perm	Split		
Protected Phases		4		3	8				2	2		6
Permitted Phases		4		4					2	2		6
Actuated Green, G (s)	36.6	36.6	4.4	4.4	45.5				16.0	16.0		16.0
Effective Green, g (s)	37.1	37.1	4.9	4.9	46.0				16.5	16.5		16.5
Actuated g/C Ratio	0.46	0.46	0.06	0.06	0.38				0.21	0.21		0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5				4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0				3.0	3.0		3.0
Lane Grp Cap (vph)	1641	734	210	2035					347	358		374
v/s Ratio Prot	c0.26	0.16		c0.03	0.16				0.11	c0.11		c0.02
v/s Ratio Perm	0.56	0.35	0.45	0.27					0.53	0.54		0.12
Uniform Delay, d1	15.5	13.7	36.2	8.6					28.3	28.4		25.8
Progression Factor	1.20	1.90	1.01	0.90					0.87	0.87		0.86
Incremental Delay, d2	0.1	0.1	1.4	0.3					5.3	5.4		0.7
Delay (s)	18.8	26.2	38.0	8.0					30.1	30.1		22.3
Level of Service	B	C	D	A					C	D		C
Approach Delay (s)	21.1		12.4						37.2			22.6
Approach LOS	C		B						D			C
<b>Intersection Summary</b>												
HCM Average Control Delay	21.6											
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	60.2%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	0.95	0.95	0.95	0.95	0.88	1.00	1.00	0.97
Lane Util. Factor	1.00	1.00	0.85	1.00	0.96	1.00	1.00	1.00	0.85	1.00	0.95	1.00
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	3539	1583	3433	3539	3409	3409	1681	1734	2787	1770	1814	1814
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3539	1583	3433	3539	3409	3409	1681	1734	2787	1770	1814	1814
Volume (vph)	0	872	381	89	523	0	0	0	328	324	489	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	918	401	94	551	0	0	0	345	341	515	0
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	0	0	213	0
Lane Group Flow (vph)	0	918	258	94	551	0	0	0	345	341	515	0
Turn Type		Perm	Perm	Prot	Prot				Perm	Split		
Protected Phases		4		3	8				2	2		6
Permitted Phases		4		4					2	2		6
Actuated Green, G (s)	36.6	36.6	4.4	4.4	45.5				16.0	16.0		16.0
Effective Green, g (s)	37.1	37.1	4.9	4.9	46.0				16.5	16.5		16.5
Actuated g/C Ratio	0.46	0.46	0.06	0.06	0.38				0.21	0.21		0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5				4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0				3.0	3.0		3.0
Lane Grp Cap (vph)	1641	734	210	2035					347	358		374
v/s Ratio Prot	c0.26	0.16		c0.03	0.16				0.11	c0.11		c0.02
v/s Ratio Perm	0.56	0.35	0.45	0.27					0.53	0.54		0.12
Uniform Delay, d1	15.5	13.7	36.2	8.6					28.3	28.4		25.8
Progression Factor	1.20	1.90	1.01	0.90					0.87	0.87		0.86
Incremental Delay, d2	0.1	0.1	1.4	0.3					5.3	5.4		0.7
Delay (s)	18.8	26.2	38.0	8.0					30.1	30.1		22.3
Level of Service	B	C	D	A					C	D		C
Approach Delay (s)	21.1		12.4						37.2			22.6
Approach LOS	C		B						D			C
<b>Intersection Summary</b>												
HCM Average Control Delay	21.6											
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	60.2%											
Analysis Period (min)	15											
Critical Lane Group	C											

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vph/ft)	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	0.97	0.95	0.95	1.00	0.85	1.00
Fit Protected	0.95	0.95	1.00	0.95	1.00	0.85
Satd. Flow (prot)	3433	3539	3513	1770	1583	1770
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3539	3513	1770	1583	1770
Volume (vph)	195	1016	653	33	92	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	205	1069	687	35	97	248
RTOR Reduction (vph)	0	0	4	0	0	183
Lane Group Flow (vph)	205	1069	718	0	97	63
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	10.0	50.5	36.0	20.5	20.5	20.5
Effective Green, g (s)	10.5	51.0	36.3	21.0	21.0	21.0
Actuated g/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	451	2256	1603	465	416	416
v/s Ratio Prot	0.06	0.30	0.20	0.20	0.05	0.04
v/s Ratio Perm						
v/c Ratio	0.45	0.47	0.45	0.21	0.16	0.16
Uniform Delay, d1	32.1	7.5	14.9	23.0	22.7	22.7
Progression Factor	0.92	2.10	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.6	0.9	1.0	0.8	0.8
Delay (s)	30.2	16.4	15.8	24.0	23.5	23.5
Level of Service	C	B	B	C	C	C
Approach Delay (s)		18.6	15.8		23.6	
Approach LOS		B	B		C	
Intersection Summary						
HCM Average Control Delay	18.5		18.5		HCM Level of Service	
HCM Volume to Capacity ratio	0.40		0.40		B	
Actuated Cycle Length (s)	80.0		80.0		Sum of lost time (s)	
Intersection Capacity Utilization	40.4%		40.4%		A	
Analysis Period (min)	15		15		ICU Level of Service	
					C	
Critical Lane Group						

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBR
Lane Configurations									
Ideal Flow (vph/ft)	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
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.85
Fit Protected	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1681	1686	1583	1741	1770	3537	1770	3539	1583
Fit Permitted	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1681	1686	1583	1741	1770	3537	1770	3539	1583
Volume (vph)	418	3	40	8	3	514	489	2	7
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	440	3	42	8	3	541	515	2	7
RTOR Reduction (vph)	0	0	34	0	5	0	0	0	0
Lane Group Flow (vph)	220	223	8	0	11	0	541	517	0
Turn Type	Split	Split	Perm	Split	Split	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	8	8	5	2	1	6
Permitted Phases									
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4	27.1	43.6	1.5	18.0
Effective Green, g (s)	15.9	15.9	15.9	15.9	15.9	27.6	44.1	2.0	18.5
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.35	0.55	0.02	0.23
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	335	315	44	44	611	1950	44	818
v/s Ratio Prot	0.13	0.13	0.01	0.01	0.01	0.31	0.15	0.00	0.13
v/s Ratio Perm									
v/c Ratio	0.66	0.67	0.03	0.03	0.03	0.89	0.26	0.16	0.56
Uniform Delay, d1	29.5	29.6	25.8	38.3	38.3	24.7	9.4	38.2	27.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.29	1.12
Incremental Delay, d2	4.6	4.9	0.0	3.0	3.0	14.4	0.3	1.1	1.8
Delay (s)	34.2	34.5	25.9	41.3	41.3	39.1	9.8	50.5	32.3
Level of Service	C	C	C	D	D	D	A	D	C
Approach Delay (s)		33.6				41.3	24.8		87.6
Approach LOS		C				D	C		F
Intersection Summary									
HCM Average Control Delay	52.4		52.4		HCM Level of Service		D		
HCM Volume to Capacity ratio	0.72		0.72		Sum of lost time (s)		16.0		
Actuated Cycle Length (s)	80.0		80.0		Intersection Capacity Utilization		79.0%		
Intersection Capacity Utilization	79.0%		79.0%		ICU Level of Service		D		
Analysis Period (min)	15		15		Critical Lane Group		C		

13: Project Dwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative E  
PM Peak

2008 Alternative E  
PM Peak

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Sign Control	0%	0%	Free	Free	0%	0%
Volume (veh/h)	0	37	832	63	0	750
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	39	876	66	0	789
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
p0 queue free %						
CM capacity (veh/h)						
Direction, Lane #	WBL	WBR	NBT	NBR	SBL	SBT
Volume Total	39	942	789			
Volume Left	0	0	0			
Volume Right	39	66	0			
cSH	333	1700	1700			
Volume to Capacity	0.12	0.55	0.46			
Queue Length 95th (ft)	10	0	0			
Control Delay (s)	17.2	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	17.2	0.0	0.0			
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay	0.4					
Intersection Capacity Utilization	57.6%					
Analysis Period (min)	15					
ICU Level of Service	B					

Movement	EBL	EBR	NBL	NBR	SBT	SBR
Sign Control	0%	0%	Free	Free	0%	0%
Volume (veh/h)	172	89	33	464	489	41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	181	94	35	468	515	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
p0 queue free %						
CM capacity (veh/h)						
Direction, Lane #	EBL	EBR	NBL	NBR	SBT	SBR
Volume Total	181	94	35	244	244	215
Volume Left	181	0	35	0	0	0
Volume Right	0	94	0	0	0	43
cSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.14	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A			
Approach Delay (s)	27.5	0.6	0.6			
Approach LOS	D					
<b>Intersection Summary</b>						
Average Delay	5.8					
Intersection Capacity Utilization	37.7%					
Analysis Period (min)	15					
ICU Level of Service	A					

Movement	WB1	WBR	NB1	NBR	SB1	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Fr	0.95	1.00	1.00	0.95	1.00	1.00
Flt Protected	1770	1583	1863	1583	1770	1863
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00
Flt Permitted	1770	1583	1863	1583	1770	1863
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	257	333	582	251	282	467
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	351	592	264	297	492
RTOR Reduction (vph)	0	274	0	150	0	0
Lane-Group Flow (vph)	271	77	592	114	297	492
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	2	2	1	6	
Permitted Phases						
Actuated Green, G (s)	13.4	13.4	26.6	26.6	9.5	40.6
Effective Green, g (s)	13.9	13.9	27.1	27.1	10.0	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	391	349	801	681	281	1215
v/s Ratio Prot	c0.15	c0.32	c0.17	c0.17	0.26	
v/s Ratio Perm						
v/c Ratio	0.69	0.22	0.74	0.17	1.06	0.40
Uniform Delay, d1	22.6	20.1	15.0	11.0	26.5	5.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.3	6.1	0.5	69.5	1.0
Delay (s)	27.8	20.4	21.0	11.5	96.0	6.2
Level of Service	C	C	C	B	F	A
Approach Delay (s)	23.7		18.1		40.0	
Approach LOS	C		B		D	
Intersection Summary						
HCM Average Control Delay	27.2 HCM Level of Service C					
HCM Volume to Capacity ratio	0.79					
Actuated Cycle Length (s)	63.0					
Intersection Capacity Utilization	69.4%					
Sum of lost time (s)	120					
ICU Level of Service	C					
Analysis Period (min)	15					
Critical Lane Group	C					

Movement	EB1	EBT	EBR	WBR	WB1	NBR	NBT	NBR	SB1	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.90
Fr	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3539	1583	3433	3539	1583	3433	3539	1504	1770	1668
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3539	1583	3433	3539	1583	3433	3539	1504	1770	1668
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	3539	1504	1770	1668
Volume (vph)	50	670	35	202	622	154	64	19	154	270	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	705	38	213	655	162	67	20	162	284	45
RTOR Reduction (vph)	0	0	29	0	0	119	0	63	70	0	59
Lane-Group Flow (vph)	53	705	9	213	655	43	67	34	15	284	90
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	7	4	4	3	8	5	2	2	1	6	
Permitted Phases											
Actuated Green, G (s)	3.3	18.3	18.3	5.5	20.5	20.5	4.4	13.8	13.8	24.4	33.8
Effective Green, g (s)	3.8	18.8	18.8	6.0	21.0	21.0	4.9	14.3	14.3	24.9	34.3
Actuated g/C Ratio	0.05	0.24	0.24	0.08	0.26	0.26	0.06	0.18	0.18	0.31	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	84	832	372	257	929	416	210	279	269	551	715
v/s Ratio Prot	0.03	c0.20	0.01	0.06	c0.19	c0.02	c0.02	c0.02	c0.16	0.05	
v/s Ratio Perm											
v/c Ratio	0.63	0.85	0.02	0.83	0.71	0.10	0.32	-0.12	0.06	0.52	0.13
Uniform Delay, d1	37.4	29.2	23.5	36.5	26.7	22.4	36.0	27.6	27.3	22.6	13.8
Progression Factor	1.00	1.00	1.00	0.84	0.56	0.24	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	8.0	0.0	15.8	1.9	0.1	0.9	0.9	0.4	0.8	0.4
Delay (s)	51.8	37.2	23.6	46.5	16.5	5.3	36.8	28.5	27.7	23.4	14.2
Level of Service	D	D	C	D	B	A	D	C	C	C	B
Approach Delay (s)	37.6			20.9			30.4			20.2	
Approach LOS	D			C			C			C	
Intersection Summary											
HCM Average Control Delay	27.0 HCM Level of Service C										
HCM Volume to Capacity ratio	0.57										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	56.7%										
Sum of lost time (s)	16.0										
ICU Level of Service	B										
Analysis Period (min)	15										
Critical Lane Group	C										

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EB	EBT	EBR	WB	WB1	WB2	WBR	NBL	NBR	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.91	0.97	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.91	0.97	0.91	0.97	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Protected	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583	1583	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Permitted	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583	1583	1583	1583
Satd. Flow (perm)	233	771	146	371	703	358	137	252	422	364	264	243	243	243	243
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	812	154	391	740	377	144	265	444	383	278	256	256	256	256
RTOR Reduction (vph)	0	0	103	0	0	255	0	117	227	0	0	0	206	0	0
RTOR Flow (vph)	245	812	51	391	740	122	144	318	473	383	278	256	256	256	256
Lane Group Flow (vph)	7	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Perm
Protected Phases															
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6
Actuated Green, G (s)	12.1	26.0	25.0	11.5	25.4	25.4	9.5	13.1	13.1	11.4	15.0	15.0	15.0	15.0	15.0
Effective Green, G (s)	12.0	26.5	25.5	12.0	25.9	25.9	10.0	13.6	13.6	11.9	15.5	15.5	15.5	15.5	15.5
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1684	524	515	1146	512	221	542	245	511	361	307	307	307	307
v/s Ratio Prot	c0.14	0.16	0.03	0.11	c0.21	0.08	0.08	0.08	0.10	0.08	c0.11	c0.15	c0.15	c0.15	c0.15
v/s Ratio Perm															
v/c Ratio	0.88	0.48	0.10	0.76	0.65	0.24	0.65	0.59	0.19	0.75	0.77	0.77	0.77	0.77	0.77
Uniform Delay, d1	32.9	21.3	18.5	32.6	23.1	19.8	33.3	30.6	28.5	32.5	30.6	26.8	26.8	26.8	26.8
Progression Factor	0.81	0.50	0.37	0.78	0.68	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.1	0.7	0.3	5.3	2.3	0.9	6.7	1.6	0.4	6.0	9.7	0.2	0.2	0.2	0.2
Delay (s)	45.8	11.4	7.0	30.7	18.2	20.1	40.1	32.2	28.9	38.5	40.3	27.1	27.1	27.1	27.1
Level of Service	D	B	A	C	B	C	D	D	C	C	D	D	D	D	C
Approach Delay (s)	17.8	B	A	C	B	C	D	D	C	C	D	D	D	D	C
Approach LOS	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary															
HCM Average Control Delay	25.7														
HCM Volume to Capacity ratio	0.71														
Actuated Cycle Length (s)	80.0														
Intersection Capacity Utilization	67.5%														
Analysis Period (min)	15														
c Critical Lane Group															

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EB	EBT	EBR	WB	WB1	WB2	WBR	NBL	NBR	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.91	0.97	0.91	0.97	1.00	1.00
Lane Util. Factor	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.91	0.97	0.91	0.97	1.00	1.00
Fit	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Protected	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583	1583	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Permitted	1770	5085	1583	3433	3539	1583	1770	3191	1441	3433	1863	1583	1583	1583	1583
Satd. Flow (perm)	233	771	146	371	703	358	137	252	422	364	264	243	243	243	243
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	1320	317	72	1127	209	7	0	18	739	1	369	0	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Flow (vph)	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1590	0	1127	209	7	0	12	0	0	0	0	0	0	44
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Perm
Protected Phases															
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6
Actuated Green, G (s)	35.4	35.4	35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Effective Green, G (s)	35.9	35.9	35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
Actuated g/C Ratio	0.45	0.45	0.45	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2216	117	2000	1583	512	512	439	420	530	439	420	530	530	530	530
v/s Ratio Prot	c0.32	0.04	c0.32	0.13	0.01	0.01	0.28	c0.30	0.21	0.01	0.28	c0.30	0.21	0.21	0.21
v/s Ratio Perm															
v/c Ratio	0.72	0.62	0.56	0.13	0.03	0.03	0.84	0.88	0.61	0.03	0.84	0.88	0.61	0.61	0.61
Uniform Delay, d1	17.9	36.4	11.1	0.0	17.8	24.6	25.1	22.3	22.3	17.8	24.6	25.1	22.3	22.3	22.3
Progression Factor	0.41	1.15	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	8.2	1.0	0.2	0.0	0.0	13.7	18.9	2.1	0.0	13.7	18.9	2.1	2.1	2.1
Delay (s)	9.1	50.0	10.2	0.2	17.9	38.4	44.0	24.4	24.4	17.9	38.4	44.0	24.4	24.4	24.4
Level of Service	A	D	B	A	B	A	D	D	D	B	A	D	D	D	D
Approach Delay (s)	9.1	10.7	17.9	B	B	B	D	D	D	B	B	D	D	D	D
Approach LOS	A	B	B	C	B	B	D	D	D	B	B	D	D	D	D
Intersection Summary															
HCM Average Control Delay	16.7														
HCM Volume to Capacity ratio	0.78														
Actuated Cycle Length (s)	80.0														
Intersection Capacity Utilization	70.8%														
Analysis Period (min)	15														
c Critical Lane Group															

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBR	SBT	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	1.00	0.85	0.95	0.95	1.00	0.98	1.00
Lane Util. Factor	0.95	1.00	0.85	1.00	1.00	0.95	1.00	1.00	1.00	0.96	0.98	1.00
Flt Protected	1770	6408	1583	5085	1583	1770	1504	1504	1504	1746	1486	1486
Satd. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	1.00	0.82	0.95	1.00
Flt Permitted	1770	6408	1583	5085	1583	1369	1504	1504	1504	1486	1486	1486
Volume (vph)	17	1677	273	0	1001	350	334	0	306	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1765	287	0	1054	368	352	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	0	2	0
Lane Group Flow (vph)	18	1765	287	0	1054	368	352	160	160	0	16	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Per	Per	Per	Per	Per
Protected Phases	7	4	6	8	2	2	2	6	2	6	6	6
Permitted Phases	Free	Free	Free	Free	2	2	2	6	2	6	6	6
Actuated Green, G (s)	2.2	45.9	80.0	40.2	80.0	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Effective Green, g (s)	2.7	47.4	80.0	40.7	80.0	24.6	24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.03	0.59	1.00	0.51	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	3797	1583	2587	1583	427	462	462	462	457	457	457
v/s Ratio Prot	0.01	0.28	0.18	0.21	0.23	0.25	0.11	0.11	0.11	0.11	0.01	0.01
v/s Ratio Perm	0.30	0.46	0.18	0.41	0.23	0.82	0.35	0.35	0.35	0.03	0.03	0.03
Uniform Delay, d1	37.7	9.2	0.0	12.2	0.0	25.7	21.5	21.5	21.5	19.4	19.4	19.4
Progression Factor	1.07	1.10	1.00	0.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.3	0.2	0.4	0.3	1.22	0.5	0.5	0.5	0.0	0.0	0.0
Delay (s)	42.2	10.3	0.2	7.9	0.3	37.9	21.9	21.9	21.9	19.4	19.4	19.4
Level of Service	D	B	A	A	A	D	C	C	C	B	B	B
Approach Delay (s)	9.2	5.9	5.9	5.9	5.9	30.3	30.3	30.3	30.3	19.4	19.4	19.4
Approach LOS	A	A	A	A	A	C	C	C	C	B	B	B
Intersection Summary												
HCM Average Control Delay	11.5											
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	51.8%											
Analysis Period (min)	15											
c Critical Lane Group												

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBT	EBT	EBR	WBL	WBL	WBR	NBL	NBL	NBR	SBT	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00
Lane Util. Factor	0.97	1.00	0.85	1.00	0.97	1.00	1.00	1.00	0.85	1.00	0.95	1.00
Flt Protected	3433	5085	1583	1770	4950	1610	3329	1583	1610	3390	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	1.00
Flt Permitted	3433	5085	1583	1770	4950	1610	3329	1583	1610	3390	1583	1583
Volume (vph)	270	1184	545	141	787	170	380	286	224	102	230	183
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1246	574	148	828	179	400	301	236	107	242	193
RTOR Reduction (vph)	0	0	395	0	38	0	0	0	189	0	0	164
Lane Group Flow (vph)	284	1246	179	148	969	0	226	475	47	107	242	29
Turn Type	Prot	Prot	Prot	Prot	Prot	Split	Split	Per	Per	Split	Split	Per
Protected Phases	7	4	4	3	3	8	2	2	2	6	6	6
Permitted Phases	12.5	24.5	24.5	10.6	10.6	22.6	15.4	15.4	15.4	11.5	11.5	11.5
Actuated Green, G (s)	13.0	25.0	25.0	11.1	11.1	23.1	15.9	15.9	15.9	12.0	12.0	12.0
Effective Green, g (s)	0.16	0.31	0.31	0.14	0.14	0.29	0.20	0.20	0.20	0.15	0.15	0.15
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	558	1589	495	246	1428	320	682	315	242	509	237	237
Lane Grp Cap (vph)	0.08	0.25	0.11	0.08	0.20	0.14	0.14	0.03	0.07	0.07	0.07	0.07
v/s Ratio Prot	0.51	0.78	0.36	0.60	0.68	0.71	0.72	0.15	0.44	0.48	0.48	0.48
v/s Ratio Perm	30.6	25.0	21.3	32.4	25.2	29.9	30.0	26.5	31.0	31.1	29.4	29.4
Uniform Delay, d1	0.70	0.68	2.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.7	3.6	1.9	4.1	2.6	6.9	3.7	0.2	1.3	0.7	0.2	0.2
Incremental Delay, d2	22.1	20.6	57.9	36.5	27.8	36.8	33.7	26.7	32.2	31.8	29.7	29.7
Delay (s)	C	C	E	D	C	D	C	C	C	C	C	C
Level of Service	C	C	E	D	C	D	C	C	C	C	C	C
Approach Delay (s)	31.0	28.9	28.9	28.9	28.9	32.7	32.7	32.7	32.7	31.1	31.1	31.1
Approach LOS	C	C	E	D	C	D	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	30.8											
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	63.0%											
Analysis Period (min)	15											
c Critical Lane Group												



22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Volume (vph)	133	484	202	728	589	119	321	494	108	142	342	219
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	509	213	135	620	125	338	520	114	149	360	231
RTOR Reduction (vph)	0	67	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	140	655	0	135	620	29	338	520	39	149	360	57
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	3	8	5	2	2	1	1	6	6
Permitted Phases	5	15	8	15	8	13	15	23	5	16	16	16
Actuated Green, G (s)	6.0	16.3	6.0	16.3	16.3	14.0	24.0	24.0	7.0	17.0	17.0	17.0
Effective Green, g (s)	0.09	0.24	0.09	0.24	0.24	0.20	0.35	0.35	0.10	0.25	0.25	0.25
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	153	796	153	832	372	358	645	548	179	457	368	368
Lane Grp Cap (vph)	0.08	0.19	0.08	0.18	0.18	0.19	0.28	0.08	0.08	0.19	0.04	0.04
v/s Ratio Prot	0.92	0.82	0.88	0.75	0.08	0.94	0.81	0.07	0.83	0.79	0.15	0.15
v/s Ratio Perm	31.4	25.1	31.3	24.6	20.7	27.3	20.5	15.2	30.6	24.5	20.5	20.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	48.1	6.9	40.4	3.7	0.1	33.1	10.4	0.3	26.8	12.9	0.8	0.8
Incremental Delay, d2	79.3	32.0	71.7	28.2	20.7	60.4	30.9	15.4	57.4	37.3	21.3	21.3
Delay (s)	E	C	E	C	C	E	C	B	E	D	C	C
Level of Service	E	C	E	C	C	E	C	B	E	D	C	C
Approach Delay (s)	39.7	33.8	39.7	33.8	33.8	39.7	39.4	39.4	39.4	36.4	36.4	36.4
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
<b>Intersection Summary</b>												
HCM Average Control Delay	37.4											
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	69.3											
Sum of lost time (s)	12.0											
Intersection Capacity Utilization	76.0%											
Analysis Period (min)	15											
Critical Lane Group	C											

23: Gravenstien Hwy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Volume (vph)	102	671	32	53	754	333	48	24	63	485	29	96
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	706	34	56	794	351	51	25	66	511	31	101
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	107	737	0	56	794	216	51	30	0	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	3	8	5	2	2	1	1	6	6
Permitted Phases	5	15	8	15	8	13	15	23	5	16	16	16
Actuated Green, G (s)	6.0	16.3	6.0	16.3	16.3	14.0	24.0	24.0	7.0	17.0	17.0	17.0
Effective Green, g (s)	0.09	0.24	0.09	0.24	0.24	0.20	0.35	0.35	0.10	0.25	0.25	0.25
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	159	1125	159	1125	372	358	645	548	179	457	368	368
Lane Grp Cap (vph)	0.06	0.21	0.06	0.21	0.22	0.22	0.14	0.03	0.22	0.22	0.04	0.04
v/s Ratio Prot	0.67	0.55	0.67	0.55	0.58	0.79	0.48	0.68	0.24	0.78	0.11	0.11
v/s Ratio Perm	39.7	25.3	39.7	25.3	41.6	29.7	26.7	42.5	39.2	24.9	16.6	16.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	10.7	3.0	8.0	5.7	3.3	22.4	1.0	0.2	33	22.4	1.0	1.0
Incremental Delay, d2	50.4	29.3	50.4	29.3	36.2	23.4	9.2	64.9	40.2	30.6	16.7	16.7
Delay (s)	E	C	E	C	D	C	A	E	D	C	B	B
Level of Service	E	C	E	C	D	C	A	E	D	C	B	B
Approach Delay (s)	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
<b>Intersection Summary</b>												
HCM Average Control Delay	26.7											
HCM Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	90.0											
Sum of lost time (s)	20.0											
Intersection Capacity Utilization	71.8%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBT	EBR	WBL	WBR	NBL	NBR	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	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
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00
Fit	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583
Volume (vph)	0	818	407	99	916	0	0	639
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	428	104	964	0	0	673
RTOR Reduction (vph)	0	0	107	0	0	0	0	0
Lane-Group Flow (vph)	0	862	321	104	964	0	0	673
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8	1	6			
Permitted Phases	4	4	4	4	4			
Actuated Green, G (s)	36.4	36.4	11.6	62.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	36.9	36.9	12.1	53.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.41	0.41	0.13	0.59	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1451	649	238	2084	1106	510	1106	510
v/s Ratio Prot	c0.24	0.20	0.08	c0.27	c0.20	0.09		
w/s Ratio Perm	0.59	0.49	0.44	0.46	0.61	0.27		
w/c Ratio	20.7	19.6	35.8	10.5	25.7	22.6		
Uniform Delay, d1	0.54	0.48	1.25	1.65	1.00	1.00		
Progression Factor	1.3	2.0	1.2	0.7	1.0	1.3		
Incremental Delay, d2	12.5	11.5	46.0	18.0	26.7	23.9		
Delay (s)	B	B	D	B	C	C		
Level of Service	B	B	D	B	C	C		
Approach Delay (s)	12.1	20.7	0.0	26.0	26.0	26.0		
Approach LOS	B	C	C	A	C	C		
<b>Intersection Summary</b>								
HCM Average Control Delay	18.8		10.9		10.9		10.9	
HCM Volume to Capacity ratio	0.56		0.53		0.53		0.53	
Actuated Cycle Length (s)	90.0		90.0		90.0		90.0	
Sum of lost time (s)	8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	61.7%		61.7%		61.7%		61.7%	
Analysis Period (min)	15		15		15		15	
c Critical Lane Group								

Movement	EBT	EBR	WBL	WBR	NBL	NBR	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	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
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00
Fit	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3433	1583
Fit Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3433	1583
Volume (vph)	0	818	407	99	916	0	0	639
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	428	104	964	0	0	673
RTOR Reduction (vph)	0	0	107	0	0	0	0	0
Lane-Group Flow (vph)	0	862	321	104	964	0	0	673
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8	1	6			
Permitted Phases	4	4	4	4	4			
Actuated Green, G (s)	36.4	36.4	11.6	62.5	28.5	28.5	28.5	28.5
Effective Green, g (s)	36.9	36.9	12.1	53.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.41	0.41	0.13	0.59	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1451	649	238	2084	1106	510	1106	510
v/s Ratio Prot	c0.24	0.20	0.08	c0.27	c0.20	0.09		
w/s Ratio Perm	0.59	0.49	0.44	0.46	0.61	0.27		
w/c Ratio	20.7	19.6	35.8	10.5	25.7	22.6		
Uniform Delay, d1	0.54	0.48	1.25	1.65	1.00	1.00		
Progression Factor	1.3	2.0	1.2	0.7	1.0	1.3		
Incremental Delay, d2	12.5	11.5	46.0	18.0	26.7	23.9		
Delay (s)	B	B	D	B	C	C		
Level of Service	B	B	D	B	C	C		
Approach Delay (s)	12.1	20.7	0.0	26.0	26.0	26.0		
Approach LOS	B	C	C	A	C	C		
<b>Intersection Summary</b>								
HCM Average Control Delay	18.8		10.9		10.9		10.9	
HCM Volume to Capacity ratio	0.56		0.53		0.53		0.53	
Actuated Cycle Length (s)	90.0		90.0		90.0		90.0	
Sum of lost time (s)	8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	61.7%		61.7%		61.7%		61.7%	
Analysis Period (min)	15		15		15		15	
c Critical Lane Group								

26: Millbrae Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	6	11	2	7	199	19	734	20	116	554	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95
Hourly flow rate (vph)	7	6	12	2	7	209	20	773	21	122	583	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked												
vc, conflicting volume	1364	1663	294	1363	1644	386	587			794		
vc1, stage 1 conf vol												
vc2, stage 2 conf vol	1364	1663	294	1363	1644	386	587			794		
vcu, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tc, single (s)												
tc, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	92	98	98	91	66	98			85		
pm capacity (veh/h)	57	80	703	86	82	612	984			823		
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	25	219	20	386	386	21	122	389	199			
Volume Left	7	2	0	0	0	0	122	0	0			
Volume Right	12	209	0	0	0	21	0	0	0			
csh	112	640	984	1700	1700	1700	823	1700	1700			
Volume to Capacity	0.22	0.34	0.02	0.23	0.23	0.01	0.15	0.23	0.12			
Queue Length 95th (ft)	20	38	2	0	0	0	13	0	0			
Control Delay (s)	46.0	15.6	8.7	0.0	0.0	0.0	10.1	0.0	0.0			
Lane LOS	E	C	A				B					
Approach Delay (s)	46.0	15.6	0.2				1.7					
Approach LOS	E	C	C									
Intersection Summary												
Average Delay	3.4											
Intersection Capacity Utilization	45.9%											
Analysis Period (min)	15											
ICU Level of Service	A											

27: Millbrae Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	139	3	4	199	2	5	0	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	146	3	4	209	2	5	0	1	0	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
px. platoon unblocked												
vc, conflicting volume	212			149			369	370	148	370	371	211
vc1, stage 1 conf vol												
vc2, stage 2 conf vol	212			149			369	370	148	370	371	211
vcu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tc, single (s)												
tc, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
pm capacity (veh/h)	1359			1432			585	557	896	564	557	830
Direction Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	151	216	6	1								
Volume Left	1	4		5								
Volume Right	3	2		1								
csh	1359	1432	621	557								
Volume to Capacity	0.00	0.00	0.01	0.00								
Queue Length 95th (ft)	0	0	0	1								
Control Delay (s)	0.1	0.2	10.9	11.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	10.9	11.5								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	24.4%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SBL	SBL1	SBL2	SBL3
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	123	2	4	208	8	1	9	0	4	0	4	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	129	2	4	219	8	1	9	0	4	0	4	0
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage (veh)													
Upstream signal (ft)													
px, platoon unblocked													
vc, conflicting volume													
vc1, stage 1 conf vol													
vc2, stage 2 conf vol													
vCu, unblocked vol													
tc, single (s)													
tc, 2 stage (s)													
tf (s)													
p0 queue free %													
p0 queue free %													
cM capacity (veh/h)													
Direction Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SBL	SBL1	SBL2	SBL3
Volume Total	133	232	11	5									
Volume Left	1	4	1	4									
Volume Right	2	8	0	1									
CSH	1341	1454	561	614									
Volume to Capacity	0.00	0.00	0.02	0.01									
Queue Length 95th (ft)	0	0	1	1									
Control Delay (s)	0.1	0.2	11.5	10.9									
Lane LOS	A	A	B	B									
Approach Delay (s)	0.1	0.2	11.5	10.9									
Approach LOS	B	B	B	B									
Intersection Summary													
Average Delay	0.6												
Intersection Capacity Utilization	24.0%												
ICU Level of Service	A												
Analysis Period (min)	15												

Movement	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3
Lane Configurations	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	149	9	4	270	5	11			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Hourly flow rate (vph)	157	9	4	284	5	12			
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type									
Median storage (veh)									
Upstream signal (ft)									
px, platoon unblocked									
vc, conflicting volume									
vc1, stage 1 conf vol									
vc2, stage 2 conf vol									
vCu, unblocked vol									
tc, single (s)									
tc, 2 stage (s)									
tf (s)									
p0 queue free %									
p0 queue free %									
cM capacity (veh/h)									
Direction Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3
Volume Total	166	288	17						
Volume Left	0	4	5						
Volume Right	9	0	12						
CSH	1700	1412	749						
Volume to Capacity	0.10	0.00	0.02						
Queue Length 95th (ft)	0	0	0						
Control Delay (s)	0.0	0.1	9.9						
Lane LOS	A	A	A						
Approach Delay (s)	0.0	0.1	9.9						
Approach LOS	A	A	A						
Intersection Summary									
Average Delay	0.4								
Intersection Capacity Utilization	27.4%								
ICU Level of Service	A								
Analysis Period (min)	15								

Movement	EBT	EBR	WBL	WBR	NBL	NBR	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	135	9	11	250	0	25	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0
Pedestrians	0	0	0	0	0	0	0	0
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type							None	None
Median storage (veh)								
Upstream signal (ft)								
PX, platoon unblocked								
vC, conflicting volume	263				173		454	454
vC1, stage 1 cont vol							454	454
vC2, stage 2 cont vol	263				173		7.1	6.5
vCU, unblocked vol	4.1				4.1		6.2	7.1
IC, single (s)								
IC, 2 stage (s)								
IF (s)	2.2				2.2		3.5	4.0
p0 queue free %	100				99		100	100
p0 capacity (veh/h)	1301				1404		513	498
Direction, Lane #	EBT, WBL, NBL, SBT	EBR, WBR, NBR, SBR						
Volume Total	173	275	35	0	0	0	0	0
Volume Left	0	12	26	0	0	0	0	0
Volume Right	9	0	8	0	0	0	0	0
CSH	1301	1404	570	1700				
Volume to Capacity	0.00	0.01	0.08	0.00				
Queue Length 95th (ft)	0	1	5	0				
Control Delay (s)	0.0	0.4	11.7	0.0				
Lane LOS	A	A	B	A				
Approach Delay (s)	0.0	0.4	11.7	0.0				
Approach LOS	B	B	A	A				
Intersection Summary								
Average Delay	1.1							
Intersection Capacity Utilization	32.1%							
Analysis Period (min)	15							
ICU Level of Service	A							

Movement	EBT	EBR	WBL	WBR	NBL	NBR	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	135	9	11	250	0	25	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	163	9	12	263	0	26	0
Pedestrians	0	0	0	0	0	0	0	0
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type							None	None
Median storage (veh)								
Upstream signal (ft)								
PX, platoon unblocked								
vC, conflicting volume	263				173		454	454
vC1, stage 1 cont vol							454	454
vC2, stage 2 cont vol	263				173		7.1	6.5
vCU, unblocked vol	4.1				4.1		6.2	7.1
IC, single (s)								
IC, 2 stage (s)								
IF (s)	2.2				2.2		3.5	4.0
p0 queue free %	100				99		100	100
p0 capacity (veh/h)	1301				1404		513	498
Direction, Lane #	EBT, WBL, NBL, SBT	EBR, WBR, NBR, SBR						
Volume Total	173	275	35	0	0	0	0	0
Volume Left	0	12	26	0	0	0	0	0
Volume Right	9	0	8	0	0	0	0	0
CSH	1301	1404	570	1700				
Volume to Capacity	0.00	0.01	0.08	0.00				
Queue Length 95th (ft)	0	1	5	0				
Control Delay (s)	0.0	0.4	11.7	0.0				
Lane LOS	A	A	B	A				
Approach Delay (s)	0.0	0.4	11.7	0.0				
Approach LOS	B	B	A	A				
Intersection Summary								
Average Delay	1.0							
Intersection Capacity Utilization	22.4%							
Analysis Period (min)	15							
ICU Level of Service	A							

Lane Group	EBL	WBL	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	844	191	312	568	215	163	279
v/c Ratio	1.55	0.34	0.52	0.62	0.97	0.58	0.72
Control Delay	291.4	38.0	42.3	8.7	122.0	77.8	18.3
Queue Delay	95.5	5.0	27.7	1.3	0.0	0.0	1.0
Total Delay	386.9	43.0	70.1	10.1	122.0	77.8	19.2
Queue Length 50th (ft)	~1240	152	270	87	228	87	0
Queue Length 95th (ft)	#1503	210	354	146	#402	127	95
Internal Link Dist (ft)	550		220		110		270
Turn Bay Length (ft)	546	567	597	911	221	376	418
Base Capacity (vph)	0	307	286	167	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	66	0	0	0	0	0	31
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.76	0.73	1.00	0.76	0.97	0.43	0.72

Intersections Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum, alter two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	32	147	5	200	173	163	5	32	218
v/c Ratio	0.04	0.15	0.48	0.04	0.44	0.55	0.07	0.00	0.20	0.12
Control Delay	34.4	32.8	11.5	29.0	25.5	34.5	5.3	4.6	35.8	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	32.8	11.5	29.0	25.5	34.5	5.3	4.6	35.8	11.8
Queue Length 50th (ft)	2	15	0	2	20	87	6	0	15	24
Queue Length 95th (ft)	13	39	49	m6	72	m11	m34	m1	40	64
Internal Link Dist (ft)		160		140		120			40	130
Turn Bay Length (ft)	75	100	75	100	150	150	400	150	200	200
Base Capacity (vph)	155	442	488	155	854	400	2462	1102	184	1875
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.30	0.03	0.23	0.43	0.07	0.00	0.17	0.12

Intersections Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	918	401	94	551	345	856
v/c Ratio	0.55	0.45	0.37	0.27	0.66	0.70
Control Delay	18.7	9.0	39.4	8.0	30.4	18.2
Queue Delay	8.3	1.8	0.0	0.0	0.0	0.8
Total Delay	27.0	10.8	39.4	8.1	30.4	18.9
Queue Length 50th (ft)	237	137	21	38	161	127
Queue Length 95th (ft)	m236	m117	36	61	261	197
Internal Link Dist (ft)	220		465		346	
Turn Bay Length (ft)	1881	892	257	2035	523	1215
Base Capacity (vph)	722	325	0	0	0	0
Starvation Cap Reductn	0	0	0	86	0	128
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.71	0.37	0.28	0.66	0.79

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	636	626	435	502	185	599
v/c Ratio	0.56	0.74	0.78	0.33	0.53	0.57
Control Delay	42.4	22.9	48.2	16.5	30.6	30.7
Queue Delay	0.0	2.3	0.0	0.0	0.0	0.0
Total Delay	42.4	25.2	48.2	16.5	30.6	30.7
Queue Length 50th (ft)	160	188	120	111	60	83
Queue Length 95th (ft)	182	267	#180	148	m124	m129
Internal Link Dist (ft)	466		345		380	
Turn Bay Length (ft)	1144	841	558	1523	347	358
Base Capacity (vph)	0	110	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.88	0.78	0.33	0.53	0.54

Intersection Summary  
 #. 95th percentile volume exceeds capacity. queue may be longer.  
 m. Volume for 95th percentile queue is metered by upstream signal.

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Lane Group	EBL	EBT	WBT	WBL	SBL	SBR
Lane Group Flow (vph)	205	1069	722	97	248	
v/c Ratio	0.46	0.47	0.45	0.21	0.41	
Control Delay	32.1	16.6	16.2	24.5	5.8	
Queue Delay	0.0	0.6	0.0	0.0	0.0	
Total Delay	32.1	17.2	16.2	24.5	5.8	
Queue Length 50th (ft)	64	256	123	38	0	
Queue Length 95th (ft)	87	275	180	76	53	
Internal Link Dist (ft)	345	164	232			
Turn Bay Length (ft)	80			200		
Base Capacity (vph)	301	2256	1608	465	598	
Starvation Cap Reductn	0	740	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.71	0.45	0.21	0.41	

Intersection Summary



12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	220	223	42	16	541	517	7	458
v/c Ratio	0.66	0.67	0.12	0.11	1.02	0.23	0.05	0.40
Control Delay	38.7	39.0	8.8	29.3	74.3	9.2	43.4	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	39.0	8.8	29.3	74.3	9.2	43.4	27.1
Queue Length 50th (ft)	107	109	0	5	278	39	4	126
Queue Length 95th (ft)	168	170	23	23	478	147	m5	224
Internal Link Dist (ft)	284			118	214			360
Turn Bay Length (ft)	250			200			100	175
Base Capacity (vph)	441	443	447	179	531	2270	177	1140
Starvation Cap Reductn	0	0	0	0	0	0	0	67
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.50	0.09	0.09	1.02	0.23	0.04	0.40

Intersection Summary



Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	271	351	592	264	297	492
v/c Ratio	0.69	0.56	0.74	0.32	1.06	0.40
Control Delay	32.6	6.7	22.9	3.1	100.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	6.7	22.9	3.1	100.8	6.8
Queue Length 50th (ft)	96	0	193	0	136	84
Queue Length 95th (ft)	168	57	351	38	7272	136
Internal Link Dist (ft)	480	175	3820	450	700	2550
Turn Bay Length (ft)	436	654	800	830	291	1215
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.54	0.74	0.32	1.05	0.40

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	705	38	213	655	162	67	87	85	284	149
v/c Ratio	0.40	0.94	0.10	0.83	0.71	0.30	0.26	0.25	0.22	0.93	0.18
Control Delay	44.6	53.3	9.9	54.2	20.4	2.3	37.7	11.2	8.1	27.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	53.3	9.9	54.2	20.4	2.3	37.7	11.2	8.1	27.8	5.7
Queue Length 50th (ft)	26	183	0	38	131	0	16	8	0	118	13
Queue Length 95th (ft)	61	4290	23	m#104	#244	m4	36	48	36	193	45
Internal Link Dist (ft)	160	1540	200	250	170	130	1010	130	100	100	520
Turn Bay Length (ft)	133	752	366	257	929	535	257	392	387	531	827
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.94	0.10	0.83	0.71	0.30	0.26	0.25	0.22	0.93	0.18

**Intersection Summary**  
 Volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel

2008 Alternative E  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	245	812	154	391	740	377	144	435	274	383	278	256
v/c Ratio	0.88	0.48	0.25	0.76	0.65	0.49	0.65	0.66	0.58	0.75	0.77	0.50
Control Delay	52.0	11.6	2.0	34.8	18.7	4.4	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	11.6	2.0	34.8	18.7	4.4	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	76	57	3	107	182	35	71	74	0	95	129	0
Queue Length 95th (ft)	m63	m6	m6	#167	213	47	#157	118	65	#186	#230	58
Internal Link Dist (ft)	320			520			554			480		
Turn Bay Length (ft)	200			350			250			175		175
Base Capacity (vph)	288	1685	627	515	1145	767	221	789	522	511	396	538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.48	0.25	0.76	0.65	0.49	0.65	0.55	0.52	0.75	0.70	0.48

Lane Group	EBT	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	1637	72	1127	209	25	370	370
v/c Ratio	0.71	0.51	0.56	0.13	0.05	0.84	0.88
Control Delay	8.9	53.0	10.8	0.2	9.8	43.2	48.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	53.0	10.8	0.2	9.8	43.2	48.5
Queue Length 50th (ft)	134	34	175	0	2	169	172
Queue Length 95th (ft)	171	m71	99	m0	18	431.8	329
Internal Link Dist (ft)	520		960		428	378	
Turn Bay Length (ft)	225					400	400
Base Capacity (vph)	2319	142	2000	1583	568	475	455
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.51	0.56	0.13	0.04	0.78	0.81

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	WBL	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	18	1765	287	1054	368	352	161	161	18
v/c Ratio	0.14	0.46	0.18	0.38	0.23	0.82	0.35	0.35	0.04
Control Delay	38.9	11.8	0.2	8.5	0.3	40.8	21.5	21.5	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	11.8	0.2	8.5	0.3	40.8	21.5	21.5	13.6
Queue Length 50th (ft)	10	175	0	75	0	162	65	65	5
Queue Length 95th (ft)	m13	m246	m0	128	m0	210	92	92	16
Internal Link Dist (ft)	190	960		360		225	366	420	
Turn Bay Length (ft)	133	3797	1583	2759	1583	730	790	790	607
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.46	0.18	0.38	0.23	0.48	0.20	0.20	0.02

m Volume for 95th percentile queue is metered by upstream signal.

Intersection Summary

EBL	EBT	EBR	WBT	WBL	NBL	NBT	NBR	SBT
18	1765	287	1054	368	352	161	161	18

Lane Group	EBL	EBT	EBR	WBT	WBL	NBL	NBT	NBR	SBT	SBR	SSBR
Lane Group Flow (vph)	284	1246	574	148	1007	236	475	236	107	242	193
v/c Ratio	0.51	0.78	0.64	0.60	0.69	0.71	0.72	0.47	0.44	0.48	0.48
Control Delay	24.7	21.7	9.8	46.8	28.3	42.9	36.7	7.4	35.9	33.6	8.9
Queue Delay	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	21.7	10.3	46.8	28.3	42.9	36.7	7.4	35.9	33.6	8.9
Queue Length 50th (ft)	70	227	142	69	155	114	170	0	54	62	0
Queue Length 95th (ft)	87	218	313	187	253	210	173	56	98	91	51
Internal Link Dist (ft)	250	1592	890	246	1470	342	707	522	342	720	488
Turn Bay Length (ft)	0	0	85	0	0	0	0	0	0	0	0
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.78	0.71	0.60	0.69	0.66	0.67	0.45	0.31	0.34	0.40

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection Summary

EBL	EBT	EBR	WBT	WBL	NBL	NBT	NBR	SBT	SBR	SSBR
284	1246	574	148	1007	236	475	236	107	242	193

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	140	722	135	620	125	338	520	114	149	360	231
v/c Ratio	0.92	0.84	0.88	0.74	0.27	0.95	0.81	0.18	0.83	0.79	0.41
Control Delay	89.3	32.4	82.8	30.8	6.4	66.8	32.8	4.5	69.5	39.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.4	66.8	32.8	4.5	69.5	39.5	6.0
Queue Length 50th (ft)	61	136	59	128	0	145	201	0	164	148	0
Queue Length 95th (ft)	#162	#221	#155	184	37	#296	#358	30	#161	#275	49
Internal Link Dist (ft)	689	500	500	6630	150	550	734	675	500	980	625
Turn Bay Length (ft)	350	887	153	859	479	357	645	623	179	456	562
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.25	0.95	0.81	0.18	0.83	0.79	0.41

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	107	740	56	794	351	51	91	511	132	
v/c Ratio	0.67	0.60	0.47	0.74	0.57	0.43	0.44	0.80	0.18	
Control Delay	64.2	29.8	39.9	23.0	6.5	52.2	21.8	35.9	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	64.2	29.8	39.9	23.0	6.5	52.2	21.8	35.9	5.8	
Queue Length 50th (ft)	61	203	33	237	4	26	14	237	10	
Queue Length 95th (ft)	#161	#285	#69	#336	18	65	57	#388	43	
Internal Link Dist (ft)	6630	6630	350	350	200	236				
Turn Bay Length (ft)	225	150	80	50	225					
Base Capacity (vph)	159	1232	118	1077	613	118	367	653	782	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.67	0.60	0.47	0.74	0.57	0.43	0.25	0.78	0.17	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

	EBT	EBR	WBT	WBT	SBT	SBT
Lane Group	862	428	104	964	673	223
Lane Group Flow (vph)	0.58	0.56	0.39	0.46	0.61	0.37
v/c Ratio	12.9	8.1	46.8	18.2	28.6	12.4
Control Delay	0.2	0.3	0.0	0.3	0.0	0.0
Queue Delay	13.1	8.4	46.8	18.5	28.6	12.4
Total Delay	124	65	57	223	164	40
Queue Length 50th (ft)	154	m101	m108	280	222	98
Queue Length 95th (ft)	350	50	100	370	425	585
Internal Link Dist (ft)	1486	770	295	2084	1106	595
Turn Bay Length (ft)	139	66	0	492	0	0
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0.64	0.61	0.35	0.61	0.61	0.37
Reduced v/c Ratio	Intersection Summary					
m. Volume for 95th percentile queue is metered by upstream signal.						

	EBT	WBT	NBL	NBR
Lane Group	1538	649	385	248
Lane Group Flow (vph)	0.61	0.26	0.55	0.72
v/c Ratio	3.5	5.8	34.2	41.1
Control Delay	0.0	0.0	0.0	0.0
Queue Delay	3.5	5.8	34.2	41.1
Total Delay	0	38	102	119
Queue Length 50th (ft)	243	112	129	178
Queue Length 95th (ft)	370	312	431	431
Internal Link Dist (ft)	2502	2502	1221	580
Turn Bay Length (ft)	65	0	0	0
Base Capacity (vph)	0	0	0	0
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0.63	0.26	0.32	0.43
Reduced v/c Ratio	Intersection Summary			

**CUMULATIVE 2020 + ALTERNATIVE E  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SBR	
Lane Configurations														
Sign Control	Stop				Free				Free				Stop	
Grade	0%				0%				0%				0%	
Volume (veh/h)	0	13	16	259	22	134	14	714	74	118	508	3	3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	14	17	273	23	141	15	752	78	124	535	3	3	
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)	None													
Median type	None													
Median storage (veh)														
Upstream signal (ft)														
pX platoon unblocked														
VC conflicting volume	1648	1644	536	1627	1606	791	538							829
VC1 stage 1 conf vol														
VC2 stage 2 conf vol														
vCu unblocked vol	1648	1644	536	1627	1606	791	538							829
IC single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1							4.1
IC 2 stage (s)														
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2							2.2
p0 queue free %	100	84	97	0	74	64	99							85
CM capacity (veh/h)	35	83	544	61	88	390	1030							802
Direction: Lane #														
Volume Total	31	437	15	829	124	538								
Volume Left	0	273	15	0	124	0								
Volume Right	17	141	0	78	0	3								
CSH	156	85	1030	1700	802	1700								
Volume to Capacity	0.20	5.12	0.01	0.49	0.15	0.32								
Queue Length 95th (ft)	17	Err	1	0	14	0								
Control Delay (s)	33.6	Err	8.5	0.0	10.3	0.0								
Lane LOS	D	F	A	B	B	F								
Approach Delay (s)	33.6		0.0	0.1		1.9								
Approach LOS	D		F	D		F								
Intersection Summary														
Average Delay	2214.3													
Intersection Capacity Utilization	80.8%													
ICU Level of Service	D													
Analysis Period (min)	15													

2: Wilfred Ave & Primrose Ave  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	EB1	EB2	EB3	EB4	WB1	WB2	WB3	WB4	NB1	NB2	NB3	NB4	SBR	
Lane Configurations														
Sign Control	Free				Free				Free				Stop	
Grade	0%				0%				0%				0%	
Volume (veh/h)	10	170	26	88	280	9	126	19	312	10	10	10	10	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	11	179	27	93	295	9	133	20	328	11	11	11	11	
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)	None													
Median type	None													
Median storage (veh)														
Upstream signal (ft)														
pX platoon unblocked														
VC conflicting volume	304													
VC1 stage 1 conf vol														
VC2 stage 2 conf vol														
vCu unblocked vol	304													
IC single (s)	4.1													
IC 2 stage (s)														
IF (s)	2.2													
p0 queue free %	99													
CM capacity (veh/h)	1257													
Direction: Lane #														
Volume Total	217	397	481	32										
Volume Left	11	93	133	11										
Volume Right	27	9	328	11										
CSH	1257	1365	553	230										
Volume to Capacity	0.01	0.07	0.87	0.14										
Queue Length 95th (ft)	1	5	241	12										
Control Delay (s)	0.5	2.3	40.5	23.1										
Lane LOS	A	A	E	C										
Approach Delay (s)	0.5		2.3		40.5		23.1							
Approach LOS	E		E		E		C							
Intersection Summary														
Average Delay	18.8													
Intersection Capacity Utilization	74.8%													
ICU Level of Service	D													
Analysis Period (min)	15													

3: Wilfred Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Lane Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	10	472	10	9	359	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	497	11	9	378	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	387			507			941	929	502	941	930	383
vc1, stage 1 conf vol												
vc2, stage 2 conf vol												
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	96	98	95	96	98
cM capacity (veh/h)	1171			1057			229	263	569	229	262	665
Direction Lane #												
Volume Total	518	397	32	32								
Volume Left	11	9	11	11								
Volume Right	1171	1057	302	310								
Volume to Capacity	0.01	0.01	0.70	0.10								
Queue Length 95th (ft)	1	1	9	8								
Control Delay (s)	0.3	0.3	18.3	17.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.3	18.3	17.9								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay	1.4											
Intersection Capacity Utilization	49.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

4: Wilfred Ave & Langner Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Lane Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	10	472	10	9	359	9	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	497	11	9	378	9	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	387			507			936	929	502	936	925	378
vc1, stage 1 conf vol												
vc2, stage 2 conf vol												
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	96	98	95	96	98
cM capacity (veh/h)	1171			1057			231	263	569	230	264	669
Direction Lane #												
Volume Total	518	397	32	32								
Volume Left	11	9	11	11								
Volume Right	1171	1057	302	310								
Volume to Capacity	0.01	0.01	0.70	0.10								
Queue Length 95th (ft)	1	1	9	8								
Control Delay (s)	0.3	0.3	18.3	17.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.3	18.3	17.9								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay	1.4											
Intersection Capacity Utilization	43.5%											
ICU Level of Service	A											
Analysis Period (min)	15											



5: Wilfred Ave & Labath Ave  
Graton Rancheria Casino & Hotel

6: Wilfred Avenue & Dowdell Ave  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

2020 Alternative E  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Sign Control											
Grade											
Volume (veh/h)	40	411	41	188	324	189	44	14	396	180	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	433	43	198	341	199	46	15	417	189	33
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
px, platoon unblocked											
vc, conflicting volume	540			476			1133	1474	238	1561	1396
vc1, stage 1 cont vol											
vc2, stage 2 cont vol	540			476			1133	1474	238	1561	1396
vcu, unblocked vol	4.1			4.1			7.5	5.5	6.9	7.5	6.5
tc, single (s)											
tc, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
tf (s)	96			82			54	85	45	0	70
p0 queue free %	1025			1063			101	98	763	26	110
cM capacity (veh/h)											
Direction/Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SBR
Volume Total	42	288	187	198	227	313	478	234			
Volume Left	0	0	0	198	0	0	0	46	189		
Volume Right	0	0	43	0	0	199	417	12			
C/S/H	1025	1700	1700	1083	1700	1700	1700	413	30		
Volume to Capacity	0.04	0.17	0.11	0.18	0.13	0.18	1.16	7.74			
Queue Length 95th (ft)	3	0	0	17	0	0	451	Err			
Control Delay (s)	8.7	0.0	0.0	9.1	0.0	0.0	124.9	Err			
Lane LOS	A	A	A	F	F	F	F	F			
Approach Delay (s)	0.7			2.4			124.9	Err			
Approach LOS	F			F			F	F			
<b>Intersection Summary</b>											
Average Delay	1219.1										
Intersection Capacity Utilization	76.3%										
ICU Level of Service	D										
Analysis Period (min)	15										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Sign Control											
Grade											
Volume (veh/h)	53	661	273	509	439	273	143	105	559	217	41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	696	287	536	462	287	151	111	588	228	43
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
px, platoon unblocked											
vc, conflicting volume	749			983			2401	2772	492	2781	2772
vc1, stage 1 cont vol											
vc2, stage 2 cont vol	749			983			2401	2772	492	2781	2772
vcu, unblocked vol	4.1			4.1			7.5	6.5	6.9	7.5	6.5
tc, single (s)											
tc, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
tf (s)	93			23			0	0	0	0	80
p0 queue free %	855			698			0	4	523	0	4
cM capacity (veh/h)											
Direction/Lane #	EB1	EB2	EB3	WB1	WB2	WB3	NB1	NB2	NB3	SB1	SBR
Volume Total	56	464	519	536	308	441	849	397			
Volume Left	56	0	0	536	0	0	151	228			
Volume Right	0	0	287	0	0	287	588	125			
C/S/H	855	1700	1700	698	1700	1700	0	0			
Volume to Capacity	0.07	0.27	0.31	0.77	0.18	0.26	Err	Err			
Queue Length 95th (ft)	5	0	0	162	0	0	Err	Err			
Control Delay (s)	9.5	0.0	0.0	25.1	0.0	0.0	Err	Err			
Lane LOS	A	A	A	D	F	F	F	F			
Approach Delay (s)	0.5			10.4			Err	Err			
Approach LOS	F			F			F	F			
<b>Intersection Summary</b>											
Average Delay	Err										
Intersection Capacity Utilization	120.6%										
ICU Level of Service	H										
Analysis Period (min)	15										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Legal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	0.91	0.95	0.95	1.00	0.85	1.00	0.85	1.00	0.89
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1441	1687	1770	1583	1770	3539	1583	3433	1650
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1441	1687	1770	1583	1770	3539	1583	3433	1650
Volume (vph)	151	1031	255	73	441	730	556	103	350	453	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1085	268	77	464	768	565	108	358	477	74
RTOR Reduction (vph)	0	0	71	0	0	409	0	0	342	0	72
Lane Group Flow (vph)	159	1085	197	77	464	359	565	108	26	477	236
Turn Type	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split
Protected Phases	4	4	4	8	8	8	5	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	1	6	6
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	262	113	657	227
v/s Ratio Prot	0.09	c0.32	0.14	0.05	c0.26	0.23	c0.33	0.03	0.02	0.14	c0.14
v/c Ratio	0.30	1.07	0.46	0.14	0.76	0.67	2.65	0.43	0.23	0.73	1.05
Uniform Delay, d1	43.1	56.0	45.4	36.8	47.6	45.4	70.0	71.2	70.2	60.8	69.0
Progression Factor	1.00	1.00	1.00	0.85	0.88	1.31	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	47.8	0.8	0.4	8.3	5.7	754.0	1.2	1.1	4.0	73.6
Delay (s)	43.4	103.8	46.2	37.2	56.0	51.1	824.0	72.4	71.2	64.8	142.5
Level of Service	D	F	D	C	D	E	F	E	E	E	F
Approach Delay (s)	D	F	D	C	D	E	F	E	E	E	F
Approach LOS	F	F	D	C	D	E	F	E	E	E	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Legal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.97	0.95	1.00	0.85	1.00	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90
Fit Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1583	3433	3539	3539	3539	3539	3539	1610	3065
Fit Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1583	3433	3539	3539	3539	3539	3539	1610	3065
Volume (vph)	0	1392	445	77	729	0	0	0	0	355	288
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1485	468	81	767	0	0	0	0	374	303
RTOR Reduction (vph)	0	0	169	0	0	0	0	0	0	0	128
Lane Group Flow (vph)	0	1485	299	81	767	0	0	0	0	374	714
Turn Type	Perm	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	4	4	4	3	6	3	6	3	6	3	6
Permitted Phases	4	4	4	3	6	3	6	3	6	3	6
Actuated Green, G (s)	36.6	36.6	36.6	4.4	45.5	4.4	45.5	4.4	45.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	37.1	4.9	46.0	4.9	46.0	4.9	46.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.46	0.06	0.58	0.06	0.58	0.06	0.58	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	734	210	2035	210	2035	210	2035	523	996
v/s Ratio Prot	c0.41	0.19	0.19	0.02	c0.22	0.02	c0.22	0.02	c0.22	0.23	0.23
v/c Ratio	0.89	0.41	0.41	0.39	0.38	0.39	0.38	0.39	0.38	0.72	0.87
Uniform Delay, d1	19.6	14.2	14.2	36.1	9.2	36.1	9.2	36.1	9.2	23.7	23.8
Progression Factor	1.45	1.85	1.85	1.04	0.94	1.04	0.94	1.04	0.94	1.00	1.00
Incremental Delay, d2	3.1	0.6	0.6	1.1	0.5	1.1	0.5	1.1	0.5	8.1	4.4
Delay (s)	31.6	26.8	26.8	38.5	9.1	38.5	9.1	38.5	9.1	31.9	28.2
Level of Service	C	C	C	D	A	D	A	D	A	C	C
Approach Delay (s)	C	C	C	D	A	D	A	D	A	C	C
Approach LOS	C	C	C	D	A	D	A	D	A	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	26.2										
HCM Volume to Capacity ratio	0.76										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	68.3%										
Analysis Period (min)	15										
dr - Defacto Right Lane	Records with 1 through lane as a right lane.										
c - Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Legal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	0.91	0.95	0.95	1.00	0.85	1.00	0.85	1.00	0.89
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1441	1687	1770	1583	1770	3539	1583	3433	1650
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1441	1687	1770	1583	1770	3539	1583	3433	1650
Volume (vph)	151	1031	255	73	441	730	556	103	350	453	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1085	268	77	464	768	565	108	358	477	74
RTOR Reduction (vph)	0	0	71	0	0	409	0	0	342	0	72
Lane Group Flow (vph)	159	1085	197	77	464	359	565	108	26	477	236
Turn Type	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split
Protected Phases	4	4	4	8	8	8	5	2	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	1	6	6
Actuated Green, G (s)	47.5	47.5	47.5	53.5	53.5	53.5	19.5	10.9	10.9	30.1	21.5
Effective Green, g (s)	48.0	48.0	48.0	54.0	54.0	54.0	20.0	11.4	11.4	30.6	22.0
Actuated g/C Ratio	0.30	0.30	0.30	0.34	0.34	0.34	0.12	0.07	0.07	0.19	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	531	1017	432	567	597	534	221	262	113	657	227
v/s Ratio Prot	0.09	c0.32	0.14	0.05	c0.26	0.23	c0.33	0.03	0.02	0.14	c0.14
v/c Ratio	0.30	1.07	0.46	0.14	0.76	0.67	2.65	0.43	0.23	0.73	1.05
Uniform Delay, d1	43.1	56.0	45.4	36.8	47.6	45.4	70.0	71.2	70.2	60.8	69.0
Progression Factor	1.00	1.00	1.00	0.85	0.88	1.31	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	47.8	0.8	0.4	8.3	5.7	754.0	1.2	1.1	4.0	73.6
Delay (s)	43.4	103.8	46.2	37.2	56.0	51.1	824.0	72.4	71.2	64.8	142.5
Level of Service	D	F	D	C	D	E	F	E	E	E	F
Approach Delay (s)	D	F	D	C	D	E	F	E	E	E	F
Approach LOS	F	F	D	C	D	E	F	E	E	E	F

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	171.1										
HCM Volume to Capacity ratio	1.17										
Actuated Cycle Length (s)	160.0										
Intersection Capacity Utilization	116.0%										
Analysis Period (min)	15										
dr - Defacto Right Lane	Records with 1 through lane as a right lane.										
c - Critical Lane Group											

11: Wilfred Avenue & Robert Lakes Road  
Graton Rancheria Casino & Hotel

10: Wilfred Ave & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

2020 Alternative E  
PM Peak

Movement	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00
Fr	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fr Protected	5085	1583	3433	3520	1681	1693	2787	1770
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fr Permitted	0.805	0.942	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	0.805	0.942	0.95	0.95	0.95	0.95	0.95	0.95
Volume (vph)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5
RTOR Reduction (vph)	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21
Lane Group Flow (vph)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Turn Type	Prot	Perm	Prot	Split	Perm	Split	Perm	Split
Permitted Phases	7	4	3	8	2	2	6	6
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	558	1540	347	349	575	365
v/s Ratio Prot	0.17	0.15	0.14	0.14	0.11	0.12	0.07	0.07
v/s Ratio Perm	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.74	1.12	0.94	0.32	0.54	0.57	0.22	0.02
Uniform Delay, d1	28.8	31.0	33.1	14.7	28.4	28.5	26.4	25.4
Progression Factor	1.46	4.56	1.22	1.25	0.90	0.90	1.51	1.00
Incremental Delay, d2	2.3	71.0	21.6	0.5	5.4	5.8	0.8	0.1
Delay (s)	44.3	212.4	62.1	18.9	31.0	31.5	40.6	25.5
Level of Service	D	F	E	B	C	C	D	C
Approach Delay (s)	135.0			41.0		37.0		25.5
Approach LOS	F			D		D		C
<b>Intersection Summary</b>								
HCM Average Control Delay	84.4							
HCM Volume to Capacity ratio	0.66							
Actuated Cycle Length (s)	80.0							
Intersection Capacity Utilization	85.9%							
Analysis Period (min)	15							
c Critical Lane Group								

Movement	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.88	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.99	1.00	0.85	1.00	0.93
Fr	1.00	1.00	0.95	1.00	0.95	0.96	1.00	0.95
Fr Protected	5085	1583	3433	3520	1681	1693	2787	1770
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fr Permitted	0.805	0.942	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	0.805	0.942	0.95	0.95	0.95	0.95	0.95	0.95
Volume (vph)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5
RTOR Reduction (vph)	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21
Lane Group Flow (vph)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Turn Type	Prot	Perm	Prot	Split	Perm	Split	Perm	Split
Permitted Phases	7	4	3	8	2	2	6	6
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	558	1540	347	349	575	365
v/s Ratio Prot	0.17	0.15	0.14	0.14	0.11	0.12	0.07	0.07
v/s Ratio Perm	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.74	1.12	0.94	0.32	0.54	0.57	0.22	0.02
Uniform Delay, d1	28.8	31.0	33.1	14.7	28.4	28.5	26.4	25.4
Progression Factor	1.46	4.56	1.22	1.25	0.90	0.90	1.51	1.00
Incremental Delay, d2	2.3	71.0	21.6	0.5	5.4	5.8	0.8	0.1
Delay (s)	44.3	212.4	62.1	18.9	31.0	31.5	40.6	25.5
Level of Service	D	F	E	B	C	C	D	C
Approach Delay (s)	135.0			41.0		37.0		25.5
Approach LOS	F			D		D		C
<b>Intersection Summary</b>								
HCM Average Control Delay	84.4							
HCM Volume to Capacity ratio	0.66							
Actuated Cycle Length (s)	80.0							
Intersection Capacity Utilization	85.9%							
Analysis Period (min)	15							
c Critical Lane Group								

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WB	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (veh/h)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.85
Lane Util. Factor	1.00	1.00	0.85	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Protected	1681	1686	1583	1741	1770	3537	1770	3537	1770	3539	1583
Satd. Flow (prot)	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Flt Permitted	1681	1686	1583	1741	1770	3537	1770	3537	1770	3539	1583
Satd. Flow (perm)	504	3	47	81	3	57	552	413	2	7	816
Volume (Vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	331	3	49	8	3	5	581	435	2	7	648
Adj. Flow (Vph)	0	0	38	0	5	0	0	0	0	0	532
RTOR Reduction (Vph)	266	268	11	0	11	0	581	437	0	7	648
Lane Group Flow (Vph)	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split	Perm	Split
Turn Type	4	4	8	8	8	8	8	8	8	8	8
Protected Phases											
Permitted Phases	4	4	8	8	8	8	8	8	8	8	8
Activated Green, G (s)	16.8	16.8	16.8	15	15	15	15	15	15	15	16.6
Effective Green, g (s)	17.3	17.3	17.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	17.1
Acquainted g/C Ratio	0.22	0.22	0.22	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (Vph)	354	365	342	44	611	1888	44	756	338	44	756
V/S Ratio Prot	0.16	0.16	0.01	0.01	0.01	0.33	0.02	0.00	0.18	0.00	0.18
V/S Ratio Perm	0.73	0.73	0.03	0.25	0.95	0.23	0.16	0.86	0.98	0.16	0.86
Uniform Delay, d1	29.2	29.2	24.7	38.3	25.5	9.9	38.2	30.3	31.3	38.2	30.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.21	1.16	2.42	1.21	1.16
Incremental Delay, d2	7.4	7.5	0.0	3.0	24.8	0.3	0.2	1.3	10.5	0.2	1.3
Delay (s)	36.5	36.7	24.8	41.3	50.3	10.2	46.4	36.3	86.0	46.4	36.3
Level of Service	D	D	C	D	D	B	D	D	D	D	D
Approach Delay (s)	35.6	35.6	24.8	41.3	50.3	10.2	46.4	36.3	86.0	46.4	36.3
Approach LOS	D	D	C	D	D	B	D	D	D	D	D
Intersection Summary											
HCM Average Control Delay	48.9 HCM Level of Service D										
HCM Volume to Capacity ratio	0.88										
Actuated Cycle Length (s)	80.0										
Sum of lost time (s)	16.0										
Intersection Capacity Utilization	94.7%										
Analysis Period (min)	15										
Critical Lane Group	C										

13: Project Dwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative E  
 PM Peak

Movement	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign/Control	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	37	765	63	0	780
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (Vph)	0	39	805	66	0	821
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream Signal (ft)						
p.x. platoon unblocked						
V/C conflicting volume	1659	838				872
V/C1, stage 1 cont vol						
V/C2, stage 2 cont vol						
V/CU, unblocked vol	1659	838				872
V/C single (S)	6.4	6.2				4.1
T/C, 2 stage (S)						
IF (s)	3.5	3.3				2.2
po queue free %	100	89				100
CM capacity (V/veh)	107	366				174
Direction: Lane	WBL	NBL	SBL			
Volume Total	39	872	821			
Volume Left	0	0	0			
Volume Right	39	866	0			
CSH	366	1700	1700			
Volume to Capacity	0.11	0.51	0.48			
Queue Length 95th (ft)	9	0	0			
Control Delay (s)	16.0	0.0	0.0			
Lane LOS	C	C	C			
Approach Delay (s)	16.0	0.0	0.0			
Approach LOS	C	C	C			
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	54.1%					
Analysis Period (min)	15					
ICU Level of Service	A					

15: Business Park Drive & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	EBL	EBR	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations								
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	144	31	12	359	353	25		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	152	33	13	378	382	26		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type								
Median storage (veh)								
Upstream signal (ft)								
nX platoon unblocked								
vC1 conflicting volume	609	204	408					
vC1 stage 1 conf vol								
vC2 stage 2 conf vol	609	204	408					
vCU unblocked vol	6.8	6.9	4.1					
tC 2 stage (s)								
tF (s)	3.5	3.3	2.2					
90 queue free %	84	96	99					
cM capacity (veh/h)	422	803	1147					
Direction Lane	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	152	33	13	189	189	255	154	
Volume Left	152	0	13	0	0	0	0	
Volume Right	0	33	0	0	0	0	26	
CSH	422	803	1147	1700	1700	1700	1700	
Volume to Capacity	0.36	0.04	0.01	0.11	0.11	0.15	0.09	
Queue Length 95th (ft)	40	3	1	0	0	0	0	
Control Delay (s)	18.2	9.7	8.2	0.0	0.0	0.0	0.0	
Lane LOS	C	A	A	A	A	A	A	
Approach Delay (s)	16.7						0.0	
Approach LOS	C						C	
<b>Intersection Summary</b>								
Average Delay	3.2							
Intersection Capacity Utilization	25.5%							
Analysis Period (min)	15							
	ICU Level of Service A							

16: Ronnett Park Expy & Stony Point Road  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	WBL	WBR	NB1	NB2	NB3	SB1	SB2	SB3
Lane Configurations								
Ideal Flow (veh/pl)	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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	0.85	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863	1770	1863
Volume (vph)	253	264	563	253	275	506		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	266	278	593	266	289	533		
RTOR Reduction (vph)	0	217	0	151	0	0		
Lane Group Flow (vph)	266	61	393	115	289	533		
Turn Type	Perm	Perm	Perm	Perm	Prot	Prot		
Protected Phases	8	2	2	2	1	6		
Permitted Phases	8	2	2	2	1	6		
Actuated Green, G (s)	13.2	13.2	26.6	26.6	9.5	40.6		
Effective Green, g (s)	13.7	13.7	27.1	27.1	10.0	41.1		
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	386	345	804	683	282	1219		
v/s Ratio Prot	0.15	0.04	0.32	0.07	0.16	0.29		
v/s Ratio Perm	0.69	0.18	0.74	0.17	1.02	0.44		
w/c Ratio	22.6	20.0	14.9	10.9	26.4	5.3		
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00		
Progression Factor	5.1	0.2	6.0	0.3	60.1	1.1		
Incremental Delay, d2	27.7	20.2	20.9	11.5	86.5	6.4		
Delay (s)	C	C	C	C	B	F		
Level of Service	C	C	C	C	B	F		
Approach Delay (s)	23.8		18.0		34.6			
Approach LOS	C		B		C			
<b>Intersection Summary</b>								
HCM Average Control Delay	25.5							
HCM Volume to Capacity ratio	0.78							
Actuated Cycle Length (s)	62.8							
Intersection Capacity Utilization	69.9%							
Analysis Period (min)	15							
	ICU Level of Service C							
	Sum of lost time (s) 12.0							
	ICU Level of Service C							
	c Critical Lane Group							

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	63	655	53	116	539	92	69	26	153	281	40	97
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	669	56	122	567	97	73	27	161	296	42	102
RTOR Reduction (vph)	0	0	44	0	0	76	0	57	70	0	55	0
Lane Group Flow (vph)	87	669	12	122	567	21	73	42	19	296	89	0
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Prot	Perm	Prot
Protected Phases	7	4	4	3	8	5	2	2	1	6		
Permitted Phases												
Actuated Green, G (s)	4.5	16.7	16.7	4.4	16.6	16.6	4.4	16.5	16.5	24.4	36.5	
Effective Green, g (s)	5.0	17.2	17.2	4.9	17.1	17.1	4.9	17.0	17.0	24.9	37.0	
Actuated g/C Ratio	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.21	0.21	0.31	0.46	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	761	340	210	756	338	210	335	320	551	770	
v/s Ratio Prot	0.05	c0.19	0.01	0.04	c0.16	0.01	c0.02	c0.03	c0.17	0.05		
w/s Ratio Perm												
w/c Ratio	0.78	0.91	0.04	0.58	0.75	0.06	0.35	0.13	0.06	0.54	0.12	
Uniform Delay, d1	37.0	30.6	24.8	36.6	29.4	25.1	36.0	25.5	25.1	22.8	12.2	
Progression Factor	1.00	1.00	1.00	0.82	0.56	0.29	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.4	14.2	0.0	3.2	3.3	0.1	1.0	0.8	0.4	1.0	0.3	
Delay (s)	66.4	44.9	24.9	33.2	19.7	7.3	37.0	28.3	25.5	23.8	12.5	
Level of Service	E	D	C	C	B	A	D	C	C	C	B	
Approach Delay (s)												
Approach LOS												

Intersection Summary	HCM Average Control Delay	HCM Level of Service
HCM Average Control Delay	30.4	C
HCM Volume to Capacity ratio	0.57	
Actuated Cycle Length (s)	80.0	
Intersection Capacity Utilization	54.8%	A
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.91	0.91	1.00	0.97	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	216	770	163	377	650	318	173	326	510	339	301	236
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	811	172	397	684	335	182	343	537	357	317	248
RTOR Reduction (vph)	0	0	115	0	0	227	0	70	264	0	0	198
Lane Group Flow (vph)	227	811	57	397	684	108	182	443	103	357	317	50
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Prot	Perm	Prot
Protected Phases	7	4	4	3	8	5	2	2	1	6		
Permitted Phases												
Actuated Green, G (s)	12.1	25.8	25.8	11.5	25.2	25.2	9.0	15.0	15.0	9.7	15.7	15.7
Effective Green, g (s)	12.6	26.3	26.3	12.0	25.7	25.7	9.5	15.5	15.5	10.2	16.2	16.2
Actuated g/C Ratio	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.19	0.19	0.13	0.20	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	1672	520	515	1137	509	210	624	279	438	377	321
v/s Ratio Prot	c0.13	0.16	0.04	c0.12	c0.19	0.10	0.14	0.07	c0.10	c0.17	0.03	
w/s Ratio Perm												
w/c Ratio	0.81	0.49	0.11	0.77	0.60	0.21	0.87	0.71	0.37	0.82	0.84	0.16
Uniform Delay, d1	32.6	21.4	18.7	32.7	22.8	19.8	34.6	30.1	28.0	34.0	30.7	26.3
Progression Factor	0.78	0.55	0.42	0.87	0.80	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.3	0.7	0.3	5.9	2.0	0.8	29.1	3.7	0.8	11.1	15.4	0.2
Delay (s)	37.7	12.5	8.2	34.2	20.2	21.5	63.7	33.9	28.8	45.1	46.1	26.5
Level of Service	D	B	A	C	C	C	E	C	C	D	D	C
Approach Delay (s)												
Approach LOS												

Intersection Summary	HCM Average Control Delay	HCM Level of Service
HCM Average Control Delay	28.5	C
HCM Volume to Capacity ratio	0.75	
Actuated Cycle Length (s)	80.0	
Intersection Capacity Utilization	66.7%	C
Analysis Period (min)	15	
c Critical Lane Group		

19: Rohnert Park Expwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.96
Lane Util. Factor	0.97	0.99	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.96
Fit Protected	4934	4934	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583
Satd. Flow (prot)	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583	1686	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583	1686	1583
Volume (vph)	0	1298	320	68	909	255	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1366	337	72	957	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	12	0	0	71
Lane Group Flow (vph)	0	1655	0	72	957	268	0	12	0	322	322	378
Turn Type		Prot	Free	Perm	Free	Perm	Free	Perm	Free	Perm	Free	Perm
Protected Phases		4	3	8	2	2	6	6	6	6	6	6
Permitted Phases		Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)		37.0	5.0	46.5	80.0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2313	122	2079	1583	484	410	392	495	410	392	495
v/s Ratio Prot		c0.34	c0.04	c0.27	0.17	0.01	0.25	c0.26	0.24	0.25	c0.26	0.24
v/s Ratio Perm		0.72	0.59	0.46	0.17	0.02	0.79	0.82	0.76	0.79	0.82	0.76
v/c Ratio		17.0	36.2	9.3	0.0	19.0	25.1	25.4	24.8	25.1	25.4	24.8
Uniform Delay, d1		0.45	1.13	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor		1.5	6.5	0.7	0.2	0.0	9.5	13.0	6.9	9.5	13.0	6.9
Incremental Delay, d2		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Delay (s)		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Level of Service		A	D	A	A	B	C	D	C	D	D	C
Approach Delay (s)		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Approach LOS		A	D	A	A	B	C	D	C	D	D	C
Intersection Summary		Intersection Summary										
HCM Average Control Delay		15.9	HCM Level of Service									
HCM Volume to Capacity ratio		0.74	HCM Level of Service									
Actuated Cycle Length (s)		80.0	Sum of lost time (s)									
Intersection Capacity Utilization		68.6%	ICU Level of Service									
Analysis Period (min)		15	Critical Lane Group									
Critical Lane Group		C										

20: Rohnert Park Expwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.97	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.96
Lane Util. Factor	0.97	0.99	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.96
Fit Protected	4934	4934	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583
Satd. Flow (prot)	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583	1686	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1770	3539	1583	1653	1681	1686	1583	1681	1686	1583	1686	1583
Volume (vph)	0	1298	320	68	909	255	6	0	17	611	1	427
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1366	337	72	957	268	6	0	18	643	1	449
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	12	0	0	71
Lane Group Flow (vph)	0	1655	0	72	957	268	0	12	0	322	322	378
Turn Type		Prot	Free	Perm	Free	Perm	Free	Perm	Free	Perm	Free	Perm
Protected Phases		4	3	8	2	2	6	6	6	6	6	6
Permitted Phases		Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)		37.0	5.0	46.5	80.0	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)		37.5	5.5	47.0	80.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.47	0.07	0.59	1.00	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2313	122	2079	1583	484	410	392	495	410	392	495
v/s Ratio Prot		c0.34	c0.04	c0.27	0.17	0.01	0.25	c0.26	0.24	0.25	c0.26	0.24
v/s Ratio Perm		0.72	0.59	0.46	0.17	0.02	0.79	0.82	0.76	0.79	0.82	0.76
v/c Ratio		17.0	36.2	9.3	0.0	19.0	25.1	25.4	24.8	25.1	25.4	24.8
Uniform Delay, d1		0.45	1.13	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor		1.5	6.5	0.7	0.2	0.0	9.5	13.0	6.9	9.5	13.0	6.9
Incremental Delay, d2		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Delay (s)		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Level of Service		A	D	A	A	B	C	D	C	D	D	C
Approach Delay (s)		9.2	47.5	8.6	0.2	19.1	34.6	38.4	31.7	34.6	38.4	31.7
Approach LOS		A	D	A	A	B	C	D	C	D	D	C
Intersection Summary		Intersection Summary										
HCM Average Control Delay		15.9	HCM Level of Service									
HCM Volume to Capacity ratio		0.74	HCM Level of Service									
Actuated Cycle Length (s)		80.0	Sum of lost time (s)									
Intersection Capacity Utilization		68.6%	ICU Level of Service									
Analysis Period (min)		15	Critical Lane Group									
Critical Lane Group		C										

21: Rohnert Park Expy & Commerce Boulevard  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.91	0.91	1.00	0.85	1.00	0.91	0.91	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.97	0.95	0.98	1.00	0.95	1.00	1.00	0.85
Fr	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.85
Fr Protected	3433	3539	1583	1770	4914	1610	3330	1583	1610	3387	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.85
Fr Permitted	3433	3539	1583	1770	4914	1610	3330	1583	1610	3387	1583	1583
Satd. Flow (perm)	235	1267	462	165	698	202	364	293	241	179	354	152
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	247	1334	486	174	735	213	404	308	254	188	373	160
Adj. Flow (vph)	0	0	342	0	62	0	0	204	0	0	0	131
RTOR Reduction (vph)	247	1334	486	174	735	213	404	308	254	188	373	160
Lane Group Flow (vph)	247	1334	486	174	735	213	404	308	254	188	373	160
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	3	3	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	12.6	22.6	20.0	20.0	20.0	15.4	15.4	15.4	15.4	14.0	14.0	14.0
Effective Green, g (s)	13.1	23.1	20.5	20.5	20.5	15.9	15.9	15.9	15.9	14.5	14.5	14.5
Actuated g/C Ratio	0.16	0.29	0.13	0.26	0.26	0.20	0.20	0.20	0.20	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	562	1022	457	232	1259	320	662	315	292	614	287	287
v/s Ratio Prot	0.07	c0.38	0.10	c0.18	0.14	c0.15	0.14	c0.15	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.44	1.31	0.31	0.75	0.70	0.72	0.73	0.16	0.62	0.62	0.62	0.62
Uniform Delay, d1	30.1	28.4	22.3	33.5	27.0	29.9	30.0	26.5	30.2	27.3	27.3	27.3
Progression Factor	0.67	0.72	1.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	143.9	1.6	12.8	3.3	7.4	4.0	0.2	3.9	1.9	0.2	0.2
Delay (s)	20.6	164.4	40.3	46.2	30.3	37.4	34.1	26.8	34.1	32.1	27.3	27.3
Level of Service	C	F	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)	118.0	F	D	D	C	D	C	C	32.8	C	C	31.6
Approach LOS	F	F	D	D	C	D	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	68.8											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	80.3%											
Analysis Period (min)	15											
c Critical Lane Group												

22: Gravenstien Hwy & Stony Point Road  
Graton Rancheria Casino & Hotel

2020 Alternative E  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.85
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.85
Fr	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.85
Fr Protected	1770	3390	1583	1770	4914	1610	3330	1583	1610	3387	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.85
Fr Permitted	1770	3390	1583	1770	4914	1610	3330	1583	1610	3387	1583	1583
Satd. Flow (perm)	235	1267	462	165	698	202	364	293	241	179	354	152
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	247	1334	486	174	735	213	404	308	254	188	373	160
Adj. Flow (vph)	0	0	342	0	62	0	0	204	0	0	0	131
RTOR Reduction (vph)	247	1334	486	174	735	213	404	308	254	188	373	160
Lane Group Flow (vph)	247	1334	486	174	735	213	404	308	254	188	373	160
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	3	3	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	5.5	16.5	16.5	16.5	16.5	13.5	13.5	13.5	13.5	23.5	23.5	23.5
Effective Green, g (s)	6.0	17.0	17.0	17.0	17.0	14.0	14.0	14.0	14.0	24.0	24.0	24.0
Actuated g/C Ratio	0.09	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.20	0.34	0.34	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	152	823	384	354	639	340	508	41	161	377	377	377
v/s Ratio Prot	c0.09	c0.23	0.08	0.20	0.02	0.03	0.03	0.03	0.03	0.09	0.09	0.20
v/s Ratio Perm	1.03	0.97	0.81	0.81	0.96	0.79	0.08	0.91	0.83	0.83	0.83	0.17
Uniform Delay, d1	32.0	26.2	31.9	25.0	20.5	27.7	20.8	15.5	31.2	25.2	20.9	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	82.0	23.1	62.4	5.8	0.1	37.3	9.9	0.3	42.2	16.4	1.0	1.0
Delay (s)	114.0	49.3	94.3	30.8	20.6	65.9	30.6	15.8	73.4	41.5	21.9	21.9
Level of Service	F	D	F	C	C	E	C	B	E	D	D	C
Approach Delay (s)	59.4	F	F	F	C	E	C	B	E	D	D	41.9
Approach LOS	F	F	F	F	C	E	C	B	E	D	D	D
Intersection Summary												
HCM Average Control Delay	45.6											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	70.0											
Intersection Capacity Utilization	81.2%											
Analysis Period (min)	15											
c Critical Lane Group												



23: Gravenstien Hwy & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt. Protected	1770	3517	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Std. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt. Permitted	1770	3517	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Std. Flow (perm)	122	754	32	53	813	406	48	28	59	592	28	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	794	34	56	856	427	51	29	62	623	29	116
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	128	824	0	56	856	263	51	34	0	623	84	0
Turn Type	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.5	21.8		4.4	20.7	3.3	6.4			39.4	42.5	
Effective Green, g (s)	6.0	22.3		4.9	21.2	3.8	6.9			39.9	43.0	
Actuated g/C Ratio	0.07	0.25		0.05	0.24	0.04	0.08			0.44	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5			4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	118	871		96	834	373	75	128		785	783	
v/s Ratio Prot	0.07	c0.23		0.03	c0.24		c0.03	0.02		c0.35	c0.05	
v/s Ratio Perm												
w/s Ratio	1.08	0.95		0.58	1.03	0.71	0.88	0.26		0.79	0.11	
Uniform Delay, d1	42.0	33.3		41.6	34.4	31.5	42.5	39.2		21.5	12.9	
Progression Factor	1.00	1.00		0.67	0.60	0.24	1.00	1.00		1.00	1.00	
Incremental Delay, d2	107.4	20.0		7.7	36.1	9.5	22.4	1.1		5.5	0.1	
Delay (s)	149.4	53.2		35.6	56.7	16.9	64.9	40.3		27.1	13.0	
Level of Service	F	D		D	E	B	E	D		C	B	
Approach Delay (s)	66.1			43.1			49.1			24.4		
Approach LOS	E			D			D			C		
<b>Intersection Summary</b>												
HCM Average Control Delay	45.8											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	76.1%											
Analysis Period (min)	15											
Critical Lane Group	c											

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt. Protected	1770	3517	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Std. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt. Permitted	1770	3517	1770	3539	1583	1770	1672	1770	1639	1770	1639	1770
Std. Flow (perm)	122	754	32	53	813	406	48	28	59	592	28	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	794	34	56	856	427	51	29	62	623	29	116
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	128	824	0	56	856	263	51	34	0	623	84	0
Turn Type	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	36.4	36.4		11.6	52.5					28.5	28.5	
Effective Green, g (s)	36.9	36.9		12.1	53.0					29.0	29.0	
Actuated g/C Ratio	0.41	0.41		0.13	0.59					0.32	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5					4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)	1451	649		238	2084					1106	510	
v/s Ratio Prot	c0.28			0.04	c0.30					c0.50	c0.13	
v/s Ratio Perm												
w/s Ratio	0.69	0.58		0.29	0.51					0.61	0.40	
Uniform Delay, d1	21.9	20.6		35.1	10.9					25.7	23.7	
Progression Factor	0.47	0.43		1.21	1.56					1.00	1.00	
Incremental Delay, d2	1.5	2.1		0.6	0.9					1.0	2.3	
Delay (s)	11.8	10.9		43.2	17.9					26.7	26.1	
Level of Service	B	B		D	B					C	C	
Approach Delay (s)	11.5			19.4			0.0			26.5		
Approach LOS	B			B			A			C		
<b>Intersection Summary</b>												
HCM Average Control Delay	18.0											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	67.7%											
Analysis Period (min)	15											
Critical Lane Group	c											

Movement	EBL	EBR	WBL	WBR	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vph)	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	0.85	0.95	0.97	1.00	0.85	0.85
Fr	1.00	1.00	1.00	0.85	1.00	1.00
Fr Protected	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3539	3539	3433	1583	3539	3539
Fr Permitted	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	3539	3433	1583	3539	3539
Volume (vph)	1596	0	663	391	273	273
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1680	0	719	412	287	287
RTOR Reduction (vph)	0	0	0	0	0	14
Lane-Group Flow (vph)	1680	0	719	412	273	273
Turn Type					Perm	
Protected Phases	4		8	2		2
Permitted Phases						
Actuated Green, G (s)	60.8	20.2	20.2	20.2	20.2	20.2
Effective Green, g (s)	61.3	20.7	20.7	20.7	20.7	20.7
Actuated g/C Ratio	0.68	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2410	790	364			
v/s Ratio Prot	c0.47	0.20	0.12			
v/s Ratio Perm					c0.17	
v/c Ratio	0.70	0.30	0.52	0.75		
Uniform Delay, d1	8.7	5.7	30.3	32.2		
Progression Factor	0.35	1.00	1.00	1.00		
Incremental Delay, d2	1.3	0.3	0.6	8.4		
Delay (s)	4.3	6.1	30.9	40.7		
Level of Service	A	A	C	D		
Approach Delay (s)	4.3	6.1	34.9			
Approach LOS	A	A	C			
<b>Intersection Summary</b>						
HCM Average Control Delay	11.6			B		
HCM Volume to Capacity ratio	0.71			B		
Actuated Cycle Length (s)	90.0			8.0		
Intersection Capacity Utilization	67.7%			C		
Analysis Period (min)	15			15		
c Critical Lane Group						

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (vph)	11	5	8	23	25	228	7	765	26	132	601	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	5	8	24	26	240	7	865	27	139	633	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type						None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1465	1762	320	1425	1738	403	640					833
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	1465	1762	320	1425	1738	403	640					833
tC, single (s)	7.5	6.5	8.9	7.5	6.5	6.9	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	65	92	99	68	63	60	99					83
p0 capacity (veh/h)	33	66	676	77	71	597	940					796
Directions Lane #	EBL	WBL	NB	NB2	NB3	NB4	SB	SB2	SB3	SB4	SB5	SB6
Volume Total	25	291	7	403	403	27	139	422	218			
Volume Left	12	24	7	0	0	0	139	0	0			
Volume Right	8	240	0	0	0	27	0	0	0			
cSH	58	423	940	1700	1700	796	1700	1700	1700			
Volume to Capacity	0.44	0.69	0.01	0.24	0.24	0.02	0.17	0.25	0.13			
Queue Length 95th (ft)	42	126	1	0	0	0	16	0	0			
Control Delay (s)	109.6	34.1	8.9	0.0	0.0	0.0	10.5	0.0	0.0			
Lane LOS	F	D	A	A	A	B	B	B	B			
Approach Delay (s)	109.6	34.1	0.1									
Approach LOS	F	D	A									
<b>Intersection Summary</b>												
Average Delay	7.3											
Intersection Capacity Utilization	48.6%									A		
Analysis Period (min)	15											

27: Millbrae Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	161	5	7	265	2	10	0	2	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	169	5	7	279	2	11	0	2	0	1	0
Pedestrians	-											
Lane Width (ft)	-											
Walking Speed (ft/s)	-											
Percent Blockage	-											
Right turn flare (veh)	-											
Median type	None											
Median storage (veh)	-											
Upstream signal (ft)	-											
pX platoon unblocked	-											
vC1, conflicting volume	281	175	13	175	469	470	172	471	472	280	280	280
vC2, stage 1 conf vol	281	175	13	175	469	470	172	471	472	280	280	280
vC2, stage 2 conf vol	4.1	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2	6.2	6.2
IC, single (s)	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	4.0	3.3
IC, 2 stage (s)	100	99	99	99	98	100	100	100	100	100	100	100
pl queue free %	1281	1402	501	489	872	499	488	758	488	758	488	758
cm capacity (veh/h)	176	288	13	1	176	288	13	1	176	288	13	1
Direction, Lane #	EBT	WBT	NBT	SBT	EBR	WBR	NBR	SBR	EBL	WBL	NBL	SBL
Volume Total	1	7	11	0	5	2	2	0	1281	1402	539	488
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0	0	0	0
cSH	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volume to Capacity	0	0	0	0	0	0	0	0	0	0	0	0
Queue Length 95th (ft)	0.1	0.2	11.8	12.4	0.1	0.1	11.8	12.4	0.1	0.1	11.8	12.4
Control Delay (s)	A	A	B	B	A	A	B	B	A	A	B	B
Lane LOS	A	A	B	B	A	A	B	B	A	A	B	B
Approach Delay (s)	0.1	0.2	11.8	12.4	0.1	0.2	11.8	12.4	0.1	0.2	11.8	12.4
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	32.9%											
Analysis Period (min)	15											
ICU Level of Service	A											

28: Millbrae Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative E  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBR
Lane Configurations	↕			↕			↕			↕		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	146	2	4	279	8	1	9	0	4	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	151	2	4	294	8	1	9	0	4	0	1
Pedestrians	-											
Lane Width (ft)	-											
Walking Speed (ft/s)	-											
Percent Blockage	-											
Right turn flare (veh)	-											
Median type	None											
Median storage (veh)	-											
Upstream signal (ft)	-											
pX platoon unblocked	-											
vC1, conflicting volume	302	156	156	156	464	467	155	468	464	298	298	298
vC2, stage 1 conf vol	302	156	156	156	464	467	155	468	464	298	298	298
vC2, stage 2 conf vol	4.1	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5	6.2	6.2	6.2
IC, single (s)	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	4.0	3.3
IC, 2 stage (s)	100	100	100	100	100	98	100	100	100	100	100	100
pl queue free %	1259	1424	493	532	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
cm capacity (veh/h)	157	306	11	5	157	306	11	5	157	306	11	5
Direction, Lane #	EBT	WBT	NBT	SBT	EBR	WBR	NBR	SBR	EBL	WBL	NBL	SBL
Volume Total	1	4	1	4	1259	1424	493	532	1259	1424	493	532
Volume Left	0	0	0	0	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0	0	0	0	0
cSH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volume to Capacity	0	0	0	0	0	0	0	0	0	0	0	0
Queue Length 95th (ft)	0.1	0.1	12.5	11.8	0.1	0.1	12.5	11.8	0.1	0.1	12.5	11.8
Control Delay (s)	A	A	B	B	A	A	B	B	A	A	B	B
Lane LOS	A	A	B	B	A	A	B	B	A	A	B	B
Approach Delay (s)	0.1	0.1	12.5	11.8	0.1	0.1	12.5	11.8	0.1	0.1	12.5	11.8
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	27.8%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBR	WBT	WBR	NBT	NBR
<b>Lane Configurations</b>						
Sign Control	Free	0%	Free	0%	Stop	0%
Grade	154	27	7	331	27	25
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	162	28	7	348	28	26
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pk. platoon unblocked						
VC1, stage 1 conf vol	191				539	176
VC2, stage 2 conf vol	191				539	176
VCU, unblocked vol	191				539	176
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)	2.2				3.5	3.3
p0 queue free %	88				94	97
q0 capacity (veh/h)	1383				500	867
<b>Direction: Lane 7</b>						
Volume Total	191	356	55			
Volume Left	0	7	26			
Volume Right	170	1383	628			
cSH	0.11	0.01	0.09			
Volume to Capacity	0	0	7			
Queue Length 95th (ft)	0.0	0.2	11.3			
Control Delay (s)	0.0	0.2	11.3			
Lane LOS	A	B	B			
Approach Delay (s)	0.0	0.2	11.3			
Approach LOS	B	B	B			
<b>Intersection Summary</b>						
Average Delay					1.2	
Intersection Capacity Utilization					33.0%	A
Analysis Period (min)					15	

Movement	EBT	EBR	WBT	WBR	NBT	NBR
<b>Lane Configurations</b>						
Sign Control	Free	0%	Free	0%	Stop	0%
Grade	160	23	36	225	0	114
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0.168	24	38	237	0	120
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pk. platoon unblocked						
VC1, stage 1 conf vol	237				493	181
VC2, stage 2 conf vol	237				493	181
VCU, unblocked vol	237				493	181
IC, single (s)	4.1				7.1	6.5
IC, 2 stage (s)	2.2				3.5	4.0
p0 queue free %	100				75	100
q0 capacity (veh/h)	1330				476	864
<b>Direction: Lane 7</b>						
Volume Total	193	275	147	0		
Volume Left	0	38	120	0		
Volume Right	24	0	27	0		
cSH	1330	1381	519	1700		
Volume to Capacity	0.00	0.03	0.28	0.00		
Queue Length 95th (ft)	0	2	29	0		
Control Delay (s)	0.0	0.0	14.7	0.0		
Lane LOS	A	B	B	A		
Approach Delay (s)	0.0	0.3	14.7	0.0		
Approach LOS	B	B	B	A		
<b>Intersection Summary</b>						
Average Delay					4.1	
Intersection Capacity Utilization					41.6%	A
Analysis Period (min)					15	

Movement	EBF	EBR	WBL	WBT	NBL	NBR
Lane Configurations	Free	Free	Stop			
Sign Control	0%	0%	0%			
Grade	131	51	0	235	55	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	138	54	0	247	58	0
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
PX, platoon, unblocked						
YC, conflicting volume			192			412
VC1, stage 1 conf vol						165
VC2, stage 2 conf vol						165
VCU, unblocked vol			41			6.4
IC, single (s)						6.2
IC, 2 stage (s)						
IF (s)			2.2			3.5
p0 queue free %			100			90
CM capacity (veh/h)			1382			596
Direction, Lane #	EBF	WBL	WBT	NBL	NBR	
Volume Total	192	247	58			
Volume Left	0	0	0			
Volume Right	54	0	0			
CSH	1700	1362	596			
Volume to Capacity	0.11	0.00	0.10			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.0	0.0	11.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.7			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay	1.4					
Intersection Capacity Utilization	22.4%				Level of Service A	
Analysis Period (min)	15					

Lane Group	EB	EBT	EBR	WBE	WBT	WBR	NBL	NBT	NBR	SB	SBT	SBT
Lane Group Flow (vph)	159	1085	268	77	464	768	585	108	368	477	310	
v/c Ratio	0.30	1.07	0.53	0.14	0.78	0.81	2.85	0.43	0.81	0.73	1.04	
Control Delay	45.0	100.2	32.7	32.5	80.8	18.9	778.1	75.6	20.8	68.1	110.0	
Queue Delay	0.0	169.8	0.0	0.0	103.7	2.9	0.0	0.0	21.3	421.4	0.0	
Total Delay	45.0	270.0	32.7	32.5	154.5	21.8	778.1	75.6	42.1	489.4	110.0	
Queue Length 50th (ft)	129	686	160	52	408	193	1028	58	0	243	269	
Queue Length 95th (ft)	196	832	268	m80	602	284	#1271	89	110	350	#471	
Internal Link Dist (ft)					220							
Turn Bay Length (ft)	150		150		150		150	110	100	275	270	
Base Capacity (vph)	331	1017	503	567	597	944	221	376	497	656	298	
Starvation Cap Reductn	0	0	0	0	217	94	0	0	0	0	0	
Spillback Cap Reductn	0	271	0	0	0	0	0	0	127	409	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	1.45	0.53	0.14	1.22	0.90	2.55	0.25	0.99	1.93	1.04	

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EB	EBT	EBR	WBE	WBT	WBR	NBL	NBT	NBR	SB	SBT	SBT
Lane Group Flow (vph)	1465	468	81	767	374	842						
v/c Ratio	0.87	0.51	0.32	0.38	0.72	0.87						
Control Delay	31.0	9.4	39.6	9.3	32.9	23.3						
Queue Delay	104.3	1.7	0.0	0.1	0.0	1.6						
Total Delay	135.3	11.1	39.6	9.4	32.9	24.9						
Queue Length 50th (ft)	497	110	18	51	179	158						
Queue Length 95th (ft)	m629	m116	m38	87	#292	231						
Internal Link Dist (ft)	220			466		348						
Turn Bay Length (ft)			300		250							
Base Capacity (vph)	1681	918	257	2035	523	1124						
Starvation Cap Reductn	491	280	0	0	0	0						
Spillback Cap Reductn	0	0	0	288	0	134						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	1.23	0.73	0.32	0.44	0.72	0.85						

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 m Defacto Right Lane. Recode with 1 through lane as a right lane.

Lane Group	EBT	NBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	847	992	525	501	189	198	601	9	18
v/c Ratio	0.74	1.04	0.94	0.32	0.54	0.57	0.57	0.02	0.05
Control Delay	44.5	57.4	64.9	18.9	31.7	32.2	6.1	25.7	18.8
Queue Delay	0.0	71.3	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	44.5	128.7	64.9	18.9	31.7	32.2	6.6	25.7	18.8
Queue Length 50th (ft)	181	-432	148	128	61	63	0	4	4
Queue Length 95th (ft)	187	#1098	#241	176	m117	m122	63	16	21
Internal Link Dist (ft)	466		345		380		200		270
Turn Bay Length (ft)	150		150		150		200		200
Base Capacity (vph)	1144	951	558	1544	347	349	052	365	363
Starvation Cap Reductn	0	134	0	0	0	0	0	0	0
Spillback Cap Reductn	0	17	0	0	0	0	140	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	1.21	0.94	0.32	0.54	0.57	0.66	0.02	0.05

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	144	1317	984	107	108
v/c Ratio	0.37	0.58	0.59	0.23	0.22
Control Delay	28.4	19.7	17.4	24.8	6.3
Queue Delay	0.0	2.2	0.0	0.0	0.0
Total Delay	28.4	22.0	17.4	24.8	6.3
Queue Length 50th (ft)	41	297	178	42	0
Queue Length 95th (ft)	m55	340	252	83	36
Internal Link Dist (ft)	80	345	164	232	200
Turn Bay Length (ft)	80	2256	1664	465	495
Base Capacity (vph)	901	760	0	0	0
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.88	0.59	0.23	0.22

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	266	268	49	16	581	437	7	648	863
v/c Ratio	0.73	0.74	0.13	0.11	1.09	0.70	0.05	0.60	0.91
Control Delay	41.2	41.3	8.2	29.3	96.8	9.5	40.4	30.5	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Total Delay	41.2	41.3	8.2	29.3	96.8	9.5	40.4	30.5	20.5
Queue Length 50th (ft)	130	131	0	5	333	35	3	164	251
Queue Length 95th (ft)	204	205	25	23	#524	124	m3	#319	m#364
Internal Link Dist (ft)	284		118		214			380	
Turn Bay Length (ft)	250	250	0	0	200	100	100	175	175
Base Capacity (vph)	441	443	452	179	531	2209	177	1077	953
Starvation Cap Reductn	0	0	0	0	0	0	0	0	60
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.60	0.11	0.09	1.09	0.20	0.04	0.60	0.97
<b>Intersection Summary</b>									
Volume exceeds capacity, queue is theoretically infinite.									
Queue shown is maximum after two cycles.									
# .95th percentile volume exceeds capacity, queue may be longer.									
Queue shown is maximum after two cycles.									
m Volume for 95th percentile queue is metered by upstream signal.									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	266	278	593	266	289	533
v/c Ratio	0.69	0.49	0.74	0.32	1.02	0.44
Control Delay	32.6	6.4	22.7	3.1	91.6	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	6.4	22.7	3.1	91.6	7.1
Queue Length 50th (ft)	94	0	188	0	126	89
Queue Length 95th (ft)	164	52	#352	38	#264	152
Internal Link Dist (ft)	480		3920		700	2550
Turn Bay Length (ft)	175		450		282	1219
Base Capacity (vph)	436	599	803	834	282	1219
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.46	0.74	0.32	1.02	0.44
<b>Intersection Summary</b>						
Volume exceeds capacity, queue is theoretically infinite.						
Queue shown is maximum after two cycles.						
# .95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						



17: Rohnert Park Expy & Labath Ave  
 Graton Rancheria Casino & Hotel

2020 Alternative E  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	87	689	56	122	567	97	73	99	89	286	144	
v/c Ratio	0.64	0.91	0.15	0.47	0.35	0.23	0.28	0.23	0.21	0.56	0.17	
Control Delay	58.8	49.1	8.8	34.3	22.3	2.9	38.1	12.0	7.8	28.4	5.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.8	49.1	8.8	34.3	22.3	2.9	38.1	12.0	7.8	28.4	5.5	
Queue Length 50th (ft)	43	178	0	19	108	1	18	11	0	123	12	
Queue Length 95th (ft)	#111	#280	29	m40	m147	m4	38	52	37	202	43	
Internal Link Dist (ft)	1540			220			1010			520		
Turn Bay Length (ft)	160	200	250	170	130				130	100		
Base Capacity (vph)	136	757	382	257	757	415	257	427	423	531	862	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.64	0.91	0.15	0.47	0.35	0.23	0.28	0.23	0.21	0.56	0.17	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
 Graton Rancheria Casino & Hotel

2020 Alternative E  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	227	811	172	397	684	335	182	513	367	357	317	248
v/c Ratio	0.81	0.49	0.27	0.77	0.60	0.46	0.87	0.74	0.67	0.81	0.84	0.48
Control Delay	44.2	12.7	2.3	38.3	20.7	4.6	73.5	31.9	12.1	51.7	51.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	12.7	2.3	38.3	20.7	4.6	73.5	31.9	12.1	51.7	51.3	7.3
Queue Length 50th (ft)	71	59	4	108	153	38	92	108	17	92	151	0
Queue Length 95th (ft)	m#111	m66	m7	m#160	m222	m42	#210	163	107	#172	#279	57
Internal Link Dist (ft)	320			520			554			480		
Turn Bay Length (ft)	200	250	350	155	250				250	175		
Base Capacity (vph)	288	1669	636	515	1134	735	210	753	565	439	396	522
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.49	0.27	0.77	0.60	0.46	0.87	0.66	0.65	0.81	0.80	0.47

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1703	72	957	268	24	322	322	449	
v/c Ratio	0.71	0.49	0.46	0.17	0.05	0.78	0.82	0.79	
Control Delay	9.2	51.2	9.5	0.2	9.5	38.5	42.5	29.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.2	51.2	9.5	0.2	9.5	38.5	42.5	29.6	
Queue Length 50th (ft)	146	29	163	0	2	143	146	149	
Queue Length 95th (ft)	185	m71	m101	m0	17	238	#267	255	
Internal Link Dist (ft)	520		960		428		378		
Turn Bay Length (ft)	225				400		400		
Base Capacity (vph)	2414	147	2078	1583	576	476	455	640	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.71	0.49	0.46	0.17	0.04	0.68	0.71	0.70	

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	FBR	WBTR	NBL	NBT	NBR	SBR
Lane Group Flow (vph)	22	1696	314	902	403	389	181	182
v/c Ratio	0.17	0.47	0.20	0.35	0.25	0.83	0.36	0.36
Control Delay	40.8	14.6	0.2	10.4	0.3	39.0	19.9	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	14.6	0.2	10.4	0.3	39.0	19.9	19.9
Queue Length 50th (ft)	12	178	0	70	0	178	70	70
Queue Length 95th (ft)	m16	257	m0	118	m0	223	94	95
Internal Link Dist (ft)	190	960		360		225	366	420
Turn Bay Length (ft)	133	3811	1583	2611	1583	730	791	801
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.47	0.20	0.35	0.25	0.53	0.23	0.23

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	1334	486	174	948	229	483	254	181	380	160
v/c Ratio	0.44	1.31	0.61	0.75	0.72	0.71	0.73	0.49	0.62	0.62	0.38
Control Delay	22.7	168.0	7.9	60.0	29.5	43.2	36.9	7.4	39.4	34.4	7.7
Queue Delay	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	168.0	8.4	60.0	29.5	43.2	36.9	7.4	39.4	34.4	7.7
Queue Length 50th (ft)	53	476	129	88	149	116	123	0	91	86	0
Queue Length 95th (ft)	56	580	5	222	221	214	176	58	158	138	47
Internal Link Dist (ft)		360		1350		601			175	150	150
Turn Bay Length (ft)	250		200		250		250		175	150	150
Base Capacity (vph)	558	1020	799	231	1322	342	707	536	342	720	462
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.31	0.66	0.75	0.72	0.67	0.68	0.47	0.53	0.53	0.35

Intersection Summary:  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 - 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	157	854	147	696	136	340	508	119	151	377	247
v/c Ratio	1.03	0.97	0.97	0.81	0.28	0.86	0.79	0.19	0.91	0.83	0.44
Control Delay	118.8	49.3	102.1	34.1	6.2	70.2	32.2	4.5	83.1	43.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	118.8	49.3	102.1	34.1	6.2	70.2	32.2	4.5	83.1	43.6	6.5
Queue Length 50th (ft)	72	176	65	148	0	146	194	0	70	154	3
Queue Length 95th (ft)	183	295	170	230	39	298	346	31	176	292	54
Internal Link Dist (ft)		689		6630		734			500	500	625
Turn Bay Length (ft)	350		500		150	550		675	177	452	565
Base Capacity (vph)	152	883	152	859	487	354	639	621	177	452	565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.97	0.97	0.81	0.28	0.86	0.79	0.19	0.91	0.83	0.44

Intersection Summary:  
 - Volume exceeds capacity, queue is theoretically infinite.  
 - Queue shown is maximum after two cycles.  
 - 95th percentile volume exceeds capacity, queue may be longer.  
 - Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	WBRT	WBL	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	828	56	856	427	51	91	623
v/c Ratio	1.08	0.84	0.47	0.95	0.75	0.43	0.44	0.81
Control Delay	150.1	41.0	39.1	39.6	12.5	52.2	22.9	34.4
Queue Delay	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0
Total Delay	150.1	41.5	39.1	39.6	13.0	52.2	22.9	34.4
Queue Length 50th (ft)	-82	240	31	247	5	28	16	310
Queue Length 95th (ft)	#194	#354	m58	#361	#111	65	59	#556
Internal Link Dist (ft)	6630	350			200			236
Turn Bay Length (ft)	225	150			80	50		225
Base Capacity (vph)	118	981	118	904	564	118	366	767
Starvation Cap Reductn	0	0	0	0	16	0	0	0
Spillback Cap Reductn	0	22	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.86	0.47	0.95	0.78	0.43	0.25	0.81

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBRT	WBRT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	1003	482	69	1067	674	272	272
v/c Ratio	0.97	0.63	0.27	0.51	0.61	0.61	0.47
Control Delay	12.1	8.3	42.6	18.1	28.6	28.6	18.3
Queue Delay	0.4	0.5	0.0	0.3	0.0	0.0	0.0
Total Delay	12.5	8.8	42.6	18.4	28.6	28.6	18.3
Queue Length 50th (ft)	151	87	38	253	164	75	148
Queue Length 95th (ft)	m181	m121	m78	314	222	148	585
Internal Link Dist (ft)	350				370		
Turn Bay Length (ft)		50	100			425	
Base Capacity (vph)	1486	767	295	2084	1108	577	577
Starvation Cap Reductn	138	65	0	404	0	0	0
Spillback Cap Reductn	34	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.69	0.23	0.64	0.61	0.61	0.47

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1680	719	412	287
v/c Ratio	0.70	0.30	0.52	0.76
Control Delay	4.9	7.0	31.7	42.5
Queue Delay	0.1	0.0	0.0	0.0
Total Delay	4.9	7.0	31.7	42.5
Queue Length 50th (ft)	189	75	105	143
Queue Length 95th (ft)	250	137	131	205
Internal Link Dist (ft)	370	312	431	
Turn Bay Length (ft)			395	275
Base Capacity (vph)	2409	2409	1221	574
Starvation Cap Reductn	61	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.30	0.34	0.50

Intersection Summary

**NEAR-TERM 2008 + ALTERNATIVE H  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	0%	Free	0%	Free	0%	Free	0%	Free	0%	Free	0%
Grade	0	8	14	123	11	132	11	754	97	148	514	6
Volume (veh/h)	0	95	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0	8	15	129	12	139	12	794	102	156	541	6
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1748	1775	544	1739	1727	845	547					895
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	1748	1775	544	1739	1727	845	547					895
vCU, unblocked vol	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
IC, single (s)												
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	100	87	97	0	83	62	99					79
p0 capacity (veh/h)	30	65	539	50	70	363	1022					758
Direction: Lane #	EB1	WB1	NB1	NB2	SB1	SB2	SB1	SB2	SB1	SB2	SB1	SB2
Volume Total	23	280	12	896	156	547						
Volume Left	0	129	0	0	156	0						
Volume Right	15	139	0	102	0	0						
cSH	148	90	1022	1700	798	1700						
Volume to Capacity	0.16	3.12	0.01	0.53	0.21	0.32						
Queue Length 95th (ft)	13	Err	1	0	19	0						
Control Delay (s)	33.9	Err	8.6	0.0	11.0	0.0						
Lane LOS	D	F	A	F	B	B						
Approach Delay (s)	33.9	Err	0.1		2.4							
Approach LOS	D	F										
Intersection Summary												
Average Delay	1464.4											
Intersection Capacity Utilization	77.8%											
ICU Level of Service	D											
Analysis Period (min)	15											

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	0%	Free	0%	Free	0%	Free	0%	Free	0%	Free	0%
Grade	0	8	14	123	11	132	11	754	97	148	514	6
Volume (veh/h)	0	95	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0	8	15	129	12	139	12	794	102	156	541	6
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	266	266	258	258	258	258	258	566	555	251	566	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	266	266	258	258	258	258	258	566	555	251	566	252
vCU, unblocked vol	4.1	4.1	4.1	4.1	4.1	4.1	4.1	7.1	6.5	6.2	7.1	6.5
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0
p0 queue free %	99	99	99	99	99	99	99	97	98	99	97	98
p0 capacity (veh/h)	1298	1298	1309	1309	1309	1309	1309	416	434	788	416	433
Direction: Lane #	EB1	WB1	NB1	NB2	SB1	SB2	SB1	SB2	SB1	SB2	SB1	SB2
Volume Total	266	275	32	32	32	32						
Volume Left	11	8	11	11	11	11						
Volume Right	11	8	11	11	11	11						
cSH	1298	1309	502	500	500	500						
Volume to Capacity	0.01	0.01	0.06	0.06	0.06	0.06						
Queue Length 95th (ft)	1	0	5	5	5	5						
Control Delay (s)	0.4	0.3	12.7	12.7	12.7	12.7						
Lane LOS	A	A	B	B	B	B						
Approach Delay (s)	0.4	0.3	12.7	12.7	12.7	12.7						
Approach LOS	B	B	B	B	B	B						
Intersection Summary												
Average Delay	1.6											
Intersection Capacity Utilization	27.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

3: Wilfred Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EET	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	232	10	7	241	15	10	10	10	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	244	11	7	254	16	11	11	11	11	11	11
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	269			255			563	555	249	563	552	262
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	269			255			563	555	249	563	552	262
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	98	99	97	98	99
qM capacity (veh/h)	1294			1310			419	434	789	419	436	777
Directions, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	265	277	32	32								
Volume Left	11	7	11	11								
Volume Right	11	16	11	11								
cSH	1294	1310	503	503								
Volume to Capacity	0.01	0.01	0.06	0.06								
Queue Length 95th (ft)	1	0	5	5								
Control Delay (s)	0.4	0.3	12.6	12.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.4	0.3	12.6	12.6								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay							1.6					
Intersection Capacity Utilization							27.4%			A		
Analysis Period (min)							15					

4: Wilfred Ave & Langner Ave  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EET	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	10	129	113	137	179	8	85	17	114	10	10	10
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	136	119	144	188	8	89	18	120	11	11	11
Hourly flow rate (vph)												
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	197			255			713	702	195	826	757	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	197			255			713	702	195	826	757	193
vCU, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	98	99	97	98	99
qM capacity (veh/h)	1376			1310			304	320	846	218	298	849
Directions, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	265	341	227	32								
Volume Left	11	144	89	11								
Volume Right	119	8	120	11								
cSH	1376	1310	462	329								
Volume to Capacity	0.01	0.11	0.49	0.10								
Queue Length 95th (ft)	1	9	67	8								
Control Delay (s)	0.4	4.0	20.1	17.1								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.4	4.0	20.1	17.1								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay							7.6					
Intersection Capacity Utilization							59.4%			B		
Analysis Period (min)							15					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	15	183	54	424	304	25	20	17	395	17	3	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	193	57	446	320	26	21	18	416	18	3	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
pX, conflicting volume	346			249			1481	1492	221	1903	1507	333
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	346			249			1481	1492	221	1903	1507	333
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			66			71	78	49	0	96	100
cM capacity (veh/h)	1213			1316			73	81	819	16	79	709
Direction Lane #	EB1	WB1	NB1	EB1	WB1	NB1	EB1	WB1	NB1	EB1	WB1	NB1
Volume Total	265	793	455	22								
Volume Left	16	446	21	18								
Volume Right	57	26	416	1								
CSH	1213	1316	447	19								
Volume to Capacity	0.01	0.34	1.02	1.18								
Queue Length 95th (ft)	1	38	339	77								
Control Delay (s)	0.6	6.8	77.8	557.9								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.6	6.8	77.8	557.9								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	34.7											
Intersection Capacity Utilization	90.7%											
Analysis Period (min)	15											
ICU Level of Service	E											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	525	59	82	726	23	21	14	75	14	2	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	553	62	86	764	24	22	15	79	15	2	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
pX, conflicting volume	0.68			615			1563	1568	584	1642	1587	776
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	0.68			615			1563	1568	584	1642	1587	776
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			91			36	68	85	23	95	98
cM capacity (veh/h)	613			965			34	46	512	19	44	309
Direction Lane #	EB1	WB1	NB1	EB1	WB1	NB1	EB1	WB1	NB1	EB1	WB1	NB1
Volume Total	626	875	116	23								
Volume Left	12	86	22	15								
Volume Right	62	24	79	6								
CSH	613	965	103	28								
Volume to Capacity	0.02	0.09	1.12	0.84								
Queue Length 95th (ft)	1	7	186	67								
Control Delay (s)	0.5	2.3	202.7	323.7								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.5	2.3	202.7	323.7								
Approach LOS	F	F	F	F								
Intersection Summary												
Average Delay	20.3											
Intersection Capacity Utilization	92.4%											
Analysis Period (min)	15											
ICU Level of Service	F											

7: Wilfred Avenue & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	0.99	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.93	1.00	0.93
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1828	1681	1770	1583	1770	1583	1681	1770	1583	1681	1770	1583
Flt Permitted	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1828	1681	1770	1583	1770	1583	1681	1770	1583	1681	1770	1583
Volume (vph)	46	500	67	180	558	541	172	154	267	425	128	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	526	71	189	587	569	181	162	281	447	135	105
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	258	0	17	0
Lane Group Flow (vph)	0	642	0	189	587	329	181	162	23	447	223	0
Turn Type	Split	Split	Split	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	5	2	2	1	1	6
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	48.5	53.5	53.5	53.5	53.5	53.5	18.6	12.6	12.6	27.4	21.4	21.4
Effective Green, g (s)	49.0	54.0	54.0	54.0	54.0	54.0	19.1	13.1	13.1	27.9	21.9	21.9
Actuated g/C Ratio	0.31	0.34	0.34	0.34	0.34	0.34	0.12	0.08	0.08	0.17	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	560	567	597	534	211	290	130	589	238	589	238	238
v/s Ratio Prot	c0.35	0.11	c0.33	0.21	c0.10	0.05	0.13	c0.13	0.13	c0.13	0.13	c0.13
v/s Ratio Perm	1.15	0.33	0.98	0.62	0.96	0.56	0.18	0.75	0.94	0.75	0.94	0.94
Uniform Delay, d1	55.5	39.6	52.6	44.3	69.1	70.7	68.4	62.7	68.4	62.7	68.4	68.4
Progression Factor	1.00	0.88	0.91	1.06	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95
Incremental Delay, d2	85.5	1.3	29.7	4.4	27.4	2.3	0.7	5.0	40.6	2.3	5.0	40.6
Delay (s)	141.0	36.3	77.5	51.2	96.5	73.0	69.1	64.6	105.5	64.6	105.5	105.5
Level of Service	F	D	E	D	F	E	E	E	F	E	F	F
Approach Delay (s)	141.0	60.6	78.1	78.1	78.1	78.1	78.1	78.1	78.9	78.1	78.9	78.9
Approach LOS	F	E	E	E	E	E	E	E	F	E	F	F
Intersection Summary												
HCM Average Control Delay	83.4											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	160.0											
Intersection Capacity Utilization	96.0%											
Analysis Period (min)	15											
Critical Lane Group	C											

8: Commerce Boulevard & Redwood Drive  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3274	3274	1770	3539	1583	1770	3529	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	3274	3274	1770	3539	1583	1770	3529	1770
Volume (vph)	5	30	138	5	95	95	164	147	5	30	233	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	32	145	5	100	100	173	155	5	32	245	5
RTOR Reduction (vph)	0	0	129	0	89	0	0	0	0	2	0	0
Lane Group Flow (vph)	5	32	16	3	111	111	0	173	155	3	32	249
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	3	3	5	2	2	1	1	6
Permitted Phases	7	4	4	3	3	3	5	2	2	1	1	6
Actuated Green, G (s)	1.3	8.5	8.5	1.3	8.5	8.5	13.5	48.9	48.9	3.3	38.7	1.3
Effective Green, g (s)	1.8	9.0	9.0	1.8	9.0	9.0	14.0	49.4	49.4	3.8	39.2	1.8
Actuated g/C Ratio	0.02	0.11	0.11	0.02	0.11	0.11	0.18	0.62	0.62	0.05	0.49	0.02
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	40	210	178	40	368	368	310	2185	978	84	1729	40
v/s Ratio Prot	c0.00	0.02	0.01	0.00	c0.03	c0.03	c0.10	0.04	0.04	0.02	c0.07	0.00
v/s Ratio Perm	0.12	0.15	0.09	0.12	0.30	0.30	0.56	0.07	0.00	0.38	0.14	0.12
Uniform Delay, d1	38.3	32.1	31.8	38.3	32.6	32.6	30.2	6.1	5.9	37.0	11.2	38.3
Progression Factor	1.00	1.00	1.00	1.00	0.82	1.30	0.94	0.77	0.69	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.2	1.1	0.4	0.4	1.5	0.0	0.0	2.9	0.2	1.4
Delay (s)	39.7	32.4	32.1	32.4	42.6	42.6	29.9	4.8	4.1	39.8	11.4	39.7
Level of Service	D	C	C	D	D	D	C	A	A	D	B	D
Approach Delay (s)	39.7	32.4	32.1	32.4	42.6	42.6	29.9	4.8	4.1	39.8	11.4	39.7
Approach LOS	D	C	C	D	D	D	C	A	A	D	B	D
Intersection Summary												
HCM Average Control Delay	24.6											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	31.4%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	0.91	0.95	0.95	0.88	1.00	1.00	0.97
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.97	1.00
Flt. Protected	0	0	0	0	0	0	0	0	0	0	0
Std. Flow (prot)	3539	1583	3433	3539	1610	3071	1610	3071	1610	3071	1610
Std. Flow (perm)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Volume (vph)	0	751	440	93	727	0	0	0	327	327	552
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.85	0.95	0.95
Adj. Flow (vph)	0	791	463	98	765	0	0	0	344	344	581
RTOR Reduction (vph)	0	0	140	0	0	0	0	0	0	0	129
Lane Group Flow (vph)	0	791	323	98	765	0	0	0	344	344	736
Turn Type	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	4	3	8	3	8	6	6	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	36.6	36.6	44	45.5	45.5	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	4.9	46.0	46.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.06	0.58	0.58	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1641	734	210	2035	2035	523	998	523	998	523	998
v/s Ratio Prot	c0.22	0.20	0.03	c0.22	c0.22	0.21	0.26	0.21	0.26	0.21	0.26
v/s Ratio Perm	0.48	0.44	0.47	0.38	0.38	0.66	0.94	0.66	0.94	0.66	0.94
Uniform Delay, d1	14.8	14.5	36.3	9.2	9.2	23.2	24.6	23.2	24.6	23.2	24.6
Progression Factor	1.18	1.69	1.21	1.69	1.69	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.8	1.2	0.4	0.4	6.4	6.6	6.4	6.6	6.4	6.6
Delay (s)	17.8	25.0	45.1	15.9	15.9	29.5	31.2	29.5	31.2	29.5	31.2
Level of Service	B	C	D	B	B	C	C	C	C	C	C
Approach Delay (s)	20.5	19.2	30.8	19.2	19.2	30.8	30.8	30.8	30.8	30.8	30.8
Approach LOS	C	C	A	B	B	C	C	C	C	C	C

Intersection Summary

HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
dr Delacto Right Lane		Recode with 1 though lane as a right lane.	
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	0.97	0.95	0.91	0.95	0.95	0.88	1.00	1.00	0.97
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.97	1.00
Flt. Protected	0	0	0	0	0	0	0	0	0	0	0
Std. Flow (prot)	5083	1583	3433	3539	1681	1713	1681	1713	1681	1713	1681
Std. Flow (perm)	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Volume (vph)	0	495	583	409	301	116	509	107	572	42	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	521	614	431	317	122	536	113	602	44	43
RTOR Reduction (vph)	0	0	476	0	41	0	0	0	478	0	7
Lane Group Flow (vph)	0	521	138	431	398	0	316	333	124	44	45
Turn Type	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	3	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	588	1484	347	353	575	365	374	365	374
v/s Ratio Prot	c0.10	0.09	0.13	0.12	0.19	c0.19	0.04	0.04	0.02	0.02	0.02
v/s Ratio Perm	0.46	0.39	0.77	0.27	0.91	0.94	0.22	0.12	0.12	0.12	0.12
Uniform Delay, d1	26.8	26.3	32.1	14.3	31.0	31.3	26.4	25.8	25.8	25.8	25.8
Progression Factor	1.45	9.36	1.19	1.24	1.00	0.99	2.24	0.86	0.84	0.84	0.84
Incremental Delay, d2	1.1	2.7	6.1	0.4	25.4	30.3	0.7	0.7	0.7	0.7	0.7
Delay (s)	40.0	249.0	44.2	18.2	56.3	61.4	59.7	23.0	22.5	22.5	22.5
Level of Service	D	F	D	B	E	E	E	C	C	C	C
Approach Delay (s)	153.1	31.1	59.3	31.1	59.3	59.3	22.7	22.7	22.7	22.7	22.7
Approach LOS	F	C	C	C	E	E	C	C	C	C	C

Intersection Summary

HCM Average Control Delay	82.7	HCM Level of Service	F
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	WBL	WBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00	0.85	1.00
Fr	0.95	0.95	1.00	1.00	0.85	1.00
Flt Protected	3433	3539	3510	1770	1583	
Sat'd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	
Sat'd. Flow (perm)	3433	3539	3510	1770	1583	
Volume (vph)	187	922	610	35	93	217
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	197	971	642	37	98	228
RTOR Reduction (vph)	0	0	4	0	0	168
Lane Group Flow (vph)	197	971	675	0	98	60
Turn Type	Prot	Prot	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	6	6	6
Permitted Phases						
Actuated Green, G (s)	9.8	50.5	36.2	20.5	20.5	20.5
Effective Green, g (s)	10.3	51.0	36.7	21.0	21.0	21.0
Actuated g/C Ratio	0.13	0.84	0.46	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	442	2256	1610	465	416	
v/s Ratio Prot	0.06	0.27	0.19	0.06	0.06	0.04
v/s Ratio Perm						
v/c Ratio	0.45	0.43	0.42	0.21	0.14	0.14
Uniform Delay, d1	32.2	7.2	14.5	23.0	22.5	22.5
Progression Factor	0.94	2.03	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.5	0.8	1.0	0.7	0.7
Delay (s)	31.0	15.3	15.3	24.1	23.3	23.3
Level of Service	C	B	B	C	C	C
Approach Delay (s)	17.9	15.3	23.6			
Approach LOS	B	B	B	C	C	C
Intersection Summary						
HCM Average Control Delay	17.9					
HCM Volume to Capacity ratio	0.37					
Actuated Cycle Length (s)	80.0					
Intersection Capacity Utilization	38.5%					
Analysis Period (min)	15					
c Critical Lane Group						

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	MBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.85
Lane Util. Factor	1.00	1.00	0.85	1.00	0.96	1.00	1.00	1.00	1.00	1.00	0.85
Fr	0.95	0.95	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	1681	1686	1583	1741	1770	3537	1770	3539	1583		
Sat'd. Flow (prot)	0.95	0.95	1.00	0.98	0.95	1.00	0.95	1.00	1.00	1.00	0.85
Flt Permitted	0.95	0.95	1.00	0.98	0.98	1.00	0.95	1.00	1.00	1.00	0.85
Sat'd. Flow (perm)	1681	1686	1583	1741	1770	3537	1770	3539	1583		
Volume (vph)	708	3	40	8	3	5	514	475	2	7	408
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	745	3	42	8	3	5	541	500	2	7	429
RTOR Reduction (vph)	0	0	31	0	5	0	0	0	0	0	0
Lane Group Flow (vph)	373	375	11	0	11	0	541	501	0	7	429
Turn Type	Split	Split	Perm	Split	Split	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	4	4	4	8	8	5	2	1	6		6
Permitted Phases											
Actuated Green, G (s)	19.7	19.7	19.7	1.5	1.5	27.1	39.3	1.5	13.7	13.7	13.7
Effective Green, g (s)	20.2	20.2	20.2	2.0	2.0	27.6	39.8	2.0	14.2	14.2	14.2
Actuated g/C Ratio	0.25	0.25	0.25	0.02	0.02	0.35	0.50	0.02	0.18	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	424	426	400	44	44	611	1760	44	628	628	281
v/s Ratio Prot	0.22	0.22	0.22	0.01	0.01	0.31	0.14	0.01	0.00	0.00	0.07
v/s Ratio Perm											
v/c Ratio	0.88	0.88	0.88	0.03	0.03	0.89	0.28	0.03	0.16	0.16	0.41
Uniform Delay, d1	28.7	28.7	22.5	38.3	38.3	24.7	11.8	38.2	30.8	29.2	29.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.29	1.14	1.14	5.40
Incremental Delay, d2	18.4	18.6	0.0	3.0	3.0	14.4	0.4	1.1	1.1	1.1	4.0
Delay (s)	47.1	47.4	22.5	41.3	41.3	39.1	12.2	50.3	39.2	39.2	160.5
Level of Service	D	D	C	D	D	D	B	D	D	D	F
Approach Delay (s)	45.9	45.9	26.1	41.3	41.3	26.1	112.0	112.0	112.0	112.0	112.0
Approach LOS	D	D	C	D	D	D	C	D	D	D	F
Intersection Summary											
HCM Average Control Delay	63.3										
HCM Volume to Capacity ratio	0.82										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	80.1%										
Analysis Period (min)	15										
c Critical Lane Group											

Movement	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	Stop	Free	Free	Free	Free	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	0	0	0	0	0
Volume (veh/h)	0	0	872	0	0	670
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	918	0	0	705
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1623	918				918
vC1, stage 1 cont vol						
vC2, stage 2 cont vol	1623	918				918
vCU, unblocked vol	6.4	6.2				4.1
IC, single (s)						
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	100	100				100
cM capacity (veh/h)	113	329				743
Direction Lane #	WBL	NBR	NBR	SBL	SBR	SBR
Volume Total	0	918	705			
Volume Left	0	0	0			
Volume Right	0	0	0			
CSH	1700	1700	1700			
Volume to Capacity	0.00	0.54	0.41			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
<b>Intersection Summary</b>						
Average Delay				0.0		
Intersection Capacity Utilization				45.2%	ICU Level of Service A	
Analysis Period (min)				15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	0	0	0	0	0
Volume (veh/h)	211	105	74	0	0	222
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	222	111	78	0	0	234
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	78					633
vC1, stage 1 cont vol						
vC2, stage 2 cont vol	78					633
vCU, unblocked vol	4.1					6.4
IC, single (s)						
IC, 2 stage (s)						
IF (s)	2.2					3.5
p0 queue free %	85					100
cM capacity (veh/h)	1521					379
Direction Lane #	EBT	WBT	WBT	SBL	SBR	SBR
Volume Total	333	78	234			
Volume Left	222	0	0			
Volume Right	0	0	234			
CSH	1521	1700	983			
Volume to Capacity	0.15	0.05	0.24			
Queue Length 95th (ft)	13	0	23			
Control Delay (s)	5.6	0.0	9.8			
Lane LOS	A	A	A			
Approach Delay (s)	5.6	0.0	9.8			
Approach LOS	A	A	A			
<b>Intersection Summary</b>						
Average Delay				6.4		
Intersection Capacity Utilization				44.3%	ICU Level of Service A	
Analysis Period (min)				15		

15: Business Park Drive & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative H  
PM Peak

Movement	EBL	EBR	NBL	NBR	SBT	SBR
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	172	89	33	464	489	41
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	181	94	35	488	515	43
Heavily flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	None					
Median type						
Median storage (veh)						
Upstream signal (ft)						
Pk. Platoon unblocked						
VC, conflicting volume	850	279	558			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol	850	279	558			
VCU, unblocked vol	6.8	6.9	4.1			
IC, single (s)						
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	37	87	97			
cm capacity (veh/h)	289	718	1009			
Direction, Lane #	EB1	EB2	NB1	NB2	SB1	SB2
Volume Total	181	94	35	244	244	215
Volume Left	181	0	35	0	0	0
Volume Right	0	94	0	0	0	43
CSH	289	718	1009	1700	1700	1700
Volume to Capacity	0.63	0.13	0.03	0.14	0.20	0.13
Queue Length 95th (ft)	97	11	3	0	0	0
Control Delay (s)	36.2	10.8	8.7	0.0	0.0	0.0
Lane LOS	E	B	A			
Approach Delay (s)	27.5		0.6			0.0
Approach LOS	D					
<b>Intersection Summary</b>						
Average Delay	5.8					
Intersection Capacity Utilization	37.7%					
Analysis Period (min)	15					
	ICU Level of Service A					

16: Rohnert Park Expy & Stony Point Road  
Graton Rancheria Casino & Hotel

2008 Alternative H  
PM Peak

Movement	WBL	WBR	NBL	NBR	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Flt. Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt. Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	257	286	586	251	212	457
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	271	301	617	264	223	481
RTOR Reduction (vph)	0	235	0	150	0	0
Lane Group Flow (vph)	271	66	617	114	223	481
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	2	2	1	6	
Permitted Phases	8	2	2	2	2	
Actuated Green, G (s)	13.3	13.3	26.7	26.7	9.4	40.6
Effective Green, g (s)	13.8	13.8	27.2	27.2	9.9	41.1
Actuated g/C Ratio	0.22	0.22	0.43	0.43	0.16	0.65
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	388	347	806	685	279	1217
V/S Ratio Prot	c0.15	c0.33	c0.13	c0.26		
V/S Ratio Perm	0.04					
v/c Ratio	0.70	0.19	0.77	0.17	0.60	0.40
Uniform Delay, d1	22.6	20.0	15.1	10.9	25.5	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	0.3	6.8	0.5	14.7	1.0
Delay (s)	28.0	20.3	22.0	11.4	40.3	6.1
Level of Service	C	C	C	B	D	A
Approach Delay (s)	24.0		18.8		16.9	
Approach LOS	C		B		B	
<b>Intersection Summary</b>						
HCM Average Control Delay	19.6					
HCM Volume to Capacity ratio	0.75					
Actuated Cycle Length (s)	62.9					
Intersection Capacity Utilization	66.8%					
Analysis Period (min)	15					
	ICU Level of Service C					
	Sum of lost time (s) 12.0					
	ICU Level of Service C					
	Critical Lane Group					

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

2008

Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	1.00	1.00	0.90
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.88	0.85	1.00	0.90	1.00	1.00	0.90
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1688	1688
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	1559	1504	1770	1688	1688
Volume (vph)	50	600	36	202	575	365	64	19	154	492	43	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	632	38	213	605	384	67	20	162	518	45	104
RTOR Reduction (vph)	0	0	29	0	0	285	0	63	69	0	59	0
Lane Group Flow (vph)	53	632	9	213	605	399	67	34	16	518	90	0
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	3	18.0	18.0	5.5	20.2	20.2	4.4	14.1	14.1	24.4	34.1	34.1
Actuated Green, G (s)	3.8	18.5	18.5	6.0	20.7	20.7	4.9	14.6	14.6	24.9	34.6	34.6
Effective Green, g (s)	0.05	0.23	0.23	0.08	0.26	0.26	0.06	0.18	0.18	0.31	0.43	0.43
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	84	818	366	257	916	410	210	285	274	551	721	721
Lane Grp Cap (vph)	0.03	c0.18	0.01	c0.06	0.17	0.06	c0.02	c0.02	0.01	c0.29	0.05	0.05
v/s Ratio Prot	0.63	0.77	0.02	0.83	0.66	0.24	0.32	0.12	0.06	0.84	0.12	0.12
v/s Ratio Perm	37.4	28.8	23.8	36.5	28.5	23.4	36.0	27.3	27.0	26.8	13.6	13.6
Uniform Delay, d1	1.00	1.00	1.00	0.94	0.51	0.44	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	14.4	4.6	0.0	13.8	1.2	0.2	0.9	0.9	0.4	24.4	0.4	0.4
Incremental Delay, d2	51.8	33.3	23.8	48.2	14.7	10.5	36.8	28.2	27.4	51.2	14.0	14.0
Delay (s)	D	C	C	D	B	B	D	C	C	D	B	B
Level of Service	D	C	C	D	B	B	D	C	C	D	B	B
Approach Delay (s)	34.2			19.3			30.2			42.9		
Approach LOS	C			B			C			D		D
Intersection Summary												
HCM Average Control Delay	29.6											
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	66.3%											
Analysis Period (min)	15											
C Critical Lane Group	C											

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008

Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	1.00	0.97	0.95	1.00	0.97	0.95	0.91	0.97	1.00	0.85
Lane Util. Factor	1.00	0.91	1.00	0.85	1.00	0.85	1.00	0.85	0.94	0.85	1.00	0.85
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1770	5085	1583	3433	3539	1583	1770	1770	3191	1441	3433	1663
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	1770	5085	1583	3433	3539	1583	1770	1770	3191	1441	3433	1663
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	1770	3191	1441	3433	1663
Volume (vph)	233	923	146	371	867	358	137	252	422	364	264	243
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	245	972	154	391	913	377	144	265	444	383	278	256
RTOR Reduction (vph)	0	0	103	0	0	250	0	117	227	0	0	206
Lane Group Flow (vph)	245	972	51	391	913	127	144	318	47	383	278	50
Turn Type	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Prot	Perm
Protected Phases	7	4	4	3	8	5	2	5	2	1	6	6
Permitted Phases	4	26.0	26.0	11.5	25.3	25.3	9.5	13.1	13.1	11.4	15.0	15.0
Actuated Green, G (s)	12.2	26.5	26.5	12.0	25.8	25.8	10.0	13.6	13.6	11.9	15.5	15.5
Effective Green, g (s)	0.16	0.33	0.33	0.15	0.32	0.32	0.12	0.17	0.17	0.15	0.19	0.19
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	281	1684	524	515	1141	511	221	542	245	511	361	307
Lane Grp Cap (vph)	c0.14	0.19	0.03	0.11	c0.26	0.08	0.10	0.08	0.10	c0.11	c0.15	0.03
v/s Ratio Prot	0.87	0.58	0.10	0.76	0.80	0.25	0.65	0.59	0.19	0.75	0.77	0.16
v/s Ratio Perm	32.9	22.1	18.5	32.6	24.7	20.0	33.3	30.6	28.5	32.6	30.6	26.8
Uniform Delay, d1	0.77	0.67	0.88	0.73	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	15.9	0.9	0.2	4.9	4.6	0.9	6.7	1.6	0.4	6.0	9.7	0.2
Incremental Delay, d2	41.1	15.7	16.5	28.5	20.6	13.9	40.1	32.2	28.9	38.6	40.3	27.1
Delay (s)	D	B	B	C	C	B	D	C	C	D	D	C
Level of Service	D	B	B	C	C	B	D	C	C	D	D	C
Approach Delay (s)	20.4			20.9			32.5			35.9		
Approach LOS	C			C			C			D		D
Intersection Summary												
HCM Average Control Delay	25.7											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	72.1%											
Analysis Period (min)	15											
C Critical Lane Group	C											

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.95	1.00	1.00	0.90	1.00	1.00	0.85	1.00	0.95	1.00
Lane Util. Factor	0.96	1.00	1.00	0.85	1.00	0.99	0.95	0.95	1.00	0.85	0.95	1.00
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	4865	1770	3539	1583	1583	1583	1581	1586	1583	1581	1586	1583
Flt Permitted	1.00	0.95	1.00	1.00	1.00	0.91	0.74	0.71	1.00	0.74	0.71	1.00
Satd. Flow (perm)	4865	1770	3539	1583	1529	1311	1254	1583	1583	1311	1254	1583
Volume (vph)	0	1215	493	68	1235	199	7	0	17	702	1	351
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1229	519	72	1300	209	7	0	18	735	1	369
RTOR Reduction (vph)	0	86	0	0	0	0	0	0	12	0	0	28
Lane Group Flow (vph)	0	1712	0	72	1300	209	0	13	0	370	370	341
Turn Type	Prot	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8	2	2	6	6	6	6	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	35.4	4.8	44.7	80.0	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Effective Green, g (s)	35.9	5.3	45.2	80.0	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
Actuated g/C Ratio	0.95	0.07	0.57	1.00	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2183	117	2000	1583	512	439	420	530	439	420	530	530
v/s Ratio Prot	c0.35	0.04	c0.37	0.13	0.01	0.28	c0.30	0.22	0.28	c0.30	0.22	0.22
v/s Ratio Perm	0.78	0.62	0.85	0.13	0.03	0.84	0.88	0.64	0.84	0.88	0.64	0.64
v/c Ratio	18.8	36.4	12.0	0.0	17.8	24.6	25.1	22.6	24.6	25.1	22.6	22.6
Uniform Delay, d1	0.36	1.27	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.3	7.3	1.3	0.1	0.0	13.7	18.9	2.7	13.7	18.9	2.7	2.7
Incremental Delay, d2	9.0	53.5	10.2	0.1	17.9	38.4	44.0	25.2	38.4	44.0	25.2	25.2
Delay (s)	A	D	B	A	B	D	D	C	D	D	C	C
Level of Service	A	D	B	A	B	D	D	C	D	D	C	C
Approach Delay (s)	9.0	10.9	17.9	17.9	17.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
Approach LOS	A	B	B	B	B	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	16.3											
HCM Volume to Capacity Ratio	0.83											
HCM Level of Service	B											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	12.0											
Intersection Capacity Utilization	74.4%											
ICU Level of Service	D											
Analysis Period (min)	15											
Critical Lane Group	c											

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.85	0.85	0.85
Flt Protected	0	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (prot)	1770	6408	1583	5085	1583	1583	1770	1504	1504	1504	1504	1504
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	0.75	1.00	1.00	1.00	1.00	0.83
Satd. Flow (perm)	1770	6408	1583	5085	1583	1583	1389	1504	1504	1504	1504	1518
Volume (vph)	17	1638	273	0	993	350	505	0	306	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	1724	287	0	1045	368	532	0	322	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	1	1	0	2
Lane Group Flow (vph)	18	1724	287	0	1045	368	532	160	160	160	0	16
Turn Type	Prot	Prot	Free	Free	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	2	2	6	6	6	6	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	2.2	37.1	80.0	30.4	80.0	33.9	33.9	33.9	33.9	33.9	33.9	33.9
Effective Green, g (s)	2.7	37.6	80.0	30.9	80.0	34.4	34.4	34.4	34.4	34.4	34.4	34.4
Actuated g/C Ratio	0.03	0.47	1.00	0.39	1.00	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	3012	1583	1864	1583	597	647	647	647	647	647	653
v/s Ratio Prot	0.01	c0.27	0.18	0.21	0.23	c0.38	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.30	0.57	0.18	0.53	0.23	0.89	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	37.7	15.4	0.0	19.0	0.0	21.1	14.5	14.5	14.5	14.5	14.5	13.1
Uniform Delay, d1	1.04	1.05	1.00	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.6	0.5	0.1	0.8	0.3	1.55	0.2	0.2	0.2	0.2	0.2	0.2
Incremental Delay, d2	40.9	16.7	0.1	12.9	0.3	36.5	14.7	14.7	14.7	14.7	14.7	13.2
Delay (s)	D	B	A	B	A	D	B	B	B	B	B	B
Level of Service	D	B	A	B	A	D	B	B	B	B	B	B
Approach Delay (s)	14.5	9.6	28.3	9.6	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
Approach LOS	B	B	A	B	A	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	15.6											
HCM Volume to Capacity Ratio	0.72											
HCM Level of Service	B											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	61.8%											
Intersection Capacity Utilization	15											
ICU Level of Service	B											
Analysis Period (min)	15											
Critical Lane Group	c											



21: Rohnert Park Expwy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2008 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.91	1.00	0.85	1.00	0.91	1.00	0.85	1.00	0.85
Lane Util. Factor	0.97	0.95	1.00	1.00	0.97	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Frt	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	3433	3539	1583	1770	4949	1610	3329	1583	1610	3390	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	3433	3539	1583	1770	4949	1610	3329	1583	1610	3390	1583	1583
Satd. Flow (perm)	270	1145	545	141	779	170	380	286	224	102	230	183
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.16	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15	0.15
Adj. Flow (vph)	284	1205	574	148	820	179	400	301	236	107	242	193
RTOR Reduction (vph)	0	0	395	0	39	0	0	0	189	0	0	164
Lane Group Flow (vph)	284	1205	178	148	960	0	226	475	47	107	242	29
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	3	8	3	8	2	2	2	6	6	6
Permitted Phases	4											
Actuated Green, G (s)	12.5	24.5	10.6	22.6	15.4	15.4	15.4	15.4	11.5	11.5	11.5	11.5
Effective Green, g (s)	13.0	25.0	11.1	23.1	15.9	15.9	15.9	15.9	12.0	12.0	12.0	12.0
Actuated g/C Ratio	0.16	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	1106	495	246	1429	320	662	315	242	509	237	237
v/s Ratio Prot	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	c0.14	0.07	c0.07	0.02	0.02
v/s Ratio Perm												
v/c Ratio	0.51	1.09	0.36	0.60	0.67	0.71	0.72	0.75	0.44	0.48	0.12	0.12
Uniform Delay, d1	30.6	27.5	21.3	32.4	25.1	29.9	30.0	26.5	31.0	31.1	29.4	29.4
Progression Factor	0.55	0.53	1.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	53.3	1.8	4.1	2.5	6.9	3.7	0.2	1.3	0.7	0.2	0.2
Delay (s)	17.6	67.8	40.5	36.5	27.6	36.8	33.7	26.7	32.2	31.8	29.7	29.7
Level of Service	B	E	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)	B	E	D	D	C	D	C	C	C	C	C	C
Approach LOS	D											
Intersection Summary	HCM Average Control Delay: 40.6 HCM Level of Service: D HCM Volume to Capacity ratio: 0.83 Actuated Cycle Length (s): 80.0 Sum of lost time (s): 16.0 Intersection Capacity Utilization: 71.8% ICU Level of Service: C Analysis Period (min): 15 Critical Lane Group:											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85
Lane Util. Factor	0.97	0.95	1.00	1.00	0.97	1.00	0.95	0.98	1.00	0.95	1.00	0.95
Frt	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Satd. Flow (prot)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1583
Satd. Flow (perm)	270	1145	545	141	779	170	380	286	224	102	230	183
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	0.16	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15	0.15
Adj. Flow (vph)	284	1205	574	148	820	179	400	301	236	107	242	193
RTOR Reduction (vph)	0	0	395	0	39	0	0	0	189	0	0	164
Lane Group Flow (vph)	284	1205	178	148	960	0	226	475	47	107	242	29
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Split	Split	Split	Split	Split	Perm
Protected Phases	7	4	3	8	3	8	2	2	2	6	6	6
Permitted Phases	4											
Actuated Green, G (s)	12.5	24.5	10.6	22.6	15.4	15.4	15.4	15.4	11.5	11.5	11.5	11.5
Effective Green, g (s)	13.0	25.0	11.1	23.1	15.9	15.9	15.9	15.9	12.0	12.0	12.0	12.0
Actuated g/C Ratio	0.16	0.31	0.14	0.29	0.20	0.20	0.20	0.20	0.15	0.15	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	1106	495	246	1429	320	662	315	242	509	237	237
v/s Ratio Prot	0.08	c0.34	0.11	0.08	c0.19	0.14	c0.14	c0.14	0.07	c0.07	0.02	0.02
v/s Ratio Perm												
v/c Ratio	0.51	1.09	0.36	0.60	0.67	0.71	0.72	0.75	0.44	0.48	0.12	0.12
Uniform Delay, d1	30.6	27.5	21.3	32.4	25.1	29.9	30.0	26.5	31.0	31.1	29.4	29.4
Progression Factor	0.55	0.53	1.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	53.3	1.8	4.1	2.5	6.9	3.7	0.2	1.3	0.7	0.2	0.2
Delay (s)	17.6	67.8	40.5	36.5	27.6	36.8	33.7	26.7	32.2	31.8	29.7	29.7
Level of Service	B	E	D	D	C	D	C	C	C	C	C	C
Approach Delay (s)	B	E	D	D	C	D	C	C	C	C	C	C
Approach LOS	D											
Intersection Summary	HCM Average Control Delay: 40.6 HCM Level of Service: D HCM Volume to Capacity ratio: 0.83 Actuated Cycle Length (s): 80.0 Sum of lost time (s): 16.0 Intersection Capacity Utilization: 71.8% ICU Level of Service: C Analysis Period (min): 15 Critical Lane Group:											

23: Gravenstien Hwy & Redwood Drive  
Graton Rancheria Casino & Hotel

2008 Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.85	1.00	1.00	0.89	1.00	0.89	1.00	0.85
Lane Util. Factor	1.00	0.99	1.00	1.00	0.85	1.00	0.89	1.00	0.89	1.00	0.89	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3514	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3514	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Volume (vph)	102	661	32	53	778	333	48	24	63	485	29	96
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	696	34	56	819	351	51	25	66	511	31	101
RTOR Reduction (vph)	0	3	0	0	0	132	0	61	0	0	0	60
Lane Group Flow (vph)	107	727	0	56	819	219	51	30	0	511	72	0
Turn Type	Prot	Prot	Prot	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	7.6	28.3	4.4	25.1	25.1	3.3	6.3	33.0	35.0	35.0	35.0	35.0
Effective Green, g (s)	8.1	28.8	4.9	25.6	25.6	3.8	6.8	33.5	35.5	35.5	35.5	35.5
Actuated g/C Ratio	0.09	0.32	0.05	0.28	0.28	0.04	0.08	0.37	0.41	0.41	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1124	96	1007	450	75	125	689	669	669	669	669
v/s Ratio Prot	0.06	0.21	0.03	0.23	0.14	0.03	0.02	0.29	0.04	0.04	0.04	0.04
v/s Ratio Perm												
v/c Ratio	0.67	0.65	0.58	0.81	0.49	0.68	0.24	0.78	0.11	0.11	0.11	0.11
Uniform Delay, d1	39.7	26.2	41.6	30.0	26.7	42.5	39.2	24.9	16.6	16.6	16.6	16.6
Progression Factor	1.00	1.00	0.67	0.68	0.21	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	2.9	8.0	6.6	3.4	22.4	1.0	5.7	0.1	0.1	0.1	0.1
Delay (s)	50.4	29.1	35.7	24.0	9.0	64.9	40.2	30.6	16.7	16.7	16.7	16.7
Level of Service	D	C	D	C	A	E	D	C	B	C	C	C
Approach Delay (s)	31.8	20.2	49.1	20.2	14.9	49.1	27.8	27.8	27.8	27.8	27.8	27.8
Approach LOS	C	C	C	C	D	D	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	26.8											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	72.3%											
Analysis Period (min)	15											
Critical Lane Group	C											

24: Gravenstien Hwy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2008 Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.85	1.00	1.00	0.89	1.00	0.89	1.00	0.85
Lane Util. Factor	1.00	0.99	1.00	1.00	0.85	1.00	0.89	1.00	0.89	1.00	0.89	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3514	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3514	1770	3539	1583	1770	1660	1770	1649	1770	1649	1770
Volume (vph)	0	819	397	98	940	0	0	0	0	638	0	212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	862	418	104	989	0	0	0	0	673	0	223
RTOR Reduction (vph)	0	0	105	0	0	0	0	0	0	0	0	61
Lane Group Flow (vph)	0	862	313	104	989	0	0	0	0	673	142	0
Turn Type	Prot	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	3	3	3	3	3	3	3	3	3
Permitted Phases												
Actuated Green, G (s)	36.4	36.4	36.4	11.6	52.5					28.5	28.5	28.5
Effective Green, g (s)	36.9	36.9	36.9	12.1	53.0					29.0	29.0	29.0
Actuated g/C Ratio	0.41	0.41	0.41	0.13	0.59					0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	1451	649	238	2084						1106	510	
v/s Ratio Prot	0.24	0.20	0.06	0.28						0.20	0.09	
v/s Ratio Perm												
v/c Ratio	0.59	0.48	0.44	0.47						0.61	0.28	
Uniform Delay, d1	20.7	19.5	35.8	10.6						25.7	22.7	
Progression Factor	0.54	0.49	1.27	1.89						1.00	1.00	
Incremental Delay, d2	1.3	1.9	1.2	0.7						1.0	1.4	
Delay (s)	12.6	11.4	46.6	18.6						26.7	24.1	
Level of Service	B	B	B	D						C	C	
Approach Delay (s)	12.2	21.3	0.0	21.3						26.0	26.0	
Approach LOS	B	B	A	C						C	C	
Intersection Summary												
HCM Average Control Delay	19.0											
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	61.7%											
Analysis Period (min)	15											
Critical Lane Group	C											

Movement	EB	EBT	EBR	WB	WBT	NB	NBT	NBR	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (veh/pl)	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
Lane Util. Factor	0.95	0.97	1.00	0.95	0.97	1.00	0.95	0.97	1.00
Fr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	3539	3539	3433	3583	3539	3433	3583	3539	3433
Satd. Flow (prot)	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Flt Permitted	3539	3539	3433	3583	3539	3433	3583	3539	3433
Satd. Flow (perm)	3539	3539	3433	3583	3539	3433	3583	3539	3433
Volume (vph)	0	0	617	391	236	0	0	617	391
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1538	0	649	412	248	0	0	649	412
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1538	0	649	412	227	0	0	649	412
Turn Type	Perm								
Protected Phases	4								
Permitted Phases	8 2 2								
Actuated Green, G (s)	63.0 18.0 18.0								
Effective Green, g (s)	63.5 18.5 18.5								
Actuated g/C Ratio	0.71 0.21 0.21								
Clearance Time (s)	4.5 4.5 4.5								
Vehicle Extension (s)	3.0 3.0 3.0								
Lane Grp Cap (vph)	2497 706 325								
v/s Ratio Prot	60.43								
v/s Ratio Perm	0.18 0.12 0.14								
v/C Ratio	0.26 0.58 0.70								
Uniform Delay, d1	4.8 32.3 33.2								
Progression Factor	1.00 1.00 1.00								
Incremental Delay, d2	0.3 1.2 6.4								
Delay (s)	3.2								
Level of Service	A C D								
Approach Delay (s)	3.2								
Approach LOS	A								
Intersection Summary	11.2 HCM Level of Service B								
HCM Average Control Delay	0.63								
HCM Volume to Capacity ratio	90.0								
Actuated Cycle Length (s)	61.7%								
Intersection Capacity Utilization	1.5								
Analysis Period (min)	15								
Level of Service	B								
Sum of lost time (s)	8.0								
ICU Level of Service	A								
Analysis Period (min)	15								
Level of Service	A								
ICU Level of Service	A								

Movement	EB	EBT	EBR	WB	WBT	NB	NBT	NBR	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	8	5	10	1	6	211	19	770	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	5	11	1	6	222	20	811	18
Pedestrians	0	0	0	0	0	0	0	0	0
Lane Width (ft)	11.5								
Walking Speed (ft/s)	3.5								
Percent Blockage	0								
Right turn flare (veh)	None								
Median type	None								
Median storage (veh)	None								
Upstream signal (ft)	None								
pX, platoon unlocked	None								
v/C, conflicting volume	1464	1773	334	1434	1757	405	568	828	828
vC1, stage 1 conf vol	1464	1773	334	1434	1757	405	568	828	828
vC2, stage 2 conf vol	0	0	0	0	0	0	0	0	0
vC3, unblocked vol	7.5	6.5	6.9	7.5	6.5	6.9	4.1	4.1	4.1
IC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2
p0 queue free %	82	92	98	99	91	63	98	85	85
CM capacity (veh/h)	46	58	562	75	70	585	917	795	795
Direction, Lane #	EB	EBT	EBR	WB	WBT	NB	NBT	NBR	SBR
Volume Total	24	229	20	405	405	18	119	443	226
Volume Left	8	1	20	0	0	0	119	0	0
Volume Right	11	222	0	0	0	18	0	0	4
cSH	87	615	917	1700	1700	799	1700	1700	1700
Volume to Capacity	0.28	0.37	0.02	0.24	0.24	0.01	0.15	0.26	0.13
Queue Length 95th (ft)	25	43	2	0	0	0	13	0	0
Control Delay (s)	61.3	16.1	9.0	0.0	0.0	0.0	10.3	0.0	0.0
Lane LOS	F	C	A	A	A	B	B	A	A
Approach Delay (s)	61.3	16.1	0.2	0.0	0.0	1.6	0.0	0.0	0.0
Approach LOS	F	C	A	A	A	B	A	A	A
Intersection Summary	3.5								
Average Delay	47.7%								
Intersection Capacity Utilization	15								
Analysis Period (min)	15								
Level of Service	A								
ICU Level of Service	A								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade												
Volume (veh/h)	1	134	3	3	216	2	1	0	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	141	3	3	227	2	1	0	1	0	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	229			144			360	381	143	381	381	228
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	229			144			360	381	143	381	381	228
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
qM capacity (veh/h)	1339			1438			576	550	505	575	550	811
Direction, Lane #	EBL	WBL	NBL	EBT	WBT	NBT	EBR	WBR	NBR	SBL	SBT	SBR
Volume Total	145	233	2	1								
Volume Left	1	3	2	1	0							
Volume Right	1339	1438	704	550								
cSH	0.00	0.00	0.00	-0.00								
Volume to Capacity	0.1	0.1	10.1	11.6								
Queue Length 95th (ft)												
Control Delay (s)	A	A	B	B								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.1	10.1	11.6								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.2											
Intersection Capacity Utilization	23.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade												
Volume (veh/h)	1	119	2	4	225	8	1	9	0	4	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	125	2	4	237	8	1	9	0	4	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	245			127			379	382	126	383	379	241
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	245			127			379	382	126	383	379	241
VCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)												
IC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	98	100	99	100	100
qM capacity (veh/h)	1321			1459			576	549	924	566	551	798
Direction, Lane #	EBL	WBL	NBL	EBT	WBT	NBT	EBR	WBR	NBR	SBL	SBT	SBR
Volume Total	128	249	11	5								
Volume Left	1	4	1	4								
Volume Right	1321	1459	551	601								
cSH	0.00	0.00	0.02	0.01								
Volume to Capacity	0	0	1	1								
Queue Length 95th (ft)												
Control Delay (s)	0.1	0.2	11.7	11.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	11.7	11.0								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.6											
Intersection Capacity Utilization	24.9%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EBT	EBR	WBL	WBR	NBL	NBR	Stop
Lane Configurations	Free	Free	Free	Free	Free	Free	0%
Sign Control	0%	0%	0%	0%	0%	0%	0%
Grade	150	5	2	280	10	6	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	158	5	2	295	11	6	0
Hourly flow rate (vph)							
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							None
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked	163			459	161		
vC, conflicting volume							
vC1, stage 1 conf vol	163			459	161		
vC2, stage 2 conf vol	4			6.4	6.2		
vCu, unblocked vol							
tC, single (s)	2.2			3.5	3.3		
tC, 2 stage (s)	100			98	99		
p0 queue free %	1415			559	885		
cM capacity (veh/h)							
Direction, Lane #	EBT	WBL	NBL	EBR	WBR	NBR	
Volume Total	163	297	17				
Volume Left	0	2	11				
Volume Right	5	0	6				
cSH	1700	1415	648				
Volume to Capacity	0.10	0.00	0.03				
Queue Length 95th (ft)	0	0	2				
Control Delay (s)	0.0	0.1	10.7				
Lane LOS	A	A	B				
Approach Delay (s)	0.0	0.1	10.7				
Approach LOS	B	B	B				
<b>Intersection Summary</b>							
Average Delay	0.4			0.4			
Intersection Capacity Utilization	26.3%			26.3%			A
Analysis Period (min)	15			15			

Movement	EBT	EBR	WBL	WBR	NBL	NBR	Stop
Lane Configurations	Free	Free	Free	Free	Free	Free	0%
Sign Control	0%	0%	0%	0%	0%	0%	0%
Grade	0	155	4	10	252	0	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	0	163	4	11	255	0	0
Hourly flow rate (vph)							
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							None
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked	265			167	452	452	165
vC, conflicting volume							
vC1, stage 1 conf vol	265			167	452	452	165
vC2, stage 2 conf vol	4.1			4.1	7.1	6.5	6.2
vCu, unblocked vol							
tC, single (s)	2.2			2.2	3.5	4.0	3.3
tC, 2 stage (s)	100			99	94	100	99
p0 queue free %	1299			1410	515	500	879
cM capacity (veh/h)							
Direction, Lane #	EBT	WBL	NBL	EBR	WBR	NBR	
Volume Total	167	276	44				
Volume Left	0	11	33				
Volume Right	4	0	12				
cSH	1299	1410	578	1700			
Volume to Capacity	0.00	0.01	0.08	0.00			
Queue Length 95th (ft)	0	1	6	0			
Control Delay (s)	0.0	0.4	11.7	0.0			
Lane LOS	A	A	B	A			
Approach Delay (s)	0.0	0.4	11.7	0.0			
Approach LOS	B	B	B	A			
<b>Intersection Summary</b>							
Average Delay	1.3			1.3			
Intersection Capacity Utilization	31.4%			31.4%			A
Analysis Period (min)	15			15			

Movement	EBT	EBR	WBT	WBR	NBT	NBR
Lane Configurations	Free	Free	Stop	Stop	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	143	20	0	235	32	0
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	151	21	0	247	34	0
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
Pk, Platoon unblocked						
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol						
IC, single (s)						
IC, 2 stage (s)						
IF (s)						
p0 queue free %						
CM capacity (veh/h)						
Direction/Lane #	EBT	EBR	WBT	WBR	NBT	NBR
Volume Total	172	247	34			
Volume Left	0	0	34			
Volume Right	21	0	0			
GSH	1700	1405	599			
Volume to Capacity	0.10	0.00	0.06			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	22.4%					
Analysis Period (min)	15					
ICU Level of Service	A					

Lane Group	EBL	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	645	189	587	569	181	162	281	447	240
v/c Ratio	1.15	0.33	0.96	0.74	0.85	0.56	0.72	0.75	0.94
Control Delay	133.4	36.8	77.3	22.3	101.7	77.7	18.3	68.3	101.5
Queue Delay	20.9	4.8	163.8	5.8	0.0	0.0	0.3	2.8	0.0
Total Delay	154.3	41.6	241.1	28.2	101.7	77.7	18.6	71.0	101.5
Queue Length 50th (ft)	-800	142	682	175	188	87	0	229	234
Queue Length 95th (ft)	#1051	m189	#930	302	#317	126	97	4316	#410
Internal Link Dist (ft)	550	220	220	220	110	110	100	275	270
Turn Bay Length (ft)	563	567	597	774	221	376	419	598	257
Base Capacity (vph)	0	307	175	152	0	0	0	0	0
Starvation Cap Reductn	23	0	0	0	0	0	12	72	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	1.19	0.73	1.39	0.91	0.82	0.43	0.59	0.85	0.93
Reduced v/c Ratio									

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	32	145	5	200	173	155	5	32	250
v/c Ratio	0.04	0.75	0.47	0.04	0.44	0.56	0.06	0.00	0.20	0.13
Control Delay	34.4	32.8	11.6	28.0	24.1	32.7	4.7	4.0	35.8	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	32.8	11.6	28.0	24.1	32.7	4.7	4.0	35.8	11.7
Queue Length 50th (ft)	2	15	0	2	30	87	4	0	15	30
Queue Length 95th (ft)	13	39	49	m5	m50	m109	m41	m1	40	72
Internal Link Dist (ft)	180	140	140	140	120	120	150	150	200	130
Turn Bay Length (ft)	75	75	100	75	100	150	400	2464	1104	184
Base Capacity (vph)	155	442	487	155	854	400	2464	1104	184	1891
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.30	0.03	0.23	0.43	0.06	0.00	0.17	0.13

Intersection Summary  
 Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	791	463	98	765	344	925
v/c Ratio	0.47	0.52	0.38	0.38	0.56	0.94
Control Delay	17.7	11.5	45.9	16.0	30.3	26.9
Queue Delay	2.2	2.5	0.0	0.1	0.0	4.5
Total Delay	19.9	14.0	45.9	16.1	30.3	31.4
Queue Length 50th (ft)	200	167	22	107	160	166
Queue Length 95th (ft)	m226	m190	m29	m128	261	#270
Internal Link Dist (ft)	220	300	466	466	250	348
Turn Bay Length (ft)	1681	889	257	2035	523	1127
Base Capacity (vph)	714	297	0	0	0	0
Starvation Cap Reductn	0	0	0	325	0	140
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.78	0.38	0.45	0.66	0.94

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Delactio Right Lane. Recode with 1 though lane as a right lane.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	521	614	431	439	316	333	602	44
v/c Ratio	0.45	0.74	0.77	0.28	0.91	0.91	0.57	0.12
Control Delay	40.2	23.0	48.2	15.3	58.9	64.1	7.8	23.2
Queue Delay	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	25.1	48.2	15.3	58.9	64.1	7.8	23.2
Queue Length 50th (ft)	128	170	119	91	122	128	5	22
Queue Length 95th (ft)	153	266	#178	125 m#237	m254	m45	43	44
Internal Link Dist (ft)	466	150	345	150	345	380	200	270
Turn Bay Length (ft)	1144	832	558	1525	347	353	1053	365
Base Capacity (vph)	0	107	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.85	0.77	0.29	0.91	0.94	0.57	0.12

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.



11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

2008

Alternative H  
 PM Peak



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	197	971	679	98	228
v/c Ratio	0.45	0.43	0.42	0.21	0.39
Control Delay	33.0	15.4	15.6	24.5	5.8
Queue Delay	0.0	0.5	0.0	0.0	0.0
Total Delay	33.0	15.8	15.6	24.5	5.8
Queue Length 50th (ft)	61	217	113	38	0
Queue Length 95th (ft)	84	249	166	77	51
Internal Link Dist (ft)	80	345	164	232	200
Turn Bay Length (ft)	0	2266	1617	465	584
Base Capacity (vph)	0	740	0	0	0
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.64	0.42	0.21	0.39

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m - Volume for 95th percentile queue is metered by upstream signal.

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2008

Alternative H  
 PM Peak



Lane Group	EBL	EBT	WBT	NBT	SBL	SBR
Lane Group Flow (vph)	373	375	42	16	541	502
v/c Ratio	0.88	0.88	0.10	0.11	1.02	0.24
Control Delay	52.4	52.5	8.3	29.3	74.3	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.4	52.5	8.3	29.3	74.3	10.5
Queue Length 50th (ft)	186	187	0	5	278	48
Queue Length 95th (ft)	341	343	23	23	478	142
Internal Link Dist (ft)	250	284	118	200	214	100
Turn Bay Length (ft)	441	443	447	179	531	2081
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.85	0.09	0.09	1.02	0.24

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m - Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	271	301	617	264	223	481
v/c Ratio	0.70	0.52	0.77	0.32	0.80	0.40
Control Delay	32.9	6.5	24.2	3.0	50.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	6.5	24.2	3.0	50.2	6.7
Queue Length 50th (ft)	96	0	201	0	86	78
Queue Length 95th (ft)	168	54	4375	38	1194	132
Internal Link Dist (ft)	480	175	3920	450	700	2550
Turn Bay Length (ft)	436	617	805	834	291	1217
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.49	0.77	0.32	0.79	0.40

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	53	632	38	213	605	364	67	97	85	518	149
v/c Ratio	0.40	0.86	0.11	0.83	0.66	0.55	0.26	0.24	0.22	0.98	0.18
Control Delay	44.6	43.6	9.9	55.0	17.6	3.7	37.7	11.2	8.0	63.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	43.6	9.9	55.0	17.6	3.7	37.7	11.2	8.0	63.6	5.7
Queue Length 50th (ft)	26	160	0	42	80	0	16	8	0	254	13
Queue Length 95th (ft)	61	4245	23	m#80	m#156	m4	36	48	36	451	45
Internal Link Dist (ft)	160	1540	200	250	220	170	130	1010	130	100	520
Turn Bay Length (ft)	133	752	366	257	915	694	257	398	393	531	833
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.84	0.10	0.83	0.66	0.55	0.26	0.24	0.22	0.98	0.18

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	245	972	154	391	913	377	144	435	274	383	278	256
v/c Ratio	0.88	0.58	0.25	0.76	0.80	0.50	0.65	0.66	0.58	0.75	0.77	0.50
Control Delay	47.5	16.0	3.9	32.5	21.5	3.7	50.0	25.3	9.2	45.8	45.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	16.0	3.9	32.5	21.5	3.7	50.0	25.3	9.2	45.8	45.6	7.6
Queue Length 50th (ft)	83	95	9	108	229	27	71	74	0	95	129	0
Queue Length 95th (ft)	m116	m108	m13	#156	#264	37	#157	118	65	#188	#230	58
Internal Link Dist (ft)	320	520	520	520	520	520	554	554	554	554	480	480
Turn Bay Length (ft)	200	250	350	155	250	155	250	250	250	175	175	175
Base Capacity (vph)	288	1685	527	515	1143	761	221	789	522	511	396	538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.58	0.25	0.76	0.80	0.50	0.65	0.65	0.55	0.52	0.75	0.70

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m ... Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBL	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1798	72	1300	209	25	370	369	0.66			
v/c Ratio	0.77	0.51	0.65	0.13	0.05	0.84	0.88	0.66			
Control Delay	8.8	56.1	10.9	0.1	9.8	43.2	48.5	25.9			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	8.8	56.1	10.9	0.1	9.8	43.2	48.5	25.9			
Queue Length 50th (ft)	125	38	237	0	2	169	172	131			
Queue Length 95th (ft)	161	m65	m141	m0	18	#318	#329	222			
Internal Link Dist (ft)	920	960	960	428	378	400	400	400			
Turn Bay Length (ft)	225	142	2000	1583	568	475	455	601			
Base Capacity (vph)	2325	0	0	0	0	0	0	0			
Starvation Cap Reductn	0	0	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0	0	0			
Reduced v/c Ratio	0.77	0.51	0.65	0.13	0.04	0.78	0.81	0.61			

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m ... Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	18	1724	287	1045	368	532	161	161	18
v/c Ratio	0.14	0.57	0.18	0.49	0.23	0.89	0.25	0.25	0.03
Control Delay	37.6	16.3	0.1	13.8	0.3	38.0	13.7	13.7	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	16.3	0.1	13.8	0.3	38.0	13.7	13.7	8.8
Queue Length 50th (ft)	10	204	0	60	0	227	49	49	4
Queue Length 95th (ft)	m12	m274	m0	131	m0	321	76	76	13
Internal Link Dist (ft)	960	360		360		360		420	
Turn Bay Length (ft)	190			225		730	791	791	807
Base Capacity (vph)	133	3009	1583	2133	1583	730	791	791	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.57	0.18	0.49	0.23	0.73	0.20	0.20	0.02

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	284	1205	574	148	999	226	475	236	107
v/c Ratio	0.51	1.09	0.54	0.60	0.68	0.71	0.72	0.47	0.44
Control Delay	20.0	72.7	7.6	46.8	28.1	42.9	36.7	7.4	35.9
Queue Delay	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	72.7	8.9	46.8	28.1	42.9	36.7	7.4	35.9
Queue Length 50th (ft)	59	401	0	68	153	114	120	0	54
Queue Length 95th (ft)	69	485	90	187	249	210	173	56	98
Internal Link Dist (ft)	360			200	1350	901		660	
Turn Bay Length (ft)	250			250		175	150	150	150
Base Capacity (vph)	558	1107	850	246	1470	342	707	522	342
Starvation Cap Reductn	0	0	145	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.09	0.77	0.60	0.68	0.66	0.67	0.45	0.31

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # - 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	140	722	135	620	151	338	520	114	139
v/c Ratio	0.92	0.84	0.88	0.74	0.31	0.95	0.81	0.18	0.78
Control Delay	88.3	32.4	82.8	30.8	6.2	66.8	32.8	4.5	61.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	32.4	82.8	30.8	6.2	66.8	32.8	4.5	61.8
Queue Length 50th (ft)	61	136	59	128	0	145	201	0	60
Queue Length 95th (ft)	#162	#221	#155	184	41	#296	#358	30	#148
Internal Link Dist (ft)	689	6630	500	6630	150	550	734	675	500
Turn Bay Length (ft)	350	867	133	859	499	357	645	623	779
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.81	0.88	0.72	0.30	0.95	0.81	0.18	0.78

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	107	730	56	819	351	91	511	132
v/c Ratio	0.67	0.59	0.47	0.76	0.58	0.44	0.80	0.18
Control Delay	64.2	29.6	39.4	23.6	6.5	52.2	21.8	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	29.6	39.4	23.6	6.5	52.2	21.8	35.9
Queue Length 50th (ft)	61	200	33	244	4	28	14	237
Queue Length 95th (ft)	#161	#276	m65	#347	19	65	57	#386
Internal Link Dist (ft)	6630	6630	350	350	80	50	200	236
Turn Bay Length (ft)	225	159	1232	118	1077	610	367	653
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.59	0.47	0.76	0.58	0.43	0.25	0.78

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m: Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	862	418	104	989	673	223
v/c Ratio	0.58	0.54	0.39	0.47	0.61	0.38
Control Delay	13.0	8.1	47.3	18.9	28.6	13.1
Queue Delay	0.2	0.3	0.0	0.3	0.0	0.0
Total Delay	13.2	8.4	47.3	19.2	28.6	13.1
Queue Length 50th (ft)	125	64	58	233	164	43
Queue Length 95th (ft)	155	m99	m106	291	222	101
Internal Link Dist (ft)	350			370		585
Turn Bay Length (ft)		50	100		425	
Base Capacity (vph)	1486	198	295	2084	1106	591
Starvation Cap Reductn	139	65	0	492	0	0
Spillback Cap Reductn	1	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.59	0.35	0.62	0.61	0.38

Intersection Summary  
 m. Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1538	649	412	248
v/c Ratio	0.62	0.26	0.59	0.72
Control Delay	3.5	5.8	34.9	40.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.6	5.8	34.9	40.8
Queue Length 50th (ft)	0	58	110	119
Queue Length 95th (ft)	243	112	137	178
Internal Link Dist (ft)	370		312	431
Turn Bay Length (ft)		2498	2498	1221
Base Capacity (vph)	2498	2498	1221	580
Starvation Cap Reductn	65	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.26	0.34	0.43

Intersection Summary

**CUMULATIVE 2020 + ALTERNATIVE H  
TRAFFIC CONDITIONS  
(SYNCHRO)**

1: Wilfred Ave & Stony Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	12	17	129	23	130	14	740	184	177	522	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	13	18	136	24	137	15	779	194	185	549	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol												
tC, single (s)												
tC, 2 stage (s)												
tF (s)												
p0 queue free %												
qM capacity (veh/h)												
Direction Lane 1	EBL	EBT	EBR	WBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	31	297	15	973	186	556						
Volume Left	0	136	15	0	186	0						
Volume Right	18	137	0	194	0	6						
CSH	103	63	1015	1700	709	1700						
Volume to Capacity	0.30	4.71	0.01	0.57	0.26	0.33						
Queue Length 95th (ft)	28	Err	1	0	26	0						
Control Delay (s)	53.8	Err	8.6	0.0	11.9	0.0						
Lane LOS	F	F	F	A	B	B						
Approach Delay (s)	53.8	Err	0.1		3.0							
Approach LOS	F	F	F		B							
Intersection Summary												
Average Delay	1445.0											
Intersection Capacity Utilization	85.0%											
Analysis Period (min)	15											
ICU Level of Service	E											

2: Wilfred Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	25	328	20	8	263	10	10	10	10	9	9	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	345	21	8	277	11	11	11	11	9	9	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX platoon unblocked												
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol												
tC, single (s)												
tC, 2 stage (s)												
tF (s)												
p0 queue free %												
qM capacity (veh/h)												
Direction Lane 1	EBL	EBT	EBR	WBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	393	296	32	29								
Volume Left	26	8	11	9								
Volume Right	21	21	11	11								
CSH	1275	1192	404	416								
Volume to Capacity	0.02	0.01	0.08	0.07								
Queue Length 95th (ft)	2	1	6	6								
Control Delay (s)	0.7	0.3	14.7	14.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	0.3	14.7	14.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	1.7											
Intersection Capacity Utilization	40.0%											
Analysis Period (min)	15											
ICU Level of Service	A											



3: Wilfred Ave & Whistler Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EB1	EBT	EBR	WB1	WBT	WBR	NB1	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	325	11	11	263	25	10	10	10	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	342	12	12	277	26	11	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC1, conflicting volume	303			354			700	697	348	700	690	290
vC2, stage 1 cont vol												
vC2, stage 2 cont vol	303			354			700	697	348	700	690	290
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IC, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			97	97	98	97	97	99
p0 queue free %	1258			1205			336	358	695	336	361	749
cM capacity (veh/h)												
Direction, Lane #	EB1	WB1	NB1	SB1	EB1	WB1	NB1	SB1	EB1	WB1	NB1	SB1
Volume Total	365	315	32	32	1258	1205	336	358	695	336	361	749
Volume Left	12	12	11	11	12	12	11	11	11	11	11	11
Volume Right	12	26	11	11	1258	1205	416	424	0.07	0.07	0.07	0.07
CSH												
Volume to Capacity	0.01	0.01	0.08	0.07	0.01	0.01	0.08	0.07	0.01	0.01	0.08	0.07
Queue Length 95th (ft)	1	1	6	6	1	1	6	6	1	1	6	6
Control Delay (s)	A	A	B	B	A	A	B	B	A	A	B	B
Lane LOS	A	A	B	B	A	A	B	B	A	A	B	B
Approach Delay (s)	0.3	0.4	14.4	14.2	0.3	0.4	14.4	14.2	0.3	0.4	14.4	14.2
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	32.1%											
Analysis Period (min)	15											
ICU Level of Service	A											

4: Wilfred Ave & Langner Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EB1	EBT	EBR	WB1	WBT	WBR	NB1	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	44	187	114	138	199	32	83	15	112	23	10	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	197	120	145	209	34	87	16	118	24	11	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC1, conflicting volume	243			317			873	883	257	975	909	209
vC2, stage 1 cont vol												
vC2, stage 2 cont vol	243			317			873	883	257	975	909	209
vCu, unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IC, 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			62	93	85	85	96	98
p0 queue free %	1323			1243			227	243	782	165	234	831
cM capacity (veh/h)												
Direction, Lane #	EB1	WB1	NB1	SB1	EB1	WB1	NB1	SB1	EB1	WB1	NB1	SB1
Volume Total	363	145	209	34	221	53	1323	1243	1700	368	247	831
Volume Left	46	145	0	0	87	24	120	0	34	118	18	18
Volume Right	120	0	0	0	144	29	1103	1243	1700	368	247	813
CSH												
Volume to Capacity	0.04	0.12	0.12	0.02	0.60	0.21	0.04	0.12	0.12	0.02	0.60	0.21
Queue Length 95th (ft)	3	10	0	0	94	20	3	10	0	0	94	20
Control Delay (s)	1.3	8.3	0.0	0.0	28.5	23.5	1.3	8.3	0.0	0.0	28.5	23.5
Lane LOS	A	A	D	D	A	C	A	A	D	D	A	C
Approach Delay (s)	1.3	3.1			28.5	23.5	1.3	3.1			28.5	23.5
Approach LOS	D	D			D	C	D	D			D	C
Intersection Summary												
Average Delay	9.0											
Intersection Capacity Utilization	54.5%											
Analysis Period (min)	15											
ICU Level of Service	A											

5: Wilfred Ave & Labath Ave  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	242	60	486	316	75	49	24	558	65	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	255	63	512	333	79	52	25	587	68	12
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type										None	None
Median storage (veh)											
Upstream signal (ft)											
pk platoon unblocked											
vC conflicting volume	412	318					1528	1763	159	2165	1755
vC1 stage 1 conf vol											
vC2 stage 2 conf vol	412	318					1528	1763	159	2165	1755
vCu unblocked vol	4.1	4.1					7.5	6.5	6.9	7.5	6.5
tC single (s)											
tC 2 stage (s)											
tF (s)	2.2	2.2					3.5	4.0	3.5	3.5	4.0
p0 queue free %	98	59					0	47	32	0	76
p0 queue free %	1144	1239					44	48	858	3	49
cM capacity (veh/h)											
Direction/Lane #	EB-1	EB-2	EB-3	WB-1	WB-2	WB-3	NB-1	NB-2	NB-3	SB-1	SB-2
Volume Total	21	170	148	512	222	190	664	664	84		
Volume Left	0	0	0	512	0	0	52	68			
Volume Right	0	63	0	0	0	79	587	4			
cSH	1144	1700	1239	1700	1700	280	4				
Volume to Capacity	0.02	0.10	0.09	0.41	0.13	0.11	2.37	20.38			
Queue Length 95th (ft)	1	0	0	52	0	0	1319	Err			
Control Delay (s)	B.2	0.0	0.0	9.9	0.0	0.0	657.8	Err			
Lane LOS	A	A	A	F	F	F	F	F			
Approach Delay (s)	0.5			5.5			657.8	Err			
Approach LOS	F			F			F	F			
<b>Intersection Summary</b>											
Average Delay	638.7										
Intersection Capacity Utilization	83.0%										
ICU Level of Service	E										
Analysis Period (min)	15										

6: Wilfred Avenue & Dowdell Ave  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	23	660	182	327	732	98	98	67	352	76	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	695	192	344	771	103	103	71	371	80	16
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type										None	None
Median storage (veh)											
Upstream signal (ft)											
pk platoon unblocked											
vC conflicting volume	874	886					1969	2401	443	2312	2445
vC1 stage 1 conf vol											
vC2 stage 2 conf vol	874	886					1969	2401	443	2312	2445
vCu unblocked vol	4.1	4.1					7.5	6.5	6.9	7.5	6.5
tC single (s)											
tC 2 stage (s)											
tF (s)	2.2	2.2					3.5	4.0	3.3	3.5	4.0
p0 queue free %	97	55					0	0	34	0	3
p0 queue free %	768	760					3	17	562	0	16
cM capacity (veh/h)											
Direction/Lane #	EB-1	EB-2	EB-3	WB-1	WB-2	WB-3	NB-1	NB-2	NB-3	SB-1	SB-2
Volume Total	24	463	423	344	514	360	544	144			
Volume Left	0	0	0	344	0	0	103	80			
Volume Right	0	192	0	0	0	103	371	48			
cSH	768	1700	1700	760	1700	1700	13	0			
Volume to Capacity	0.03	0.27	0.25	0.45	0.30	0.21	41.15	Err			
Queue Length 95th (ft)	2	0	0	59	0	0	Err	Err			
Control Delay (s)	9.8	0.0	0.0	13.6	0.0	0.0	Err	Err			
Lane LOS	A	A	A	B	B	B	F	F			
Approach Delay (s)	0.3			3.8			Err	Err			
Approach LOS	F			F			F	F			
<b>Intersection Summary</b>											
Average Delay	Err										
Intersection Capacity Utilization	83.2%										
ICU Level of Service	E										
Analysis Period (min)	15										

7: Wilfred Avenue & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Util. Factor	1.00	0.91	0.91	0.95	1.00	0.85	1.00	0.95	1.00	0.97	1.00	0.92
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.92
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Satd. Flow (prot)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1705	1705
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3390	1441	1681	1770	1583	1770	3539	1583	3433	1705	1705
Volume (vph)	75	857	156	235	907	529	184	40	350	553	52	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	902	164	247	955	557	194	42	368	582	55	71
RTOR Reduction (vph)	0	0	53	0	0	142	0	0	345	0	29	0
Lane Group Flow (vph)	79	902	111	247	955	415	194	42	23	582	97	0
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	45.6	45.6	45.6	55.4	55.4	55.4	19.0	9.5	9.5	31.5	22.0	22.0
Effective Green, g (s)	46.1	46.1	46.1	55.9	55.9	55.9	19.5	10.0	10.0	32.0	22.5	22.5
Actuated g/C Ratio	0.29	0.29	0.29	0.35	0.35	0.35	0.12	0.06	0.06	0.20	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	510	977	415	587	618	553	216	221	99	687	240	0.06
v/s Ratio Prot	0.04	c0.27	0.15	c0.54	0.26	0.26	c0.11	0.01	0.01	c0.17	0.06	0.06
v/s Ratio Perm	0.15	0.92	0.27	0.42	1.55	0.75	0.90	0.19	0.23	0.85	0.40	0.40
Uniform Delay, d1	42.4	55.2	43.9	39.7	52.0	45.9	69.3	71.2	71.3	61.6	62.6	62.6
Progression Factor	1.00	1.00	1.00	0.84	0.87	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	13.8	0.3	1.5	250.8	6.2	34.5	0.4	1.2	9.5	1.1	1.1
Delay (s)	42.5	69.0	44.3	34.8	286.2	47.2	103.8	71.6	72.6	71.1	63.7	63.7
Level of Service	D	E	D	C	F	D	F	E	E	E	E	E
Approach Delay (s)	63.7	E	D	C	F	D	F	E	E	E	E	E
Approach LOS	E	E	D	C	F	D	F	E	E	E	E	E
Intersection Summary												
HCM Average Control Delay	116.2											
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	180.0											
Intersection Capacity Utilization	105.5%											
Analysis Period (min)	15											
c Critical Lane Group												

9: Wilfred Avenue & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.85	1.00	0.91	0.91	0.91
Fit	1.00	1.00	0.85	1.00	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.90
Fit Protected	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1583	3433	3539	3539	3539	3539	1610	3047	1610	3047
Fit Permitted	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1583	3433	3539	3539	3539	3539	1610	3047	1610	3047
Volume (vph)	0	1213	546	85	970	0	0	0	0	424	339	702
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1277	575	89	1021	0	0	0	0	446	357	739
RTOR Reduction (vph)	0	0	137	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1277	438	89	1021	0	0	0	0	446	357	739
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	35.6	36.6	4.4	45.5	45.5	45.5	45.5	45.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	37.1	37.1	4.9	46.0	46.0	46.0	46.0	46.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.46	0.46	0.06	0.58	0.58	0.58	0.58	0.58	0.32	0.32	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1541	734	210	2035	2035	2035	2035	2035	523	990	523	990
v/s Ratio Prot	c0.36	0.28	0.28	0.60	0.42	0.50	0.28	0.28	0.28	0.34	0.28	0.34
v/s Ratio Perm	0.78	0.60	0.42	0.50	0.50	0.50	0.50	0.50	0.65	1.32d	0.65	1.32d
Uniform Delay, d1	18.0	15.9	36.2	10.2	10.2	10.2	10.2	10.2	25.2	27.0	25.2	27.0
Progression Factor	1.44	1.58	1.22	1.65	1.65	1.65	1.65	1.65	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	1.6	0.9	0.6	0.6	0.6	0.6	0.6	16.0	38.4	16.0	38.4
Delay (s)	27.8	26.8	45.0	17.4	17.4	17.4	17.4	17.4	41.3	65.4	41.3	65.4
Level of Service	C	C	D	B	B	B	B	B	D	E	D	E
Approach Delay (s)	27.3	C	D	B	B	B	B	B	58.4	E	58.4	E
Approach LOS	C	C	D	B	B	B	B	B	A	E	A	E
Intersection Summary												
HCM Average Control Delay	36.0											
HCM Volume to Capacity ratio	8.83											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	76.7%											
Analysis Period (min)	15											
d1 Defacto Right Lane. Records with 1 though lane as a right lane.												
c Critical Lane Group												

10: Wilfred Ave & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	0.95	0.95	0.88	1.00	1.00	0.93	1.00	0.93
Lane Util. Factor	1.00	1.00	1.00	0.99	1.00	1.00	0.85	1.00	1.00	0.95	1.00	0.95
Flt Protected	5085	1583	3433	3518	1681	1690	2787	1770	1723			
Satd. Flow (prot)	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	5085	1583	3433	3518	1681	1690	2787	1770	1723			
Satd. Flow (perm)	0	815	822	178	407	17	638	18	571	9	9	9
Volume (vph)	0	815	822	178	407	17	638	18	571	9	9	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	858	865	187	428	18	672	19	601	9	9	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	858	220	187	443	0	337	354	124	9	11	0
Turn Type	Prot	Prot	Prot	Split	Split	Split	Perm	Split	Perm	Split	Perm	Split
Protected Phases	7	4	3	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	17.5	17.5	12.5	34.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Effective Green, g (s)	18.0	18.0	13.0	35.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Actuated g/C Ratio	0.22	0.22	0.16	0.44	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1144	356	558	1539	347	349	575	365	355			
w/s Ratio Prot	c0.17	0.14	0.05	c0.13	0.20	c0.21	0.04	0.01	c0.01			
w/s Ratio Perm												
v/c Ratio	0.75	0.62	0.34	0.29	0.97	1.01	0.22	0.02	0.03			
Uniform Delay, d1	28.9	27.9	29.7	14.5	31.5	31.8	26.4	25.3	25.4			
Progression Factor	1.39	7.46	1.21	1.23	0.98	0.96	2.07	1.00	1.00			
Incremental Delay, d2	2.7	4.8	0.3	0.4	35.4	45.5	0.5	0.1	0.2			
Delay (s)	43.1	213.1	36.2	18.2	66.4	78.6	55.3	25.5	25.5			
Level of Service	D	F	D	B	E	E	E	C	C			
Approach Delay (s)	128.4					64.1		23.5	25.5			
Approach LOS	F					E		C	C			
Intersection Summary												
HCM Average Control Delay	87.0											
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	69.3%											
Analysis Period (min)	15											
c Critical Lane Group												

11: Wilfred Avenue & Robert Lakes Road  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.95	1.00	0.95
Flt Protected	3433	3539	3502	1770	1583							
Satd. Flow (prot)	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Permitted	3433	3539	3502	1770	1583							
Satd. Flow (perm)	180	1214	766	57	137	81						
Volume (vph)	180	1214	766	57	137	81						
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95						
Adj. Flow (vph)	189	1278	806	60	144	86						
RTOR Reduction (vph)	0	0	0	0	0	0						
Lane Group Flow (vph)	189	1278	861	0	144	25						
Turn Type	Prot	Prot	Prot	Split	Split	Split	Perm	Split	Perm	Split	Perm	Split
Protected Phases	7	4	8	2	2	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	9.6	50.5	36.4	20.5	20.5	20.5						
Effective Green, g (s)	10.1	51.0	36.9	21.0	21.0	21.0						
Actuated g/C Ratio	0.13	0.64	0.46	0.26	0.26	0.26						
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0						
Lane Grp Cap (vph)	433	2286	1615	465	416							
w/s Ratio Prot	0.06	c0.36	0.25	c0.08	0.02							
w/s Ratio Perm												
v/c Ratio	0.44	0.57	0.53	0.31	0.06							
Uniform Delay, d1	32.3	8.2	15.4	23.7	22.1							
Progression Factor	0.81	2.31	1.00	1.00	1.00							
Incremental Delay, d2	0.5	0.8	1.3	1.7	0.3							
Delay (s)	26.7	19.7	16.7	25.4	22.4							
Level of Service	C	B	B	C	C							
Approach Delay (s)	20.6	16.7	24.2									
Approach LOS	C	B	B									
Intersection Summary												
HCM Average Control Delay	19.6											
HCM Volume to Capacity ratio	6.49											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	47.8%											
Analysis Period (min)	15											
c Critical Lane Group												

12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

13: Project Dwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Movement	EBL	EBF	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	0.95	1.00	0.96	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	0.85	0.97	0.95	1.00	0.95	1.00	0.85
Fit Protected	1681	1686	1583	1745	1770	3527	1770	3539	1583
Satd. Flow (prot)	0.95	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Fit Permitted	1681	1686	1583	1745	1770	3527	1770	3539	1583
Satd. Flow (perm)	0.95	0.95	1.00	0.97	0.95	1.00	0.95	1.00	0.95
Volume (vph)	734	5	108	15	6	9	557	483	11
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	773	5	114	16	6	9	588	508	12
RTOR Reduction (vph)	0	0	85	0	9	0	2	0	0
Lane Group Flow (vph)	387	381	26	0	22	0	586	518	0
Turn Type	Split	Split	Perm	Split	Perm	Split	Perm	Split	Perm
Protected Phases	4	4	8	8	8	5	2	1	6
Permitted Phases	4	4	8	8	8	5	2	1	6
Actuated Green, G (s)	19.9	19.9	19.9	3.0	3.0	27.1	37.6	11.5	12.0
Effective Green, g (s)	20.4	20.4	20.4	3.5	3.5	27.6	38.1	2.0	12.5
Actuated g/C Ratio	0.25	0.25	0.25	0.04	0.04	0.35	0.48	0.02	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	429	430	404	76	611	1680	44	553	247
v/s Ratio Prot.	0.23	0.23	0.02	0.01	0.01	0.15	0.01	0.12	0.06
v/s Ratio Perm	0.90	0.91	0.07	0.29	0.29	0.96	0.31	0.20	0.75
Uniform Delay, d1	28.8	28.9	22.6	37.1	37.1	25.6	12.9	38.2	32.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.14
Incremental Delay, d2	21.7	22.7	0.1	2.2	2.2	26.2	0.5	1.4	5.8
Delay (s)	50.6	51.6	22.7	39.2	39.2	51.9	13.3	42.7	115.8
Level of Service	D	D	C	D	D	D	B	D	D
Approach Delay (s)	47.4	47.4	33.7	39.2	39.2	33.7	0	86.6	0
Approach LOS	D	D	C	D	D	C	E	F	F
<b>Intersection Summary</b>									
HCM Average Control Delay	55.9								
HCM Volume to Capacity ratio	0.87								
Actuated Cycle Length (s)	80.0								
Sum of lost time (s)	16.0								
Intersection Capacity Utilization	81.8%								
ICU Level of Service	D								
Analysis Period (min)	15								
§ Critical Lane Group	-								

Movement	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	Stop	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	0	942	0	0	668
Volume (veh/h)	0	0	942	0	0	668
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	992	0	0	703
Pedestrians	0	0	0	0	0	0
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream Signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	1695	992				992
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
VC3, unblocked vol	1695	992				992
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	100	100				100
GM capacity (veh/h)	102	298				697
<b>Directions: Lane 1 WBL, NB, SBL</b>						
Volume Total	0	992	703			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.58	0.41			
Queue Length 55th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
<b>Intersection Summary</b>						
Average Delay	0.0					
Intersection Capacity Utilization	52.9%					
ICU Level of Service	A					
Analysis Period (min)	15					

14: Business Park Drive & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Sign Control	4	0	0	0	0	0
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	211	73	45	0	0	222
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	222	77	47	0	0	234
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
pX, platoon unblocked						
Upstream signal (ft)						
pX, conflicting volume	47					568
vC, conflicting volume						
vC1, stage 1 cont vol						
vC2, stage 2 cont vol	47					568
vCU, unblocked vol	41					6.4
tC, single (s)						
tC, 2 stage (s)						
tF (s)	2.2					3.5
p0 queue free %	86					100
cM capacity (veh/h)	1560					415
Direction, Lane #	EBL	EBT	WBT	WBR	SBL	SBR
Volume Total	289	47	234			
Volume Left	222	0	0			
Volume Right	0	0	234			
cSH	1560	1700	1022			
Volume to Capacity	0.14	0.03	0.23			
Queue Length 95th (ft)	12	0	22			
Control Delay (s)	6.0	0.0	9.6			
Lane LOS	A	A	A			
Approach Delay (s)	6.0	0.0	5.6			
Approach LOS	A	A	A			
<b>Intersection Summary</b>						
Average Delay	7.0					
Intersection Capacity Utilization	42.6%					
Analysis Period (min)	15					
	ICU Level of Service A					

15: Business Park Drive & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Movement	EBL	EBR	NBL	NBR	SBL	SBR
Sign Control	0	0	0	0	0	0
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	197	32	13	429	373	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	207	34	14	452	393	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
pX, platoon unblocked						
Upstream signal (ft)						
pX, conflicting volume	663	213	426			
vC, conflicting volume						
vC1, stage 1 cont vol						
vC2, stage 2 cont vol	663	213	426			
vCU, unblocked vol	6.8	6.9	4.1			
tC, single (s)						
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	47	96	99			
cM capacity (veh/h)	390	792	1129			
Direction, Lane #	EBL	EBR	NBL	NBR	SBL	SBR
Volume Total	207	34	14	226	226	165
Volume Left	207	0	14	0	0	0
Volume Right	0	34	0	0	0	34
cSH	390	792	1129	1700	1700	1700
Volume to Capacity	0.53	0.04	0.01	0.13	0.13	0.10
Queue Length 95th (ft)	75	3	1	0	0	0
Control Delay (s)	24.3	9.7	8.2	0.0	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	22.2	A	0.2			
Approach LOS	C	C	C			
<b>Intersection Summary</b>						
Average Delay	4.8					
Intersection Capacity Utilization	29.4%					
Analysis Period (min)	15					
	ICU Level of Service A					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1583	1863	1770	1863	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1583	1863	1770	1863	1770
Volume (vph)	299	372	570	285	228	447
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	315	392	600	300	240	471
RTOR Reduction (vph)	0	302	0	173	0	0
Lane Group Flow (vph)	315	60	600	127	240	471
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	8	2	1	6		
Permitted Phases						
Actuated Green, G (s)	14.2	14.2	26.5	9.5	40.5	
Effective Green, g (s)	14.7	14.7	27.0	10.0	41.0	
Actuated g/C Ratio	0.23	0.23	0.43	0.16	0.64	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	408	365	780	671	1199	
v/s Ratio Prot	c0.18	c0.32	c0.14	0.25		
v/s Ratio Perm	0.06	0.25	0.76	0.19	0.86	0.39
Uniform Delay, d1	22.9	20.0	15.6	11.5	26.2	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.8	0.4	6.8	0.6	23.1	1.0
Delay (s)	31.7	20.3	22.4	12.1	49.3	6.4
Level of Service	C	C	C	B	D	A
Approach Delay (s)	25.4	C	18.9	B	20.9	C
Approach LOS	C	B				
Intersection Summary						
HCM Average Control Delay	21.5					
HCM Volume to Capacity ratio	0.78					
Actuated Cycle Length (s)	63.7					
Intersection Capacity Utilization	69.2%					
Analysis Period (min)	15					
Critical Lane Group	C					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	0.85	1.00	0.90	0.90
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1504	1770	1672
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	3539	1583	1504	1770	1672
Volume (vph)	58	539	45	122	584	316	69	17	123	470	48	104
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	567	47	128	615	333	73	18	129	495	51	109
RTOR Reduction (vph)	0	0	37	0	0	264	0	47	54	0	58	0
Lane Group Flow (vph)	61	567	10	128	615	89	73	31	15	495	102	0
Turn Type	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm	Prot	Perm
Protected Phases	7	4	3	6	8							
Permitted Phases												
Actuated Green, G (s)	4.4	16.1	16.1	4.4	16.1	16.1	4.4	17.1	17.1	24.4	37.1	
Effective Green, g (s)	4.9	16.6	16.6	4.9	16.6	16.6	4.9	17.6	17.6	24.9	37.6	
Actuated g/C Ratio	0.06	0.21	0.21	0.06	0.21	0.21	0.06	0.22	0.22	0.31	0.47	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	108	734	328	210	734	328	210	344	331	551	786	
v/s Ratio Prot	0.03	c0.16	0.01	0.04	c0.17	0.04	c0.02	0.02	c0.28	c0.06		
v/s Ratio Perm	0.56	0.77	0.03	0.61	0.84	0.21	0.35	0.09	0.05	0.90	0.13	
Uniform Delay, d1	36.5	29.9	25.3	36.6	30.4	26.3	36.0	24.8	24.6	26.3	12.0	
Progression Factor	1.00	1.00	1.00	0.84	0.52	0.50	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.6	5.1	0.0	4.1	6.9	0.3	1.0	0.5	0.3	17.3	0.3	
Delay (s)	43.1	35.0	25.3	34.8	22.7	13.5	37.0	25.4	24.8	43.6	12.3	
Level of Service	D	C	C	C	C	B	D	C	C	D	B	
Approach Delay (s)	35.0	D	21.3	C	21.3	C	29.1	C	36.0	D		
Approach LOS	D											
Intersection Summary												
HCM Average Control Delay	29.1											
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	62.2%											
Analysis Period (min)	15											
Critical Lane Group	C											

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

19: Rohnert Park Expy & US-101 SB Ramps  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

2020 Alternative H  
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	1.00	0.93	0.85	1.00	0.97	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	0.85	1.00	0.93	0.85	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3146	1441	3433	1863	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3146	1441	3433	1863	1583
Volume (vph)	209	805	118	448	672	408	122	228	464	439	210	228
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	220	847	124	472	707	429	128	240	488	462	221	240
RTOR Reduction (vph)	0	0	84	0	0	285	0	187	224	0	0	197
Lane Group Flow (vph)	220	847	40	472	707	144	128	275	42	462	221	43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5		2	1		6
Permitted Phases												
Actuated Green, G (s)	12.0	25.5	25.0	11.5	25.0	11.3	12.2	12.2	12.2	12.8	13.7	13.7
Effective Green, g (s)	12.5	26.0	26.0	12.0	25.5	11.8	12.7	12.7	12.7	13.3	14.2	14.2
Actuated G/C Ratio	0.16	0.32	0.32	0.15	0.32	0.15	0.16	0.16	0.16	0.17	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	1653	514	515	1128	505	261	489	229	571	331	281
v/s Ratio Prot	c0.12	0.17		c0.14	c0.20		0.07	0.09		c0.13	c0.12	
v/s Ratio Perm												
v/c Ratio	0.79	0.51	0.09	0.92	0.63	0.28	0.49	0.55	0.18	0.81	0.67	0.15
Uniform Delay, d1	32.5	21.9	18.7	33.5	23.2	20.4	31.3	31.0	29.2	32.1	30.7	27.8
Progression Factor	0.71	0.70	0.97	0.74	0.61	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.7	0.2	17.6	2.1	1.1	1.5	1.3	0.4	8.3	5.0	0.3
Delay (s)	32.4	16.1	18.4	42.4	16.3	18.9	32.8	32.3	29.6	40.4	35.7	28.1
Level of Service	C	B	B	D	B	B	C	C	C	D	D	C
Approach Delay (s)	19.3			24.7			31.5			36.1		
Approach LOS	B			C			C			D		D
Intersection Summary												
HCM Average Control Delay	25.9 HCM Level of Service C											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	80.0 Sum of lost time (s)											
Intersection Capacity Utilization	67.3% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.97	0.95	1.00	0.93	0.85	1.00	0.97	1.00	1.00	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	0.85	1.00	0.93	0.85	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	3433	3539	1583	1770	3146	1441	3433	1863	1583
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	1770	5085	1583	3433	3539	1583	1770	3146	1441	3433	1863	1583
Volume (vph)	0	1165	542	78	1199	234	6	0	17	692	0	323
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1226	571	82	1262	246	6	0	18	728	0	340
RTOR Reduction (vph)	0	97	0	0	0	0	0	0	12	0	0	32
Lane Group Flow (vph)	0	1700	0	82	1262	246	0	12	0	364	364	308
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3	8		2			6		6
Permitted Phases												
Actuated Green, G (s)	36.1			4.9	45.5	80.0				25.5		25.5
Effective Green, g (s)	36.6			5.4	46.0	80.0				26.0		26.0
Actuated G/C Ratio	0.46			0.07	0.58	1.00				0.32		0.32
Clearance Time (s)	4.5			4.5	4.5	4.5				4.5		4.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0				3.0		3.0
Lane Grp Cap (vph)	2216			119	2035	1563				501		426
v/s Ratio Prot	c0.35			0.05	c0.36					0.16		0.16
v/s Ratio Perm												
v/c Ratio	0.77			0.69	0.62	0.16				0.01		0.01
Uniform Delay, d1	16.1			36.5	11.2	0.0				18.4		18.4
Progression Factor	0.44			1.27	0.69	1.00				1.00		1.00
Incremental Delay, d2	2.1			12.1	1.1	0.2				0.0		0.0
Delay (s)	10.0			58.4	8.8	0.2				18.4		18.4
Level of Service	B			E	A	A				B		B
Approach Delay (s)	10.0			10.1						18.4		18.4
Approach LOS	B			B						B		B
Intersection Summary												
HCM Average Control Delay	16.1 HCM Level of Service B											
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	80.0 Sum of lost time (s)											
Intersection Capacity Utilization	74.8% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												



20: Rohmert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.86	1.00	0.91	1.00	1.00	0.95	0.85	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.98	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	1.00
Satd. Flow (prot)	1770	6408	1583	5085	1583	1770	1504	1504	1748	1583	1583	1583
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.82	1.00	1.00	1.00
Satd. Flow (perm)	1770	6408	1583	5085	1583	1389	1504	1504	1500	1583	1583	1583
Volume (vph)	19	1352	504	0	904	343	523	0	376	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	1423	531	0	1036	361	551	0	396	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	3	0	2	0
Lane Group Flow (vph)	20	1423	531	0	1036	361	551	195	195	0	16	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	8	8	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	2	2	6	6	6
Actuated Green, G (s)	2.2	36.1	80.0	29.4	80.0	34.9	34.9	34.9	34.9	34.9	34.9	34.9
Effective Green, g (s)	2.7	36.6	80.0	29.9	80.0	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Actuated g/C Ratio	0.03	0.46	1.00	0.37	1.00	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2932	1583	1901	1583	615	666	666	664	664	664	664
v/s Ratio Prot	0.01	c0.22	c0.20	0.23	c0.40	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.33	0.49	0.34	0.54	0.23	0.90	0.29	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	37.8	15.1	0.0	19.7	0.0	20.6	14.3	14.3	12.6	12.6	12.6	12.6
Progression Factor	1.03	1.02	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.3	0.3	0.7	0.2	15.6	0.2	0.2	0.0	0.0	0.0	0.0
Delay (s)	41.0	15.8	0.3	14.5	0.2	36.2	14.5	14.5	12.6	12.6	12.6	12.6
Level of Service	D	B	A	B	A	D	B	B	B	B	B	B
Approach Delay (s)	11.9	B	A	10.8	B	27.1	C	C	12.6	B	B	B
Approach LOS	B	B	B	B	B	B	C	C	B	B	B	B
Intersection Summary												
HCM Average Control Delay	14.9 HCM Level of Service B											
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	58.8% ICU Level of Service B											
Analysis Period (min)	15											
C Critical Lane Group												

21: Rohmert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EFT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.85	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.85	1.00	0.85	1.00	0.85	0.85	0.98	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	1.00
Satd. Flow (prot)	1770	6408	1583	5085	1583	1770	1504	1504	1748	1583	1583	1583
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.82	1.00	1.00	1.00
Satd. Flow (perm)	1770	6408	1583	5085	1583	1389	1504	1504	1500	1583	1583	1583
Volume (vph)	19	1352	504	0	904	343	523	0	376	14	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	1423	531	0	1036	361	551	0	396	15	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	3	0	2	0
Lane Group Flow (vph)	20	1423	531	0	1036	361	551	195	195	0	16	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Perm	Perm	Perm	Perm
Protected Phases	7	4	8	8	8	8	8	2	2	6	6	6
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	2	2	6	6	6
Actuated Green, G (s)	2.2	36.1	80.0	29.4	80.0	34.9	34.9	34.9	34.9	34.9	34.9	34.9
Effective Green, g (s)	2.7	36.6	80.0	29.9	80.0	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Actuated g/C Ratio	0.03	0.46	1.00	0.37	1.00	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	2932	1583	1901	1583	615	666	666	664	664	664	664
v/s Ratio Prot	0.01	c0.22	c0.20	0.23	c0.40	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.33	0.49	0.34	0.54	0.23	0.90	0.29	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	37.8	15.1	0.0	19.7	0.0	20.6	14.3	14.3	12.6	12.6	12.6	12.6
Progression Factor	1.03	1.02	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.3	0.3	0.7	0.2	15.6	0.2	0.2	0.0	0.0	0.0	0.0
Delay (s)	41.0	15.8	0.3	14.5	0.2	36.2	14.5	14.5	12.6	12.6	12.6	12.6
Level of Service	D	B	A	B	A	D	B	B	B	B	B	B
Approach Delay (s)	11.9	B	A	10.8	B	27.1	C	C	12.6	B	B	B
Approach LOS	B	B	B	B	B	B	C	C	B	B	B	B
Intersection Summary												
HCM Average Control Delay	14.9 HCM Level of Service B											
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	58.8% ICU Level of Service B											
Analysis Period (min)	15											
C Critical Lane Group												

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

23: Gravenstien Hwy & Redwood Drive  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3383	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770
Satd. Flow (perm)	150	774	324	115	510	133	316	511	102	276	529	230
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	158	815	341	121	537	140	333	538	107	291	557	242
Adj. Flow (vph)	0	66	0	0	0	106	0	0	70	0	0	183
RTOR Reduction (vph)	158	1090	0	121	537	34	333	538	37	291	557	39
Lane Group Flow (vph)	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Turn Type	7	4	3	3	8	5	2	2	1	6	6	6
Protected Phases	5.5	16.5	16.5	13.5	23.5	23.5	6.5	16.5	16.5	16.5	16.5	16.5
Permitted Phases	6.0	17.0	17.0	14.0	24.0	24.0	7.0	17.0	17.0	17.0	17.0	17.0
Actuated Green, G (s)	0.09	0.24	0.24	0.20	0.34	0.34	0.10	0.24	0.24	0.24	0.24	0.24
Effective Green, g (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Actuated g/C Ratio	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Clearance Time (s)	152	822	152	859	384	354	639	543	177	452	384	384
Vehicle Extension (s)	c0.09	c0.32	c0.07	0.15	0.02	c0.19	0.29	0.02	0.02	c0.16	c0.30	0.04
Lane Grp Cap (vph)	1.04	1.33	0.80	0.63	0.09	0.94	0.84	0.07	1.84	1.23	0.15	0.15
w/s Ratio Perm	32.0	26.5	31.4	23.7	20.5	27.6	21.2	15.5	31.5	26.5	20.8	20.8
v/c Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	24.3	155.2	24.3	1.4	0.1	32.7	12.7	0.2	313.8	122.6	0.8	0.8
Progression Factor	115.8	181.7	55.7	25.1	20.6	60.3	34.0	15.7	345.3	149.1	21.7	21.7
Incremental Delay, d2	F	F	F	F	F	F	F	F	F	F	F	F
Delay (s)	173.8	173.8	173.8	28.9	28.9	28.9	41.0	41.0	173.2	173.2	173.2	173.2
Level of Service	F	F	F	E	C	C	E	C	B	F	F	F
Approach Delay (s)	F	F	F	F	F	F	F	F	F	F	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
<b>Intersection Summary</b>												
HCM Average Control Delay	114.9											
HCM Volume to Capacity ratio	1.23											
Actuated Cycle Length (s)	70.0											
Intersection Capacity Utilization	96.8%											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1770	3516	1770	3539	1583	1770	1658	1583	1770	1658	1583	1770
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	1770	3516	1770	3539	1583	1770	1658	1583	1770	1658	1583	1770
Satd. Flow (perm)	107	720	33	62	890	320	48	23	63	562	35	105
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	113	758	35	65	937	337	51	24	66	592	37	111
Adj. Flow (vph)	0	4	0	0	0	118	0	61	0	58	0	58
RTOR Reduction (vph)	113	788	0	65	937	219	51	29	0	592	90	0
Lane Group Flow (vph)	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Turn Type	7	4	3	3	8	5	2	2	1	6	6	6
Protected Phases	5.6	21.9	4.4	20.7	20.7	3.3	6.3	6.3	39.4	42.4	42.4	42.4
Permitted Phases	6.1	22.4	4.9	21.2	21.2	3.8	6.8	6.8	39.9	42.9	42.9	42.9
Actuated Green, G (s)	0.07	0.25	0.05	0.24	0.24	0.04	0.08	0.08	0.44	0.48	0.48	0.48
Effective Green, g (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Actuated g/C Ratio	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Clearance Time (s)	120	875	96	834	373	75	125	125	785	788	788	788
Vehicle Extension (s)	0.06	c0.22	0.04	c0.26	0.14	c0.03	0.02	0.02	c0.33	c0.05	c0.05	c0.05
Lane Grp Cap (vph)	0.94	0.90	0.68	1.12	0.59	0.68	0.23	0.23	0.75	0.11	0.11	0.11
w/s Ratio Perm	41.8	32.7	41.8	34.4	30.5	42.5	39.1	39.1	20.9	13.0	13.0	13.0
v/c Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	63.8	14.3	63.8	14.3	69.4	5.9	22.4	1.0	4.1	0.1	0.1	0.1
Progression Factor	105.6	47.0	43.4	90.2	13.9	64.9	40.1	40.1	25.1	13.1	13.1	13.1
Incremental Delay, d2	F	D	D	F	B	E	D	D	C	B	B	B
Delay (s)	54.3	54.3	54.3	68.7	68.7	68.7	49.1	49.1	22.7	22.7	22.7	22.7
Level of Service	F	D	D	F	B	E	D	D	C	B	B	B
Approach Delay (s)	F	F	F	F	F	F	F	F	F	F	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
<b>Intersection Summary</b>												
HCM Average Control Delay	52.8											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	80.1%											
Analysis Period (min)	15											
c Critical Lane Group	15											

24: Gravenstien Hwy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3539	1583	1770	3539	3433	1583
Fit Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3539	1583	1770	3539	3433	1583
Volume (vph)	0	969	376	119	1004	0	0	0	0	626	0	268
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1020	396	125	1057	0	0	0	0	659	0	282
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	68
Lane Group Flow (vph)	0	1020	308	125	1057	0	0	0	0	659	0	214
Turn Type		Perm	Prot	Prot	Prot					Prot		Prot
Protected Phases	4		3	8						1		6
Permitted Phases		4										
Actuated Green, G (s)	33.5	33.5	14.5	52.5						28.5		28.5
Effective Green, g (s)	34.0	34.0	15.0	53.0						29.0		29.0
Actuated g/C Ratio	0.38	0.38	0.17	0.59						0.32		0.32
Clearance Time (s)	4.5	4.5	4.5	4.5						4.5		4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0						3.0		3.0
Lane Grp Cap (vph)	1337	588	295	2084						1105		510
w/s Ratio Prot	c0.29		0.07	c0.30						c0.19		0.13
w/s Ratio Perm		0.19										
w/c Ratio	0.76	0.51	0.42	0.51						0.60		0.42
Uniform Delay, d1	24.5	21.6	33.6	10.8						25.6		23.9
Progression Factor	0.51	0.44	1.24	1.61						1.00		1.00
Incremental Delay, d2	2.6	1.9	0.9	0.8						0.9		2.5
Delay (s)	15.1	11.4	42.7	18.3						26.5		26.4
Level of Service	B	B	D	B						C		C
Approach Delay (s)	14.1		20.9							26.4		
Approach LOS	B		C							A		C
<b>Intersection Summary</b>												
HCM Average Control Delay	19.6											
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	66.5%											
Analysis Period (min)	15											
Critical Lane Group	C											

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583	3539	1583	1770
Fit Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583	3539	1583	1770
Volume (vph)	0	1594	0	0	700	423	265	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1678	0	0	737	445	268	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	14	0	0
Lane Group Flow (vph)	1678	0	0	0	737	445	254	0	0
Turn Type		Perm			Perm		Perm		Perm
Protected Phases	4			8			2		
Permitted Phases		4					2		
Actuated Green, G (s)	61.5	61.5	19.5	19.5	61.5	19.5	19.5	61.5	19.5
Effective Green, g (s)	62.0	62.0	20.0	20.0	62.0	20.0	20.0	62.0	20.0
Actuated g/C Ratio	0.69	0.69	0.22	0.22	0.69	0.22	0.22	0.69	0.22
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2438	763	352		2438	763	352		
w/s Ratio Prot	c0.47		0.21	0.13					
w/s Ratio Perm		0.21							
w/c Ratio	0.69	0.30	0.58	0.72					
Uniform Delay, d1	8.3	5.5	31.3	32.4					
Progression Factor	0.28	1.00	1.00	1.00					
Incremental Delay, d2	1.1	0.3	1.1	7.1					
Delay (s)	3.4	5.8	32.4	39.5					
Level of Service	A	A	C	D					
Approach Delay (s)	3.4		5.8	35.1					
Approach LOS	A		A	D					
<b>Intersection Summary</b>									
HCM Average Control Delay	11.2								
HCM Volume to Capacity ratio	0.70								
Actuated Cycle Length (s)	90.0								
Intersection Capacity Utilization	66.5%								
Analysis Period (min)	15								
Critical Lane Group	C								

26: Millbrae Ave & Stomy Point Road  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4			4			4			4		
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	11	4	9	18	21	222	8	780	24	119	677	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	4	9	19	25	234	8	821	25	125	713	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	5											
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
vC, conflicting volume	1524	1830	360	1456	1808	411	720					846
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	1524	1830	360	1456	1808	411	720					846
IC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	61	93	99	74	61	60	99					84
cM capacity (veh/h)	30	63	637	74	65	590	877					786
Direction Lane	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Volume Total	25	278	8	411	411	25	125	475	245			
Volume Left	12	19	8	0	0	0	125	0	0			
Volume Right	9	234	0	0	0	25	0	0	7			
CSH	54	433	877	1700	1700	1700	786	1700	1700			
Volume to Capacity	0.47	0.64	0.01	0.24	0.24	0.01	0.16	0.28	0.14			
Queue Length 95th (ft)	44	110	1	0	0	0	14	0	0			
Control Delay (s)	F	D	A	120.3	32.3	9.1	0.0	0.0	10.4	0.0	0.0	0.0
Lane LOS	F	D	A				B					
Approach Delay (s)	F	D		120.3	32.3	0.1						
Approach LOS	F	D					B					
Intersection Summary												
Average Delay	6.7											
Intersection Capacity Utilization	48.6%											
Analysis Period (min)	15											
ICU Level of Service	A											

27: Millbrae Ave & Primrose Ave  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4			4			4			4		
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	1	142	4	7	281	2	2	0	2	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	149	4	7	275	2	2	0	2	1	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)												
Upstream signal (ft)												
px platoon unblocked												
vC, conflicting volume	277			154			445	445	152	446	446	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCU, unblocked vol	277			154			445	445	152	446	446	276
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	100	100	100
cM capacity (veh/h)	1286			1427			520	505	895	519	504	763
Direction Lane	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Volume Total	155	284	4	2	2	1						
Volume Left	1	7	2	2	0							
Volume Right	4	2	2	0								
CSH	1286	1427	558	511								
Volume to Capacity	0.00	0.01	0.01	0.00								
Queue Length 95th (ft)	0	0	0	0								
Control Delay (s)	0.1	0.2	10.5	12.1								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.2	10.5	12.1								
Approach LOS	B	B	B	B								
Intersection Summary												
Average Delay	0.3											
Intersection Capacity Utilization	28.6%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EB	EB	WB	WB	WB	NBL	NBL	NBL	NBR	NBR	SB	SB	SB	SBR
Lane Configurations	4			4			4			4			4		
Sign Control	Free			Free			Stop			Stop			Stop		
Grade	0%			0%			0%			0%			0%		
Volume (veh/h)	2	129	2	4	275	8	1	10	0	3	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	136	2	4	289	8	1	11	0	3	1	1	1	1	1
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type							None								
Median storage (veh)															
Upstream signal (ft)															
pX, platoon unblocked															
vC, conflicting volume							445			447			137		
vC1, stage 1 cont vol															
vC2, stage 2 cont vol															
vCu, unblocked vol							445			447			137		
IC, single (s)							7.1			6.5			6.2		
IC, 2 stage (s)															
IF (s)							3.5			4.0			3.3		
p0 queue free %							100			98			100		
GM capacity (veh/h)							1446			520			612		
Direction Lane #	EB	WB	NB	WB	NB	SB	WB	NB	SB	WB	NB	SB	WB	NB	SB
Volume Total	140	302	12	5	5	5	140	302	12	5	5	5	140	302	12
Volume Left	2	4	1	3	3	3	2	4	1	3	3	3	2	4	1
Volume Right	2	8	0	1	1	1	2	8	0	1	1	1	2	8	0
cSH	1263	1446	505	544	544	544	1263	1446	505	544	544	544	1263	1446	505
Volume to Capacity	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.02
Queue Length 95th (ft)	0	0	2	1	1	1	0	0	2	1	1	1	0	0	2
Control Delay (s)	0.1	0.1	12.3	11.7	11.7	11.7	0.1	0.1	12.3	11.7	11.7	11.7	0.1	0.1	12.3
Lane LOS	A	A	B	B	B	B	A	A	B	B	B	B	A	A	B
Approach Delay (s)	0.1	0.1	12.3	11.7	11.7	11.7	0.1	0.1	12.3	11.7	11.7	11.7	0.1	0.1	12.3
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary															
Average Delay	0.6														
Intersection Capacity Utilization	27.2%														
ICU Level of Service	A														
Analysis Period (min)	15														

Movement	EB	EB	EB	WB	WB	WB	NBL	NBL	NBL	NBR	NBR	SB	SB	SB	SBR
Lane Configurations	4			4			4			4			4		
Sign Control	Free			Free			Stop			Stop			Stop		
Grade	0%			0%			0%			0%			0%		
Volume (veh/h)	2	153	10	4	336	13	9	9	9	9	9	9	9	9	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	161	11	4	354	14	9	9	9	9	9	9	9	9	9
Pedestrians															
Lane Width (ft)															
Walking Speed (ft/s)															
Percent Blockage															
Right turn flare (veh)															
Median type							None								
Median storage (veh)															
Upstream signal (ft)															
pX, platoon unblocked															
vC, conflicting volume							172			528			166		
vC1, stage 1 cont vol															
vC2, stage 2 cont vol															
vCu, unblocked vol							172			528			166		
IC, single (s)							4.1			6.4			6.2		
IC, 2 stage (s)															
IF (s)							2.2			3.5			3.3		
p0 queue free %							100			97			99		
GM capacity (veh/h)							1405			509			878		
Direction Lane #	EB	WB	NB	WB	NB	SB	WB	NB	SB	WB	NB	SB	WB	NB	SB
Volume Total	172	358	23	9	9	9	172	358	23	9	9	9	172	358	23
Volume Left	0	4	14	14	14	14	0	4	14	14	14	14	0	4	14
Volume Right	11	0	9	9	9	9	11	0	9	9	9	9	11	0	9
cSH	1700	1405	615	615	615	615	1700	1405	615	615	615	615	1700	1405	615
Volume to Capacity	0.10	0.00	0.04	0.04	0.04	0.04	0.10	0.00	0.04	0.04	0.04	0.04	0.10	0.00	0.04
Queue Length 95th (ft)	0	0	3	3	3	3	0	0	3	3	3	3	0	0	3
Control Delay (s)	0.0	0.1	11.1	11.1	11.1	11.1	0.0	0.1	11.1	11.1	11.1	11.1	0.0	0.1	11.1
Lane LOS	A	A	B	B	B	B	A	A	B	B	B	B	A	A	B
Approach Delay (s)	0.0	0.1	11.1	11.1	11.1	11.1	0.0	0.1	11.1	11.1	11.1	11.1	0.0	0.1	11.1
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary															
Average Delay	0.5														
Intersection Capacity Utilization	30.9%														
ICU Level of Service	A														
Analysis Period (min)	15														

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	150	16	17	244	0	100	0	29	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	158	17	18	257	0	105	0	31	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	257					175			459	459	166	489
vC1, stage 1 cont vol												
vC2, stage 2 cont vol	257					175			459	459	166	489
vCU, unblocked vol	4.1					4.1			7.1	6.5	6.2	7.1
IC, 2 stage (s)												
IC (s)	2.2					2.2			3.5	4.0	3.3	3.5
p0 queue free %	100					99			79	100	97	100
CM capacity (veh/h)	1308					1402			507	492	678	487
Direction Lane	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR	SB	SBT	SBR
Volume Total	175	275	136	0	0	0	0	0	0	0	0	0
Volume Left	0	18	105	0	0	0	0	0	0	0	0	0
Volume Right	17	0	31	0	0	0	0	0	0	0	0	0
CSH	1308	1402	561	1700	0	0	0	0	0	0	0	0
Volume to Capacity	0.00	0.01	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	1	24	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.6	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	0.0	0.6	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	A	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	3.4											
Intersection Capacity Utilization	40.0%											
Analysis Period (min)	15											
ICU Level of Service	A											

Movement	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	137	32	0	235	32	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	144	34	0	247	34	0	0	0
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, conflicting volume						178		408	161
vC1, stage 1 cont vol									
vC2, stage 2 cont vol						178		408	161
vCU, unblocked vol						4.1		6.4	6.2
IC, 2 stage (s)									
IC (s)						2.2		3.5	3.3
p0 queue free %						100		94	100
CM capacity (veh/h)						1398		599	884
Direction Lane	EB	EBT	EBR	WB	WBT	WBR	NB	NBT	NBR
Volume Total	178	247	34	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	178	1398	599	0	0	0	0	0	0
CSH	1700	1398	599	0	0	0	0	0	0
Volume to Capacity	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	B	A	A	A	A	A	A
Approach Delay (s)	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	B	A	B	B	B	B	B	B
Intersection Summary									
Average Delay	0.8								
Intersection Capacity Utilization	22.4%								
Analysis Period (min)	15								
ICU Level of Service	A								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	902	164	247	955	557	184	42	368	582	126	
v/c Ratio	0.15	0.92	0.35	0.42	1.54	0.80	0.90	0.19	0.83	0.85	0.47	
Control Delay	42.7	70.5	25.9	35.8	282.8	32.3	108.2	71.1	22.6	73.6	52.4	
Queue Delay	0.0	28.0	0.0	7.0	92.7	26.1	0.0	0.0	5.8	381.0	0.0	
Total Delay	42.7	98.5	25.9	42.8	375.5	58.4	108.2	71.1	28.4	454.6	52.4	
Queue Length 50th (ft)	61	497	76	185	1532	288	203	22	0	300	90	
Queue Length 95th (ft)	106	596	154	m226	m1640	m368	#352	43	110	#474	163	
Internal Link Dist. (ft)	550			220				110			279	
Turn Bay Length (ft)	150			150				150	100		275	
Base Capacity (vph)	531	1017	484	587	619	695	221	376	497	686	269	
Starvation Cap Reductn	0	0	0	287	73	154	0	0	0	0	0	
Spillback Cap Reductn	0	158	0	0	0	0	0	0	83	371	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.15	1.05	0.34	0.82	1.75	1.03	0.88	0.11	0.89	1.85	0.47	

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	1277	575	89	1021	446	1096
v/c Ratio	0.76	0.65	0.35	0.50	0.85	1.32
Control Delay	27.3	15.7	45.7	17.7	43.0	62.5
Queue Delay	51.4	4.5	0.0	0.2	0.0	94.7
Total Delay	78.7	20.2	45.7	17.9	43.0	157.2
Queue Length 50th (ft)	442	183	21	244	226	307
Queue Length 95th (ft)	m594	m319	m28	m223	#405	#437
Internal Link Dist. (ft)	220			466		348
Turn Bay Length (ft)			300		250	
Base Capacity (vph)	1681	886	257	2035	523	1061
Starvation Cap Reductn	527	235	0	0	0	0
Spillback Cap Reductn	0	0	0	339	0	190
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.88	0.35	0.60	0.85	1.26

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 dr Defacto Right Lane. Record with 1 though lane as a right lane.

Lane Group	EBT	EBR	WBT	WBL	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	858	865	187	446	337	354	601	9	18
v/c Ratio	0.75	0.86	0.34	0.29	0.97	1.01	0.57	0.02	0.05
Control Delay	43.2	22.4	37.7	18.2	69.4	79.6	7.3	25.7	18.8
Queue Delay	0.0	18.6	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	43.2	40.9	37.7	18.2	69.4	79.6	7.7	25.7	18.8
Queue Length 50th (ft)	204	255	52	112	133	144	10	4	4
Queue Length 95th (ft)	187	200	85	156	m#256	m#277	m#40	16	21
Internal Link Dist (ft)	466		345		380			270	
Turn Bay Length (ft)		150		150				200	
Base Capacity (vph)	1144	1001	558	1542	347	349	1052	363	363
Starvation Cap Reductn	0	152	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	127	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	1.02	0.34	0.29	0.97	1.01	0.65	0.02	0.05

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBE	EBT	WBT	WBL	SBL	SBT
Lane Group Flow (vph)	189	1278	865	144	96	
v/c Ratio	0.43	0.57	0.53	0.31	0.20	
Control Delay	28.2	20.0	17.1	25.9	6.6	
Queue Delay	0.0	1.9	0.0	0.0	0.0	
Total Delay	28.2	21.8	17.1	25.9	6.6	
Queue Length 50th (ft)	58	326	154	58	0	
Queue Length 95th (ft)	m70	332	221	106	34	
Internal Link Dist (ft)		345	164	232		
Turn Bay Length (ft)	80			200		
Base Capacity (vph)	901	2256	1621	465	486	
Starvation Cap Reductn	0	773	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.86	0.53	0.31	0.20	

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.



12: US-101 NB Ramps & Commerce Boulevard  
 Graton Rancharia Casino & Hotel

2020 Alternative H  
 PM Peak

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	387	391	114	31	586	520	9	415	639
v/c Ratio	0.90	0.91	0.23	0.20	1.10	0.26	0.06	0.50	0.74
Control Delay	55.9	56.7	6.4	29.4	99.9	12.0	36.6	33.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Delay	55.9	56.7	6.4	29.4	99.9	12.0	36.6	33.8	12.1
Queue Length 50th (ft)	194	196	0	10	339	51	5	112	33
Queue Length 95th (ft)	#360	#353	37	35	#531	147	m6	m#143	m78
Internal Link Dist (ft)	284		118	200	214		100	380	
Turn Bay Length (ft)	250		250		200		100	175	
Base Capacity (vph)	441	443	500	183	531	1864	177	835	962
Starvation Cap Reductn	0	0	0	0	0	0	0	0	36
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.88	0.23	0.17	1.10	0.26	0.05	0.50	0.77

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

16: Rohnert Park Expy & Stony Point Road  
 Graton Rancharia Casino & Hotel

2020 Alternative H  
 PM Peak

Lane Group	WVBL	WBRT	NBT	NBT	SBL	SBT
Lane Group Flow (vph)	315	392	600	300	240	471
v/c Ratio	0.77	0.59	0.76	0.36	0.86	0.39
Control Delay	37.5	6.7	24.1	3.1	58.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	6.7	24.1	3.1	58.8	6.9
Queue Length 50th (ft)	115	0	197	0	95	79
Queue Length 95th (ft)	#221	60	#359	40	#213	129
Internal Link Dist (ft)	480		3920		2550	
Turn Bay Length (ft)	175		450		700	
Base Capacity (vph)	436	685	790	844	278	1199
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.57	0.76	0.36	0.86	0.39

**Intersection Summary**  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.

17: Rohnert Park Expy & Labath Ave  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	61	567	47	128	615	333	73	78	69	495	160	
v/c Ratio	0.46	0.77	0.13	0.50	0.84	0.56	0.28	0.18	0.17	0.93	0.18	
Control Delay	47.1	38.0	9.3	35.7	26.0	5.0	38.1	11.7	8.3	54.9	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.1	38.0	9.3	35.7	26.0	5.0	38.1	11.7	8.3	54.9	5.8	
Queue Length 50th (ft)	30	141	0	20	117	0	18	7	0	239	14	
Queue Length 95th (ft)	67	197	26	m43	#228	6	38	43	33	#424	48	
Internal Link Dist (ft)	1540							1010				
Turn Bay Length (ft)	160	200	250	170	130	100	100	130	100	100	520	
Base Capacity (vph)	133	752	373	257	752	598	257	425	417	531	879	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.46	0.75	0.13	0.50	0.82	0.56	0.28	0.18	0.17	0.93	0.18	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

18: Rohnert Park Expy & Redwood Drive  
Graton Rancheria Casino & Hotel

2020 Alternative H  
PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	220	847	124	472	107	429	128	462	286	462	221	240
v/c Ratio	0.79	0.51	0.21	0.92	0.63	0.54	0.49	0.67	0.59	0.81	0.67	0.50
Control Delay	38.3	16.2	4.6	47.1	16.6	4.6	40.8	20.8	9.6	48.0	40.5	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	16.2	4.6	47.1	16.6	4.6	40.8	20.8	9.6	48.0	40.5	8.0
Queue Length 50th (ft)	69	83	8	131	142	36	60	80	0	116	103	0
Queue Length 95th (ft)	m106	m93	m13	#211	167	48	#136	104	64	#237	169	56
Internal Link Dist (ft)	320							554				
Turn Bay Length (ft)	200	250	350	155	250	175	175	250	175	175	175	175
Base Capacity (vph)	288	1653	598	515	1126	790	260	843	516	572	396	525
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.51	0.21	0.92	0.63	0.54	0.49	0.55	0.52	0.81	0.56	0.46

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

19: Rohnert Park Expy & US-101 SB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Lane Group	EBL	WBL	WBT	WBR	NBT	SBL	SBR
Lane Group Flow (vph)	1797	82	1262	246	24	364	340
v/c Ratio	0.76	0.56	0.62	0.16	0.05	0.85	0.62
Control Delay	9.8	58.3	9.6	0.2	9.5	44.6	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	58.3	9.6	0.2	9.5	44.6	24.3
Queue Length 50th (ft)	146	45	128	0	2	165	114
Queue Length 95th (ft)	357	m#78	m140	m0	17	#311	197
Internal Link Dist (ft)	520		960		428		378
Turn Bay Length (ft)	225				400		400
Base Capacity (vph)	2363	146	2034	1583	572	476	604
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.56	0.62	0.16	0.04	0.76	0.56

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 \* Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

20: Rohnert Park Expy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel  
 2020 Alternative H  
 PM Peak

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	20	1423	531	1036	361	551	198	198	18
v/c Ratio	0.15	0.49	0.34	0.50	0.23	0.89	0.30	0.30	0.03
Control Delay	37.6	17.3	0.3	15.3	0.2	38.1	13.6	13.6	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	17.3	0.3	15.3	0.2	38.1	13.6	13.6	8.6
Queue Length 50th (ft)	10	16	0	84	0	231	58	58	4
Queue Length 95th (ft)	m13	212	m0	134	m0	342	92	92	13
Internal Link Dist (ft)		960		360			386		420
Turn Bay Length (ft)	190					225			
Base Capacity (vph)	133	2928	1583	2070	1583	730	792	792	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.49	0.34	0.50	0.23	0.75	0.25	0.25	0.02

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

21: Rohnert Park Expy & Commerce Boulevard  
 Graton Rancheria Casino & Hotel

22: Gravenstien Hwy & Stony Point Road  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NGR	SBL	SBT	SBR
Lane Group Flow (vph)	283	976	576	205	1086	250	527	334	167	351	182	
v/c Ratio	0.51	0.96	0.70	0.90	0.82	0.76	0.77	0.58	0.58	0.58	0.42	
Control Delay	21.0	37.5	9.4	78.6	33.5	45.9	38.3	8.8	38.3	33.9	7.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.0	37.5	9.4	78.6	33.5	45.9	38.3	8.8	38.3	33.9	7.8	
Queue Length 50th (ft)	65	271	205	104	173	128	136	7	84	89	0	
Queue Length 95th (ft)	70	368	92	264	274	245	193	75	147	128	50	
Internal Link Dist. (ft)		360		1350			601			660		
Turn Bay Length (ft)	250		200		250		250		175	150	150	
Base Capacity (vph)	558	1017	828	228	1318	342	710	585	342	718	480	
Starvation Cap Reductn	0	0	63	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.96	0.75	0.90	0.82	0.73	0.74	0.57	0.49	0.49	0.38	

Intersection Summary  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NGR	SBL	SBT	SBR
Lane Group Flow (vph)	158	1156	121	537	140	333	538	107	291	557	242	
v/c Ratio	1.04	1.30	0.80	0.63	0.29	0.94	0.84	0.17	1.64	1.23	0.43	
Control Delay	120.6	169.6	69.1	27.4	6.2	66.0	35.8	4.6	340.2	150.1	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	120.6	169.6	69.1	27.4	6.2	66.0	35.8	4.6	340.2	150.1	6.0	
Queue Length 50th (ft)	-75	-331	52	108	0	142	210	0	-186	-303	0	
Queue Length 95th (ft)	#183	#452	#138	157	39	#280	#378	29	#325	#482	51	
Internal Link Dist. (ft)		689		6630		734				980		
Turn Bay Length (ft)	350		500		150	550		675	500	625		
Base Capacity (vph)	152	887	152	859	490	354	639	613	177	452	568	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.04	1.30	0.80	0.63	0.29	0.94	0.84	0.17	1.64	1.23	0.43	

Intersection Summary  
 # Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

LANE GROUP	EBT	EBL	WBT	WBL	WBRT	WBRL	SBL	SBL
Lane Group Flow (vph)	1020	396	125	1057	659	282		
v/c Ratio	0.76	0.50	0.42	0.51	0.60	0.49		
Control Delay	15.3	8.4	46.7	18.6	28.3	18.7		
Queue Delay	1.1	0.4	0.0	0.3	0.0	0.0		
Total Delay	16.4	8.8	46.7	18.9	28.3	18.7		
Queue Length 50th (ft)	152	69	70	253	160	79		
Queue Length 95th (ft)	184	m/99	m/25	314	216	154		
Internal Link Dist (ft)	350			370		585		
Turn Bay Length (ft)		50	100		425			
Base Capacity (vph)	1337	686	295	2084	1106	579		
Starvation Cap Reductn	134	60	0	428	0	0		
Spillback Cap Reductn	17	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.85	0.63	0.42	0.64	0.60	0.49		

Intersection Summary  
 m Volume for 95th percentile queue is metered by upstream signal.

LANE GROUP	EBT	EBL	WBT	WBL	WBRT	WBRL	SBL	SBL
Lane Group Flow (vph)	113	793	65	937	337	51	90	592
v/c Ratio	0.93	0.81	0.55	1.04	0.65	0.43	0.44	0.77
Control Delay	111.2	38.5	44.2	60.8	9.8	52.2	21.6	31.9
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.2	39.0	44.2	60.8	9.8	52.2	21.6	31.9
Queue Length 50th (ft)	65	226	37	311	6	28	13	286
Queue Length 95th (ft)	#171	#331	m/81	#415	33	65	56	#513
Internal Link Dist (ft)	6630			350		200		236
Turn Bay Length (ft)		225	150		80	50		225
Base Capacity (vph)	121	965	118	904	519	178	367	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	30	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.83	0.55	1.04	0.65	0.43	0.25	0.77

Intersection Summary  
 Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 m Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

25: Gravenstien Hwy & US-101 NB Ramps  
 Graton Rancheria Casino & Hotel

2020 Alternative H  
 PM Peak

	→	←	↔	↖	↗
Lane Group	EBT	WBT	NBT	NBR	
Lane Group Flow (vph)	1678	737	445	268	
v/c Ratio	0.69	0.30	0.58	0.73	
Control Delay	3.9	6.7	33.5	41.4	
Queue Delay	0.1	0.0	0.0	0.0	
Total Delay	3.9	6.7	33.5	41.4	
Queue Length 50th (ft)	35	74	117	133	
Queue Length 95th (ft)	239	137	144	192	
Internal Link Dist (ft)	370	312	431	395	
Turn Bay Length (ft)	2436	2438	1221	574	
Base Capacity (vph)	62	0	0	0	
Starvation Cap Reductn	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	
Storage Cap Reductn	0	0	0	0	
Reduced v/c Ratio	0.71	0.30	0.36	0.47	

Intersection Summary

**SIGNAL WARRANT ANALYSIS**  
**NO BUILD**

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Wilfred Ave

COUNT DATE: Existing

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Wilfred Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			420	140		630	70			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM	806	42	Y			Y				
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,186	122	Y			Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,992	164	0			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Primrose Ave

COUNT DATE: Existing

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM	70	30								
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	108	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	178	60	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Whistler Ave

COUNT DATE: Existing

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			350	140		525	70			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM	70	30								
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	108	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	178	50	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD

## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Langer Ave

COUNT DATE: Existing

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Langer Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			350	105		525	53			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM	70	30								
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	108	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	178	60	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Labath Ave

COUNT DATE: Existing

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM	41	3								
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	83	7								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	124	10	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Dowdell Ave

COUNT DATE: Existing

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM	45	10								
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	91	19								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	136	29	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Redwood Drive and Business Park Drive

COUNT DATE: Existing

MAJOR STREET: Redwood Drive

# OF APPROACH LANES: 2

MINOR STREET: Business Park Drive

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	200		900	100			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM	469	50								
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,003	160	Y			Y	Y	Y		
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,472	210	0			1			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Milbrae Ave

COUNT DATE: Existing

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 1

MINOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,407	187	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,407	187	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Wilfred Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Wilfred Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			420	140		630	70			
05:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,424	216	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,424	216	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Primrose Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	372	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	372	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Whistler Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			350	140		525	70			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	381	30	Y							
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	381	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Langer Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Langer Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			350	105		525	53			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	370	30	Y							
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	370	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Labath Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	524	307	Y	Y	Y		Y	Y		
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	524	307	1			0			1	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Dowdell Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	833	347	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	833	347	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Redwood Drive and Business Park Drive

COUNT DATE: Near-Term No Build

MAJOR STREET: Redwood Drive

# OF APPROACH LANES: 2

MINOR STREET: Business Park Drive

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	200		900	100			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,027	261	Y	Y	Y	Y	Y	Y		
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,027	261	1			1			1	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 1

MINOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,420	203	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,420	203	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A - Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B - Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 - Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 - Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Primrose Ave and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM	TO	07:00 AM								
07:00 AM	TO	08:00 AM								
08:00 AM	TO	09:00 AM								
09:00 AM	TO	10:00 AM								
10:00 AM	TO	11:00 AM								
11:00 AM	TO	12:00 PM								
12:00 PM	TO	01:00 PM								
01:00 PM	TO	02:00 PM								
02:00 PM	TO	03:00 PM								
03:00 PM	TO	04:00 PM								
04:00 PM	TO	05:00 PM								
05:00 PM	TO	06:00 PM	348	1						
06:00 PM	TO	07:00 PM								
07:00 PM	TO	08:00 PM								
08:00 PM	TO	09:00 PM								
09:00 PM	TO	10:00 PM								
			348	1						
			0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Whistler Ave and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	346	10								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	346	10	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Langner Ave and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Langner Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	432	16								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	432	16	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Labath Ave and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	425	33								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	425	33	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Dowdell Ave and Milbrae Ave

COUNT DATE: Near-Term No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	392	37								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	392	37	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Wilfred Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Wilfred Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): Y

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			420	140		630	70			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,378	299	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,378	299	1			1			1	1
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED SATISFIED</b>

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-2

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-4

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Primrose Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	488	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	488	30	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Whistler Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			500	200		750	100			
05:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	488	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	488	30	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Langner Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Langner Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	488	30								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	488	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Labath Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Labath Ave

# OF APPROACH LANES: 1

MINOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	812	622	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	812	622	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Dowdell Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,827	807	Y	Y	Y	Y	Y	Y	Y	Y
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,827	807	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Redwood Drive and Business Park Drive

COUNT DATE: Cumulative No Build

MAJOR STREET: Redwood Drive

# OF APPROACH LANES: 2

MINOR STREET: Business Park Drive

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	200		900	100			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	759	175	Y				Y			
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	759	175	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Story Point Rd and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Story Point Rd

# OF APPROACH LANES: 1

MINOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,485	291	Y	Y	Y	Y	Y	Y	Y	Y
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,485	291	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2008 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Primrose Ave and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	441	3								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	441	3	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Whistler Ave and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	440	10								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	440	10	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Langner Ave and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Langner Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	519	140	Y				Y			
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	519	140	0			0			0	0
			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>8 HOURS NEEDED NOT SATISFIED</b>			<b>4 HRS NEEDED NOT SATISFIED</b>	<b>1 HR NEEDED NOT SATISFIED</b>

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Labath Ave and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	444	140					Y			
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	444	140	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Dowdell Ave and Milbrae Ave

COUNT DATE: Cumulative No Build

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	417	55								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	417	55	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

**SIGNAL WARRANT ANALYSIS  
ALTERNATIVE A**

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: **Stony Point Rd and Wilfred Ave**

COUNT DATE: **Near-Term Alt A**

MAJOR STREET: **Stony Point Rd**

# OF APPROACH LANES: **2**

MINOR STREET: **Wilfred Ave**

# OF APPROACH LANES: **2**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **N**

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): **N**

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			600	200		900	100			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,586	305	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,586	305	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Primrose Ave

COUNT DATE: Near-Term A/A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	609	30	Y							
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	609	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Whistler Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	200		750	100			
05:00 AM	TO	07:00 AM								
07:00 AM	TO	08:00 AM								
08:00 AM	TO	09:00 AM								
09:00 AM	TO	10:00 AM								
10:00 AM	TO	11:00 AM								
11:00 AM	TO	12:00 PM								
12:00 PM	TO	01:00 PM								
01:00 PM	TO	02:00 PM								
02:00 PM	TO	03:00 PM								
03:00 PM	TO	04:00 PM								
04:00 PM	TO	05:00 PM								
05:00 PM	TO	06:00 PM	610	30	Y					
06:00 PM	TO	07:00 PM								
07:00 PM	TO	08:00 PM								
08:00 PM	TO	09:00 PM								
09:00 PM	TO	10:00 PM								
			610	30	0	0	0	0		
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Langer Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Langer Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	694	299	Y	Y	Y		Y	Y		
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	694	299	1			0			1	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Labath Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,284	582	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,284	582	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Dowdell Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,833	110	Y			Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,833	110	0			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD



## TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Project Driveway

COUNT DATE: Near-Term Alt A

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Project Driveway

# OF APPROACH LANES: 1

Project Driveway

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			600	150		900	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,534	0	Y			Y				
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,534	0	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Labath Ave and Business Park Dr

COUNT DATE: Near-Term Alt A

MAJOR STREET: Labath Ave # OF APPROACH LANES: 1

MINOR STREET: Business Park Dr # OF APPROACH LANES: 1

Project Driveay

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	423	322		Y			Y	Y		
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	423	322	0			0			1	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Redwood Drive and Business Park Drive

COUNT DATE: Near-Term Alt A

MAJOR STREET: Redwood Drive

# OF APPROACH LANES: 2

MINOR STREET: Business Park Drive

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	200		900	100			
08:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	847	229	Y	Y	Y		Y			
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	847	229	1			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Milbrae Ave

COUNT DATE: Near-Term All A

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 1

MINOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,614	228	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,614	228	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Primrose Ave and Milbrae Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	32	0								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	32	0	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Whistler Ave and Milbrae Ave

COUNT DATE: Near-Term All A

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	32	0								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	32	0	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Langner Ave and Milbrae Ave

COUNT DATE: Near-Term AIRA

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Langner Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	22	11								
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	22	11	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Labath Ave and Milbrae Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Labath Ave

# OF APPROACH LANES: 1

MINOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HICHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM	TO	07:00 AM								
07:00 AM	TO	08:00 AM								
08:00 AM	TO	09:00 AM								
09:00 AM	TO	10:00 AM								
10:00 AM	TO	11:00 AM								
11:00 AM	TO	12:00 PM								
12:00 PM	TO	01:00 PM								
01:00 PM	TO	02:00 PM								
02:00 PM	TO	03:00 PM								
03:00 PM	TO	04:00 PM								
04:00 PM	TO	05:00 PM								
05:00 PM	TO	06:00 PM	22	0						
06:00 PM	TO	07:00 PM								
07:00 PM	TO	08:00 PM								
08:00 PM	TO	09:00 PM								
09:00 PM	TO	10:00 PM								
			22	0	0		0	0	0	
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD



### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Dowdell Ave and Milbrae Ave

COUNT DATE: Near-Term Alt A

MAJOR STREET: Milbrae Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM	TO	07:00 AM								
07:00 AM	TO	08:00 AM								
08:00 AM	TO	09:00 AM								
09:00 AM	TO	10:00 AM								
10:00 AM	TO	11:00 AM								
11:00 AM	TO	12:00 PM								
12:00 PM	TO	01:00 PM								
01:00 PM	TO	02:00 PM								
02:00 PM	TO	03:00 PM								
03:00 PM	TO	04:00 PM								
04:00 PM	TO	05:00 PM								
05:00 PM	TO	06:00 PM	398	32						
06:00 PM	TO	07:00 PM								
07:00 PM	TO	08:00 PM								
08:00 PM	TO	09:00 PM								
09:00 PM	TO	10:00 PM								
			398	32	0	0	0	0	0	
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Wilfred Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Wilfred Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	200		900	100			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,699	321	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,699	321	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Primrose Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Primrose Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
<b>THRESHOLD VALUES</b>			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	749	30	Y							
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	749	30			0		0	0	0	
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Whistler Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Whistler Ave

# OF APPROACH LANES: 2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	200		750	100			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	741	30	Y							
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	741	30	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Langner Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Langner Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	832	293	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	832	293	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A – Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B – Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 – Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 – Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Labath Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Labath Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,478	781	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,478	781	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Wilfred Ave and Dowdell Ave

COUNT DATE: Cumulative All A

MAJOR STREET: Wilfred Ave

# OF APPROACH LANES: 1

MINOR STREET: Dowdell Ave

# OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROAC HES	MINOR ST HIGHEST APPROAC H	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			500	150		750	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	2,429	517	Y	Y	Y	Y	Y	Y	Y	
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	2,429	517	1			1			1	1
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD

### TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

INTERSECTION NAME: Stony Point Rd and Project Driveway

COUNT DATE: Cumulative All A

MAJOR STREET: Stony Point Rd

# OF APPROACH LANES: 2

MINOR STREET: Project Driveway

# OF APPROACH LANES: 1

Project Driveway

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

	MAJOR ST BOTH APPROACHES	MINOR ST HIGHEST APPROACH	Warrant 1 - Condition A			Warrant 1 - Condition B			WARRANT 2	WARRANT 3
			MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES			600	150		900	75			
06:00 AM TO 07:00 AM										
07:00 AM TO 08:00 AM										
08:00 AM TO 09:00 AM										
09:00 AM TO 10:00 AM										
10:00 AM TO 11:00 AM										
11:00 AM TO 12:00 PM										
12:00 PM TO 01:00 PM										
01:00 PM TO 02:00 PM										
02:00 PM TO 03:00 PM										
03:00 PM TO 04:00 PM										
04:00 PM TO 05:00 PM										
05:00 PM TO 06:00 PM	1,534	0	Y			Y				
06:00 PM TO 07:00 PM										
07:00 PM TO 08:00 PM										
08:00 PM TO 09:00 PM										
09:00 PM TO 10:00 PM										
	1,534	0	0			0			0	0
			8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

WARRANT 1 - Condition A -- Minimum Vehicular Volume Warrant (8 hours)

WARRANT 1 - Condition B -- Interruption of Continuous Traffic Warrant (8 hours)

WARRANT 2 -- Four Hour Volume Warrant - Figure 4C-1

WARRANT 3 -- Peak Hour Volume Warrant - Figure 4C-3

Conditions: Based on 2000 MUTCD