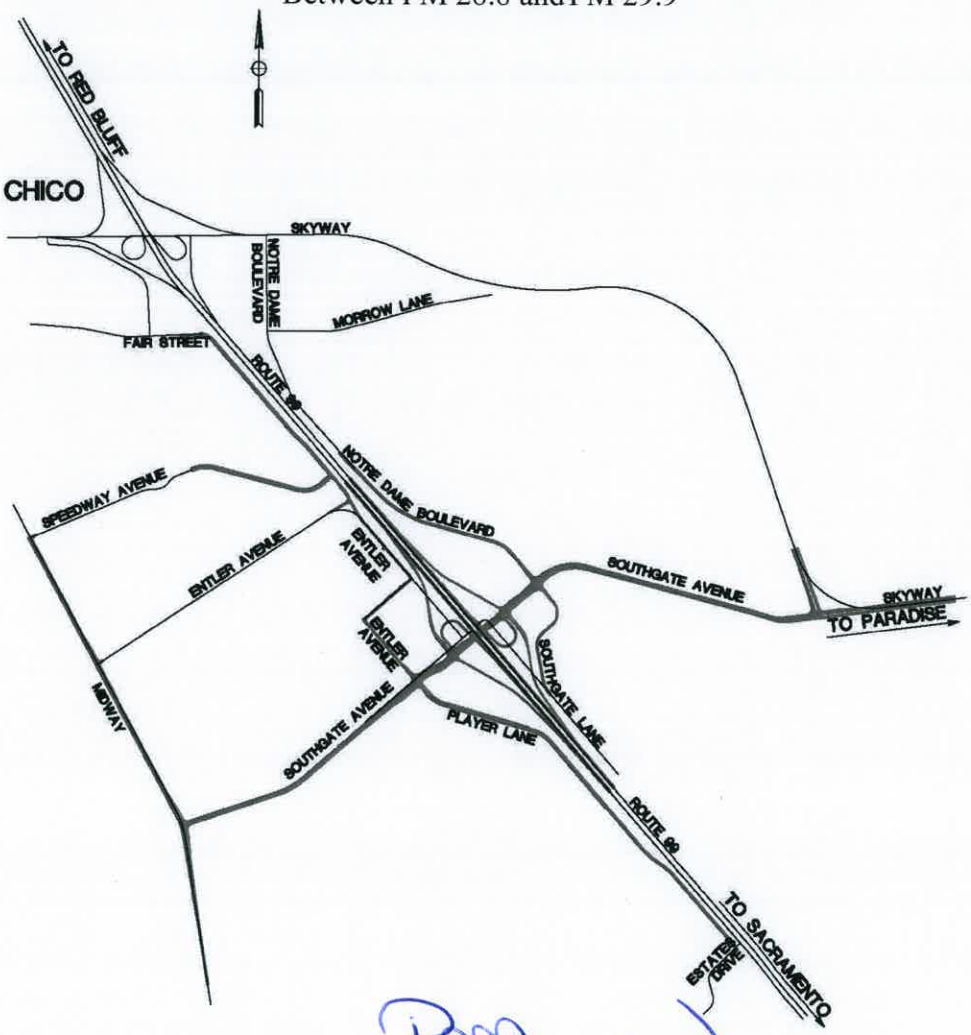
03-But-99 – PM R28.8/29.9
EA -03-4E670
EFIS No. 03/0000/071/5
January 2012

PROJECT STUDY REPORT
To
Request for Conceptual Approval for a Project Funded by the City of Chico

On State Route 99 at the Southgate Avenue Interchange
Between PM 28.8 and PM 29.9



APPROVAL RECOMMENDED: R Mowry
REBECCA MOWRY, PROJECT MANAGER

APPROVED: Jody Jones
JODY JONES, DISTRICT 3 DIRECTOR

2/7/12
DATE

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This Project Study Report has been prepared under the direction of the following Registered Engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

January 23, 2012

R. MATTHEW BROGAN, REGISTERED CIVIL ENGINEER | *DATE*

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1. INTRODUCTION

The City of Chico (City) is the lead agency for completion of a Project Study Report (PSR) for the State Route 99(SR 99)/Southgate Avenue Interchange. The purpose of the PSR is to identify and evaluate alternative designs for a new interchange connection with SR 99 at the existing Southgate Avenue at-grade signalized intersection. The completion of the PSR will allow the City to provide proposed developments with future right of way requirements and to begin to plan for future transportation funding needs.

The PSR is being completed in conjunction with a local road corridor study that identifies new roadway connections to Southgate Avenue from Skyway (to the east), Midway (to the west), Estates Drive (to the south), and Notre Dame Boulevard (to the north). The project approvals and design of these connections will be locally funded by the City, and a separate City of Chico PSR has been prepared for their approval. An exhibit showing both the interchange improvements and the proposed corridor improvements is shown in Attachment B on the "Proposed Corridor Improvements Phasing" exhibit.

This project proposes an interchange at the existing SR 99 and Southgate Avenue at-grade intersection located within the City of Chico. There are two alternatives considered in this PSR. Alternative 1 proposes an L-8 interchange and Alternative 2 proposes an L-9 interchange. Both interchange alternatives will provide new signals at each on/off-ramp intersection and will require Southgate Avenue to be relocated east of its current location. Both alternatives are designed to allow the interchange ramps to operate at LOS C in the Design Year of 2035.

Phased improvements (either 1A or 1B) are also being considered that would provide connections to the new roadways east and west of SR 99 along with upgrades to the existing at-grade intersection. Phase 1A would construct improvements to the existing at-grade intersection for an Interim Design Period of 10 years. Phase 1B would construct a Type L-2 interchange and would defer loop entrance ramps to a later phase. Phase 1B will operate acceptably beyond the Interim Design Period of 10 years. Either of the phased improvements could be constructed in advance of the ultimate alternatives (Alternatives 1 and 2).

Both the current Caltrans Freeway Agreement and City of Chico General Plan identify an interchange connection to SR 99 at Southgate Avenue.

The estimated cost of the Alternative 2 (L-9) project (not including capital outlay support) is $45.6 million, which includes $21.4 million for roadway work, $800k for stormwater work, $4.6 million for structure work and $18.8 million for right of way items.

The estimated cost of the Alternative 1 (L-8) project (not including capital outlay support) is $33.6 million, which includes $17.2 million for roadway work, $700k for stormwater work, $4.9 million for structure work and $10.8 million for right of way items.

The estimated cost of the Phase 1A project (not including capital outlay support) is $14.4 million, which includes $4 million for roadway work, $200k for stormwater work, and $10.3 million for right of way items.

The estimated cost of the Phase 1B project (not including capital outlay support) is $43.6 million, which includes $19.4 million for roadway work, $4.6 million for structure work, $800k for stormwater work, and $18.8 million for right of way items.

This project will be advertised, awarded, and administered by the City of Chico. The City plans to fund project construction through a mix of funding types, which may include developer fees, City capitol project funds, and potential federal funding. The project is a Category 3 Project.

Project Limits	3-But-99, PM R28.8/29.9
Number of Alternatives:	3 Total (2 Ultimate Alternatives with 2 Phase Options; No Build Alternative)
Alternative Recommended for Programming:	Alternative 2 – Type L-9 Interchange
Programmed or Proposal Capital Right of Way Costs:	$10,241,000 Phase 1A (Interim) $18,809,000 Phase 1B (Interim) $18,809,000 Alternative 2 (Ultimate)
Funding Source:	Local Agency
Type of Facility (conventional, expressway, freeway):	Freeway
Number of Structures:	1
Anticipated Environmental Determination/Document	IS/MND (Interchange Only) – CEQA CE (Interchange Only) – NEPA
Legal Description	Interchange
Project Category	3

The Ultimate Interchange Type L-9 for Alternative 2 is recommended for Programming at this time. The City intends to carry all alternatives (including phasing options and the "No Build" alternative) through to the PA&ED Phase.

2. BACKGROUND

Discussions regarding the State Route 99/Southgate Avenue Interchange have a history exceeding ten years with Butte County, Butte County Association of Governments (BCAG), the City of Chico, Caltrans, and other stakeholders including the business owners and neighborhood residents in the surrounding area. The following sections outline previous studies completed within the project area.

SR 99/Southgate Avenue Interchange and Circulation Study

In the late nineties, BCAG commissioned the *State Route 99/Southgate Avenue Interchange and Circulation Study* (prepared by Fehr & Peers) to identify the location of the future interchange and connections of the local circulation system to the interchange. The study objectives were to:

- Identify a preferred interchange design and location;
- Develop improvement alternatives that would address existing and future roadway deficiencies;
- Integrate local circulation improvements with planned and approved development;
- Integrate public involvement and participation in the development of recommended roadway improvements; and
- Reach a consensus among local jurisdictions, residents, and businesses within the study area on future roadway improvements.

Public participation in the study was encouraged and three public open houses were held to gain input and present the recommended interim and ultimate circulation improvements. In addition, a Study Advisory Committee (SAC) was formed and included representatives from public agencies (BCAG, Butte County supervisors, Butte County staff, Caltrans, and City of Chico), local residents, and business owners Norfield Industries and Smucker Quality Beverage. A total of five SAC meetings were held over the period of 1998 and 1999. The focus of these meetings was to review and assess the impacts of potential alignment and interchange alternatives. A majority of the concern was centered on the impacts to the neighborhoods and residential streets west of SR 99 due to cut through traffic between SR 99 and the Hegan Lane Business Park.

The study included eight improvement alternatives that were developed for Year 2018 conditions and evaluated and compared to Year 2018 conditions without the improvements. The results of the alternative analysis were presented to the public at an open house and input from the open house was taken into consideration in the development of recommended improvements. The recommended improvements are the basis for the current PSR and included the following:

- Installing a traffic signal - Caltrans installed this signal in September 1999. The intersection was expected to operate at acceptable LOS for at least 10 years at which time an interchange will be needed.
- Interim improvements - These improvements included the extension of Otterson Drive, the extension of the frontage roads on both sides of SR 99 and a connection from SR 99 to Midway. Due to public controversy, the extension of Otterson Drive was eliminated from the study.
- Ultimate improvements – Construct a new interchange with loop exit ramps (Caltrans Type L-8), extend Southgate Avenue east to Skyway, and construct a frontage road between Southgate Avenue and Estates Drive. This frontage road connection would eliminate the existing signal at the intersection of SR 99 / Estates Drive and would restrict the movements to right in/right out only.

Skyway Interchange

In addition to providing roadway connections to the west side of SR 99, the construction of the Southgate Avenue Interchange will alleviate congestion along Skyway and at the Skyway/SR 99 Interchange. In 1996, Caltrans approved a Project Study Report/Project Report (PSR/PR) for a set of interim (Phase I) and ultimate (Phase II) improvements to the Skyway/State Route 99 Interchange. Phase I converted the existing cloverleaf interchange into a standard Caltrans L-9 interchange and the construction was split into two phases (Phase I-A and Phase I-B). Phase I-A was constructed with the Home Depot project in 1999 and built the easterly half of the interchange, and Phase I-B completed the west half of the interchange in the spring of 2011.

In order to document the future conditions of Skyway Interchange Phase I-B project, Fehr & Peers prepared the *Skyway/SR 99 Interchange Traffic Study*, which was approved by Caltrans in February 2006. The full L-9 interchange is anticipated to operate at an acceptable LOS through 2015.

As identified in the approved PSR/PR, the ultimate (Phase II) Skyway Interchange improvements would require a complete replacement of the existing Skyway overcrossing with a 6 lane structure. Ramp improvements would also be required to conform with the new overcrossing. To avoid local roadway queuing into the interchange, the traffic report indicated that Skyway should be widened to 6 lanes to the Bruce Road intersection east of the interchange.

The Fehr & Peers Study also identified a second option to alleviate the traffic congestion on Skyway in the Ultimate Design Year of 2030, which is a new connection to Skyway from SR 99 via the Southgate Avenue extension. Preliminary analysis indicates that the traffic at the Skyway Interchange begins to break down and that the Southgate Avenue connection would need to be in place by 2017. With the new Southgate Avenue Interchange (studied in this PSR) and the proposed 4-lane arterial connection to Skyway,

the traffic volumes on the Skyway corridor will be reduced to acceptable levels and Phase II of the Skyway Interchange will not be needed.

Adjacent Developments

A new development is planned adjacent to the proposed Southgate Avenue Interchange that will impact traffic operations at the interchange and the configuration of the adjacent roadways. The development is planned for the land adjacent to the southwest quadrant of the interchange and is anticipated to be a mix of commercial, high density residential, single-family residential, and park space.

The planned development has an internal roadway network that will connect to Southgate Avenue at Entler/Player Lane. The Player Lane connection through the development will also serve as frontage access along SR 99 with a connection to Estates Drive. Both of these connections are planned to be funded as a part of these developments but are covered within the Traffic Study and geometric planning included within this PSR.

3. PURPOSE AND NEED STATEMENT

Need:

Traffic forecasts project increased travel demands on the SR 99 corridor in the City of Chico. Skyway cannot handle the projected traffic unless the SR 99/Skyway Phase II Interchange is built. The SR 99/Southgate Avenue Interchange is needed to mitigate traffic along Skyway as well as provide capacity for future commercial business and residential growth within the City and Butte County.

Purpose:

The purpose of the proposed project is to improve traffic operations and accommodate anticipated travel demand due to planned development. The existing SR 99/Southgate Avenue signalized intersection operates at LOS C, but in year 2035 conditions drop to LOS F if one of the proposed interchange alternatives is not implemented. The SR 99/Southgate Avenue Interchange will operate at LOS B or LOS C in 2035 depending on the alternative that is constructed.

4. DEFICIENCIES

TRAFFIC

The Traffic Operations Report was completed by Fehr & Peers and is contained in Attachment F. The study intersections for the entire corridor were evaluated during the morning (AM) and evening (PM) peak hours. The study reviews the Construction Year (2015), Interim Design Year (2025), and Ultimate Design Year (2035) traffic operations.

The summary included below focuses on the analysis for the new connection of Southgate Avenue at SR 99. The full traffic analysis, however, studied a larger project area that includes extensions of Southgate Avenue east of SR 99 to Skyway and west of SR 99 to Midway. Frontage road connections from Southgate Avenue south to Estates Drive (on the west side of SR 99) and north to Notre Dame Boulevard (east of SR 99) are also included. Finally, extensions of Speedway Avenue and the widening of Midway are also included in the full traffic study. An exhibit showing these additional roadway connections is shown in Attachment B on the "Proposed Corridor Improvements Phasing" exhibit.

Three alternatives and two phasing options for the connection to SR 99 have been included in the Traffic Operations Report that are being carried forward for further study within this PSR. They are as follows:

- No Build Alternative
- Alternative 1 – Two-quadrant partial cloverleaf (Caltrans Type L-8) interchange with a five lane overcrossing structure
- Alternative 2 – Partial cloverleaf (Caltrans Type L-9) interchange with a four lane overcrossing structure
- Interim Phase 1A – Enlarged at-grade intersection with additional through lanes on SR 99
- Interim Phase 1B – Spread diamond (Caltrans Type L-2) interchange with a four lane overcrossing structure

Two additional alternatives were studied in the Traffic Operations Report and not carried forward into this PSR. These consist of:

- Alternative 1C – Spread Diamond (Caltrans Type L-2) with a five lane overcrossing. This is not required because adequate capacity exists for an L-2 with a four lane overcrossing.

- Tight Diamond Interchange – The tight diamond was rejected due to congestion at the ramp terminal intersections.

Each alternative would improve operations on the SR 99 corridor by diverting traffic away from the congested SR 99/Skyway Interchange. However, Alternative 1A and Alternative 1B are considered as phasing options as they are not expected to have the typical 20 year design life of the ultimate projects (Alternatives 1 and 2).

The key findings of the traffic study are listed below:

- Under existing conditions, all study intersections and freeway mainline segments operate at an acceptable LOS during the AM and PM peak hours.
- Under construction year (2015) "no project" conditions, all study intersections operate at an acceptable LOS during the AM peak hour and the Hegan

Lane/Midway intersection will operate at an unacceptable LOS E during the PM peak hour. All freeway facilities will operate at an acceptable LOS during the AM and PM peak hours. Under "with project" conditions, the Hegan Lane/Midway intersection is still expected to operate at an unacceptable LOS E during the PM peak hour, but delay will be lower when compared to "no project" conditions since some traffic now heads south on Midway to access SR 99 via a new Southgate Avenue extension. All other study intersections, freeway segments, and ramp junctions are expected to operate at acceptable levels during the AM and PM peak hours for all five "with project" alternatives.

- Under interim year (2025) "no project" conditions, two study intersections will operate unacceptably during the AM and PM peak hours. With development anticipated near the project area, the intersections of Southgate Avenue/Entler Avenue and SR 99/Southgate Avenue will no longer operate acceptably. Under "with project" conditions, all study intersections will operate acceptably. However, the SR 99/Southgate Avenue at-grade intersection under Alternative 1A and the southbound ramp terminal intersection under Alternative 1B are both expected to fail within a few years after 2025; this Interim Design Analysis will be reviewed in the PA&ED Phase to confirm that it will operate acceptably for a 10 year design horizon. The Interim Design Analysis will also be reviewed to ensure freeway facilities will continue to operate acceptably under both "no project" and "with project" conditions in the Interim Design Year.
- Under design year (2035) "no project" conditions, two intersections will operate unacceptably during the AM peak hour and three intersections will operate unacceptably during the PM peak hour. Under all "with project" alternatives, the Hegan Lane/Midway intersection will operate unacceptably during both the AM and PM peak hours and additional improvements would be required to improve operations. All freeway and ramp facilities will operate acceptably under design year conditions for all scenarios. Although the LOS is acceptable for intersections along Southgate Avenue under all three plus project alternatives (the two interim projects were not analyzed), left turn queuing may occur on the overcrossing under Alternative 1 and Alternative 1B. Alternative 2 eliminates this potential queuing issue by constructing loop on-ramps to SR 99.
- This analysis determined that a phased approach to constructing the interchange is possible by initially building either a widened at-grade intersection (Alternative 1A) or a four-lane spread diamond interchange (Alternative 1B). Both of these phased options will be designed to last ten years, however, increasing traffic between 2025 and 2035 will ultimately require that these interim designs be replaced with one of the ultimate interchange designs.

Construction Year (2015) Operations

Without the proposed improvements, the only study intersection with unacceptable operations is Hegan Lane/Midway, which is expected to operate at LOS E during the PM peak hour. Under the "with project" scenarios, the Hegan Lane/Midway intersection continues to operate unacceptably during the PM peak hour (LOS E); however, the overall intersection delay is lower since some traffic diverts to the new Southgate Avenue extension between Midway and SR 99.

Under the "with project" scenarios, traffic exiting SR 99 at Southgate Avenue and traveling toward Skyway (and the reverse direction) is expected to increase dramatically. However, even with this increase in traffic, all of the "with project" alternatives operate acceptably. A summary of the Construction Year (2015) traffic operations is shown in Table 1 below:

TABLE 1 – 2015 CONSTRUCTION YEAR INTERSECTION LEVEL OF SERVICE

Intersection	Peak Hour	No Project		With Project Alternative 1A		With Project Alternative 1B		With Project Alternative 1		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/ Midway	AM	28	C	21	C	21	C	21	C	21	C
	PM	**73**	**E**	**57**	**E**	**57**	**E**	**57**	**E**	**57**	**E**
2. Entler Avenue/ Midway	AM	15	B	<10	A	<10	A	<10	A	<10	A
	PM	20	C	<10	A	<10	A	<10	A	<10	A
3. Southgate Avenue/Midway	AM	Not Applicable[4]		16	B	17	B	16	B	16	B
	PM			18	B	19	B	18	B	18	B
4. Southgate Avenue/ Entler Avenue[3]	AM	14	B	21	C	16	B	15	B	19	B
	PM	<10	A	22	C	17	B	17	B	24	C
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		Not Applicable[4]		19	B	20	B	10	B
	PM					22	C	19	B	19	B
6. Southgate Avenue/ SR 99 (Existing Signalized Intersection)	AM	28	C	44	D	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	30	C	47	D						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		Not Applicable[4]		19	B	18	B	<10	A
	PM					11	B	13	B	<10	A
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	19	B	17	B	13	B	14	B
	PM	<10	A	15	B	14	B	9	A	10	B
9. Southgate Avenue/Skyway	AM	Not Applicable[4]		26	C	26	C	26	C	26	C
	PM			24	C	24	C	24	C	24	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009

Construction Year (Interim 2025) Operations

The Interim Year (2025) traffic operations are shown on Table 2 below. Without the proposed improvements, the intersections of Southgate Avenue/Entler Avenue and SR 99/Southgate Avenue operate unacceptably during the AM and PM peak hours. The deterioration of traffic operations at these two intersections is largely attributable to increased traffic on SR 99 and the new development planned to the southwest of the SR 99/Southgate Avenue intersection.

Under "with project" conditions, all study intersections are expected to operate acceptably. Note that under Alternative 1, the LOS E operations at the SR 99/Southgate Avenue intersection is considered acceptable per the State Route 99 Transportation Concept Report prepared by Caltrans in 2004.

TABLE 2 – 2025 INTERIM YEAR INTERSECTION LEVEL OF SERVICE

Intersection	Peak Hour	No Project		With Project Alternative 1A		With Project Alternative 1		With Project Alternative 1B		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/ Midway	AM	15	B	24	C	24	C	24	C	24	C
	PM	30	C	29	C	29	C	29	C	29	C
2. Entler Avenue/ Midway	AM	22	C	12	B	12	B	12	B	12	B
	PM	14	B	16	C	16	C	16	C	16	C
3. Southgate Avenue/Midway	AM	Not Applicable[4]		21	C	15	B	21	C	15	B
	PM			32	C	23	C	32	C	23	C
4. Southgate Avenue/ Entler Avenue[3]	AM	**65**	**F**	30	C	16	B	26	C	19	B
	PM	**41**	**E**	38	D	19	B	25	C	19	B
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		Not Applicable[4]		21	C	24	C	11	B
	PM					21	C	25	C	17	B
6. Southgate Avenue/ SR 99 (Existing Signalized Intersection)	AM	**100**	**F**	66	E	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	**99**	**F**	73	E						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		Not Applicable[4]		21	C	27	C	<10	A
	PM					14	B	15	B	<10	A
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	28	C	15	B	29	C	17	B
	PM	<10	A	16	B	13	B	21	C	18	B
9. Southgate Avenue/Skyway	AM	Not Applicable[4]		40	D	40	D	40	D	40	D
	PM			26	C	26	C	26	C	26	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009

Design Year (2035) Operations

The LOS for the Design Year (2035) at each study intersection are shown on Table 3 below. The intersection of Hegan Lane/Midway is expected to operate unacceptably under "with project" conditions during the AM and PM peak hours and under "no project" conditions during the PM peak hour. The increased delay experienced under "with project" conditions is related to traffic attracted to the Midway corridor bound for SR 99 at Southgate Avenue. Additional improvements will be required to maintain an acceptable LOS at this intersection by 2035.

Under the "no project" scenario, the intersections of Southgate Avenue/Entler Avenue and Southgate Avenue/SR 99 continue to operate unacceptably in 2035 without any improvements. The addition of the interchange and associated improvements under the "with project" scenarios brings all intersections, with the exception of Hegan Lane/Midway, to an acceptable LOS.

TABLE 3 – INTERSECTION LEVEL OF SERVICE FOR DESIGN YEAR (2035) CONDITIONS

Intersection	Peak Hour	No Project		With Project Alternative 1		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/Midway	AM	32	C	**76**	**E**	**76**	**E**
	PM	**140**	**F**	**144**	**F**	**144**	**F**
2. Entler Avenue/Midway	AM	25	C	15	C	15	C
	PM	17	C	18	C	18	C
3. Southgate Avenue/ Midway	AM	Not Applicable[4]		18	B	18	B
	PM			23	C	23	C
4. Southgate Avenue/ Entler Avenue[3]	AM	**152**	**F**	22	C	23	C
	PM	**58**	**F**	30	C	25	C
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		23	C	12	B
	PM			26	C	17	B
6. Southgate Avenue/SR 99 (Existing Signalized Intersection)	AM	**292**	**F**	Not Applicable[4]		Not Applicable[4]	
	PM	**366**	**F**				
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		28	C	<10	A
	PM			18	B	10	B
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	21	C	23	C
	PM	<10	A	19	B	19	B
9. Southgate Avenue/ Skyway	AM	Not Applicable[4]		43	D	43	D
	PM			35	C	35	C

Notes:
[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported
[2] LOS = level of service
[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"
[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009

Traffic Report Conclusions

Without the construction of the Southgate Avenue Interchange and roadway extension to the east, the SR 99/Skyway Interchange is forecasted to have approximately 50 percent more traffic under 2035 conditions. The Southgate Avenue Interchange in conjunction with the eastern extension of the roadway to Skyway will provide a more direct route between SR 99 and Paradise, and will serve future development anticipated in the City of Chico General Plan. The project will also improve traffic operations and reduce traffic hazards on SR 99 removing two at-grade intersections at Southgate Avenue and Estates Drive.

Without the interchange or the extension of Southgate Avenue to Skyway, the intersection of SR 99/Southgate Avenue would operate unacceptably by 2025 due to increased traffic on the SR 99 mainline and future development planned nearby. All of the "plus project" alternatives would result in acceptable operations at all intersections along Southgate Avenue under 2015, 2025, and 2035 conditions. However, by 2035, the left-turn queues are forecasted to spill beyond the turn pockets on the overcrossing structure under Alternative 1B and Alternative 1. Alternative 2 eliminates this potential queuing issue by constructing loop-on ramps to SR 99.

This analysis also determined that a phased approach to the interchange is possible by initially constructing either an expanded at-grade intersection or a spread diamond (Caltrans Type L-2) interchange with a four lane overcrossing. The at-grade intersection would include additional through lanes and turn lanes on both SR 99 and Southgate Avenue. The interim interchange overcrossing would accommodate one westbound lane, back-to-back left-turn lanes, and two eastbound lanes. Both interim projects are expected to operate acceptably for a minimum of 10 years, with the interim interchange (Alternative 1B) having a slightly longer lifespan; these assumptions will be confirmed in the PA&ED phase. Ultimately, both interim projects would need to be reconfigured as one of the ultimate interchange projects (Alternatives 1 or 2).

Based on the recommended Design Options of the Traffic Report, Mark Thomas and Company (MTCo) has analyzed two Ultimate Design Alternatives and two Interim (i.e. phased) Alternatives. These Alternatives are discussed in Section 6 of this report.

COLLISION HISTORY

Three year vehicle collision history along SR 99 between Estates Drive and Skyway was obtained from Caltrans. The Traffic Accident Surveillance Analysis System (TASAS) provided data for the three year period from 2005-2008. Table 4 summarizes the collision history along the mainline and at the Southgate Avenue and Estates Drive intersections and compares the collision rates to statewide averages.

TABLE 4 - COLLISION HISTORY FOR SR 99 BETWEEN SKYWAY AND ESTATES DRIVE

Location	Number of Collisions			Actual Collision Rate			Average Collision Rate		
	Total	Fatal	Injury	Fatal	F+I	Total	Fatal	F+I	Total
SR 99 Mainline between Skyway and Estates Drive	43	0	14	0.000	0.21	0.66	0.018	0.32	0.71
SR 99/Southgate Avenue. Intersection	14	0	5	0.000	0.14	0.39	0.007	0.33	0.70
SR 99/Estates Dr. Intersection	12	0	5	0.000	**0.15**	**0.35**	0.004	0.10	0.22

Source: Caltrans and Fehr & Peers, 2009

Bold entries indicate higher than average accident rates

The collision history indicates that the overall mainline segment of SR 99 between Skyway and Estates Drive has a lower-than-average collision rate when compared to similar facilities around the state. Similarly, the SR 99/Southgate Avenue intersection also has a lower-than-average collision rate. However, the SR 99/Estates Drive intersection has a higher-than-average collision rate for both total collisions and collisions with injuries (but not for collisions with fatalities).

The collision data presented above for the Estates Drive intersection is consistent with expectations for an isolated signalized intersection located on a four-lane expressway. When approaching Chico from the south on SR 99, Estates Drive is the first signalized intersection in a ten mile stretch and drivers may not be expecting to encounter a traffic signal at this location.

The construction of interchange improvements at Southgate Avenue, along with the proposed Player Lane connection from Southgate Avenue to Estates Drive, will allow this existing signal to be removed and for the Estates Drive/SR 99 Intersection to be restricted to right in/right out movements only.

5. CORRIDOR AND SYSTEM COORDINATION

SR 99 begins in Kern County, ends in Tehama County and is part of the California Freeway and Expressway System. SR 99 is a freeway from the San Joaquin/Sacramento County line to SR70 and between SR 149 to north of the City of Chico, and an expressway from just north of the City of Chico to the Butte/Tehama County line. SR 99 is a primary connector route for interregional travel.

In 2004, Caltrans issued the State Route 99 Transportation Concept Report for a 20 year planning horizon. The Concept LOS for SR 99 in the project area is “E”. The report

identifies that the 20 year concept facility for SR 99 between SR149 and Skyway is a four lane freeway. The ultimate facility for this section of SR 99 is a six lane freeway. The ultimate facility north of Skyway is a six lane freeway with auxiliary lanes.

The Transportation Concept Report identifies improvements to the project area that includes upgrades to the Skyway Interchange.

The interchange at SR 99 and Southgate Avenue is consistent with the City's General Plan and its ongoing General Plan Update.

6. ALTERNATIVES

6A. BUILD ALTERNATIVES

Based on 20-year traffic projections, two Ultimate Interchange build alternatives have been identified that will meet the need and purpose statement and provide acceptable traffic operations through the interchange. Additionally, two Interim Phase alternatives have been identified to provide acceptable traffic operations to the Interim Design Year (2025). Per the Traffic Analysis, acceptable operations have been defined as LOS D for City/County facilities and LOS E for Caltrans facilities.

All of the alternatives have taken into account the surrounding roadway connections to Skyway, Midway, Estates Drive, and Notre Dame Boulevard/Fair Street. These connections are outside of current and future Caltrans access control. Details regarding these connections can be found under *Southgate Corridor Analysis and Interchange Study* prepared for the City of Chico, and an exhibit showing these future connections can be seen in Attachment B.

<u>Alternative 1</u>

This alternative proposes a Caltrans Standard L-8 interchange with a four lane overcrossing and a full 14 foot center median. The Preliminary Geometrics for the interchange and Advanced Planning Study for the overcrossing are included as Attachments B and C respectively.

Southgate Avenue will include two 12 foot through lanes with 2 foot inside and 8 foot outside shoulders in each direction and a 14 foot center median. New traffic signals will be constructed at the ramp terminal intersections; a single left turn lane and dedicated right turn lane will be included for northbound and southbound movements.

Single lane entrance ramps and single loop exit ramps will be constructed for northbound and southbound access to SR 99. The loop exit ramps will include dual left turns and single dedicated right turn at the ramp terminal intersection.

Class II bike lanes and 5 foot sidewalks will be included along both sides of Southgate Avenue. The bike lanes will utilize the 8 foot shoulder along the overcrossing and transition to separate 4 foot lanes at each of the ramp terminal intersections.

Intersections along Southgate Avenue at Player Lane/Entler and Southgate Lane/Notre Dame Boulevard will be provided. These intersections have been set at the 500 foot minimum allowable spacing from the ramp terminals. These connections will provide access to anticipated developments in the southwest quadrant of the interchange and existing residential and commercial sites to the north and south of the interchange.

Right of way will be required from parcels in all four quadrants of the interchange; a Right of Way Data Sheet is included in Attachment E. This will include acquisitions from both vacant and improved parcels. There will be six (6) parcels impacted by the improvements. The acquisition in the northeast quadrant of the interchange will require full acquisition of a business and demolition of an existing structure. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. For the purposes of this report, three (3) full acquisitions and three (3) partial acquisitions have been assumed. Access control will extend along the new right of way; this limit has been set along Southgate Avenue at 100 feet from the curb return of the ramp terminal intersection.

Alternative 2

This alternative proposes a Caltrans Standard L-9 interchange with a four lane overcrossing and a 4 foot median. The Preliminary Geometrics for the interchange and Advanced Planning Study for the overcrossing are included as Attachments B and C respectively.

Southgate Avenue will include two 12 foot through lanes with 2 foot inside and 8 foot outside shoulders in each direction and a 4 foot center median. New traffic signals will be constructed at the ramp terminal intersections; a dedicated right turn lane will be included for movements onto the northbound and southbound loop entrance ramps. The ramp terminal intersections have been designed using the “pedestrian/bicycle friendly” approach, which includes shortened pedestrian crossings of the loop ramp intersections.

Single lane entrance and exit ramps will be constructed for northbound and southbound access to SR 99. The exit ramps will transition to include dual left turns and a dedicated right turn lane at the ramp terminal intersections. A dedicated right turn lane will be provided for access to the entrance ramps.

Class II bike lanes and 5 foot sidewalks will be included along both sides of Southgate Avenue. The bike lanes will utilize the 8 foot shoulder along the overcrossing and transition to separate 4 foot lanes at each of the ramp terminal intersections.

Intersections along Southgate Avenue at Player Lane/Entler Lane and Southgate Lane/Notre Dame Boulevard will be provided. These intersections have been set at the 500 foot minimum allowable spacing from the ramp terminals. These connections will

provide access to new developments in the southwest quadrant of the interchange and existing residential and commercial sites to the north and south of the interchange.

Right of way will be required from parcels in all four quadrants of the interchange; a Right of Way Data Sheet is included in Attachment E. There will be twelve (12) parcels impacted by the improvements. This will include acquisitions from both vacant and improved parcels. This alternative requires the total acquisition of seven (7) parcels. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. For the purposes of this report, nine (9) full acquisitions and three (3) partial acquisitions have been assumed. Access control will extend along the new right of way; this limit has been set along Southgate Avenue at 100 feet from the curb return of the ramp terminal intersection.

6B. PROJECT PHASING

Due to anticipated funding limitations for the Ultimate Interchange, the City of Chico proposes to implement the improvements at Southgate Avenue and SR 99 in phases. These phases would provide acceptable traffic operations in the Interim Year (2025), with the anticipation that the Ultimate Interchange would be constructed shortly after the Interim Year and provide acceptable operations in the Design Year of 2035. For purposes of this report, the phasing options described below have been studied for Alternative 2 (L-9 Interchange). A phasing plan will be studied and approved during PA&ED, along with a funding plan and commitment for construction of the Ultimate Interchange in the Cooperative Agreement.

A description of this phasing is as follows:

<u>Phase 1A</u>

Phase 1A would provide improvements to the existing at-grade intersection of Southgate Avenue/SR 99; during the PA&ED phase, a detailed traffic analysis for Phase 1A would be developed to confirm that it will provide acceptable traffic operations for a ten year design life. These improvements would be required once the developments on the east side of SR 99 are in place and the Southgate Avenue connection to Skyway is constructed. Details regarding these improvements are included in Attachment B.

The intersection would include a modified traffic signal and would be widened to include dual left turns at all four legs. Exclusive right turn lanes would be provided to Southgate Avenue from northbound and southbound SR 99. The east leg of the intersection would include two through lanes and dual right turns from Southgate Avenue onto northbound SR 99. The west leg of the intersection would include one through lane and a shared through/right turn lane for the eastbound Southgate Avenue to southbound SR 99 movement.

Additional through lanes would be constructed along SR 99. These would extend approximately 1500 feet north and south of the intersection before conforming down to the existing two lane section along SR 99.

During the PA&ED Phase, the Phase 1A improvements would be studied to ensure adequate traffic operations (LOS E) until the Interim Design Year. This phasing will allow for connections to Skyway and Midway to be completed without significant right of way acquisitions. This will allow developments in the area to move forward and for the City to begin to collect developer impact fees that will ultimately be used to fund the ultimate interchange improvements.

Right of way will be required from parcels on both sides of SR 99 and parcels south of proposed Southgate Avenue; a Right of Way Data Sheet is included in Attachment E. There will be nine (9) parcels impacted by the improvements. This will include acquisitions from both vacant and improved parcels. This alternative requires the total acquisition of four (4) parcels. There is a possibility that one (1) additional parcel may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. For the purposes of this report, five (5) full acquisitions and four (4) partial acquisitions have been assumed. Access control would be incorporated with the ultimate phase.

Phase 1B

Phase 1B would construct a standard Caltrans spread diamond interchange (Type L-2) with a four lane overcrossing of SR 99. The northbound and southbound loop ramps required to provide a Caltrans Type L-9 interchange would be deferred until the ultimate phase. Traffic accessing SR 99 would use left turn movements onto the northbound and southbound slip entrance ramps.

The right of way requirements for Phase 1B are consistent with the ultimate Type L-9 interchange (Alternative 2). A Right of Way Data sheet for Alternative 2 can be found in Appendix E.

6C. REJECTED ALTERNATIVES

During the development of the PSR, the construction of a Caltrans Standard Tight Diamond Interchange and construction of a Spread Diamond with a five lane overcrossing were reviewed.

The footprint for the Tight Diamond provides for a much smaller impact to the parcels on the east and west side of SR 99. Due to the tight spacing between the ramp terminal intersections, the Tight Diamond is meant for rural interchange locations with limited traffic volumes. The ultimate traffic projections and anticipated development within the project area will impact the operations of the Tight Diamond Interchange. Therefore, this interchange configuration was rejected.

The Spread Diamond with a five lane overcrossing was reviewed, but it was determined that a Spread Diamond with a four lane overcrossing (i.e. Alternative 1) provided sufficient operations at the interchange. Therefore, this interchange configuration was rejected.

6D. CONSTRUCTION STAGING/TRAFFIC MANAGEMENT PLAN

The traffic management plan will aim to minimize traffic impacts along SR 99 during construction. The following strategies will be implemented:

- Erection of false work will be done during off-peak hours and/or staged to minimize traffic impacts.
- Provide construction staging to allow the Southgate Avenue intersection to operate throughout the duration of construction. This would consist of shifting the intersection to the north of its existing location by providing temporary paving and a temporary traffic signal.
- Provide temporary access and/or detours for traffic accessing Entler Avenue, Loren Avenue, and Southgate Lane. This would consist of constructing portions of the Southgate Avenue improvements as a first phase of work to ensure this access.

6E. AGREEMENTS

As the interchange project moves into the PA&ED phase, the City of Chico and Caltrans will need to enter into a Cooperative Agreement and Maintenance Agreement.

The interchange at Southgate Avenue is included within the current Freeway Agreement for SR 99. No additions or modifications to the Freeway Agreement is required.

7. COMMUNITY INVOLVEMENT

Two public workshops have been held with this phase of the project to provide information on the alternatives for the interchange improvements, modifications to the SR 99/Southgate Avenue intersection, and improvements to the project corridor. The public was notified via mailing notifications to adjacent property owners, an advertisement in the local newspaper, and posting an announcement on the City of Chico's website.

The first workshop was held on November 5th, 2008 at the City of Chico. Staff from the City and MTCo provided background information regarding the previous studies in the

project area, reviewed the purpose and scope of the current study, and introduced interchange and corridor alignment options that were going to be reviewed in the PSR.

A number of comments were received at the workshop. The majority of these comments focused on the connection from the new interchange to Midway and its impact on the City of Chico's "Greenline". The Greenline is an urban development boundary, and within the project area, it is located on the west side of SR 99 just prior to Midway. Land uses on the west side of the Greenline are restricted to agricultural uses only.

One of the proposed connections to Midway will cross the Greenline. While there is no specific restriction to crossing the Greenline with a roadway connection, there are citizens groups who oppose this connection. In order to avoid crossing the Greenline, an alternative connection to Midway would be along Entler Drive.

During the first public meeting, a number of residents from the Entler Drive neighborhood expressed their opposition to roadway widening for additional capacity along Entler Drive. Based upon these comments, the general consensus from those that attended the first public meeting is that the connection to Midway along Entler Avenue is not supported. These comments are included in Attachment J.

A Butte County Board of Supervisors meeting was held on March 3, 2009. Interchange alternatives, preliminary project costs, and project phasing were reviewed.

A second public workshop was held on April 2, 2009, also at the City of Chico. Detailed interchange alternatives were reviewed at this meeting, the results of the Draft Traffic Analysis were discussed, and preliminary project costs were presented. Preliminary concepts for project phasing were also reviewed.

Comments from the second workshop are included in Attachment J. The comments focused on regional traffic and funding issues; no comments specific to the interchange improvements were received.

A Technical Advisory Committee (TAC) has been formed to allow additional public input on the project. The TAC consists of local residents, business owners, elected officials, City of Chico, Butte County, and BCAG staff. A total of four TAC meetings were held in the Fall of 2008 through the Spring of 2009. Input and comments from the TAC have been incorporated in the project alternatives, traffic studies, and public workshop presentations. Additional TAC meetings will be held as project development continues.

Additionally, a project website (www.markthomas.com/southgate/) has been created to provide project information along with updated meeting agendas, minutes, and exhibits.

Finally, the project was presented to the Butte County Board of Supervisors for their preliminary review. This was an information presentation only and no Board Action was taken.

8. ENVIRONMENTAL DETERMINATION/DOCUMENT

A Preliminary Environmental Analysis Report (PEAR) has been prepared for the interchange connection at SR 99 and is included as Attachment H.

The proposed project includes improvements to the SR 99/Southgate Avenue Intersection that meet Caltrans Highway Design Capacity Manual standards for traffic interchanges. The ultimate Southgate Avenue Circulation System improvements are identified in the City of Chico 2030 General Plan and would be constructed as part of a series of subsequent phases/extensions.

Other improvements not included as part of this PEAR include the Speedway Avenue extension to Entler Avenue, Southgate Avenue extension to Midway, Southgate Avenue extension to Skyway, Fair Street Extension to Entler Avenue, and Notre Dame Boulevard Extension to Southgate Avenue.

The Butte County General Plan includes the upgrades to the SR 99/Southgate Avenue Interchange and the four-lane Southgate Avenue extension to Skyway. The Butte County General Plan also includes plans for a Midway to Entler Avenue Connection, which would be accompanied by extension of Speedway Avenue and Southgate Avenue.

The proposed project would require the preparation of environmental documentation pursuant to the California Environmental Quality Act (CEQA). Based on the preliminary review, it is anticipated that the interchange project would require an Initial Study/Mitigated Negative Declaration in order to satisfy CEQA. The City of Chico would be the CEQA Lead Agency.

At this time, federal funding is not identified for construction of the project. The proposed project is not programmed into the Federal Statewide Transportation Improvement Program (FSTIP), and no federal funding has been identified or requested for the proposed interchange project. In the event that federal funding is used for the project, the project would be required to comply with the National Environmental Policy Act (NEPA) with Caltrans serving as the NEPA Lead Agency on behalf of the Federal Highway Administration (FHWA) (per the SAFETEA-LU Section 6005 MOU). The level of federal involvement would influence the nature of the NEPA analysis. Based upon a preliminary review, NEPA approval for the interchange project would likely be a Section 6005 Categorical Exclusion.

With the exception of the No-Project Alternative, each of the identified interchange project alternatives may require the following permits or agency consultation:

Potential Federal and State Regulations and Agencies

Regulation	Section	Agency
Clean Water Act	§404	USACE
	§402	RWQCB
	§401	RWQCB
Federal Endangered Species Act	§7	NOAA
		USFWS
National Historic Preservation Act	§106	SHPO
Migratory Bird Treaty Act	50 CFR	USFWS
Streambed Alteration	§1600	DFG
CA Endangered Species Act	§2050 et seq.	DFG
Fish and Game Code (Raptors)	§3505	DFG
Fish and Game Code (Fully Protected)	§3511	DFG
	§4700	
	§5050	
	§5515	
Fish and Game Code (Rare Plant)	§1900	DFG
CA Code of Regulations (Floodways)	Title 23	CVFPB

The proposed northbound SR 99 auxiliary lane would involve a box culvert on Comanche Creek and the possible discharge of dredged or fill materials in waters of the US and wetlands that are subject to Section 404 of the Clean Water Act. A Nationwide Permit (fill of less than ½-acre of waters of the US) may be needed for this project. Additionally, Section 7 consultation may be required as Comanche Creek is potential habitat for a federally listed species. If Section 7 consultation is needed, involvement by US Fish and Wildlife Service (USFWS) would be required.

The following table identifies anticipated environmental commitments that could influence project implementation:

Anticipated Environmental Commitments

Resource	Potential Issues/Additional Studies Needed
Community	Utility Relocations
Visual/ Aesthetics	Sound Barriers
Cultural Resources	Prehistoric Resources Historic Resources Architectural Resources
Hydrology/ Floodplains	FEMA CVFPB
Water Quality	§401 §402 MS4 NPDES II §402 CASWP
Geology/Soils	Tailings Erosion Expansive
Paleontology	FHWA Involvement, if federal funds are used.
Hazardous Materials	High Risk Sites Medium Risk Sites Low Risk Sites General Risks
Air Quality	Non-Attainment Status Construction Emissions Operational Emissions Sensitive Receptors
Noise/Vibration	Sensitive Receptors
Energy/Climate	Climate Change/Greenhouse Gas Emissions
Biological Environment	Protocol-Level Surveys Federal Agency Permits/Approvals State Agency Permits/Approvals Timing/Avoidance/Minimization Mitigation and Monitoring
Cumulative Impacts	Cumulative Impact Analysis

Additionally, the proposed project is identified in the 2008 Regional Transportation Plan (RTP) as a "locally funded project." Thus, the proposed project was included as part of the traffic model and regional emissions analysis for air quality conformity. However, in the event that the project would require state or federal funds, the RTP would need to be amended to include the project under the Regional Improvement Program (RIP) funds and the Regional Transportation Improvement Program (RTIP) and the State Transportation Improvement Program (STIP).

8A. HAZARDOUS WASTE

An Initial Site Assessment (ISA) was completed for the project by Blackburn Consulting, Inc. The purpose of this report is to identify historical and present-day indications of the use, misuse, or storage of hazardous and/or potentially hazardous substances that may impact the planned *SR 99/Southgate Avenue Interchange Project.* This section summarizes the key issues identified in the report; a full copy of the report is included in Attachment I.

The purpose of this assessment is to identify recognized environmental conditions (RECs) and potential RECs within and adjacent to the area being considered for various project alternatives. This assessment identifies sites and REC issues that could potentially impact design and construction.

The ISA has been prepared to review potential hazardous waste sites for the entire project area (including local roadway and frontage connections) as shown in Attachment B. The full study includes a discussion of all potentially hazardous waste sites within the entire project area. The discussion below includes identification of potential hazardous waste sites within the interchange study area only.

Potential Hazardous Materials Impacts

Two sites within the potential acquisition area for the interchange have been identified as RECs that fall under the "High Risk" category in the Caltrans PA/ED Risk Classification.

The sites are listed within the report and are summarized in the tables below. The tables contain assessor's parcel number, address, current and/or former use, REC description, and recommended action.

High Risk Sites				
Address	**APN**	**Former and/or Current Use**	**Potential REC**	**Recommended Action**
775 Entler Ave.	040-400-021	Former FMC Corp. Agri Chem Group	Ag Chemicals/ Pesticides	Records review, site inspection, possible Phase II sampling
425 Southgate Ln.	040-400-088	Peterson Tractor	Surface spill of petroleum hydrocarbons, UST-status unknown	Records review, site inspection, possible Phase II sampling

Right-of-way acquisitions will likely be required from these parcels, and additional site-specific assessment is warranted. Additional assessment will include a more detailed site

inspection, thorough regulatory file review, interviews, and Phase II sampling for building material and soils.

General Hazardous Waste Issues

A number of general issues with the interchange project site have been identified. These are summarized below.

Agricultural Chemicals (Pesticides/Herbicides)

Significant portions of the project study area are located on agricultural land historically cultivated in orchards; consequently, there is potential for residual pesticides and/or herbicides. No evidence of potential historical pesticide/herbicide mixing, storage and/or misuse within the study area was observed (other than sites already identified as possible pesticide manufacturing/handling facilities). Some historic orchard areas within the project limits were active during a period when use of persistent pesticides would be expected to be most prevalent (1950's and earlier).

Aerially Deposited Lead

The presence of aerially deposited lead (ADL) adjacent to heavily traveled roadways, such as SR 99 is not uncommon. Based on review of air photos and topographical maps, SR 99 has been in service since at least 1957. Before SR 99 construction, Midway was the main north-south roadway in the area dating back to at least 1912. It is anticipated that Caltrans will require an ADL study for improvements to the SR 99 corridor. This is consistent with their general requirement to require ADL testing along heavily traveled roads in use prior to 1987.

Yellow Traffic Stripes

Yellow traffic stripes typically contain heavy metals including lead and chromium at concentrations in excess of the hazardous waste thresholds established by Title 22 of the California Code of Regulations and may produce toxic fumes when heated. Consequently, any yellow traffic striping within the project area will require proper disposal, which may include disposal at a Class 1 disposal facility.

Asphalt

It is anticipated that project improvements will include the removal of existing asphalt. Currently, asphalt is not regulated as a hazardous material, but potential contaminants in the asphalt binder are subject to off-site disposal restrictions imposed by the State of California Integrated Waste Management Board. Consequently, asphalt removal from the project will need to be disposed in accordance with current regulations.

Building Materials

Asbestos and lead based paint associated with the demolition/modification of existing structures, bridges, and/or roadway may be encountered. Consequently, the resulting debris may be a regulated waste and should be characterized and classified prior to disposal.

8B. AIR QUALITY CONFORMITY

An Air Quality Analysis was prepared for the project by ICF and is summarized in the PEAR document included as Attachment H. This analysis covered the entire Southgate Avenue Interchange project area including the local roadway and frontage connections adjacent to the interchange. This extends from the Midway connection to the west to the Skyway connection to the east.

An Air Quality Study Report (AQSR) consistent with the Caltrans and EPA/FHWA standards would need to be prepared to assess the environmental impacts associated with the SR 99/Southgate Avenue Interchange. The AQSR would document compliance with regards to the Clean Air Act State Implementation Plan, CO, PM10, and PM2.5 hotspots, and compliance with mobile source air toxics (MSAT) effects. Air quality impacts under NEPA and CEQA would also be evaluated in relation to the project. The AQSR will take approximately two months to prepare and obtain approval.

The project site is located in the County of Butte within the Sacramento Valley Air Basin (SVAB). The Butte County Air Quality Management District has jurisdiction over air quality in Butte County. With regard to the state air quality standards, the California Air Resources Board has designated Butte County as a moderate non-attainment area for ozone, a non-attainment area for PM10 and PM 2.5, and an attainment area for CO. With regard to the federal air quality standards, the U.S. Environmental Protection Agency (EPA) has designated Butte County a non-attainment area for ozone, a moderate maintenance area for CO, and is expected to be designated non-attainment for PM2.5 in the future.

The project is included in the Butte County Association of Governments 2008 Regional Transportation Plan, adopted on December 11, 2008, which has been found to be in conformity with the Clean Air Act State Implementation Plan. The project must be shown to not "cause or contribute to any new localized CO, PM10, or PM2.5 violations or increase the frequency or severity of any existing CO, PM10 or PM2.5 violations."

In order to show that this criteria has been met, the following analysis will need to take place during the PA&ED phase of the project:

- Provide an analysis of localized CO impacts following the methodology contained within the Caltrans' Transportation Project-Level Carbon Monoxide Protocol (Garza et al. 1997).
- Evaluate the assessment of localized PM10 and PM2.5 impacts using EPA/FHWA's Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM2.5 and PM10 Non-attainment and Maintenance Areas (Federal Highway Administration, and U.S. Environmental Protection Agency 2006).
- Evaluate project-specific criteria pollutant and greenhouse gas (GHG) emissions for the build alternative using Caltrans' CT-EMFAC model.

- Evaluate the project's MSAT impacts using FHWA's Interim Guidance on Air Toxic Analysis in NEPA Documents (Federal Highway Administration 2006).

Based on traffic volumes along SR 99 and Southgate Avenue, it is anticipated that the project is a "project with low potential MSAT effects" which does not require a quantitative MSAT analysis (less than threshold of 140,000-150,000 AADT).

8C. NOISE ABATEMENT DECISION REPORT

A Preliminary Noise Analysis was prepared by ICF for inclusion with the PEAR, which is included as Attachment H. This analysis included the entire Southgate Avenue Interchange project area, including the local roadway and frontage connections adjacent to the interchange. This extends from the Midway connection to the west to the Skyway connection to the east; an exhibit showing the total project area is shown in Attachment B.

Federal aid highway projects are analyzed per Procedures for Abatement of Highway Traffic Noise (23 CFR 772). Caltrans protocol for the implementation of 23 CFR 772 is set forth in the Traffic Noise Analysis Protocol. The proposed project would require an evaluation of noise impacts per 23 CFR 772. Furthermore, the proposed interchange project would likely be considered a "Type 1" project because it would result in new alignments near receivers.

Per Caltrans protocol, potentially significant noise impacts are generated under two circumstances: the projected design year traffic would exceed the specified noise abatement criteria (NAC) or the projected design year traffic noise would substantially exceed existing ambient noise levels.

In addition to the Caltrans protocol, the proposed project would be analyzed per the City of Chico Noise Ordinance as set forth in Chapter 9.38 of the Municipal Code.

Various noise sensitive land uses are found in the project area. The table below summarizes the primary locations of these land uses.

Type of Receptor	Location
SR 99/Southgate Avenue	
Single-Family Residences	Estates Drive approximately 350 feet west of SR 99
Single-Family Residences	Near Estates Drive approximately 400 feet west of SR 99
SR 99/Entler Avenue	
Chico Christian School	North of Entler Avenue, approximately 300 feet east of SR 99
Neighborhood Church of Chico	East of SR 99 approximately 600 feet north of improvements
Residential Subdivision	Adjacent to proposed Speedway Avenue extension approximately 500 feet west of SR 99
Southgate Avenue	
Single-Family Residence	Approximately 700 feet east of Midway Road
Single-Family Residence	Midway Road approximately 500 feet north of Southgate Avenue
Skyway	
Single-Family Residences	Approximately 150 feet north of Skyway, east of the Skyway/Southgate Avenue intersection

A detailed Noise Analysis, including a review of these sensitive land use locations, will be included within the project Environmental Document. Should noise levels increase at these locations due to the project improvements, noise abatement (such as soundwalls or noise reducing pavement) will be considered.

8D. PRELIMINARY GEOTECHNICAL ANALYSIS

Blackburn Consulting (BCI) has prepared a Preliminary Geotechnical Memorandum for the project area. A copy of the Preliminary Geotechnical Analysis is included as Attachment I. The report includes an analysis of the geotechnical setting for the overall project site and preliminary recommendations for potential structure foundations, grading, and retaining wall footings. This analysis covered the entire Southgate Avenue Interchange project area, including local roadway bridge crossings of Butte Creek, Little Chico Creek Diversion Channel, and Comanche Creek. The preliminary recommendations of this analysis are as follows.

Preliminary Structure Foundation Alternatives

The following foundations are considered as appropriate for preliminary structure design and type selection for the bridge crossings within the project limits:

- Southgate Avenue Interchange at SR 99: Spread footings in undisturbed Modesto Formation materials. Alternatively, H-piles driven to about 30 ft below existing ground surface, developing capacities up to 70 tons per pile.

- Southgate Avenue Bridge at Little Chico Creek Diversion: H-piles, driven to about 40 ft below existing old railroad grade, developing capacities up to 70 tons per pile.

- Southgate Avenue Bridge at Butte Creek: H-piles likely with 70 ton capacity at depths about 30-40 ft at the west abutment. At the east abutment, likely footing foundation in rock. Bent foundations may be either short H-piles (about 20 ft long) or spread footings, depending on the rock line and design scour levels.

- Player Lane Bridge at Butte Creek: H-piles, driven to about 30 ft below channel bottom, developing capacities up to 70 tons per pile.

- Entler Avenue Bridge at Comanche Creek: Spread footings in undisturbed Modesto Formation materials, similar to the SR 99 bridges immediately upstream. Alternately, H-piles driven about 20-30 ft below channel bottom with design capacities to 70 tons per pile.

- Entler Avenue Culvert (or Bridge) at Comanche Creek tributary: A box culvert similar to the SR 99 triple box appears reasonable, bearing into undisturbed Modesto Formation soils. For a bridge structure, spread footings appear feasible with preliminary design loads to 2 tons per square foot.

Roadway Grading & Retaining Walls

New cut slopes will be stable at gradients of about 1.5H:1V or flatter, and new fill slopes at gradients of 2H:1V. It is anticipated that settlement of new embankment established on appropriately prepared subgrade will be nominal (on the order of 1-inch), occurring rapidly during fill placement.

Areas of slope instability, shallow ground water or soft/compressible soils were not observed, although these issues may require consideration where dredge tailings are present. In the tailing areas, measures such as over-excavation and replacement may be required, depending on fill heights and grading details. Areas of significant fill over tailings will require consideration of possible soft clays (“slickens”) within the tailings that may be present as a byproduct of the dredging operations.

8E. PRELIMINARY STORMWATER & DRAINAGE ANALYSIS

A Preliminary Drainage Impact Report, and Floodplain Risk Assessment Memorandum have been prepared by WRECO for this project; these documents are included as Attachment G. This analysis covered the entire Southgate Avenue Interchange project, including local roadway bridge crossings of Butte Creek, Little Chico Creek Diversion Channel, and Comanche Creek.

Stormwater Analysis Summary

Preparation of a Storm Water Data Report will be completed concurrently during PA&ED, and will cover the specific phased improvements identified during that phase.

Drainage/Floodplain Analysis Summary

The existing drainage systems within the project limits along SR 99 are comprised mostly of longitudinal systems connecting cross culverts that drain toward the creek crossings. Storm water on the west side of SR 99 is collected at the outside shoulders along asphalt concrete (AC) dikes before discharging into overside drains. On the east side of SR 99, there are roadside drainage ditches to collect storm water that flows directly off the edge of the pavement.

There are some existing drainage issues that should be addressed for the implementation of the project including uncertified levees on Butte Creek, the placement of the bridges over Butte Creek and Comanche Creek that would be part of the proposed roads, the weir in Butte Creek at the proposed Southgate Avenue extension to Skyway, groundwater drainage problems between Midway and Butte Creek, and the railroad embankment that acts as a hydraulic barrier protecting against flooding from Comanche Creek and the Little Chico-Butte Creek Diversion Channel. These issues are discussed further in the following sections.

Butte Creek Levees - Butte Creek is bordered by levees in most of the valley reach, including in the vicinity of the project. These levees are uncertified by the Federal Emergency Management Agency (FEMA) and were analyzed as failed levees in the FEMA Flood Insurance Study (FIS). As a result, a portion of the proposed project area is depicted in a Special Flood Hazard Area (SFHA) Zone AE in the Flood Insurance Rate Map (FIRM). The project should be designed in such a way that it would not exacerbate flood risk.

Although the increase in storm water runoff for the project is expected to be minimal, given the unknown structural integrity and freeboard deficiencies of the existing levees, the project area cannot be assumed to be safe from flooding despite the presence of the levees. During the PA&ED phase of the project, a geotechnical investigation (to

determine the condition of the existing levees and foundations) and an updated hydrologic and hydraulic analysis of the entire waterway systems may be required.

A more detailed evaluation of flooding and mitigations proposed for the implementation of the project are available in the preliminary floodplain risk assessment memorandum prepared by WRECO in 2009.

New Bridge Crossings – New bridge crossings would need to be designed for the local roads improvement portion of this project. The local roadway frontage connections on the east and west sides of SR 99 would include bridge crossings at Butte Creek and at Comanche Creek. The Southgate Avenue extension to Skyway would require two bridges to cross the Little Chico-Butte Creek Diversion Channel and Butte Creek. The Player Lane connection would require a bridge on the west side of SR 99 crossing over Butte Creek.

According to City of Chico Municipal Code Design Criteria, the bridges must be designed to convey the 0.5% probability of annual exceedance event (i.e. 200-year storm) with a minimum of three feet of freeboard.

Butte Creek Weir/Trestle - There is a railroad trestle and weir on Butte Creek. The proposed Southgate Avenue extension to Skyway would require construction of a new bridge at this location. WRECO recommends the railroad trestle be removed and the weir not be removed unless it is necessary to do so. If the trestle is removed, it would eliminate the flow constriction within that area of Butte Creek.

Groundwater Recharge - There are documented issues related to groundwater recharge in the area on the west side of SR 99 just south of Southgate Avenue. These issues are described in the 2001 report entitled *Investigation of Groundwater Drainage Problems between Speedway Avenue and Oroville-Chico Highway* prepared by Gus Yates, for the Butte County Department of Public Works (Yates 2001).

This report mentions a sump pump at Southgate Acres Subdivision on Entler Avenue. The pump was put in place to decrease the surcharging groundwater in the area by collecting the water and sending it eastward. This has, however, created an increase in groundwater discharge further south.

The report identifies mitigation for these issues, including a new drainage system that would allow discharge into the adjacent Butte Creek channel. Mitigation options for this discharge will need to be further studied as the new roadway connections and developments in the area move into final design.

Existing Railroad Embankment - The new connection from Southgate Avenue to Skyway would be constructed along an old railroad embankment on the north side of the project limits. In the FIRM, the railroad embankment is shown as a feature that protects an area

downstream from flooding from Comanche Creek and the Little Chico-Butte Creek Diversion Channel.

The new connection would need to maintain the existing alignment and embankment height in order to maintain flood protection from Comanche Creek. This requirement will need to be considered when developing the horizontal and vertical alignments of the Skyway connection.

9. FUNDING

The preliminary project costs for the Ultimate Interchange Alternatives and Phasing Options are as listed below.

Construction Costs				
	Alternative 1	Alternative 2	Interim Phase1A	Interim Phase 1B
Roadway Items	$17,220,000	$21,430,000	$4,000,000	$19,410,000
Structure Items	$4,850,000	$4,600,000	$0	$4,600,000
Stormwater	$700,000	$800,000	$200,000	$800,000
Right of Way & Utilities*	$10,787,000	$18,809,000	$9,841,000	$18,809,000
Total Capital Costs	**$33,557,000**	**$45,639,000**	**$10,041,000**	**$43,619,000**
Support Costs				
	Alternative 1	Alternative 2	Phase 1A	Phase 1B
Environmental	$600,000	$600,000	$100,000	$600,000
Design (10%)	$2,277,000	$2,683,000	$420,000	$2,481,000
Right of Way	$620,000	$1,080,000	$590,000	$1,080,000
Construction Support (15%)	$3,415,500	$4,024,500	$630,000	$3,721,500
Total Support Costs	**$6,912,500**	**$8,387,500**	**$1,740,000**	**$7,882,500**
Total Project Costs	**$40,469,500**	**$54,026,500**	**$16,181,000**	**$51,501,500**

* Right of Way costs are unescalated.
These costs include all interchange, roadway, and structures work along SR 99 and along Southgate Avenue between Estates Drive/Player Lane to the west and Southgate Lane/Notre Dame Boulevard to the east. Project costs outside of these limits are included in the *Southgate Corridor Analysis and Interchange Study* prepared for the City of Chico.

The City of Chico plans to fund the project with a mix of funding types, including developer impact fees, City Capital Project funds, and potential federal funding.

10. SCHEDULE

For the purposes of this report, it is assumed that Alternative 1A will be constructed and the project will begin construction in the Spring of 2015. The approximate schedules are as follows:

Alternative 1A Project Schedule

HQ Milestones	Delivery Date (Month, Day, Year)
Begin Environmental	June 2013
PA & ED	December 2015
Project PS&E	July 2016 – December 2017
Right of Way Certification	December 2017
Ready to List	January 2018

The schedule for constructing Alternatives 1 or 2 will depend on funding availability and adjacent development activities. Additionally, during the PA&ED Phase, the City will provide further traffic analysis and study of the potential phases for the project to ensure that useful design life is achieved for each phase. This typically consists of a 10 year useful life.

For the purposes of developing project cost estimates, the construction year and right of way certification date for Alternatives 1 and 2 are assumed to be July 2018, when forecasted traffic volumes will require the Southgate Avenue extension to Skyway. It is assumed that Alternative 1 or Alternative 2 would be constructed as stand-alone projects (i.e. without Alternative 1A).

11. PROJECT PERSONNEL/DISTRICT CONTACTS

Bob Greenlaw	Senior Civil Engineer City of Chico Capital Project Services	(530) 879-6930
Jeff Jukkola	Associate Civil Engineer City of Chico Capital Project Services	(530) 879-6935
Matt Brogan	Project Manager Mark Thomas & Company	(916) 381-9100
Rebecca Mowry	Caltrans Special Funded Project Mgmt	(916) 799-5794
Sandra Rosas	Caltrans Office of Environmental Mgmt	(530) 741-4017
Damian Farley	Caltrans Traffic Operations	(530) 741-5753
Chris Breiland	Fehr & Peers – Traffic Analysis	(425) 820-0100
Kamie Loeser	Gallaway Consulting – PEAR	(530) 343-8327
Han Bin Liang	WRECO – Hydraulic Analysis/SWDR	(925) 941-0017
Mike Lahodney	Bender-Rosenthal – Right of Way	(916) 978-4900
Rick Sowers	Blackburn Consulting – Geotechnical	(530) 887-1494

12. PROJECT REVIEWS

This Final PSR is being submitted to Caltrans for approval. All comments provided by Caltrans staff have been addressed.

13. ATTACHMENTS

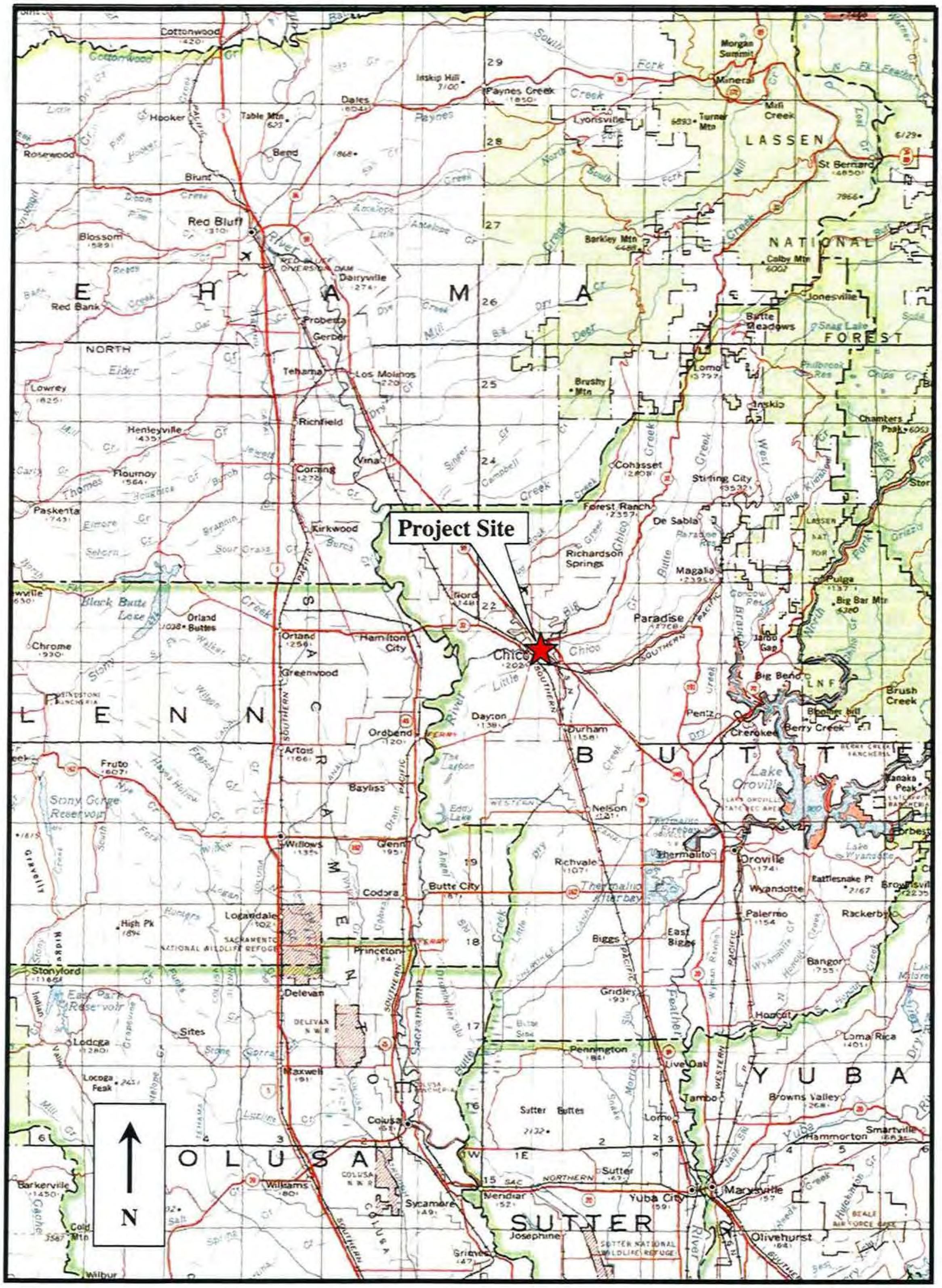
A. Location Map
B. Project Geometrics
C. Structures Advanced Planning Study
D. Project Cost Estimates
E. Right of Way Data Sheet/Utility Information Sheet

The Following Attachments are Included on Compact Disc Only:

F. Traffic Operations Report
G. Drainage Impact Report / Floodplain Risk Assessment
H. Preliminary Environmental Analysis Report
I. Initial Site Assessment/Preliminary Geotechnical Memorandum
J. Public Workshop Comments
K. TMP Data Sheet

A. LOCATION MAP

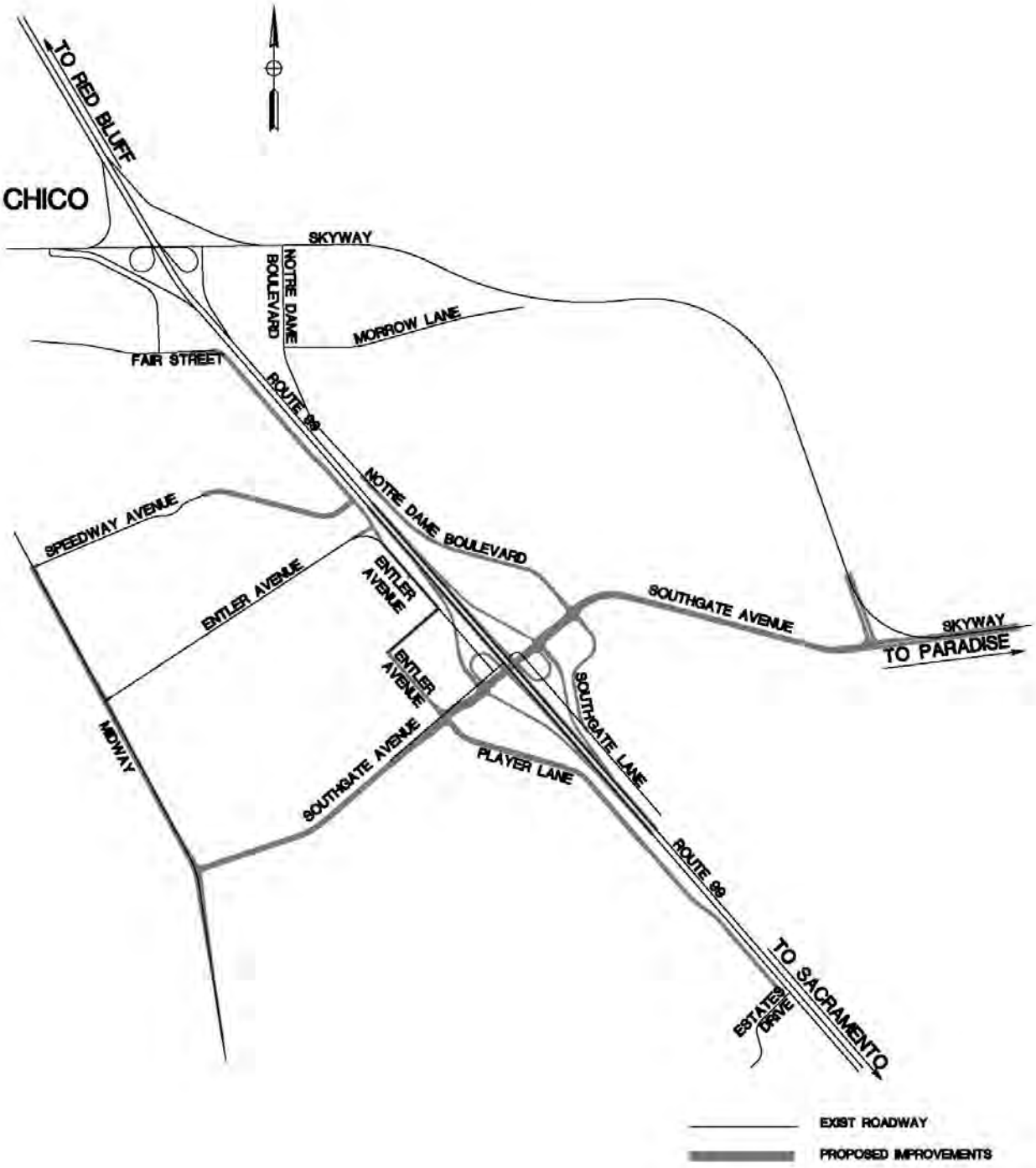
Regional Location Map



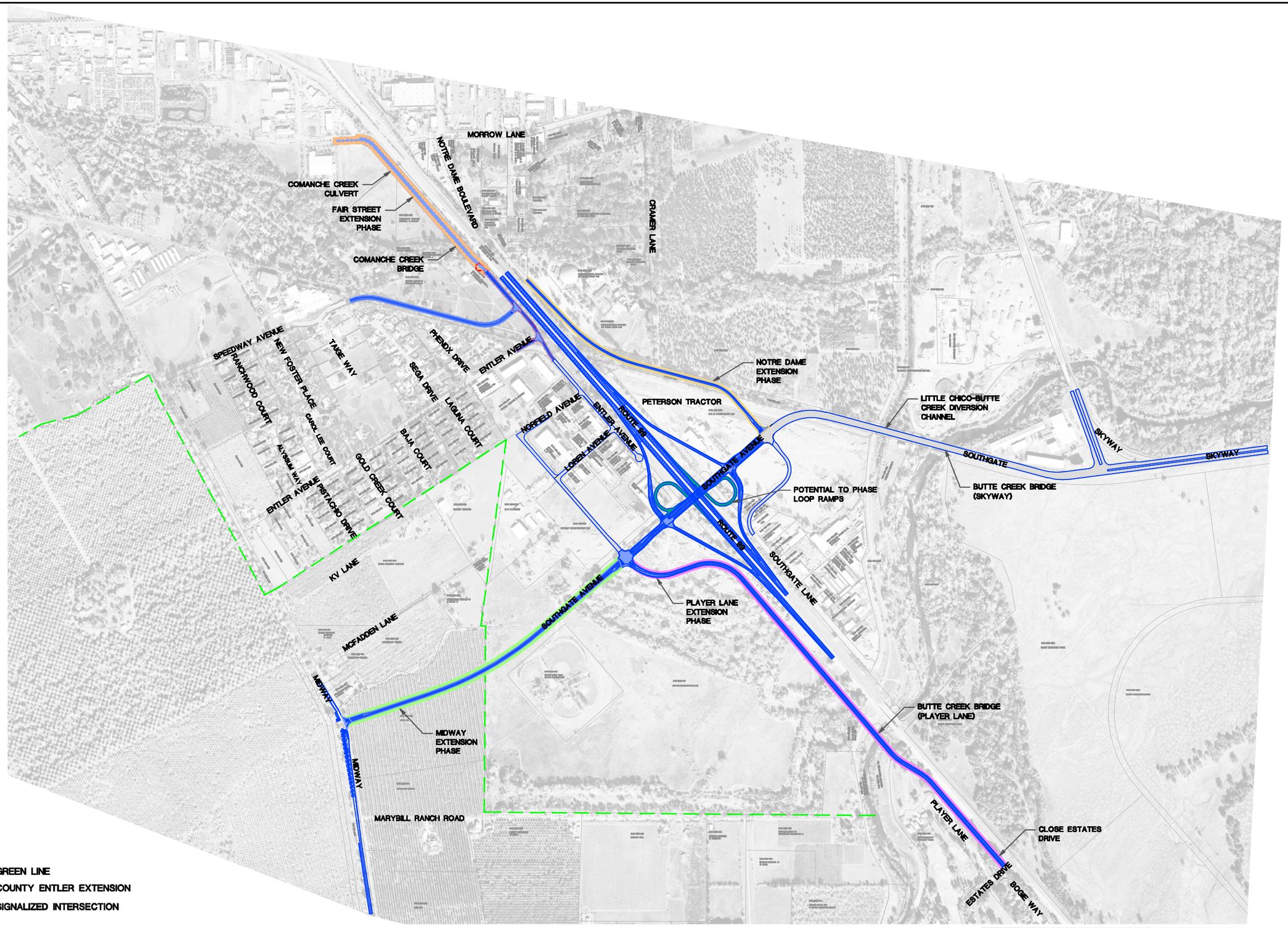
Project Site

Location Map

No Scale



B. PROJECT GEOMETRICS



MARK THOMAS & COMPANY, INC.
Providing Engineering, Surveying and Planning Services

CITY of CHICO
INC. 1872

PROPOSED CORRIDOR IMPROVEMENTS PHASING

SCALE:1"=1000'

PRELIMINARY GEOMETRICS - ALTERNATIVE 1
SR 99/SOUTHGATE INTERCHANGE

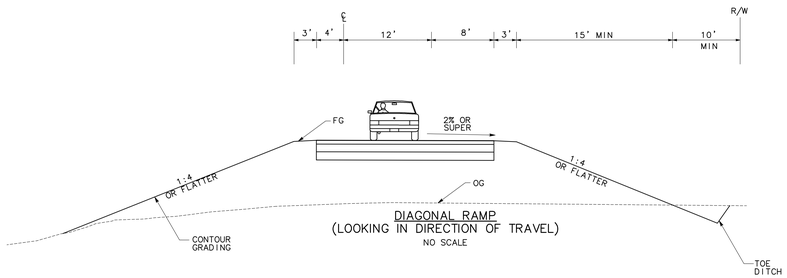
03-BUT-99 PM 28.8/29.9 EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JWW	APPROVED ON		JOB NO. 57-0253	SHEET NO. 1 OF 3
CKD. BY MB	BY			
DATE 1/20/11	RCE NO.		FILE NO.	
SCALE 1"=100'				

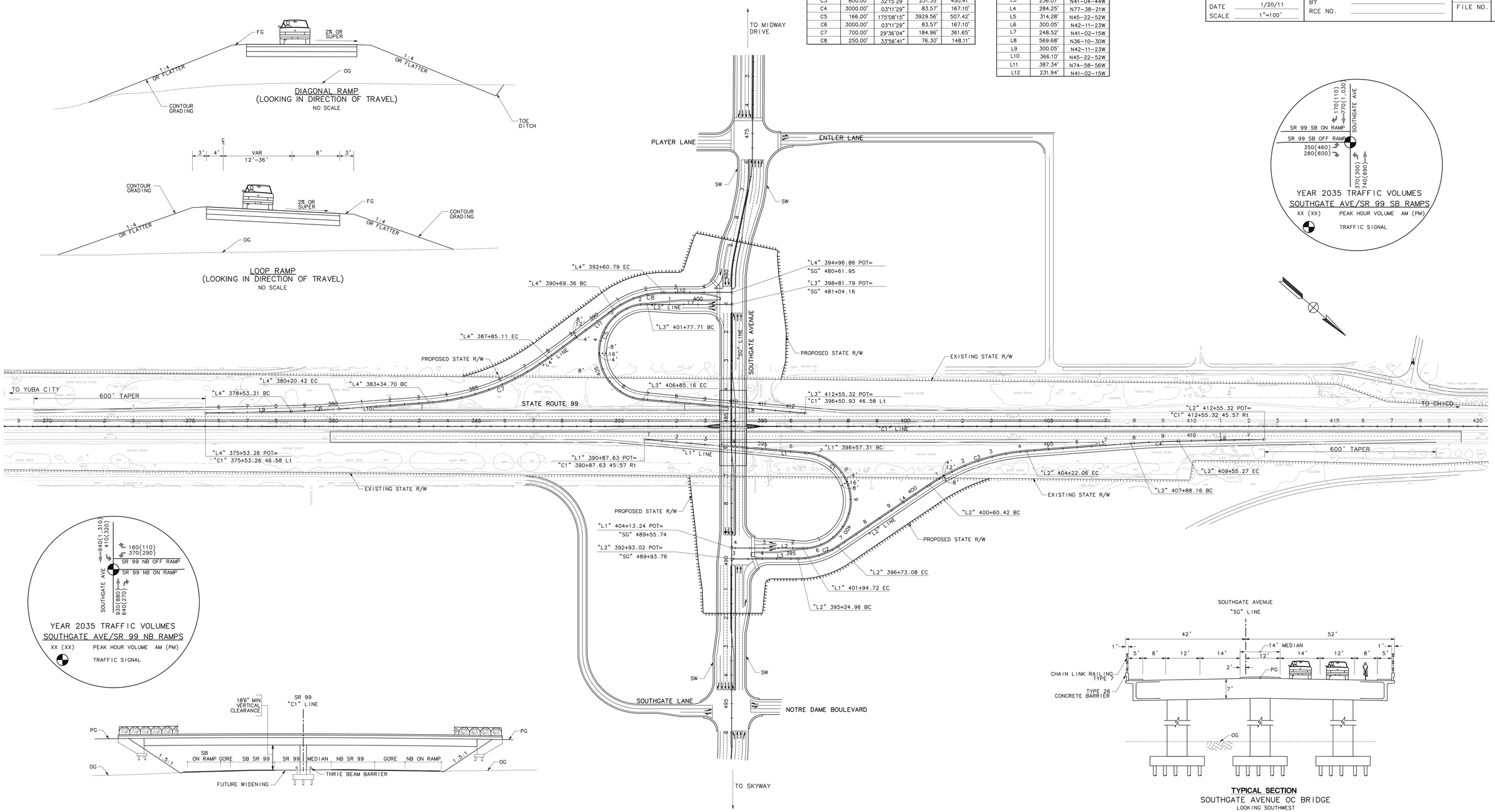
CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	166.00'	175°08'56"	3918.96'	507.45'
C2	300.00'	33°33'37"	99.10'	191.43'
C3	800.00'	32°15'29"	231.35'	450.41'
C4	3000.00'	03°11'29"	83.57'	167.10'
C5	166.00'	175°08'15"	3929.56'	507.42'
C6	3000.00'	03°11'29"	83.57'	167.10'
C7	700.00'	29°36'04"	184.96'	361.65'
C8	250.00'	33°56'41"	76.30'	148.11'

LINE TABLE		
CURVE	LENGTH	BEARING
L1	570.16'	N36-10-30W
L2	295.92'	N41-01-34W
L3	236.07'	N41-04-44W
L4	284.25'	N77-38-21W
L5	314.28'	N45-22-52W
L6	300.05'	N42-11-23W
L7	248.52'	N41-02-15W
L8	569.68'	N36-10-30W
L9	300.05'	N42-11-23W
L10	366.10'	N45-22-52W
L11	387.34'	N74-58-56W
L12	231.94'	N41-02-15W



DIAGONAL RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

LOOP RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE



LONGITUDINAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING NORTHWEST
NO SCALE

TYPICAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING SOUTHWEST
NO SCALE

PRELIMINARY GEOMETRICS - ALTERNATIVE 2
SR 99/SOUTHGATE INTERCHANGE

03-BUT-99 PM 28.8/29.9 EA 4E670

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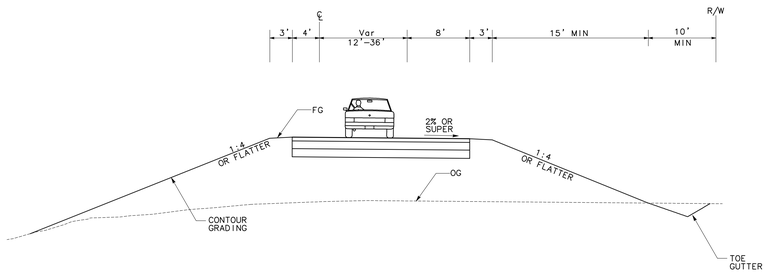
DATE 1/20/11	RCE NO.		3
SCALE 1"=100'			

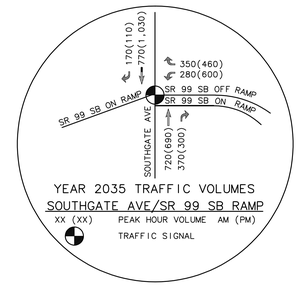


DIAGONAL RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

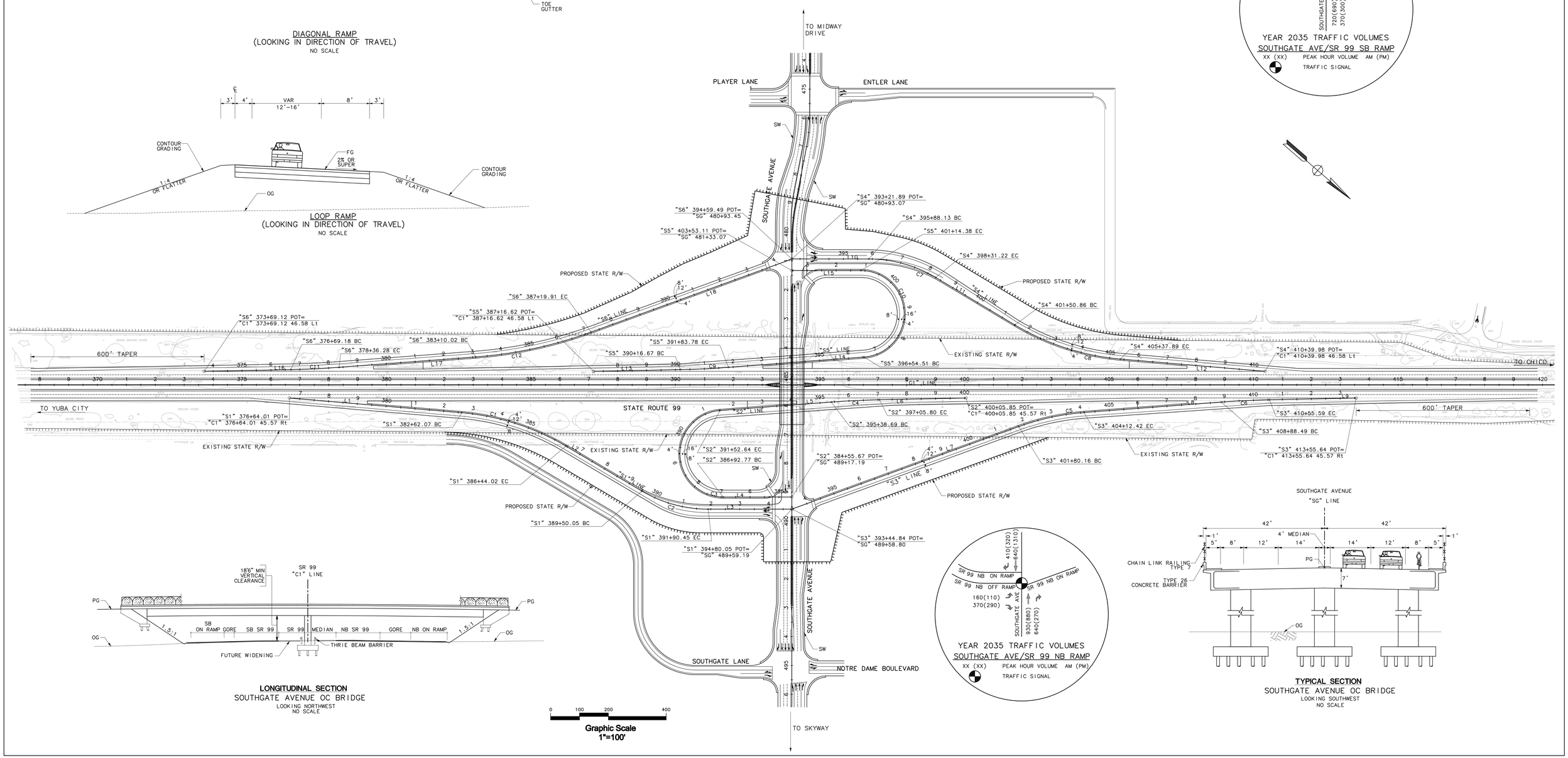
LOOP RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

LINE TABLE		
LINE	LENGTH	BEARING
L1	598.06'	N36°10'30"W
L2	306.03'	N10°23'44"W
L3	289.60'	N41°02'15"W
L4	237.40'	S41°02'15"E
L5	386.05'	N45°22'52"W
L6	300.05'	N42°11'23"W
L7	835.32'	N61°02'15"W
L8	476.06'	N45°22'52"W
L9	300.05'	N42°11'23"W
L10	266.24	N41°02'15"W
L11	319.64'	N10°05'10"W
L12	502.08'	N36°10'30"W
L13	300.05'	N42°11'23"W
L14	470.74'	N45°22'52"W
L15	238.73'	S41°02'15"E
L16	300.06'	N42°11'23"W
L17	473.74'	N45°22'52"W
L18	739.58'	N61°02'16"W

CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	850.00'	25°44'16"	194.25'	381.95'
C2	450.00'	30°36'31"	123.14'	240.40'
C3	150.00'	175°39'23"	3955.47'	459.87'
C4	3000.00'	03°11'29"	83.57'	167.10'
C5	850.00'	15°39'23"	116.86'	232.27'
C6	3000.00'	03°11'29"	83.57'	167.10'
C7	450.00'	30°57'05"	124.59'	243.09'
C8	850.00'	26°05'20"	196.93'	387.09'
C9	3000.00'	03°11'29"	83.57'	167.10'
C10	150.00'	175°39'23"	3955.45'	459.87'
C11	3000.00'	03°11'29"	83.57'	167.10'
C12	1500.00'	15°39'24"	206.23'	409.89'



YEAR 2035 TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99 SB RAMP
XX (XX) PEAK HOUR VOLUME AM (PM)
TRAFFIC SIGNAL



LONGITUDINAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING NORTHWEST
NO SCALE

YEAR 2035 TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99 NB RAMP
XX (XX) PEAK HOUR VOLUME AM (PM)
TRAFFIC SIGNAL

TYPICAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING SOUTHWEST
NO SCALE

PRELIMINARY GEOMETRICS - ALTERNATIVE 1A
SR 99/SOUTHGATE INTERCHANGE

03-BUT-99 PM 28.8/29.9 EA 4E670

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SACRAMENTO, CALIFORNIA 95826

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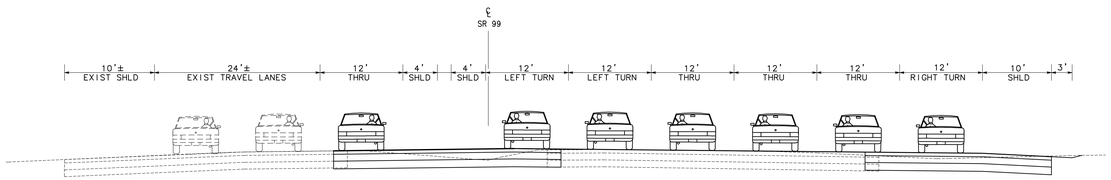
CKD. BY MB	BY	FILE NO.	OF 3
DATE 1/20/11	RCE NO.		
SCALE 1"=100'			

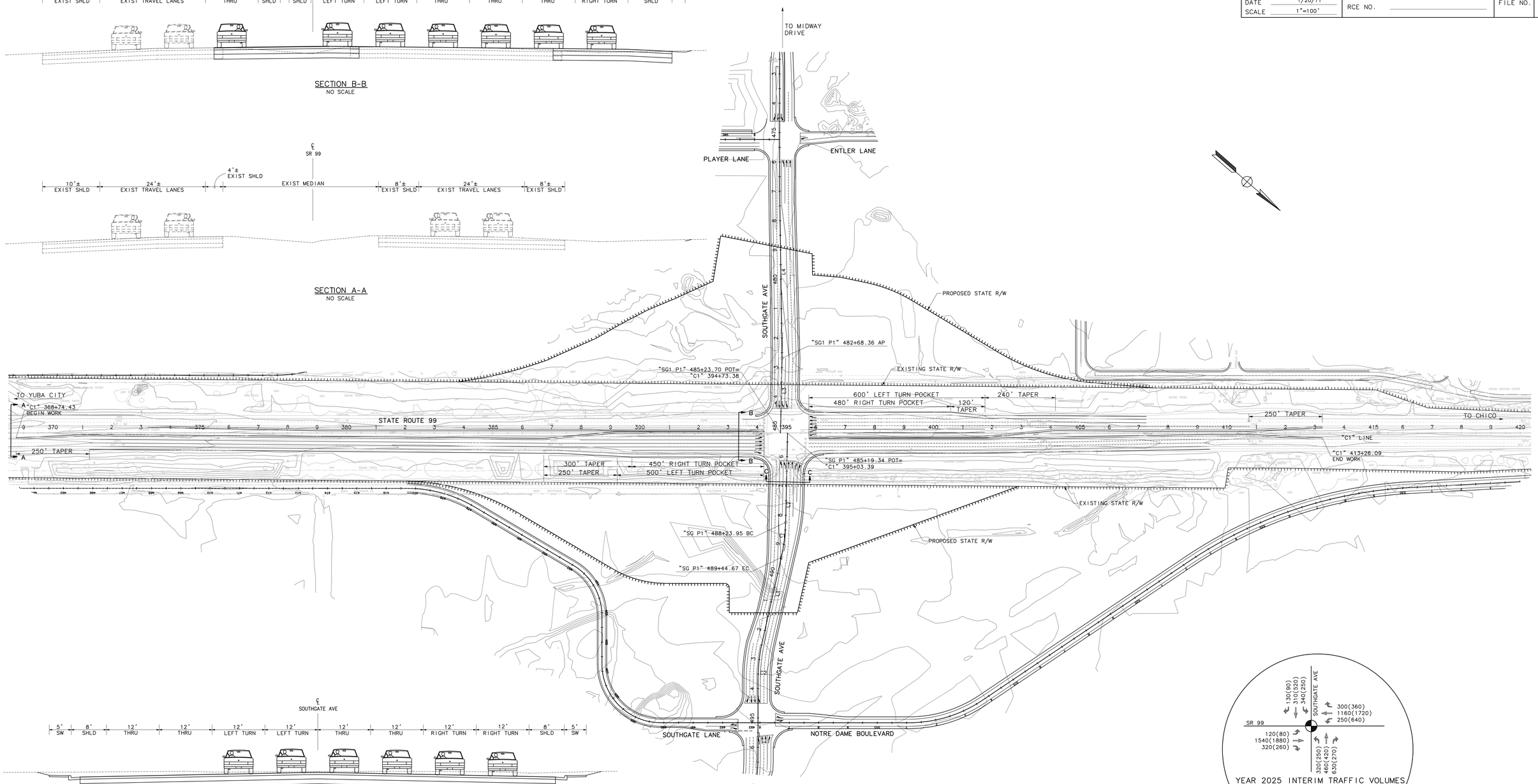
CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	600.00'	11°31'38"	60.56'	120.71'
C2	600.00'	12°44'21"	66.98	133.40'

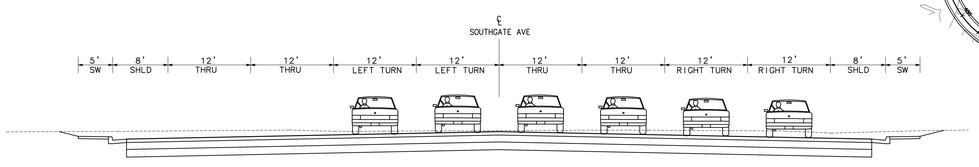
LINE TABLE		
LINE	LENGTH	BEARING
L1	293.65'	N61°42'06"E
L2	304.61'	N50°10'28"E
L3	255.34'	N50°10'28"E
L4	582.51'	N48°07'39"E



SECTION B-B
NO SCALE

SECTION A-A
NO SCALE





SECTION C-C
NO SCALE

YEAR 2025 INTERIM TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99

XX (XX) PEAK HOUR VOLUME AM (PM)

TRAFFIC SIGNAL

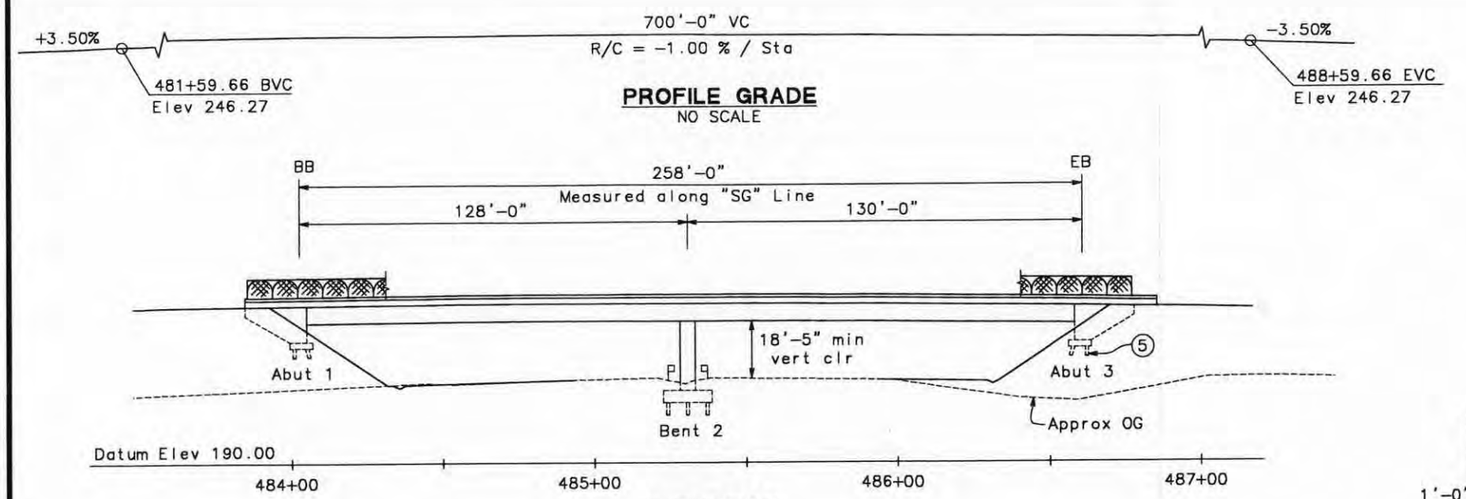
0 100 200 400
Graphic Scale
1"=100'

C. STRUCTURES ADVANCE PLANNING STUDY

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
03	BUT	99	R28.8/29.9

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD., STE 203
SACRAMENTO, CA 95826

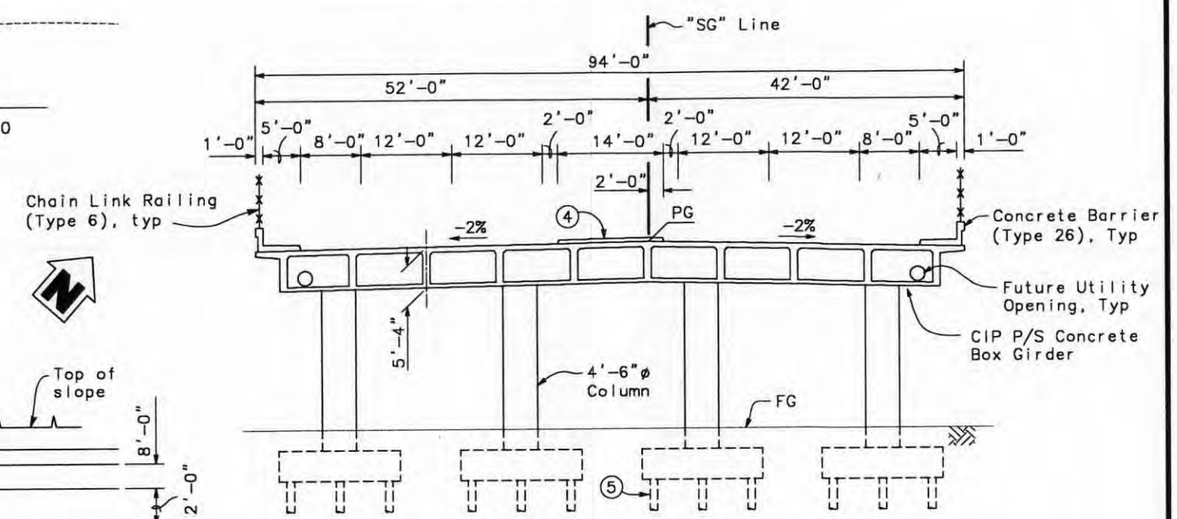
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



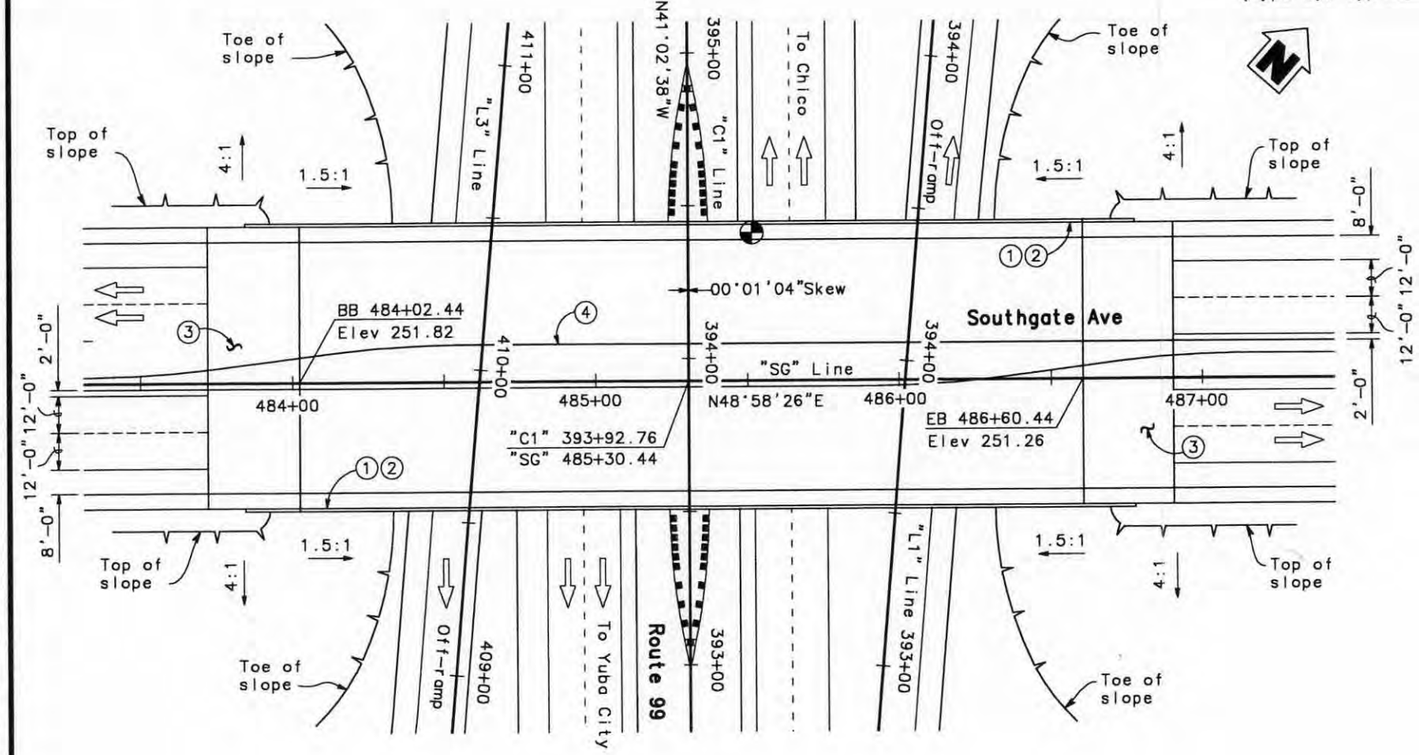
VEHICULAR TRAFFIC
1. ✓ New alignment.
2. ___ Traffic will be detoured away from the site.
3. ___ Traffic will be carried on the structure. Stage construction will not be required.
4. ✓ Traffic will pass under the structure on State Route 99
   A. ___ No falsework allowed over traffic.
   B. 2 Falsework opening(s) required:

	Temporary Vertical Clearance	Width of Traffic Opening
N Bnd.	15'-0"	61'-0"
S Bnd.	15'-0"	49'-0"

   C. ___ Temporary traffic lane reduction needed for footing excavation.



TYPICAL SECTION
1" = 10'



PLAN
1" = 50'

NOTES

1. Paint "BR. NO. 12-XXXX"
2. Paint "Southgate Ave OC"
3. Structure Approach Slab Type N(30S)
4. 14'-0" Max & varies Raised Median
5. Assumed Driven Piles

Indicates Point of Minimum Vertical Clearance

Date of Estimate	=	June 2011
Str Depth	=	5'-4"
Length	=	258'-0"
Width	=	94'-0"
Area	=	24,252 ft²
Cost/ft² including 10% Mobilization 25% Contingency	=	$200 / ft²
Total Cost	=	$4,850,000

DESIGNED BY	T. Pham	DATE	04/08/10
DRAWN BY	G. Boyko	DATE	04/08/10
CHECKED BY	J. Passalacqua	DATE	04/08/10
APPROVED	Eric Fredrickson	DATE	6-16-11

J. Passalacqua
PROJECT ENGINEER

PLANNING STUDY (Alt 1)
SOUTHGATE AVE OVERCROSSING

BRIDGE NO.	12-0NEW	CU	03
SCALE:	AS NOTED	EA	4E670K

TIME PLOTTED => $TIME
DATE PLOTTED =>
USERNAME => $USER

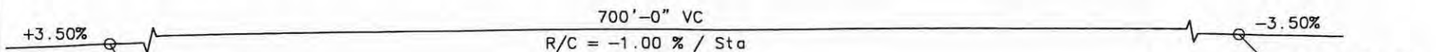
FILE => $REQUEST

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 5/9/00)

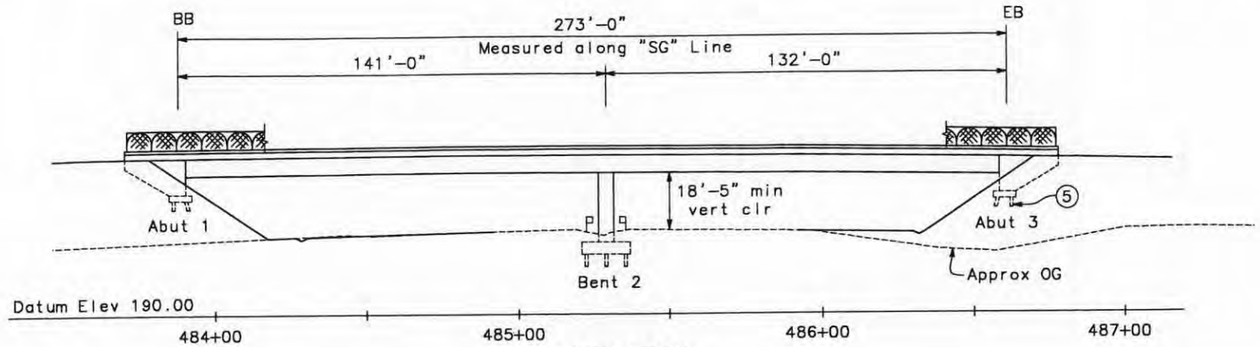
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
03	BUT	99	R28.8/29.9

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD., STE 203
SACRAMENTO, CA 95826

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



PROFILE GRADE
NO SCALE



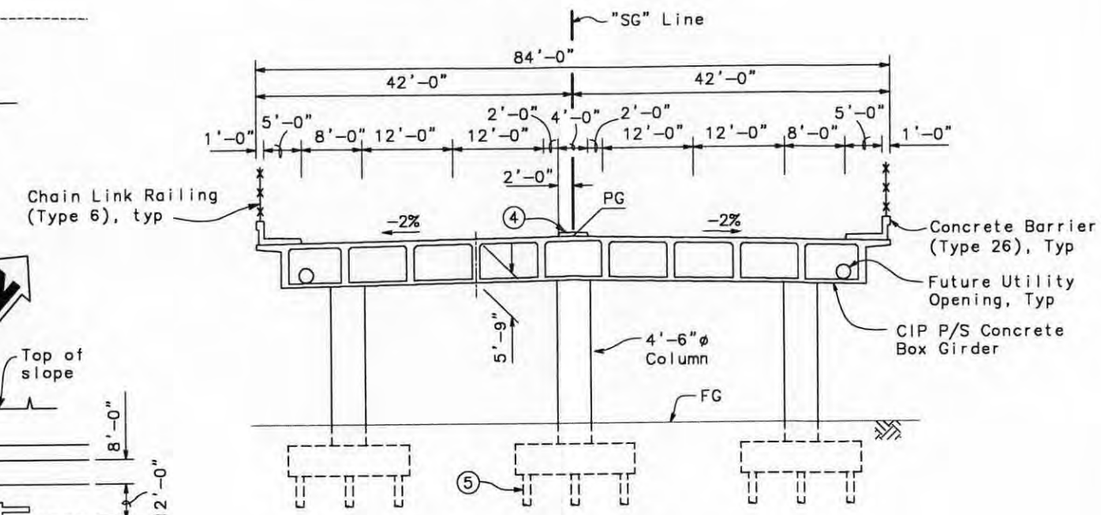
ELEVATION
1" = 50'

VEHICULAR TRAFFIC
1. ✓ New alignment.
2. ___ Traffic will be detoured away from the site.
3. ___ Traffic will be carried on the structure. Stage construction will not be required.
4. ✓ Traffic will pass under the structure on State Route 99

A. ___ No falsework allowed over traffic.
B. 2 Falsework opening(s) required:

	Temporary Vertical Clearance	Width of Traffic Opening
N Bnd.	15'-0"	61'-0"
S Bnd.	15'-0"	49'-0"

C. ___ Temporary traffic lane reduction needed for footing excavation.



TYPICAL SECTION
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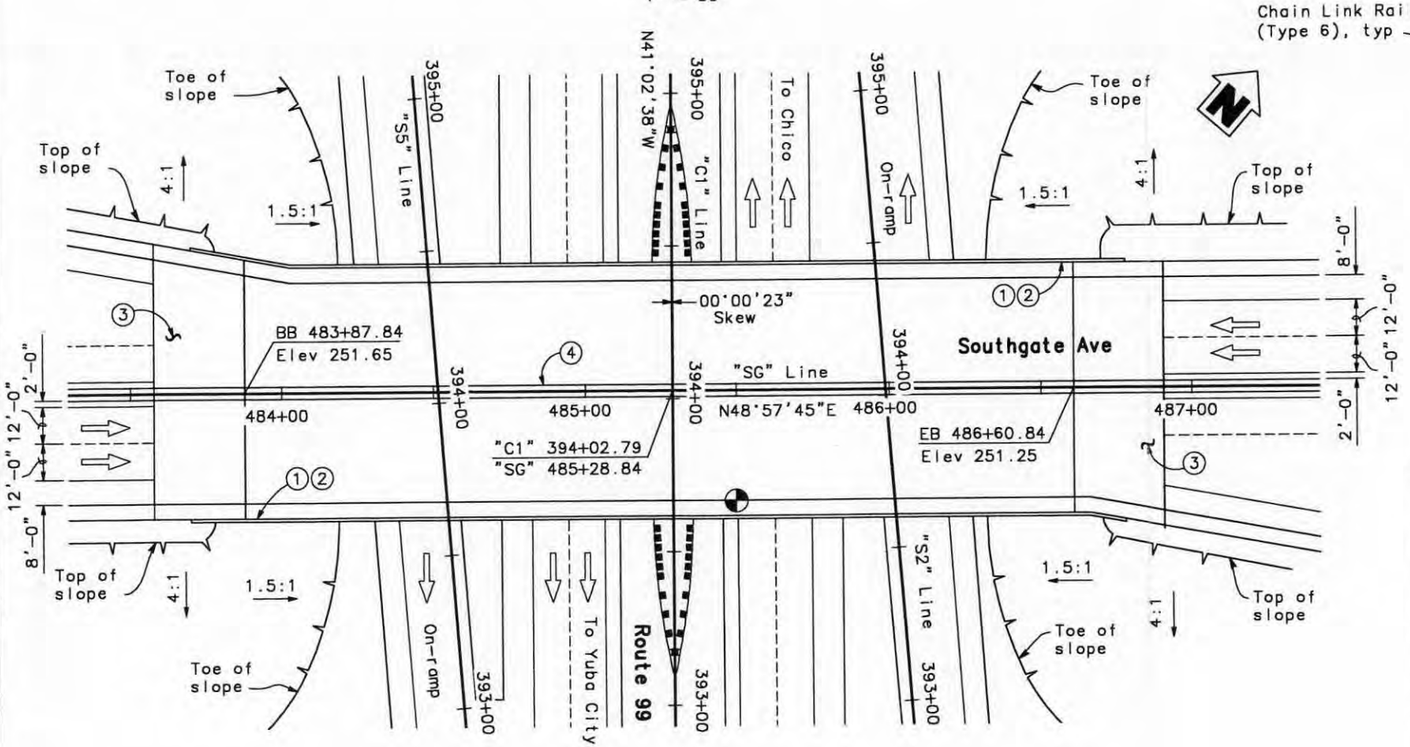


PLAN
1" = 50'

NOTES

1. Paint "BR. NO. 12-XXXX"
2. Paint "Southgate Ave OC"
3. Structure Approach Slab Type N(30S)
4. 4'-0" Raised Median
5. Assumed Driven Piles

Indicates Point of Minimum Vertical Clearance

Date of Estimate	=	June 2011
Str Depth	=	5'-9"
Length	=	273'-0"
Width	=	84'-0"
Area	=	22,932 ft^2
Cost/ft^2 including 10% Mobilization 25% Contingency	=	\$200 / ft^2
Total Cost	=	\$4,600,000

DESIGNED BY T. Pham	DATE 04/08/10	J. Passalacqua PROJECT ENGINEER	PLANNING STUDY (Alt 2)
DRAWN BY G. Boyko	DATE 04/08/10		SOUTHGATE AVE OVERCROSSING
CHECKED BY J. Passalacqua	DATE 04/08/10		BRIDGE NO. 12-0NEW / CU 03
APPROVED Eric Fredrickson	DATE 6-16-11		SCALE: AS NOTED / EA 4E670K

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => TIME PLOTTED => $TIME

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 5/9/00)

D. PROJECT COST ESTIMATES

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) Temporary at-grade I/S, within SR99/Southgate Lane interchange limits

Alternative: Alternative 1A-Enlarged At-grade Intersection

ROADWAY ITEMS	$4,000,000
STRUCTURE ITEMS	$0
SUBTOTAL CONSTRUCTION	**$4,000,000**
STORMWATER	$200,000
RIGHT OF WAY & UTILITIES	$9,841,000
TOTAL PROJECT COST	**$14,041,000**

Reviewed by Program Manager	R. M. B		1/23/12
	(Signature)		(Date)
Approved by Project Manager	Matt Brogan	(916) 381-9100	1/23/2012
	(Signature)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	18,350	CY	$15.00	$275,250	
Imported Borrow	0	CY	$12.00	$0	
Clearing & Grubbing	20	AC	$3,000	$60,000	
Remove Trees	10	EA	$250	$2,500	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$347,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	9,360	ton	$90	$842,400	
Aggregate Base (1.55')	13,870	CY	$55	$762,850	
				Total Structural Section	$1,605,250
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$100,000	$100,000	
				Total Drainage	$100,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Landscaping	0	SF	$10.00	$0	
Minor Concrete (Sidewalk)	15,300	SF	$10	$153,000	
Minor Concrete (Curb & Gutter)	4,900	LF	$20	$98,000	
				Total Specialty Items	$251,000
Section 5 - Traffic Items					
Traffic Signals - New	2	EA	$300,000	$600,000	
Traffic Signal - Modification	1	EA	$200,000	$200,000	
Permanent Signing & Striping	1	LS	$70,000	$70,000	
Traffic Management Plan	1	LS	$20,000	$20,000	
				Total Traffic Items	$890,000

SUBTOTAL SECTIONS 1 - 5: $3,194,000

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$3,194,000	X	0%	$0	
					TOTAL MINOR ITEMS:	$0
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items			(5-10%)			
	Sum	$3,194,000	X	0%	$0	
			TOTAL ROADWAY MOBILIZATION			$0
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items		$0	(5-10%)			
	Sum	$3,194,000	X	0%	$0	
Contingencies						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items		$0				
	Sum	$3,194,000	X	25% *	$798,500	
					TOTAL ROADWAY ADDITIONS	$798,500
					TOTAL ROADWAY ITEMS	$3,992,500
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

II. STRUCTURES ITEMS

Bridge Name				
Structure Type				
Width (FT) - out to out				
Span Lengths (FT)				
Total Area (SF)				
Footing Type (pile/spread)				
Cost per SF. Including: Mobilization: 10% Contingency: 25%				
Total Cost For Structure	$0	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $0

TOTAL STRUCTURES ITEMS: $0

COMMENTS:

#

Estimate Prepared By: Matt Brogan (916) 381-9100 1/23/2012

(Print Name) (Phone) (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$7,790,000	3%	$9,167,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,729,000
Clearance / Demolition Alternative 1A-Enlarg	$125,000	3%	$147,000
Relocation Assistance Program	$500,000	3%	$588,000
Environmental Mitigation		0%	$0
Title and Escrow Fees	$9,000	0%	$9,000
Hazardous Waste Clean-up		0%	$0
Project Permit Fees	$50,000	0%	$50,000
SB 1210 Costs	$45,000	0%	$45,000
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$9,841,000	TOTAL ESCALATED RIGHT OF WAY	$11,640,000 11/30/2011

* - Escalated to assumed year of advertising: 12/15/2016

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at-grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 1B - L-2 Spread Diamond Interchange

ROADWAY ITEMS	$19,410,000
STRUCTURE ITEMS	$4,600,000
STORMWATER	$800,000
SUBTOTAL CONSTRUCTION	**$24,810,000**
RIGHT OF WAY & UTILITIES	$18,809,000
TOTAL PROJECT COST	**$43,619,000**

Reviewed by Program Manager R. M. Br (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	7,500	CY	$15.00	$112,500	
Imported Borrow	269,000	CY	$12.00	$3,228,000	
Clearing & Grubbing	40	AC	$3,000	$120,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$3,491,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	19,160	ton	$90	$1,724,400	
Aggregate Base (1.55')	22,850	CY	$55	$1,256,750	
				Total Structural Section	$2,981,150
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$1,000,000	$1,000,000	
				Total Drainage	$1,000,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	164,768	SY	$1	$164,768	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	7,600	LF	$30	$228,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	18,600	SF	$10	$186,000	
Minor Concrete (Curb & Gutter)	3,500	LF	$20	$70,000	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$766,268
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$175,000	$175,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	2	LS	$75,000	$150,000	
				Total Traffic Items	$3,925,000

SUBTOTAL SECTIONS 1 - 5: $12,164,168

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$12,164,168	X	10%	$1,216,417	
					TOTAL MINOR ITEMS:	$1,216,417
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417	(5-10%)			
	Sum	$13,380,585	X	10%	$1,338,058	
			TOTAL ROADWAY MOBILIZATION			$1,338,058
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417	(5-10%)			
	Sum	$13,380,585	X	10%	$1,338,058	
Contingencies						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417				
	Sum	$13,380,585		25% *	$3,345,146	
					TOTAL ROADWAY ADDITIONS	$4,683,205
					TOTAL ROADWAY ITEMS	$19,401,848
			(Total of Sections 1 - 8)			

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

				DIST - CO - RTE
				03-BUT-99
			KP:	0
			EA:	4E670
			PP No. :	0

II. STRUCTURES ITEMS

	Alt 1B			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	84.0			
Span Lengths (FT)	Span 1:141'-0" Span 2:132'-0"			
Total Area (SF)	22,932			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,600,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,600,000

0

TOTAL STRUCTURES ITEMS: $4,600,000

COMMENTS:

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$16,150,000	3%	$19,929,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$315,000	3%	$389,000
Relocation Assistance Program	$900,000	3%	$1,111,000
Environmental Mitigation			$0
Title and Escrow Fees	$12,000		$12,000
SB 1210 Costs	$60,000	0.00%	$60,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$18,809,000	TOTAL ESCALATED RIGHT OF WAY	$23,421,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 1 - L-8 interchange

ROADWAY ITEMS	$17,220,000
STRUCTURE ITEMS	$4,850,000
STORMWATER	$700,000
SUBTOTAL CONSTRUCTION	**$22,770,000**
RIGHT OF WAY & UTILITIES	$10,787,000
TOTAL PROJECT COST	**$33,557,000**

Reviewed by Program Manager R. M. B (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	8,610	CY	$15.00	$129,150	
Imported Borrow	186,000	CY	$12.00	$2,232,000	
Clearing & Grubbing	30	AC	$3,000	$90,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$2,482,400
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	18,485	ton	$90	$1,663,650	
Aggregate Base (1.55')	21,000	CY	$55	$1,155,000	
				Total Structural Section	$2,818,650
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$850,000	$850,000	
				Total Drainage	$850,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	120,720	SY	$1	$120,720	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	2,200	LF	$30	$66,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	17,060	SF	$10	$170,600	
Minor Concrete (Curb & Gutter)	3,460	LF	$20	$69,200	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$544,020
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$200,000	$200,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	4	LS	$75,000	$300,000	
				Total Traffic Items	$4,100,000

SUBTOTAL SECTIONS 1 - 5: $10,795,070

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$10,795,070	X	10%	$1,079,507	
					TOTAL MINOR ITEMS:	$1,079,507
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507	(5-10%)			
	Sum	$11,874,577	X	10%	$1,187,458	
			TOTAL ROADWAY MOBILIZATION			$1,187,458
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507	(5-10%)			
	Sum	$11,874,577	X	10%	$1,187,458	
Contingencies						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507				
	Sum	$11,874,577		25% *	$2,968,644	
					TOTAL ROADWAY ADDITIONS	$4,156,102
					TOTAL ROADWAY ITEMS	$17,218,137
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

II. STRUCTURES ITEMS	Alt 1			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	94.0			
Span Lengths (FT)	Span 1:128'-0" Span 2:130'-0"			
Total Area (SF)	24,252			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,850,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,850,000

0

TOTAL STRUCTURES ITEMS: $4,850,000

COMMENTS:

#

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$8,809,000	3%	$10,870,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$75,000	3%	$93,000
Relocation Assistance Program	$500,000	3%	$617,000
Environmental Mitigation		0%	$0
Title and Escrow Fees	$6,000		$6,000
SB 1210 Costs	$25,000	0.00%	$25,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$10,787,000	TOTAL ESCALATED RIGHT OF WAY	11/30/2011 $13,531,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at-grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 2 - L-9 interchange

ROADWAY ITEMS	$21,430,000
STRUCTURE ITEMS	$4,600,000
STORMWATER	$800,000
SUBTOTAL CONSTRUCTION	**$26,830,000**
RIGHT OF WAY & UTILITIES	$18,809,000
TOTAL PROJECT COST	**$45,639,000**

Reviewed by Program Manager R. M. B (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	7,500	CY	$15.00	$112,500	
Imported Borrow	288,000	CY	$12.00	$3,456,000	
Clearing & Grubbing	40	AC	$3,000	$120,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$3,719,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	25,150	ton	$90	$2,263,500	
Aggregate Base (1.55')	28,900	CY	$55	$1,589,500	
				Total Structural Section	$3,853,000
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$1,000,000	$1,000,000	
				Total Drainage	$1,000,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	164,768	SY	$1	$164,768	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	7,600	LF	$30	$228,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	17,800	SF	$10	$178,000	
Minor Concrete (Curb & Gutter)	3,500	LF	$20	$70,000	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$758,268
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$200,000	$200,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	4	LS	$75,000	$300,000	
				Total Traffic Items	$4,100,000

SUBTOTAL SECTIONS 1 - 5: $13,431,018

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$13,431,018	X	10%	$1,343,102	
					TOTAL MINOR ITEMS:	$1,343,102
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102	(5-10%)			
	Sum	$14,774,120	X	10%	$1,477,412	
			TOTAL ROADWAY MOBILIZATION			$1,477,412
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102	(5-10%)			
	Sum	$14,774,120	X	10%	$1,477,412	
Contingencies						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102				
	Sum	$14,774,120		25% *	$3,693,530	
					TOTAL ROADWAY ADDITIONS	$5,170,942
					TOTAL ROADWAY ITEMS	$21,422,474
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

				DIST - CO - RTE
				03-BUT-99
			KP:	0
			EA:	4E670
			PP No. :	0
II. STRUCTURES ITEMS	Alt 2			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	84.0			
Span Lengths (FT)	Span 1:141'-0" Span 2:132'-0"			
Total Area (SF)	22,932			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,600,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,600,000

0

TOTAL STRUCTURES ITEMS: $4,600,000

COMMENTS:

#

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$16,150,000	3%	$19,929,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$315,000	3%	$389,000
Relocation Assistance Program	$900,000	3%	$1,111,000
Environmental Mitigation			$0
Title and Escrow Fees	$12,000		$12,000
SB 1210 Costs	$60,000	0.00%	$60,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$18,809,000	TOTAL ESCALATED RIGHT OF WAY	11/30/2011 $23,421,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

E. RIGHT OF WAY DATA SHEETS / UTILITY INFORMATION SHEETS

July 25, 2011(rev)

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 7,790,000	3%	$ 9,186,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50 ,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,740,000
Relocation Assistance	$ 500,000	3%	$ 619,000
Clearance/Demolition	$ 125,000	3%	$ 148,000
Title and Escrow	$ 9,000		$ 9,000
SB 1210 Costs	$ 45,000		$ 45,000
Total Estimated Cost	**$ 9,841,000**		**$ 11,797,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: December 2016

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	5
A			-2	C&M Agmt		Clear/Demo	5
B			-3	Svc Contract		Const Permits	0
C	7		-4 -5	Design		Condemnation	1
D	2		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	9		-9 -5				

Area: In R/W 336,831 SF

No. of Excess Parcels 5

4. **Are there any major items of construction contract work?**
   None

5. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**
   The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, including industrial, commercial and some agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee, public service easement and temporary construction easements. The project requires the total acquisition of four parcels. There is a possibility that one additional parcel may be an uneconomic remnant resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in small amount of excess land.

6. **Is there an effect on assessed valuation?**
   No.

7. **Are utility facilities or rights of way affected?**
   Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. **Are Railroad facilities or rights of way affected?**
   The project does not impact any operating railroad facilities.

9. **Were any previously unidentified sites with hazardous waste and /or material found?**
   None evident. An ISA was completed in November 2008.

10. **Are RAP displacements required?**
    Yes. There is five business relocations required.

11. **Are material borrow and/or disposal sites required?**
    Commercial sites will be utilized.

12. **Are there any potential relinquishments and/or abandonments?**
    No

13. **Are there any existing and/or potential airspace sites?**
    No

14. **Indicate the anticipated Right of Way schedule and lead time requirements.**
    Right of way lead time should be approximately twelve to eighteen months.

15. **Is it anticipated that Caltrans staff will perform all Right of Way Work.**
    The right of way activities will be performed by consultants under contract with the City of Chico.

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: May 23, 2009 & May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

Brenda L. ~~Schmipf~~ Schimpf
District Division Chief/Regional Manager
Department of Transportation

Date: February 7, 2012

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
   Pacific Gas and Electric – gas & electric
   City - sewer
   AT & T – telecommunications
   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

Right of Way Data Sheet Premise, Assumptions, Limiting Conditions and Extra Ordinary Assumptions

Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
2. Estimate requires looking into the future and projecting the anticipated highest and best use of the properties at the time they are required for the project.
3. The estimate will be developed using appraisal principles without the depth of investigation and verification. The estimate may consider indicators of value which may not be acceptable in appraising.
4. The estimate will consider costs known as Construction Contract Work (CCW) as severance damages and included as compensation to the owner.
5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
6. When in doubt because of inadequate or marginal requirement information, a full acquisition will be assumed.

Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

July 25, 2011

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 16,150,000	3%	$ 20,414,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50 ,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,883,000
Relocation Assistance	$ 900,000	3%	$ 1,113 ,000
Clearance/Demolition	$ 315,000	3%	$ 390,000
Title and Escrow	$ 12,000		$ 12,000
SB 1210 Costs	$ 60,000		$ 60,000
Total Estimated Cost	**$ 18,809,000**		**$ 23,922,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: July 2018

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	9
A			-2	C&M Agmt		Clear/Demo	9
B			-3	Svc Contract		Const Permits	0
C	10		-4 5	Design		Condemnation	2
D	2		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	12		-9 5				

Area: In R/W 967,510 SF

No. of Excess Parcels 9

4. **Are there any major items of construction contract work?**
   None

5. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**
   The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, including industrial, commercial and some agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee, public service easement and temporary construction easements. The project requires the total acquisition of seven parcels. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in small amount of excess land.

6. **Is there an effect on assessed valuation?**
   No.

7. **Are utility facilities or rights of way affected?**
   Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. **Are Railroad facilities or rights of way affected?**
   The project does not impact any operating railroad facilities.

9. **Were any previously unidentified sites with hazardous waste and /or material found?**
   None evident. An ISA was completed in November 2008.

10. **Are RAP displacements required?**
    Yes. There is the potential for up to nine business relocations.

11. **Are material borrow and/or disposal sites required?**
    Commercial sites will be utilized.

12. **Are there any potential relinquishments and/or abandonments?**
    No

13. **Are there any existing and/or potential airspace sites?**
    No

14. **Indicate the anticipated Right of Way schedule and lead time requirements.**
    Right of way lead time should be approximately twelve to eighteen months.

15. **Is it anticipated that Caltrans staff will perform all Right of Way Work.**
    The right of way activities will be performed by consultants under contract with the City of Chico. Caltrans will provide oversight and assistance.

BENDER ROSENTHAL, INC.
COMMERCIAL VALUATION AND RIGHT OF WAY SERVICES

03-BUT-99
PM R28.8/29.9
EA: 03-4E670
SR 99/Southgate Interchange (Alt 2)

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: May 23, 2009 & May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

Brenda L. ~~Schmipf~~ Schimpf
District Division Chief/Regional Manager
Department of Transportation

Date: February 7, 2012

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
   Pacific Gas and Electric – gas & electric
   City - sewer
   AT & T – telecommunications
   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

Right of Way Data Sheet Premise, Assumptions, Limiting Conditions and Extra Ordinary Assumptions

Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
2. Estimate requires looking into the future and projecting the anticipated highest and best use of the properties at the time they are required for the project.
3. The estimate will be developed using appraisal principles without the depth of investigation and verification. The estimate may consider indicators of value which may not be acceptable in appraising.
4. The estimate will consider costs known as Construction Contract Work (CCW) as severance damages and included as compensation to the owner.
5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
6. When in doubt because of inadequate or marginal requirement information, a full acquisition will be assumed.

Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

July 25, 2011

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 8,809,000	3%	$ 10,892,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,883,000
Relocation Assistance	$ 500,000	3%	$ 619,000
Clearance/Demolition	$ 75,000	3%	$ 93,000
Title and Escrow	$ 6,000		$ 6,000
SB 1210 Costs	$ 25,000		$ 25,000
Total Estimated Cost	**$ 10,787,000**		**$ 13,568,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: July 2018

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	3
A			-2	C&M Agmt		Clear/Demo	3
B			-3	Svc Contract		Const Permits	1
C	3		-4 5	Design		Condemnation	2
D	3		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	6		-9 5				

Area: In R/W 740,546 SF

No. of Excess Parcels 3

4. Are there any major items of construction contract work?
None

5. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).
The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, primarily industrial, but also some commercial and agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee and temporary construction easements. The project requires the total acquisition of one parcel. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in excess land.

6. Is there an effect on assessed valuation?
No.

7. Are utility facilities or rights of way affected?
Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. Are Railroad facilities or rights of way affected?
The project does not impact any operating railroad facilities.

9. Were any previously unidentified sites with hazardous waste and /or material found?
None evident. An ISA was completed in November 2008.

10. Are RAP displacements required?
Yes. There is a potential for up to three business relocations required.

11. Are material borrow and/or disposal sites required?
Commercial sites will be utilized.

12. Are there any potential relinquishments and/or abandonments?
No

13. Are there any existing and/or potential airspace sites?
No

14. Indicate the anticipated Right of Way schedule and lead time requirements.
Right of way lead time should be approximately twelve to eighteen months.

15. Is it anticipated that Caltrans staff will perform all Right of Way Work.
The right of way activities will be performed by consultants under contract with City of Chico. Caltrans will provide oversight and assistance.

BENDER ROSENTHAL, INC.
COMMERCIAL VALUATION AND RIGHT OF WAY SERVICES

03-BUT-99
PM 28.8/29.9
EA: 03-4E670
SR99/Southgate Interchange (Alt 1)

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: March 29, 2010, May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

Brenda L. Schimpf
District Division Chief/Regional Manager
Department of Transportation

Date: February 7, 2012

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
   Pacific Gas and Electric – gas & electric
   City - sewer
   AT & T – telecommunications
   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

Right of Way Data Sheet Premise, Assumptions, Limiting Conditions and Extra Ordinary Assumptions

Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
2. Estimate requires looking into the future and projecting the anticipated highest and best use of the properties at the time they are required for the project.
3. The estimate will be developed using appraisal principles without the depth of investigation and verification. The estimate may consider indicators of value which may not be acceptable in appraising.
4. The estimate will consider costs known as Construction Contract Work (CCW) as severance damages and included as compensation to the owner.
5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
6. When in doubt because of inadequate or marginal requirement information, a full acquisition will be assumed.

Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

ROW EXHIBIT - ALT 1
SR 99/SOUTHGATE INTERCHANGE

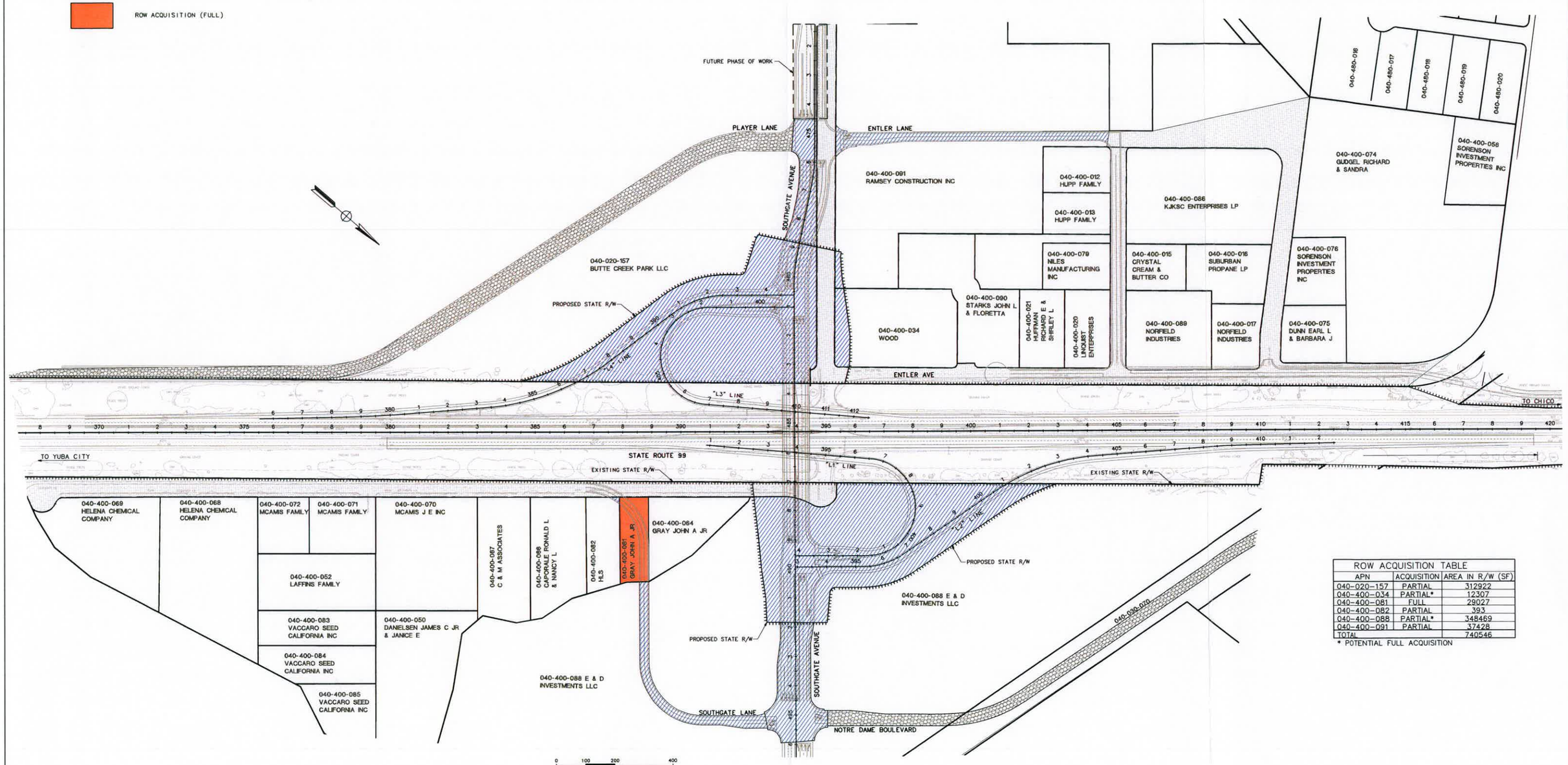
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY MH	APPROVED ON	JOB NO. 57-0253	SHEET NO. 1
CKD. BY MB	BY	FILE NO.	OF
DATE 6/13/2011	RCE NO.		3
SCALE 1"=100'			

LEGEND

- EXISTING CITY ROW
- DEDICATED CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	312922
040-400-034	PARTIAL*	12307
040-400-081	FULL	29027
040-400-082	PARTIAL	393
040-400-088	PARTIAL*	348469
040-400-091	PARTIAL	37428
TOTAL		740546

* POTENTIAL FULL ACQUISITION

ROW EXHIBIT - ALT 2
SR 99/SOUTHGATE INTERCHANGE

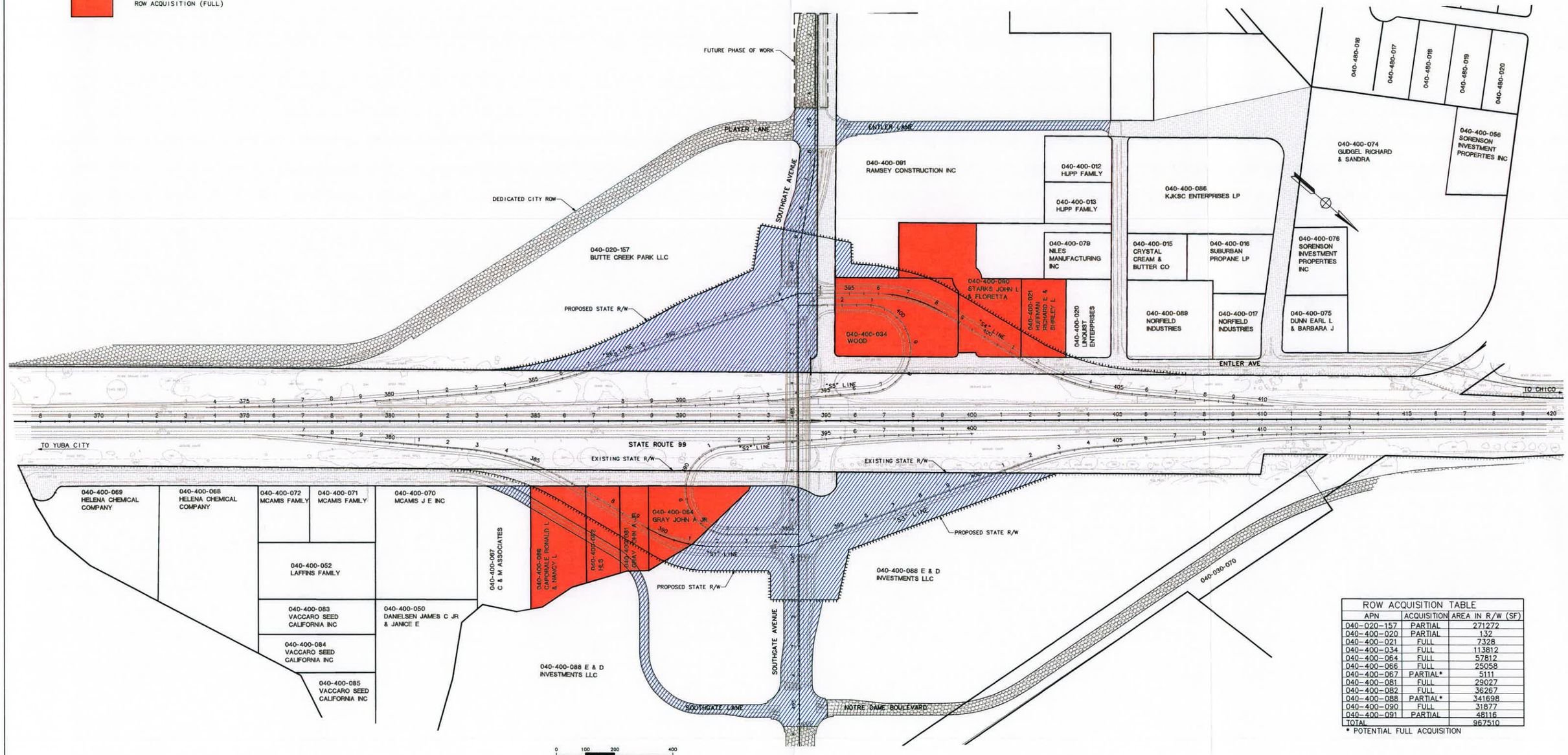
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY MH	APPROVED ON		JOB NO. 57-0253	SHEET NO. 2
CKD. BY MB	BY		FILE NO.	OF
DATE 6/13/2011	RCE NO.			3
SCALE 1"=100'				

LEGEND

- EXISTING CITY ROW
- DEDICATED CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	271272
040-400-020	PARTIAL	132
040-400-021	FULL	7328
040-400-034	FULL	113812
040-400-064	FULL	57812
040-400-066	FULL	25058
040-400-067	PARTIAL*	5111
040-400-081	FULL	29027
040-400-082	FULL	36267
040-400-088	PARTIAL*	341698
040-400-090	FULL	31877
040-400-091	PARTIAL	48116
TOTAL		967510

* POTENTIAL FULL ACQUISITION

A. LOCATION MAP

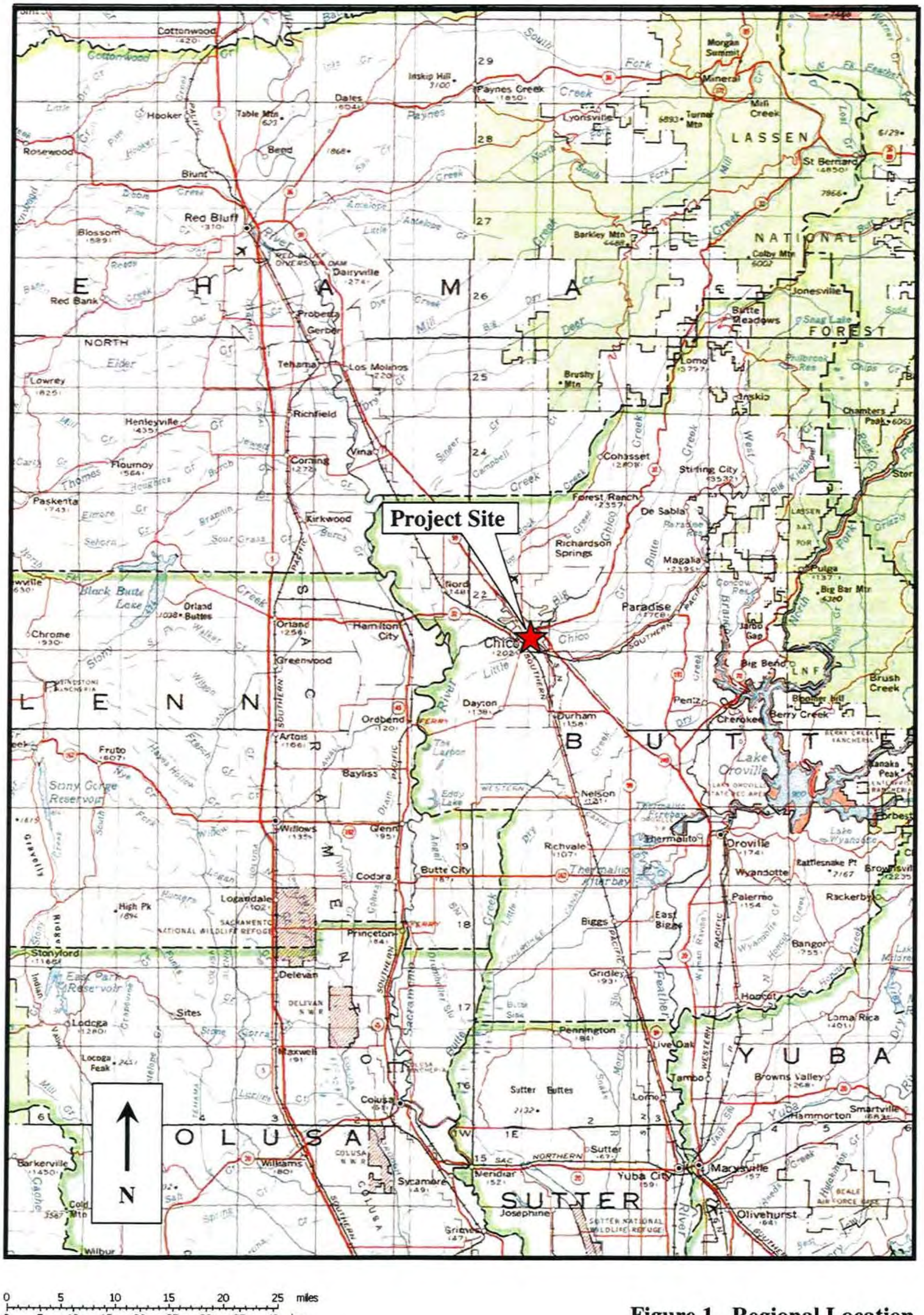
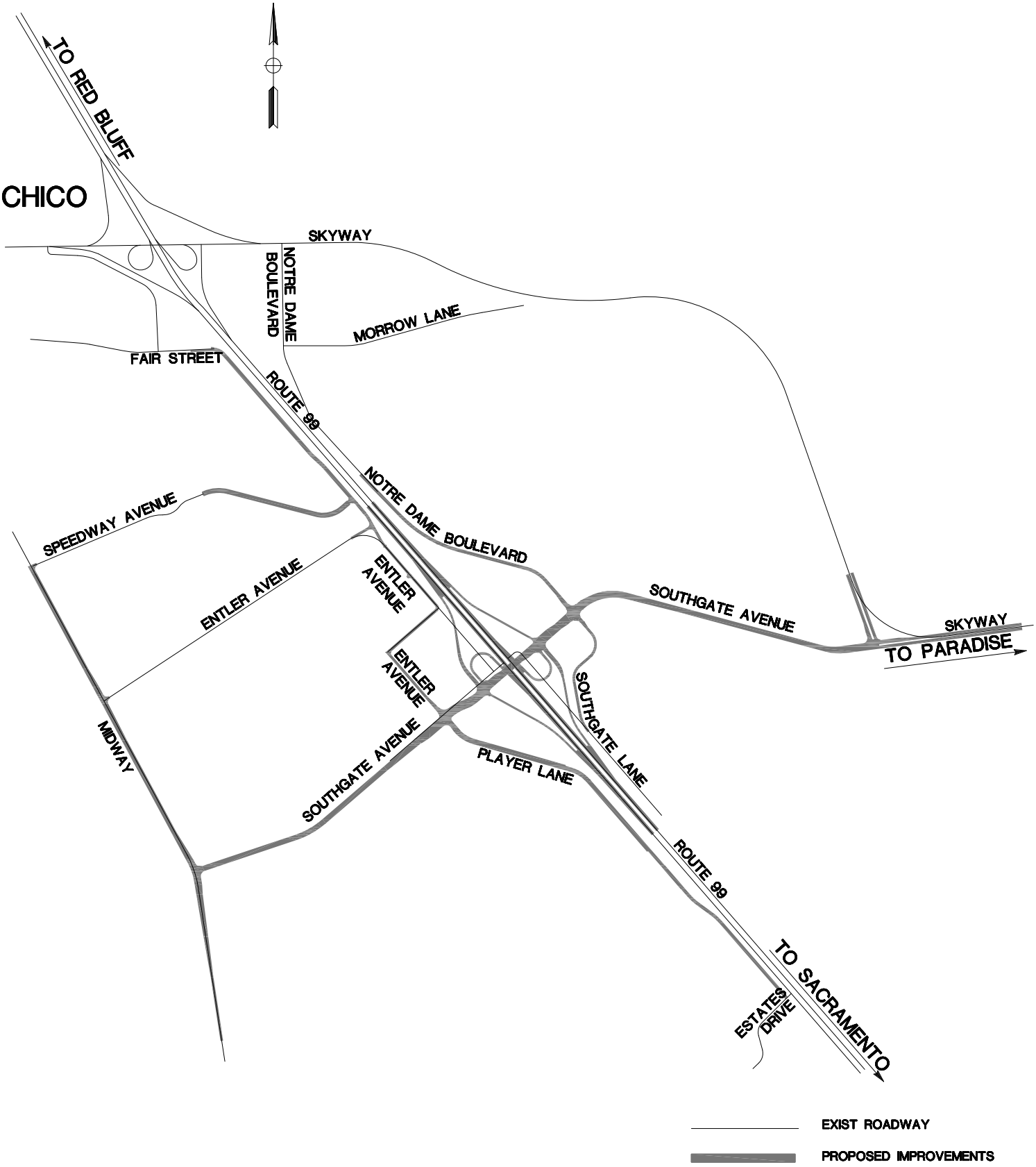


Figure 1. Regional Location

Location Map

No Scale



B. PROJECT GEOMETRICS

PRELIMINARY GEOMETRICS - ALTERNATIVE 1
SR 99/SOUTHGATE INTERCHANGE

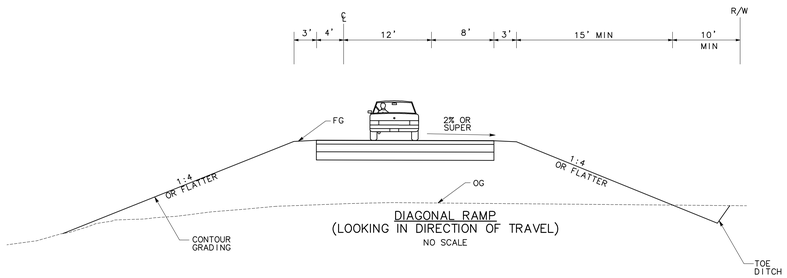
03-BUT-99 PM 28.8/29.9 EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JWW	APPROVED ON		JOB NO. 57-0253	SHEET NO. 1 OF 3
CKD. BY MB	BY			
DATE 1/20/11	RCE NO.		FILE NO.	
SCALE 1"=100'				

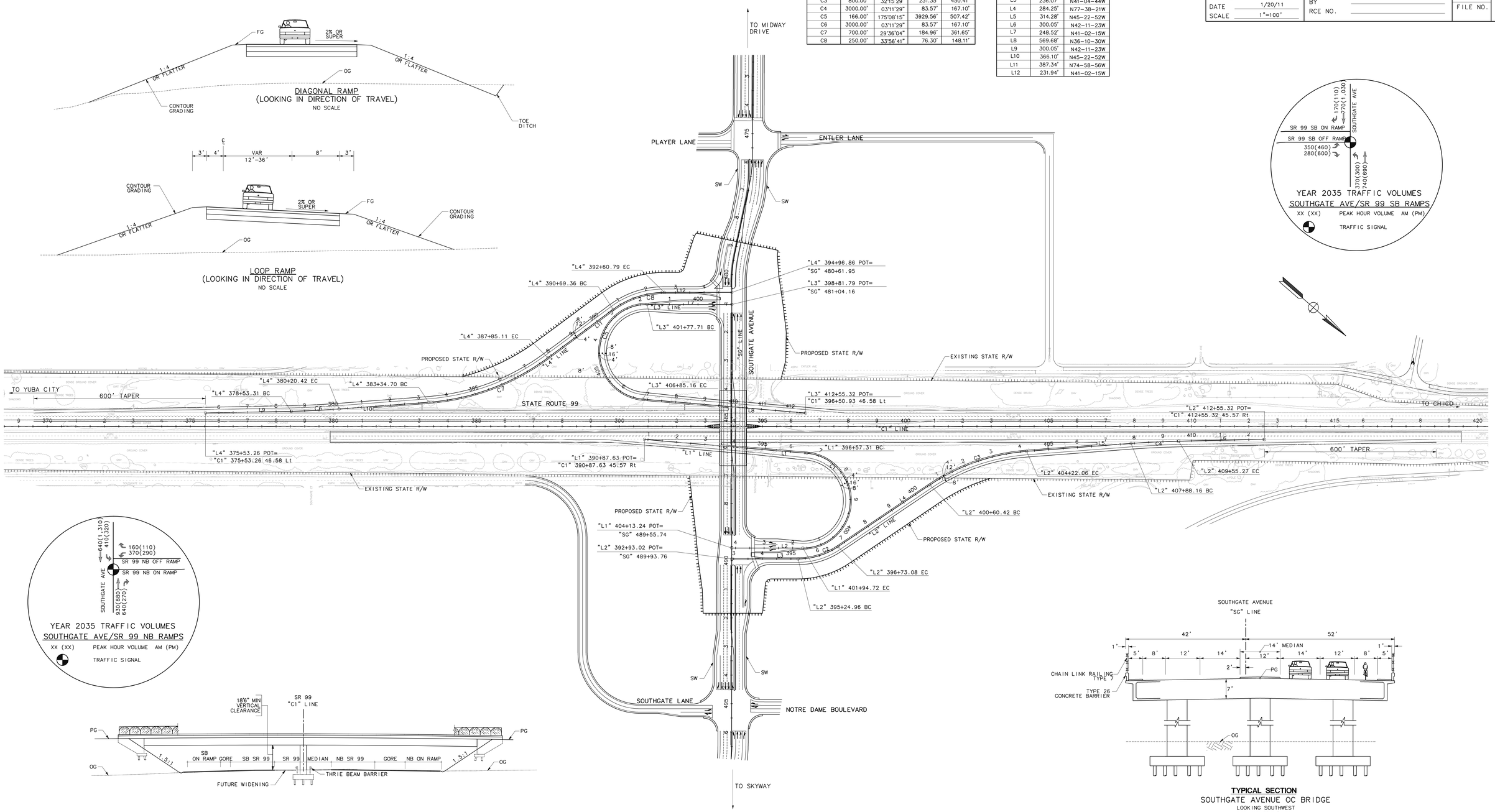
CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	166.00'	175°08'56"	3918.96'	507.45'
C2	300.00'	33°33'37"	99.10'	191.43'
C3	800.00'	32°15'29"	231.35'	450.41'
C4	3000.00'	03°11'29"	83.57'	167.10'
C5	166.00'	175°08'15"	3929.56'	507.42'
C6	3000.00'	03°11'29"	83.57'	167.10'
C7	700.00'	29°36'04"	184.96'	361.65'
C8	250.00'	33°56'41"	76.30'	148.11'

LINE TABLE		
CURVE	LENGTH	BEARING
L1	570.16'	N36-10-30W
L2	295.92'	N41-01-34W
L3	236.07'	N41-04-44W
L4	284.25'	N77-38-21W
L5	314.28'	N45-22-52W
L6	300.05'	N42-11-23W
L7	248.52'	N41-02-15W
L8	569.68'	N36-10-30W
L9	300.05'	N42-11-23W
L10	366.10'	N45-22-52W
L11	387.34'	N74-58-56W
L12	231.94'	N41-02-15W



DIAGONAL RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

LOOP RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE



LONGITUDINAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING NORTHWEST
NO SCALE

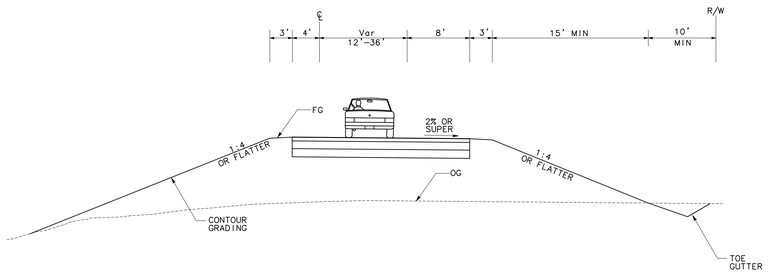
TYPICAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING SOUTHWEST
NO SCALE

PRELIMINARY GEOMETRICS - ALTERNATIVE 2
SR 99/SOUTHGATE INTERCHANGE

03-BUT-99 PM 28.8/29.9 EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JWW	APPROVED ON	JOB NO. 57-0253	SHEET NO. 2
CKD. BY MB	BY	FILE NO.	OF
DATE 1/20/11	RCE NO.		3
SCALE 1"=100'			

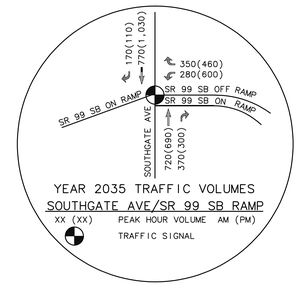


DIAGONAL RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

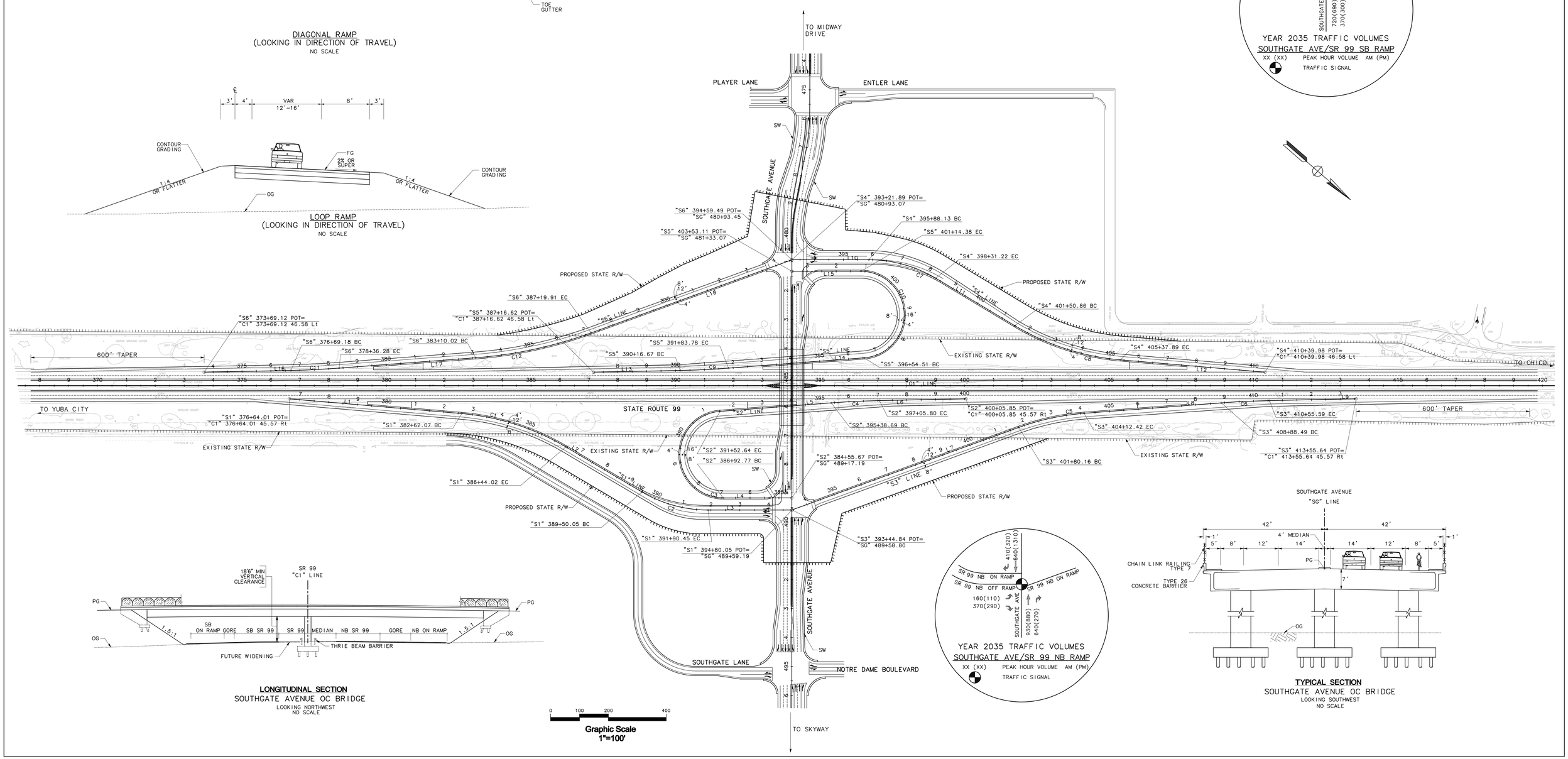
LOOP RAMP
(LOOKING IN DIRECTION OF TRAVEL)
NO SCALE

LINE TABLE		
LINE	LENGTH	BEARING
L1	598.06'	N36°10'30"W
L2	306.03'	N10°23'44"W
L3	289.60'	N41°02'15"W
L4	237.40'	S41°02'15"E
L5	386.05'	N45°22'52"W
L6	300.05'	N42°11'23"W
L7	835.32'	N61°02'15"W
L8	476.06'	N45°22'52"W
L9	300.05'	N42°11'23"W
L10	266.24	N41°02'15"W
L11	319.64'	N10°05'10"W
L12	502.08'	N36°10'30"W
L13	300.05'	N42°11'23"W
L14	470.74'	N45°22'52"W
L15	238.73'	S41°02'15"E
L16	300.06'	N42°11'23"W
L17	473.74'	N45°22'52"W
L18	739.58'	N61°02'16"W

CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	850.00'	25°44'16"	194.25'	381.95'
C2	450.00'	30°36'31"	123.14'	240.40'
C3	150.00'	175°39'23"	3955.47'	459.87'
C4	3000.00'	03°11'29"	83.57'	167.10'
C5	850.00'	15°39'23"	116.86'	232.27'
C6	3000.00'	03°11'29"	83.57'	167.10'
C7	450.00'	30°57'05"	124.59'	243.09'
C8	850.00'	26°05'20"	196.93'	387.09'
C9	3000.00'	03°11'29"	83.57'	167.10'
C10	150.00'	175°39'23"	3955.45'	459.87'
C11	3000.00'	03°11'29"	83.57'	167.10'
C12	1500.00'	15°39'24"	206.23'	409.89'



YEAR 2035 TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99 SB RAMP
XX (XX) PEAK HOUR VOLUME AM (PM)
TRAFFIC SIGNAL



LONGITUDINAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING NORTHWEST
NO SCALE

YEAR 2035 TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99 NB RAMP
XX (XX) PEAK HOUR VOLUME AM (PM)
TRAFFIC SIGNAL

TYPICAL SECTION
SOUTHGATE AVENUE OC BRIDGE
LOOKING SOUTHWEST
NO SCALE

PRELIMINARY GEOMETRICS - ALTERNATIVE 1A
SR 99/SOUTHGATE INTERCHANGE

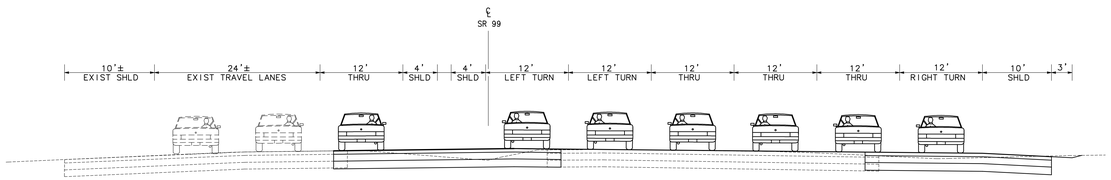
03-BUT-99 PM 28.8/29.9 EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JWW	APPROVED ON	JOB NO. 57-0253	SHEET NO. 3
CKD. BY MB	BY	FILE NO.	OF 3
DATE 1/20/11	RCE NO.		
SCALE 1"=100'			

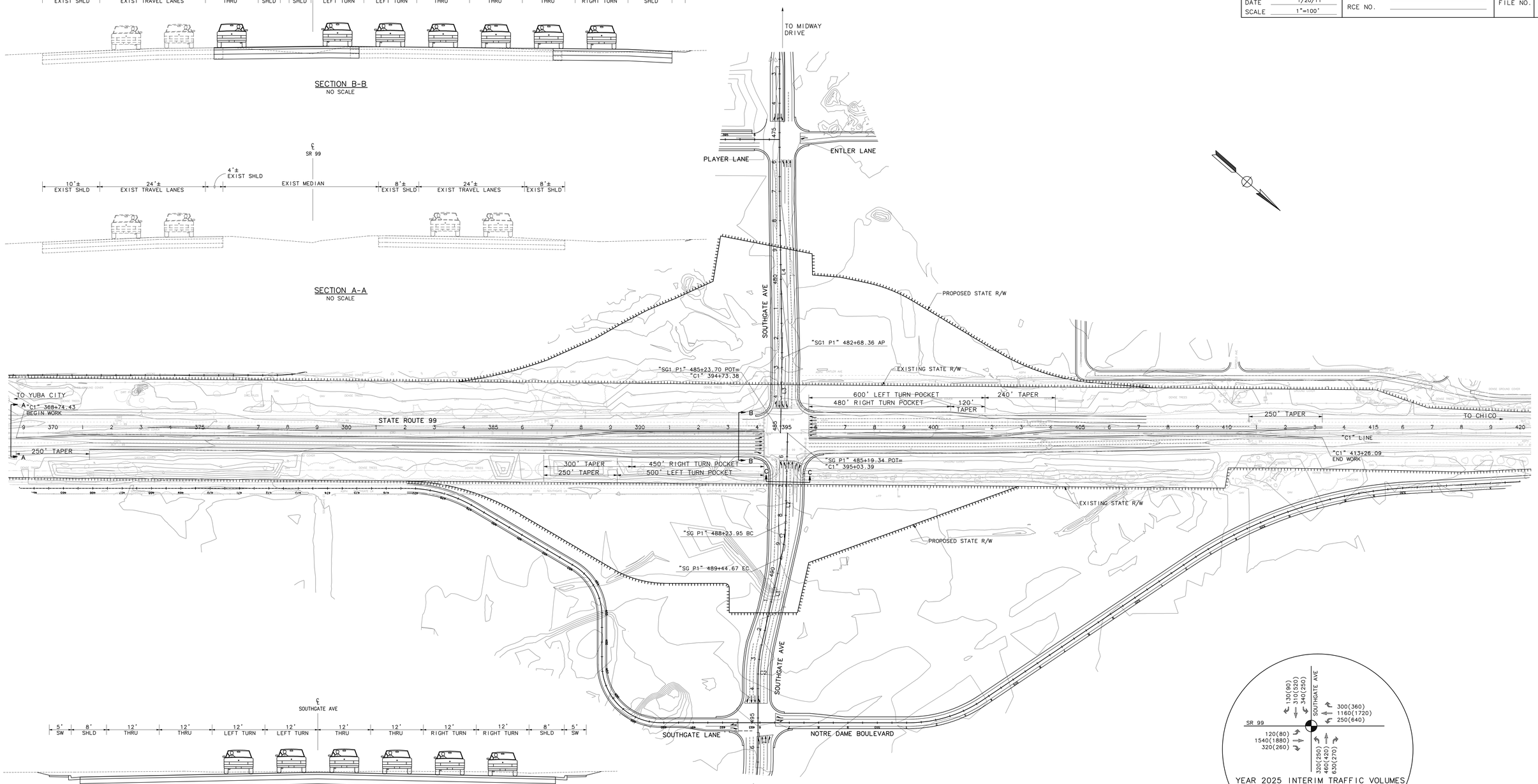
CURVE TABLE				
CURVE	RADIUS	DELTA	TANGENT	LENGTH
C1	600.00'	11°31'38"	60.56'	120.71'
C2	600.00'	12°44'21"	66.98	133.40'

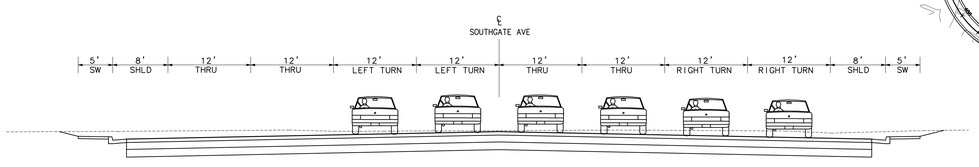
LINE TABLE		
LINE	LENGTH	BEARING
L1	293.65'	N61°42'06"E
L2	304.61'	N50°10'28"E
L3	255.34'	N50°10'28"E
L4	582.51'	N48°07'39"E



SECTION B-B
NO SCALE

SECTION A-A
NO SCALE





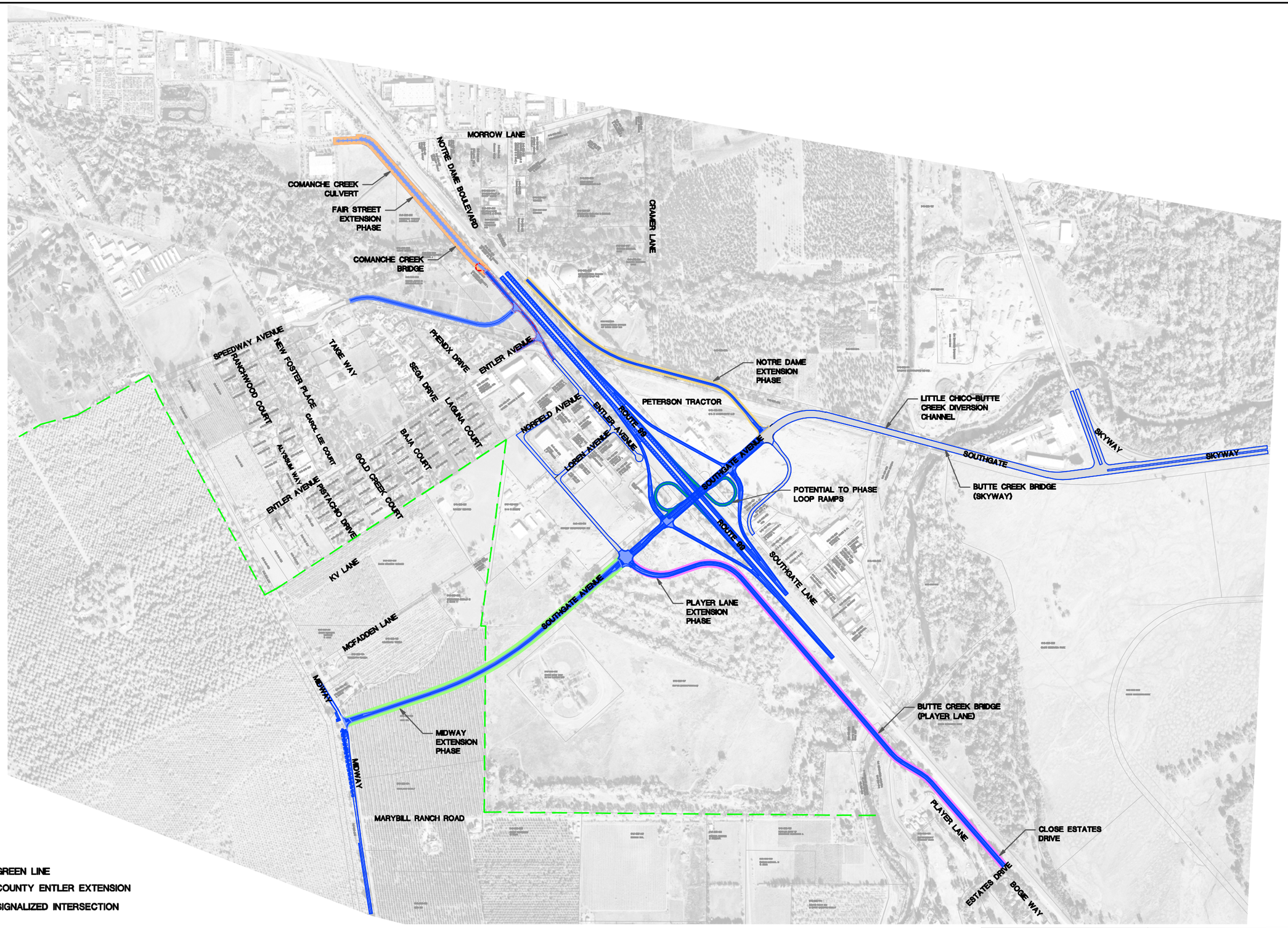
SECTION C-C
NO SCALE

YEAR 2025 INTERIM TRAFFIC VOLUMES
SOUTHGATE AVE/SR 99

XX (XX) PEAK HOUR VOLUME AM (PM)

TRAFFIC SIGNAL

0 100 200 400
Graphic Scale
1"=100'



MARK THOMAS & COMPANY, INC.
Providing Engineering, Surveying and Planning Services

CITY of CHICO
INC. 1872

PROPOSED CORRIDOR IMPROVEMENTS PHASING

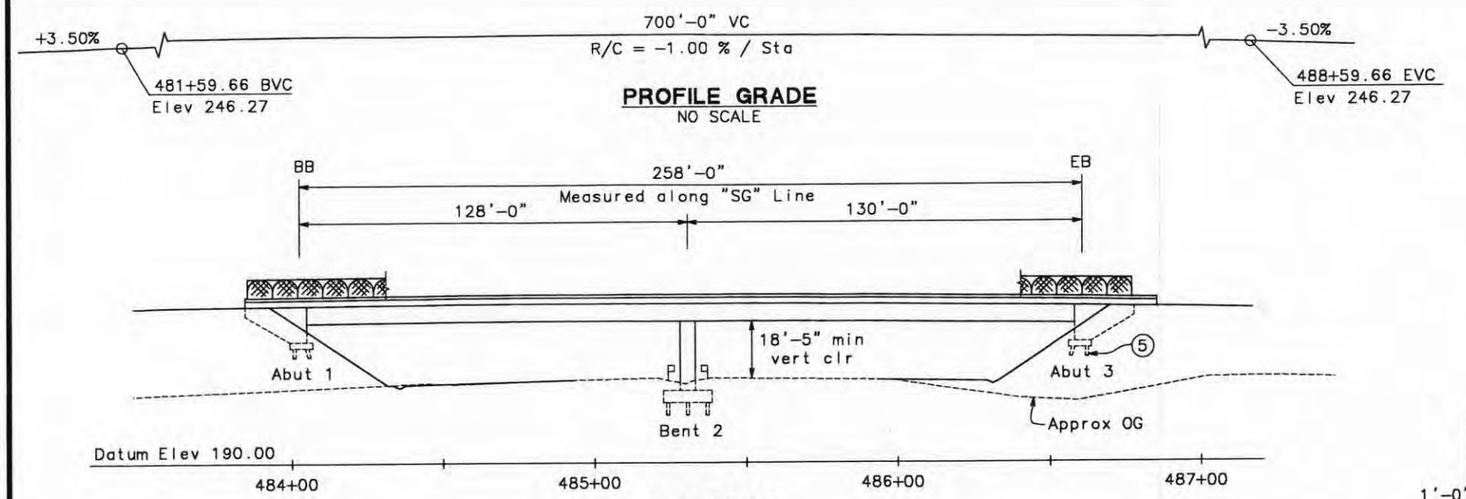
SCALE:1"=1000'

C. STRUCTURES ADVANCE PLANNING STUDY

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
03	BUT	99	R28.8/29.9

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD., STE 203
SACRAMENTO, CA 95826

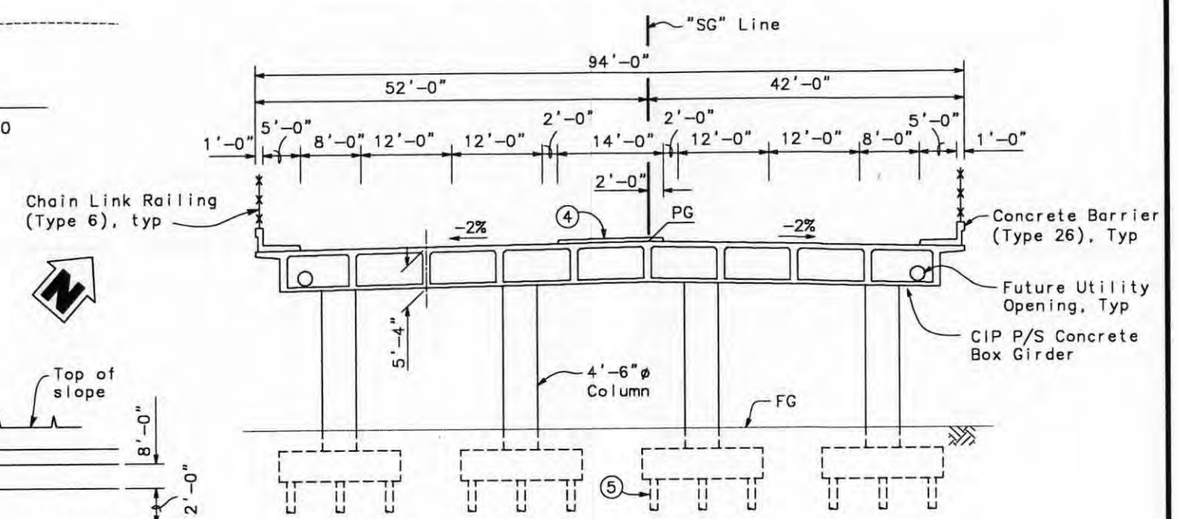
PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



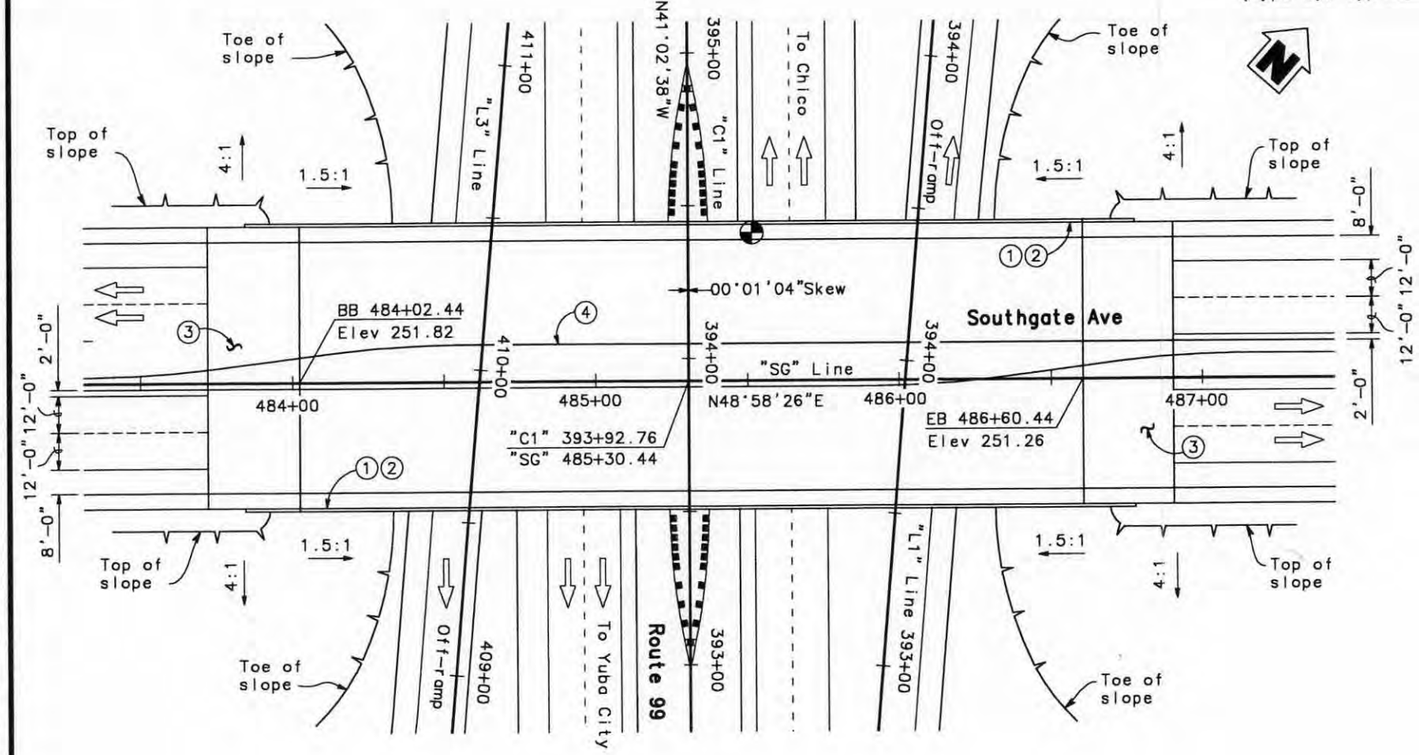
VEHICULAR TRAFFIC
1. ✓ New alignment.
2. ___ Traffic will be detoured away from the site.
3. ___ Traffic will be carried on the structure. Stage construction will not be required.
4. ✓ Traffic will pass under the structure on State Route 99
   A. ___ No falsework allowed over traffic.
   B. 2 Falsework opening(s) required:

	Temporary Vertical Clearance	Width of Traffic Opening
N Bnd.	15'-0"	61'-0"
S Bnd.	15'-0"	49'-0"

   C. ___ Temporary traffic lane reduction needed for footing excavation.



TYPICAL SECTION
1" = 10'



PLAN
1" = 50'

NOTES

1. Paint "BR. NO. 12-XXXX"
2. Paint "Southgate Ave OC"
3. Structure Approach Slab Type N(30S)
4. 14'-0" Max & varies Raised Median
5. Assumed Driven Piles

Indicates Point of Minimum Vertical Clearance

Date of Estimate	=	June 2011
Str Depth	=	5'-4"
Length	=	258'-0"
Width	=	94'-0"
Area	=	24,252 ft²
Cost/ft² including 10% Mobilization 25% Contingency	=	$200 / ft²
Total Cost	=	$4,850,000

DESIGNED BY	T. Pham	DATE	04/08/10
DRAWN BY	G. Boyko	DATE	04/08/10
CHECKED BY	J. Passalacqua	DATE	04/08/10
APPROVED	Eric Fredrickson	DATE	6-16-11

J. Passalacqua
PROJECT ENGINEER

PLANNING STUDY (Alt 1)
SOUTHGATE AVE OVERCROSSING

BRIDGE NO.	12-0NEW	CU	03
SCALE:	AS NOTED	EA	4E670K

TIME PLOTTED => $TIME
DATE PLOTTED =>
USERNAME => $USER

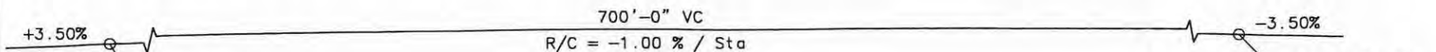
FILE => $REQUEST

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 5/9/00)

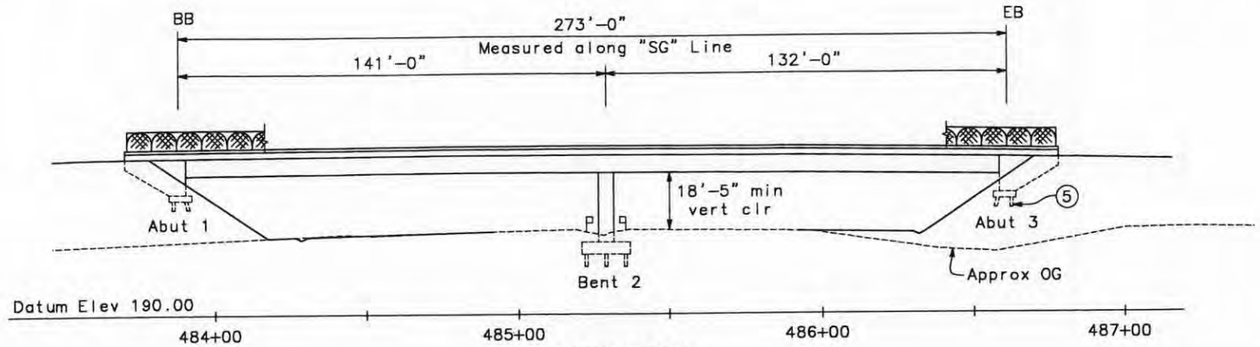
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
03	BUT	99	R28.8/29.9

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD., STE 203
SACRAMENTO, CA 95826

PREPARED FOR THE STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



PROFILE GRADE
NO SCALE



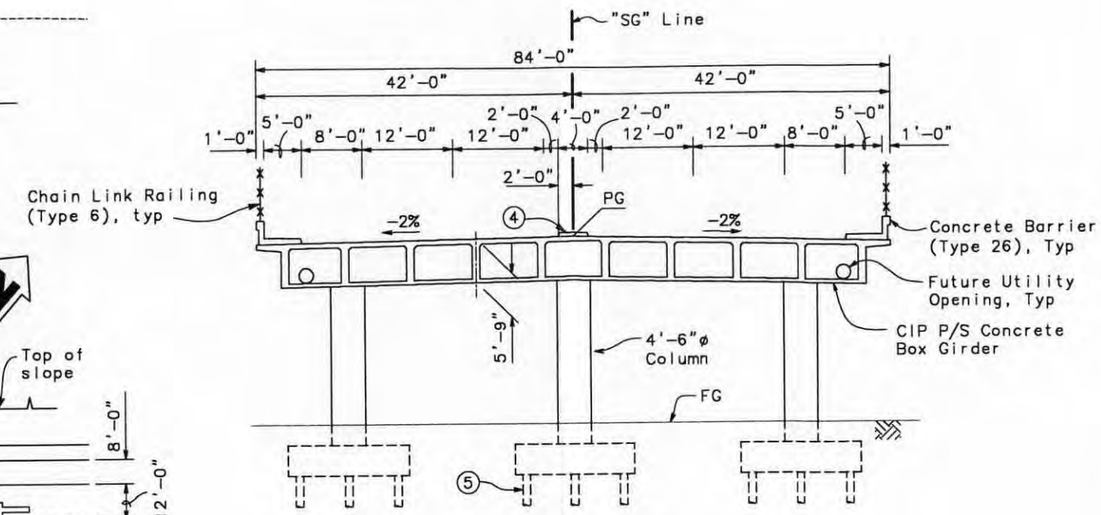
ELEVATION
1" = 50'

VEHICULAR TRAFFIC
1. ✓ New alignment.
2. ___ Traffic will be detoured away from the site.
3. ___ Traffic will be carried on the structure. Stage construction will not be required.
4. ✓ Traffic will pass under the structure on State Route 99

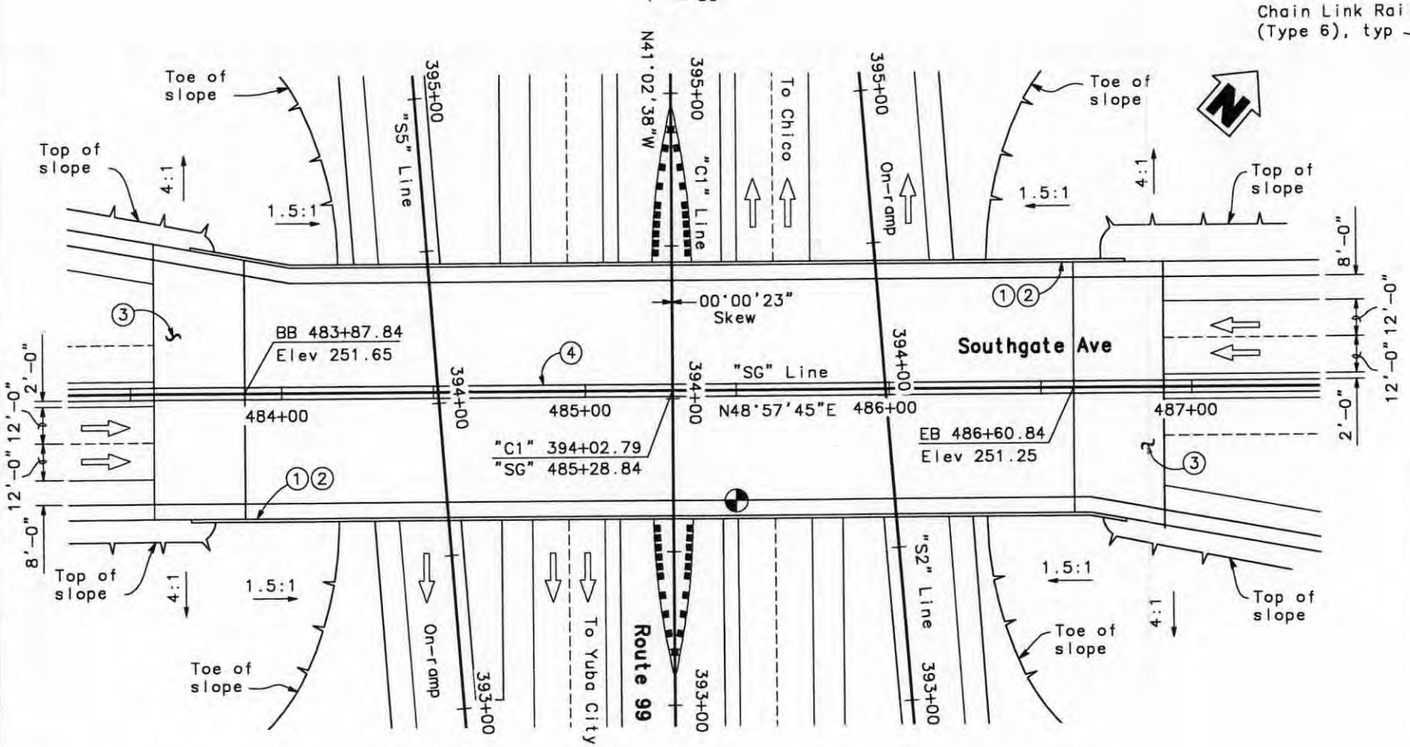
A. ___ No falsework allowed over traffic.
B. 2 Falsework opening(s) required:

	Temporary Vertical Clearance	Width of Traffic Opening
N Bnd.	15'-0"	61'-0"
S Bnd.	15'-0"	49'-0"

C. ___ Temporary traffic lane reduction needed for footing excavation.



TYPICAL SECTION
1" = 20'



PLAN
1" = 50'

NOTES

1. Paint "BR. NO. 12-XXXX"
2. Paint "Southgate Ave OC"
3. Structure Approach Slab Type N(30S)
4. 4'-0" Raised Median
5. Assumed Driven Piles

Indicates Point of Minimum Vertical Clearance

Date of Estimate	=	June 2011
Str Depth	=	5'-9"
Length	=	273'-0"
Width	=	84'-0"
Area	=	22,932 ft^2
Cost/ft^2 including 10% Mobilization 25% Contingency	=	\$200 / ft^2
Total Cost	=	\$4,600,000

DESIGNED BY T. Pham	DATE 04/08/10	J. Passalacqua PROJECT ENGINEER	PLANNING STUDY (Alt 2)
DRAWN BY G. Boyko	DATE 04/08/10		SOUTHGATE AVE OVERCROSSING
CHECKED BY J. Passalacqua	DATE 04/08/10		BRIDGE NO. 12-0NEW / CU 03
APPROVED Eric Fredrickson	DATE 6-16-11		SCALE: AS NOTED / EA 4E670K

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => TIME PLOTTED => $TIME

ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 5/9/00)

D. PROJECT COST ESTIMATES

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) Temporary at-grade I/S, within SR99/Southgate Lane interchange limits

Alternative: Alternative 1A-Enlarged At-grade Intersection

ROADWAY ITEMS	$4,000,000
STRUCTURE ITEMS	$0
SUBTOTAL CONSTRUCTION	**$4,000,000**
STORMWATER	$200,000
RIGHT OF WAY & UTILITIES	$9,841,000
TOTAL PROJECT COST	**$14,041,000**

Reviewed by Program Manager	R. M. B		1/23/12
	(Signature)		(Date)
Approved by Project Manager	Matt Brogan	(916) 381-9100	1/23/2012
	(Signature)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	18,350	CY	$15.00	$275,250	
Imported Borrow	0	CY	$12.00	$0	
Clearing & Grubbing	20	AC	$3,000	$60,000	
Remove Trees	10	EA	$250	$2,500	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$347,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	9,360	ton	$90	$842,400	
Aggregate Base (1.55')	13,870	CY	$55	$762,850	
				Total Structural Section	$1,605,250
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$100,000	$100,000	
				Total Drainage	$100,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Landscaping	0	SF	$10.00	$0	
Minor Concrete (Sidewalk)	15,300	SF	$10	$153,000	
Minor Concrete (Curb & Gutter)	4,900	LF	$20	$98,000	
				Total Specialty Items	$251,000
Section 5 - Traffic Items					
Traffic Signals - New	2	EA	$300,000	$600,000	
Traffic Signal - Modification	1	EA	$200,000	$200,000	
Permanent Signing & Striping	1	LS	$70,000	$70,000	
Traffic Management Plan	1	LS	$20,000	$20,000	
				Total Traffic Items	$890,000

SUBTOTAL SECTIONS 1 - 5: $3,194,000

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$3,194,000	X	0%	$0	
					TOTAL MINOR ITEMS:	$0
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items			(5-10%)			
	Sum	$3,194,000	X	0%	$0	
			TOTAL ROADWAY MOBILIZATION			$0
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items		$0	(5-10%)			
	Sum	$3,194,000	X	0%	$0	
Contingencies						
Subtotal Sections 1 - 5		$3,194,000				
Minor Items		$0				
	Sum	$3,194,000	X	25% *	$798,500	
					TOTAL ROADWAY ADDITIONS	$798,500
					TOTAL ROADWAY ITEMS	$3,992,500
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

II. STRUCTURES ITEMS

Bridge Name				
Structure Type				
Width (FT) - out to out				
Span Lengths (FT)				
Total Area (SF)				
Footing Type (pile/spread)				
Cost per SF. Including: Mobilization: 10% Contingency: 25%				
Total Cost For Structure	$0	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $0

TOTAL STRUCTURES ITEMS: $0

COMMENTS:

#

Estimate Prepared By: Matt Brogan (916) 381-9100 1/23/2012

(Print Name) (Phone) (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$7,790,000	3%	$9,167,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,729,000
Clearance / Demolition Alternative 1A-Enlarg	$125,000	3%	$147,000
Relocation Assistance Program	$500,000	3%	$588,000
Environmental Mitigation		0%	$0
Title and Escrow Fees	$9,000	0%	$9,000
Hazardous Waste Clean-up		0%	$0
Project Permit Fees	$50,000	0%	$50,000
SB 1210 Costs	$45,000	0%	$45,000
TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$9,841,000	TOTAL ESCALATED RIGHT OF WAY	$11,640,000 11/30/2011

* - Escalated to assumed year of advertising: 12/15/2016

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at-grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 1B - L-2 Spread Diamond Interchange

ROADWAY ITEMS	$19,410,000
STRUCTURE ITEMS	$4,600,000
STORMWATER	$800,000
SUBTOTAL CONSTRUCTION	**$24,810,000**
RIGHT OF WAY & UTILITIES	$18,809,000
TOTAL PROJECT COST	**$43,619,000**

Reviewed by Program Manager R. M. Br (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	7,500	CY	$15.00	$112,500	
Imported Borrow	269,000	CY	$12.00	$3,228,000	
Clearing & Grubbing	40	AC	$3,000	$120,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$3,491,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	19,160	ton	$90	$1,724,400	
Aggregate Base (1.55')	22,850	CY	$55	$1,256,750	
				Total Structural Section	$2,981,150
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$1,000,000	$1,000,000	
				Total Drainage	$1,000,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	164,768	SY	$1	$164,768	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	7,600	LF	$30	$228,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	18,600	SF	$10	$186,000	
Minor Concrete (Curb & Gutter)	3,500	LF	$20	$70,000	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$766,268
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$175,000	$175,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	2	LS	$75,000	$150,000	
				Total Traffic Items	$3,925,000

SUBTOTAL SECTIONS 1 - 5: $12,164,168

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$12,164,168	X	10%	$1,216,417	
					TOTAL MINOR ITEMS:	$1,216,417
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417	(5-10%)			
	Sum	$13,380,585	X	10%	$1,338,058	
			TOTAL ROADWAY MOBILIZATION			$1,338,058
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417	(5-10%)			
	Sum	$13,380,585	X	10%	$1,338,058	
Contingencies						
Subtotal Sections 1 - 5		$12,164,168				
Minor Items		$1,216,417				
	Sum	$13,380,585		25% *	$3,345,146	
					TOTAL ROADWAY ADDITIONS	$4,683,205
					TOTAL ROADWAY ITEMS	$19,401,848
			(Total of Sections 1 - 8)			

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

				DIST - CO - RTE
				03-BUT-99
			KP:	0
			EA:	4E670
			PP No. :	0

II. STRUCTURES ITEMS

	Alt 1B			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	84.0			
Span Lengths (FT)	Span 1:141'-0" Span 2:132'-0"			
Total Area (SF)	22,932			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,600,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,600,000

0

TOTAL STRUCTURES ITEMS: $4,600,000

COMMENTS:

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$16,150,000	3%	$19,929,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$315,000	3%	$389,000
Relocation Assistance Program	$900,000	3%	$1,111,000
Environmental Mitigation			$0
Title and Escrow Fees	$12,000		$12,000
SB 1210 Costs	$60,000	0.00%	$60,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$18,809,000	TOTAL ESCALATED RIGHT OF WAY	$23,421,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 1 - L-8 interchange

ROADWAY ITEMS	$17,220,000
STRUCTURE ITEMS	$4,850,000
STORMWATER	$700,000
SUBTOTAL CONSTRUCTION	**$22,770,000**
RIGHT OF WAY & UTILITIES	$10,787,000
TOTAL PROJECT COST	**$33,557,000**

Reviewed by Program Manager R. M. B (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	8,610	CY	$15.00	$129,150	
Imported Borrow	186,000	CY	$12.00	$2,232,000	
Clearing & Grubbing	30	AC	$3,000	$90,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$2,482,400
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	18,485	ton	$90	$1,663,650	
Aggregate Base (1.55')	21,000	CY	$55	$1,155,000	
				Total Structural Section	$2,818,650
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$850,000	$850,000	
				Total Drainage	$850,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	120,720	SY	$1	$120,720	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	2,200	LF	$30	$66,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	17,060	SF	$10	$170,600	
Minor Concrete (Curb & Gutter)	3,460	LF	$20	$69,200	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$544,020
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$200,000	$200,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	4	LS	$75,000	$300,000	
				Total Traffic Items	$4,100,000

SUBTOTAL SECTIONS 1 - 5: $10,795,070

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$10,795,070	X	10%	$1,079,507	
					TOTAL MINOR ITEMS:	$1,079,507
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507	(5-10%)			
	Sum	$11,874,577	X	10%	$1,187,458	
			TOTAL ROADWAY MOBILIZATION			$1,187,458
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507	(5-10%)			
	Sum	$11,874,577	X	10%	$1,187,458	
Contingencies						
Subtotal Sections 1 - 5		$10,795,070				
Minor Items		$1,079,507				
	Sum	$11,874,577		25% *	$2,968,644	
					TOTAL ROADWAY ADDITIONS	$4,156,102
					TOTAL ROADWAY ITEMS	$17,218,137
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

II. STRUCTURES ITEMS	Alt 1			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	94.0			
Span Lengths (FT)	Span 1:128'-0" Span 2:130'-0"			
Total Area (SF)	24,252			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,850,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,850,000

0

TOTAL STRUCTURES ITEMS: $4,850,000

COMMENTS:

#

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$8,809,000	3%	$10,870,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$75,000	3%	$93,000
Relocation Assistance Program	$500,000	3%	$617,000
Environmental Mitigation		0%	$0
Title and Escrow Fees	$6,000		$6,000
SB 1210 Costs	$25,000	0.00%	$25,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$10,787,000	TOTAL ESCALATED RIGHT OF WAY	11/30/2011 $13,531,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE 03-BUT-99
Type of Estimate (Pre-PSR, PSR, PR, etc.): PSR/PR
Program Code:
PM:
EA: 4E670
PP No. :

Project Description:

Limits: On State Route 99 at Southgate Avenue in the City of Chico

Proposed Improvement: (Scope) This project proposes to replace the at-grade intersection at SR99/Southgate Ave and construct an interchange. Roadway improvements supporting the interchange include Southgate Lane and Entler Lane connections

Alternative: Alternative 2 - L-9 interchange

ROADWAY ITEMS	$21,430,000
STRUCTURE ITEMS	$4,600,000
STORMWATER	$800,000
SUBTOTAL CONSTRUCTION	**$26,830,000**
RIGHT OF WAY & UTILITIES	$18,809,000
TOTAL PROJECT COST	**$45,639,000**

Reviewed by Program Manager R. M. B (Signature) 1/23/12 (Date)

Approved by Project Manager Matt Brogan (Signature) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
Pkm	0
EA:	4E670
PP No. :	0

I. ROADWAY ITEMS

	Quantity	Unit	Unit Cost	Section Cost	
Section 1 - Earthwork					
Roadway Excavation	7,500	CY	$15.00	$112,500	
Imported Borrow	288,000	CY	$12.00	$3,456,000	
Clearing & Grubbing	40	AC	$3,000	$120,000	
Remove Trees	85	EA	$250	$21,250	
Develop Water Supply	1	LS	$10,000	$10,000	
				Total Earthwork	$3,719,750
Section 2 - Structural Section *					
Asphalt Concrete (0.50')	25,150	ton	$90	$2,263,500	
Aggregate Base (1.55')	28,900	CY	$55	$1,589,500	
				Total Structural Section	$3,853,000
Section 3 - Drainage					
Small Drainage Facilities	1	LS	$1,000,000	$1,000,000	
				Total Drainage	$1,000,000

* Attach sketch showing typical structural section elements of the roadway.
Include (if available) T.I., R-Value, and date when tests were performed

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	

	Quantity	Unit	Unit Cost	Section Cost	
Section 4 - Specialty Items					
Retaining Walls	0	SF	$70	$0	
Slope Protection	164,768	SY	$1	$164,768	
Landscaping	0	SF	$10.00	$0	
Barriers and Guardrails	7,600	LF	$30	$228,000	
Terminal System Type (SRT)	7	EA	$2,500	$17,500	
Minor Concrete (Sidewalk)	17,800	SF	$10	$178,000	
Minor Concrete (Curb & Gutter)	3,500	LF	$20	$70,000	
Chain Link Fence	5,000	LF	$20.00	$100,000	
				Total Specialty Items	$758,268
Section 5 - Traffic Items					
Lighting	1	LS	$400,000	$400,000	
Traffic Signals - New	4	EA	$300,000	$1,200,000	
Traffic Signal Modification	0	EA	$150,000	$0	
Permanent Signing & Striping	1	LS	$200,000	$200,000	
Overhead Signs	10	EA	$150,000	$1,500,000	
Traffic Management Plan	1	LS	$500,000	$500,000	
Ramp Metering	4	LS	$75,000	$300,000	
				Total Traffic Items	$4,100,000

SUBTOTAL SECTIONS 1 - 5: $13,431,018

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

DIST - CO - RTE	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

Section 6 - Minor Items			(5-10%)			
Subtotal Sections 1 - 5		$13,431,018	X	10%	$1,343,102	
					TOTAL MINOR ITEMS:	$1,343,102
Section 7 - Roadway Mobilization						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102	(5-10%)			
	Sum	$14,774,120	X	10%	$1,477,412	
			TOTAL ROADWAY MOBILIZATION			$1,477,412
Section 8 - Roadway Additions						
Supplemental						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102	(5-10%)			
	Sum	$14,774,120	X	10%	$1,477,412	
Contingencies						
Subtotal Sections 1 - 5		$13,431,018				
Minor Items		$1,343,102				
	Sum	$14,774,120		25% *	$3,693,530	
					TOTAL ROADWAY ADDITIONS	$5,170,942
					TOTAL ROADWAY ITEMS	$21,422,474
			(Total of Sec		11/30/2011	

Estimate Prepared By:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

* Use 25% at the PSR stage or a higher or lower rate if justified.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

				DIST - CO - RTE
				03-BUT-99
			KP:	0
			EA:	4E670
			PP No. :	0
II. STRUCTURES ITEMS	Alt 2			
Bridge Name	Southgate Overcrossing			
Structure Type	CIP P/S Box Girder			
Width (FT) - out to out	84.0			
Span Lengths (FT)	Span 1:141'-0" Span 2:132'-0"			
Total Area (SF)	22,932			
Footing Type (pile/spread)	Pile			
Cost per SF. Including: Mobilization: 10% Contingency: 25%	$200.00			
Total Cost For Structure	$4,600,000	$0	$0	$0

SUBTOTAL STRUCTURES ITEMS $4,600,000

0

TOTAL STRUCTURES ITEMS: $4,600,000

COMMENTS:

#

Estimate Prepared By: Matt Brogan (Print Name) (916) 381-9100 (Phone) 1/23/2012 (Date)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

	DIST - CO - RTE
	03-BUT-99
KP:	0
EA:	4E670
PP No. :	0

III. RIGHT OF WAY

Right-of-Way estimates should consider the probable highest and best use and type and intent of improvements at the time of acquisition. Assume acquisition including utility relocation occurs at the right of way certification milestone as shown in the Funding and Scheduling Section of the report. For further guidance see Chapter 1, Caltrans Right of Way Procedural Handbook.

	Current Area (Future Use)	Escalation Rate (%/yr)	Escalated Value *
Acquisition, including excess lands and damages to remainders	$16,150,000	3%	$19,929,000
Project Permit Fees	$50,000		$50,000
Utility Relocation (Project Cost)	$1,322,000	5%	$1,870,000
Clearance / Demolition	$315,000	3%	$389,000
Relocation Assistance Program	$900,000	3%	$1,111,000
Environmental Mitigation			$0
Title and Escrow Fees	$12,000		$12,000
SB 1210 Costs	$60,000	0.00%	$60,000
Hazardous Waste Clean-up			$0

TOTAL RIGHT OF WAY ** (CURRENT VALUE)	$18,809,000	TOTAL ESCALATED RIGHT OF WAY	11/30/2011 $23,421,000

* - Escalated to assumed year of advertising: 7/15/18

** - Current total value for use on sheet 1 of 6

Estimate prepared by:	Matt Brogan	(916) 381-9100	1/23/2012
	(Print Name)	(Phone)	(Date)

E. RIGHT OF WAY DATA SHEETS / UTILITY INFORMATION SHEETS

July 25, 2011(rev)

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 7,790,000	3%	$ 9,186,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50 ,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,740,000
Relocation Assistance	$ 500,000	3%	$ 619,000
Clearance/Demolition	$ 125,000	3%	$ 148,000
Title and Escrow	$ 9,000		$ 9,000
SB 1210 Costs	$ 45,000		$ 45,000
Total Estimated Cost	**$ 9,841,000**		**$ 11,797,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: December 2016

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	5
A			-2	C&M Agmt		Clear/Demo	5
B			-3	Svc Contract		Const Permits	0
C	7		-4 -5	Design		Condemnation	1
D	2		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	9		-9 -5				

Area: In R/W 336,831 SF

No. of Excess Parcels 5

4. **Are there any major items of construction contract work?**
   None

5. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**
   The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, including industrial, commercial and some agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee, public service easement and temporary construction easements. The project requires the total acquisition of four parcels. There is a possibility that one additional parcel may be an uneconomic remnant resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in small amount of excess land.

6. **Is there an effect on assessed valuation?**
   No.

7. **Are utility facilities or rights of way affected?**
   Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. **Are Railroad facilities or rights of way affected?**
   The project does not impact any operating railroad facilities.

9. **Were any previously unidentified sites with hazardous waste and /or material found?**
   None evident. An ISA was completed in November 2008.

10. **Are RAP displacements required?**
    Yes. There is five business relocations required.

11. **Are material borrow and/or disposal sites required?**
    Commercial sites will be utilized.

12. **Are there any potential relinquishments and/or abandonments?**
    No

13. **Are there any existing and/or potential airspace sites?**
    No

14. **Indicate the anticipated Right of Way schedule and lead time requirements.**
    Right of way lead time should be approximately twelve to eighteen months.

15. **Is it anticipated that Caltrans staff will perform all Right of Way Work.**
    The right of way activities will be performed by consultants under contract with the City of Chico.

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: May 23, 2009 & May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

_____ Date: _____

Brenda L. Schmipf
District Division Chief/Regional Manager
Department of Transportation

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
   Pacific Gas and Electric – gas & electric
   City - sewer
   AT & T – telecommunications
   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

Right of Way Data Sheet Premise, Assumptions, Limiting Conditions and Extra Ordinary Assumptions

Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
2. Estimate requires looking into the future and projecting the anticipated highest and best use of the properties at the time they are required for the project.
3. The estimate will be developed using appraisal principles without the depth of investigation and verification. The estimate may consider indicators of value which may not be acceptable in appraising.
4. The estimate will consider costs known as Construction Contract Work (CCW) as severance damages and included as compensation to the owner.
5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
6. When in doubt because of inadequate or marginal requirement information, a full acquisition will be assumed.

Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

July 25, 2011

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 16,150,000	3%	$ 20,414,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50 ,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,883,000
Relocation Assistance	$ 900,000	3%	$ 1,113 ,000
Clearance/Demolition	$ 315,000	3%	$ 390,000
Title and Escrow	$ 12,000		$ 12,000
SB 1210 Costs	$ 60,000		$ 60,000
Total Estimated Cost	**$ 18,809,000**		**$ 23,922,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: July 2018

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	9
A			-2	C&M Agmt		Clear/Demo	9
B			-3	Svc Contract		Const Permits	0
C	10		-4 5	Design		Condemnation	2
D	2		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	12		-9 5				

Area: In R/W 967,510 SF

No. of Excess Parcels 9

4. **Are there any major items of construction contract work?**
   None

5. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**
   The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, including industrial, commercial and some agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee, public service easement and temporary construction easements. The project requires the total acquisition of seven parcels. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in small amount of excess land.

6. **Is there an effect on assessed valuation?**
   No.

7. **Are utility facilities or rights of way affected?**
   Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. **Are Railroad facilities or rights of way affected?**
   The project does not impact any operating railroad facilities.

9. **Were any previously unidentified sites with hazardous waste and /or material found?**
   None evident. An ISA was completed in November 2008.

10. **Are RAP displacements required?**
    Yes. There is the potential for up to nine business relocations.

11. **Are material borrow and/or disposal sites required?**
    Commercial sites will be utilized.

12. **Are there any potential relinquishments and/or abandonments?**
    No

13. **Are there any existing and/or potential airspace sites?**
    No

14. **Indicate the anticipated Right of Way schedule and lead time requirements.**
    Right of way lead time should be approximately twelve to eighteen months.

15. **Is it anticipated that Caltrans staff will perform all Right of Way Work.**
    The right of way activities will be performed by consultants under contract with the City of Chico. Caltrans will provide oversight and assistance.

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: May 23, 2009 & May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

_____ Date: _____

Brenda L. Schmipf
District Division Chief/Regional Manager
Department of Transportation

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
   Pacific Gas and Electric – gas & electric
   City - sewer
   AT & T – telecommunications
   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

Right of Way Data Sheet Premise, Assumptions, Limiting Conditions and Extra Ordinary Assumptions

Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
2. Estimate requires looking into the future and projecting the anticipated highest and best use of the properties at the time they are required for the project.
3. The estimate will be developed using appraisal principles without the depth of investigation and verification. The estimate may consider indicators of value which may not be acceptable in appraising.
4. The estimate will consider costs known as Construction Contract Work (CCW) as severance damages and included as compensation to the owner.
5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
6. When in doubt because of inadequate or marginal requirement information, a full acquisition will be assumed.

Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

July 25, 2011

RIGHT OF WAY DATA SHEET

Right of Way Cost Estimate

	Current Value	Escalation Rate	Escalated Value
1. Right of Way Cost Estimate			
Acquisition, including Excess Lands, Damages and Goodwill	$ 8,809,000	3%	$ 10,892,000
Mitigation Acquisition	$		
Project Permit Fees	$ 50,000		$ 50,000
Utility Relocation (Project Share)	$ 1,322,000	5%	$ 1,883,000
Relocation Assistance	$ 500,000	3%	$ 619,000
Clearance/Demolition	$ 75,000	3%	$ 93,000
Title and Escrow	$ 6,000		$ 6,000
SB 1210 Costs	$ 25,000		$ 25,000
Total Estimated Cost	**$ 10,787,000**		**$ 13,568,000**
Construction Contract Work	$ 0		

2. Current Date of Right of Way Certification: July 2018

3. Parcel Data:

Type	Number	Dual/Appr	Utilities	RR involvement		Misc. R/W Work	
X			U4-1	None	x	RAP Displ	3
A			-2	C&M Agmt		Clear/Demo	3
B			-3	Svc Contract		Const Permits	1
C	3		-4 5	Design		Condemnation	2
D	3		U5-7	Const.			
E			-8	Lic/RE/Clauses			
Total	6		-9 5				

Area: In R/W 740,546 SF

No. of Excess Parcels 3

4. Are there any major items of construction contract work?
None

5. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).
The project provides for the construction of a new Interchange along SR 99 south of the City of Chico. It will be coordinated with the construction, relocation and improvement of the existing local streets and roads. The project is in an area of mixed land uses, primarily industrial, but also some commercial and agricultural uses. The properties required for the project include both improved and vacant parcels. The right of way requirements are in fee and temporary construction easements. The project requires the total acquisition of one parcel. There is a possibility that two additional parcels may be uneconomic remnants resulting in full acquisitions due to the location of the acquisition and impacts on improvements. Abutters' rights will be acquired along the interchange ramps. The acquisitions may result in excess land.

6. Is there an effect on assessed valuation?
No.

7. Are utility facilities or rights of way affected?
Yes. The project will require possible positive location of underground facilities to determine exact locations for analysis and review.

8. Are Railroad facilities or rights of way affected?
The project does not impact any operating railroad facilities.

9. Were any previously unidentified sites with hazardous waste and /or material found?
None evident. An ISA was completed in November 2008.

10. Are RAP displacements required?
Yes. There is a potential for up to three business relocations required.

11. Are material borrow and/or disposal sites required?
Commercial sites will be utilized.

12. Are there any potential relinquishments and/or abandonments?
No

13. Are there any existing and/or potential airspace sites?
No

14. Indicate the anticipated Right of Way schedule and lead time requirements.
Right of way lead time should be approximately twelve to eighteen months.

15. Is it anticipated that Caltrans staff will perform all Right of Way Work.
The right of way activities will be performed by consultants under contract with City of Chico. Caltrans will provide oversight and assistance.

Data for evaluation prepared on and by:

Right of Way: Michael Lahodny — Date: March 29, 2010, May 25, 2011

Utilities: Mark Thomas Engineering & M. Lahodny — Date: May 23, 2009

Recommended for Approval:

Michael E. Lahodny
Bender Rosenthal, Inc.
California Certified General Appraiser
#044258

Date: August 5, 2011

Reviewed and approved based on information provided to date:

_____ Date: _____

Brenda L. Schimpf
District Division Chief/Regional Manager
Department of Transportation

UTILITY INFORMATION SHEET

1. **Name of utility companies involved in Project:**
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   City - sewer
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   Comcast - cable

2. **Types of facilities and agreements required:**
   PG & E:
   Relocation of overhead electric facilities - Notice and Agreement.
   PG & E:
   Relocation of underground gas facilities- Notice and Agreement
   AT & T:
   Relocation of underground fiber optics - Notice and Agreement.
   City sewer:
   Relocation of underground sewer and manhole cover adjustment – Notice and Agreement
   Comcast Communications
   Cable– Notice and Agreement

3. Is any facility a longitudinal encroachment in existing or proposed access controlled right of way? No.

4. Additional Information concerning utility involvements on this project, i.e., long lead time materials, growing or species seasons, customer service seasons:

5. Total estimated cost of the project's obligation for utility relocation on this project:
   Current Estimate of Project Expense: $ 1,322,000

Prepared By: Mark Thomas & Michael E. Lahodny Bender Rosenthal, Inc.

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Estimate Premise

1. Estimates are forecasts of anticipated costs for properties that will be acquired at a future date.
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5. The estimator has based the estimate on the highest supported anticipated costs and a "worst case" scenario.
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Assumptions

1. Estimate mapping is assumed to adequately provided information on which partial acquisition and damages are based.
2. The right of way area calculations are assumed to reflect the needs for the project or alternative. Changes in the areas may dramatically impact the estimated right of way costs.

Limiting Conditions

1. Utility locations and information of property rights have not been fully researched and utility costs are based on field observations and cost information provided by others. More accurate costs will be developed as the project approaches selection of final alignment and design. Rights and obligations of parties will be verified and a liability determination will be established. Master agreements with Utility Companies may establish the costs to the owners and project.

Extraordinary Assumptions

1. A contingency factor was applied at the rate of 25%. This additional estimated cost provides for possible business goodwill claims, outdoor advertising signs, administrative settlements, condemnation awards, utility overruns and interest payments.
2. Environmental permitting fees will also be estimated as they are generally paid at the right of way acquisition phase.

ROW EXHIBIT - ALT 1
SR 99/SOUTHGATE INTERCHANGE

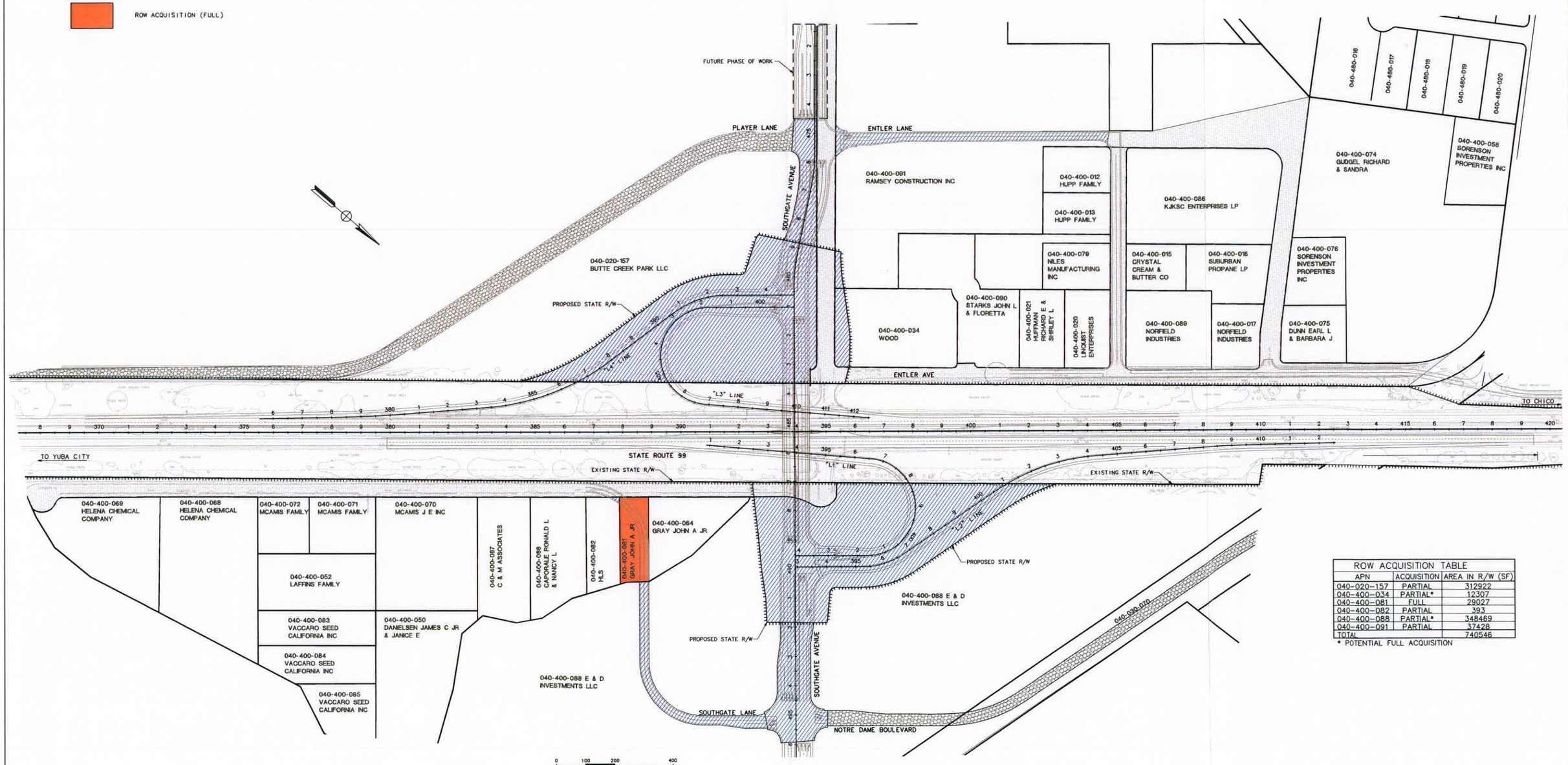
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY MH	APPROVED ON	JOB NO. 57-0253	SHEET NO. 1
CKD. BY MB	BY	FILE NO.	OF
DATE 6/13/2011	RCE NO.		3
SCALE 1"=100'			

LEGEND

- EXISTING CITY ROW
- DEDICATED CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	312922
040-400-034	PARTIAL*	12307
040-400-081	FULL	29027
040-400-082	PARTIAL	393
040-400-088	PARTIAL*	348469
040-400-091	PARTIAL	37428
TOTAL		740546

* POTENTIAL FULL ACQUISITION

ROW EXHIBIT - ALT 2
SR 99/SOUTHGATE INTERCHANGE

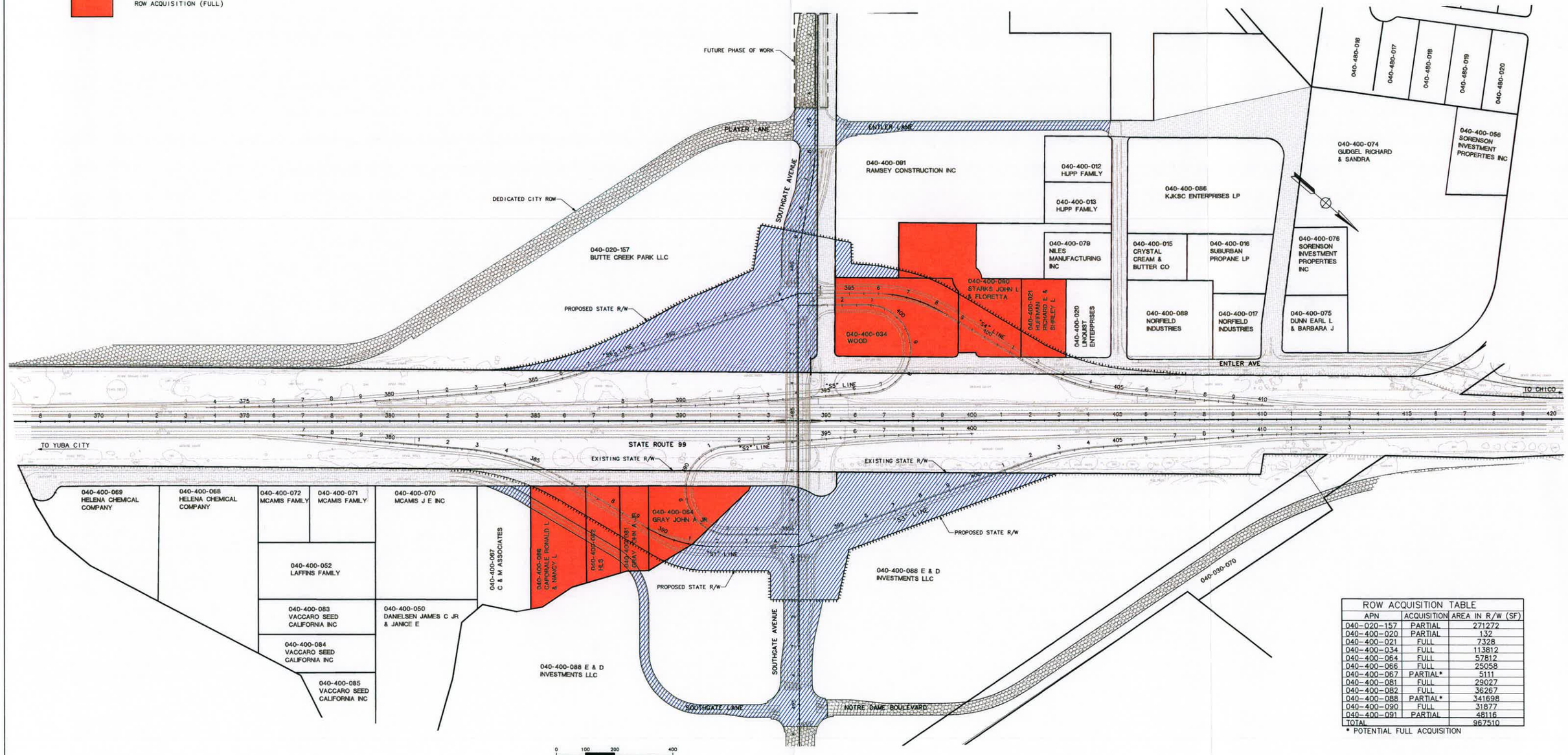
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY MH	APPROVED ON		JOB NO. 57-0253	SHEET NO. 2
CKD. BY MB	BY		FILE NO.	OF
DATE 6/13/2011	RCE NO.			3
SCALE 1"=100'				

LEGEND

- EXISTING CITY ROW
- DEDICATED CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	271272
040-400-020	PARTIAL	132
040-400-021	FULL	7328
040-400-034	FULL	113812
040-400-064	FULL	57812
040-400-066	FULL	25058
040-400-067	PARTIAL*	5111
040-400-081	FULL	29027
040-400-082	FULL	36267
040-400-088	PARTIAL*	341698
040-400-090	FULL	31877
040-400-091	PARTIAL	48116
TOTAL		967510

* POTENTIAL FULL ACQUISITION

ROW EXHIBIT - PHASE 1A
SR 99/SOUTHGATE INTERCHANGE

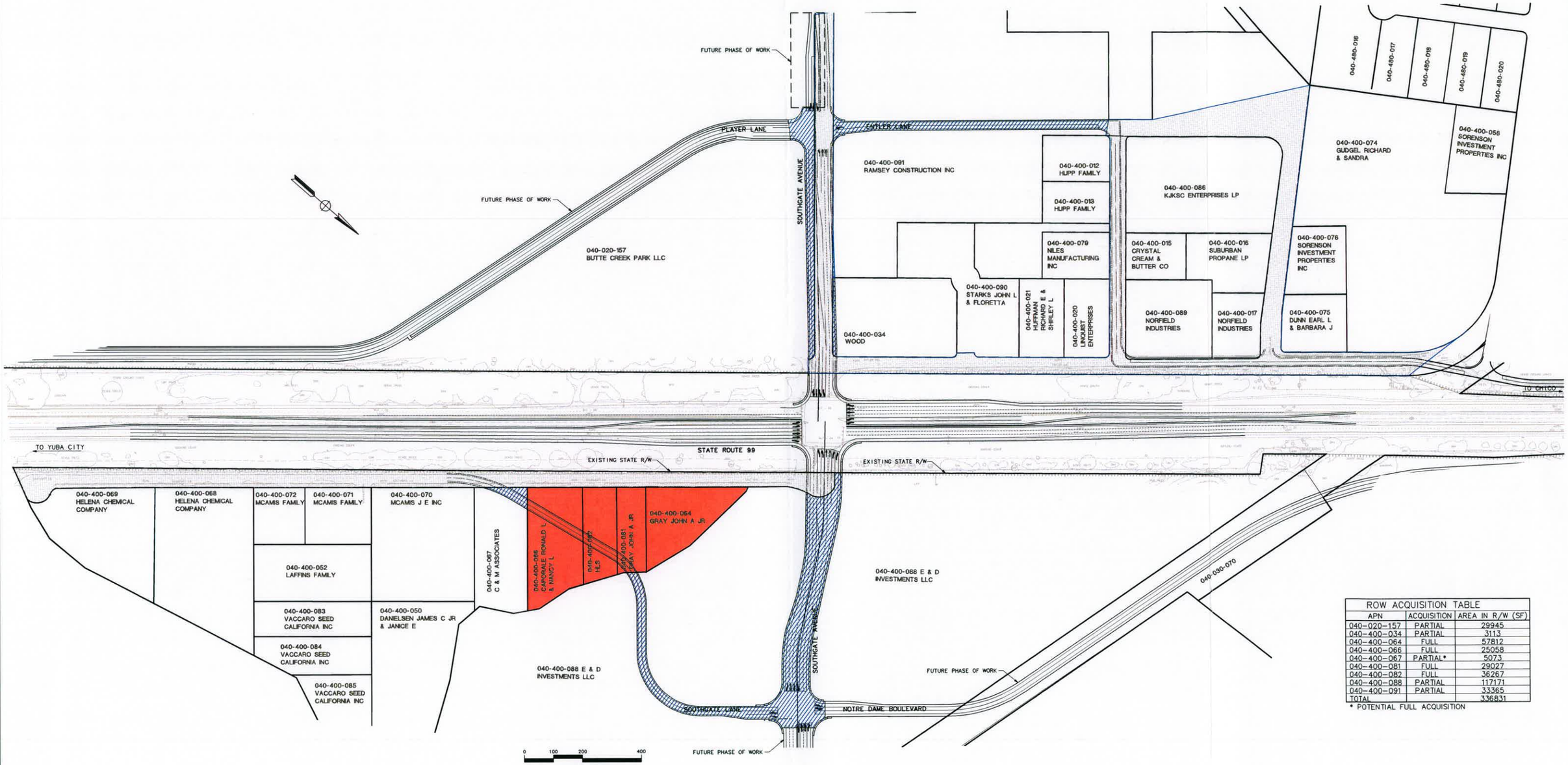
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JW	APPROVED ON	JOB NO. 57-0253	SHEET NO. 3
CKD. BY MB	BY	FILE NO.	OF
DATE 6/13/2011	RCE NO.		3
SCALE 1"=100'			

LEGEND

- EXISTING CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	29945
040-400-034	PARTIAL	3113
040-400-064	FULL	57812
040-400-066	FULL	25058
040-400-067	PARTIAL*	5073
040-400-081	FULL	29027
040-400-082	FULL	36267
040-400-088	PARTIAL	117171
040-400-091	PARTIAL	33365
TOTAL		336831

* POTENTIAL FULL ACQUISITION

ROW EXHIBIT - PHASE 1A
SR 99/SOUTHGATE INTERCHANGE

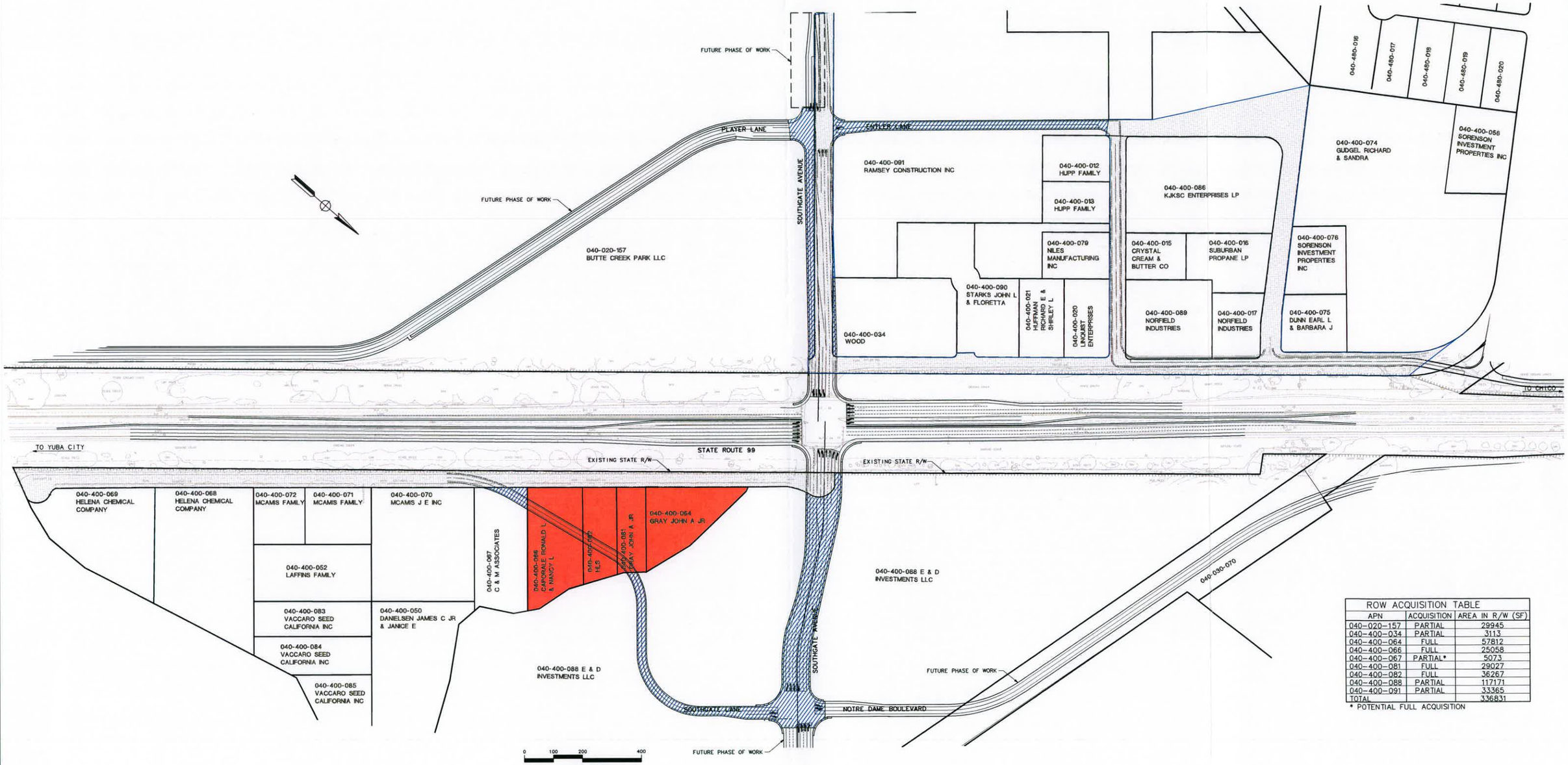
03-BUT-99 | PM 28.8/29.9 | EA 4E670

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CALIFORNIA 95826

DRAWN BY JW	APPROVED ON	JOB NO. 57-0253	SHEET NO. 3
CKD. BY MB	BY	FILE NO.	OF
DATE 6/13/2011	RCE NO.		3
SCALE 1"=100'			

LEGEND

- EXISTING CITY ROW
- ROW ACQUISITION (PARTIAL)
- ROW ACQUISITION (FULL)



ROW ACQUISITION TABLE		
APN	ACQUISITION	AREA IN R/W (SF)
040-020-157	PARTIAL	29945
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040-400-064	FULL	57812
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040-400-067	PARTIAL*	5073
040-400-081	FULL	29027
040-400-082	FULL	36267
040-400-088	PARTIAL	117171
040-400-091	PARTIAL	33365
TOTAL		336831

* POTENTIAL FULL ACQUISITION

F. Traffic Operations Report

TRAFFIC REPORT

FOR THE STATE ROUTE 99/SOUTHGATE AVENUE INTERCHANGE

PROJECT STUDY REPORT

This report was prepared under my direction and responsible charge. I attest to the technical information contained herein and have judged the qualification of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

9/28/11

Jeffrey E. Clark, P.E. Date
Registered Professional Civil Engineer
Fehr & Peers

REGISTERED PROFESSIONAL ENGINEER
JEFFREY EDWARD CLARK
C040605
CIVIL
STATE OF CALIFORNIA

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SimTraffic Results – No Project

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SimTraffic Results – Alternative 1A (At-Grade Intersection)

SimTraffic Results – Alternative 1B (Four-Lane Spread Diamond INterchange)

SimTraffic Results – Alternative 1C (Five-Lane Spread Diamond Interchange)

SimTraffic Results – Alternative 2 (Partial Cloverleaf Interchange)

Queuing Results – No Project

Queuing Results – Alternative 1 (Two-Quadrant Partial Cloverleaf Interchange)

Queuing Results – Alternative 1A (At-Grade Intersection)

Queuing Results – Alternative 1B (Four-Lane Spread Diamond Interchange)

Queuing Results – Alternative 1C (Five-Lane Spread Diamond INterchange)

Queuing Results – Alternative 2 (Partial Cloverleaf Interchange)

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EXECUTIVE SUMMARY

This report describes the traffic operations analysis conducted for the State Route (SR) 99/Southgate Avenue Interchange Project Study Report (PSR). The proposed interchange is located in the City of Chico in Butte County and is an important element to reducing congestion at the SR 99/Skyway interchange, which is expected to operate unacceptably by 2018 if no improvements are made.

Five alternative designs have been proposed for this project:

- Alternative 1 – Two-quadrant partial cloverleaf (Caltrans Type L-8) interchange with a five lane overcrossing structure
- Alternative 1A – Enlarged at-grade intersection with additional through lanes on SR 99
- Alternative 1B – Spread diamond (Caltrans Type L-2) interchange with a four lane overcrossing structure
- Alternative 1C – Spread diamond (Caltrans Type L-2) interchange with a five lane overcrossing structure
- Alternative 2 – Partial cloverleaf (Caltrans Type L-2) interchange with a four lane overcrossing structure

Figure ES-1 illustrates the design alternatives. Each alternative would improve operations on the SR 99 corridor by diverting traffic away from the congested SR 99/Skyway interchange. However, Alternatives 1A and 1B are considered interim projects as they are not expected to have the typical 20 year design life of the ultimate projects (Alternatives 1, 1C, and 2).

A previous Project Study Report for the SR 99/Skyway interchange noted that the Skyway interchange would begin to fail in 2018 if improvements either of the following improvements were not made:

- Widen Skyway to six lanes between the southbound SR 99 off-ramps to a point east of Notre Dame Boulevard; or
- Construct an extension to Southgate Avenue to connect Skyway to SR 99 to provide an alternative to the Skyway interchange.

The key findings of this study are listed below.

- Under existing conditions, all study intersections and freeway mainline segments operate at an acceptable level of service (LOS) during the AM and PM peak hours.
- Under construction year (2015) “no project” conditions, all study intersections operate at an acceptable LOS during the AM peak hour and the Hegan Lane/Midway intersection will operate at an unacceptable LOS E during the PM peak hour. All freeway facilities will operate at an acceptable LOS during the AM and PM peak hours. Under “with project” conditions, the Hegan Lane/Midway intersection is still expected to operate at an unacceptable LOS E during the PM peak hour, but delay will be lower when compared to “no project” conditions since some traffic now heads south on Midway to access the SR 99 via a new Southgate Avenue extension. All other study intersections,

freeway segments, and ramp junctions are expected to operate at acceptable levels during the AM and PM peak hours for all five "with project" alternatives.

- Under interim year (2025) "no project" conditions, two study intersections will operate unacceptably during the AM and PM peak hours. With development anticipated near the project area, the intersections of Southgate Avenue/Entler Avenue and SR 99/Southgate Avenue will no longer operate acceptably. Under "with project" conditions, all study intersections will operate acceptably. However, the SR 99/Southgate Avenue at-grade intersection under Alternative 1A and the southbound ramp terminal intersection under Alternative 1B are both expected to fail within a few years after 2025. These failures would require upgrades of these interim projects (Alternative 1A and Alternative 1B) to one of the ultimate interchange designs (Alternatives 1, 1C, or 2). All freeway facilities will continue to operate acceptably under both "no project" and "with project" conditions in 2025.

- Under design year (2035) "no project" conditions, two intersections will operate unacceptably during the AM peak hour and three intersections will operate unacceptably during the PM peak hour. Under all "with project" alternatives, the Hegan Lane/Midway intersection will operate unacceptably during both the AM and PM and additional improvements would be required to improve operations. All freeway and ramp facilities will operate acceptably under design year conditions for all scenarios. Although the LOS is acceptable for intersections along Southgate Avenue under all three plus project alternatives (the two interim projects were not analyzed), left turn queuing may occur on the overcrossing under Alternatives 1 and 1C. Alternative 2 eliminates this potential queuing issue by constructing loop on-ramps to SR 99.

- This analysis determined that a phased approach to the constructing the interchange is possible by initially building either a widened at-grade intersection (Alternative 1A) or a four-lane spread diamond interchange (Alternative 1B). Both of these designs are expected to last to 2025 conditions, however, increasing traffic between 2025 and 2035 will ultimately require that these interim designs be replaced with one of the ultimate interchange designs.

TABLE ES-1 – INTERSECTION LEVEL OF SERVICE FOR DESIGN YEAR (2035) CONDITIONS

Intersection	Peak Hour	No Project		With Project Alternative 1		With Project Alternative 1C		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/Midway	AM	32	C	**76**	**E**	**76**	**E**	**76**	**E**
	PM	**140**	**F**	**144**	**F**	**144**	**F**	**144**	**F**
2. Entler Avenue/Midway	AM	25	C	15	C	15	C	15	C
	PM	17	C	18	C	18	C	18	C
3. Southgate Avenue/ Midway	AM	Not Applicable[4]		18	C	18	B	18	B
	PM			23	C	23	C	23	C
4. Southgate Avenue/ Entler Avenue[3]	AM	**152**	**F**	22	C	23	C	23	C
	PM	**58**	**F**	30	C	29	C	25	C
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		23	C	21	C	12	B
	PM			26	C	26	C	17	B
6. Southgate Avenue/ SR 99	AM	**292**	**F**	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	**366**	**F**						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		28	C	18	C	<10	A
	PM			17	B	17	B	10	B
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	21	C	23	C	23	C
	PM	<10	A	19	C	26	C	19	B
9. Southgate Avenue/ Skyway	AM	Not Applicable[4]		43	D	43	D	43	D
	PM			35	C	35	C	35	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

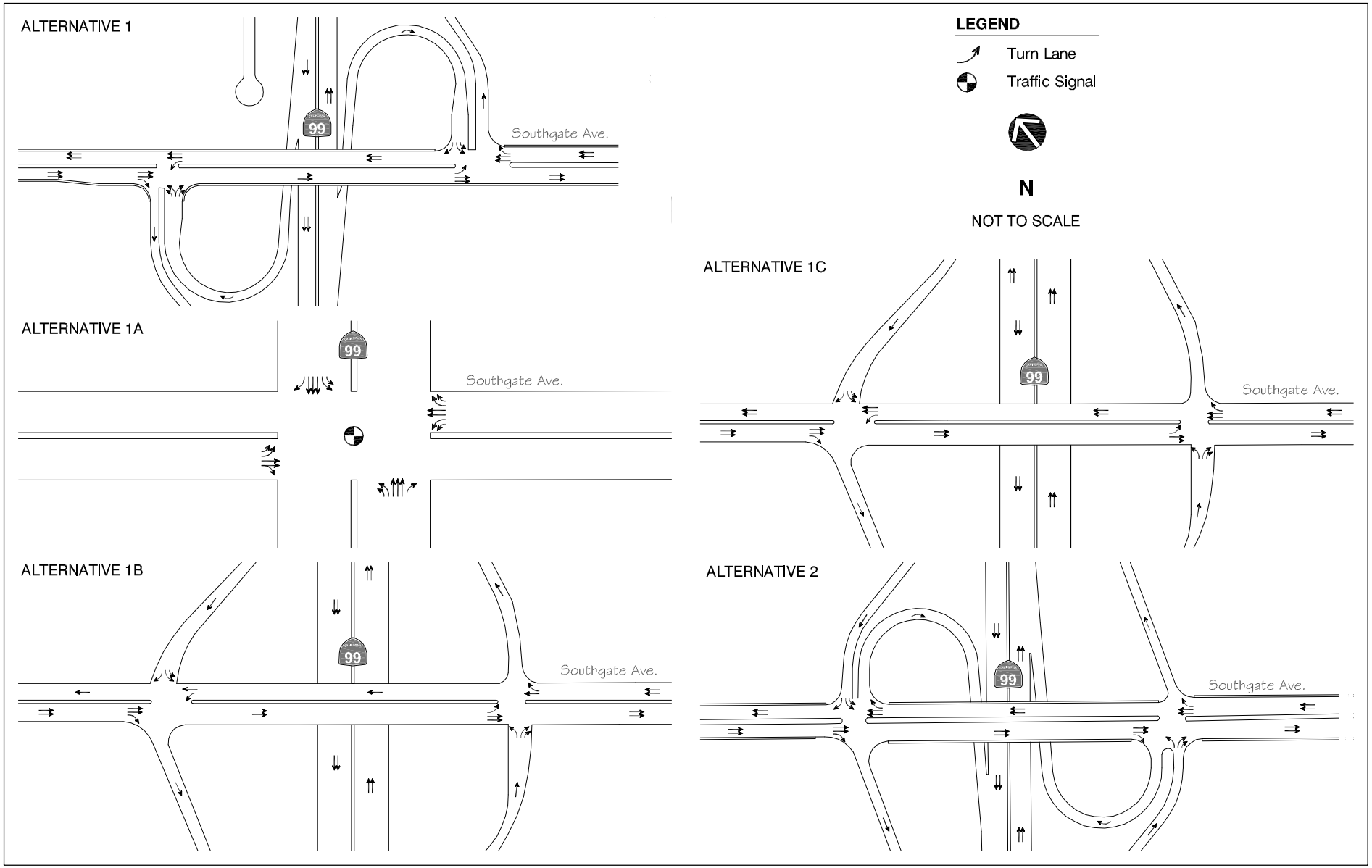
[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009



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ROADWAY NETWORK AND INTERCHANGE ALTERNATIVES

FIGURE ES-1

1. INTRODUCTION

This report describes the traffic operations analysis conducted for the State Route 99 (SR 99)/Southgate Avenue Interchange Project Study Report (PSR). The proposed interchange will be located in the City of Chico and involves the reconstruction of the existing at-grade intersection. Associated with the new interchange is an extension of Southgate Avenue between Midway and Skyway. This extension will provide an alternative to the increasingly congested SR 99/Skyway interchange.

The primary purpose of this project is to provide congestion relief at the SR 99/Skyway interchange. The results of a traffic study prepared in 2006 determined that additional roadway capacity is necessary to maintain acceptable traffic operations at the SR 99/Skyway interchange. The study indicated that the additional roadway capacity would be needed by approximately 2018 and could take one of the following forms:

- Construction of the Phase II Skyway Interchange Improvements, which would include replacement of the existing four-lane overcrossing structure with a six-lane structure. Additionally, Skyway would need to be widened to six lanes between the southbound SR 99 off-ramp to Forest Avenue; or
- Construction of a four-lane extension of Southgate Avenue between Skyway and SR 99.

At this time, the City of Chico has chosen further study of the Southgate Avenue extension since it maintains the four-lane cross-section for Skyway (consistent with the General Plan and is consistent with the land use and circulation elements of the currently adopted and draft versions of the General Plan.

This traffic operations analysis includes components of the freeway system and local adjacent intersections that will be impacted by the SR 99/Southgate Avenue Interchange.

The remainder of this report contains the following chapters.

- Chapter 2 – Traffic Operations Analysis Methodology
- Chapter 3 – Existing Conditions
- Chapter 4 – Project Description
- Chapter 5 – Construction Year (2015) Conditions
- Chapter 6 – Interim Year (2025) Conditions
- Chapter 7 – Design Year (2035) Conditions

Chapter 2 describes the methodology used to develop traffic volume forecasts and analyze freeway and local intersection traffic operations. Chapter 3 presents the existing traffic operations in the study area, and Chapter 4 describes the proposed SR 99/Southgate Avenue interchange/intersection alternatives. Chapters 5, 6, and 7 present the results of the traffic operations analysis under construction year (2015), interim year (2025) and design year (2035) conditions, respectively.

2. TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

TRAFFIC VOLUME FORECASTS

The traffic volume forecasts were generated for the proposed SR 99/Southgate Avenue interchange using the Butte County Association of Governments (BCAG) travel demand forecasting (TDF) model. This model was recently developed for BCAG and has been used to evaluate the Butte County Regional Transportation Plan, and is also being used for the ongoing Butte County General Plan Update. The model has two versions, a 2006 base year and a 2035 future year.

When the 2035 land use forecasts were initially developed by BCAG, the City of Chico and Butte County were early in the General Plan update process and BCAG made a conservative estimate about the intensity of development near the SR 99/Southgate interchange area. However, by the time that forecasts were being developed for this project, both the City of Chico and Butte County had adopted preferred land use alternatives that had considerably less land use assumed in the area. Most notably, Chico removed the Nance Canyon Special Planning Area which greatly reduced the amount of development expected to the east of the interchange project.

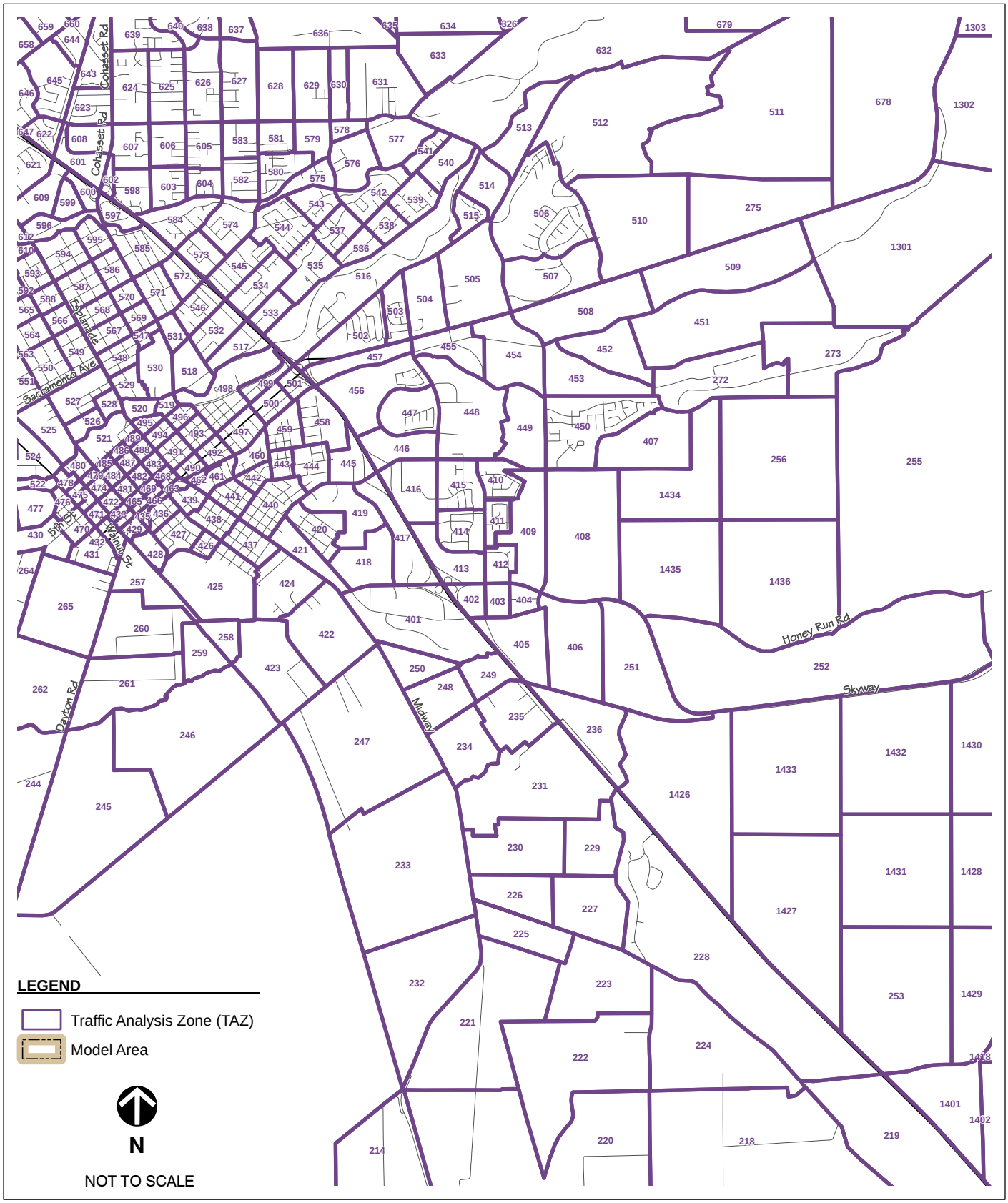
To reflect the change in land use assumptions, Fehr & Peers modified the BCAG TDF model land use file to remove the Nance Canyon development. Table 1 summarizes the original BCAG land use totals by traffic analysis zone (TAZ) and the modified land use totals. Figure 1 presents a map of the TAZs near the interchange.

TABLE 1 – 2035 LAND USE COMPARISON

TAZ	BCAG 2035 Model Land Use			Modified 2035 Land Use File		
	Households (DUs)	Retail (ksf)	Non-Retail (ksf)	Households (DUs)	Retail (ksf)	Non-Retail (ksf)
231	900	0	500	900	0	500
234	138	0	0	138	0	0
235	16	15	221	16	15	221
236	0	89	200	0	89	192
247	1,366	172	523	1,366	172	523
248	45	0	0	45	0	0
249	27	0	26	27	0	26
1427	500	0	1,000	0	0	0
1433	950	400	0	0	0	0
Total	**3,942**	**676**	**2,470**	**2,492**	**276**	**1,462**

Source: Fehr & Peers 2009

Typically, traffic forecasts for the 2015 construction year and 2025 interim year traffic analyses would be developed using straight line interpolation between traffic counts and 2035 forecast results. However, since the construction of the Southgate Avenue extension between Midway and Skyway is expected to lead to an immediate shift in traffic (particularly for Paradise residents heading to and from SR 99), standard linear interpolation would underestimate the traffic volumes under 2015 and 2025 conditions.



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TRAFFIC ANALYSIS ZONES

FIGURE 1

To account for the shift in traffic patterns expected to occur after the Southgate Avenue extension is built, Fehr & Peers ran a 2006 "with project" version of the BCAG TDF model. This model run estimates the volume of traffic that will shift from Skyway to Southgate Avenue to access SR 99 under opening day conditions.

All future year forecasts were developed using an industry standard method known as the "difference method." The difference method works by taking the difference between the 2035 raw model volumes and the 2006 raw model volumes to determine the growth in traffic between base and future year versions of the model. The growth in traffic is then added to existing traffic counts to yield adjusted cumulative conditions traffic forecasts.

Adjusted Volume = (Future Year Raw Model Volume – Base Year Raw Model Volume) + Existing Count

Traffic counts for this project were collected at the study intersections in November 2007.

ANALYSIS METHODOLOGY AND KEY ASSUMPTIONS

The traffic operations analysis methodologies and key assumptions are described below.

Analysis Methodologies

- All intersection operations analyses were conducted using procedures and methodologies contained in the *Highway Capacity Manual* (*HCM),* Transportation Research Board, 2000. These methodologies were applied using the Synchro/SimTraffic software package.
- Freeway mainline segments and ramp junctions were analyzed using the equations contained in the *HCM*.

Key Assumptions

- The peak hour factors (PHF) for existing conditions were based on existing traffic counts. For the construction year (2015) analysis, the PHF was set to 0.92 or the existing PHF, whichever was higher. For the interim year (2025) and design year (2035) analysis, the PHF was set to 0.95. The higher peak hour factors applied under future conditions are representative of higher traffic volumes and peak hour spreading anticipated in the future.
- A free-flow speed of 65 mph was used for the SR 99 mainline analysis. Speeds on the local roadways (used for intersection analysis) were set to the current posted speed limit.
- To determine the percentage of heavy-vehicles on mainline SR 99, vehicle classification data were acquired from Caltrans. Based on the Caltrans data, heavy-vehicles constitute ten percent of all traffic on SR 99. For local roadways and ramps, a value of two percent was assumed for the heavy-vehicle share of traffic.

The level of service (LOS) was calculated for each study facility to evaluate traffic operations. LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (least delay) to F (most delay), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. Table 2 displays the delay range associated with each LOS category for signalized and unsignalized intersections.

TABLE 2 – LEVEL OF SERVICE DEFINITIONS FOR STUDY INTERSECTIONS

Level of Service	Average Control Delay (seconds/vehicle)	
	Signalized	**Unsignalized**
A	≤ 10.0	≤ 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

Notes: The average delay reported for signalized intersections is for all vehicles passing through the intersection, whereas the average delay reported for unsignalized intersections is for the minor street movement with the greatest delay.

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Table 3 describes the LOS criteria from the HCM 2000 for freeway mainline sections and ramp junctions.

TABLE 3 – FREEWAY MAINLINE AND RAMP JUNCTION LOS THRESHOLDS

Level of Service	Description	Density[1]	
		Mainline	**Ramp Junction**
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	≤ 11	≤ 10
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	> 11 to 18	> 10 to 20
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.	> 18 to 26	> 20 to 28
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	> 26 to 35	> 28 to 35
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing.	> 35 to 45	> 35 to 43
F	Represents a breakdown in flow and oversaturated conditions.	> 45	> 43

Note: [1] Measured in vehicles per mile per lane

Source: *Highway Capacity Manual* (Transportation Research Board, 2000)

ANALYSIS EVALUATION CRITERIA

The SR 99 Transportation Concept Report (Caltrans, May 2004) identifies a concept level of service as LOS E. The City of Chico and Butte County have identified LOS D as the minimum acceptable LOS within their

jurisdictions. Therefore this report will assume LOS D as the minimum acceptable operating level for city and county intersections in the study area and LOS E as the minimum acceptable operating level for state facilities.

ANALYSIS SCENARIOS

The following scenarios were analyzed for the traffic report.

1. Existing Conditions
2. 2015 No Project Conditions
3. 2015 With Project Conditions – Alt. 1
4. 2015 With Project Conditions – Alt. 1A
5. 2015 With Project Conditions – Alt. 1B
6. 2015 With Project Conditions – Alt. 1C
7. 2015 With Project Conditions – Alt. 2
8. 2025 No Project Conditions
9. 2025 With Project Conditions – Alt. 1
10. 2025 With Project Conditions – Alt. 1A
11. 2025 With Project Conditions – Alt. 1B
12. 2025 With Project Conditions – Alt. 1C
13. 2025 With Project Conditions – Alt. 2
14. 2035 No Project Conditions
15. 2035 With Project Conditions – Alt. 1
16. 2035 With Project Conditions – Alt. 1C
17. 2035 With Project Conditions – Alt. 2

The project alternatives are described in Chapter 4.

3. EXISTING CONDITIONS

The existing conditions analysis presents the physical and operational characteristics of the roadway system near the proposed project. This information provides a context for the purpose and need to construct improvements.

STUDY AREA

The proposed project is located at the intersection of SR 99 and Southgate Avenue in the City of Chico. The following five study intersections were analyzed under existing conditions:

1. Hegan Lane/Midway – signalized
2. Midway/Entler Avenue – side-street stop-controlled
3. Southgate Avenue/Entler Avenue – side-street stop-controlled
4. Southgate Avenue/SR 99 – signalized
5. Southgate Avenue/Southgate Lane – side-street stop-controlled

In addition, the following SR 99 mainline operations were analyzed near the proposed project:

1. SR 99 northbound – Southgate Avenue to Skyway
2. SR 99 southbound – Skyway to Southgate Avenue
3. SR 99 northbound – Estates Drive to Southgate Avenue
4. SR 99 southbound – Southgate Avenue to Estates Drive

The following section provides a brief description of the key roadways in the study area.

SR 99 is a major north-south highway in California that runs parallel to Interstate 5 (I-5) through almost the entire length of the Central Valley. The southern end of SR 99 merges with I-5 near Wheeler Ridge, and the northern terminus of the highway is at State Route 36 near Red Bluff. North of the proposed project, SR 99 is a four-lane freeway and south of the proposed project, SR 99 is a four-lane expressway.

Southgate Avenue is a two-lane roadway that extends for approximately a half mile from the Chico Eastside Little League fields, across SR 99 (at-grade) to Southgate Lane. Southgate Avenue provides access to Entler Avenue as well as to the industrial uses surrounding SR 99.

Midway is a two-lane north-south arterial roadway that extends from State Route 162 at its southern end to Park Avenue within the City of Chico at its northern end. The speed limit on Midway is 50 mph through the southern portion of the study area before dropping to 35 mph just south of Hegan Lane.

Entler Avenue is a two-lane roadway that connects Midway to Southgate Avenue just west of SR 99. The western portion of the roadway is residential with a speed limit of 35 mph. On the eastern end of the road the road turns sharply to the south and is lined with light retail and industrial land uses.

Skyway is an east-west four-lane expressway that connects SR 99 to Paradise, and then turns northward to Magalia. Skyway has an interchange with SR 99 located about one mile north of the SR 99/Southgate intersection. To relieve congestion under existing conditions, this interchange is currently being reconfigured to a partial cloverleaf (Caltrans Type L-9) interchange.

DATA COLLECTION

AM (7:00 to 9:00) and PM (4:00 to 6:00) peak period intersection counts were conducted on November 27, 2007 at each of the five study intersections.

A field visit to the study area confirmed intersection geometries, lane configurations, and traffic controls. In addition, information on speed limits, pavement quality, pedestrian and bicycle facilities, and vehicle queuing was collected.

INTERSECTION OPERATIONS

The results of the LOS analysis at the study intersections are presented in Table 4 and show that all of the study intersections currently operation at an acceptable LOS. These results confirm field observations, which indicate relatively light traffic in the AM and PM peak hours. Figure 2 presents the AM and PM peak hour turning movement volumes at the study intersections.

TABLE 4 – EXISTING INTERSECTION LEVEL OF SERVICE

Intersection	Peak Hour	Intersection Control	Delay	LOS
1. Hegan Lane/Midway	AM PM	Signalized	14 17	B B
2. Entler Avenue/Midway	AM PM	Side-Street Stop-Controlled	11 10	B B
3. Southgate Avenue/Entler Avenue	AM PM	Side-Street Stop-Controlled	9 8	A A
4. Southgate Avenue/SR 99	AM PM	Signalized	14 12	B B
5. Southgate Avenue/Southgate Lane	AM PM	Side-Street Stop-Controlled	2 2	A A

Source: Fehr & Peers, 2009

Field observations indicate that there is little pedestrian or bicycle activity in this portion of Chico. Pedestrian facilities (sidewalks, crosswalks) are intermittent in the study area, although the majority of Entler Avenue has a sidewalk on one side of the road. Bicycle facilities are also intermittent in the study area; however, there is a Class I (separated from the road) bike path that runs along the east side of Midway.

QUEUING

A queuing analysis was performed at the Southgate Avenue/SR 99 intersection under existing conditions. The average maximum queue results from SimTraffic are presented in Table 5.

TABLE 5 – INTERSECTION QUEUING RESULTS UNDER EXISTING CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	450	86	70
		Right	500	37	13
	SB	Left	450	124	86
		Right	500	62	61
	EB	Left	100	**116**	**118**
		Through	100	**116**	**118**
		Right	100	**116**	**118**
	WB	Left	100	81	98
		Through	100	81	98
		Right	100	81	98

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

As shown in Table 5, the queues on SR 99 are adequately accommodated. However, the close spacing of Entler Avenue and SR 99 leads to queue spillback on the eastbound approach of SR 99/Southgate Avenue in the AM and PM peak hours. This queue spillback is currently viewed as a minor issue since about 95 percent of all the traffic at the Southgate Avenue/Entler Avenue intersection makes the south-to-east or west-to-north movement. The south-to-east movement is impacted by the queue, but the queue can be reasonably accommodated along southbound Enter Avenue without posing a substantial traffic hazard. The west-to-north movement is unaffected by the queue.

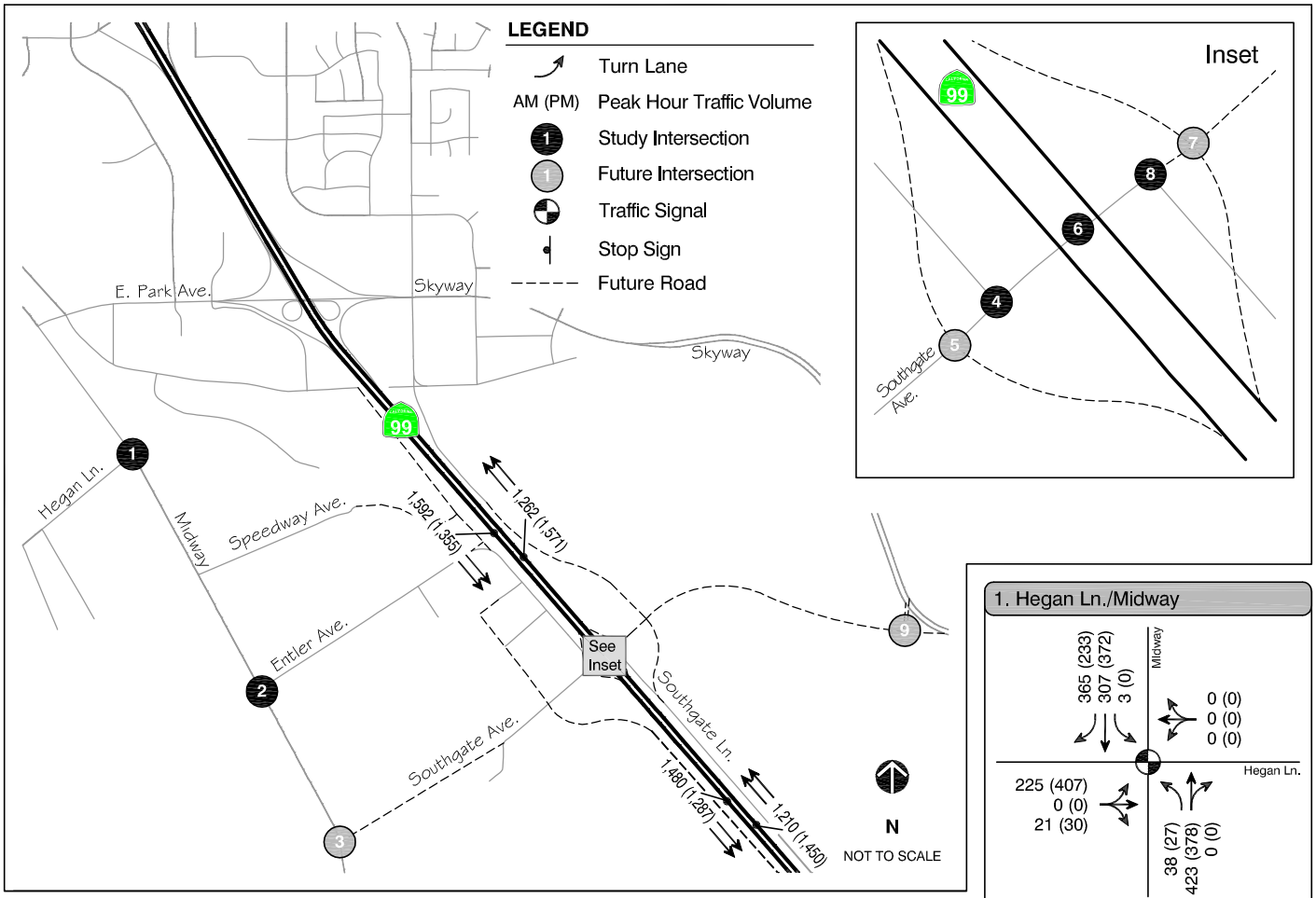
SR 99 MAINLINE OPERATIONS

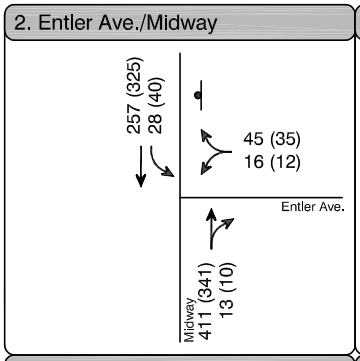
Figure 2 shows the existing AM and PM peak hour traffic volumes for the SR 99 mainline segments. Table 6 shows existing traffic operations for the mainline segments. As shown, all SR 99 mainline sections operate acceptably during the AM and PM peak hours.

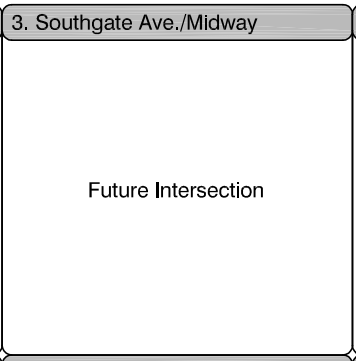
TABLE 6 – SR 99 MAINLINE OPERATIONS FOR EXISTING CONDITIONS

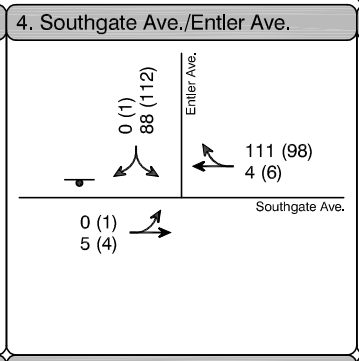
Intersection	Peak Hour	Density	LOS
1. Northbound SR 99 between Estates Drive and Southgate Avenue	AM PM	12.1 13.2	B B
2. Northbound SR 99 between Southgate Avenue and Skyway	AM PM	12.6 14.3	B B
3. Southbound SR 99 between Skyway and Southgate Avenue	AM PM	15.9 12.3	B B
4. Southbound SR 99 between Southgate Avenue and Estates Drive	AM PM	14.8 11.7	B B

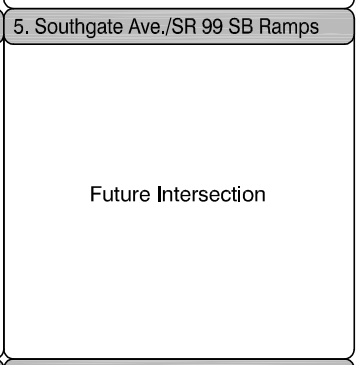
Source: Fehr & Peers, 2009

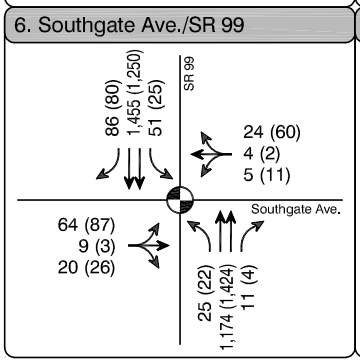


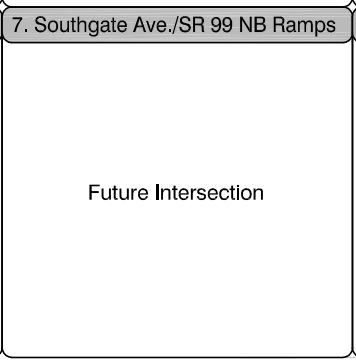


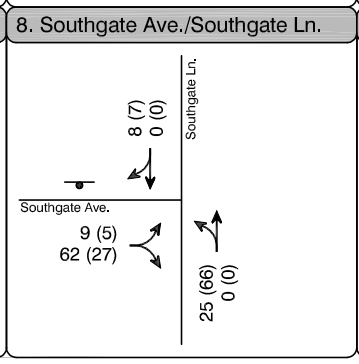


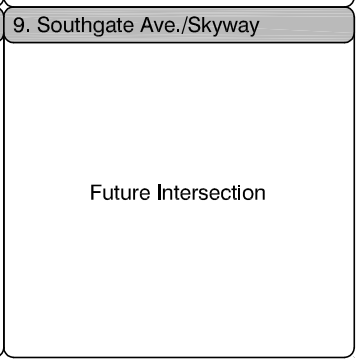












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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - EXISTING CONDITIONS

FIGURE 2

COLLISION HISTORY

Three year vehicle collision history along SR 99 between Estates Drive and Skyway was obtained from Caltrans. Table 7 summarizes the collision history along the mainline and at the Southgate Avenue and Estates Drive intersections and compares the collision rates to statewide averages.

TABLE 7 – COLLISION HISTORY FOR SR 99 BETWEEN SKYWAY AND ESTATES DRIVE

Location	Number of Collisions			Actual Collision Rate			Average Collision Rate		
	Total	Fatal	Injury	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
SR 99 Mainline between Skyway and Estates Drive	43	0	14	0.000	0.21	0.66	0.018	0.32	0.71
SR 99/Southgate Ave. Intersection	14	0	5	0.000	0.14	0.39	0.007	0.33	0.70
SR 99/Estates Dr. Intersection	12	0	5	0.000	**0.15**	**0.35**	0.004	0.10	0.22

Source: Caltrans and Fehr & Peers, 2009

Bold entries indicate higher than average accident rates

Reviewing the collision history indicates that the overall mainline segment of SR 99 between Skyway and Estates Drive has a lower-than-average collision rate when compared to similar facilities around the state. Similarly, the SR 99/Southgate Avenue intersection also has a lower-than-average collision rate. However, the SR 99/Estates Drive intersection has a higher-than-average collision rate for both total collisions and collisions with injuries (but not for collisions with fatalities). A review of the collision data indicated the following at the SR 99/Estates Drive intersection:

- Seven rear-end collisions (58 percent)
- Four broadside collisions (33 percent)
- One sideswipe collision (8 percent)

The collision data presented above for the Estates Drive intersection is consistent with expectations for an isolated signalized intersection located on a four-lane expressway. When approaching Chico from the south on SR 99, Estates Drive is the first signalized intersection in a ten mile stretch and drivers may not be expecting to encounter a traffic signal at this location.

4. PROJECT DESCRIPTION

Construction of Southgate Avenue between Midway and Skyway is intended to relieve congestion at the SR 99/Skyway interchange and serve future development in southern Chico. The conclusion of a 2006 traffic study, which analyzed a set of improvements at the SR 99/Skyway interchange, was the following:

> The Design Year (2015) and 2030 Conditions analyses indicate that the Skyway interchange will exceed capacity at approximately 2018. Additional capacity will be necessary to prevent queue spillback from degrading interchange and freeway mainline operations. A review of the City's General Plan and the original PSR/PR for the SR 99/Skyway interchange reveals two options to relieve congestion at the SR 99/Skyway interchange:
>
> - Construction of the ultimate (Phase II) Skyway interchange improvements, with improvements to the Skyway/Notre Dame Boulevard intersection (including widening of Skyway to six lanes from SR 99 to Forest Avenue); or
> - Construction of the Southgate Avenue extension between SR 99 and Skyway with a new interchange at SR 99/Southgate Avenue
>
> The Phase II interchange improvements improve operations by widening Skyway between SR 99and Forest Avenue (which would involve replacement of the overcrossing of SR 99). The Southgate Avenue extension improves operations at SR 99/Skyway by diverting approximately 30 percent of the projected traffic to the new road. Both options would provide acceptable operations at the SR 99/Skyway interchange under the 2030 design year.

This study is an extension of the SR 99/Skyway analysis and provides more detail on how the proposed Southgate Avenue project will tie into SR 99 and the surrounding local transportation system. Following is a detailed description of the project alternatives.

NO PROJECT ALTERNATIVE

For comparison purposes, this study includes a "do-nothing" or "no project" Alternative. This alternative is analyzed under construction year (2015), interim year (2025), and design year (2035) conditions and assumes the following:

- Southgate Avenue is not extended to the west or east.
- No improvements are constructed at the SR 99/Southgate Avenue intersection (i.e., the intersection remains signalized and the lane configurations and turn pocket lengths remain unchanged).

PROPOSED PROJECT

The "with project" alternatives propose to construct either a new interchange at the SR 99/Southgate junction, or to expand (at least on an interim basis) the at-grade intersection. As described above, Southgate Avenue would be extended between Midway and Skyway. Descriptions of the five "with project" alternatives follow:

Alternative 1

Alternative 1 proposes to construct a two-quadrant partial cloverleaf (Caltrans type L-8) interchange. This interchange design has the smallest footprint of all the interchange options since there are on/off-ramps in only two of the four quadrants of the interchange. The L-8 interchange would have four through lanes on the overcrossing structure and back-to-back left-turn lanes.

Alternative 1A

Alternative 1A is an at-grade intersection option that would allow for a phased approach to constructing the interchange. Alternative 1A proposes to expand the existing SR 99/Southgate Avenue as follows:

- Construct a third northbound and southbound through lane on SR 99[1]
- Construct dual left-turn lanes on all approaches
- Construct a second through lane and dual right-turn lanes on the westbound approach
- Construct a second through lane on the eastbound approach
- Relocate the Entler Avenue and Southgate Lane intersections with Southgate Avenue to accommodate queuing at the SR 99/Southgate Avenue intersection (see Figures 3 and 11)

Ultimately, Alternative 1A would be converted into an interchange when traffic volumes on SR 99 and Southgate Avenue reach a critical level.

Alternative 1B

Alternative 1B proposes to construct a spread diamond (Caltrans type L-2) interchange at the SR 99/Southgate Avenue junction. This interchange is a common design that features diagonal on- and off-ramps. The SR 99/Durham-Pentz Road interchange is a similar example. Alternative 1B features four lanes on the overcrossing structure: one westbound lane, back-to-back left-turn lanes, and two eastbound lanes. The off-ramps would feature a single right-turn lane and dual left-turn lanes for the southbound ramp and a single left-turn lane and dual right-turn lanes for the northbound ramp.

This alternative allows for a phased approach to constructing the interchange since it allows for a future conversion to Alternative 3 with a minimum of throw-away costs.

Alternative 1C

Alternative 1C is a larger version of Alternative 1B. Alternative 1C is spread diamond L-2 interchange, but the overcrossing structure would be wider, accommodating four through lanes and back-to-back left-turn lanes. The off-ramps would be the same as those described for Alternative 1B.

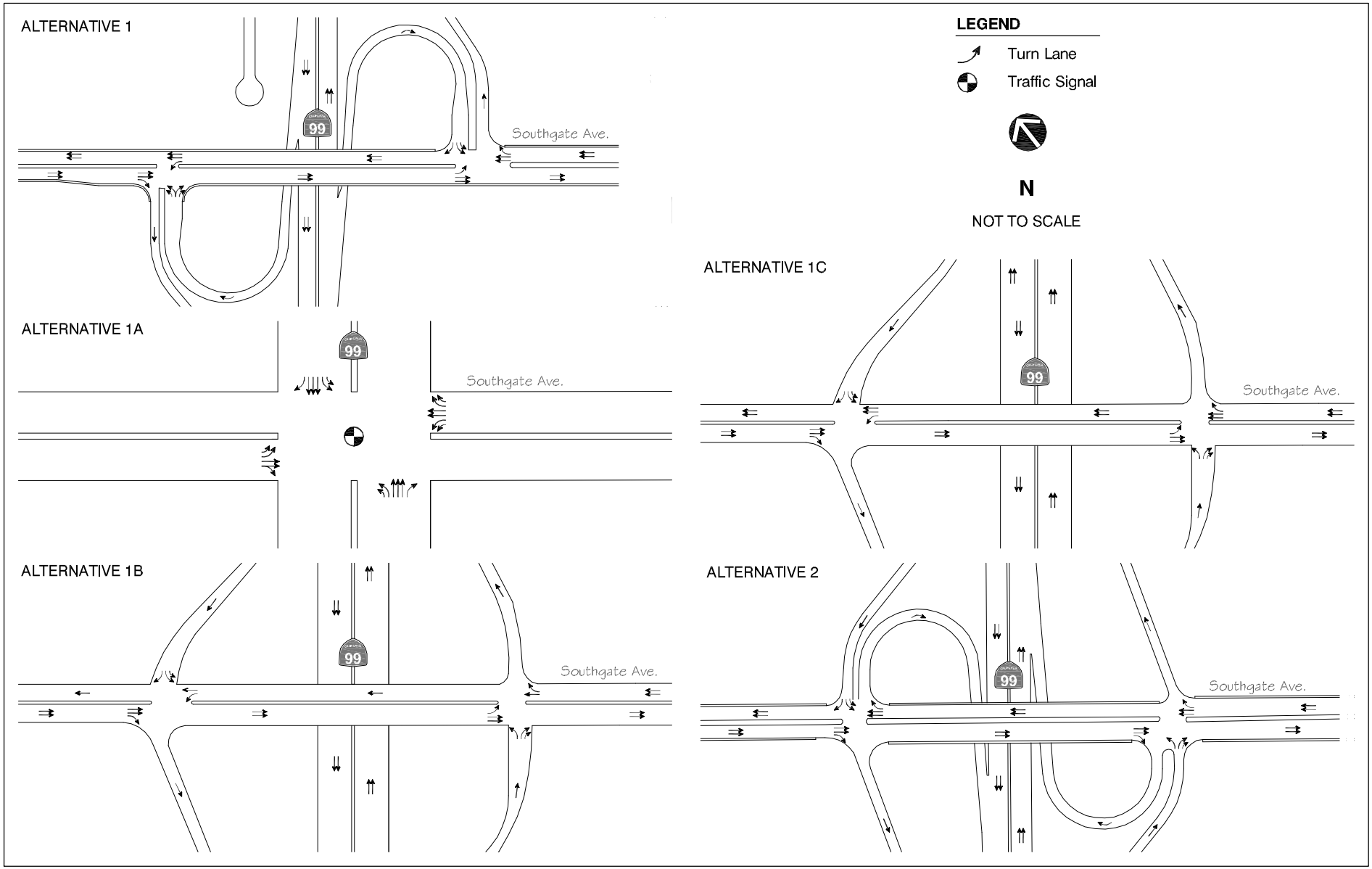
Alternative 2

Alternative 2 proposes to construct a partial cloverleaf (Caltrans type L-9) interchange. This interchange is a common design at high-volume interchanges and features diagonal off-ramps and both loop and diagonal on-

[1] The additional lane should extend at least 1,500 feet north and south of the Southgate Avenue intersection

ramps. This interchange can accommodate high volumes of traffic since there are no left-turns at the ramp terminal intersections. The SR 99/Skyway interchange is being converted to this design. The L-9 interchange would have four through lanes on the overcrossing structure, and the loop on-ramps would have right-turn pockets that are not part of the overcrossing structure. The off-ramps would be the same as described above for the Alternative 1B interchange.

Figure 3 shows the lane configurations at the study intersections near the SR 99/Southgate Avenue junction for the five “with project” alternatives.



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ROADWAY NETWORK AND INTERCHANGE ALTERNATIVES

FIGURE 3

5. CONSTRUCTION YEAR (2015) CONDITIONS

The construction year analysis presents the operational characteristics of the roadway system under 2015 conditions.

ROADWAY NETWORK CHANGES

Other than the proposed project, the only area roadway project assumed under 2015 conditions is the extension of Speedway Avenue to a northern extension the frontage road that runs west of SR 99.

ANALYSIS SCENARIOS

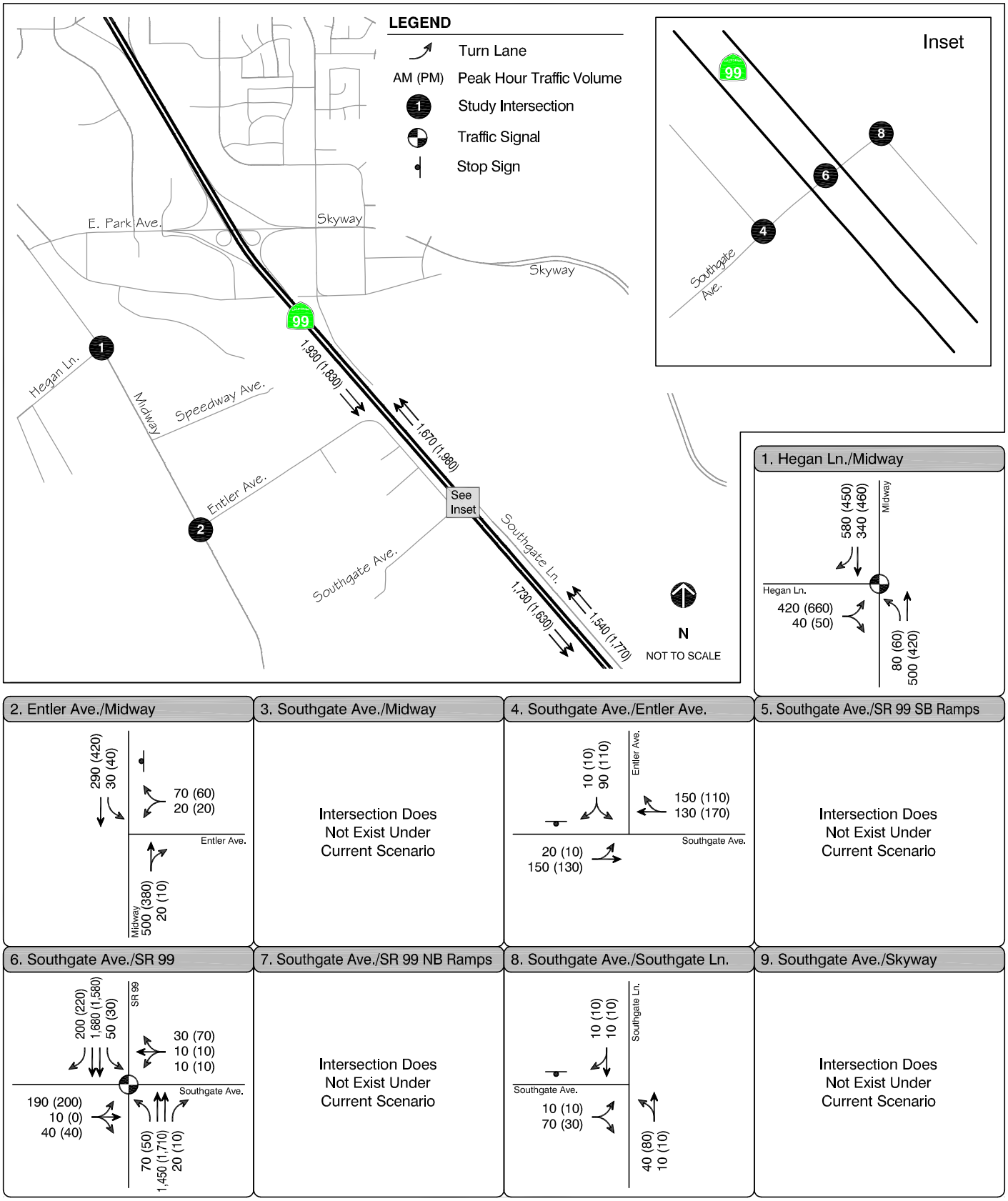
Five scenarios were analyzed under 2015 conditions – the "no project" alternative and the five "with project" alternatives.

INTERSECTION OPERATIONS

Figures 4, 5, 6, 7, and 8 present the projected traffic volumes, lane configurations, and traffic controls under construction year "no project" and "with project" conditions, respectively. As can be seen in the figures, there is a significant difference in traffic volumes between the "no project" and "with project" scenarios. The difference in traffic is primarily related to the Southgate Avenue extension between SR 99 and Skyway, which is expected to attract a large amount of traffic once the extension is open, reducing traffic volumes at the SR 99/Skyway interchange and Skyway/Notre Dame Boulevard intersection by 26 percent. Table 8 on the following page shows the LOS and delay for the study intersections under 2015 AM and PM peak hour conditions.

As shown on Table 8, without the proposed improvements, the only study intersection with unacceptable operations is Hegan Lane/Midway, which is expected to operate at LOS E during the PM peak hour. Under the "with project" scenarios, the Hegan Lane/Midway intersection continues to operate unacceptably during the PM peak hour (LOS E); however, the overall intersection delay is lower since some traffic diverts to the new Southgate Avenue extension between Midway and SR 99.

Under the "with project" scenarios, traffic exiting SR 99 to Southgate Avenue and traveling toward Skyway (and the reverse direction) is expected to increase dramatically. However, even with this increase in traffic, all of the "with project" alternatives operate acceptably.



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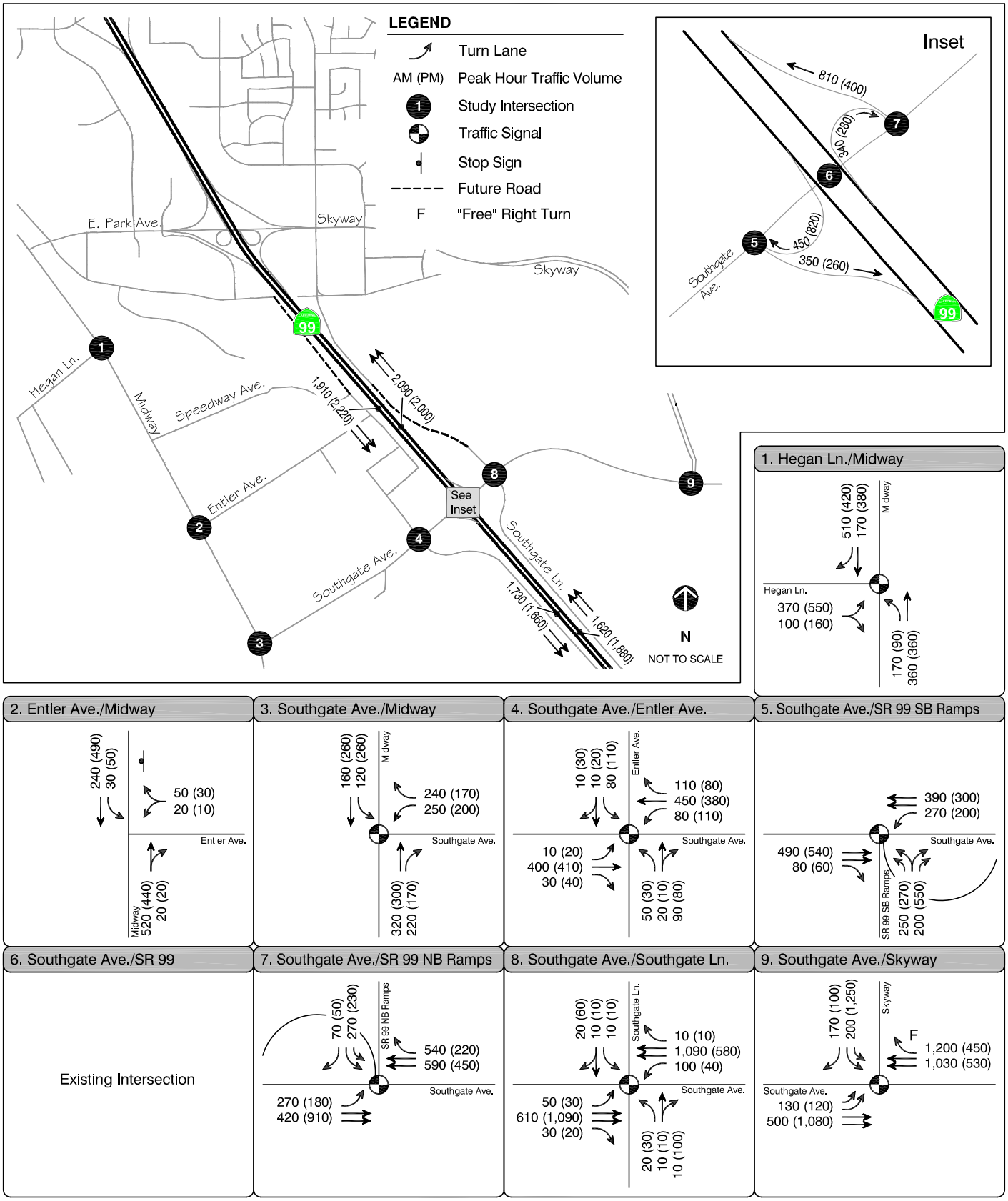
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 NO PROJECT CONDITIONS

FIGURE 4



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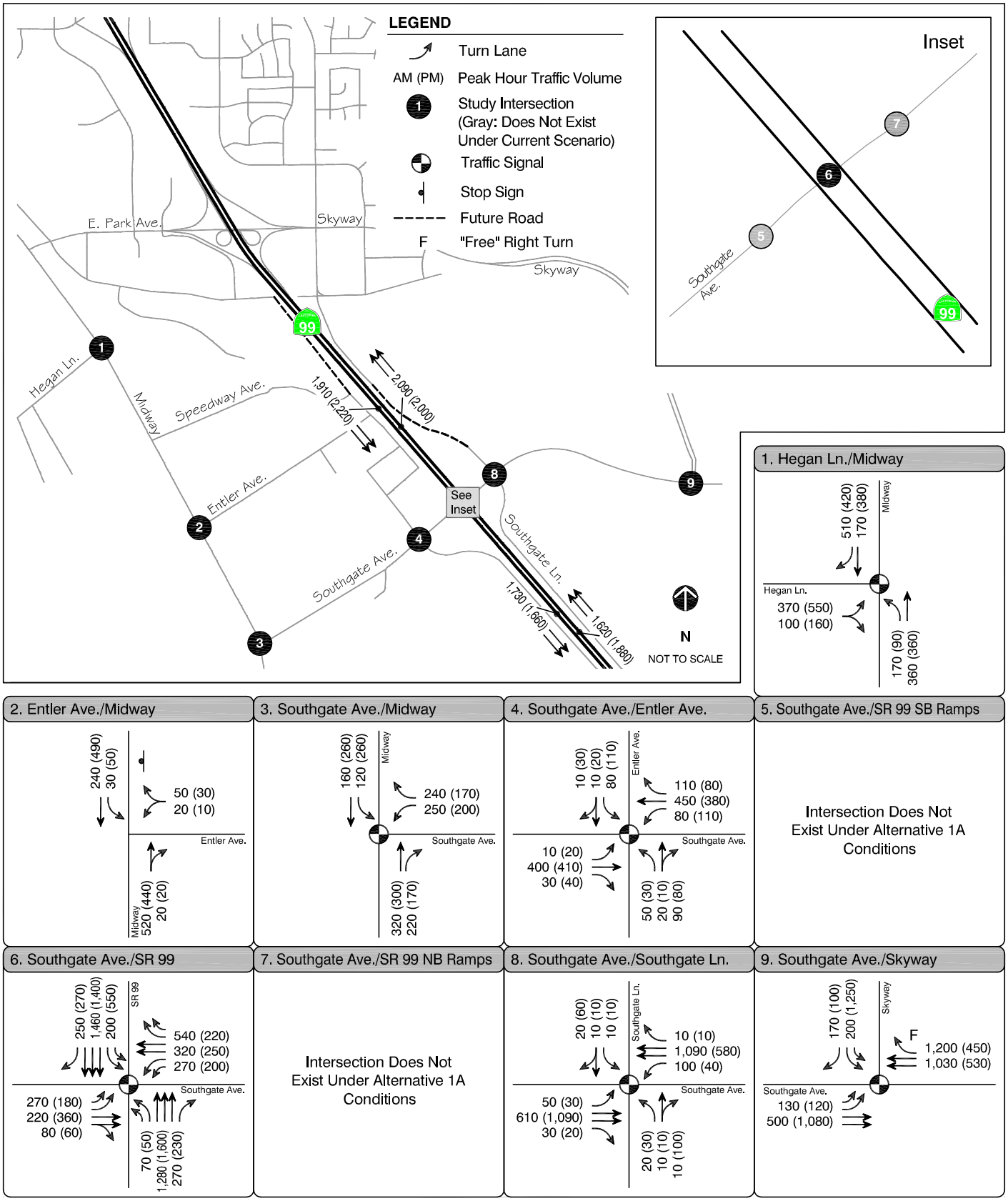
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 PLUS PROJECT CONDITIONS ALTERNATIVE 1

FIGURE 5



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 PLUS PROJECT CONDITIONS ALTERNATIVE 1A

FIGURE 6

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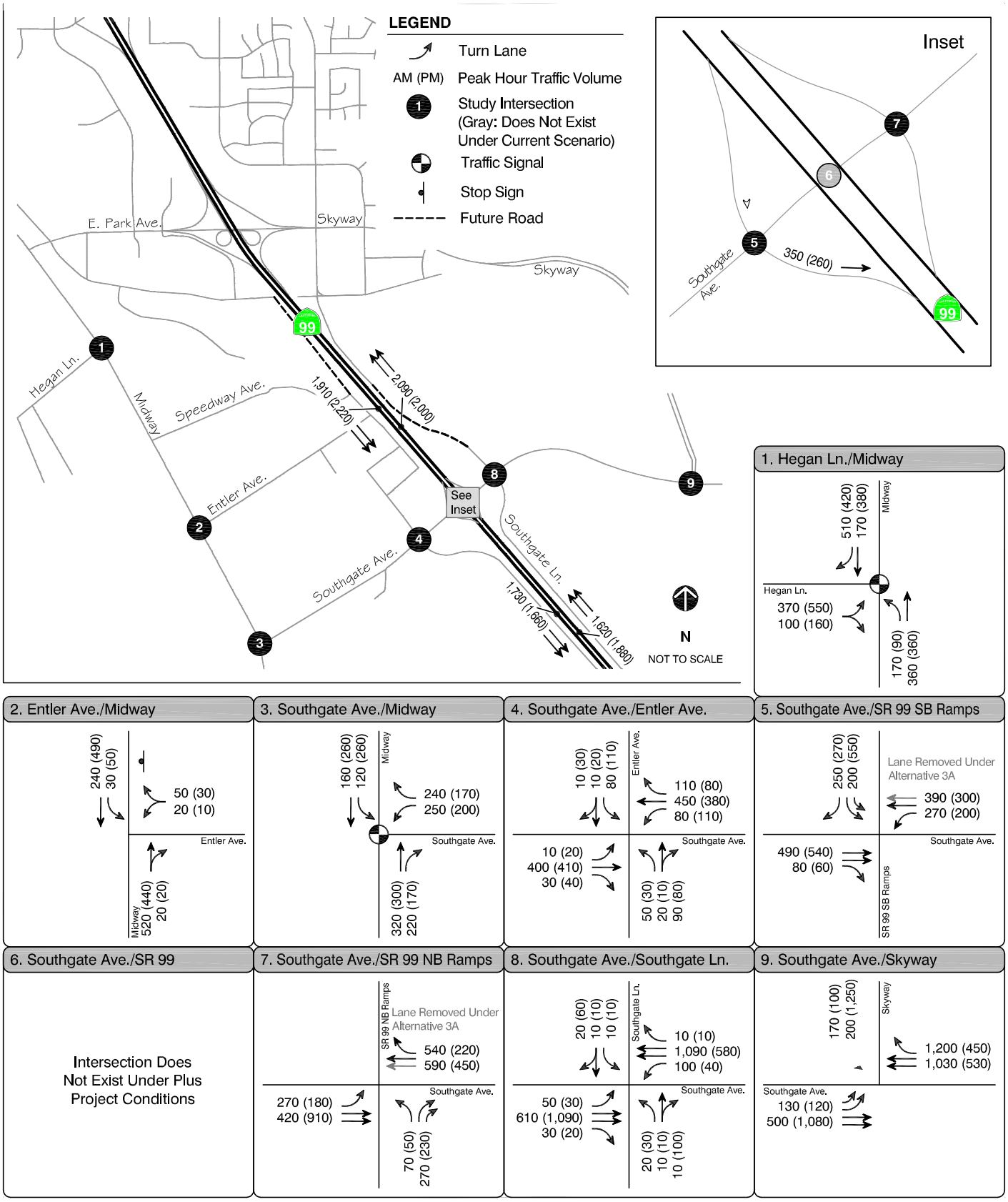

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 PLUS PROJECT CONDITIONS ALTERNATIVES 1B AND 1C

FIGURE 7

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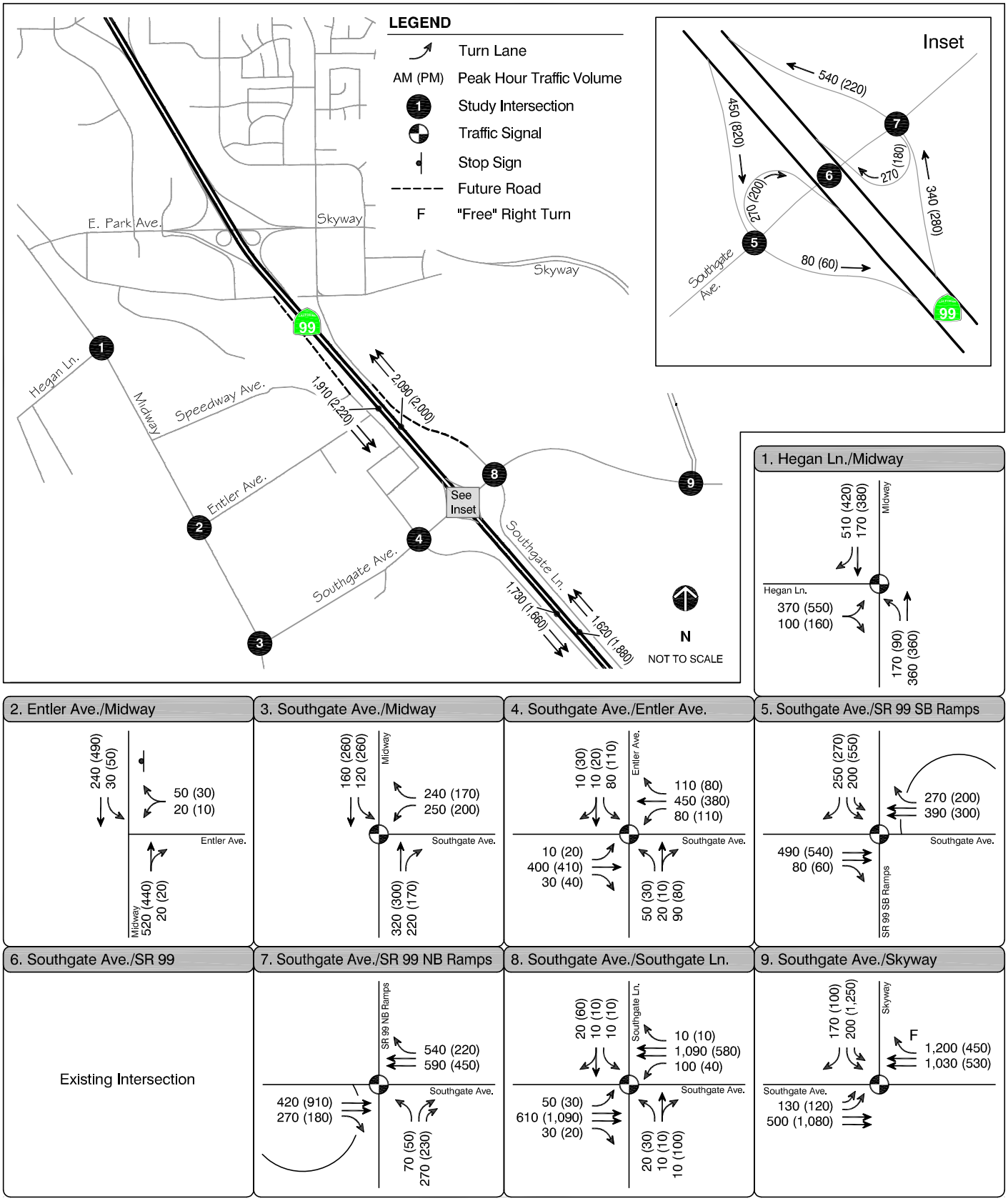

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 PLUS PROJECT CONDITIONS ALTERNATIVE 2

FIGURE 8

TABLE 8 – 2015 CONSTRUCTION YEAR INTERSECTION LEVEL OF SERVICE

Intersection	Peak Hour	No Project		With Project Alternative 1		With Project Alternative 1A		With Project Alternative 1B		With Project Alternative 1C		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/ Midway	AM	28	C	21	C	21	C	21	C	21	C	21	C
	PM	**73**	**E**	**57**	**E**	**57**	**E**	**57**	**E**	**57**	**E**	**57**	**E**
2. Entler Avenue/ Midway	AM	15	B	<10	A	<10	A	<10	A	<10	A	<10	A
	PM	20	C	<10	A	<10	A	<10	A	<10	A	<10	A
3. Southgate Avenue/Midway	AM	Not Applicable[4]		16	B	16	B	17	B	16	B	16	B
	PM			18	B	18	B	19	B	18	B	18	B
4. Southgate Avenue/ Entler Avenue[3]	AM	14	B	15	B	21	C	16	B	16	B	19	B
	PM	<10	A	17	B	22	C	17	B	17	B	24	C
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		20	B	Not Applicable[4]		19	B	19	B	10	B
	PM			19	B			22	C	22	C	19	B
6. Southgate Avenue/SR 99	AM	28	C	Not Applicable[4]		44	D	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	30	C			47	D						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		18	B	Not Applicable[4]		19	B	16	B	<10	A
	PM			13	B			11	B	13	B	<10	A
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	13	B	19	B	17	B	19	B	14	B
	PM	<10	A	<10	A	15	B	14	B	15	B	10	B
9. Southgate Avenue/Skyway	AM	Not Applicable[4]		26	C	26	C	26	C	26	C	26	C
	PM			24	C	24	C	24	C	24	C	24	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009

QUEUING

Vehicle queues at the key intersections adjacent to SR 99 were also evaluated under 2015 conditions. The "no project" and "with Alternative 1A project" queuing results for the SR 99/Southgate intersection are presented in Tables 9 and 10, respectively. For the four "with interchange project" alternatives, vehicle queues that could negatively impact interchange and freeway operations were evaluated at the following four intersections:

- Southgate Avenue/Entler Avenue – Westbound
- Southgate Avenue/SB SR 99 Ramps – Southbound, Westbound, Eastbound
- Southgate Avenue/NB SR 99 Ramps – Northbound, Westbound, Eastbound
- Southgate Avenue/Southgate Lane – Eastbound

The average maximum queue results from the four "with project" scenarios are presented in Table 11.

TABLE 9 – INTERSECTION QUEUING RESULTS UNDER 2015 "NO PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	450	132	98
		Right	500	35	13
	SB	Left	450	107	109
		Right	500	169	139
	EB	Left	100	**127**	**119**
		Through	100	**127**	**119**
		Right	100	**127**	**119**
	WB	Left	100	69	83
		Through	100	69	83
		Right	100	69	83

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

As shown in Table 9, the queues at the SR 99/Southgate Avenue intersection under "no project" conditions are adequately accommodated, except on the eastbound approach. As was the case under existing conditions, the close spacing between the SR 99/Southgate Avenue intersection and the Entler Avenue/Southgate Avenue intersection causes the eastbound queue at the SR 99 intersection to spill back into the Entler Avenue intersection. The eastbound queuing does not cause any operational problems on SR 99. However, with increased development anticipated at the southwest corner of the SR 99/Southgate Avenue intersection, the risk of southbound-to-eastbound vehicles blocking westbound vehicles on Southgate Avenue increases, which could ultimately lead to queues that extend into the SR 99 mainline. To reduce the likelihood of this type of queuing, construction of a cul-de-sac is recommended on Entler Avenue in addition to a new roadway located approximately 800 feet to the west that would connect Southgate Avenue to Entler Avenue via Loren Avenue.

Table 10 shows that under the at-grade "with project" scenario, all queues will be accommodated within the available storage areas.

TABLE 10 – INTERSECTION QUEUING RESULTS UNDER 2015 "ALTERNATIVE 1A" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	500	118	154
		Right	500	169	308
	SB	Left	600	130	367
		Right	500	103	99
	EB	Left	300	197	179
		Through	875	92	221
		Right	250	56	68
	WB	Left	250	164	176
		Through	875	595	166
		Right	400	340	223

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

Table 11 shows that under all the "with project" interchange scenarios, queues will be accommodated within the available storage areas.

TABLE 11 – INTERSECTION QUEUING RESULTS UNDER 2015 "WITH PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)							
				Alternative 1		Alternative 1B		Alternative 1C		Alternative 2	
				AM	PM	AM	PM	AM	PM	AM	PM
1. Southgate Avenue/ Entler Avenue	WB	Left	200	119	132	119	131	109	129	102	155
		Through	475	147	130	139	162	159	131	27	35
		Right	200	33	25	39	58	36	33	46	56
2. Southgate Avenue/ SB SR 99 Ramps	NB	Left[2]	1,300	190	197	--	--	--	--	--	--
		Right[2]	1,300	92	121	--	--	--	--	--	--
	SB	Left[2]	1,750	--	--	112	215	109	204	122	234
		Right[2]	1,750	--	--	135	120	85	87	53	58
	EB	Through	475	181	189	193	187	221	162	34	66
		Right	250	42	46	61	55	46	52	18	32
	WB	Left[2]	350	262	227	272	229	283	206	--	--
		Through	825	123	107	138	140	83	110	66	79
		Right[2]	150	--	--	--	--	--	--	56	65
3. Southgate Avenue/ NB SR 99 Ramps	NB	Left	1,750	--	--	86	77	84	80	92	63
		Right	1,750	--	--	83	76	71	77	67	90
	SB	Left[2]	1,300	137	104	--	--	--	--	--	--
		Right[2]	1,300	39	33	--	--	--	--	--	--
	EB	Left[2]	350	326	192	329	186	299	209	--	--
		Through	825	118	118	144	71	110	76	27	71
		Right[2]	150	--	--	--	--	--	--	36	33
	WB	Through	475	278	184	362	180	245	164	105	90
		Right	350	265	100	259	67	271	79	72	47
4. Southgate Avenue/ Southgate Lane	EB	Left	200	71	69	96	100	82	70	59	39
		Through	475	190	175	164	290	154	294	110	238
		Right	200	39	20	51	67	40	44	38	9

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
[2] Depending on the interchange alternative, some movements are not allowed.

Source: Fehr & Peers, 2009

FREEWAY OPERATIONS

Figures 4, 5, 6, 7, and 8 show the AM and PM peak hour traffic demand volumes for the SR 99 mainline segments and the freeway ramp junctions (for the "with interchange project" alternatives). Table 12 shows traffic operations for the SR 99 mainline segments. Note that on Table 12, there is no differentiation between the five "with project" scenarios since the intersection/interchange design will not affect the mainline traffic volumes. Table 13 presents the results of the freeway ramp junction analysis under the four "with interchange project" scenarios (there are no ramp junctions under the "no project" or Alternative 1A scenarios).

Table 12 shows that all SR 99 mainline segments will operate acceptably with or without the project. Table 13 shows that all ramp junctions will operate acceptably under all of the "with project" alternatives.

TABLE 12 – SR 99 MAINLINE OPERATIONS UNDER 2015 CONDITIONS

Intersection	Peak Hour	No Project		With Project	
		Density	LOS	Density	LOS
1. Northbound SR 99 between Estates Drive and Southgate Avenue	AM PM	15 16	B B	16 17	B B
2. Northbound SR 99 between Southgate Avenue and Skyway	AM PM	17 18	B B	21 18	C C
3. Southbound SR 99 between Skyway and Southgate Avenue	AM PM	19 17	C B	18 21	C C
4. Southbound SR 99 between Southgate Avenue and Estates Drive	AM PM	17 15	B B	18 15	C B

Source: Fehr & Peers, 2009

TABLE 13 – SR 99 RAMP JUNCTION OPERATIONS UNDER 2015 CONDITIONS

Intersection	Peak Hour	Alternative 1		Alternative 1B		Alternative 1C		Alternative 2	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
1. Northbound SR 99 Off-Ramp	AM PM	18 21	B C	18 21	B C	18 21	B C	18 21	B C
2. Northbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		Not Applicable		16 19	B B
3. Northbound SR 99 Slip On-Ramp	AM PM	21 21	C C	21 21	C C	21 21	C C	21 21	C C
4. Southbound SR 99 Off-Ramp	AM PM	20 25	C C	20 25	C C	20 25	C C	20 25	C C
5. Southbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		Not Applicable		19 18	B B
6. Southbound SR 99 Slip On-Ramp	AM PM	19 18	B B	19 18	B B	19 18	B B	19 18	B B

Notes: [1] Loop on-ramps would only be constructed with the Alternative 2 project.
Source: Fehr & Peers, 2009

6. INTERIM YEAR (2025) CONDITIONS

This chapter presents the interim year operational characteristics of the roadway system under 2025 conditions.

ROADWAY NETWORK CHANGES

Under 2025 conditions, several local roadway projects are expected to be completed near the study area. These projects, which are listed in the BCAG Regional Transportation Plan (RTP), include:

- Midway – Widen to four lanes between East Park Avenue and Hegan Lane
- West Frontage Road – New two-lane frontage road west of SR 99 between Fair Street and Speedway Avenue and between Southgate Avenue and Estates Drive (the SR 99/Estates Drive intersection is assumed to be removed)
- East Frontage Road – New two-lane frontage road east of SR 99 between the current southern terminus of Notre Dame Boulevard and Southgate Avenue

In addition to the projects described above, the RTP lists the following project along Southgate Avenue:

- Southgate Avenue West Extension – Widening to four-lanes from Entler Avenue to Midway

Based on a preliminary analysis of traffic volumes, the western extension of Southgate Avenue would also require additional widening on Midway between Hegan Lane and Southgate Avenue; this widening project is also included in all 2025 “with project” scenarios except for Alternative 1A and Alternative 1B. Under these interim improvement conditions, Midway south of Hegan Lane and Southgate Avenue west of SR 99 will remain as two lane roadways in 2025.

ANALYSIS SCENARIOS

Five scenarios were analyzed under 2025 conditions – the “no project” alternative and the four “with project” alternatives.

INTERSECTION OPERATIONS

Figures 9, 10, 11, 12, and 13 present the projected traffic volumes, lane configurations, and traffic controls under interim year “no project” and “with project” conditions, respectively. Table 14 shows the LOS and delay for the study intersections under 2025 AM and PM peak hour conditions.

TABLE 14 – 2025 INTERIM YEAR INTERSECTION LEVEL OF SERVICE

Intersection	Peak Hour	No Project		With Project Alternative 1		With Project Alternative 1A		With Project Alternative 1B		With Project Alternative 1C		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/ Midway	AM	15	B	24	C	24	C	24	C	24	C	24	C
	PM	30	C	29	C	29	C	29	C	29	C	29	C
2. Entler Avenue/ Midway	AM	22	C	12	B	12	B	12	B	12	B	12	B
	PM	14	B	16	C	16	C	16	C	16	C	16	C
3. Southgate Avenue/Midway	AM	Not Applicable[4]		21	C	21	C	15	B	15	B	15	B
	PM			32	C	32	C	23	C	23	C	23	C
4. Southgate Avenue/ Entler Avenue[3]	AM	**65**	**F**	16	B	16	B	26	C	16	B	19	B
	PM	**41**	**E**	19	B	19	B	25	C	19	B	19	B
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		21	C	Not Applicable[4]		24	C	18	B	11	B
	PM			21	C			25	C	22	C	17	B
6. Southgate Avenue/SR 99	AM	**100**	**F**	Not Applicable[4]		66	E	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	**99**	**F**			73	E						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		21	C	Not Applicable[4]		27	C	20	C	<10	A
	PM			14	B			15	B	12	B	<10	A
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	15	B	28	C	29	C	22	C	17	B
	PM	<10	A	13	B	16	B	21	C	15	B	18	B
9. Southgate Avenue/Skyway	AM	Not Applicable[4]		40	D	40	D	40	D	40	D	40	D
	PM			26	C	26	C	26	C	26	C	26	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

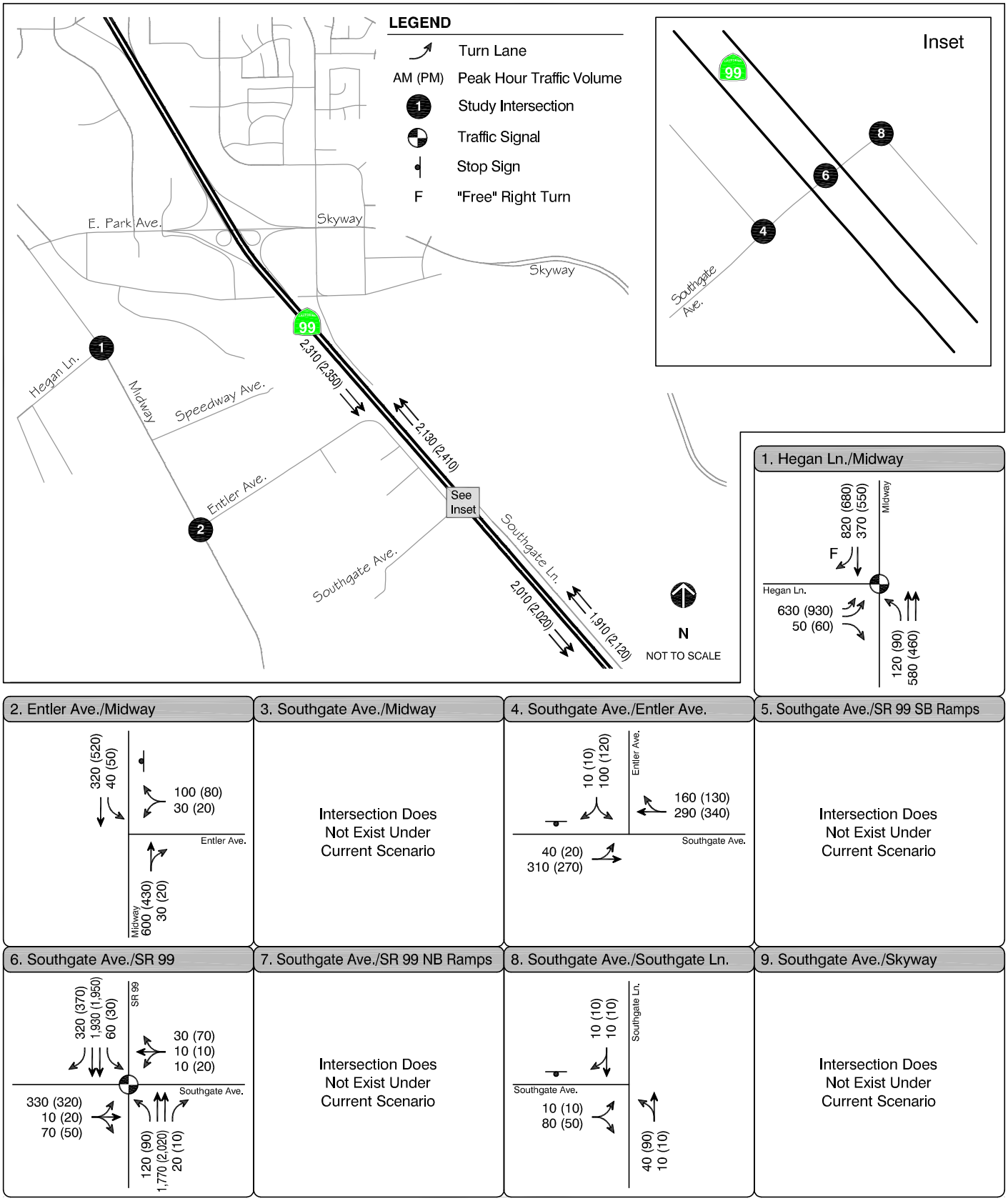
[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009

As shown on Table 14, without the proposed improvements, the intersections of Southgate Avenue/Entler Avenue and SR 99/Southgate Avenue operate unacceptably during the AM and PM peak hours. The deterioration of traffic operations at these two intersections is largely attributable to increased traffic on SR 99 and the new development planned to the southwest of the SR 99/Southgate Avenue intersection.

Under "with project" conditions, all study intersections are expected to operate acceptably. Note that the under Alternative 1A, the LOS E operations at the SR 99/Southgate Avenue intersection is considered acceptable because the Caltrans concept LOS on SR 99 is LOS E.



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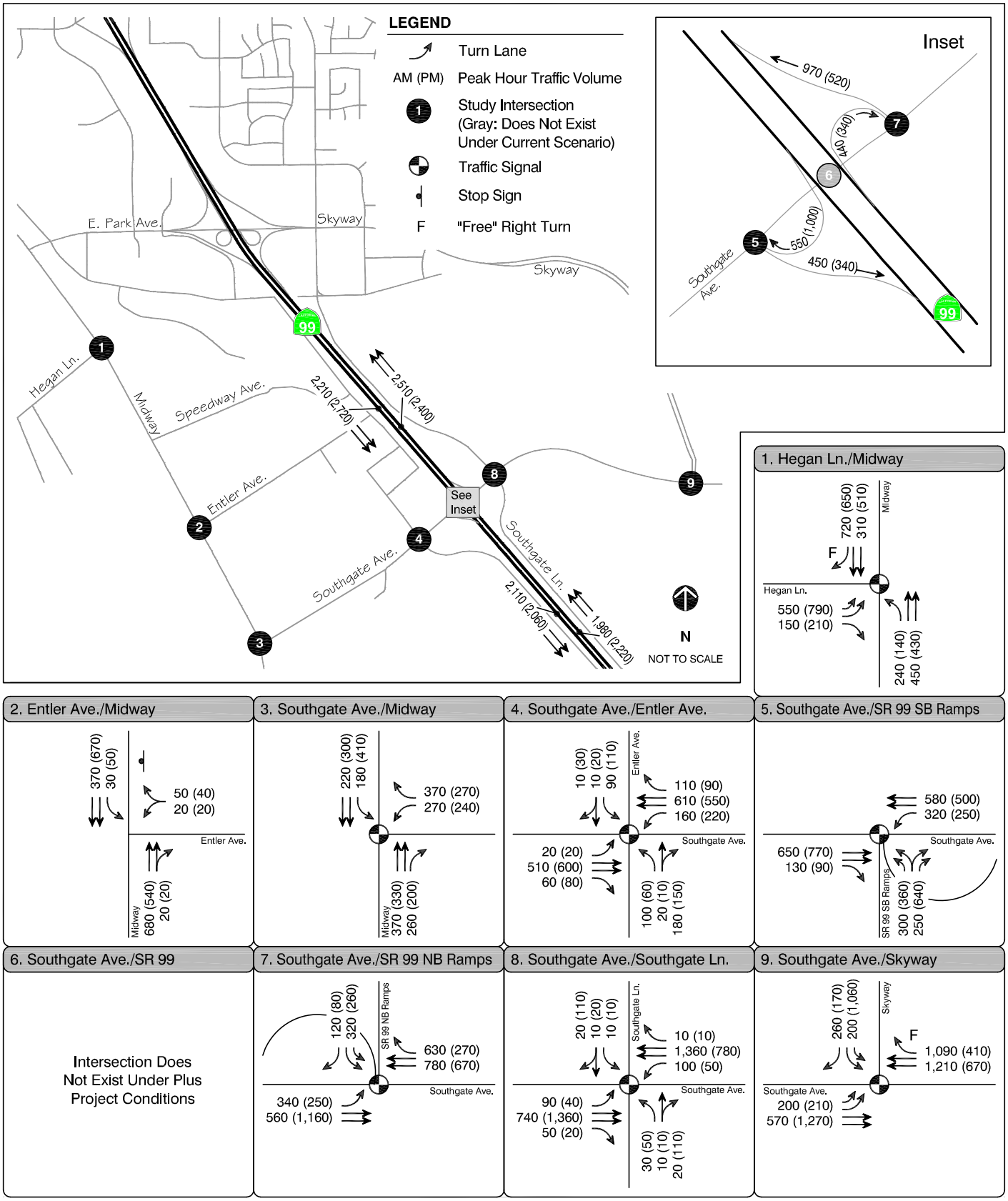
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2025 NO PROJECT CONDITIONS

FIGURE 9



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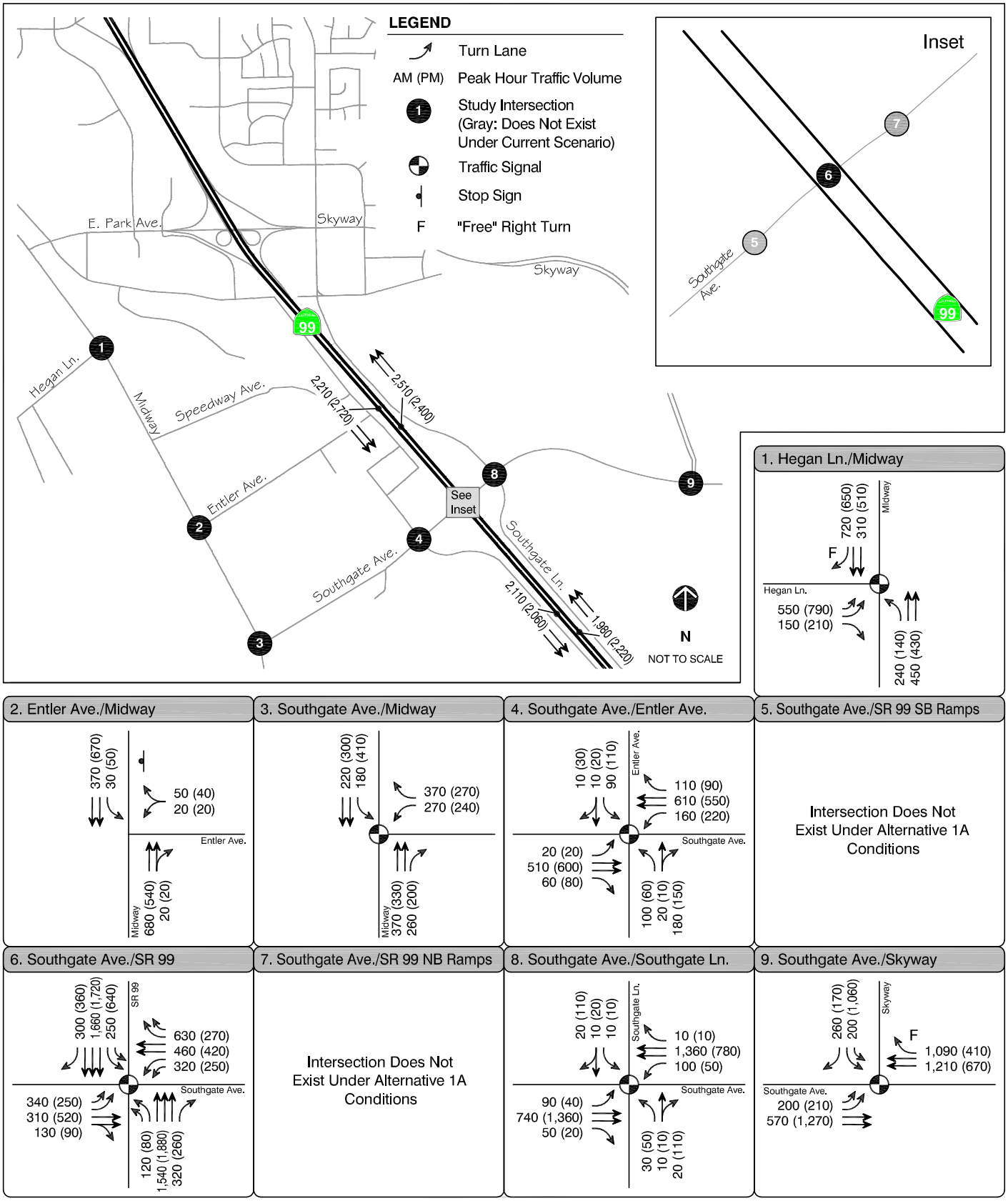
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2025 PLUS PROJECT CONDITIONS ALTERNATIVE 1

FIGURE 10



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2025 PLUS PROJECT CONDITIONS ALTERNATIVE 1A

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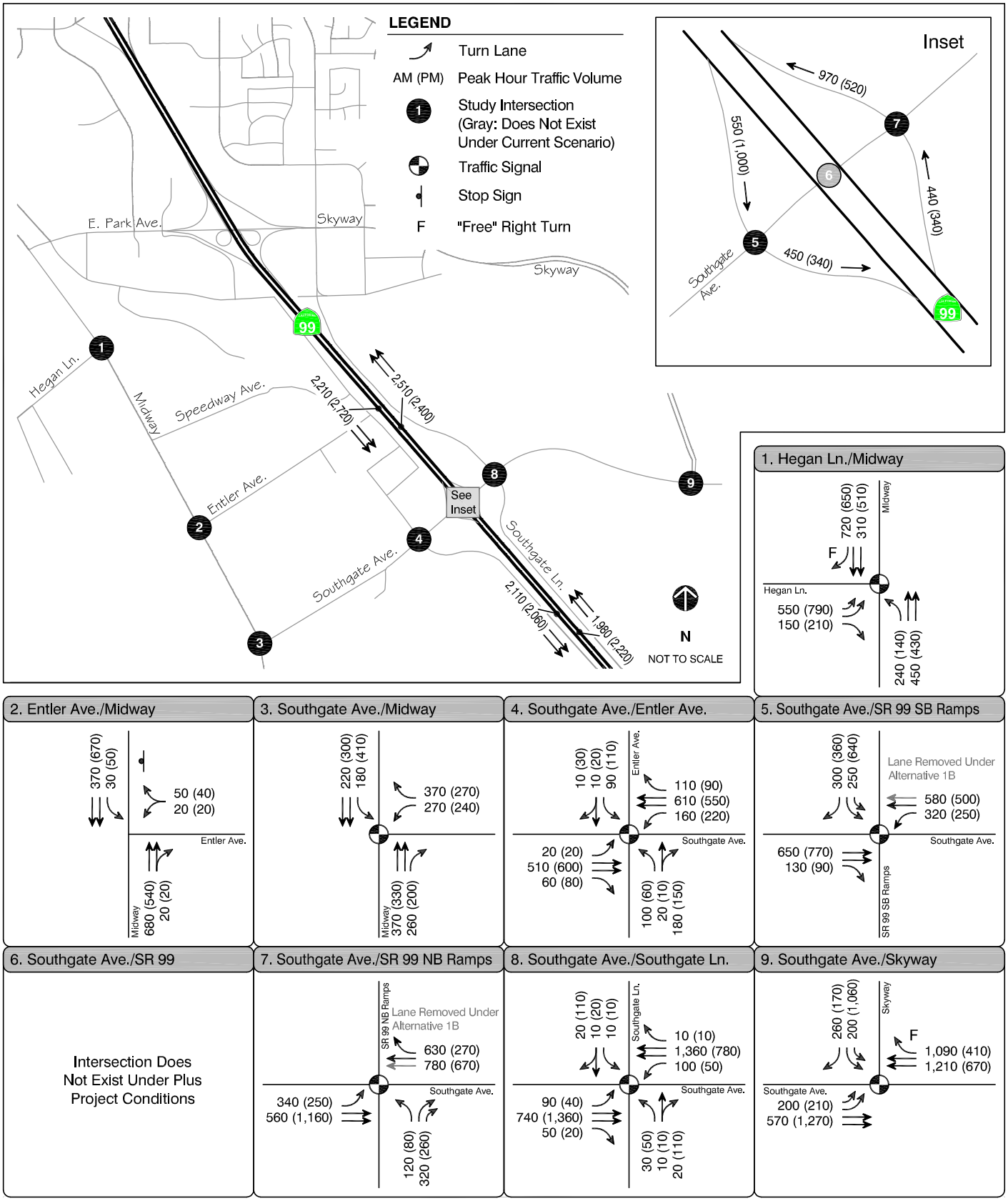
FIGURE 11



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2025 PLUS PROJECT CONDITIONS ALTERNATIVES 1B AND 1C

FIGURE 12

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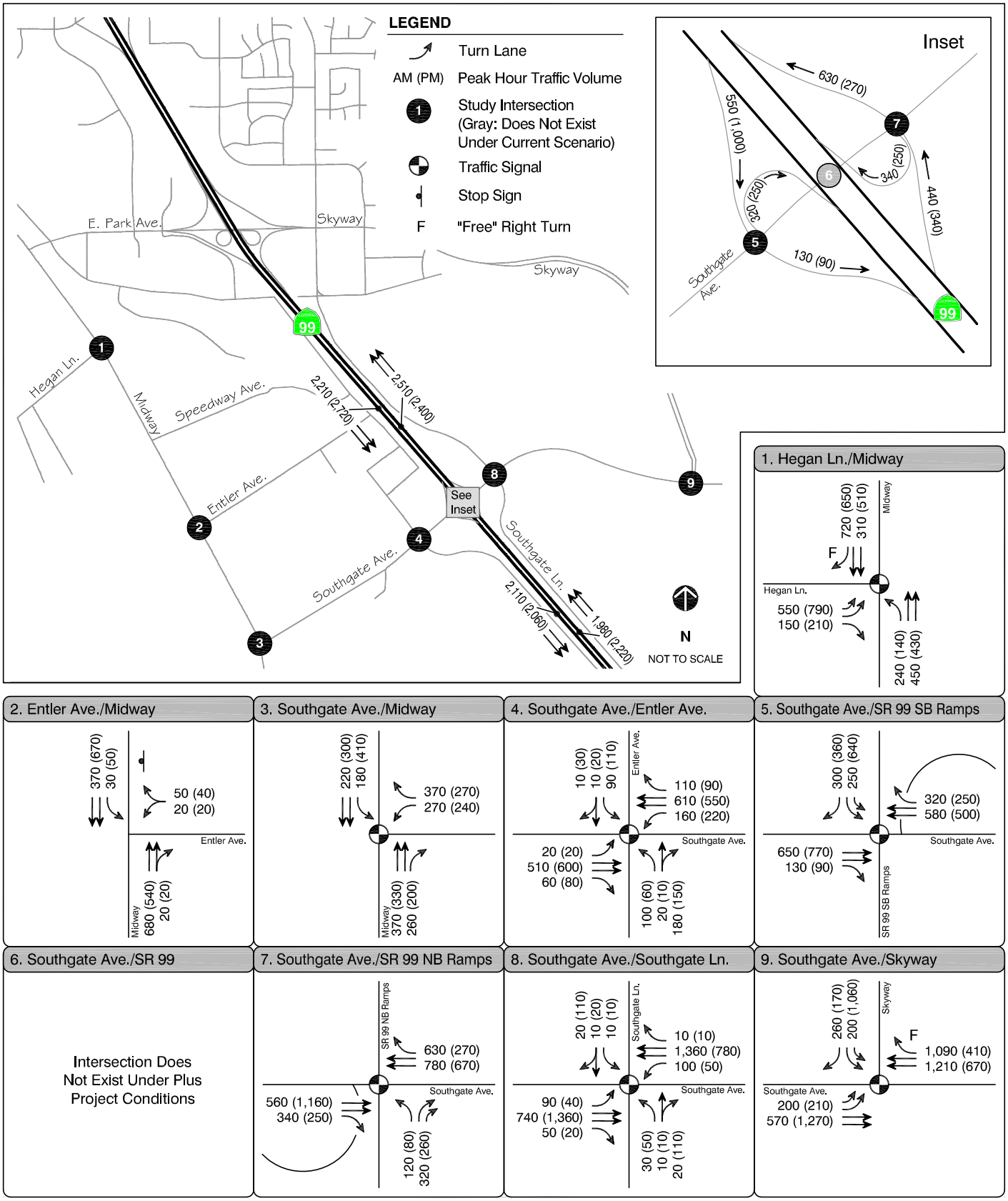

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2025 PLUS PROJECT CONDITIONS ALTERNATIVE 2

FIGURE 13

QUEUING

Vehicle queues at the key intersections adjacent to SR 99 were also evaluated under 2025 conditions. Under the "no project" scenario and the Alternative 1A "with project" scenario, vehicle queues at the SR 99/Southgate Avenue intersection were estimated. Under the "with interchange project" scenarios, vehicle queues were evaluated at the two ramp terminal intersections and the two intersections east and west of the interchange. The "no project" queuing results are presented in Table 15, the Alternative 1A queuing results are presented in Table 16, and the "with interchange project" queuing results are presented in Table 17.

TABLE 15 – INTERSECTION QUEUING RESULTS UNDER 2025 "NO PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	450	430	446
		Right	500	82	130
	SB	Left	450	292	156
		Right	500	**536**	**534**
	EB	Left	100	**135**	**133**
		Through	100	**135**	**133**
		Right	100	**135**	**133**
	WB	Left	100	70	**108**
		Through	100	70	**108**
		Right	100	70	**108**

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

As shown in Table 15, the eastbound queues at the SR 99/Southgate Avenue intersection under "no project" conditions continue to spill back into the Entler Avenue intersection. Table 15 also shows that the southbound right-turn queue will exceed the length of the existing turn pocket. However, a review of the simulation model indicated that the long southbound right-turn queue is caused by right-turning vehicles being trapped in the long southbound through queue. Therefore, the southbound turn pocket is not expected to block the SR 99 mainline during the AM or PM peak hour. The westbound queue is also expected to exceed its storage area under 2025 conditions during the PM peak hour. However, similar to the Southgate Avenue/Entler Avenue intersection to the west, this spillback would not cause a substantial traffic hazard as traffic will simply queue to the south on Southgate Lane. Under "no project" conditions this westbound queue would impact the Peterson Tractor driveway located just east of SR 99, and not another roadway.

Table 16 shows that with the expanded intersection, all vehicle queues would be contained within the available storage areas.

Table 17 shows that under the Alternative 1 and Alternative 2 "with project" scenarios, all queues will be accommodated within the available storage areas. Under Alternatives 1B and 1C the eastbound left-turn exceeds its turn pocket during the AM peak hour by 7 and 27 feet, respectively. Under Alternative 1C only, westbound traffic approaching the northbound ramps may extend to the intersection of Southgate Avenue and Southgate Lane. While vehicle queues under Alternatives 1B and 1C will exceed the available storage

areas during the AM peak hour, the queues will not adversely impact freeway mainline operations, or cause intersections to operate unacceptably. There will be no queuing issues outside of the AM peak hour.

TABLE 16 – INTERSECTION QUEUING RESULTS UNDER 2025 "ALTERNATIVE 1A" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	500	489	260
		Right	500	447	484
	SB	Left	600	144	540
		Right	500	146	142
	EB	Left	300	270	256
		Through	875	315	414
		Right	250	104	237
	WB	Left	250	242	232
		Through	875	839	327
		Right	400	332	267

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

TABLE 17 – INTERSECTION QUEUING RESULTS UNDER 2025 "WITH PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)							
				Alternative 1		Alternative 1B		Alternative 1C		Alternative 2	
				AM	PM	AM	PM	AM	PM	AM	PM
1. Southgate Avenue/ Entler Avenue	WB	Left	200	151	175	204[3]	262[3]	153	167	162	176
		Through	475	160	297	321	274	128	193	195	264
		Right	200	39	48	117	59	52	57	50	39
2. Southgate Avenue/ SB SR 99 Ramps	NB	Left[2]	1,300	161	218	--	--	--	--	--	--
		Right[2]	1,300	155	224	--	--	--	--	--	--
	SB	Left	1,750	--	--	162	252	134	240	141	242
		Right	1,750	--	--	206	205	131	147	113	130
	EB	Through	475	239	254	326	201	263	267	109	137
		Right	250	52	76	109	61	100	67	33	32
	WB	Left[2]	350	324	267	328	235	314	249	--	--
		Through	825	94	126	175	142	100	80	169	186
		Right[2]	150	--	--	--	--	--	--	78	64
3. Southgate Avenue/ NB SR 99 Ramps	NB	Left	1,750	--	--	162	102	123	104	149	114
		Right	1,750	--	--	92	105	84	103	74	89
	SB	Left[2]	1,300	144	115	--	--	--	--	--	--
		Right[2]	1,300	69	52	--	--	--	--	--	--
	EB	Left[2]	350	331	255	**377**	292	**357**	206	--	--
		Through	825	166	145	643	92	224	113	87	136
		Right[2]	150	--	--	--	--	--	--	51	73
	WB	Through	475	424	225	**500**	355	404	170	130	80
		Right	350	321	93	**408**	91	318	105	87	43
4. Southgate Avenue/ Southgate Lane	EB	Left	200	118	102	163	78	138	70	132	128
		Through	475	110	283	400	412	183	273	142	423
		Right	200	34	49	109	85	49	70	39	103

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
[2] Depending on the interchange alternative, some movements are not allowed.
[3] Under Alternative 1B the length of the westbound left turn lane at Southgate Avenue/Enter Avenue was extended to 450 feet.

Source: Fehr & Peers, 2009

FREEWAY OPERATIONS

Figures 9, 10, 11, 12, and 13 show the AM and PM peak hour traffic demand volumes for the SR 99 mainline segments and the freeway ramp junctions (for the "with interchange project" scenarios). Table 18 shows traffic operations for the SR 99 mainline segments. Note that on Table 18, there is no differentiation between the five "with project" scenarios since intersection/interchange design will not affect the mainline traffic

volumes. Table 19 presents the results of the freeway ramp junction analysis under the four "with project" scenarios interchange (there are no ramp junctions under the "no project" or Alternative 1A scenarios).

As shown in Table 18, the SR 99 mainline segments are expected to operate acceptably with or without the project. Table 19 shows that all ramp junctions will operate acceptably under all of the "with project" alternatives.

TABLE 18 – SR 99 MAINLINE OPERATIONS UNDER 2025 CONDITIONS

Intersection	Peak Hour	No Project		With Project	
		Density	LOS	Density	LOS
1. Northbound SR 99 between Estates Drive and Southgate Avenue	AM PM	19 19	C C	20 20	C C
2. Northbound SR 99 between Southgate Avenue and Skyway	AM PM	21 22	C C	25 22	C C
3. Southbound SR 99 between Skyway and Southgate Avenue	AM PM	23 21	C C	22 25	C C
4. Southbound SR 99 between Southgate Avenue and Estates Drive	AM PM	20 18	C C	21 19	C C

Source: Fehr & Peers, 2009

TABLE 19 – SR 99 RAMP JUNCTION OPERATIONS UNDER 2025 CONDITIONS

Intersection	Peak Hour	Alternative 1		Alternative 1B		Alternative 1C		Alternative 2	
		Density	LOS	Density	LOS	Density	LOS	Density	LOS
1. Northbound SR 99 Off-Ramp	AM PM	22 24	C C	22 24	C C	22 24	C C	22 24	C C
2. Northbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		Not Applicable		20 22	B C
3. Northbound SR 99 Slip On-Ramp	AM PM	24 24	C C	24 24	C C	25 24	C C	24 24	C C
1. Southbound SR 99 Off-Ramp	AM PM	22 24	C C	22 24	C C	22 24	C C	22 24	C C
2. Southbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		Not Applicable		20 20	C C
3. Southbound SR 99 Slip On-Ramp	AM PM	21 21	C C	21 21	C C	22 21	C C	21 21	C C

Notes: [1] Loop on-ramps would only be constructed with the Alternative 2 project.
Source: Fehr & Peers, 2009

7. DESIGN YEAR (2035) CONDITIONS

The design year analysis presents the operational characteristics of the roadway system under 2035 conditions.

ROADWAY NETWORK CHANGES

No additional roadway network changes are anticipated near the study area between 2025 and 2035 conditions.

ANALYSIS SCENARIOS

Four scenarios were analyzed under 2035 conditions – the "no project" alternative and three "with project" alternatives. Since Alternatives 1A and 1B were envisioned as interim improvements, these were not evaluated under 2035 conditions. It is anticipated that if Alternative 1A is implemented, it would be converted to one of the interchange designs, while Alternative 1C would be converted to the Alternative 1 design. In either event, the interim intersection/interchange design would begin to fail soon after 2025 conditions and an ultimate solution would be required.

INTERSECTION OPERATIONS

Figures 14, 15, 16, and 17 present the projected traffic volumes, lane configurations, and traffic controls under interim year "no project" and "with project" conditions, respectively. Table 20 shows the level of service and delay for the study intersections under 2035 AM and PM peak hour conditions.

As shown on Table 20, the intersection of Hegan Lane/Midway is expected to operate unacceptably under "with project" conditions during the AM and PM peak hours and under "no project" conditions during the PM peak hour. The increased delay experienced under "with project" conditions is related to traffic attracted to the Midway corridor bound for SR 99 at Southgate Avenue. Additional improvements will be required to maintain an acceptable LOS at this intersection by 2035.

Under the "no project" scenario, the intersections of Southgate Avenue/Entler Avenue and Southgate Ave/SR 99 continue to operate unacceptably in 2035 without any improvements. The addition of the interchange and associated improvements under the "with project" scenarios brings all intersections, with the exception of Hegan Lane/Midway, to an acceptable LOS.

TABLE 20 – INTERSECTION LEVEL OF SERVICE FOR DESIGN YEAR (2035) CONDITIONS

Intersection	Peak Hour	No Project		With Project Alternative 1		With Project Alternative 1C		With Project Alternative 2	
		Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]	Delay[1]	LOS[2]
1. Hegan Lane/Midway	AM	32	C	**76**	**E**	**76**	**E**	**76**	**E**
	PM	**140**	**F**	**144**	**F**	**144**	**F**	**144**	**F**
2. Entler Avenue/Midway	AM	25	C	15	C	15	C	15	C
	PM	17	C	18	C	18	C	18	C
3. Southgate Avenue/ Midway	AM	Not Applicable[4]		18	B	18	B	18	B
	PM			23	C	23	C	23	C
4. Southgate Avenue/ Entler Avenue[3]	AM	**152**	**F**	22	C	23	C	23	C
	PM	**58**	**F**	30	C	29	C	25	C
5. Southgate Avenue/ SB SR 99 Ramps	AM	Not Applicable[4]		23	C	21	C	12	B
	PM			26	C	26	C	17	B
6. Southgate Avenue/ SR 99	AM	**292**	**F**	Not Applicable[4]		Not Applicable[4]		Not Applicable[4]	
	PM	**366**	**F**						
7. Southgate Avenue/ NB SR 99 Ramps	AM	Not Applicable[4]		28	C	28	C	<10	A
	PM			18	B	17	B	10	B
8. Southgate Avenue/ Southgate Lane[3]	AM	<10	A	21	C	23	C	23	C
	PM	<10	A	19	B	26	C	19	B
9. Southgate Avenue/ Skyway	AM	Not Applicable[4]		43	D	43	D	43	D
	PM			35	C	35	C	35	C

Notes:

[1] For signalized intersections, average intersection delay is reported in seconds per vehicle. For the side-street stop controlled intersection of Entler/Midway, the delay and LOS for the most-delayed individual movement is reported

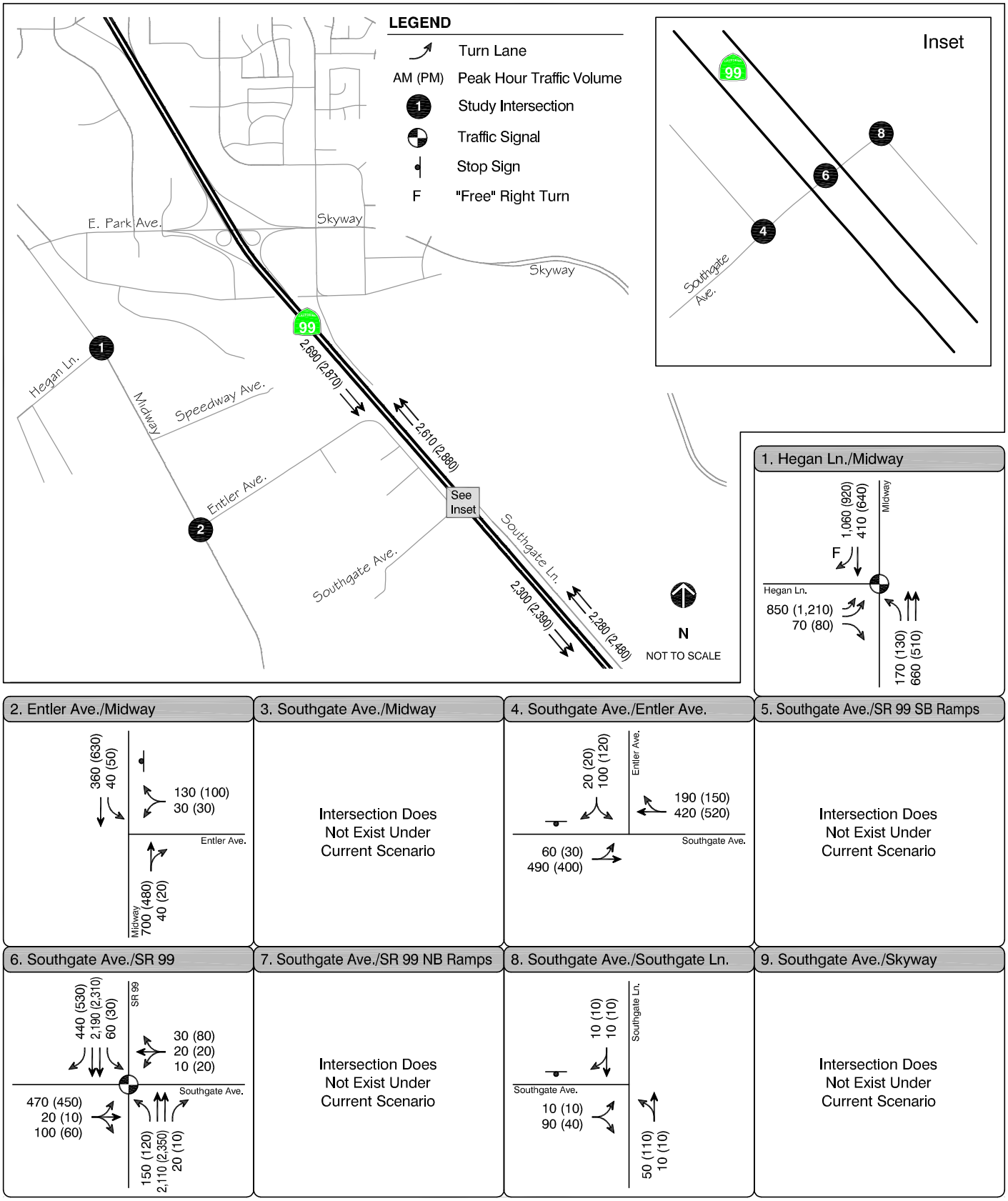
[2] LOS = level of service

[3] These intersections operate with side-street stop-control under the "no project" scenario and with signal control under the "with project scenarios"

[4] These intersections do not exist under certain scenarios

Bold indicates unacceptable operations

Source: Fehr & Peers, 2009



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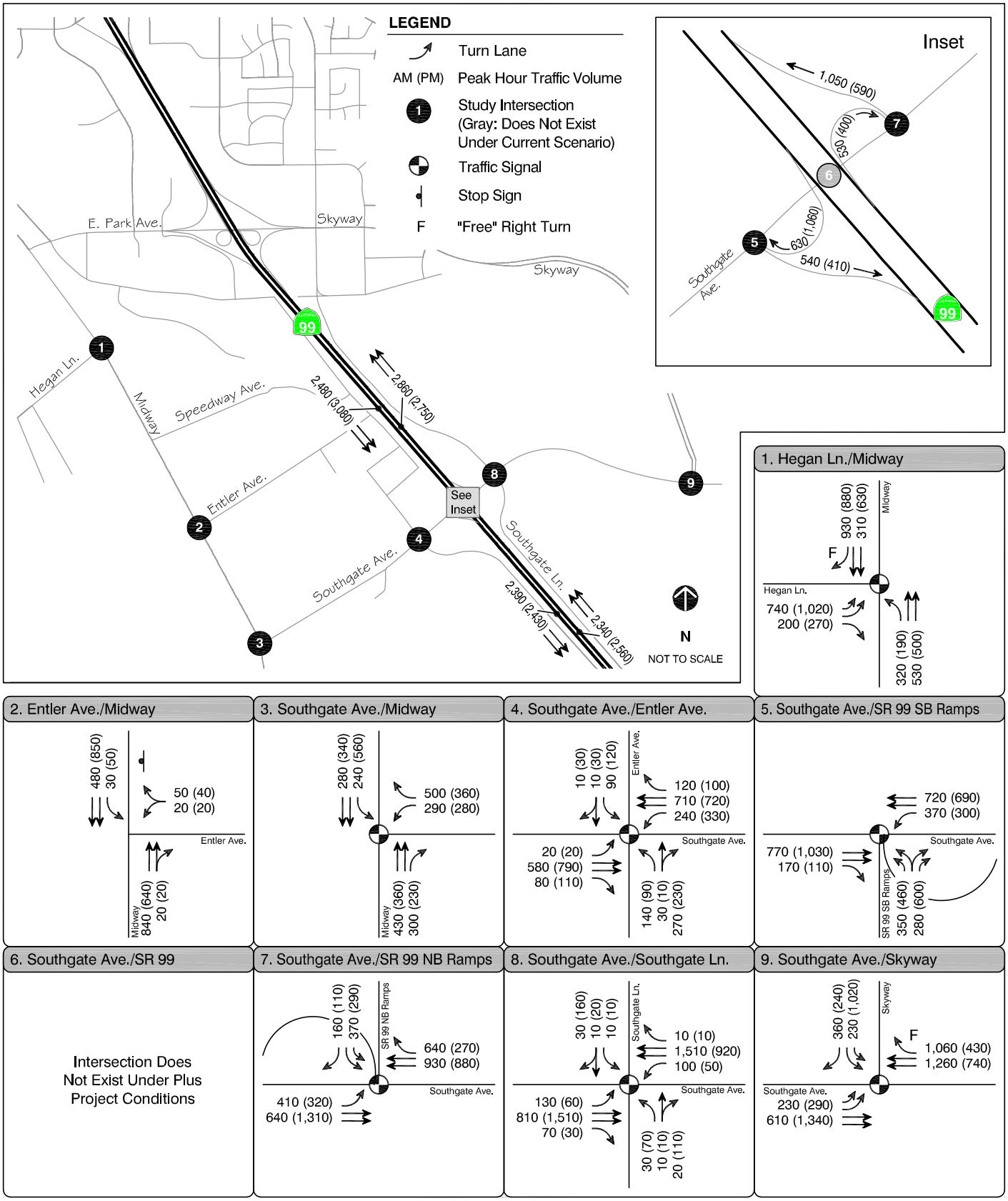
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2035 NO PROJECT CONDITIONS

FIGURE 14



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2035 PLUS PROJECT CONDITIONS ALTERNATIVE 1

FIGURE 15

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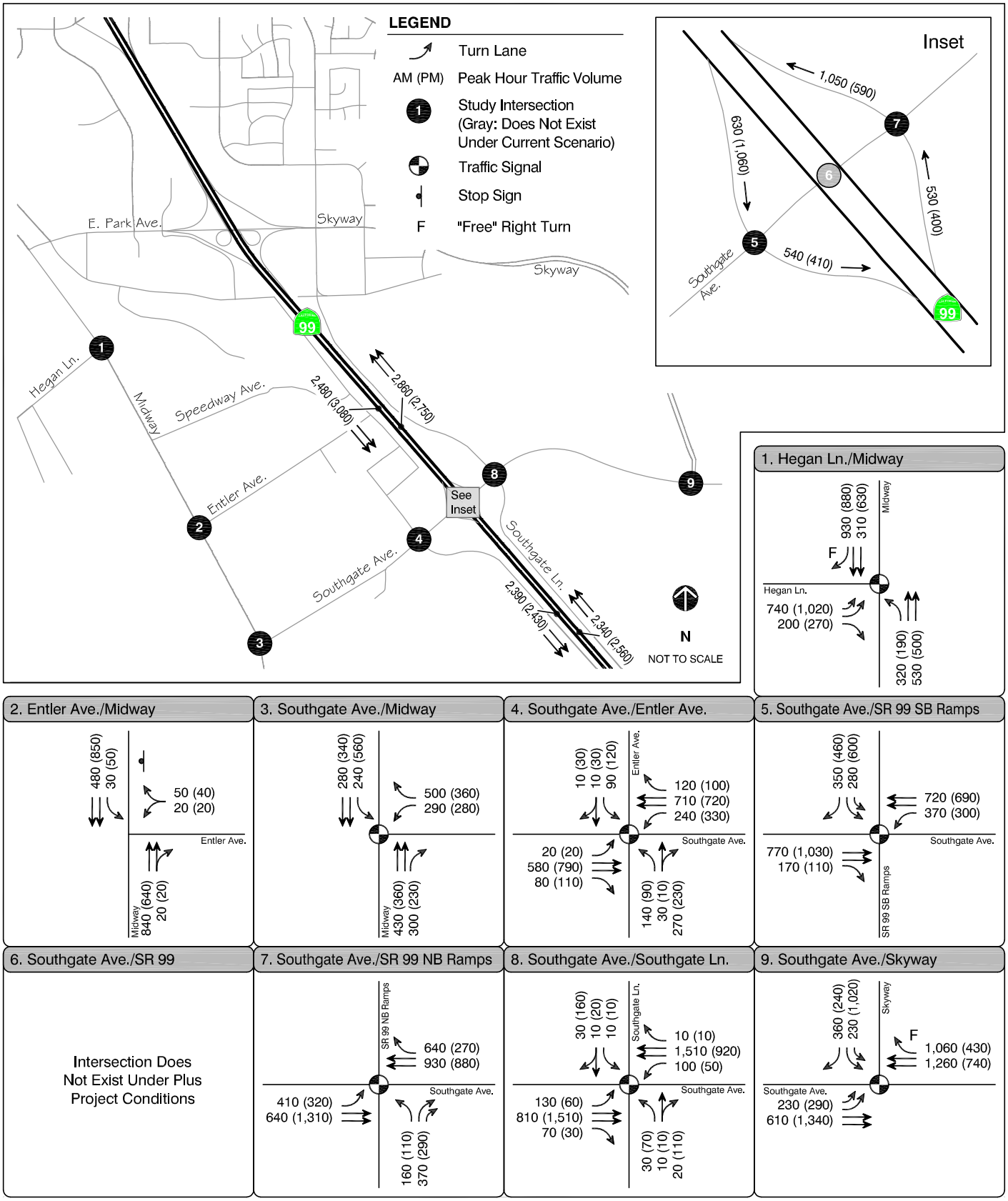

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2035 PLUS PROJECT CONDITIONS ALTERNATIVE 1C

FIGURE 16

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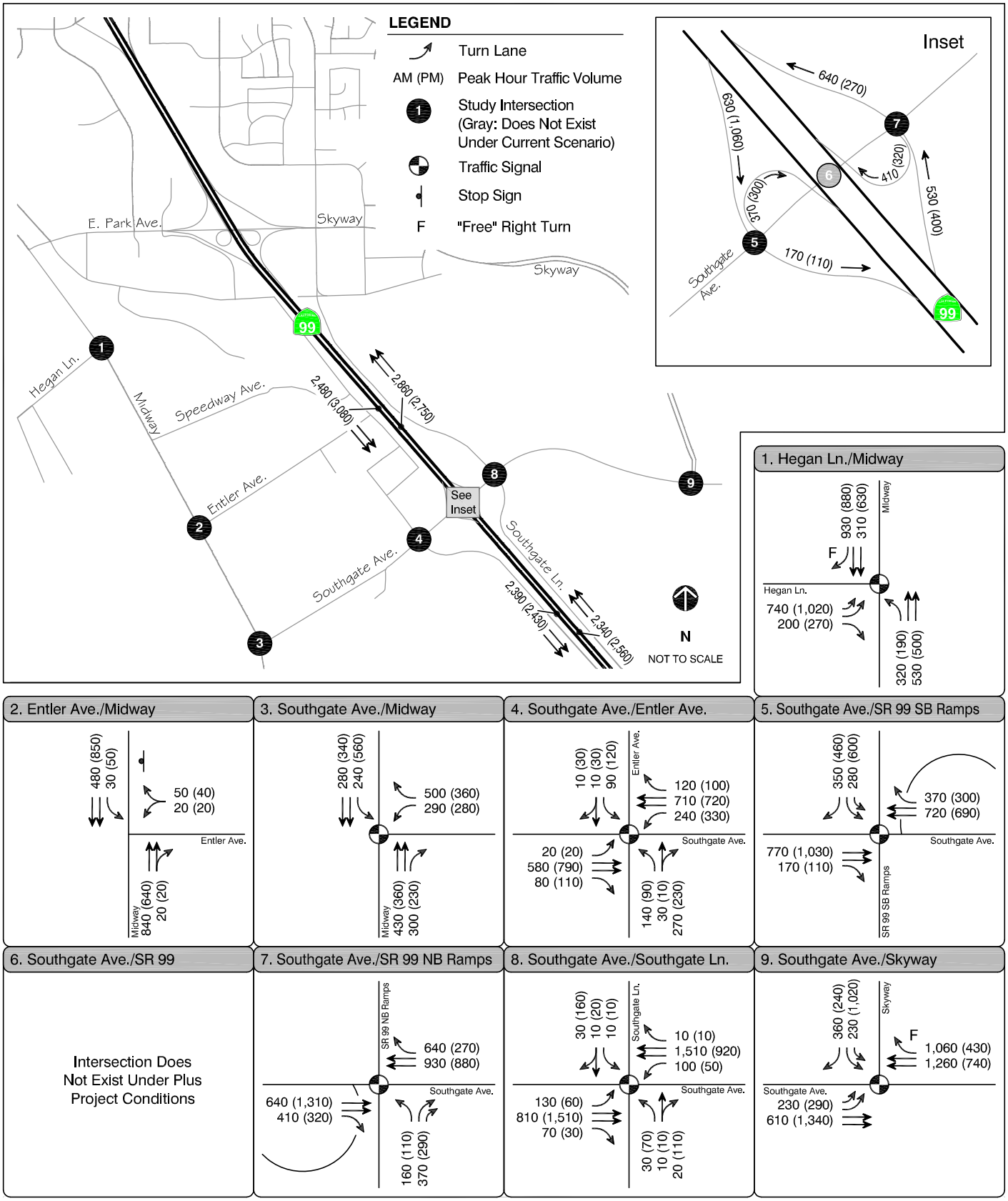

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2035 PLUS PROJECT CONDITIONS ALTERNATIVE 2

FIGURE 17

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QUEUING

Under the "no project" scenario, the vehicle queue at the SR 99/Southgate Avenue intersection during the AM peak hour would exceed the available storage for northbound left-turns. Additionally, the movements previously identified to exceed available storage under interim year conditions will continue to spill-back under 2035 conditions.

Under the three "with project" scenarios, vehicle queues were evaluated at the two ramp terminal intersections and the two intersections east and west of the interchange. Under Alternative 1C, the back-to-back left-turn lanes on the overcrossing would both exceed the available storage during the AM peak hour by at least 18 feet. In addition, the westbound through approach to the northbound SR 99 ramp terminal intersection is expected to queue back into the Southgate Lane intersection by as much as 25 feet during the AM peak hour. Under Alternative 1C during the PM peak hour, the eastbound through approach to the Southgate Avenue/Southgate Lane intersection is estimated to have a maximum queue nearly equal to the available storage. Under Alternative 1, AM queues are expected to exceed available storage for eastbound left turns on the overpass, as well as for the westbound through approach to the northbound SR-99 ramp terminal intersection. The two loop-on ramps constructed under Alternative 2 eliminate any potential queuing issues.

While vehicle queues under Alternatives 1 and 1C will exceed the available storage areas during the peak hours, the queues will not adversely impact freeway mainline operations, or cause intersections to operate unacceptably. Note also that vehicle queues would only be present the peak hours and queuing would not present a problem for the majority of the day.

The "no project" queuing results are presented in Table 21 and the "with project" queuing results are presented in Table 22.

TABLE 21 – INTERSECTION QUEUING RESULTS UNDER 2035 "NO PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)	
				AM	PM
1. Southgate Avenue/SR 99	NB	Left	450	**452**	345
		Right	500	79	21
	SB	Left	450	246	189
		Right	500	**542**	**503**
	EB	Left	100	**141**	**143**
		Through	100	**141**	**143**
		Right	100	**141**	**143**
	WB	Left	100	75	**110**
		Through	100	75	**110**
		Right	100	75	**110**

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
Source: Fehr & Peers, 2009

TABLE 22 – INTERSECTION QUEUING RESULTS UNDER 2035 "WITH PROJECT" CONDITIONS

Intersection	Movement		Available Storage (feet)	Queue[1] (feet)					
				Alternative 1		Alternative 1C		Alternative 2	
				AM	PM	AM	PM	AM	PM
1. Southgate Avenue/ Entler Avenue	WB	Left	200	177	189	184	186	176	183
		Through	475	272	452	315	440	275	339
		Right	200	67	34	69	88	42	92
2. Southgate Avenue/ SB SR 99 Ramps	NB	Left[2]	1,300	178	266	--	--	--	--
		Right[2]	1,300	174	261	--	--	--	--
	SB	Left	1,750	--	--	133	272	169	211
		Right	1,750	--	--	182	383	149	221
	EB	Through	475	349	318	340	280	149	239
		Right	250	85	85	82	84	44	83
	WB	Left[2]	350	330	303	**368**	303	--	--
		Through	825	213	301	434	159	207	170
		Right[2]	150	--	--	--	--	103	75
3. Southgate Avenue/ NB SR 99 Ramps	NB	Left	1,750	--	--	178	122	181	137
		Right	1,750	--	--	94	132	91	117
	SB	Left[2]	1,300	182	157	--	--	--	--
		Right[2]	1,300	89	88	--	--	--	--
	EB	Left[2]	350	**354**	329	**374**	297	--	--
		Through	825	388	273	588	185	110	235
		Right[2]	150	--	--	--	--	60	82
	WB	Through	475	**518**	312	**500**	318	132	142
		Right	350	330	89	328	136	85	31
4. Southgate Avenue/ Southgate Lane	EB	Left	200	150	121	165	109	168	115
		Through	475	208	415	216	**476**	267	442
		Right	200	66	71	50	101	127	90

Notes: [1] The reported queue is the average maximum queue based on the SimTraffic simulation results.
Bold font and underline indicates that the maximum vehicle queue would exceed the available vehicle storage.
[2] Depending on the interchange alternative, some movements are not allowed.
Source: Fehr & Peers, 2009

FREEWAY OPERATIONS

Figures 14, 15, 16, and 17 show the AM and PM peak hour traffic demand volumes for the SR 99 mainline segments and the freeway ramp junctions (for the "with project" scenarios). Table 23 shows traffic operations for the SR 99 mainline segments. Table 24 presents the results of the freeway ramp junction analysis under the three "with project" scenarios.

As shown in Table 23, the SR 99 mainline segments are expected to operate acceptably with or without the project. Table 24 shows that all ramp junctions will operate acceptably under all of the "with project" alternatives.

TABLE 23 – SR 99 MAINLINE OPERATIONS UNDER 2035 CONDITIONS

Intersection	Peak Hour	No Project		With Project	
		Density	LOS	Density	LOS
1. Northbound SR 99 between Estates Drive and Southgate Avenue	AM PM	23 23	C C	23 23	C C
2. Northbound SR 99 between Southgate Avenue and Skyway	AM PM	26 26	D D	29 25	D C
3. Southbound SR 99 between Skyway and Southgate Avenue	AM PM	27 26	D D	25 29	C D
4. Southbound SR 99 between Southgate Avenue and Estates Drive	AM PM	23 22	C C	24 22	C C

Source: Fehr & Peers, 2009

TABLE 24 – SR 99 RAMP JUNCTION OPERATIONS UNDER 2035 CONDITIONS

Intersection	Peak Hour	Alternative 1		Alternative 1C		Alternative 2	
		Density	LOS	Density	LOS	Density	LOS
1. Northbound SR 99 Off-Ramp	AM PM	25 27	C C	25 27	C C	25 27	C C
2. Northbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		22 25	C C
3. Northbound SR 99 Slip On-Ramp	AM PM	27 27	C C	28 24	C C	27 27	C C
1. Southbound SR 99 Off-Ramp	AM PM	27 32	C D	27 32	C D	27 32	C D
2. Southbound SR 99 Loop On-Ramp[1]	AM PM	Not Applicable		Not Applicable		22 25	C C
3. Southbound SR 99 Slip On-Ramp	AM PM	24 24	C C	24 25	C C	24 24	C C

Notes: [1] Loop on-ramps would only be constructed with the Alternative 2 project.
Source: Fehr & Peers, 2009

8. CONCLUSION

Without the construction of the Southgate Avenue interchange and roadway extension to the east, the SR 99/Skyway interchange is forecasted to have approximately 50 percent more traffic under 2035 conditions. The Southgate Avenue interchange in conjunction with the eastern extension of the roadway will provide a more direct route between SR 99 and Paradise, and will serve future development anticipated in the City of Chico General Plan. Additionally, construction of the project will improve traffic operations and reduce traffic hazards on SR 99 by ultimately removing two at-grade intersections once a new interchange at Southgate Avenue is constructed.

Without the interchange or the extension of Southgate Avenue to Skyway, the intersection of SR 99/Southgate Avenue would operate unacceptably by 2025 due to increased traffic on the SR 99 mainline and future development planned nearby. All of the "plus project" alternatives would result in acceptable operations at all intersections along Southgate Avenue under 2015, 2025, and 2035 conditions. However, by 2035, the left-turn queues are forecasted to spill beyond the turn pockets on the overcrossing structure under Alternatives 1 and 1C. Alternative 2 eliminates this potential queuing issue by constructing loop-on ramps to SR 99.

This analysis also determined that a phased approach to the interchange is possible by initially constructing either an expanded at-grade intersection or a spread diamond (Caltrans Type L-2) interchange with a four lane overcrossing. The at-grade intersection would include additional through lanes and turn lanes on both SR 99 and Southgate Avenue. The interim interchange overcrossing would accommodate one westbound lane, back-to-back left-turn lanes, and two eastbound lanes. Both interim projects are expected to operate acceptably until 2025, with the interim interchange (Alternative 1B) having a slightly longer lifespan. Ultimately, both interim projects would need to be reconfigured as one of the ultimate interchange projects (Alternative 1, 1C, or 2).

SIMTRAFFIC RESULTS – NO PROJECT

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	22	18	82	3	38.4	D	--
	T	136	130	96	10	18.2	B	--
	Subtotal	**158**	**148**	**94**	**--**	**20.6**	**C**	**--**
SB	T	92	84	91	10	37.6	D	--
	R	158	145	92	12	28.8	C	--
	Subtotal	**250**	**229**	**91**	**--**	**32.0**	**C**	**--**
EB	L	114	106	93	12	28.5	C	--
	R	11	11	100	3	23.0	C	--
	Subtotal	**125**	**118**	**94**	**--**	**28.0**	**C**	**--**
	Total	**533**	**494**	**93**	**--**	**27.7**	**C**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	136	125	92	11	2.8	A	--
	R	5	4	80	1	1.0	A	--
	Subtotal	**141**	**130**	**92**	**--**	**2.7**	**A**	**--**
SB	L	8	6	75	2	3.8	A	--
	T	79	89	113	12	2.8	A	--
	Subtotal	**87**	**95**	**109**	**--**	**2.9**	**A**	**--**
WB	L	5	4	80	2	15.0	B	--
	R	19	18	95	5	12.1	B	--
	Subtotal	**24**	**22**	**92**	**--**	**12.7**	**B**	**--**
	Total	**253**	**246**	**97**	**--**	**3.7**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	24	20	83	2	53.7	F	--
	R	3	2	67	1	31.2	D	--
	Subtotal	**27**	**22**	**81**	**--**	**51.4**	**F**	**--**
EB	L	5	5	100	2	17.1	C	--
	T	41	39	95	7	18.6	C	--
	Subtotal	**46**	**45**	**98**	**--**	**18.5**	**C**	**--**
WB	T	35	39	111	3	0.9	A	--
	R	41	37	90	7	0.5	A	--
	Subtotal	**76**	**76**	**100**	**--**	**0.7**	**A**	**--**
	Total	**149**	**142**	**95**	**--**	**14.1**	**B**	**--**

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	19	17	89	6	95.3	F	--
	T	394	361	92	19	16.3	B	--
	R	5	5	100	2	8.4	A	--
	Subtotal	**418**	**384**	**92**	**--**	**19.8**	**B**	**--**
SB	L	14	12	86	3	73.1	E	--
	T	457	417	91	23	33.2	C	--
	R	54	51	94	5	13.7	B	--
	Subtotal	**524**	**480**	**92**	**--**	**32.0**	**C**	**--**
EB	L	52	46	88	5	52.1	D	--
	T	3	7	233	2	24.6	C	--
	R	11	11	100	3	37.5	D	--
	Subtotal	**65**	**65**	**98**	**--**	**46.6**	**D**	**--**
WB	L	3	3	100	1	32.7	C	--
	T	3	4	133	1	19.8	B	--
	R	8	8	100	3	13.0	B	--
	Subtotal	**14**	**14**	**100**	**--**	**18.5**	**B**	**--**
	Total	**1022**	**942**	**92**	**--**	**27.8**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	11	10	91	3	1.1	A	--
	T	3	3	100	2	0.1	A	--
	Subtotal	**14**	**14**	**100**	**--**	**0.9**	**A**	**--**
SB	T	3	3	100	2	3.7	A	--
	R	3	3	100	2	2.3	A	--
	Subtotal	**5**	**6**	**120**	**--**	**3.0**	**A**	**--**
EB	L	3	3	67	1	0.8	A	--
	R	19	16	84	3	0.6	A	--
	Subtotal	**22**	**19**	**86**	**--**	**0.6**	**A**	**--**
	Total	**41**	**38**	**93**	**--**	**1.1**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	12	75	3	46.9	D	--
	T	111	109	98	7	21.7	C	--
	Subtotal	**126**	**121**	**96**	**--**	**24.3**	**C**	**--**
SB	T	121	98	81	5	131.6	F	--
	R	118	105	89	9	117.0	F	--
	Subtotal	**239**	**202**	**85**	**--**	**124.0**	**F**	**--**
EB	L	174	163	93	7	46.6	D	--
	R	13	13	92	2	43.7	D	--
	Subtotal	**187**	**175**	**94**	**--**	**46.4**	**D**	**--**
	Total	**553**	**498**	**90**	**--**	**72.6**	**E**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	100	97	97	9	2.0	A	--
	R	3	3	100	1	0.8	A	--
	Subtotal	**103**	**100**	**97**	**--**	**2.0**	**A**	**--**
SB	L	11	8	73	3	5.1	A	--
	T	111	103	92	9	3.6	A	--
	Subtotal	**121**	**111**	**91**	**--**	**3.7**	**A**	**--**
WB	L	5	3	60	2	19.7	C	--
	R	16	14	88	3	10.9	B	--
	Subtotal	**21**	**18**	**86**	**--**	**12.5**	**B**	**--**
	Total	**245**	**228**	**93**	**--**	**3.6**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	29	26	90	4	16.9	C	--
	R	3	3	100	2	13.3	B	--
	Subtotal	**32**	**29**	**91**	**--**	**16.6**	**C**	**--**
EB	L	3	3	100	2	10.1	B	--
	T	34	30	88	5	6.2	A	--
	Subtotal	**37**	**33**	**89**	**--**	**6.6**	**A**	**--**
WB	T	45	48	107	6	0.8	A	--
	R	29	27	93	4	0.5	A	--
	Subtotal	**74**	**76**	**103**	**--**	**0.7**	**A**	**--**
	Total	**142**	**137**	**96**	**--**	**5.4**	**A**	**--**

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	92	4	74.4	E	--
	T	450	432	96	23	29.8	C	--
	R	3	3	100	2	12.4	B	--
	Subtotal	**466**	**447**	**96**	**--**	**30.9**	**C**	**--**
SB	L	8	7	88	2	55.5	E	--
	T	416	396	95	22	30.2	C	--
	R	58	56	97	7	13.3	B	--
	Subtotal	**482**	**460**	**95**	**--**	**28.5**	**C**	**--**
EB	L	53	45	85	8	37.8	D	--
	R	11	9	82	3	32.2	C	--
	Subtotal	**63**	**55**	**87**	**--**	**36.9**	**D**	**--**
WB	L	3	2	67	1	28.2	C	--
	T	3	5	167	2	16.0	B	--
	R	18	17	94	4	19.5	B	--
	Subtotal	**24**	**24**	**100**	**--**	**19.5**	**B**	**--**
	Total	**1034**	**985**	**95**	**--**	**29.9**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	21	20	95	5	0.7	A	--
	T	3	3	100	1	1.1	A	--
	Subtotal	**24**	**23**	**96**	**--**	**0.7**	**A**	**--**
SB	T	3	2	67	1	3.7	A	--
	R	3	3	67	1	2.4	A	--
	Subtotal	**5**	**5**	**100**	**--**	**3.0**	**A**	**--**
EB	L	3	3	100	1	1.0	A	--
	R	8	8	100	3	0.6	A	--
	Subtotal	**11**	**10**	**91**	**--**	**0.7**	**A**	**--**
	Total	**39**	**38**	**97**	**--**	**1.0**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	158	153	97	12	3.9	A	--
	R	8	8	100	1	2.6	A	--
	Subtotal	**166**	**161**	**97**	**--**	**3.9**	**A**	**--**
SB	L	11	8	73	3	5.2	A	--
	T	84	76	90	5	3.1	A	--
	Subtotal	**95**	**84**	**88**	**--**	**3.3**	**A**	**--**
WB	L	8	7	75	2	22.3	C	--
	R	26	25	92	5	18.5	C	--
	Subtotal	**34**	**31**	**91**	**--**	**19.3**	**C**	**--**
	Total	**295**	**276**	**94**	**--**	**5.4**	**A**	**--**

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	26	10	38	6	569.0	F	--
	R	3	2	67	1	509.0	F	--
	Subtotal	**29**	**12**	**41**	**--**	**561.2**	**F**	**--**
EB	L	11	10	91	4	73.8	F	--
	T	82	71	87	6	84.0	F	--
	Subtotal	**92**	**81**	**88**	**--**	**82.7**	**F**	**--**
WB	T	76	75	99	5	1.3	A	--
	R	42	39	93	6	0.8	A	--
	Subtotal	**118**	**114**	**97**	**--**	**1.1**	**A**	**--**
	Total	**239**	**207**	**87**	**--**	**64.6**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	27	84	3	291.5	F	--
	T	466	433	93	17	48.8	D	--
	R	5	6	120	2	19.7	B	--
	Subtotal	**503**	**465**	**92**	**--**	**62.5**	**E**	**--**
SB	L	16	14	88	4	214.0	F	--
	T	508	431	85	12	146.5	F	--
	R	84	75	89	9	105.3	F	--
	Subtotal	**608**	**520**	**86**	**--**	**142.3**	**F**	**--**
EB	L	87	62	71	4	62.8	E	--
	T	3	8	267	3	27.6	C	--
	R	18	17	94	4	50.9	D	--
	Subtotal	**108**	**86**	**80**	**--**	**57.3**	**E**	**--**
WB	L	3	2	67	2	33.0	C	--
	T	3	4	133	2	18.0	B	--
	R	8	9	113	2	25.4	C	--
	Subtotal	**13**	**15**	**115**	**--**	**24.6**	**C**	**--**
	Total	**1232**	**1086**	**88**	**--**	**99.8**	**F**	**--**

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	11	12	109	3	0.2	A	--
	T	3	2	67	1	0.4	A	--
	Subtotal	**13**	**14**	**108**	**--**	**0.2**	**A**	**--**
SB	T	3	2	67	1	4.5	A	--
	R	3	3	100	1	2.9	A	--
	Subtotal	**5**	**5**	**100**	**--**	**3.6**	**A**	**--**
EB	L	3	2	67	1	1.3	A	--
	R	21	19	86	5	0.7	A	--
	Subtotal	**24**	**21**	**88**	**--**	**0.7**	**A**	**--**
	Total	**42**	**40**	**95**	**--**	**0.9**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	30	94	6	29.7	C	--
	T	153	145	95	10	6.5	A	--
	Subtotal	**184**	**175**	**95**	**--**	**10.4**	**B**	**--**
SB	T	97	93	96	8	12.7	B	--
	R	216	199	92	13	8.1	A	--
	Subtotal	**313**	**292**	**93**	**--**	**9.5**	**A**	**--**
EB	L	166	156	94	12	28.9	C	--
	R	13	14	108	4	14.2	B	--
	Subtotal	**179**	**170**	**95**	**--**	**27.7**	**C**	**--**
	Total	**676**	**637**	**94**	**--**	**14.6**	**B**	**--**

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	113	106	94	8	2.5	A	--
	R	5	5	100	1	1.5	A	--
	Subtotal	**118**	**111**	**94**	**--**	**2.5**	**A**	**--**
SB	L	13	7	46	3	4.0	A	--
	T	137	86	63	4	4.0	A	--
	Subtotal	**150**	**93**	**62**	**--**	**4.0**	**A**	**--**
WB	L	5	4	80	2	14.0	B	--
	R	21	17	81	4	12.2	B	--
	Subtotal	**26**	**22**	**85**	**--**	**12.6**	**B**	**--**
	Total	**295**	**226**	**77**	**--**	**4.1**	**A**	**--**

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	32	15	47	5	319.5	F	--
	R	3	2	67	1	263.7	F	--
	Subtotal	**34**	**17**	**50**	**--**	**314.5**	**F**	**--**
EB	L	5	5	100	3	37.4	E	--
	T	71	66	93	11	41.2	E	--
	Subtotal	**76**	**71**	**93**	**--**	**40.9**	**E**	**--**
WB	T	89	84	94	8	1.0	A	--
	R	34	29	85	5	0.7	A	--
	Subtotal	**124**	**113**	**91**	**--**	**0.9**	**A**	**--**
	Total	**234**	**201**	**86**	**--**	**41.3**	**E**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	17	71	4	292.6	F	--
	T	532	480	90	24	78.1	E	--
	R	3	3	100	1	50.7	D	--
	Subtotal	**558**	**500**	**90**	**--**	**85.0**	**F**	**--**
SB	L	8	6	75	2	196.9	F	--
	T	513	444	87	16	128.6	F	--
	R	97	84	87	10	96.2	F	--
	Subtotal	**618**	**534**	**86**	**--**	**124.3**	**F**	**--**
EB	L	84	68	81	7	49.2	D	--
	T	5	11	200	3	33.8	C	--
	R	13	10	77	3	36.3	D	--
	Subtotal	**103**	**88**	**85**	**--**	**45.9**	**D**	**--**
WB	L	5	5	100	2	47.9	D	--
	T	3	5	167	2	33.3	C	--
	R	18	17	89	4	34.5	C	--
	Subtotal	**26**	**26**	**100**	**--**	**36.6**	**D**	**--**
	Total	**1305**	**1148**	**88**	**--**	**99.2**	**F**	**--**

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	22	92	4	3.1	A	--
	T	3	3	100	2	2.6	A	--
	Subtotal	**26**	**25**	**96**	**--**	**3.0**	**A**	**--**
SB	T	3	2	67	1	3.6	A	--
	R	3	2	67	1	4.2	A	--
	Subtotal	**5**	**4**	**80**	**--**	**3.9**	**A**	**--**
EB	L	3	2	67	1	1.1	A	--
	R	13	12	92	3	0.7	A	--
	Subtotal	**16**	**15**	**88**	**--**	**0.8**	**A**	**--**
	Total	**47**	**44**	**94**	**--**	**2.4**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	21	88	4	40.2	D	--
	T	121	113	93	8	9.0	A	--
	Subtotal	**145**	**135**	**92**	**--**	**14.0**	**B**	**--**
SB	T	145	129	89	9	21.3	C	--
	R	179	171	95	9	6.7	A	--
	Subtotal	**324**	**299**	**92**	**--**	**13.0**	**B**	**--**
EB	L	245	228	93	12	60.0	E	--
	R	16	17	106	6	46.7	D	--
	Subtotal	**261**	**245**	**94**	**--**	**59.1**	**E**	**--**
	Total	**729**	**679**	**93**	**--**	**29.8**	**C**	**--**

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SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	184	176	96	14	4.8	A	--
	R	11	10	91	3	2.7	A	--
	Subtotal	**195**	**185**	**95**	**--**	**4.7**	**A**	**--**
SB	L	11	8	73	3	7.5	A	--
	T	95	71	75	4	2.7	A	--
	Subtotal	**105**	**78**	**74**	**--**	**3.1**	**A**	**--**
WB	L	8	6	75	2	24.7	C	--
	R	34	24	71	3	18.8	C	--
	Subtotal	**42**	**30**	**71**	**--**	**20.0**	**C**	**--**
	Total	**342**	**294**	**86**	**--**	**5.8**	**A**	**--**

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	26	2	8	2	1474.8	F	--
	R	5	0	0	0	1001.3	F	--
	Subtotal	**32**	**2**	**6**	**--**	**1455.0**	**F**	**--**
EB	L	16	9	56	3	291.7	F	--
	T	129	95	74	9	295.0	F	--
	Subtotal	**145**	**103**	**71**	**--**	**294.7**	**F**	**--**
WB	T	111	83	75	8	1.1	A	--
	R	50	35	70	5	0.7	A	--
	Subtotal	**161**	**118**	**73**	**--**	**1.0**	**A**	**--**
	Total	**337**	**224**	**66**	**--**	**152.1**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	39	25	62	4	486.5	F	--
	T	555	434	78	18	217.7	F	--
	R	5	5	80	3	168.2	F	--
	Subtotal	**600**	**463**	**77**	**--**	**231.5**	**F**	**--**
SB	L	16	9	56	2	569.9	F	--
	T	576	400	69	16	407.9	F	--
	R	116	77	66	8	370.4	F	--
	Subtotal	**708**	**487**	**69**	**--**	**405.1**	**F**	**--**
EB	L	124	75	60	7	77.7	E	--
	T	5	12	240	4	29.8	C	--
	R	26	17	65	5	74.8	E	--
	Subtotal	**155**	**105**	**68**	**--**	**71.6**	**E**	**--**
WB	L	3	3	100	1	37.0	D	--
	T	5	6	120	3	29.5	C	--
	R	8	8	100	3	28.2	C	--
	Subtotal	**16**	**17**	**106**	**--**	**30.1**	**C**	**--**
	Total	**1479**	**1071**	**72**	**--**	**291.6**	**F**	**--**

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	100	4	0.6	A	--
	T	3	2	67	2	0.2	A	--
	Subtotal	**16**	**15**	**94**	**--**	**0.6**	**A**	**--**
SB	T	3	2	67	2	4.2	A	--
	R	3	3	100	2	2.3	A	--
	Subtotal	**5**	**5**	**100**	**--**	**3.1**	**A**	**--**
EB	L	3	3	100	2	1.2	A	--
	R	24	16	67	3	0.7	A	--
	Subtotal	**26**	**18**	**69**	**--**	**0.7**	**A**	**--**
	Total	**47**	**39**	**83**	**--**	**1.0**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	45	44	98	8	62.3	E	--
	T	174	172	99	15	8.7	A	--
	Subtotal	**218**	**216**	**99**	**--**	**19.7**	**B**	**--**
SB	T	108	91	84	7	17.8	B	--
	R	279	264	95	12	22.7	C	--
	Subtotal	**387**	**355**	**92**	**--**	**21.4**	**C**	**--**
EB	L	224	210	94	11	61.5	E	--
	R	18	17	94	7	36.0	D	--
	Subtotal	**242**	**227**	**94**	**--**	**59.6**	**E**	**--**
	Total	**847**	**798**	**94**	**--**	**31.8**	**C**	**--**

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SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	126	115	91	10	2.6	A	--
	R	5	5	100	2	1.8	A	--
	Subtotal	**132**	**120**	**91**	**--**	**2.6**	**A**	**--**
SB	L	13	5	38	2	4.2	A	--
	T	166	78	47	5	3.7	A	--
	Subtotal	**179**	**84**	**47**	**--**	**3.7**	**A**	**--**
WB	L	8	6	75	2	16.7	C	--
	R	26	17	65	3	12.6	B	--
	Subtotal	**34**	**22**	**65**	**--**	**13.6**	**B**	**--**
	Total	**345**	**226**	**66**	**--**	**4.1**	**A**	**--**

Intersection: *4: Southgate Avenue & Entler Avenue* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	32	4	13	3	1001.3	F	--
	R	5	0	0	1	1069.8	F	--
	Subtotal	**37**	**4**	**11**	**--**	**1007.9**	**F**	**--**
EB	L	8	6	75	3	72.2	F	--
	T	105	103	98	9	90.2	F	--
	Subtotal	**113**	**109**	**96**	**--**	**89.3**	**F**	**--**
WB	T	137	103	75	11	1.0	A	--
	R	39	27	69	7	0.7	A	--
	Subtotal	**176**	**131**	**74**	**--**	**1.0**	**A**	**--**
	Total	**326**	**244**	**75**	**--**	**57.8**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	20	63	3	535.5	F	--
	T	618	439	71	12	371.3	F	--
	R	3	2	67	1	382.9	F	--
	Subtotal	**653**	**460**	**70**	**--**	**378.4**	**F**	**--**
SB	L	8	4	50	2	493.1	F	--
	T	608	389	64	8	452.4	F	--
	R	139	93	67	13	409.6	F	--
	Subtotal	**755**	**486**	**64**	**--**	**444.6**	**F**	**--**
EB	L	118	92	78	5	77.0	E	--
	T	3	10	333	3	18.8	B	--
	R	16	12	75	3	63.1	E	--
	Subtotal	**137**	**113**	**82**	**--**	**70.7**	**E**	**--**
WB	L	5	6	120	2	34.5	C	--
	T	5	7	140	2	28.3	C	--
	R	21	20	95	6	25.4	C	--
	Subtotal	**32**	**33**	**100**	**--**	**27.6**	**C**	**--**
	Total	**1576**	**1092**	**69**	**--**	**365.5**	**F**	**--**

Intersection: *8: Southgate Avenue & Southgate Lane* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	29	29	97	7	2.1	A	--
	T	3	3	100	2	1.5	A	--
	Subtotal	**32**	**32**	**100**	**--**	**2.0**	**A**	**--**
SB	T	3	3	100	1	4.5	A	--
	R	3	3	100	1	2.2	A	--
	Subtotal	**5**	**6**	**120**	**--**	**3.5**	**A**	**--**
EB	L	3	1	33	1	1.0	A	--
	R	11	6	55	2	0.8	A	--
	Subtotal	**13**	**8**	**62**	**--**	**0.8**	**A**	**--**
	Total	**50**	**45**	**90**	**--**	**2.0**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	34	31	91	4	52.4	D	--
	T	134	130	97	13	11.9	B	--
	Subtotal	**168**	**161**	**96**	**--**	**19.7**	**B**	**--**
SB	T	168	152	90	10	62.6	E	--
	R	242	232	96	8	16.6	B	--
	Subtotal	**411**	**384**	**93**	**--**	**34.8**	**C**	**--**
EB	L	318	225	71	8	391.5	F	--
	R	21	13	62	4	406.3	F	--
	Subtotal	**339**	**238**	**70**	**--**	**392.3**	**F**	**--**
	Total	**918**	**783**	**85**	**--**	**140.2**	**F**	**--**

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SIMTRAFFIC RESULTS – ALTERNATIVE 1 (TWO-QUADRANT PARTIAL CLOVERLEAF INTERCHANGE)

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	14	10	71	4	40.3	D	--
	T	5	4	80	2	41.0	D	--
	R	24	23	96	5	9.7	A	--
	Subtotal	**43**	**38**	**88**	**--**	**21.6**	**C**	**--**
SB	L	22	22	100	5	50.0	D	--
	T	3	3	100	2	40.2	D	--
	R	3	4	133	3	9.6	A	--
	Subtotal	**27**	**29**	**107**	**--**	**43.8**	**D**	**--**
EB	L	3	3	67	2	53.0	D	--
	T	109	100	92	7	10.8	B	--
	R	8	6	75	3	4.0	A	--
	Subtotal	**120**	**109**	**91**	**--**	**11.4**	**B**	**--**
WB	L	22	21	95	3	57.0	E	--
	T	122	116	95	9	5.0	A	--
	R	30	29	97	5	1.5	A	--
	Subtotal	**174**	**165**	**95**	**--**	**11.1**	**B**	**--**
	Total	**364**	**341**	**94**	**--**	**15.1**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	68	65	96	5	33.0	C	--
	R	54	53	98	9	8.9	A	--
	Subtotal	**122**	**118**	**97**	**--**	**22.2**	**C**	**--**
EB	T	133	123	92	7	16.1	B	--
	R	22	21	95	5	5.0	A	--
	Subtotal	**155**	**144**	**93**	**--**	**14.5**	**B**	**--**
WB	L	73	71	97	9	41.9	D	--
	T	106	99	92	6	8.3	A	--
	Subtotal	**179**	**169**	**94**	**--**	**22.4**	**C**	**--**
	Total	**457**	**432**	**95**	**--**	**19.7**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	73	66	90	9	35.7	D	--
	R	19	17	89	4	6.8	A	--
	Subtotal	**92**	**83**	**90**	**--**	**29.8**	**C**	**--**
EB	L	73	66	90	7	46.9	D	--
	T	114	109	96	9	5.3	A	--
	Subtotal	**188**	**175**	**93**	**--**	**21.0**	**C**	**--**
WB	T	160	155	97	9	14.9	B	--
	R	147	132	90	8	11.5	B	--
	Subtotal	**307**	**287**	**93**	**--**	**13.4**	**B**	**--**
	Total	**587**	**545**	**93**	**--**	**18.3**	**B**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	4	80	2	52.9	D	--
	T	3	3	100	2	37.9	D	--
	R	3	2	67	1	5.1	A	--
	Subtotal	**11**	**8**	**73**	**--**	**36.3**	**D**	**--**
SB	L	3	2	67	2	51.3	D	--
	T	3	2	67	1	40.6	D	--
	R	5	5	100	2	8.7	A	--
	Subtotal	**11**	**9**	**82**	**--**	**25.2**	**C**	**--**
EB	L	14	13	86	2	38.4	D	--
	T	166	155	93	8	8.8	A	--
	R	8	7	88	2	3.7	A	--
	Subtotal	**188**	**175**	**93**	**--**	**10.7**	**B**	**--**
WB	L	27	25	93	4	48.5	D	--
	T	296	273	92	9	10.8	B	--
	R	3	2	67	1	6.5	A	--
	Subtotal	**326**	**300**	**92**	**--**	**14.0**	**B**	**--**
	Total	**535**	**492**	**92**	**--**	**13.4**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	6	75	2	41.0	D	--
	T	3	3	100	2	42.3	D	--
	R	21	22	105	5	9.2	A	--
	Subtotal	**32**	**31**	**97**	**--**	**19.1**	**B**	**--**
SB	L	29	29	97	3	54.6	D	--
	T	5	5	100	2	36.4	D	--
	R	8	8	100	4	7.4	A	--
	Subtotal	**42**	**41**	**98**	**--**	**43.5**	**D**	**--**
EB	L	5	5	80	2	44.4	D	--
	T	108	108	100	11	12.8	B	--
	R	11	10	91	4	6.3	A	--
	Subtotal	**124**	**122**	**98**	**--**	**13.4**	**B**	**--**
WB	L	29	24	83	6	57.2	E	--
	T	100	101	100	11	4.3	A	--
	R	21	20	95	3	1.2	A	--
	Subtotal	**150**	**145**	**97**	**--**	**12.8**	**B**	**--**
	Total	**347**	**339**	**98**	**--**	**17.3**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	71	68	96	9	32.5	C	--
	R	145	141	97	8	13.0	B	--
	Subtotal	**216**	**210**	**97**	**--**	**19.3**	**B**	**--**
EB	T	142	139	98	8	18.8	B	--
	R	16	16	100	3	4.3	A	--
	Subtotal	**158**	**155**	**98**	**--**	**17.3**	**B**	**--**
WB	L	53	50	94	6	40.6	D	--
	T	79	76	96	10	8.7	A	--
	Subtotal	**132**	**126**	**95**	**--**	**21.5**	**C**	**--**
	Total	**505**	**491**	**97**	**--**	**19.3**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	61	55	89	9	36.1	D	--
	R	13	13	100	3	4.8	A	--
	Subtotal	**74**	**67**	**91**	**--**	**30.1**	**C**	**--**
EB	L	47	42	89	5	42.1	D	--
	T	239	237	99	11	5.5	A	--
	Subtotal	**287**	**280**	**98**	**--**	**11.0**	**B**	**--**
WB	T	118	111	93	10	10.2	B	--
	R	58	59	102	10	3.8	A	--
	Subtotal	**176**	**169**	**96**	**--**	**8.0**	**A**	**--**
	Total	**537**	**516**	**96**	**--**	**12.5**	**B**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	7	88	3	44.8	D	--
	T	3	2	67	1	32.0	C	--
	R	26	22	85	3	10.0	A	--
	Subtotal	**37**	**31**	**84**	**--**	**19.3**	**B**	**--**
SB	L	3	3	67	1	38.1	D	--
	T	3	3	100	2	38.6	D	--
	R	16	14	88	4	5.5	A	--
	Subtotal	**21**	**20**	**95**	**--**	**14.5**	**B**	**--**
EB	L	8	7	88	2	39.1	D	--
	T	287	278	97	10	6.2	A	--
	R	5	6	120	3	3.0	A	--
	Subtotal	**300**	**291**	**97**	**--**	**6.9**	**A**	**--**
WB	L	11	9	73	3	64.4	E	--
	T	153	148	97	11	7.3	A	--
	R	3	3	100	1	1.6	A	--
	Subtotal	**166**	**159**	**96**	**--**	**10.2**	**B**	**--**
	Total	**524**	**501**	**96**	**--**	**9.0**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	26	29	112	5	37.8	D	--
	T	5	5	100	3	42.4	D	--
	R	47	47	100	7	12.5	B	--
	Subtotal	**79**	**81**	**103**	**--**	**23.4**	**C**	**--**
SB	L	24	18	75	3	42.5	D	--
	T	3	3	100	1	39.5	D	--
	R	3	2	67	1	10.0	A	--
	Subtotal	**29**	**23**	**79**	**--**	**39.1**	**D**	**--**
EB	L	5	4	80	1	40.6	D	--
	T	134	127	95	9	15.5	B	--
	R	16	16	100	3	3.8	A	--
	Subtotal	**155**	**146**	**94**	**--**	**14.8**	**B**	**--**
WB	L	42	43	102	8	39.9	D	--
	T	161	154	96	14	6.8	A	--
	R	29	28	97	5	2.4	A	--
	Subtotal	**232**	**225**	**97**	**--**	**12.5**	**B**	**--**
	Total	**495**	**476**	**96**	**--**	**16.4**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	79	76	96	11	32.5	C	--
	R	66	65	98	5	12.1	B	--
	Subtotal	**145**	**141**	**97**	**--**	**23.1**	**C**	**--**
EB	T	171	159	93	13	17.6	B	--
	R	34	30	88	5	5.1	A	--
	Subtotal	**205**	**189**	**92**	**--**	**15.6**	**B**	**--**
WB	L	84	84	100	9	51.0	D	--
	T	153	145	95	10	6.6	A	--
	Subtotal	**237**	**229**	**97**	**--**	**22.9**	**C**	**--**
	Total	**587**	**560**	**95**	**--**	**20.5**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	84	77	92	9	35.2	D	--
	R	32	32	100	5	10.0	B	--
	Subtotal	**116**	**109**	**94**	**--**	**27.8**	**C**	**--**
EB	L	89	81	91	7	45.1	D	--
	T	147	144	98	13	5.8	A	--
	Subtotal	**237**	**225**	**95**	**--**	**20.0**	**B**	**--**
WB	T	205	200	98	17	19.7	B	--
	R	166	161	97	13	19.0	B	--
	Subtotal	**371**	**361**	**97**	**--**	**19.4**	**B**	**--**
	Total	**724**	**695**	**96**	**--**	**20.9**	**C**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	7	88	2	38.8	D	--
	T	3	3	100	2	30.4	C	--
	R	5	6	120	2	7.0	A	--
	Subtotal	**16**	**16**	**100**	**--**	**25.5**	**C**	**--**
SB	L	3	3	100	1	35.6	D	--
	T	3	3	100	1	39.3	D	--
	R	5	5	100	2	19.3	B	--
	Subtotal	**11**	**10**	**91**	**--**	**29.0**	**C**	**--**
EB	L	24	22	92	6	47.1	D	--
	T	195	190	97	14	5.2	A	--
	R	13	13	100	4	2.5	A	--
	Subtotal	**232**	**224**	**97**	**--**	**9.1**	**A**	**--**
WB	L	26	20	77	3	46.9	D	--
	T	358	351	98	13	16.7	B	--
	R	3	2	67	1	8.6	A	--
	Subtotal	**387**	**374**	**97**	**--**	**18.3**	**B**	**--**
	Total	**645**	**624**	**97**	**--**	**15.4**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* **HCM:** *2000*
Scenario: *2025 Plus Project (Alternative 1)* **PHF:** *0.95*
TOD: *PM* **Analysis Period:** *15 Minutes* **# of Runs:** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* **Type:** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	17	106	5	40.0	D	--
	T	3	2	67	1	35.9	D	--
	R	39	38	97	5	9.3	A	--
	Subtotal	**58**	**57**	**98**	**--**	**19.5**	**B**	**--**
SB	L	29	27	93	7	41.3	D	--
	T	5	5	100	2	34.9	C	--
	R	8	8	100	3	7.4	A	--
	Subtotal	**42**	**39**	**93**	**--**	**34.0**	**C**	**--**
EB	L	5	5	100	4	45.1	D	--
	T	158	144	91	12	16.3	B	--
	R	21	18	86	4	3.8	A	--
	Subtotal	**184**	**168**	**91**	**--**	**15.8**	**B**	**--**
WB	L	58	58	100	7	51.9	D	--
	T	145	134	92	15	7.3	A	--
	R	24	26	108	5	2.9	A	--
	Subtotal	**226**	**217**	**96**	**--**	**18.6**	**B**	**--**
	Total	**511**	**481**	**94**	**--**	**19.0**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* **Type:** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	95	91	96	10	34.3	C	--
	R	168	161	96	12	19.8	B	--
	Subtotal	**263**	**252**	**96**	**--**	**25.1**	**C**	**--**
EB	T	203	185	91	14	19.4	B	--
	R	24	22	92	4	5.3	A	--
	Subtotal	**226**	**207**	**92**	**--**	**17.8**	**B**	**--**
WB	L	66	66	100	8	40.1	D	--
	T	132	128	97	14	8.8	A	--
	Subtotal	**197**	**194**	**98**	**--**	**19.4**	**B**	**--**
	Total	**687**	**653**	**95**	**--**	**21.1**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	68	60	88	10	35.5	D	--
	R	21	19	90	6	8.5	A	--
	Subtotal	**89**	**79**	**89**	**--**	**29.2**	**C**	**--**
EB	L	66	59	89	7	53.3	D	--
	T	305	288	94	17	6.2	A	--
	Subtotal	**371**	**347**	**94**	**--**	**14.2**	**B**	**--**
WB	T	176	174	99	13	11.8	B	--
	R	71	66	93	8	5.0	A	--
	Subtotal	**247**	**240**	**97**	**--**	**9.9**	**A**	**--**
	Total	**708**	**666**	**94**	**--**	**14.4**	**B**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	11	85	4	47.7	D	--
	T	3	2	67	1	26.0	C	--
	R	29	30	103	6	13.3	B	--
	Subtotal	**45**	**44**	**98**	**--**	**22.8**	**C**	**--**
SB	L	3	3	100	2	42.6	D	--
	T	5	6	120	2	34.5	C	--
	R	29	28	97	5	12.2	B	--
	Subtotal	**37**	**36**	**97**	**--**	**17.9**	**B**	**--**
EB	L	11	10	91	3	43.3	D	--
	T	358	335	94	15	10.4	B	--
	R	5	4	80	1	5.7	A	--
	Subtotal	**374**	**349**	**93**	**--**	**11.3**	**B**	**--**
WB	L	13	12	92	2	60.9	E	--
	T	205	198	97	17	10.4	B	--
	R	3	3	100	1	4.9	A	--
	Subtotal	**221**	**214**	**97**	**--**	**13.1**	**B**	**--**
	Total	**676**	**643**	**95**	**--**	**13.1**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	37	34	92	5	39.8	D	--
	T	8	8	100	3	41.2	D	--
	R	71	72	101	8	20.9	C	--
	Subtotal	**116**	**114**	**98**	**--**	**28.0**	**C**	**--**
SB	L	24	24	100	4	44.9	D	--
	T	3	2	67	1	43.6	D	--
	R	3	3	100	1	7.8	A	--
	Subtotal	**29**	**29**	**100**	**--**	**41.3**	**D**	**--**
EB	L	5	3	60	1	44.9	D	--
	T	153	146	95	11	23.4	C	--
	R	21	20	95	3	6.1	A	--
	Subtotal	**179**	**169**	**94**	**--**	**21.8**	**C**	**--**
WB	L	63	59	94	7	51.5	D	--
	T	187	177	95	8	9.7	A	--
	R	32	34	106	7	3.5	A	--
	Subtotal	**282**	**270**	**96**	**--**	**18.1**	**B**	**--**
	Total	**605**	**582**	**96**	**--**	**22.3**	**C**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	92	86	93	11	36.1	D	--
	R	74	70	95	6	14.7	B	--
	Subtotal	**166**	**156**	**94**	**--**	**26.5**	**C**	**--**
EB	T	203	200	99	17	24.8	C	--
	R	45	44	98	7	7.7	A	--
	Subtotal	**247**	**244**	**99**	**--**	**21.7**	**C**	**--**
WB	L	97	87	90	10	50.3	D	--
	T	189	183	97	15	8.3	A	--
	Subtotal	**287**	**270**	**94**	**--**	**21.8**	**C**	**--**
	Total	**700**	**670**	**96**	**--**	**22.8**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	97	92	95	9	40.4	D	--
	R	42	40	95	7	12.2	B	--
	Subtotal	**139**	**132**	**95**	**--**	**31.9**	**C**	**--**
EB	L	108	101	94	10	54.0	D	--
	T	168	164	98	11	7.4	A	--
	Subtotal	**276**	**265**	**96**	**--**	**25.2**	**C**	**--**
WB	T	245	231	94	17	30.7	C	--
	R	168	164	98	6	27.6	C	--
	Subtotal	**413**	**394**	**95**	**--**	**29.4**	**C**	**--**
	Total	**829**	**791**	**95**	**--**	**28.4**	**C**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	2	52.7	D	--
	T	3	2	67	1	47.5	D	--
	R	5	4	80	3	5.5	A	--
	Subtotal	**16**	**13**	**81**	**--**	**37.5**	**D**	**--**
SB	L	3	3	100	2	48.5	D	--
	T	3	2	67	1	53.8	D	--
	R	8	9	113	2	23.1	C	--
	Subtotal	**13**	**14**	**108**	**--**	**33.1**	**C**	**--**
EB	L	34	33	97	7	52.9	D	--
	T	213	207	97	13	8.8	A	--
	R	18	16	89	4	3.9	A	--
	Subtotal	**266**	**256**	**96**	**--**	**14.1**	**B**	**--**
WB	L	26	24	92	5	57.0	E	--
	T	397	378	95	19	21.5	C	--
	R	3	2	67	1	9.7	A	--
	Subtotal	**426**	**404**	**95**	**--**	**23.5**	**C**	**--**
	Total	**721**	**687**	**95**	**--**	**20.5**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	22	92	3	45.3	D	--
	T	3	2	67	2	48.5	D	--
	R	61	61	98	7	15.8	B	--
	Subtotal	**87**	**85**	**98**	**--**	**24.3**	**C**	**--**
SB	L	32	30	94	5	81.4	F	--
	T	8	6	75	1	45.6	D	--
	R	8	8	100	2	15.6	B	--
	Subtotal	**47**	**44**	**94**	**--**	**64.7**	**E**	**--**
EB	L	5	5	100	1	56.9	E	--
	T	208	195	94	16	25.6	C	--
	R	29	27	93	6	8.6	A	--
	Subtotal	**242**	**228**	**94**	**--**	**24.3**	**C**	**--**
WB	L	87	80	92	6	86.3	F	--
	T	189	181	96	11	10.0	B	--
	R	26	22	85	4	3.4	A	--
	Subtotal	**303**	**283**	**93**	**--**	**31.0**	**C**	**--**
	Total	**679**	**639**	**94**	**--**	**30.1**	**C**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	121	109	90	8	50.3	D	--
	R	158	148	94	14	26.0	C	--
	Subtotal	**279**	**257**	**92**	**--**	**36.3**	**D**	**--**
EB	T	271	257	95	13	20.2	C	--
	R	29	27	93	5	6.4	A	--
	Subtotal	**300**	**284**	**95**	**--**	**18.9**	**B**	**--**
WB	L	79	74	94	8	50.0	D	--
	T	182	172	95	14	12.7	B	--
	Subtotal	**261**	**246**	**94**	**--**	**23.9**	**C**	**--**
	Total	**839**	**787**	**94**	**--**	**26.2**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	76	74	97	11	42.4	D	--
	R	29	27	93	5	12.7	B	--
	Subtotal	**105**	**101**	**96**	**--**	**34.4**	**C**	**--**
EB	L	84	81	95	8	56.6	E	--
	T	345	325	94	16	7.9	A	--
	Subtotal	**429**	**406**	**95**	**--**	**17.6**	**B**	**--**
WB	T	232	226	97	21	15.7	B	--
	R	71	69	97	5	6.5	A	--
	Subtotal	**303**	**295**	**97**	**--**	**13.6**	**B**	**--**
	Total	**837**	**802**	**96**	**--**	**18.2**	**B**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	18	14	78	3	52.7	D	--
	T	3	3	100	1	37.9	D	--
	R	29	26	90	4	20.9	C	--
	Subtotal	**50**	**43**	**86**	**--**	**32.7**	**C**	**--**
SB	L	3	3	100	1	43.9	D	--
	T	5	6	120	3	41.9	D	--
	R	42	44	105	9	15.9	B	--
	Subtotal	**50**	**53**	**106**	**--**	**20.5**	**C**	**--**
EB	L	16	15	94	4	50.1	D	--
	T	397	374	94	17	15.5	B	--
	R	8	6	75	3	11.9	B	--
	Subtotal	**421**	**396**	**94**	**--**	**16.8**	**B**	**--**
WB	L	13	14	108	2	83.2	F	--
	T	242	235	97	16	16.1	B	--
	R	3	2	67	1	4.7	A	--
	Subtotal	**258**	**251**	**97**	**--**	**19.7**	**B**	**--**
	Total	**779**	**743**	**95**	**--**	**19.0**	**B**	**--**

SIMTRAFFIC RESULTS – ALTERNATIVE 1A (AT-GRADE INTERSECTION)

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 w/Signal & Widened SR-99* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	14	13	93	4	45.8	D	--
	T	5	7	140	3	48.3	D	--
	R	24	25	104	4	18.9	B	--
	Subtotal	**43**	**45**	**102**	**--**	**31.3**	**C**	**--**
SB	L	22	21	95	5	51.8	D	--
	T	3	4	133	2	41.4	D	--
	R	3	4	133	1	7.7	A	--
	Subtotal	**27**	**28**	**104**	**--**	**45.0**	**D**	**--**
EB	L	3	4	133	2	55.9	E	--
	T	109	112	103	8	21.8	C	--
	R	8	9	113	4	13.2	B	--
	Subtotal	**120**	**125**	**104**	**--**	**22.4**	**C**	**--**
WB	L	22	21	95	6	59.5	E	--
	T	122	121	99	10	8.3	A	--
	R	30	30	100	8	3.9	A	--
	Subtotal	**174**	**172**	**99**	**--**	**13.8**	**B**	**--**
	Total	**364**	**370**	**102**	**--**	**21.2**	**C**	**--**

Intersection: *6: Southgate Ave. & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	19	16	84	3	62.0	E	--
	T	348	331	95	8	67.0	E	--
	R	73	79	108	8	13.3	B	--
	Subtotal	**440**	**427**	**97**	**--**	**56.9**	**E**	**--**
SB	L	54	58	107	5	53.9	D	--
	T	397	381	96	21	38.9	D	--
	R	68	69	100	7	11.2	B	--
	Subtotal	**519**	**508**	**98**	**--**	**36.8**	**D**	**--**
EB	L	73	74	101	6	73.1	E	--
	T	60	61	102	7	21.9	C	--
	R	22	22	100	6	11.0	B	--
	Subtotal	**155**	**157**	**101**	**--**	**44.5**	**D**	**--**
WB	L	73	67	92	11	52.5	D	--
	T	87	89	102	9	30.5	C	--
	R	147	136	93	10	38.4	D	--
	Subtotal	**307**	**291**	**95**	**--**	**39.3**	**D**	**--**
	Total	**1421**	**1383**	**97**	**--**	**44.4**	**D**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 w/Signal & Widened SR-99* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	5	100	2	51.7	D	--
	T	3	4	133	1	40.2	D	--
	R	3	3	100	2	10.2	B	--
	Subtotal	**11**	**12**	**109**	**--**	**37.0**	**D**	**--**
SB	L	3	3	100	2	41.6	D	--
	T	3	3	67	1	44.6	D	--
	R	5	5	100	2	11.6	B	--
	Subtotal	**11**	**10**	**91**	**--**	**29.1**	**C**	**--**
EB	L	14	13	86	4	45.9	D	--
	T	166	176	106	10	8.8	A	--
	R	8	9	113	2	5.9	A	--
	Subtotal	**188**	**198**	**105**	**--**	**11.0**	**B**	**--**
WB	L	27	26	96	7	47.8	D	--
	T	296	291	98	18	13.7	B	--
	R	3	3	100	2	9.8	A	--
	Subtotal	**326**	**320**	**98**	**--**	**16.5**	**B**	**--**
	Total	**535**	**541**	**101**	**--**	**15.2**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	26	29	112	9	62.7	E	--
	T	5	5	100	2	60.0	E	--
	R	47	48	102	10	26.0	C	--
	Subtotal	**79**	**83**	**105**	**--**	**41.1**	**D**	**--**
SB	L	24	24	100	6	64.8	E	--
	T	3	3	100	2	58.4	E	--
	R	3	3	100	2	16.3	B	--
	Subtotal	**29**	**30**	**103**	**--**	**59.4**	**E**	**--**
EB	L	5	5	100	2	85.1	F	--
	T	134	127	94	13	41.2	D	--
	R	16	18	113	5	26.9	C	--
	Subtotal	**155**	**149**	**96**	**--**	**40.9**	**D**	**--**
WB	L	42	44	105	5	51.7	D	--
	T	161	164	102	13	9.6	A	--
	R	29	33	114	5	4.2	A	--
	Subtotal	**232**	**242**	**104**	**--**	**16.6**	**B**	**--**
	Total	**495**	**503**	**102**	**--**	**30.4**	**C**	**--**

Intersection: *6: Southgate Ave. & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	34	106	7	87.0	F	--
	T	405	378	93	11	104.3	F	--
	R	84	83	99	10	27.8	C	--
	Subtotal	**521**	**494**	**95**	**--**	**90.3**	**F**	**--**
SB	L	66	66	100	8	55.4	E	--
	T	437	450	103	21	40.8	D	--
	R	79	88	111	11	16.8	B	--
	Subtotal	**582**	**604**	**104**	**--**	**38.9**	**D**	**--**
EB	L	89	83	93	4	120.7	F	--
	T	82	75	91	9	30.7	C	--
	R	34	33	94	4	17.8	B	--
	Subtotal	**205**	**191**	**93**	**--**	**67.7**	**E**	**--**
WB	L	84	71	85	10	88.3	F	--
	T	121	114	94	9	58.4	E	--
	R	166	154	93	5	86.9	F	--
	Subtotal	**371**	**340**	**92**	**--**	**77.6**	**E**	**--**
	Total	**1679**	**1629**	**97**	**--**	**66.0**	**E**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	3	69.7	E	--
	T	3	3	100	2	60.4	E	--
	R	5	6	120	2	8.8	A	--
	Subtotal	**16**	**18**	**113**	**--**	**47.8**	**D**	**--**
SB	L	3	3	100	1	52.1	D	--
	T	3	3	100	2	62.2	E	--
	R	5	5	100	2	22.8	C	--
	Subtotal	**11**	**11**	**100**	**--**	**40.3**	**D**	**--**
EB	L	24	22	92	6	64.6	E	--
	T	195	191	98	18	11.6	B	--
	R	13	13	100	3	6.6	A	--
	Subtotal	**232**	**227**	**98**	**--**	**16.5**	**B**	**--**
WB	L	26	24	92	3	68.6	E	--
	T	358	348	97	8	31.9	C	--
	R	3	3	100	1	47.4	D	--
	Subtotal	**387**	**375**	**97**	**--**	**34.3**	**C**	**--**
	Total	**645**	**629**	**98**	**--**	**28.4**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	9	113	3	44.9	D	--
	T	3	2	67	1	37.8	D	--
	R	21	20	95	5	8.1	A	--
	Subtotal	**32**	**32**	**100**	**--**	**21.0**	**C**	**--**
SB	L	29	29	100	3	89.8	F	--
	T	5	4	80	2	48.1	D	--
	R	8	7	88	3	16.4	B	--
	Subtotal	**42**	**40**	**95**	**--**	**72.4**	**E**	**--**
EB	L	5	5	100	4	56.8	E	--
	T	108	108	100	14	16.0	B	--
	R	11	10	91	4	11.6	B	--
	Subtotal	**124**	**123**	**99**	**--**	**17.3**	**B**	**--**
WB	L	29	29	97	5	48.3	D	--
	T	100	105	105	6	6.8	A	--
	R	21	23	110	2	3.7	A	--
	Subtotal	**150**	**157**	**105**	**--**	**13.9**	**B**	**--**
	Total	**347**	**351**	**101**	**--**	**22.4**	**C**	**--**

Intersection: *6: Southgate Ave. & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	15	115	3	81.8	F	--
	T	421	393	93	15	56.1	E	--
	R	61	66	108	7	19.1	B	--
	Subtotal	**495**	**474**	**96**	**--**	**51.7**	**D**	**--**
SB	L	145	150	103	16	80.5	F	--
	T	368	372	101	11	29.6	C	--
	R	71	75	106	6	10.8	B	--
	Subtotal	**584**	**597**	**102**	**--**	**40.0**	**D**	**--**
EB	L	47	47	100	3	86.9	F	--
	T	95	97	102	6	50.3	D	--
	R	16	18	113	5	15.2	B	--
	Subtotal	**158**	**161**	**102**	**--**	**57.0**	**E**	**--**
WB	L	53	48	91	6	84.9	F	--
	T	66	70	106	6	51.4	D	--
	R	58	59	102	10	24.9	C	--
	Subtotal	**176**	**177**	**101**	**--**	**51.7**	**D**	**--**
	Total	**1413**	**1409**	**100**	**--**	**47.4**	**D**	**--**

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SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	2	45.6	D	--
	T	3	2	67	1	40.4	D	--
	R	26	24	92	5	13.6	B	--
	Subtotal	**37**	**34**	**92**	**--**	**22.9**	**C**	**--**
SB	L	3	3	100	2	49.0	D	--
	T	3	3	100	2	36.4	D	--
	R	16	17	106	4	8.3	A	--
	Subtotal	**21**	**23**	**110**	**--**	**17.4**	**B**	**--**
EB	L	8	7	88	3	50.7	D	--
	T	287	287	100	17	13.6	B	--
	R	5	7	140	2	8.9	A	--
	Subtotal	**300**	**300**	**100**	**--**	**14.4**	**B**	**--**
WB	L	11	12	109	3	62.9	E	--
	T	153	151	99	13	8.2	A	--
	R	3	3	100	2	2.7	A	--
	Subtotal	**166**	**166**	**100**	**--**	**11.9**	**B**	**--**
	Total	**524**	**522**	**100**	**--**	**14.3**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	16	100	2	61.1	E	--
	T	3	3	100	1	38.6	D	--
	R	39	39	100	6	11.7	B	--
	Subtotal	**58**	**58**	**100**	**--**	**26.3**	**C**	**--**
SB	L	29	27	93	5	133.0	F	--
	T	5	6	120	2	65.7	E	--
	R	8	7	88	2	29.8	C	--
	Subtotal	**42**	**40**	**95**	**--**	**105.5**	**F**	**--**
EB	L	5	7	140	3	52.6	D	--
	T	158	157	99	20	24.2	C	--
	R	21	21	100	4	17.4	B	--
	Subtotal	**184**	**186**	**101**	**--**	**24.5**	**C**	**--**
WB	L	58	51	88	3	132.2	F	--
	T	145	140	97	11	13.5	B	--
	R	24	21	88	5	5.6	A	--
	Subtotal	**226**	**213**	**94**	**--**	**41.3**	**D**	**--**
	Total	**511**	**496**	**97**	**--**	**38.4**	**D**	**--**

Intersection: *6: Southgate Ave. & SR 99* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	21	22	105	3	112.3	F	--
	T	495	429	86	11	110.4	F	--
	R	68	61	90	6	53.0	D	--
	Subtotal	**584**	**511**	**88**	**--**	**103.7**	**F**	**--**
SB	L	168	171	102	7	120.2	F	--
	T	453	451	100	18	35.8	D	--
	R	95	90	95	11	16.9	B	--
	Subtotal	**716**	**712**	**99**	**--**	**53.6**	**D**	**--**
EB	L	66	62	94	6	112.7	F	--
	T	137	143	104	12	65.6	E	--
	R	24	21	88	6	28.0	C	--
	Subtotal	**226**	**226**	**100**	**--**	**74.9**	**E**	**--**
WB	L	66	64	97	8	99.0	F	--
	T	111	111	100	12	65.2	E	--
	R	71	82	115	6	31.7	C	--
	Subtotal	**247**	**257**	**104**	**--**	**62.9**	**E**	**--**
	Total	**1774**	**1706**	**96**	**--**	**72.9**	**E**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	100	5	42.6	D	--
	T	3	3	100	1	31.3	C	--
	R	29	30	103	6	14.9	B	--
	Subtotal	**45**	**45**	**100**	**--**	**23.7**	**C**	**--**
SB	L	3	3	100	2	37.3	D	--
	T	5	6	120	3	36.0	D	--
	R	29	32	110	6	14.0	B	--
	Subtotal	**37**	**41**	**111**	**--**	**19.2**	**B**	**--**
EB	L	11	9	82	3	37.4	D	--
	T	358	342	96	19	14.3	B	--
	R	5	5	100	2	7.6	A	--
	Subtotal	**374**	**356**	**95**	**--**	**14.7**	**B**	**--**
WB	L	13	11	85	4	51.9	D	--
	T	205	203	99	11	13.9	B	--
	R	3	3	100	1	6.4	A	--
	Subtotal	**221**	**217**	**98**	**--**	**15.7**	**B**	**--**
	Total	**676**	**659**	**97**	**--**	**15.9**	**B**	**--**

SIMTRAFFIC RESULTS – ALTERNATIVE 1B (FOUR-LANE SPREAD DIAMOND INTERCHANGE)

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	87	86	99	8	20.1	C	--
	R	60	60	100	7	10.5	B	--
	Subtotal	**147**	**146**	**99**	**--**	**16.1**	**B**	**--**
SB	L	33	31	94	5	30.6	C	--
	T	43	42	98	6	7.6	A	--
	Subtotal	**76**	**74**	**97**	**--**	**17.4**	**B**	**--**
WB	L	68	69	101	7	22.2	C	--
	R	65	65	100	11	13.0	B	--
	Subtotal	**133**	**133**	**100**	**--**	**17.7**	**B**	**--**
	Total	**356**	**353**	**99**	**--**	**17.0**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	14	14	100	3	40.5	D	--
	T	5	5	100	2	44.3	D	--
	R	24	23	96	4	12.0	B	--
	Subtotal	**43**	**42**	**98**	**--**	**25.3**	**C**	**--**
SB	L	22	22	100	4	49.9	D	--
	T	3	3	100	2	41.5	D	--
	R	3	3	100	2	8.1	A	--
	Subtotal	**27**	**29**	**107**	**--**	**44.7**	**D**	**--**
EB	L	3	2	67	1	45.9	D	--
	T	109	107	97	8	12.0	B	--
	R	8	9	100	3	6.5	A	--
	Subtotal	**120**	**117**	**98**	**--**	**12.3**	**B**	**--**
WB	L	22	19	86	4	53.9	D	--
	T	122	121	99	12	5.7	A	--
	R	30	30	100	6	2.3	A	--
	Subtotal	**174**	**170**	**98**	**--**	**10.5**	**B**	**--**
	Total	**364**	**358**	**98**	**--**	**15.6**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	54	57	106	6	34.8	C	--
	R	68	68	100	8	11.8	B	--
	Subtotal	**122**	**126**	**103**	**--**	**22.3**	**C**	**--**
EB	T	133	129	97	9	13.4	B	--
	R	22	19	86	4	6.1	A	--
	Subtotal	**155**	**147**	**95**	**--**	**12.5**	**B**	**--**
WB	L	73	74	101	16	38.4	D	--
	T	106	102	96	9	8.9	A	--
	Subtotal	**179**	**175**	**98**	**--**	**21.3**	**C**	**--**
	Total	**457**	**448**	**98**	**--**	**18.7**	**B**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	19	16	84	5	39.5	D	--
	R	73	73	99	7	11.2	B	--
	Subtotal	**92**	**88**	**96**	**--**	**16.2**	**B**	**--**
EB	L	73	66	90	7	77.5	E	--
	T	114	117	103	10	4.1	A	--
	Subtotal	**188**	**183**	**97**	**--**	**30.6**	**C**	**--**
WB	T	160	166	104	21	14.8	B	--
	R	147	144	98	7	9.9	A	--
	Subtotal	**307**	**310**	**101**	**--**	**12.5**	**B**	**--**
	Total	**587**	**581**	**99**	**--**	**18.8**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	4	80	1	46.9	D	--
	T	3	3	100	1	26.8	C	--
	R	3	4	133	2	4.8	A	--
	Subtotal	**11**	**11**	**100**	**--**	**27.5**	**C**	**--**
SB	L	3	2	67	2	51.6	D	--
	T	3	3	100	2	34.5	C	--
	R	5	6	120	3	8.2	A	--
	Subtotal	**11**	**12**	**109**	**--**	**23.9**	**C**	**--**
EB	L	14	13	93	3	43.8	D	--
	T	166	167	101	11	9.6	A	--
	R	8	10	125	3	3.6	A	--
	Subtotal	**188**	**191**	**101**	**--**	**11.6**	**B**	**--**
WB	L	27	28	104	3	56.0	E	--
	T	296	293	99	19	15.4	B	--
	R	3	3	67	1	5.8	A	--
	Subtotal	**326**	**323**	**99**	**--**	**18.8**	**B**	**--**
	Total	**535**	**536**	**100**	**--**	**16.5**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	79	78	99	10	19.3	B	--
	R	45	47	104	9	10.6	B	--
	Subtotal	**124**	**125**	**101**	**--**	**16.0**	**B**	**--**
SB	L	68	66	97	6	36.2	D	--
	T	68	67	99	8	10.6	B	--
	Subtotal	**137**	**133**	**97**	**--**	**23.3**	**C**	**--**
WB	L	53	58	109	5	24.4	C	--
	R	45	46	102	8	10.6	B	--
	Subtotal	**97**	**104**	**107**	**--**	**18.3**	**B**	**--**
	Total	**358**	**362**	**101**	**--**	**19.4**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	9	113	5	42.1	D	--
	T	3	2	67	1	40.0	D	--
	R	21	17	81	5	5.5	A	--
	Subtotal	**32**	**29**	**91**	**--**	**19.9**	**B**	**--**
SB	L	29	30	103	6	41.6	D	--
	T	5	6	120	3	35.5	D	--
	R	8	9	100	2	10.4	B	--
	Subtotal	**42**	**44**	**105**	**--**	**34.8**	**C**	**--**
EB	L	5	5	100	3	40.2	D	--
	T	108	104	96	11	13.5	B	--
	R	11	11	100	4	7.3	A	--
	Subtotal	**124**	**119**	**96**	**--**	**14.1**	**B**	**--**
WB	L	29	27	93	4	42.3	D	--
	T	100	102	102	5	6.8	A	--
	R	21	19	90	5	2.5	A	--
	Subtotal	**150**	**149**	**99**	**--**	**12.7**	**B**	**--**
	Total	**347**	**340**	**98**	**--**	**16.6**	**B**	**--**

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SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	145	141	97	12	34.9	C	--
	R	71	68	96	7	13.6	B	--
	Subtotal	**216**	**209**	**97**	**--**	**28.0**	**C**	**--**
EB	T	142	132	93	12	15.6	B	--
	R	16	14	88	2	5.1	A	--
	Subtotal	**158**	**146**	**92**	**--**	**14.6**	**B**	**--**
WB	L	53	53	100	9	34.8	C	--
	T	79	82	104	11	9.3	A	--
	Subtotal	**132**	**135**	**102**	**--**	**19.3**	**B**	**--**
	Total	**505**	**490**	**97**	**--**	**21.6**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	100	2	42.2	D	--
	R	61	59	97	5	14.4	B	--
	Subtotal	**74**	**73**	**99**	**--**	**19.5**	**B**	**--**
EB	L	47	40	85	7	55.1	E	--
	T	239	234	98	11	4.0	A	--
	Subtotal	**287**	**274**	**95**	**--**	**11.5**	**B**	**--**
WB	T	118	124	105	16	8.5	A	--
	R	58	56	97	6	3.2	A	--
	Subtotal	**176**	**180**	**102**	**--**	**6.8**	**A**	**--**
	Total	**537**	**526**	**98**	**--**	**11.0**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	2	39.7	D	--
	T	3	3	100	1	36.4	D	--
	R	26	29	112	5	12.1	B	--
	Subtotal	**37**	**41**	**111**	**--**	**19.5**	**B**	**--**
SB	L	3	3	100	2	45.3	D	--
	T	3	3	100	1	46.8	D	--
	R	16	17	106	3	6.8	A	--
	Subtotal	**21**	**23**	**110**	**--**	**17.4**	**B**	**--**
EB	L	8	8	100	3	41.4	D	--
	T	287	275	96	9	13.2	B	--
	R	5	7	120	3	4.3	A	--
	Subtotal	**300**	**289**	**96**	**--**	**13.8**	**B**	**--**
WB	L	11	10	91	3	61.6	E	--
	T	153	154	101	14	9.4	A	--
	R	3	3	100	1	1.8	A	--
	Subtotal	**166**	**167**	**101**	**--**	**12.3**	**B**	**--**
	Total	**524**	**519**	**99**	**--**	**13.9**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	97	99	102	11	24.5	C	--
	R	68	72	106	7	12.6	B	--
	Subtotal	**166**	**170**	**102**	**--**	**19.5**	**B**	**--**
SB	L	47	48	102	4	45.9	D	--
	T	58	59	102	7	10.5	B	--
	Subtotal	**105**	**107**	**102**	**--**	**26.4**	**C**	**--**
WB	L	71	65	92	7	25.1	C	--
	R	97	94	97	10	16.7	B	--
	Subtotal	**168**	**160**	**95**	**--**	**20.2**	**C**	**--**
	Total	**439**	**437**	**100**	**--**	**21.4**	**C**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	26	27	104	4	50.0	D	--
	T	5	6	120	2	48.5	D	--
	R	47	51	109	12	21.3	C	--
	Subtotal	**79**	**85**	**108**	**--**	**32.6**	**C**	**--**
SB	L	24	27	113	4	65.3	E	--
	T	3	3	100	2	74.4	E	--
	R	3	3	100	1	12.5	B	--
	Subtotal	**29**	**33**	**114**	**--**	**62.1**	**E**	**--**
EB	L	5	6	120	2	58.1	E	--
	T	134	138	103	6	26.7	C	--
	R	16	16	100	6	14.2	B	--
	Subtotal	**155**	**159**	**103**	**--**	**26.6**	**C**	**--**
WB	L	42	42	100	6	44.5	D	--
	T	161	153	95	14	12.2	B	--
	R	29	30	103	5	4.0	A	--
	Subtotal	**232**	**224**	**97**	**--**	**17.2**	**B**	**--**
	Total	**495**	**501**	**101**	**--**	**25.7**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	66	70	106	9	45.2	D	--
	R	79	82	104	10	19.5	B	--
	Subtotal	**145**	**152**	**105**	**--**	**31.3**	**C**	**--**
EB	T	171	177	103	11	18.7	B	--
	R	34	35	100	4	8.1	A	--
	Subtotal	**205**	**211**	**103**	**--**	**17.0**	**B**	**--**
WB	L	84	87	104	11	49.6	D	--
	T	153	143	93	9	9.2	A	--
	Subtotal	**237**	**230**	**97**	**--**	**24.4**	**C**	**--**
	Total	**587**	**593**	**101**	**--**	**23.6**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	32	100	7	54.1	D	--
	R	84	87	104	6	14.6	B	--
	Subtotal	**116**	**119**	**103**	**--**	**25.2**	**C**	**--**
EB	L	89	85	96	6	98.9	F	--
	T	147	154	105	16	8.1	A	--
	Subtotal	**237**	**238**	**100**	**--**	**40.4**	**D**	**--**
WB	T	205	204	100	8	23.2	C	--
	R	166	172	104	16	14.5	B	--
	Subtotal	**371**	**376**	**101**	**--**	**19.2**	**B**	**--**
	Total	**724**	**733**	**101**	**--**	**27.0**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	7	75	2	68.8	E	--
	T	3	4	133	3	55.1	E	--
	R	5	5	100	3	8.1	A	--
	Subtotal	**16**	**15**	**94**	**--**	**45.7**	**D**	**--**
SB	L	3	2	67	1	57.1	E	--
	T	3	2	67	1	55.3	E	--
	R	5	6	120	2	16.9	B	--
	Subtotal	**11**	**10**	**91**	**--**	**34.0**	**C**	**--**
EB	L	24	26	108	3	66.0	E	--
	T	195	198	102	18	27.9	C	--
	R	13	15	115	2	14.8	B	--
	Subtotal	**232**	**239**	**103**	**--**	**31.3**	**C**	**--**
WB	L	26	29	112	5	66.2	E	--
	T	358	365	102	18	24.6	C	--
	R	3	3	100	2	9.3	A	--
	Subtotal	**387**	**396**	**102**	**--**	**27.5**	**C**	**--**
	Total	**645**	**660**	**102**	**--**	**29.4**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	87	85	98	8	28.7	C	--
	R	53	52	98	10	14.6	B	--
	Subtotal	**139**	**137**	**99**	**--**	**23.3**	**C**	**--**
SB	L	108	106	98	7	62.5	E	--
	T	79	82	104	15	24.0	C	--
	Subtotal	**187**	**188**	**101**	**--**	**45.8**	**D**	**--**
WB	L	63	69	110	7	28.4	C	--
	R	71	71	99	8	14.0	B	--
	Subtotal	**134**	**140**	**104**	**--**	**21.1**	**C**	**--**
	Total	**461**	**464**	**101**	**--**	**31.7**	**C**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	17	106	4	50.2	D	--
	T	3	4	133	2	39.7	D	--
	R	39	37	92	5	12.7	B	--
	Subtotal	**58**	**57**	**98**	**--**	**25.5**	**C**	**--**
SB	L	29	26	90	5	70.8	E	--
	T	5	6	120	2	48.9	D	--
	R	8	9	113	3	16.8	B	--
	Subtotal	**42**	**41**	**98**	**--**	**55.6**	**E**	**--**
EB	L	5	6	120	2	57.0	E	--
	T	158	153	97	8	26.5	C	--
	R	21	20	95	4	15.9	B	--
	Subtotal	**184**	**178**	**97**	**--**	**26.3**	**C**	**--**
WB	L	58	57	98	7	49.3	D	--
	T	145	148	102	13	9.4	A	--
	R	24	26	108	3	2.5	A	--
	Subtotal	**226**	**230**	**102**	**--**	**18.4**	**B**	**--**
	Total	**511**	**506**	**99**	**--**	**25.0**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	168	170	101	16	47.4	D	--
	R	95	99	104	10	24.0	C	--
	Subtotal	**263**	**269**	**102**	**--**	**38.7**	**D**	**--**
EB	T	203	187	92	5	13.4	B	--
	R	24	25	100	6	5.6	A	--
	Subtotal	**226**	**212**	**94**	**--**	**12.5**	**B**	**--**
WB	L	66	65	98	6	41.5	D	--
	T	132	131	99	11	9.0	A	--
	Subtotal	**197**	**196**	**99**	**--**	**19.8**	**B**	**--**
	Total	**687**	**677**	**99**	**--**	**25.1**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	21	21	100	5	40.9	D	--
	R	68	68	100	9	19.0	B	--
	Subtotal	**89**	**89**	**100**	**--**	**24.3**	**C**	**--**
EB	L	66	59	89	7	67.5	E	--
	T	305	296	97	16	5.2	A	--
	Subtotal	**371**	**356**	**96**	**--**	**15.6**	**B**	**--**
WB	T	176	171	97	10	13.6	B	--
	R	71	75	106	7	4.9	A	--
	Subtotal	**247**	**246**	**100**	**--**	**11.0**	**B**	**--**
	Total	**708**	**691**	**97**	**--**	**15.1**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	100	4	64.9	E	--
	T	3	3	100	1	42.7	D	--
	R	29	32	110	5	20.1	C	--
	Subtotal	**45**	**48**	**107**	**--**	**33.7**	**C**	**--**
SB	L	3	3	100	2	49.6	D	--
	T	5	5	100	2	43.4	D	--
	R	29	29	97	6	9.6	A	--
	Subtotal	**37**	**36**	**97**	**--**	**16.9**	**B**	**--**
EB	L	11	11	100	3	49.1	D	--
	T	358	344	96	20	18.7	B	--
	R	5	6	120	2	10.8	B	--
	Subtotal	**374**	**360**	**96**	**--**	**19.5**	**B**	**--**
WB	L	13	17	131	4	100.5	F	--
	T	205	205	100	8	14.3	B	--
	R	3	2	67	1	2.9	A	--
	Subtotal	**221**	**223**	**101**	**--**	**20.6**	**C**	**--**
	Total	**676**	**667**	**99**	**--**	**20.7**	**C**	**--**

SIMTRAFFIC RESULTS – ALTERNATIVE 1C (FIVE-LANE SPREAD DIAMOND INTERCHANGE)

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	46	43	93	7	41.7	D	--
	T	98	100	102	6	14.4	B	--
	Subtotal	**144**	**143**	**99**	**--**	**22.7**	**C**	**--**
SB	T	46	41	89	7	24.4	C	--
	R	139	124	89	10	16.0	B	--
	Subtotal	**185**	**165**	**89**	**--**	**18.1**	**B**	**--**
EB	L	101	100	99	8	23.9	C	--
	R	27	25	93	3	18.5	B	--
	Subtotal	**128**	**125**	**98**	**--**	**22.9**	**C**	**--**
	Total	**457**	**433**	**95**	**--**	**21.0**	**C**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	141	135	96	13	5.9	A	--
	R	5	6	120	4	3.4	A	--
	Subtotal	**147**	**141**	**96**	**--**	**5.8**	**A**	**--**
SB	L	8	7	88	3	4.6	A	--
	T	65	60	92	7	2.6	A	--
	Subtotal	**73**	**67**	**92**	**--**	**2.8**	**A**	**--**
WB	L	5	5	100	2	8.0	A	--
	R	14	12	86	4	6.6	A	--
	Subtotal	**19**	**17**	**89**	**--**	**7.0**	**A**	**--**
	Total	**239**	**224**	**94**	**--**	**5.0**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	87	83	95	12	18.1	B	--
	R	60	54	90	7	9.2	A	--
	Subtotal	**147**	**137**	**93**	**--**	**14.6**	**B**	**--**
SB	L	33	29	88	4	30.1	C	--
	T	43	39	91	6	9.0	A	--
	Subtotal	**76**	**68**	**89**	**--**	**17.9**	**B**	**--**
WB	L	68	61	90	5	22.7	C	--
	R	65	57	86	5	11.0	B	--
	Subtotal	**133**	**117**	**88**	**--**	**17.0**	**B**	**--**
	Total	**356**	**322**	**90**	**--**	**16.2**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	14	12	86	3	40.6	D	--
	T	5	5	100	2	38.4	D	--
	R	24	24	100	3	10.5	B	--
	Subtotal	**43**	**40**	**93**	**--**	**22.6**	**C**	**--**
SB	L	22	22	100	5	58.2	E	--
	T	3	3	100	1	41.3	D	--
	R	3	3	100	2	7.6	A	--
	Subtotal	**27**	**27**	**100**	**--**	**50.6**	**D**	**--**
EB	L	3	2	67	2	61.3	E	--
	T	109	97	89	9	11.1	B	--
	R	8	8	100	3	4.8	A	--
	Subtotal	**120**	**107**	**89**	**--**	**11.7**	**B**	**--**
WB	L	22	20	91	5	58.9	E	--
	T	122	113	93	7	6.4	A	--
	R	30	27	90	6	1.2	A	--
	Subtotal	**174**	**159**	**91**	**--**	**12.0**	**B**	**--**
	Total	**364**	**334**	**92**	**--**	**16.3**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	54	58	107	8	35.1	D	--
	R	68	63	93	12	8.1	A	--
	Subtotal	**122**	**121**	**98**	**--**	**21.0**	**C**	**--**
EB	T	133	120	90	12	13.9	B	--
	R	22	19	86	4	4.9	A	--
	Subtotal	**155**	**139**	**90**	**--**	**12.6**	**B**	**--**
WB	L	73	68	93	10	42.0	D	--
	T	106	96	91	9	7.8	A	--
	Subtotal	**179**	**164**	**92**	**--**	**21.9**	**C**	**--**
	Total	**457**	**423**	**93**	**--**	**18.6**	**B**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	19	17	89	4	40.0	D	--
	R	73	67	92	6	10.4	B	--
	Subtotal	**92**	**84**	**91**	**--**	**16.4**	**B**	**--**
EB	L	73	67	92	12	51.0	D	--
	T	114	110	96	12	4.2	A	--
	Subtotal	**188**	**177**	**94**	**--**	**21.9**	**C**	**--**
WB	T	160	153	95	11	12.7	B	--
	R	147	140	95	11	11.0	B	--
	Subtotal	**307**	**293**	**95**	**--**	**11.9**	**B**	**--**
	Total	**587**	**554**	**94**	**--**	**15.8**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	5	80	2	47.2	D	--
	T	3	2	67	2	39.0	D	--
	R	3	2	67	1	7.8	A	--
	Subtotal	**11**	**9**	**82**	**--**	**35.1**	**D**	**--**
SB	L	3	3	100	1	47.5	D	--
	T	3	2	67	1	41.6	D	--
	R	5	6	120	3	8.4	A	--
	Subtotal	**11**	**10**	**91**	**--**	**25.3**	**C**	**--**
EB	L	14	13	93	3	41.9	D	--
	T	166	155	93	13	10.5	B	--
	R	8	8	100	2	4.9	A	--
	Subtotal	**188**	**175**	**93**	**--**	**12.5**	**B**	**--**
WB	L	27	26	96	4	57.1	E	--
	T	296	277	94	12	18.1	B	--
	R	3	2	67	1	13.6	B	--
	Subtotal	**326**	**305**	**94**	**--**	**21.4**	**C**	**--**
	Total	**535**	**500**	**93**	**--**	**18.6**	**B**	**--**

Intersection: *9: Southgate Ave. & Skyway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	54	54	100	9	11.4	B	--
	R	46	48	104	5	13.8	B	--
	Subtotal	**101**	**102**	**101**	**--**	**12.5**	**B**	**--**
EB	L	35	33	91	6	40.7	D	--
	T	136	128	94	11	16.0	B	--
	Subtotal	**171**	**160**	**94**	**--**	**21.0**	**C**	**--**
WB	T	280	259	93	13	35.6	D	--
	R	326	296	91	19	24.8	C	--
	Subtotal	**606**	**555**	**92**	**--**	**29.8**	**C**	**--**
	Total	**878**	**816**	**93**	**--**	**25.9**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	22	92	3	50.1	D	--
	T	95	96	101	9	19.7	B	--
	Subtotal	**118**	**118**	**100**	**--**	**25.5**	**C**	**--**
SB	T	100	92	92	6	83.8	F	--
	R	111	97	87	11	69.4	E	--
	Subtotal	**211**	**189**	**90**	**--**	**76.4**	**E**	**--**
EB	L	145	136	94	11	59.6	E	--
	R	42	38	90	4	52.8	D	--
	Subtotal	**187**	**174**	**93**	**--**	**58.1**	**E**	**--**
	Total	**516**	**481**	**93**	**--**	**57.3**	**E**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	116	112	97	7	5.5	A	--
	R	5	4	80	1	3.5	A	--
	Subtotal	**121**	**116**	**96**	**--**	**5.4**	**A**	**--**
SB	L	13	10	77	2	5.5	A	--
	T	129	118	91	8	4.4	A	--
	Subtotal	**142**	**128**	**90**	**--**	**4.4**	**A**	**--**
WB	L	3	2	67	1	13.1	B	--
	R	8	7	75	3	5.4	A	--
	Subtotal	**11**	**8**	**73**	**--**	**7.0**	**A**	**--**
	Total	**274**	**253**	**92**	**--**	**5.0**	**A**	**--**

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	79	74	94	12	18.8	B	--
	R	45	46	102	3	10.2	B	--
	Subtotal	**124**	**120**	**97**	**--**	**15.5**	**B**	**--**
SB	L	68	62	91	9	31.3	C	--
	T	68	59	87	5	10.9	B	--
	Subtotal	**137**	**121**	**88**	**--**	**21.4**	**C**	**--**
WB	L	53	48	91	5	22.3	C	--
	R	45	41	91	5	9.6	A	--
	Subtotal	**97**	**89**	**92**	**--**	**16.4**	**B**	**--**
	Total	**358**	**330**	**92**	**--**	**17.9**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	2	41.3	D	--
	T	3	2	67	2	44.0	D	--
	R	21	20	95	5	7.6	A	--
	Subtotal	**32**	**30**	**94**	**--**	**18.8**	**B**	**--**
SB	L	29	26	90	8	48.7	D	--
	T	5	6	120	2	34.5	C	--
	R	8	7	88	4	6.5	A	--
	Subtotal	**42**	**38**	**90**	**--**	**38.5**	**D**	**--**
EB	L	5	4	80	1	38.4	D	--
	T	108	102	94	6	13.7	B	--
	R	11	8	73	2	7.3	A	--
	Subtotal	**124**	**115**	**93**	**--**	**14.1**	**B**	**--**
WB	L	29	26	90	4	46.8	D	--
	T	100	93	93	7	6.1	A	--
	R	21	18	86	4	1.4	A	--
	Subtotal	**150**	**138**	**92**	**--**	**13.3**	**B**	**--**
	Total	**347**	**321**	**93**	**--**	**17.1**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	145	140	97	11	35.6	D	--
	R	71	65	92	6	11.1	B	--
	Subtotal	**216**	**206**	**95**	**--**	**27.8**	**C**	**--**
EB	T	142	127	89	8	15.2	B	--
	R	16	17	100	5	5.4	A	--
	Subtotal	**158**	**143**	**91**	**--**	**14.1**	**B**	**--**
WB	L	53	52	98	11	37.1	D	--
	T	79	72	91	6	10.5	B	--
	Subtotal	**132**	**123**	**93**	**--**	**21.7**	**C**	**--**
	Total	**505**	**472**	**93**	**--**	**22.0**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	12	92	3	42.9	D	--
	R	61	60	98	3	14.0	B	--
	Subtotal	**74**	**72**	**97**	**--**	**18.8**	**B**	**--**
EB	L	47	39	83	7	75.1	E	--
	T	239	232	97	14	4.5	A	--
	Subtotal	**287**	**271**	**94**	**--**	**14.6**	**B**	**--**
WB	T	118	110	93	13	8.0	A	--
	R	58	56	97	6	3.5	A	--
	Subtotal	**176**	**166**	**94**	**--**	**6.5**	**A**	**--**
	Total	**537**	**508**	**95**	**--**	**12.5**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	2	41.6	D	--
	T	3	3	100	2	33.8	C	--
	R	26	26	100	6	11.9	B	--
	Subtotal	**37**	**38**	**103**	**--**	**20.3**	**C**	**--**
SB	L	3	3	67	1	51.4	D	--
	T	3	2	67	1	33.3	C	--
	R	16	15	94	3	6.0	A	--
	Subtotal	**21**	**20**	**95**	**--**	**14.7**	**B**	**--**
EB	L	8	6	75	4	38.6	D	--
	T	287	277	97	13	13.5	B	--
	R	5	4	80	2	4.4	A	--
	Subtotal	**300**	**287**	**96**	**--**	**13.9**	**B**	**--**
WB	L	11	10	91	5	59.4	E	--
	T	153	140	92	9	13.2	B	--
	R	3	3	100	1	6.7	A	--
	Subtotal	**166**	**153**	**92**	**--**	**16.1**	**B**	**--**
	Total	**524**	**498**	**95**	**--**	**15.1**	**B**	**--**

Intersection: *9: Southgate Ave. & Skyway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	329	312	95	14	25.1	C	--
	R	26	25	96	3	15.1	B	--
	Subtotal	**355**	**337**	**95**	**--**	**24.4**	**C**	**--**
EB	L	32	33	100	5	48.3	D	--
	T	284	270	95	16	26.4	C	--
	Subtotal	**316**	**302**	**96**	**--**	**28.8**	**C**	**--**
WB	T	139	129	93	8	21.4	C	--
	R	118	114	97	9	12.8	B	--
	Subtotal	**258**	**243**	**94**	**--**	**17.3**	**B**	**--**
	Total	**929**	**882**	**95**	**--**	**24.0**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	63	60	95	7	33.8	C	--
	T	118	121	103	6	8.9	A	--
	Subtotal	**182**	**181**	**99**	**--**	**17.2**	**B**	**--**
SB	T	82	75	91	10	34.0	C	--
	R	189	186	98	14	28.1	C	--
	Subtotal	**271**	**261**	**96**	**--**	**29.8**	**C**	**--**
EB	L	145	132	91	10	26.1	C	--
	R	39	39	100	6	10.3	B	--
	Subtotal	**184**	**171**	**92**	**--**	**22.5**	**C**	**--**
	Total	**637**	**612**	**96**	**--**	**24.0**	**C**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	179	181	101	15	3.6	A	--
	R	5	5	80	2	4.3	A	--
	Subtotal	**184**	**185**	**101**	**--**	**3.6**	**A**	**--**
SB	L	8	6	75	4	5.7	A	--
	T	97	108	111	10	1.8	A	--
	Subtotal	**105**	**114**	**109**	**--**	**2.0**	**A**	**--**
WB	L	5	6	120	2	11.7	B	--
	R	13	13	100	2	5.7	A	--
	Subtotal	**18**	**19**	**106**	**--**	**7.4**	**A**	**--**
	Total	**308**	**318**	**103**	**--**	**3.2**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	97	93	96	14	14.1	B	--
	R	68	65	96	8	9.9	A	--
	Subtotal	**166**	**158**	**95**	**--**	**12.3**	**B**	**--**
SB	L	47	44	94	6	36.8	D	--
	T	58	55	95	8	7.0	A	--
	Subtotal	**105**	**99**	**94**	**--**	**20.3**	**C**	**--**
WB	L	71	61	85	8	18.8	B	--
	R	97	95	98	8	9.5	A	--
	Subtotal	**168**	**156**	**93**	**--**	**13.1**	**B**	**--**
	Total	**439**	**413**	**94**	**--**	**14.5**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	26	23	85	2	38.6	D	--
	T	5	5	100	2	39.4	D	--
	R	47	43	91	4	13.7	B	--
	Subtotal	**79**	**71**	**90**	**--**	**23.5**	**C**	**--**
SB	L	24	26	108	5	45.6	D	--
	T	3	2	67	2	39.4	D	--
	R	3	3	100	2	12.5	B	--
	Subtotal	**29**	**31**	**107**	**--**	**42.0**	**D**	**--**
EB	L	5	4	80	2	45.9	D	--
	T	134	126	94	12	14.6	B	--
	R	16	15	94	5	6.4	A	--
	Subtotal	**155**	**145**	**94**	**--**	**14.5**	**B**	**--**
WB	L	42	41	98	6	33.1	C	--
	T	161	148	92	9	5.9	A	--
	R	29	26	90	4	2.1	A	--
	Subtotal	**232**	**216**	**93**	**--**	**10.7**	**B**	**--**
	Total	**495**	**463**	**94**	**--**	**16.0**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	66	68	103	8	32.9	C	--
	R	79	75	95	9	11.1	B	--
	Subtotal	**145**	**142**	**98**	**--**	**21.4**	**C**	**--**
EB	T	171	160	94	10	16.1	B	--
	R	34	33	97	6	7.8	A	--
	Subtotal	**205**	**193**	**94**	**--**	**14.7**	**B**	**--**
WB	L	84	83	99	10	41.6	D	--
	T	153	140	92	6	5.9	A	--
	Subtotal	**237**	**223**	**94**	**--**	**19.2**	**B**	**--**
	Total	**587**	**558**	**95**	**--**	**18.2**	**B**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	28	88	6	36.7	D	--
	R	84	82	98	7	12.0	B	--
	Subtotal	**116**	**109**	**94**	**--**	**18.2**	**B**	**--**
EB	L	89	88	99	7	54.8	D	--
	T	147	141	96	10	5.5	A	--
	Subtotal	**237**	**229**	**97**	**--**	**24.4**	**C**	**--**
WB	T	205	202	99	12	18.9	B	--
	R	166	154	93	18	17.2	B	--
	Subtotal	**371**	**356**	**96**	**--**	**18.1**	**B**	**--**
	Total	**724**	**694**	**96**	**--**	**20.2**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	9	113	3	38.0	D	--
	T	3	3	67	2	36.4	D	--
	R	5	5	80	2	5.7	A	--
	Subtotal	**16**	**16**	**100**	**--**	**28.5**	**C**	**--**
SB	L	3	3	100	1	41.7	D	--
	T	3	2	67	1	47.8	D	--
	R	5	4	80	2	13.0	B	--
	Subtotal	**11**	**9**	**82**	**--**	**28.6**	**C**	**--**
EB	L	24	21	88	5	51.3	D	--
	T	195	192	98	14	10.7	B	--
	R	13	11	85	3	3.7	A	--
	Subtotal	**232**	**224**	**97**	**--**	**14.2**	**B**	**--**
WB	L	26	26	100	4	62.1	E	--
	T	358	337	94	18	24.2	C	--
	R	3	2	67	1	19.8	B	--
	Subtotal	**387**	**365**	**94**	**--**	**26.9**	**C**	**--**
	Total	**645**	**613**	**95**	**--**	**22.3**	**C**	**--**

Intersection: *9: Southgate Ave. & Skyway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	53	49	92	8	16.7	B	--
	R	68	67	99	9	18.7	B	--
	Subtotal	**121**	**116**	**96**	**--**	**17.8**	**B**	**--**
EB	L	53	50	94	5	60.6	E	--
	T	150	147	98	14	16.9	B	--
	Subtotal	**203**	**197**	**97**	**--**	**28.1**	**C**	**--**
WB	T	318	300	94	21	56.1	E	--
	R	287	274	95	15	39.4	D	--
	Subtotal	**605**	**573**	**95**	**--**	**48.2**	**D**	**--**
	Total	**929**	**887**	**95**	**--**	**39.7**	**D**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	37	33	89	7	35.4	D	--
	T	113	111	98	12	10.9	B	--
	Subtotal	**150**	**143**	**95**	**--**	**16.5**	**B**	**--**
SB	T	134	131	98	9	28.0	C	--
	R	171	164	96	10	19.7	B	--
	Subtotal	**305**	**295**	**97**	**--**	**23.4**	**C**	**--**
EB	L	208	201	96	11	44.3	D	--
	R	55	53	96	5	30.7	C	--
	Subtotal	**263**	**253**	**96**	**--**	**41.5**	**D**	**--**
	Total	**718**	**692**	**96**	**--**	**28.6**	**C**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	142	146	103	14	3.8	A	--
	R	5	4	80	2	4.4	A	--
	Subtotal	**147**	**151**	**103**	**--**	**3.8**	**A**	**--**
SB	L	13	14	108	4	6.4	A	--
	T	176	173	98	13	3.1	A	--
	Subtotal	**189**	**187**	**99**	**--**	**3.4**	**A**	**--**
WB	L	5	5	100	1	15.7	C	--
	R	11	10	91	4	6.3	A	--
	Subtotal	**16**	**15**	**94**	**--**	**9.5**	**A**	**--**
	Total	**353**	**352**	**100**	**--**	**3.8**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	87	86	99	9	17.6	B	--
	R	53	52	98	11	9.9	A	--
	Subtotal	**139**	**138**	**99**	**--**	**14.7**	**B**	**--**
SB	L	108	107	99	6	51.3	D	--
	T	79	76	96	7	7.4	A	--
	Subtotal	**187**	**183**	**98**	**--**	**33.0**	**C**	**--**
WB	L	63	60	95	4	25.4	C	--
	R	71	66	93	8	7.6	A	--
	Subtotal	**134**	**126**	**94**	**--**	**16.0**	**B**	**--**
	Total	**461**	**447**	**97**	**--**	**22.6**	**C**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	13	81	3	40.6	D	--
	T	3	4	133	3	42.3	D	--
	R	39	40	103	6	12.9	B	--
	Subtotal	**58**	**57**	**98**	**--**	**21.1**	**C**	**--**
SB	L	29	27	93	4	47.6	D	--
	T	5	4	80	3	51.6	D	--
	R	8	7	88	2	12.0	B	--
	Subtotal	**42**	**38**	**90**	**--**	**41.1**	**D**	**--**
EB	L	5	4	80	1	49.9	D	--
	T	158	157	99	11	16.7	B	--
	R	21	20	95	6	6.9	A	--
	Subtotal	**184**	**182**	**99**	**--**	**16.3**	**B**	**--**
WB	L	58	49	84	7	46.8	D	--
	T	145	136	94	14	6.2	A	--
	R	24	22	92	7	2.1	A	--
	Subtotal	**226**	**208**	**92**	**--**	**15.4**	**B**	**--**
	Total	**511**	**485**	**95**	**--**	**18.5**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	168	160	95	9	39.1	D	--
	R	95	88	93	10	16.8	B	--
	Subtotal	**263**	**248**	**94**	**--**	**31.2**	**C**	**--**
EB	T	203	203	100	13	19.4	B	--
	R	24	23	96	5	5.7	A	--
	Subtotal	**226**	**226**	**100**	**--**	**18.0**	**B**	**--**
WB	L	66	62	94	4	27.7	C	--
	T	132	123	93	13	8.2	A	--
	Subtotal	**197**	**185**	**94**	**--**	**14.7**	**B**	**--**
	Total	**687**	**659**	**96**	**--**	**22.1**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	21	20	95	2	38.6	D	--
	R	68	66	97	8	18.4	B	--
	Subtotal	**89**	**86**	**97**	**--**	**23.0**	**C**	**--**
EB	L	66	62	94	8	30.3	C	--
	T	305	300	98	13	6.0	A	--
	Subtotal	**371**	**362**	**98**	**--**	**10.1**	**B**	**--**
WB	T	176	171	97	15	11.0	B	--
	R	71	72	101	10	5.6	A	--
	Subtotal	**247**	**244**	**99**	**--**	**9.4**	**A**	**--**
	Total	**708**	**692**	**98**	**--**	**11.5**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	11	85	2	45.6	D	--
	T	3	3	67	1	30.4	C	--
	R	29	25	86	3	12.9	B	--
	Subtotal	**45**	**38**	**84**	**--**	**23.5**	**C**	**--**
SB	L	3	3	100	1	48.7	D	--
	T	5	6	120	2	38.2	D	--
	R	29	26	90	5	14.1	B	--
	Subtotal	**37**	**34**	**92**	**--**	**20.9**	**C**	**--**
EB	L	11	9	82	4	38.9	D	--
	T	358	355	99	17	10.1	B	--
	R	5	5	100	1	3.2	A	--
	Subtotal	**374**	**368**	**98**	**--**	**10.7**	**B**	**--**
WB	L	13	10	77	2	57.7	E	--
	T	205	202	99	11	18.6	B	--
	R	3	2	67	1	9.6	A	--
	Subtotal	**221**	**215**	**97**	**--**	**20.4**	**C**	**--**
	Total	**676**	**655**	**97**	**--**	**15.1**	**B**	**--**

Intersection: *9: Southgate Ave. & Skyway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	279	273	97	14	24.8	C	--
	R	45	43	96	5	16.1	B	--
	Subtotal	**324**	**315**	**97**	**--**	**23.6**	**C**	**--**
EB	L	55	51	93	6	53.7	D	--
	T	334	326	98	25	29.0	C	--
	Subtotal	**389**	**377**	**97**	**--**	**32.3**	**C**	**--**
WB	T	176	172	98	14	23.7	C	--
	R	108	105	97	13	13.1	B	--
	Subtotal	**284**	**276**	**97**	**--**	**19.7**	**B**	**--**
	Total	**997**	**968**	**97**	**--**	**25.9**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	84	79	94	11	52.0	D	--
	T	139	143	103	11	9.9	A	--
	Subtotal	**224**	**222**	**99**	**--**	**25.0**	**C**	**--**
SB	T	82	70	85	12	155.9	F	--
	R	245	207	84	2	146.8	F	--
	Subtotal	**326**	**277**	**85**	**--**	**149.1**	**F**	**--**
EB	L	195	183	94	13	42.4	D	--
	R	53	47	89	6	19.4	B	--
	Subtotal	**247**	**230**	**93**	**--**	**37.7**	**D**	**--**
	Total	**797**	**730**	**92**	**--**	**76.1**	**E**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	221	228	103	15	4.1	A	--
	R	5	5	100	3	4.3	A	--
	Subtotal	**226**	**233**	**103**	**--**	**4.1**	**A**	**--**
SB	L	8	7	88	3	5.5	A	--
	T	126	112	89	9	2.0	A	--
	Subtotal	**134**	**119**	**89**	**--**	**2.2**	**A**	**--**
WB	L	5	5	100	3	15.1	C	--
	R	13	13	100	3	6.4	A	--
	Subtotal	**18**	**18**	**100**	**--**	**8.8**	**A**	**--**
	Total	**379**	**370**	**98**	**--**	**3.8**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	113	106	94	8	18.0	B	--
	R	79	75	95	8	11.6	B	--
	Subtotal	**192**	**181**	**94**	**--**	**15.3**	**B**	**--**
SB	L	63	55	87	9	37.2	D	--
	T	74	67	91	10	7.6	A	--
	Subtotal	**137**	**122**	**89**	**--**	**20.9**	**C**	**--**
WB	L	76	71	93	12	24.7	C	--
	R	132	127	96	11	14.8	B	--
	Subtotal	**208**	**199**	**96**	**--**	**18.4**	**B**	**--**
	Total	**537**	**501**	**93**	**--**	**17.9**	**B**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	37	34	92	5	39.3	D	--
	T	8	10	125	3	40.0	D	--
	R	71	68	96	8	17.9	B	--
	Subtotal	**116**	**112**	**97**	**--**	**26.3**	**C**	**--**
SB	L	24	22	92	7	49.5	D	--
	T	3	3	100	2	41.3	D	--
	R	3	2	67	1	8.4	A	--
	Subtotal	**29**	**27**	**93**	**--**	**45.3**	**D**	**--**
EB	L	5	4	80	2	50.3	D	--
	T	153	141	92	9	24.1	C	--
	R	21	22	105	5	8.5	A	--
	Subtotal	**179**	**167**	**93**	**--**	**22.7**	**C**	**--**
WB	L	63	62	98	9	55.9	E	--
	T	187	181	97	13	9.5	A	--
	R	32	28	88	7	3.2	A	--
	Subtotal	**282**	**271**	**96**	**--**	**19.5**	**B**	**--**
	Total	**605**	**578**	**96**	**--**	**22.9**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	74	68	92	6	40.3	D	--
	R	92	91	99	10	16.0	B	--
	Subtotal	**166**	**159**	**96**	**--**	**26.4**	**C**	**--**
EB	T	203	191	94	11	21.5	C	--
	R	45	41	91	5	8.0	A	--
	Subtotal	**247**	**232**	**94**	**--**	**19.1**	**B**	**--**
WB	L	97	88	91	8	47.7	D	--
	T	189	177	94	10	6.8	A	--
	Subtotal	**287**	**265**	**92**	**--**	**20.4**	**C**	**--**
	Total	**700**	**657**	**94**	**--**	**21.4**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	42	41	98	6	40.9	D	--
	R	97	90	93	8	14.3	B	--
	Subtotal	**139**	**131**	**94**	**--**	**22.6**	**C**	**--**
EB	L	108	102	94	9	71.8	E	--
	T	168	156	93	9	7.0	A	--
	Subtotal	**276**	**258**	**93**	**--**	**32.6**	**C**	**--**
WB	T	245	229	93	15	28.7	C	--
	R	168	159	95	12	22.8	C	--
	Subtotal	**413**	**388**	**94**	**--**	**26.3**	**C**	**--**
	Total	**829**	**776**	**94**	**--**	**27.8**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	6	75	2	50.4	D	--
	T	3	3	100	1	44.8	D	--
	R	5	5	100	2	9.3	A	--
	Subtotal	**16**	**13**	**81**	**--**	**34.6**	**C**	**--**
SB	L	3	3	100	2	55.8	E	--
	T	3	2	67	1	45.4	D	--
	R	8	7	88	4	23.9	C	--
	Subtotal	**13**	**12**	**92**	**--**	**35.4**	**D**	**--**
EB	L	34	32	94	8	51.5	D	--
	T	213	197	92	15	6.5	A	--
	R	18	18	100	5	2.3	A	--
	Subtotal	**266**	**246**	**92**	**--**	**12.1**	**B**	**--**
WB	L	26	22	85	5	61.8	E	--
	T	397	379	95	15	27.6	C	--
	R	3	2	67	1	17.1	B	--
	Subtotal	**426**	**403**	**95**	**--**	**29.4**	**C**	**--**
	Total	**721**	**675**	**94**	**--**	**23.3**	**C**	**--**

Intersection: 9: Southgate Ave. & Skyway **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	61	60	98	8	18.8	B	--
	R	95	91	96	10	24.6	C	--
	Subtotal	**155**	**151**	**97**	**--**	**22.3**	**C**	**--**
EB	L	61	58	95	11	83.9	F	--
	T	161	151	94	9	16.5	B	--
	Subtotal	**221**	**209**	**95**	**--**	**35.3**	**D**	**--**
WB	T	332	311	94	10	60.6	E	--
	R	279	254	91	16	38.6	D	--
	Subtotal	**611**	**566**	**93**	**--**	**50.7**	**D**	**--**
	Total	**987**	**926**	**94**	**--**	**42.6**	**D**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *1: Hegan Lane & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	50	51	102	6	43.2	D	--
	T	132	122	92	12	11.1	B	--
	Subtotal	**182**	**173**	**95**	**--**	**20.6**	**C**	**--**
SB	T	166	136	82	15	175.0	F	--
	R	232	193	83	4	166.5	F	--
	Subtotal	**397**	**330**	**83**	**--**	**170.0**	**F**	**--**
EB	L	268	217	81	7	193.1	F	--
	R	71	58	82	8	176.3	F	--
	Subtotal	**339**	**275**	**81**	**--**	**189.6**	**F**	**--**
	Total	**918**	**777**	**85**	**--**	**143.6**	**F**	**--**

Intersection: *2: Entler Avenue & Midway* ***Type:*** *Un-Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	168	174	104	9	3.9	A	--
	R	5	5	100	1	2.6	A	--
	Subtotal	**174**	**179**	**103**	**--**	**3.9**	**A**	**--**
SB	L	13	11	85	3	6.3	A	--
	T	224	183	82	16	3.5	A	--
	Subtotal	**237**	**193**	**81**	**--**	**3.6**	**A**	**--**
WB	L	5	4	80	3	17.5	C	--
	R	11	10	91	2	7.6	A	--
	Subtotal	**16**	**14**	**88**	**--**	**10.6**	**B**	**--**
	Total	**426**	**386**	**91**	**--**	**4.0**	**A**	**--**

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SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *3: Southgate Ave. & Midway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	95	88	93	7	24.8	C	--
	R	61	54	89	6	12.4	B	--
	Subtotal	**155**	**142**	**92**	**--**	**20.1**	**C**	**--**
SB	L	147	121	82	13	41.5	D	--
	T	89	76	85	11	7.4	A	--
	Subtotal	**237**	**196**	**83**	**--**	**28.3**	**C**	**--**
WB	L	74	62	84	6	31.5	C	--
	R	95	92	97	9	11.2	B	--
	Subtotal	**168**	**154**	**92**	**--**	**19.4**	**B**	**--**
	Total	**561**	**493**	**88**	**--**	**23.2**	**C**	**--**

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	23	96	6	55.0	D	--
	T	3	3	100	1	44.9	D	--
	R	61	57	92	9	15.8	B	--
	Subtotal	**87**	**82**	**94**	**--**	**27.6**	**C**	**--**
SB	L	32	28	88	7	58.4	E	--
	T	8	8	100	2	44.4	D	--
	R	8	7	88	3	16.0	B	--
	Subtotal	**47**	**43**	**91**	**--**	**48.9**	**D**	**--**
EB	L	5	6	120	2	41.0	D	--
	T	208	176	85	12	22.0	C	--
	R	29	26	90	5	9.5	A	--
	Subtotal	**242**	**208**	**86**	**--**	**20.9**	**C**	**--**
WB	L	87	82	94	6	84.9	F	--
	T	189	177	94	14	12.4	B	--
	R	26	26	100	5	3.1	A	--
	Subtotal	**303**	**284**	**94**	**--**	**32.3**	**C**	**--**
	Total	**679**	**617**	**91**	**--**	**29.0**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	158	151	96	13	44.9	D	--
	R	121	116	96	10	32.8	C	--
	Subtotal	**279**	**267**	**96**	**--**	**39.7**	**D**	**--**
EB	T	271	235	87	17	15.5	B	--
	R	29	26	90	5	5.9	A	--
	Subtotal	**300**	**261**	**87**	**--**	**14.5**	**B**	**--**
WB	L	79	74	94	11	57.8	E	--
	T	182	169	93	9	9.2	A	--
	Subtotal	**261**	**243**	**93**	**--**	**23.9**	**C**	**--**
	Total	**839**	**771**	**92**	**--**	**26.2**	**C**	**--**

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	29	26	90	6	43.7	D	--
	R	76	75	99	9	25.6	C	--
	Subtotal	**105**	**102**	**97**	**--**	**30.3**	**C**	**--**
EB	L	84	71	85	7	46.5	D	--
	T	345	317	92	24	8.9	A	--
	Subtotal	**429**	**388**	**90**	**--**	**15.8**	**B**	**--**
WB	T	232	217	94	11	14.6	B	--
	R	71	66	93	9	7.3	A	--
	Subtotal	**303**	**284**	**94**	**--**	**12.9**	**B**	**--**
	Total	**837**	**773**	**92**	**--**	**16.6**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	18	18	100	5	84.4	F	--
	T	3	4	133	1	40.1	D	--
	R	29	28	97	5	19.3	B	--
	Subtotal	**50**	**49**	**98**	**--**	**44.4**	**D**	**--**
SB	L	3	3	67	2	48.9	D	--
	T	5	5	100	3	35.9	D	--
	R	42	40	95	6	15.5	B	--
	Subtotal	**50**	**48**	**96**	**--**	**19.4**	**B**	**--**
EB	L	16	13	81	3	58.3	E	--
	T	397	368	93	25	25.0	C	--
	R	8	9	113	4	15.1	B	--
	Subtotal	**421**	**390**	**93**	**--**	**25.9**	**C**	**--**
WB	L	13	13	100	3	72.5	E	--
	T	242	225	93	15	20.8	C	--
	R	3	3	100	1	9.6	A	--
	Subtotal	**258**	**240**	**93**	**--**	**23.5**	**C**	**--**
	Total	**779**	**727**	**93**	**--**	**25.9**	**C**	**--**

Intersection: *9: Southgate Ave. & Skyway* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	268	251	94	13	22.9	C	--
	R	63	59	94	9	17.4	B	--
	Subtotal	**332**	**310**	**93**	**--**	**21.8**	**C**	**--**
EB	L	76	71	93	3	119.2	F	--
	T	353	322	91	24	40.5	D	--
	Subtotal	**429**	**393**	**92**	**--**	**54.7**	**D**	**--**
WB	T	195	184	94	8	26.4	C	--
	R	113	111	98	9	14.6	B	--
	Subtotal	**308**	**294**	**95**	**--**	**21.9**	**C**	**--**
	Total	**1068**	**997**	**93**	**--**	**34.8**	**C**	**--**

SIMTRAFFIC RESULTS – ALTERNATIVE 2 (PARTIAL CLOVERLEAF INTERCHANGE)

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 2)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	14	14	100	2	38.3	D	--
	T	5	5	80	2	34.6	C	--
	R	24	26	108	5	8.5	A	--
	Subtotal	**43**	**45**	**105**	**--**	**20.5**	**C**	**--**
SB	L	22	20	91	5	56.2	E	--
	T	3	3	67	1	47.3	D	--
	R	3	2	67	2	4.8	A	--
	Subtotal	**27**	**25**	**93**	**--**	**50.4**	**D**	**--**
EB	L	3	3	100	2	55.3	E	--
	T	109	100	92	10	10.2	B	--
	R	8	8	100	2	4.7	A	--
	Subtotal	**120**	**111**	**93**	**--**	**11.0**	**B**	**--**
WB	L	22	20	91	2	50.7	D	--
	T	122	110	90	11	6.5	A	--
	R	30	27	90	5	1.8	A	--
	Subtotal	**174**	**157**	**90**	**--**	**11.3**	**B**	**--**
	Total	**364**	**337**	**93**	**--**	**15.3**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	54	53	98	5	32.6	C	--
	R	68	62	91	7	6.7	A	--
	Subtotal	**122**	**115**	**94**	**--**	**18.6**	**B**	**--**
EB	T	133	125	94	12	4.7	A	--
	R	22	21	95	3	1.9	A	--
	Subtotal	**155**	**146**	**94**	**--**	**4.3**	**A**	**--**
WB	T	106	94	89	14	10.6	B	--
	R	73	71	97	9	3.0	A	--
	Subtotal	**179**	**165**	**92**	**--**	**7.3**	**A**	**--**
	Total	**457**	**426**	**93**	**--**	**9.3**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 2)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	19	17	89	6	40.6	D	--
	R	73	65	89	7	9.7	A	--
	Subtotal	**92**	**82**	**89**	**--**	**16.0**	**B**	**--**
EB	T	114	106	93	11	4.6	A	--
	R	73	71	97	6	2.9	A	--
	Subtotal	**188**	**176**	**94**	**--**	**3.9**	**A**	**--**
WB	T	160	151	94	16	4.9	A	--
	R	147	132	90	8	4.7	A	--
	Subtotal	**307**	**283**	**92**	**--**	**4.8**	**A**	**--**
	Total	**587**	**541**	**92**	**--**	**6.2**	**A**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	4	80	2	42.1	D	--
	T	3	3	100	1	39.6	D	--
	R	3	3	100	1	6.9	A	--
	Subtotal	**11**	**11**	**100**	**--**	**31.1**	**C**	**--**
SB	L	3	3	100	2	39.9	D	--
	T	3	3	100	1	45.5	D	--
	R	5	7	140	2	12.7	B	--
	Subtotal	**11**	**13**	**118**	**--**	**26.7**	**C**	**--**
EB	L	14	13	93	3	40.4	D	--
	T	166	149	90	9	9.5	A	--
	R	8	9	113	3	4.2	A	--
	Subtotal	**188**	**171**	**91**	**--**	**11.5**	**B**	**--**
WB	L	27	26	96	6	51.6	D	--
	T	296	270	91	9	14.4	B	--
	R	3	2	67	1	12.2	B	--
	Subtotal	**326**	**298**	**91**	**--**	**17.6**	**B**	**--**
	Total	**535**	**493**	**92**	**--**	**16.0**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	4	40.1	D	--
	T	3	2	67	1	43.5	D	--
	R	21	18	86	4	7.1	A	--
	Subtotal	**32**	**28**	**88**	**--**	**19.1**	**B**	**--**
SB	L	29	27	93	5	50.2	D	--
	T	5	5	100	2	36.4	D	--
	R	8	7	88	2	7.3	A	--
	Subtotal	**42**	**40**	**95**	**--**	**40.3**	**D**	**--**
EB	L	5	5	100	2	52.4	D	--
	T	108	104	96	10	12.3	B	--
	R	11	10	91	4	5.6	A	--
	Subtotal	**124**	**119**	**96**	**--**	**13.5**	**B**	**--**
WB	L	29	28	97	5	43.0	D	--
	T	100	92	92	3	6.4	A	--
	R	21	19	90	5	1.7	A	--
	Subtotal	**150**	**139**	**93**	**--**	**13.1**	**B**	**--**
	Total	**347**	**326**	**94**	**--**	**17.1**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	145	142	98	7	32.5	C	--
	R	71	67	94	6	10.7	B	--
	Subtotal	**216**	**209**	**97**	**--**	**25.5**	**C**	**--**
EB	T	142	133	94	8	6.5	A	--
	R	16	14	88	3	1.7	A	--
	Subtotal	**158**	**147**	**93**	**--**	**6.0**	**A**	**--**
WB	T	79	74	94	7	13.2	B	--
	R	53	50	94	8	2.5	A	--
	Subtotal	**132**	**123**	**93**	**--**	**8.9**	**A**	**--**
	Total	**505**	**480**	**95**	**--**	**15.3**	**B**	**--**

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	92	3	41.0	D	--
	R	61	57	93	8	13.5	B	--
	Subtotal	**74**	**70**	**95**	**--**	**18.4**	**B**	**--**
EB	T	239	231	97	12	5.0	A	--
	R	47	48	102	4	2.8	A	--
	Subtotal	**287**	**279**	**97**	**--**	**4.7**	**A**	**--**
WB	T	118	110	93	7	2.9	A	--
	R	58	54	93	8	1.9	A	--
	Subtotal	**176**	**164**	**93**	**--**	**2.6**	**A**	**--**
	Total	**537**	**513**	**96**	**--**	**5.9**	**A**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	7	88	3	40.6	D	--
	T	3	2	67	1	32.7	C	--
	R	26	24	92	5	10.5	B	--
	Subtotal	**37**	**33**	**89**	**--**	**18.8**	**B**	**--**
SB	L	3	2	67	1	38.6	D	--
	T	3	3	67	1	33.4	C	--
	R	16	14	88	2	6.6	A	--
	Subtotal	**21**	**18**	**86**	**--**	**13.7**	**B**	**--**
EB	L	8	7	88	3	43.5	D	--
	T	287	274	95	12	13.0	B	--
	R	5	5	100	2	4.5	A	--
	Subtotal	**300**	**285**	**95**	**--**	**13.7**	**B**	**--**
WB	L	11	10	91	3	63.0	E	--
	T	153	141	92	12	7.1	A	--
	R	3	3	100	2	4.0	A	--
	Subtotal	**166**	**154**	**93**	**--**	**10.5**	**B**	**--**
	Total	**524**	**491**	**94**	**--**	**13.0**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	26	25	96	5	38.8	D	--
	T	5	5	100	2	43.2	D	--
	R	47	45	96	6	14.0	B	--
	Subtotal	**79**	**75**	**95**	**--**	**24.3**	**C**	**--**
SB	L	24	22	92	5	44.1	D	--
	T	3	2	67	2	41.7	D	--
	R	3	3	100	1	8.2	A	--
	Subtotal	**29**	**27**	**93**	**--**	**40.0**	**D**	**--**
EB	L	5	6	120	2	48.5	D	--
	T	134	132	99	14	17.4	B	--
	R	16	15	94	4	8.1	A	--
	Subtotal	**155**	**153**	**98**	**--**	**17.6**	**B**	**--**
WB	L	42	37	88	7	48.7	D	--
	T	161	155	96	9	9.0	A	--
	R	29	27	93	5	2.8	A	--
	Subtotal	**232**	**218**	**94**	**--**	**15.0**	**B**	**--**
	Total	**495**	**473**	**96**	**--**	**18.7**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	66	64	97	6	41.6	D	--
	R	79	75	94	8	10.2	B	--
	Subtotal	**145**	**139**	**96**	**--**	**24.7**	**C**	**--**
EB	T	171	163	95	11	5.0	A	--
	R	34	35	103	7	2.4	A	--
	Subtotal	**205**	**199**	**97**	**--**	**4.6**	**A**	**--**
WB	T	153	144	94	11	9.5	A	--
	R	84	78	93	9	5.3	A	--
	Subtotal	**237**	**222**	**94**	**--**	**8.0**	**A**	**--**
	Total	**587**	**559**	**95**	**--**	**10.9**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	32	32	100	3	42.7	D	--
	R	84	84	100	8	12.3	B	--
	Subtotal	**116**	**116**	**100**	**--**	**20.6**	**C**	**--**
EB	T	147	145	98	8	5.0	A	--
	R	89	82	92	6	3.9	A	--
	Subtotal	**237**	**227**	**96**	**--**	**4.6**	**A**	**--**
WB	T	205	190	93	11	6.2	A	--
	R	166	161	97	15	6.1	A	--
	Subtotal	**371**	**351**	**95**	**--**	**6.1**	**A**	**--**
	Total	**724**	**694**	**96**	**--**	**8.0**	**A**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	7	88	2	48.4	D	--
	T	3	3	100	1	43.1	D	--
	R	5	5	100	2	5.1	A	--
	Subtotal	**16**	**15**	**94**	**--**	**32.6**	**C**	**--**
SB	L	3	2	67	1	39.3	D	--
	T	3	2	67	1	47.3	D	--
	R	5	6	120	3	21.7	C	--
	Subtotal	**11**	**9**	**82**	**--**	**30.1**	**C**	**--**
EB	L	24	24	100	6	45.2	D	--
	T	195	190	97	13	6.2	A	--
	R	13	13	100	4	2.3	A	--
	Subtotal	**232**	**227**	**98**	**--**	**10.0**	**B**	**--**
WB	L	26	21	81	6	46.4	D	--
	T	358	337	94	23	19.2	B	--
	R	3	3	100	2	17.3	B	--
	Subtotal	**387**	**361**	**93**	**--**	**20.8**	**C**	**--**
	Total	**645**	**612**	**95**	**--**	**17.2**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	16	13	81	4	44.9	D	--
	T	3	3	100	1	45.3	D	--
	R	39	35	90	7	9.1	A	--
	Subtotal	**58**	**51**	**88**	**--**	**20.1**	**C**	**--**
SB	L	29	28	97	7	46.2	D	--
	T	5	5	100	2	41.3	D	--
	R	8	8	100	3	14.9	B	--
	Subtotal	**42**	**41**	**98**	**--**	**39.6**	**D**	**--**
EB	L	5	5	100	3	44.3	D	--
	T	158	154	97	13	16.7	B	--
	R	21	21	100	4	6.7	A	--
	Subtotal	**184**	**180**	**98**	**--**	**16.4**	**B**	**--**
WB	L	58	56	97	8	45.7	D	--
	T	145	140	97	9	7.8	A	--
	R	24	22	92	5	2.5	A	--
	Subtotal	**226**	**218**	**96**	**--**	**17.1**	**B**	**--**
	Total	**511**	**489**	**96**	**--**	**19.0**	**B**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	168	159	95	12	38.3	D	--
	R	95	89	94	12	17.0	B	--
	Subtotal	**263**	**248**	**94**	**--**	**30.6**	**C**	**--**
EB	T	203	193	95	11	8.5	A	--
	R	24	24	100	5	2.5	A	--
	Subtotal	**226**	**216**	**96**	**--**	**7.9**	**A**	**--**
WB	T	132	128	97	11	13.5	B	--
	R	66	63	94	8	5.1	A	--
	Subtotal	**197**	**190**	**96**	**--**	**10.7**	**B**	**--**
	Total	**687**	**655**	**95**	**--**	**17.3**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	21	20	95	5	40.6	D	--
	R	68	64	94	7	16.7	B	--
	Subtotal	**89**	**84**	**94**	**--**	**22.3**	**C**	**--**
EB	T	305	290	95	13	6.3	A	--
	R	66	62	94	8	5.5	A	--
	Subtotal	**371**	**351**	**95**	**--**	**6.1**	**A**	**--**
WB	T	176	171	97	8	4.1	A	--
	R	71	75	106	7	2.9	A	--
	Subtotal	**247**	**247**	**100**	**--**	**3.7**	**A**	**--**
	Total	**708**	**682**	**96**	**--**	**7.2**	**A**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	13	13	100	3	56.5	E	--
	T	3	2	67	2	34.7	C	--
	R	29	29	100	5	15.9	B	--
	Subtotal	**45**	**45**	**100**	**--**	**28.8**	**C**	**--**
SB	L	3	3	67	1	59.5	E	--
	T	5	6	120	2	39.6	D	--
	R	29	30	103	4	16.4	B	--
	Subtotal	**37**	**38**	**103**	**--**	**22.8**	**C**	**--**
EB	L	11	12	109	2	49.3	D	--
	T	358	332	93	17	18.0	B	--
	R	5	6	120	2	10.1	B	--
	Subtotal	**374**	**350**	**94**	**--**	**18.9**	**B**	**--**
WB	L	13	11	85	2	65.1	E	--
	T	205	203	99	7	11.4	B	--
	R	3	2	67	1	5.1	A	--
	Subtotal	**221**	**216**	**98**	**--**	**14.1**	**B**	**--**
	Total	**676**	**650**	**96**	**--**	**18.3**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	37	34	92	4	41.0	D	--
	T	8	7	88	3	34.7	C	--
	R	71	73	103	5	16.9	B	--
	Subtotal	**116**	**113**	**97**	**--**	**25.2**	**C**	**--**
SB	L	24	25	104	4	47.6	D	--
	T	3	3	100	2	45.1	D	--
	R	3	4	133	1	9.8	A	--
	Subtotal	**29**	**31**	**107**	**--**	**43.1**	**D**	**--**
EB	L	5	5	100	2	50.2	D	--
	T	153	147	95	10	25.0	C	--
	R	21	21	100	4	10.8	B	--
	Subtotal	**179**	**173**	**97**	**--**	**24.0**	**C**	**--**
WB	L	63	57	90	6	50.1	D	--
	T	187	180	96	9	11.7	B	--
	R	32	29	91	6	3.2	A	--
	Subtotal	**282**	**267**	**94**	**--**	**19.1**	**B**	**--**
	Total	**605**	**584**	**97**	**--**	**23.0**	**C**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	74	74	100	8	40.4	D	--
	R	92	85	92	9	12.4	B	--
	Subtotal	**166**	**159**	**96**	**--**	**25.4**	**C**	**--**
EB	T	203	200	99	7	6.4	A	--
	R	45	46	102	5	3.0	A	--
	Subtotal	**247**	**246**	**100**	**--**	**5.8**	**A**	**--**
WB	T	189	183	97	14	12.0	B	--
	R	97	90	93	10	6.0	A	--
	Subtotal	**287**	**273**	**95**	**--**	**10.0**	**B**	**--**
	Total	**700**	**679**	**97**	**--**	**12.1**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	42	40	95	4	44.8	D	--
	R	97	93	96	7	13.8	B	--
	Subtotal	**139**	**133**	**96**	**--**	**23.1**	**C**	**--**
EB	T	168	171	102	11	5.8	A	--
	R	108	103	95	10	5.3	A	--
	Subtotal	**276**	**275**	**100**	**--**	**5.6**	**A**	**--**
WB	T	245	233	95	14	6.0	A	--
	R	168	155	92	6	6.2	A	--
	Subtotal	**413**	**388**	**94**	**--**	**6.1**	**A**	**--**
	Total	**829**	**796**	**96**	**--**	**8.8**	**A**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	8	8	100	4	49.1	D	--
	T	3	3	100	1	41.1	D	--
	R	5	4	80	2	11.4	B	--
	Subtotal	**16**	**15**	**94**	**--**	**37.9**	**D**	**--**
SB	L	3	2	67	1	60.3	E	--
	T	3	3	100	1	55.8	E	--
	R	8	8	100	4	24.9	C	--
	Subtotal	**13**	**13**	**100**	**--**	**38.3**	**D**	**--**
EB	L	34	32	94	6	55.4	E	--
	T	213	210	99	10	15.0	B	--
	R	18	21	117	4	7.1	A	--
	Subtotal	**266**	**263**	**99**	**--**	**19.2**	**B**	**--**
WB	L	26	25	96	3	47.2	D	--
	T	397	375	94	19	22.6	C	--
	R	3	3	100	2	18.4	B	--
	Subtotal	**426**	**403**	**95**	**--**	**24.1**	**C**	**--**
	Total	**721**	**693**	**96**	**--**	**22.8**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	24	23	96	4	45.8	D	--
	T	3	2	67	1	51.3	D	--
	R	61	62	102	9	15.9	B	--
	Subtotal	**87**	**88**	**101**	**--**	**24.6**	**C**	**--**
SB	L	32	31	97	8	73.6	E	--
	T	8	7	88	2	53.5	D	--
	R	8	7	88	4	19.1	B	--
	Subtotal	**47**	**45**	**96**	**--**	**61.5**	**E**	**--**
EB	L	5	5	100	1	47.5	D	--
	T	208	195	94	10	21.7	C	--
	R	29	26	90	6	11.6	B	--
	Subtotal	**242**	**226**	**93**	**--**	**21.0**	**C**	**--**
WB	L	87	76	87	8	55.9	E	--
	T	189	180	95	7	12.3	B	--
	R	26	26	100	7	3.1	A	--
	Subtotal	**303**	**282**	**93**	**--**	**23.3**	**C**	**--**
	Total	**679**	**641**	**94**	**--**	**25.4**	**C**	**--**

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
SB	L	158	151	96	11	36.8	D	--
	R	121	113	93	12	21.0	C	--
	Subtotal	**279**	**265**	**95**	**--**	**30.0**	**C**	**--**
EB	T	271	262	97	15	10.2	B	--
	R	29	27	93	7	4.0	A	--
	Subtotal	**300**	**289**	**96**	**--**	**9.6**	**A**	**--**
WB	T	182	172	95	7	13.8	B	--
	R	79	76	96	7	5.3	A	--
	Subtotal	**261**	**248**	**95**	**--**	**11.2**	**B**	**--**
	Total	**839**	**801**	**95**	**--**	**16.8**	**B**	**--**

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	29	28	97	3	40.7	D	--
	R	76	71	93	11	23.4	C	--
	Subtotal	**105**	**99**	**94**	**--**	**28.3**	**C**	**--**
EB	T	345	330	96	10	10.5	B	--
	R	84	84	100	5	7.1	A	--
	Subtotal	**429**	**414**	**97**	**--**	**9.8**	**A**	**--**
WB	T	232	220	95	9	5.1	A	--
	R	71	73	103	12	3.0	A	--
	Subtotal	**303**	**292**	**96**	**--**	**4.6**	**A**	**--**
	Total	**837**	**805**	**96**	**--**	**10.2**	**B**	**--**

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	18	17	94	5	64.0	E	--
	T	3	3	100	2	40.5	D	--
	R	29	30	103	5	17.6	B	--
	Subtotal	**50**	**49**	**98**	**--**	**34.6**	**C**	**--**
SB	L	3	4	133	2	41.1	D	--
	T	5	5	100	2	44.5	D	--
	R	42	43	100	5	16.8	B	--
	Subtotal	**50**	**52**	**104**	**--**	**21.4**	**C**	**--**
EB	L	16	14	88	3	52.7	D	--
	T	397	381	96	14	17.1	B	--
	R	8	8	100	2	10.4	B	--
	Subtotal	**421**	**403**	**95**	**--**	**18.2**	**B**	**--**
WB	L	13	13	100	3	79.6	E	--
	T	242	233	96	13	14.2	B	--
	R	3	2	67	1	8.1	A	--
	Subtotal	**258**	**248**	**96**	**--**	**17.6**	**B**	**--**
	Total	**779**	**751**	**96**	**--**	**19.3**	**B**	**--**

QUEUING RESULTS – NO PROJECT

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 No Project **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 6: Southgate Avenue & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	132	--	--	136	--	--
	T	1771	321	--	--	327	--	--
	R	500	35	--	--	29	--	--
SB	L	450	107	--	--	106	--	--
	T	4908	605	--	--	578	--	--
	R	500	169	--	--	110	--	--
EB	L	102	129	Yes	--	127	Yes	--
	T	102	129	Yes	--	127	Yes	--
	R	102	129	Yes	--	127	Yes	--
WB	L	99	72	--	--	69	--	--
	T	99	72	--	--	69	--	--
	R	99	72	--	--	69	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 No Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 6: Southgate Avenue & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	98	--	--	97	--	--
	T	1771	632	--	--	648	--	--
	R	500	13	--	--	12	--	--
SB	L	450	109	--	--	92	--	--
	T	4908	515	--	--	503	--	--
	R	500	139	--	--	115	--	--
EB	L	102	119	Yes	--	129	Yes	--
	R	102	119	Yes	--	129	Yes	--
WB	L	99	83	--	--	81	--	--
	T	99	83	--	--	81	--	--
	R	99	83	--	--	81	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	430	--	--	435	--	--
	T	1771	1031	--	--	1013	--	--
	R	500	82	--	--	64	--	--
SB	L	450	292	--	--	238	--	--
	T	4908	2719	--	--	2636	--	--
	R	500	536	Yes	--	522	Yes	--
EB	L	102	135	Yes	--	134	Yes	--
	T	102	135	Yes	--	134	Yes	--
	R	102	135	Yes	--	134	Yes	--
WB	L	99	70	--	--	67	--	--
	T	99	70	--	--	67	--	--
	R	99	70	--	--	67	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 No Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	446	--	--	412	--	--
	T	1771	1534	--	--	1513	--	--
	R	500	130	--	--	60	--	--
SB	L	450	156	--	--	137	--	--
	T	4908	2508	--	--	2580	--	--
	R	500	534	Yes	--	509	Yes	--
EB	L	102	133	Yes	--	132	Yes	--
	T	102	133	Yes	--	132	Yes	--
	R	102	133	Yes	--	132	Yes	--
WB	L	99	108	Yes	--	123	Yes	--
	T	99	108	Yes	--	123	Yes	--
	R	99	108	Yes	--	123	Yes	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 No Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *6: Southgate Avenue & SR 99* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	452	Yes	--	452	Yes	--
	T	1771	1813	Yes	--	1935	Yes	--
	R	500	79	--	--	66	--	--
SB	L	450	246	--	--	216	--	--
	T	4908	4948	Yes	--	5493	Yes	--
	R	500	542	Yes	--	592	Yes	--
EB	L	102	141	Yes	--	137	Yes	--
	T	102	141	Yes	--	137	Yes	--
	R	102	141	Yes	--	137	Yes	--
WB	L	99	75	--	--	75	--	--
	T	99	75	--	--	75	--	--
	R	99	75	--	--	75	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 No Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 6: Southgate Avenue & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	345	--	--	315	--	--
	T	1771	1811	Yes	--	1810	Yes	--
	R	500	21	--	--	16	--	--
SB	L	450	189	--	--	153	--	--
	T	4908	4951	Yes	--	5518	Yes	--
	R	500	503	Yes	--	511	Yes	--
EB	L	102	143	Yes	--	135	Yes	--
	T	102	143	Yes	--	135	Yes	--
	R	102	143	Yes	--	135	Yes	--
WB	L	99	110	Yes	--	115	Yes	--
	T	99	110	Yes	--	115	Yes	--
	R	99	110	Yes	--	115	Yes	--

QUEUING RESULTS – ALTERNATIVE 1 (TWO-QUADRANT PARTIAL CLOVERLEAF INTERCHANGE)

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	67	--	--	67	--	--
	T	1361	93	--	--	84	--	--
	R	1361	93	--	--	84	--	--
SB	L	150	96	--	--	100	--	--
	T	1565	38	--	--	34	--	--
	R	1565	38	--	--	34	--	--
EB	L	150	29	--	--	28	--	--
	T	3515	150	--	--	148	--	--
	R	150	33	--	--	27	--	--
WB	L	150	119	--	--	121	--	--
	T	466	147	--	--	131	--	--
	R	466	33	--	--	29	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	190	--	--	189	--	--
	R	300	92	--	--	80	--	--
EB	T	466	181	--	--	180	--	--
	R	250	42	--	--	49	--	--
WB	L	350	262	--	--	261	--	--
	T	798	123	--	--	109	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 1)* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	137	--	--	136	--	--
	R	1822	39	--	--	36	--	--
EB	L	350	326	--	--	330	--	--
	T	798	118	--	--	104	--	--
WB	T	477	278	--	--	270	--	--
	R	300	265	--	--	269	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	36	--	--	36	--	--
	T	1096	37	--	--	33	--	--
	R	1096	37	--	--	33	--	--
SB	L	150	29	--	--	22	--	--
	T	1742	33	--	--	34	--	--
	R	1742	33	--	--	34	--	--
EB	L	150	71	--	--	75	--	--
	T	477	190	--	--	172	--	--
	R	150	39	--	--	32	--	--
WB	L	150	121	--	--	123	--	--
	T	3703	196	--	--	173	--	--
	R	150	8	--	--	6	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project (Alternative 1) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	48	--	--	49	--	--
	T	1362	86	--	--	78	--	--
	R	1362	86	--	--	78	--	--
SB	L	150	138	--	--	142	--	--
	T	1565	69	--	--	66	--	--
	R	1565	69	--	--	66	--	--
EB	L	150	49	--	--	45	--	--
	T	3504	214	--	--	204	--	--
	R	150	65	--	--	55	--	--
WB	L	150	132	--	--	137	--	--
	T	466	130	--	--	107	--	--
	R	466	25	--	--	23	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	197	--	--	193	--	--
	R	300	121	--	--	118	--	--
EB	T	466	189	--	--	189	--	--
	R	250	46	--	--	49	--	--
WB	L	350	227	--	--	222	--	--
	T	798	107	--	--	106	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project (Alternative 1) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	104	--	--	105	--	--
	R	1822	33	--	--	36	--	--
EB	L	350	192	--	--	186	--	--
	T	798	118	--	--	113	--	--
WB	T	477	184	--	--	173	--	--
	R	300	100	--	--	85	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	55	--	--	53	--	--
	T	1096	69	--	--	69	--	--
	R	1096	69	--	--	69	--	--
SB	L	150	23	--	--	24	--	--
	T	1742	53	--	--	50	--	--
	R	1742	53	--	--	50	--	--
EB	L	150	69	--	--	68	--	--
	T	477	175	--	--	161	--	--
	R	150	20	--	--	15	--	--
WB	L	150	61	--	--	57	--	--
	T	3703	121	--	--	115	--	--
	R	150	10	--	--	8	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	128	--	--	128	--	--
	T	1349	161	--	--	147	--	--
	R	1349	161	--	--	147	--	--
SB	L	150	85	--	--	86	--	--
	T	1553	30	--	--	31	--	--
	R	1553	30	--	--	31	--	--
EB	L	150	42	--	--	39	--	--
	T	3513	180	--	--	170	--	--
	R	150	44	--	--	46	--	--
WB	L	150	151	Yes	--	159	Yes	--
	T	466	160	--	--	152	--	--
	R	150	39	--	--	42	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	161	--	--	166	--	--
	R	300	155	--	--	161	--	--
EB	T	466	239	--	--	223	--	--
	R	250	52	--	--	56	--	--
WB	L	350	324	--	--	341	--	--
	T	798	94	--	--	87	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	144	--	--	141	--	--
	R	1822	69	--	--	70	--	--
EB	L	350	331	--	--	339	--	--
	T	798	166	--	--	157	--	--
WB	T	477	424	--	--	408	--	--
	R	300	321	Yes	--	369	Yes	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	49	--	--	53	--	--
	T	1096	44	--	--	41	--	--
	R	1096	44	--	--	41	--	--
SB	L	150	24	--	--	23	--	--
	T	1742	41	--	--	40	--	--
	R	1742	41	--	--	40	--	--
EB	L	150	118	--	--	116	--	--
	T	477	110	--	--	104	--	--
	R	150	34	--	--	30	--	--
WB	L	150	127	--	--	124	--	--
	T	3703	372	--	--	375	--	--
	R	150	9	--	--	7	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	96	--	--	91	--	--
	T	1350	110	--	--	98	--	--
	R	1350	110	--	--	98	--	--
SB	L	150	111	--	--	109	--	--
	T	1553	62	--	--	56	--	--
	R	1553	62	--	--	56	--	--
EB	L	150	41	--	--	40	--	--
	T	3502	163	--	--	167	--	--
	R	150	49	--	--	49	--	--
WB	L	150	175	Yes	--	191	Yes	--
	T	466	297	--	--	295	--	--
	R	150	48	--	--	44	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	218	--	--	215	--	--
	R	300	224	--	--	217	--	--
EB	T	466	254	--	--	243	--	--
	R	250	76	--	--	55	--	--
WB	L	350	267	--	--	270	--	--
	T	798	126	--	--	120	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	118	--	--	115	--	--
	R	1822	52	--	--	52	--	--
EB	L	350	259	--	--	255	--	--
	T	798	149	--	--	145	--	--
WB	T	477	225	--	--	220	--	--
	R	300	93	--	--	89	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	68	--	--	69	--	--
	T	1096	91	--	--	87	--	--
	R	1096	91	--	--	87	--	--
SB	L	150	30	--	--	28	--	--
	T	1742	110	--	--	102	--	--
	R	1742	110	--	--	102	--	--
EB	L	150	102	--	--	91	--	--
	T	477	283	--	--	294	--	--
	R	150	49	--	--	38	--	--
WB	L	150	72	--	--	68	--	--
	T	3703	172	--	--	169	--	--
	R	150	17	--	--	15	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project (Alternative 1) **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	164	Yes	--	165	Yes	--
	T	1349	282	--	--	276	--	--
	R	1349	282	--	--	276	--	--
SB	L	150	110	--	--	115	--	--
	T	1553	28	--	--	29	--	--
	R	1553	28	--	--	29	--	--
EB	L	150	55	--	--	47	--	--
	T	3513	228	--	--	239	--	--
	R	150	55	--	--	58	--	--
WB	L	150	177	Yes	--	197	Yes	--
	T	466	272	--	--	257	--	--
	R	150	67	--	--	68	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	178	--	--	179	--	--
	R	300	174	--	--	172	--	--
EB	T	466	349	--	--	362	--	--
	R	250	85	--	--	81	--	--
WB	L	350	330	--	--	339	--	--
	T	798	213	--	--	176	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2035 Plus Project (Alternative 1)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	182	--	--	174	--	--
	R	1822	89	--	--	83	--	--
EB	L	350	354	Yes	--	384	Yes	--
	T	798	388	--	--	385	--	--
WB	T	477	518	Yes	--	547	Yes	--
	R	300	330	Yes	--	378	Yes	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	72	--	--	67	--	--
	T	1096	30	--	--	30	--	--
	R	1096	30	--	--	30	--	--
SB	L	150	28	--	--	28	--	--
	T	1742	67	--	--	61	--	--
	R	1742	67	--	--	61	--	--
EB	L	150	150	--	--	153	Yes	--
	T	477	208	--	--	194	--	--
	R	150	66	--	--	50	--	--
WB	L	150	144	--	--	138	--	--
	T	3703	432	--	--	424	--	--
	R	150	12	--	--	9	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	148	--	--	134	--	--
	T	1350	174	--	--	166	--	--
	R	1350	174	--	--	166	--	--
SB	L	150	144	--	--	156	Yes	--
	T	1553	144	--	--	136	--	--
	R	1553	144	--	--	136	--	--
EB	L	150	72	--	--	68	--	--
	T	3502	285	--	--	285	--	--
	R	150	153	Yes	--	129	--	--
WB	L	150	189	Yes	--	196	Yes	--
	T	466	452	--	--	511	Yes	--
	R	150	34	--	--	32	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	300	266	--	--	269	--	--
	R	300	261	--	--	257	--	--
EB	T	466	318	--	--	334	--	--
	R	250	85	--	--	78	--	--
WB	L	350	303	--	--	310	--	--
	T	798	301	--	--	263	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	250	157	--	--	148	--	--
	R	1822	88	--	--	76	--	--
EB	L	350	329	--	--	327	--	--
	T	798	273	--	--	239	--	--
WB	T	477	312	--	--	294	--	--
	R	300	89	--	--	88	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	96	--	--	92	--	--
	T	1096	109	--	--	106	--	--
	R	1096	109	--	--	106	--	--
SB	L	150	35	--	--	33	--	--
	T	1742	135	--	--	133	--	--
	R	1742	135	--	--	133	--	--
EB	L	150	121	--	--	112	--	--
	T	477	415	--	--	436	--	--
	R	150	71	--	--	61	--	--
WB	L	150	111	--	--	109	--	--
	T	3703	292	--	--	286	--	--
	R	150	16	--	--	12	--	--

QUEUING RESULTS – ALTERNATIVE 1A (AT-GRADE INTERSECTION)

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 w/Signal & Widened SR-99 **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	89	--	--	85	--	--
	T	1354	151	--	--	142	--	--
	R	1354	151	--	--	142	--	--
SB	L	150	125	--	--	114	--	--
	T	1547	35	--	--	37	--	--
	R	1547	35	--	--	37	--	--
EB	L	150	73	--	--	64	--	--
	T	1193	330	--	--	326	--	--
	R	150	61	--	--	55	--	--
WB	L	200	134	--	--	137	--	--
	T	867	110	--	--	104	--	--
	R	200	43	--	--	45	--	--

Intersection: 6: Southgate Ave. & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	118	--	--	102	--	--
	T	4596	558	--	--	559	--	--
	R	500	169	--	--	153	--	--
SB	L	600	130	--	--	127	--	--
	T	5666	429	--	--	437	--	--
	R	500	103	--	--	99	--	--
EB	L	250	197	--	--	195	--	--
	T	867	92	--	--	91	--	--
	R	250	56	--	--	52	--	--
WB	L	250	164	--	--	162	--	--
	T	888	595	--	--	548	--	--
	R	300	340	Yes	--	380	Yes	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 w/Signal & Widened SR-99* ***PHF:*** *0.92*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	43	--	--	43	--	--
	T	1090	42	--	--	40	--	--
	R	1090	42	--	--	40	--	--
SB	L	150	22	--	--	22	--	--
	T	1736	40	--	--	35	--	--
	R	1736	40	--	--	35	--	--
EB	L	150	90	--	--	87	--	--
	T	888	160	--	--	151	--	--
	R	150	58	--	--	40	--	--
WB	L	150	149	--	--	142	--	--
	T	3701	303	--	--	285	--	--
	R	150	45	--	--	33	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2025 w/Signal & Widened SR-99 **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	159	Yes	--	166	Yes	--
	T	1354	234	--	--	217	--	--
	R	1354	234	--	--	217	--	--
SB	L	150	124	--	--	130	--	--
	T	1547	86	--	--	71	--	--
	R	1547	86	--	--	71	--	--
EB	L	150	59	--	--	59	--	--
	T	1193	547	--	--	559	--	--
	R	150	160	Yes	--	141	--	--
WB	L	200	201	Yes	--	201	Yes	--
	T	867	197	--	--	166	--	--
	R	200	39	--	--	47	--	--

Intersection: 6: Southgate Ave. & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	489	Yes	--	480	Yes	--
	T	4596	996	--	--	1015	--	--
	R	500	447	--	--	390	--	--
SB	L	600	144	--	--	143	--	--
	T	5666	517	--	--	502	--	--
	R	500	146	--	--	146	--	--
EB	L	250	270	Yes	--	288	Yes	--
	T	867	315	--	--	293	--	--
	R	250	104	--	--	99	--	--
WB	L	250	242	--	--	237	--	--
	T	888	839	--	--	884	--	--
	R	300	332	Yes	--	331	Yes	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	81	--	--	78	--	--
	T	1090	49	--	--	46	--	--
	R	1090	49	--	--	46	--	--
SB	L	150	36	--	--	32	--	--
	T	1736	41	--	--	41	--	--
	R	1736	41	--	--	41	--	--
EB	L	150	136	--	--	134	--	--
	T	888	231	--	--	220	--	--
	R	150	90	--	--	73	--	--
WB	L	150	148	--	--	148	--	--
	T	3701	701	--	--	699	--	--
	R	150	43	--	--	31	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 w/Signal & Widened SR-99 **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	59	--	--	58	--	--
	T	1354	76	--	--	70	--	--
	R	1354	76	--	--	70	--	--
SB	L	150	150	--	--	158	Yes	--
	T	1547	99	--	--	105	--	--
	R	1547	99	--	--	105	--	--
EB	L	150	48	--	--	45	--	--
	T	1193	259	--	--	251	--	--
	R	150	67	--	--	60	--	--
WB	L	200	143	--	--	148	--	--
	T	867	96	--	--	89	--	--
	R	200	40	--	--	38	--	--

Intersection: 6: Southgate Ave. & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	154	--	--	143	--	--
	T	4596	657	--	--	659	--	--
	R	500	308	--	--	258	--	--
SB	L	600	367	--	--	368	--	--
	T	5666	398	--	--	384	--	--
	R	500	99	--	--	96	--	--
EB	L	250	179	--	--	179	--	--
	T	867	221	--	--	220	--	--
	R	250	68	--	--	65	--	--
WB	L	250	176	--	--	179	--	--
	T	888	166	--	--	163	--	--
	R	300	223	--	--	221	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 w/Signal & Widened SR-99* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	65	--	--	65	--	--
	T	1090	99	--	--	91	--	--
	R	1090	99	--	--	91	--	--
SB	L	150	32	--	--	29	--	--
	T	1736	62	--	--	60	--	--
	R	1736	62	--	--	60	--	--
EB	L	150	76	--	--	73	--	--
	T	888	376	--	--	382	--	--
	R	150	21	--	--	15	--	--
WB	L	150	75	--	--	72	--	--
	T	3701	129	--	--	129	--	--
	R	150	11	--	--	8	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Default Project Name **HCM:** 2000
Scenario: Default Scenario Name **PHF:** 1
TOD: Default TOD **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	94	--	--	93	--	--
	T	1354	122	--	--	108	--	--
	R	1354	122	--	--	108	--	--
SB	L	150	172	Yes	--	181	Yes	--
	T	1547	247	--	--	218	--	--
	R	1547	247	--	--	218	--	--
EB	L	150	75	--	--	66	--	--
	T	1193	425	--	--	403	--	--
	R	150	152	Yes	--	126	--	--
WB	L	200	226	Yes	--	246	Yes	--
	T	867	417	--	--	385	--	--
	R	200	57	--	--	44	--	--

Intersection: 6: Southgate Ave. & SR 99 **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	450	292	--	--	260	--	--
	T	4596	1199	--	--	1207	--	--
	R	500	495	--	--	484	--	--
SB	L	600	525	--	--	540	--	--
	T	5666	554	--	--	532	--	--
	R	500	150	--	--	142	--	--
EB	L	250	256	Yes	--	260	Yes	--
	T	867	414	--	--	407	--	--
	R	250	237	--	--	229	--	--
WB	L	250	232	--	--	234	--	--
	T	888	327	--	--	310	--	--
	R	300	267	--	--	280	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Default Project Name* ***HCM:*** *2000*
Scenario: *Default Scenario Name* ***PHF:*** *1*
TOD: *Default TOD* ***Analysis Period:*** *Hourly* ***# of Runs:*** *10*

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	76	--	--	77	--	--
	T	1090	89	--	--	87	--	--
	R	1090	89	--	--	87	--	--
SB	L	150	27	--	--	26	--	--
	T	1736	115	--	--	114	--	--
	R	1736	115	--	--	114	--	--
EB	L	150	76	--	--	74	--	--
	T	888	395	--	--	415	--	--
	R	150	51	--	--	38	--	--
WB	L	150	71	--	--	69	--	--
	T	3701	185	--	--	180	--	--
	R	150	20	--	--	16	--	--

QUEUING RESULTS – ALTERNATIVE 1B (FOUR-LANE SPREAD DIAMOND INTERCHANGE)

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project - 4 Lane Overcrossing **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	67	--	--	71	--	--
	T	1361	99	--	--	96	--	--
	R	1361	99	--	--	96	--	--
SB	L	150	113	--	--	113	--	--
	T	1565	36	--	--	37	--	--
	R	1565	36	--	--	37	--	--
EB	L	150	31	--	--	30	--	--
	T	3471	166	--	--	171	--	--
	R	150	32	--	--	29	--	--
WB	L	200	119	--	--	123	--	--
	T	464	139	--	--	132	--	--
	R	200	39	--	--	41	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	112	--	--	113	--	--
	R	1870	135	--	--	135	--	--
EB	T	464	193	--	--	186	--	--
	R	250	61	--	--	61	--	--
WB	L	350	272	--	--	290	--	--
	T	829	138	--	--	124	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project - 4 Lane Overcrossing **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	86	--	--	86	--	--
	R	500	83	--	--	76	--	--
EB	L	350	329	--	--	339	--	--
	T	829	144	--	--	143	--	--
WB	T	474	362	--	--	355	--	--
	R	474	259	--	--	243	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	47	--	--	44	--	--
	T	1096	33	--	--	34	--	--
	R	1096	33	--	--	34	--	--
SB	L	150	25	--	--	23	--	--
	T	1742	34	--	--	34	--	--
	R	1742	34	--	--	34	--	--
EB	L	150	96	--	--	90	--	--
	T	474	164	--	--	159	--	--
	R	150	51	--	--	46	--	--
WB	L	150	137	--	--	137	--	--
	T	3703	355	--	--	337	--	--
	R	150	14	--	--	12	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project - 4 Lane Overcrossing **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	57	--	--	62	--	--
	T	1362	58	--	--	53	--	--
	R	1362	58	--	--	53	--	--
SB	L	150	128	--	--	121	--	--
	T	1565	75	--	--	58	--	--
	R	1565	75	--	--	58	--	--
EB	L	150	42	--	--	41	--	--
	T	3458	170	--	--	174	--	--
	R	150	54	--	--	42	--	--
WB	L	200	131	--	--	127	--	--
	T	464	162	--	--	137	--	--
	R	200	58	--	--	52	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	215	--	--	211	--	--
	R	1870	120	--	--	113	--	--
EB	T	464	187	--	--	174	--	--
	R	250	55	--	--	55	--	--
WB	L	350	229	--	--	217	--	--
	T	829	140	--	--	124	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	77	--	--	80	--	--
	R	500	76	--	--	78	--	--
EB	L	350	186	--	--	186	--	--
	T	829	71	--	--	60	--	--
WB	T	474	180	--	--	191	--	--
	R	474	67	--	--	64	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	56	--	--	57	--	--
	T	1096	95	--	--	90	--	--
	R	1096	95	--	--	90	--	--
SB	L	150	30	--	--	29	--	--
	T	1742	62	--	--	58	--	--
	R	1742	62	--	--	58	--	--
EB	L	150	100	--	--	94	--	--
	T	474	290	--	--	298	--	--
	R	150	67	--	--	59	--	--
WB	L	150	74	--	--	67	--	--
	T	3703	146	--	--	139	--	--
	R	150	11	--	--	8	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2025 Plus Project - 4 Lane Overcrossing **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	143	--	--	144	--	--
	T	1361	192	--	--	194	--	--
	R	1361	192	--	--	194	--	--
SB	L	150	152	Yes	--	157	Yes	--
	T	1565	67	--	--	66	--	--
	R	1565	67	--	--	66	--	--
EB	L	150	78	--	--	72	--	--
	T	3471	417	--	--	431	--	--
	R	150	127	--	--	112	--	--
WB	L	200	204	Yes	--	205	Yes	--
	T	464	321	--	--	324	--	--
	R	200	117	--	--	97	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	162	--	--	154	--	--
	R	1870	206	--	--	187	--	--
EB	T	464	326	--	--	338	--	--
	R	250	109	--	--	102	--	--
WB	L	350	328	--	--	335	--	--
	T	829	175	--	--	135	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	162	--	--	166	--	--
	R	500	92	--	--	93	--	--
EB	L	350	377	Yes	--	426	Yes	--
	T	829	643	--	--	652	--	--
WB	T	474	500	Yes	--	525	Yes	--
	R	474	408	--	--	379	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	70	--	--	71	--	--
	T	1096	48	--	--	48	--	--
	R	1096	48	--	--	48	--	--
SB	L	150	23	--	--	22	--	--
	T	1742	38	--	--	38	--	--
	R	1742	38	--	--	38	--	--
EB	L	150	163	Yes	--	175	Yes	--
	T	474	400	--	--	400	--	--
	R	150	109	--	--	97	--	--
WB	L	150	161	Yes	--	161	Yes	--
	T	3703	592	--	--	616	--	--
	R	150	12	--	--	8	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project - 4 Lane Overcrossing* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	88	--	--	87	--	--
	T	1362	118	--	--	107	--	--
	R	1362	118	--	--	107	--	--
SB	L	150	127	--	--	127	--	--
	T	1564	122	--	--	124	--	--
	R	1564	122	--	--	124	--	--
EB	L	150	72	--	--	66	--	--
	T	3458	398	--	--	403	--	--
	R	150	163	Yes	--	133	--	--
WB	L	463	262	--	--	262	--	--
	T	463	274	--	--	239	--	--
	R	250	59	--	--	56	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	252	--	--	250	--	--
	R	1858	205	--	--	198	--	--
EB	T	463	201	--	--	208	--	--
	R	250	61	--	--	57	--	--
WB	L	350	235	--	--	228	--	--
	T	829	142	--	--	128	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2025 Plus Project - 4 Lane Overcrossing **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	102	--	--	103	--	--
	R	500	105	--	--	98	--	--
EB	L	350	292	--	--	275	--	--
	T	829	92	--	--	87	--	--
WB	T	474	355	--	--	308	--	--
	R	474	91	--	--	83	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	90	--	--	95	--	--
	T	1096	130	--	--	127	--	--
	R	1096	130	--	--	127	--	--
SB	L	150	29	--	--	24	--	--
	T	1742	94	--	--	88	--	--
	R	1742	94	--	--	88	--	--
EB	L	150	78	--	--	73	--	--
	T	474	412	--	--	425	--	--
	R	150	85	--	--	66	--	--
WB	L	150	97	--	--	100	--	--
	T	3703	271	--	--	280	--	--
	R	150	8	--	--	6	--	--

QUEUING RESULTS – ALTERNATIVE 1C (FIVE-LANE SPREAD DIAMOND INTERCHANGE)

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	82	--	--	77	--	--
	T	1361	102	--	--	104	--	--
	R	1361	102	--	--	104	--	--
SB	L	150	130	--	--	131	--	--
	T	1565	31	--	--	31	--	--
	R	1565	31	--	--	31	--	--
EB	L	150	25	--	--	21	--	--
	T	3471	155	--	--	154	--	--
	R	150	24	--	--	17	--	--
WB	L	150	109	--	--	114	--	--
	T	463	159	--	--	150	--	--
	R	463	36	--	--	37	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	109	--	--	106	--	--
	R	1858	85	--	--	87	--	--
EB	T	463	221	--	--	211	--	--
	R	250	46	--	--	48	--	--
WB	L	350	283	--	--	282	--	--
	T	831	83	--	--	65	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	84	--	--	85	--	--
	R	500	71	--	--	69	--	--
EB	L	350	299	--	--	318	--	--
	T	831	110	--	--	94	--	--
WB	T	474	245	--	--	242	--	--
	R	300	271	--	--	271	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	42	--	--	37	--	--
	T	1090	33	--	--	35	--	--
	R	1090	33	--	--	35	--	--
SB	L	150	28	--	--	26	--	--
	T	1736	34	--	--	34	--	--
	R	1736	34	--	--	34	--	--
EB	L	150	82	--	--	84	--	--
	T	474	154	--	--	154	--	--
	R	150	40	--	--	37	--	--
WB	L	150	135	--	--	124	--	--
	T	3657	211	--	--	192	--	--
	R	150	8	--	--	7	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	52	--	--	51	--	--
	T	1362	70	--	--	68	--	--
	R	1362	70	--	--	68	--	--
SB	L	150	123	--	--	120	--	--
	T	1565	65	--	--	61	--	--
	R	1565	65	--	--	61	--	--
EB	L	150	41	--	--	42	--	--
	T	3458	174	--	--	170	--	--
	R	150	54	--	--	47	--	--
WB	L	150	129	--	--	131	--	--
	T	463	131	--	--	120	--	--
	R	463	33	--	--	32	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	204	--	--	207	--	--
	R	1858	87	--	--	81	--	--
EB	T	463	162	--	--	169	--	--
	R	250	55	--	--	54	--	--
WB	L	350	206	--	--	204	--	--
	T	831	110	--	--	109	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	80	--	--	77	--	--
	R	500	77	--	--	77	--	--
EB	L	350	209	--	--	209	--	--
	T	831	76	--	--	61	--	--
WB	T	474	164	--	--	155	--	--
	R	300	79	--	--	76	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	54	--	--	54	--	--
	T	1090	91	--	--	87	--	--
	R	1090	91	--	--	87	--	--
SB	L	150	29	--	--	28	--	--
	T	1736	57	--	--	50	--	--
	R	1736	57	--	--	50	--	--
EB	L	150	70	--	--	64	--	--
	T	474	294	--	--	298	--	--
	R	150	44	--	--	33	--	--
WB	L	150	67	--	--	64	--	--
	T	3657	127	--	--	119	--	--
	R	150	16	--	--	10	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	111	--	--	108	--	--
	T	1348	155	--	--	144	--	--
	R	1348	155	--	--	144	--	--
SB	L	150	129	--	--	121	--	--
	T	1553	36	--	--	35	--	--
	R	1553	36	--	--	35	--	--
EB	L	150	36	--	--	32	--	--
	T	3461	150	--	--	138	--	--
	R	150	52	--	--	42	--	--
WB	L	150	153	Yes	--	161	Yes	--
	T	463	128	--	--	119	--	--
	R	150	52	--	--	48	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	134	--	--	128	--	--
	R	1858	131	--	--	125	--	--
EB	T	463	263	--	--	259	--	--
	R	250	100	--	--	96	--	--
WB	L	350	314	--	--	317	--	--
	T	831	100	--	--	84	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	123	--	--	126	--	--
	R	500	84	--	--	83	--	--
EB	L	350	357	Yes	--	364	Yes	--
	T	831	224	--	--	155	--	--
WB	T	474	404	--	--	394	--	--
	R	300	318	Yes	--	349	Yes	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	66	--	--	63	--	--
	T	1090	35	--	--	34	--	--
	R	1090	35	--	--	34	--	--
SB	L	150	30	--	--	29	--	--
	T	1736	36	--	--	34	--	--
	R	1736	36	--	--	34	--	--
EB	L	150	138	--	--	135	--	--
	T	474	183	--	--	177	--	--
	R	150	49	--	--	36	--	--
WB	L	150	132	--	--	131	--	--
	T	3657	332	--	--	339	--	--
	R	150	3	--	--	2	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	88	--	--	80	--	--
	T	1348	129	--	--	122	--	--
	R	1348	129	--	--	122	--	--
SB	L	150	131	--	--	132	--	--
	T	1553	59	--	--	53	--	--
	R	1553	59	--	--	53	--	--
EB	L	150	63	--	--	55	--	--
	T	3461	170	--	--	171	--	--
	R	150	55	--	--	55	--	--
WB	L	150	167	Yes	--	179	Yes	--
	T	463	193	--	--	186	--	--
	R	150	57	--	--	51	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	240	--	--	239	--	--
	R	1858	147	--	--	146	--	--
EB	T	463	267	--	--	272	--	--
	R	250	67	--	--	49	--	--
WB	L	350	249	--	--	241	--	--
	T	831	80	--	--	81	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	104	--	--	105	--	--
	R	500	103	--	--	101	--	--
EB	L	350	206	--	--	214	--	--
	T	831	113	--	--	114	--	--
WB	T	474	170	--	--	169	--	--
	R	300	105	--	--	94	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	74	--	--	73	--	--
	T	1090	82	--	--	81	--	--
	R	1090	82	--	--	81	--	--
SB	L	150	25	--	--	25	--	--
	T	1736	92	--	--	91	--	--
	R	1736	92	--	--	91	--	--
EB	L	150	70	--	--	70	--	--
	T	474	273	--	--	265	--	--
	R	150	70	--	--	54	--	--
WB	L	150	95	--	--	84	--	--
	T	3657	225	--	--	230	--	--
	R	150	18	--	--	16	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	163	Yes	--	154	Yes	--
	T	1348	262	--	--	246	--	--
	R	1348	262	--	--	246	--	--
SB	L	150	110	--	--	114	--	--
	T	1553	28	--	--	28	--	--
	R	1553	28	--	--	28	--	--
EB	L	150	39	--	--	38	--	--
	T	3461	215	--	--	209	--	--
	R	150	96	--	--	82	--	--
WB	L	150	184	Yes	--	203	Yes	--
	T	463	315	--	--	328	--	--
	R	150	69	--	--	64	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	133	--	--	135	--	--
	R	1858	182	--	--	178	--	--
EB	T	463	340	--	--	346	--	--
	R	250	82	--	--	84	--	--
WB	L	350	368	Yes	--	365	Yes	--
	T	831	434	--	--	309	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	178	--	--	164	--	--
	R	500	94	--	--	92	--	--
EB	L	350	374	Yes	--	414	Yes	--
	T	831	588	--	--	541	--	--
WB	T	474	500	Yes	--	535	Yes	--
	R	300	328	Yes	--	366	Yes	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	49	--	--	47	--	--
	T	1090	37	--	--	39	--	--
	R	1090	37	--	--	39	--	--
SB	L	150	27	--	--	24	--	--
	T	1736	50	--	--	47	--	--
	R	1736	50	--	--	47	--	--
EB	L	150	165	Yes	--	158	Yes	--
	T	474	216	--	--	191	--	--
	R	150	50	--	--	47	--	--
WB	L	150	128	--	--	120	--	--
	T	3657	381	--	--	391	--	--
	R	150	32	--	--	24	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	120	--	--	117	--	--
	T	1348	159	--	--	145	--	--
	R	1348	159	--	--	145	--	--
SB	L	150	136	--	--	129	--	--
	T	1553	106	--	--	111	--	--
	R	1553	106	--	--	111	--	--
EB	L	150	54	--	--	52	--	--
	T	3461	233	--	--	237	--	--
	R	150	82	--	--	77	--	--
WB	L	150	186	Yes	--	195	Yes	--
	T	463	440	--	--	473	Yes	--
	R	150	88	--	--	80	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	272	--	--	264	--	--
	R	1858	383	--	--	368	--	--
EB	T	463	280	--	--	280	--	--
	R	250	84	--	--	73	--	--
WB	L	350	303	--	--	303	--	--
	T	831	159	--	--	143	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1700	122	--	--	125	--	--
	R	500	132	--	--	125	--	--
EB	L	350	297	--	--	291	--	--
	T	831	185	--	--	173	--	--
WB	T	474	318	--	--	307	--	--
	R	300	136	--	--	130	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	111	--	--	115	--	--
	T	1090	140	--	--	138	--	--
	R	1090	140	--	--	138	--	--
SB	L	150	28	--	--	26	--	--
	T	1736	125	--	--	121	--	--
	R	1736	125	--	--	121	--	--
EB	L	150	109	--	--	94	--	--
	T	474	476	Yes	--	501	Yes	--
	R	150	101	--	--	85	--	--
WB	L	150	84	--	--	81	--	--
	T	3657	229	--	--	219	--	--
	R	150	29	--	--	22	--	--

QUEUING RESULTS – ALTERNATIVE 2 (PARTIAL CLOVERLEAF INTERCHANGE)

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project (Alternative 2) **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	75	--	--	77	--	--
	T	1361	89	--	--	85	--	--
	R	1361	89	--	--	85	--	--
SB	L	150	106	--	--	112	--	--
	T	1565	52	--	--	59	--	--
	R	1565	52	--	--	59	--	--
EB	L	150	19	--	--	18	--	--
	T	3515	140	--	--	138	--	--
	R	150	30	--	--	24	--	--
WB	L	150	119	--	--	118	--	--
	T	463	132	--	--	133	--	--
	R	463	34	--	--	38	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	127	--	--	126	--	--
	R	1852	76	--	--	77	--	--
EB	T	463	90	--	--	84	--	--
	R	250	34	--	--	38	--	--
WB	T	809	150	--	--	149	--	--
	R	150	47	--	--	44	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project (Alternative 2) **PHF:** 0.92
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	84	--	--	92	--	--
	R	500	67	--	--	67	--	--
EB	T	809	70	--	--	62	--	--
	R	150	51	--	--	52	--	--
WB	T	474	113	--	--	91	--	--
	R	300	67	--	--	65	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	37	--	--	39	--	--
	T	1096	30	--	--	34	--	--
	R	1096	30	--	--	34	--	--
SB	L	150	28	--	--	28	--	--
	T	1742	47	--	--	44	--	--
	R	1742	47	--	--	44	--	--
EB	L	150	90	--	--	87	--	--
	T	474	139	--	--	144	--	--
	R	150	39	--	--	37	--	--
WB	L	150	131	--	--	129	--	--
	T	3703	352	--	--	338	--	--
	R	150	42	--	--	31	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2015 Plus Project (Alternative 2) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	72	--	--	67	--	--
	T	1362	85	--	--	76	--	--
	R	1362	85	--	--	76	--	--
SB	L	150	126	--	--	132	--	--
	T	1565	74	--	--	68	--	--
	R	1565	74	--	--	68	--	--
EB	L	150	50	--	--	48	--	--
	T	3504	183	--	--	178	--	--
	R	150	47	--	--	45	--	--
WB	L	150	137	--	--	133	--	--
	T	463	102	--	--	101	--	--
	R	463	29	--	--	30	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	203	--	--	214	--	--
	R	1852	72	--	--	75	--	--
EB	T	463	108	--	--	106	--	--
	R	250	30	--	--	27	--	--
WB	T	809	150	--	--	138	--	--
	R	150	58	--	--	52	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2015 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	71	--	--	74	--	--
	R	500	76	--	--	75	--	--
EB	T	809	100	--	--	103	--	--
	R	150	36	--	--	43	--	--
WB	T	474	57	--	--	51	--	--
	R	300	35	--	--	32	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	53	--	--	53	--	--
	T	1096	76	--	--	73	--	--
	R	1096	76	--	--	73	--	--
SB	L	150	26	--	--	24	--	--
	T	1742	48	--	--	44	--	--
	R	1742	48	--	--	44	--	--
EB	L	150	77	--	--	74	--	--
	T	474	293	--	--	298	--	--
	R	150	54	--	--	45	--	--
WB	L	150	68	--	--	62	--	--
	T	3703	116	--	--	114	--	--
	R	150	12	--	--	10	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *4: Southgate Ave. & Entler Ave.* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	129	--	--	120	--	--
	T	1348	158	--	--	142	--	--
	R	1348	158	--	--	142	--	--
SB	L	150	109	--	--	107	--	--
	T	1553	35	--	--	34	--	--
	R	1553	35	--	--	34	--	--
EB	L	150	48	--	--	45	--	--
	T	3512	208	--	--	202	--	--
	R	150	83	--	--	72	--	--
WB	L	150	162	Yes	--	162	Yes	--
	T	463	195	--	--	171	--	--
	R	150	50	--	--	53	--	--

Intersection: *5: Southgate Ave. & SR 99 SB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	141	--	--	132	--	--
	R	1852	113	--	--	110	--	--
EB	T	463	109	--	--	103	--	--
	R	250	33	--	--	37	--	--
WB	T	809	169	--	--	161	--	--
	R	150	78	--	--	72	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *AM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	149	--	--	146	--	--
	R	500	74	--	--	75	--	--
EB	T	809	87	--	--	83	--	--
	R	150	51	--	--	55	--	--
WB	T	474	130	--	--	120	--	--
	R	300	87	--	--	88	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	50	--	--	51	--	--
	T	1096	33	--	--	33	--	--
	R	1096	33	--	--	33	--	--
SB	L	150	26	--	--	23	--	--
	T	1742	36	--	--	35	--	--
	R	1742	36	--	--	35	--	--
EB	L	150	132	--	--	123	--	--
	T	474	142	--	--	140	--	--
	R	150	39	--	--	37	--	--
WB	L	150	105	--	--	110	--	--
	T	3703	510	--	--	489	--	--
	R	150	21	--	--	17	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2025 Plus Project (Alternative 2) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	68	--	--	68	--	--
	T	1348	85	--	--	80	--	--
	R	1348	85	--	--	80	--	--
SB	L	150	122	--	--	127	--	--
	T	1553	64	--	--	63	--	--
	R	1553	64	--	--	63	--	--
EB	L	150	59	--	--	50	--	--
	T	3512	191	--	--	192	--	--
	R	150	67	--	--	58	--	--
WB	L	150	176	Yes	--	193	Yes	--
	T	463	264	--	--	221	--	--
	R	150	39	--	--	43	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	242	--	--	231	--	--
	R	1852	130	--	--	128	--	--
EB	T	463	137	--	--	131	--	--
	R	250	32	--	--	36	--	--
WB	T	809	186	--	--	168	--	--
	R	150	64	--	--	61	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: *Southgate Interchange* ***HCM:*** *2000*
Scenario: *2025 Plus Project (Alternative 2)* ***PHF:*** *0.95*
TOD: *PM* ***Analysis Period:*** *15 Minutes* ***# of Runs:*** *10*

Intersection: *7: Southgate Ave. & SR 99 NB Ramps* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	114	--	--	113	--	--
	R	500	89	--	--	87	--	--
EB	T	809	136	--	--	130	--	--
	R	150	73	--	--	65	--	--
WB	T	474	80	--	--	84	--	--
	R	300	43	--	--	46	--	--

Intersection: *8: Southgate Ave. & Southgate Lane* ***Type:*** *Signalized*

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	79	--	--	82	--	--
	T	1096	95	--	--	96	--	--
	R	1096	95	--	--	96	--	--
SB	L	150	32	--	--	29	--	--
	T	1742	129	--	--	126	--	--
	R	1742	129	--	--	126	--	--
EB	L	150	128	--	--	114	--	--
	T	474	423	--	--	430	--	--
	R	150	103	--	--	78	--	--
WB	L	150	77	--	--	72	--	--
	T	3703	207	--	--	210	--	--
	R	150	12	--	--	10	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project (Alternative 2) **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	166	Yes	--	168	Yes	--
	T	1348	235	--	--	223	--	--
	R	1348	235	--	--	223	--	--
SB	L	150	126	--	--	125	--	--
	T	1553	35	--	--	36	--	--
	R	1553	35	--	--	36	--	--
EB	L	150	63	--	--	55	--	--
	T	3512	269	--	--	272	--	--
	R	150	134	--	--	122	--	--
WB	L	150	176	Yes	--	198	Yes	--
	T	463	275	--	--	282	--	--
	R	150	42	--	--	46	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	169	--	--	160	--	--
	R	1852	149	--	--	144	--	--
EB	T	463	149	--	--	145	--	--
	R	250	44	--	--	47	--	--
WB	T	809	207	--	--	210	--	--
	R	150	103	--	--	93	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project (Alternative 2) **PHF:** 0.95
TOD: AM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	181	--	--	180	--	--
	R	500	91	--	--	88	--	--
EB	T	809	110	--	--	108	--	--
	R	150	60	--	--	64	--	--
WB	T	474	132	--	--	128	--	--
	R	300	85	--	--	84	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	55	--	--	56	--	--
	T	1096	34	--	--	36	--	--
	R	1096	34	--	--	36	--	--
SB	L	150	23	--	--	23	--	--
	T	1742	57	--	--	59	--	--
	R	1742	57	--	--	59	--	--
EB	L	150	168	Yes	--	176	Yes	--
	T	474	267	--	--	267	--	--
	R	150	127	--	--	113	--	--
WB	L	150	117	--	--	117	--	--
	T	3703	557	--	--	513	--	--
	R	150	32	--	--	25	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project (Alternative 2) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 4: Southgate Ave. & Entler Ave. **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	123	--	--	112	--	--
	T	1348	175	--	--	156	--	--
	R	1348	175	--	--	156	--	--
SB	L	150	132	--	--	139	--	--
	T	1553	144	--	--	153	--	--
	R	1553	144	--	--	153	--	--
EB	L	150	66	--	--	60	--	--
	T	3512	264	--	--	265	--	--
	R	150	116	--	--	108	--	--
WB	L	150	183	Yes	--	196	Yes	--
	T	463	339	--	--	366	--	--
	R	150	92	--	--	72	--	--

Intersection: 5: Southgate Ave. & SR 99 SB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
SB	L	500	211	--	--	214	--	--
	R	1852	221	--	--	213	--	--
EB	T	463	239	--	--	223	--	--
	R	250	83	--	--	71	--	--
WB	T	809	170	--	--	174	--	--
	R	150	75	--	--	77	--	--

SIMTRAFFIC QUEUING REPORT
Including Upstream Queues

Project: Southgate Interchange **HCM:** 2000
Scenario: 2035 Plus Project (Alternative 2) **PHF:** 0.95
TOD: PM **Analysis Period:** 15 Minutes **# of Runs:** 10

Intersection: 7: Southgate Ave. & SR 99 NB Ramps **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	1694	137	--	--	132	--	--
	R	500	117	--	--	118	--	--
EB	T	809	235	--	--	224	--	--
	R	150	82	--	--	76	--	--
WB	T	474	142	--	--	126	--	--
	R	300	31	--	--	37	--	--

Intersection: 8: Southgate Ave. & Southgate Lane **Type:** Signalized

Approach	Movement	Storage Length	Maximum Queue (ft)			95th Queue (ft)		
			Avg	> Storage	Std Dev	Avg	> Storage	Std Dev
NB	L	150	102	--	--	98	--	--
	T	1096	98	--	--	96	--	--
	R	1096	98	--	--	96	--	--
SB	L	150	33	--	--	30	--	--
	T	1742	135	--	--	130	--	--
	R	1742	135	--	--	130	--	--
EB	L	150	115	--	--	103	--	--
	T	474	442	--	--	444	--	--
	R	150	90	--	--	84	--	--
WB	L	150	95	--	--	91	--	--
	T	3703	229	--	--	244	--	--
	R	150	40	--	--	30	--	--

FREEWAY MAINLINE RESULTS

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1210	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	373	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	784	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	784	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1262	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	390	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	818	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	818	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	12.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1592	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	491	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1032	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1032	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1480	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	457	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	959	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	959	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	14.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1450	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	407	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	855	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	855	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1571	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	441	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	927	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	927	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	14.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1355	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	381	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	799	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	799	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	12.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CB
Agency or Company:	FP
Date Performed:	7/26/2008
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2008
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1287	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	362	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	759	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	759	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	11.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1540	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	475	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	998	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	998	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1670	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	515	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1082	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1082	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1930	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	596	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1251	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1251	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	19.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1730	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	534	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1121	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1121	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1770	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	497	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1044	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1044	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	16.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1980	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	556	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1168	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1168	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.0-	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1830	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	514	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1079	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1079	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2015 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1630	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	458	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	962	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	962	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	14.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1910	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	590	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1238	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1238	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	19.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2130	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	657	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1381	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1381	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2310	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	713	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1497	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1497	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2010	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	620	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1303	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1303	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2120	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	596	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1251	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1251	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	19.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2410	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	677	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1422	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1422	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2350	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	660	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1386	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1386	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2025 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2020	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	567	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1192	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1192	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2280	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	704	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1478	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1478	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2610	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	806	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1692	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1692	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	2	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2690	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	830	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1744	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1744	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.3	mi/h
Number of lanes, N	2	
Density, D	27.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2300	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	710	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1491	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1491	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2480	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	697	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1463	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1463	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2880	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	809	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1699	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1699	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.5	mi/h
Number of lanes, N	2	
Density, D	26.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2870	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	806	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1693	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1693	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	2	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2035 No Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2390	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	671	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1410	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1410	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1620	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	500	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1050	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1050	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2060	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	636	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1335	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1335	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1830	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	565	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1186	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1186	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1830	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	565	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1186	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1186	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1900	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	534	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1121	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1121	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2030	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	570	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1197	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1197	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2290	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	643	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1351	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1351	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	20.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2015 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1700	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	478	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1003	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1003	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	1980	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	611	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1283	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1283	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2510	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	775	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1627	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1627	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	2	
Density, D	25.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2210	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	682	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1432	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1432	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2110	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	651	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1368	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1368	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2220	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	624	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1310	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1310	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	20.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2400	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	674	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2720	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	764	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1604	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1604	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	2	
Density, D	24.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2025 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2060	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	579	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1215	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1215	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/2009
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2340	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	722	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1517	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1517	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2860	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	883	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1854	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1854	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.4	mi/h
Number of lanes, N	2	
Density, D	29.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2480	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	765	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1607	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1607	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	2	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	AM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2390	veh/h
Peak-hour factor, PHF	0.81	
Peak 15-min volume, v15	738	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1549	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1549	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Estates to Southgate
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2560	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	719	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1510	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1510	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	23.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 North
From/To:	Southgate to Skyway
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2750	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	772	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1622	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1622	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	2	
Density, D	25.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Skyway to Southgate
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	3080	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	865	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1817	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1817	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	63.8	mi/h
Number of lanes, N	2	
Density, D	28.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	DC
Agency or Company:	FP
Date Performed:	1/23/09
Analysis Time Period:	PM
Freeway/Direction:	SR 99 South
From/To:	Southgate to Estates
Jurisdiction:	
Analysis Year:	2035 Plus Project
Description:	SR 99 Southgate PSR

Flow Inputs and Adjustments

Volume, V	2430	veh/h
Peak-hour factor, PHF	0.89	
Peak 15-min volume, v15	683	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1433	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1433	pc/h/ln

Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	22.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

FREEWAY RAMP RESULTS – ALTERNATIVES 1, 1B, AND 1C

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2015 (Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,280	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,415
2	SR-99 NB	Southgate Ave.	PM	2	65.0	1,620	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,791
3	SR-99 SB	Southgate Ave.	AM	2	65.0	1,490	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,647
4	SR-99 SB	Southgate Ave.	PM	2	65.0	1,450	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,603

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2015 (Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,620	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,791
2	SR-99 NB	Southgate Ave.	PM	2	65.0	1,900	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,100
3	SR-99 SB	Southgate Ave.	AM	2	65.0	1,830	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,023
4	SR-99 SB	Southgate Ave.	PM	2	65.0	2,290	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,531

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	780	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	829
2	SR-99 NB	Southgate Ave.	Right	1	35.0	410	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	436
3	SR-99 SB	Southgate Ave.	Right	1	35.0	340	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361
4	SR-99 SB	Southgate Ave.	Right	1	35.0	250	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	266

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	361
2	SR-99 NB	Southgate Ave.	Right	1	35.0	280	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	298
3	SR-99 SB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361
4	SR-99 SB	Southgate Ave.	Right	1	35.0	840	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	893

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No													
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.														
4	SR-99 SB	Southgate Ave.														

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No																0.586			1.000	1,415
2	SR-99 NB	Southgate Ave.	No																0.586			1.000	1,791
3	SR-99 SB	Southgate Ave.																	0.586			1.000	1,647
4	SR-99 SB	Southgate Ave.																	0.586			1.000	1,603

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.699			1.000	1,791
2	SR-99 NB	Southgate Ave.	No																0.694			1.000	2,100
3	SR-99 SB	Southgate Ave.	No																0.693			1.000	2,023
4	SR-99 SB	Southgate Ave.	No																0.656			1.000	2,531

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	1,415	4,800	No	2,244	4,800	No	0	No	No	1,415	2,244	4,600	No	829	2,000	No
2	SR-99 NB	Southgate Ave.	1,791	4,800	No	2,226	4,800	No	0	No	No	1,791	2,226	4,600	No	436	2,000	No
3	SR-99 SB	Southgate Ave.	1,647	4,800	No	2,008	4,800	No	0	No	No	1,647	2,008	4,600	No	361	2,000	No
4	SR-99 SB	Southgate Ave.	1,603	4,800	No	1,868	4,800	No	0	No	No	1,603	1,868	4,600	No	266	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	1,791	4,800	No	0	No	No	1,791	4400	No		1,429	4,800	No	361	2,000	No
2	SR-99 NB	Southgate Ave.	2,100	4,800	No	0	No	No	2,100	4400	No		1,802	4,800	No	298	2,000	No
3	SR-99 SB	Southgate Ave.	2,023	4,800	No	0	No	No	2,023	4400	No		1,661	4,800	No	361	2,000	No
4	SR-99 SB	Southgate Ave.	2,531	4,800	No	0	No	No	2,531	4400	No		1,638	4,800	No	893	2,000	No

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	On-ramp	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**20.7**	**C**	0.337	57.3	0.0	57.3
2	SR-99 NB	Southgate Ave.	**20.8**	**C**	0.336	57.3	0.0	57.3
3	SR-99 SB	Southgate Ave.	**19.1**	**B**	0.329	57.4	0.0	57.4
4	SR-99 SB	Southgate Ave.	**18.0**	**B**	0.325	57.5	0.0	57.5

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	Off-ramp	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**18.3**	**B**	0.461	54.4	0.0	54.4
2	SR-99 NB	Southgate Ave.	**21.0**	**C**	0.455	54.5	0.0	54.5
3	SR-99 SB	Southgate Ave.	**20.3**	**C**	0.461	54.4	0.0	54.4
4	SR-99 SB	Southgate Ave.	**24.7**	**C**	0.508	53.3	0.0	53.3

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2025 Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,540	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,702
2	SR-99 NB	Southgate Ave.	PM	2	65.0	1,880	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,078
3	SR-99 SB	Southgate Ave.	AM	2	65.0	1,660	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,835
4	SR-99 SB	Southgate Ave.	PM	2	65.0	1,720	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,901

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2025 (Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,980	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,188
2	SR-99 NB	Southgate Ave.	PM	2	65.0	2,220	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,454
3	SR-99 SB	Southgate Ave.	AM	2	65.0	2,210	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,443
4	SR-99 SB	Southgate Ave.	PM	2	65.0	2,720	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	3,006

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	970	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	1,031
2	SR-99 NB	Southgate Ave.	Right	1	35.0	520	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	553
3	SR-99 SB	Southgate Ave.	Right	1	35.0	450	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	478
4	SR-99 SB	Southgate Ave.	Right	1	35.0	340	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	440	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	468
2	SR-99 NB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361
3	SR-99 SB	Southgate Ave.	Right	1	35.0	550	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	585
4	SR-99 SB	Southgate Ave.	Right	1	35.0	1,000	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	1,063

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No													
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.														
4	SR-99 SB	Southgate Ave.														

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No																0.586			1.000	1,702
2	SR-99 NB	Southgate Ave.	No																0.586			1.000	2,078
3	SR-99 SB	Southgate Ave.																	0.586			1.000	1,835
4	SR-99 SB	Southgate Ave.																	0.586			1.000	1,901

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.684			1.000	2,188
2	SR-99 NB	Southgate Ave.	No																0.682			1.000	2,454
3	SR-99 SB	Southgate Ave.	No																0.672			1.000	2,443
4	SR-99 SB	Southgate Ave.	No																0.636			1.000	3,006

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	1,702	4,800	No	2,733	4,800	No	0	No	No	1,702	2,733	4,600	No	1,031	2,000	No
2	SR-99 NB	Southgate Ave.	2,078	4,800	No	2,631	4,800	No	0	No	No	2,078	2,631	4,600	No	553	2,000	No
3	SR-99 SB	Southgate Ave.	1,835	4,800	No	2,313	4,800	No	0	No	No	1,835	2,313	4,600	No	478	2,000	No
4	SR-99 SB	Southgate Ave.	1,901	4,800	No	2,263	4,800	No	0	No	No	1,901	2,263	4,600	No	361	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	2,188	4,800	No	0	No	No	2,188	4400	No		1,721	4,800	No	468	2,000	No
2	SR-99 NB	Southgate Ave.	2,454	4,800	No	0	No	No	2,454	4400	No		2,092	4,800	No	361	2,000	No
3	SR-99 SB	Southgate Ave.	2,443	4,800	No	0	No	No	2,443	4400	No		1,858	4,800	No	585	2,000	No
4	SR-99 SB	Southgate Ave.	3,006	4,800	No	0	No	No	3,006	4400	No		1,943	4,800	No	1,063	2,000	No

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	On-ramp	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**24.4**	**C**	0.360	56.7	0.0	56.7
2	SR-99 NB	Southgate Ave.	**23.9**	**C**	0.354	56.9	0.0	56.9
3	SR-99 SB	Southgate Ave.	**21.4**	**C**	0.339	57.2	0.0	57.2
4	SR-99 SB	Southgate Ave.	**21.1**	**C**	0.337	57.2	0.0	57.2

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	Off-ramp	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**21.7**	**C**	0.470	54.2	0.0	54.2
2	SR-99 NB	Southgate Ave.	**24.0**	**C**	0.461	54.4	0.0	54.4
3	SR-99 SB	Southgate Ave.	**23.9**	**C**	0.481	53.9	0.0	53.9
4	SR-99 SB	Southgate Ave.	**28.8**	**D**	0.524	53.0	0.0	53.0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2035 (Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,810	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,001
2	SR-99 NB	Southgate Ave.	PM	2	65.0	2,160	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,387
3	SR-99 SB	Southgate Ave.	AM	2	65.0	1,850	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,045
4	SR-99 SB	Southgate Ave.	PM	2	65.0	2,020	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,233

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2035 (Alternative 1)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	2,340	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,586
2	SR-99 NB	Southgate Ave.	PM	2	65.0	2,560	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,829
3	SR-99 SB	Southgate Ave.	AM	2	65.0	2,480	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,741
4	SR-99 SB	Southgate Ave.	PM	2	65.0	3,080	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	3,404

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	1,050	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	1,116
2	SR-99 NB	Southgate Ave.	Right	1	35.0	590	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	627
3	SR-99 SB	Southgate Ave.	Right	1	35.0	540	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	574
4	SR-99 SB	Southgate Ave.	Right	1	35.0	410	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	436

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	530	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	563
2	SR-99 NB	Southgate Ave.	Right	1	35.0	400	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	425
3	SR-99 SB	Southgate Ave.	Right	1	35.0	630	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	670
4	SR-99 SB	Southgate Ave.	Right	1	35.0	1,060	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	1,127

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No													
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.														
4	SR-99 SB	Southgate Ave.														

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No																0.586			1.000	2,001
2	SR-99 NB	Southgate Ave.	No																0.586			1.000	2,387
3	SR-99 SB	Southgate Ave.																	0.586			1.000	2,045
4	SR-99 SB	Southgate Ave.																	0.586			1.000	2,233

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.669			1.000	2,586
2	SR-99 NB	Southgate Ave.	No																0.670			1.000	2,829
3	SR-99 SB	Southgate Ave.	No																0.661			1.000	2,741
4	SR-99 SB	Southgate Ave.	No																0.623			1.000	3,404

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	2,001	4,800	No	3,117	4,800	No	0	No	No	2,001	3,117	4,600	No	1,116	2,000	No
2	SR-99 NB	Southgate Ave.	2,387	4,800	No	3,015	4,800	No	0	No	No	2,387	3,015	4,600	No	627	2,000	No
3	SR-99 SB	Southgate Ave.	2,045	4,800	No	2,619	4,800	No	0	No	No	2,045	2,619	4,600	No	574	2,000	No
4	SR-99 SB	Southgate Ave.	2,233	4,800	No	2,669	4,800	No	0	No	No	2,233	2,669	4,600	No	436	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	2,586	4,800	No	0	No	No	2,586	4400	No		2,023	4,800	No	563	2,000	No
2	SR-99 NB	Southgate Ave.	2,829	4,800	No	0	No	No	2,829	4400	No		2,404	4,800	No	425	2,000	No
3	SR-99 SB	Southgate Ave.	2,741	4,800	No	0	No	No	2,741	4400	No		2,071	4,800	No	670	2,000	No
4	SR-99 SB	Southgate Ave.	3,404	4,800	No	0	No	No	3,404	4400	No		2,277	4,800	No	1,127	2,000	No

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	On-ramp	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**27.4**	**C**	0.388	56.1	0.0	56.1
2	SR-99 NB	Southgate Ave.	**26.8**	**C**	0.379	56.3	0.0	56.3
3	SR-99 SB	Southgate Ave.	**23.8**	**C**	0.354	56.9	0.0	56.9
4	SR-99 SB	Southgate Ave.	**24.2**	**C**	0.356	56.8	0.0	56.8

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	Off-ramp	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**25.1**	**C**	0.479	54.0	0.0	54.0
2	SR-99 NB	Southgate Ave.	**27.2**	**C**	0.466	54.3	0.0	54.3
3	SR-99 SB	Southgate Ave.	**26.5**	**C**	0.488	53.8	0.0	53.8
4	SR-99 SB	Southgate Ave.	**32.2**	**D**	0.529	52.8	0.0	52.8

FREEWAY RAMP RESULTS – ALTERNATIVE 2

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2015 (Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	AM	2	65.0	1,280	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,415
2	SR-99 NB	Southgate Ave. (Loop)	PM	2	65.0	1,620	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,791
3	SR-99 NB	Southgate Ave. (Slip)	AM	2	65.0	1,430	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,581
4	SR-99 NB	Southgate Ave. (Slip)	PM	2	65.0	1,760	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,945
5	SR-99 SB	Southgate Ave. (Loop)	AM	2	65.0	1,490	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,647
6	SR-99 SB	Southgate Ave. (Loop)	PM	2	65.0	1,450	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,603
7	SR-99 SB	Southgate Ave. (Slip)	AM	2	65.0	1,780	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,967
8	SR-99 SB	Southgate Ave. (Slip)	PM	2	65.0	1,660	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,835

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2015 (Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,620	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,791
2	SR-99 NB	Southgate Ave.	PM	2	65.0	1,900	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,100
3	SR-99 SB	Southgate Ave.	AM	2	65.0	1,830	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,023
4	SR-99 SB	Southgate Ave.	PM	2	65.0	2,290	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,531

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	150	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	159
2	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	140	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	149
3	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	630	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	670
4	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	270	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	287
5	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	290	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	308
6	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	210	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	223
7	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	50	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	53
8	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	40	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	43

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	361
2	SR-99 NB	Southgate Ave.	Right	1	35.0	280	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	298
3	SR-99 SB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361
4	SR-99 SB	Southgate Ave.	Right	1	35.0	840	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	893

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Upstream Ramp Data*													
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No													
2	SR-99 NB	Southgate Ave. (Loop)	No													
3	SR-99 NB	Southgate Ave. (Slip)														
4	SR-99 NB	Southgate Ave. (Slip)														
5	SR-99 SB	Southgate Ave. (Loop)														
6	SR-99 SB	Southgate Ave. (Loop)														
7	SR-99 SB	Southgate Ave. (Slip)														
8	SR-99 SB	Southgate Ave. (Slip)														

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Upstream Ramp Data*													
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	1,415
2	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	1,791
3	SR-99 NB	Southgate Ave. (Slip)																	0.586			1.000	1,581
4	SR-99 NB	Southgate Ave. (Slip)																	0.586			1.000	1,945
5	SR-99 SB	Southgate Ave. (Loop)																	0.586			1.000	1,647
6	SR-99 SB	Southgate Ave. (Loop)																	0.586			1.000	1,603
7	SR-99 SB	Southgate Ave. (Slip)																	0.586			1.000	1,967
8	SR-99 SB	Southgate Ave. (Slip)																	0.586			1.000	1,835

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.699			1.000	1,791
2	SR-99 NB	Southgate Ave.	No																0.694			1.000	2,100
3	SR-99 SB	Southgate Ave.	No																0.693			1.000	2,023
4	SR-99 SB	Southgate Ave.	No																0.656			1.000	2,531

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave. (Loop)	1,415	4,800	No	1,574	4,800	No	0	No	No	1,415	1,574	4,600	No	159	2,000	No
2	SR-99 NB	Southgate Ave. (Loop)	1,791	4,800	No	1,939	4,800	No	0	No	No	1,791	1,939	4,600	No	149	2,000	No
3	SR-99 NB	Southgate Ave. (Slip)	1,581	4,800	No	2,250	4,800	No	0	No	No	1,581	2,250	4,600	No	670	2,000	No
4	SR-99 NB	Southgate Ave. (Slip)	1,945	4,800	No	2,232	4,800	No	0	No	No	1,945	2,232	4,600	No	287	2,000	No
5	SR-99 SB	Southgate Ave. (Loop)	1,647	4,800	No	1,955	4,800	No	0	No	No	1,647	1,955	4,600	No	308	2,000	No
6	SR-99 SB	Southgate Ave. (Loop)	1,603	4,800	No	1,826	4,800	No	0	No	No	1,603	1,826	4,600	No	223	2,000	No
7	SR-99 SB	Southgate Ave. (Slip)	1,967	4,800	No	2,021	4,800	No	0	No	No	1,967	2,021	4,600	No	53	2,000	No
8	SR-99 SB	Southgate Ave. (Slip)	1,835	4,800	No	1,877	4,800	No	0	No	No	1,835	1,877	4,600	No	43	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	1,791	4,800	No	0	No	No	1,791	4400	No		1,429	4,800	No	361	2,000	No
2	SR-99 NB	Southgate Ave.	2,100	4,800	No	0	No	No	2,100	4400	No		1,802	4,800	No	298	2,000	No
3	SR-99 SB	Southgate Ave.	2,023	4,800	No	0	No	No	2,023	4400	No		1,661	4,800	No	361	2,000	No
4	SR-99 SB	Southgate Ave.	2,531	4,800	No	0	No	No	2,531	4400	No		1,638	4,800	No	893	2,000	No

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	On-ramp	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave. (Loop)	**15.8**	**B**	0.319	57.7	0.0	57.7
2	SR-99 NB	Southgate Ave. (Loop)	**18.7**	**B**	0.327	57.5	0.0	57.5
3	SR-99 NB	Southgate Ave. (Slip)	**20.8**	**C**	0.337	57.2	0.0	57.2
4	SR-99 NB	Southgate Ave. (Slip)	**20.9**	**C**	0.336	57.3	0.0	57.3
5	SR-99 SB	Southgate Ave. (Loop)	**18.7**	**B**	0.328	57.5	0.0	57.5
6	SR-99 SB	Southgate Ave. (Loop)	**17.7**	**B**	0.324	57.5	0.0	57.5
7	SR-99 SB	Southgate Ave. (Slip)	**19.3**	**B**	0.329	57.4	0.0	57.4
8	SR-99 SB	Southgate Ave. (Slip)	**18.2**	**B**	0.325	57.5	0.0	57.5

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	Off-ramp	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**18.3**	**B**	0.461	54.4	0.0	54.4
2	SR-99 NB	Southgate Ave.	**21.0**	**C**	0.455	54.5	0.0	54.5
3	SR-99 SB	Southgate Ave.	**20.3**	**C**	0.461	54.4	0.0	54.4
4	SR-99 SB	Southgate Ave.	**24.7**	**C**	0.508	53.3	0.0	53.3

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2025 Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information / *Freeway Data* / *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	AM	2	65.0	1,540	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	1,702
2	SR-99 NB	Southgate Ave. (Loop)	PM	2	65.0	1,880	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,078
3	SR-99 NB	Southgate Ave. (Slip)	AM	2	65.0	1,880	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,078
4	SR-99 NB	Southgate Ave. (Slip)	PM	2	65.0	2,130	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,354
5	SR-99 SB	Southgate Ave. (Loop)	AM	2	65.0	1,660	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,835
6	SR-99 SB	Southgate Ave. (Loop)	PM	2	65.0	1,720	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	1,901
7	SR-99 SB	Southgate Ave. (Slip)	AM	2	65.0	1,980	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,188
8	SR-99 SB	Southgate Ave. (Slip)	PM	2	65.0	1,970	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,177

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2025 (Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information / *Freeway Data* / *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	1,980	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,188
2	SR-99 NB	Southgate Ave.	PM	2	65.0	2,220	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,454
3	SR-99 SB	Southgate Ave.	AM	2	65.0	2,210	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,443
4	SR-99 SB	Southgate Ave.	PM	2	65.0	2,720	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	3,006

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	340	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	361
2	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	250	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	266
3	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	630	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	670
4	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	270	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	287
5	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	320	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	340
6	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	250	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	266
7	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	130	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	138
8	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	90	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	96

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	440	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	468
2	SR-99 NB	Southgate Ave.	Right	1	35.0	340	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	361
3	SR-99 SB	Southgate Ave.	Right	1	35.0	550	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	585
4	SR-99 SB	Southgate Ave.	Right	1	35.0	1,000	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	1,063

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Upstream Ramp Data*													
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No													
2	SR-99 NB	Southgate Ave. (Loop)	No													
3	SR-99 NB	Southgate Ave. (Slip)														
4	SR-99 NB	Southgate Ave. (Slip)														
5	SR-99 SB	Southgate Ave. (Loop)														
6	SR-99 SB	Southgate Ave. (Loop)														
7	SR-99 SB	Southgate Ave. (Slip)														
8	SR-99 SB	Southgate Ave. (Slip)														

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Upstream Ramp Data*													
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	1,702
2	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	2,078
3	SR-99 NB	Southgate Ave. (Slip)																	0.586			1.000	2,078
4	SR-99 NB	Southgate Ave. (Slip)																	0.586			1.000	2,354
5	SR-99 SB	Southgate Ave. (Loop)																	0.586			1.000	1,835
6	SR-99 SB	Southgate Ave. (Loop)																	0.586			1.000	1,901
7	SR-99 SB	Southgate Ave. (Slip)																	0.586			1.000	2,188
8	SR-99 SB	Southgate Ave. (Slip)																	0.586			1.000	2,177

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.684			1.000	2,188
2	SR-99 NB	Southgate Ave.	No																0.682			1.000	2,454
3	SR-99 SB	Southgate Ave.	No																0.672			1.000	2,443
4	SR-99 SB	Southgate Ave.	No																0.636			1.000	3,006

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave. (Loop)	1,702	4,800	No	2,064	4,800	No	0	No	No	1,702	2,064	4,600	No	361	2,000	No
2	SR-99 NB	Southgate Ave. (Loop)	2,078	4,800	No	2,344	4,800	No	0	No	No	2,078	2,344	4,600	No	266	2,000	No
3	SR-99 NB	Southgate Ave. (Slip)	2,078	4,800	No	2,748	4,800	No	0	No	No	2,078	2,748	4,600	No	670	2,000	No
4	SR-99 NB	Southgate Ave. (Slip)	2,354	4,800	No	2,641	4,800	No	0	No	No	2,354	2,641	4,600	No	287	2,000	No
5	SR-99 SB	Southgate Ave. (Loop)	1,835	4,800	No	2,175	4,800	No	0	No	No	1,835	2,175	4,600	No	340	2,000	No
6	SR-99 SB	Southgate Ave. (Loop)	1,901	4,800	No	2,167	4,800	No	0	No	No	1,901	2,167	4,600	No	266	2,000	No
7	SR-99 SB	Southgate Ave. (Slip)	2,188	4,800	No	2,327	4,800	No	0	No	No	2,188	2,327	4,600	No	138	2,000	No
8	SR-99 SB	Southgate Ave. (Slip)	2,177	4,800	No	2,273	4,800	No	0	No	No	2,177	2,273	4,600	No	96	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	2,188	4,800	No	0	No	No	2,188	4400	No		1,721	4,800	No	468	2,000	No
2	SR-99 NB	Southgate Ave.	2,454	4,800	No	0	No	No	2,454	4400	No		2,092	4,800	No	361	2,000	No
3	SR-99 SB	Southgate Ave.	2,443	4,800	No	0	No	No	2,443	4400	No		1,858	4,800	No	585	2,000	No
4	SR-99 SB	Southgate Ave.	3,006	4,800	No	0	No	No	3,006	4400	No		1,943	4,800	No	1,063	2,000	No

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	On-ramp	Density, D (pcplpm)	Level of Service	Int. Var. M_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave. (Loop)	**19.5**	**B**	0.331	57.4	0.0	57.4
2	SR-99 NB	Southgate Ave. (Loop)	**21.8**	**C**	0.341	57.2	0.0	57.2
3	SR-99 NB	Southgate Ave. (Slip)	**24.7**	**C**	0.361	56.7	0.0	56.7
4	SR-99 NB	Southgate Ave. (Slip)	**24.1**	**C**	0.355	56.8	0.0	56.8
5	SR-99 SB	Southgate Ave. (Loop)	**20.4**	**C**	0.334	57.3	0.0	57.3
6	SR-99 SB	Southgate Ave. (Loop)	**20.4**	**C**	0.334	57.3	0.0	57.3
7	SR-99 SB	Southgate Ave. (Slip)	**21.7**	**C**	0.340	57.2	0.0	57.2
8	SR-99 SB	Southgate Ave. (Slip)	**21.3**	**C**	0.338	57.2	0.0	57.2

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Results*		*Speed Estimation*			
	Freeway/ Direction	Off-ramp	Density, D (pcplpm)	Level of Service	Int. Var. D_S	Inf. Area S_R (mph)	Out Lns. S_O (mph)	All vehs. S (mph)
1	SR-99 NB	Southgate Ave.	**21.7**	**C**	0.470	54.2	0.0	54.2
2	SR-99 NB	Southgate Ave.	**24.0**	**C**	0.461	54.4	0.0	54.4
3	SR-99 SB	Southgate Ave.	**23.9**	**C**	0.481	53.9	0.0	53.9
4	SR-99 SB	Southgate Ave.	**28.8**	**D**	0.524	53.0	0.0	53.0

HCM 2000
Merge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2035 (Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	On-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	AM	2	65.0	1,810	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,001
2	SR-99 NB	Southgate Ave. (Loop)	PM	2	65.0	2,160	No		0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,387
3	SR-99 NB	Southgate Ave. (Slip)	AM	2	65.0	2,220	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,454
4	SR-99 NB	Southgate Ave. (Slip)	PM	2	65.0	2,130	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,354
5	SR-99 SB	Southgate Ave. (Loop)	AM	2	65.0	1,850	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,045
6	SR-99 SB	Southgate Ave. (Loop)	PM	2	65.0	2,020	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,233
7	SR-99 SB	Southgate Ave. (Slip)	AM	2	65.0	2,220	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,454
8	SR-99 SB	Southgate Ave. (Slip)	PM	2	65.0	2,320	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,564

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

Jurisdiction
Analysis Year 2035 (Alternative 2)
Analyst DC

Agency or Company Fehr & Peers
Date 1/28/2009
Project Description Southgate Interchange

General Information | *Freeway Data* | *Freeway Volume Adjustment*

	Freeway/ Direction	Off-ramp	Analysis Time Period	Lanes	S_{FF} (mph)	V (vph)	HOV Lane?	HOV Lane Volume	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	AM	2	65.0	2,340	No	500	0.95	Level	0.0%	1.00	10.0%	0.0%	1.5	1.2	0.95	1.00	2,586
2	SR-99 NB	Southgate Ave.	PM	2	65.0	2,560	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,829
3	SR-99 SB	Southgate Ave.	AM	2	65.0	2,480	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	2,741
4	SR-99 SB	Southgate Ave.	PM	2	65.0	3,080	No		0.95	Level			10.0%	0.0%	1.5	1.2	0.95	1.00	3,404

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*On-Ramp Data*							*On-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Accel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	On-ramp	Type	Lanes	(mph)	(vph)	L_{A1}	L_{A2}	L_{Aeff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	410	300		300	0.95	Level	0.0%	1.00	2.0%	0.0%	1.5	1.2	0.99	1.00	436
2	SR-99 NB	Southgate Ave. (Loop)	Right	1	35.0	320	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	340
3	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	640	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	680
4	SR-99 NB	Southgate Ave. (Slip)	Right	1	35.0	270	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	287
5	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	370	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	393
6	SR-99 SB	Southgate Ave. (Loop)	Right	1	35.0	300	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	319
7	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	170	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	181
8	SR-99 SB	Southgate Ave. (Slip)	Right	1	35.0	110	300		300	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	117

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Off-Ramp Data*							*Off-Ramp Volume Adjustment*										
	Freeway/				S_{FR}	V_R	Decel Lane (ft)					Grade	Length	Truck/						Flow Rate
	Direction	Off-ramp	Type	Lanes	(mph)	(vph)	L_{D1}	L_{D2}	L_{Deff}	PHF	Terrain	%	(mi)	Bus %	RV %	E_T	E_R	f_{HV}	f_P	v_p (pcph)
1	SR-99 NB	Southgate Ave.	Right	1	35.0	530	150		150	0.95	Level	4.0%	0.70	2.0%	0.0%	1.5	1.2	0.99	1.00	563
2	SR-99 NB	Southgate Ave.	Right	1	35.0	400	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	425
3	SR-99 SB	Southgate Ave.	Right	1	35.0	630	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	670
4	SR-99 SB	Southgate Ave.	Right	1	35.0	1,060	150		150	0.95	Level			2.0%	0.0%	1.5	1.2	0.99	1.00	1,127

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No													
2	SR-99 NB	Southgate Ave. (Loop)	No													
3	SR-99 NB	Southgate Ave. (Slip)	No													
4	SR-99 NB	Southgate Ave. (Slip)	No													
5	SR-99 SB	Southgate Ave. (Loop)	No													
6	SR-99 SB	Southgate Ave. (Loop)	No													
7	SR-99 SB	Southgate Ave. (Slip)	No													
8	SR-99 SB	Southgate Ave. (Slip)	No													
			No													
			No													
			No													

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information | *Adjacent Upstream Ramp Data*

	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)
1	SR-99 NB	Southgate Ave.	No	400	500	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	571
2	SR-99 NB	Southgate Ave.	No													
3	SR-99 SB	Southgate Ave.	No													
4	SR-99 SB	Southgate Ave.	No													

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	On-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-2	L_{EQ} 25-3	P_{FM} Equations 1	2	3	P_{FM}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	2,001
2	SR-99 NB	Southgate Ave. (Loop)	No																0.586			1.000	2,387
3	SR-99 NB	Southgate Ave. (Slip)	No																0.586			1.000	2,454
4	SR-99 NB	Southgate Ave. (Slip)	No																0.586			1.000	2,354
5	SR-99 SB	Southgate Ave. (Loop)	No																0.586			1.000	2,045
6	SR-99 SB	Southgate Ave. (Loop)	No																0.586			1.000	2,233
7	SR-99 SB	Southgate Ave. (Slip)	No																0.586			1.000	2,454
8	SR-99 SB	Southgate Ave. (Slip)	No																0.586			1.000	2,564
			No																				
			No																				
			No																				

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Adjacent Downstream Ramp Data*														*v_{12} Estimation*						
	Freeway/ Direction	Off-ramp	Exists?	Distance	Volume (vph)	PHF	Terrain	Grade %	Length (mi)	Truck/ Bus %	RV %	E_T	E_R	f_{HV}	f_P	Flow Rate v_p (pcph)	L_{EQ} 25-13	L_{EQ} 25-14	P_{FD} Equations 5	6	7	P_{FD}	v_{12} (pcph)
1	SR-99 NB	Southgate Ave.	No	500	1,000	0.92	Level	4.0%	0.70	10.0%	0.0%	1.5	1.2	0.95	1.00	1,141			0.669			1.000	2,586
2	SR-99 NB	Southgate Ave.	No																0.670			1.000	2,829
3	SR-99 SB	Southgate Ave.	No																0.661			1.000	2,741
4	SR-99 SB	Southgate Ave.	No																0.623			1.000	3,404

HCM 2000
Merge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	On-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	v_{R12a} (pcph)	Max v_{R12a} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave. (Loop)	2,001	4,800	No	2,436	4,800	No	0	No	No	2,001	2,436	4,600	No	436	2,000	No
2	SR-99 NB	Southgate Ave. (Loop)	2,387	4,800	No	2,728	4,800	No	0	No	No	2,387	2,728	4,600	No	340	2,000	No
3	SR-99 NB	Southgate Ave. (Slip)	2,454	4,800	No	3,134	4,800	No	0	No	No	2,454	3,134	4,600	No	680	2,000	No
4	SR-99 NB	Southgate Ave. (Slip)	2,354	4,800	No	2,641	4,800	No	0	No	No	2,354	2,641	4,600	No	287	2,000	No
5	SR-99 SB	Southgate Ave. (Loop)	2,045	4,800	No	2,438	4,800	No	0	No	No	2,045	2,438	4,600	No	393	2,000	No
6	SR-99 SB	Southgate Ave. (Loop)	2,233	4,800	No	2,552	4,800	No	0	No	No	2,233	2,552	4,600	No	319	2,000	No
7	SR-99 SB	Southgate Ave. (Slip)	2,454	4,800	No	2,634	4,800	No	0	No	No	2,454	2,634	4,600	No	181	2,000	No
8	SR-99 SB	Southgate Ave. (Slip)	2,564	4,800	No	2,681	4,800	No	0	No	No	2,564	2,681	4,600	No	117	2,000	No

HCM 2000
Diverge Ramp Junctions
Capacity Analysis

General Information			*Capacity Checks*															
	Freeway/ Direction	Off-ramp	v_{Fi} (pcph)	Max v_{Fi} (pcph)	LOS F?	v_3, v_{av34} (pcphpl)	v_3, v_{av34} > 2,700?	v_3, v_{av34} >1.5*v_{12}/2?	v_{12a} (pcph)	Max v_{12} (pcph)	LOS F?		v_{FO} (pcph)	Max v_{FO} (pcph)	LOS F?	v_R (pcph)	Max v_R (pcph)	LOS F?
1	SR-99 NB	Southgate Ave.	2,586	4,800	No	0	No	No	2,586	4400	No		2,023	4,800	No	563	2,000	No
2	SR-99 NB	Southgate Ave.	2,829	4,800	No	0	No	No	2,829	4400	No		2,404	4,800	No	425	2,000	No
3	SR-99 SB	Southgate Ave.	2,741	4,800	No	0	No	No	2,741	4400	No		2,071	4,800	No	670	2,000	No
4	SR-99 SB	Southgate Ave.	3,404	4,800	No	0	No	No	3,404	4400	No		2,277	4,800	No	1,127	2,000	No

G. Drainage Impact Report and Preliminary Floodplain Risk Assessment

03-BUT-99
PM 28.8/29.9
EA 4E670

SR 99/Southgate Avenue Interchange Project
City of Chico, Butte County, California

Drainage Impact Report (for PID phase)

Prepared for:

Prepared by:

March 2010

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03-BUT-99
PM 28.8/29.9
EA 4E670

SR 99/Southgate Avenue Interchange Project
City of Chico, Butte County, California

Drainage Impact Report

Submitted to:
City of Chico

This report has been prepared by or under the supervision of the following Registered Engineer. The Registered Civil Engineer attests to the technical information contained herein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

Han-Bin Liang, P.E.
Registered Civil Engineer

9/28/2011
Date

REGISTERED PROFESSIONAL ENGINEER
HAN-BIN LIANG
No. C 048404
Exp. 6/30/2012
CIVIL
STATE OF CALIFORNIA

March 2010

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Executive Summary

This report is the drainage impact summary report for the proposed State Route 99 (SR 99)/Southgate Avenue Interchange Project (hereto known as the Project) located in the City of Chico, Butte County, California. The purpose of the Project is to improve the overall traffic operations in the area. The proposed Project would reduce traffic congestion and optimize traffic flows at the Interchange and local roads. This report summarizes the design criteria, discusses known drainage issues, examines design reference documents, proposes a design approach for later phases of the project and calculates preliminary cost estimates.

There are three alternatives under consideration at this point in the Project development process: Alternative L-8, Alternative L-9 and the No Build Alternative. Alternatives L-8 and L-9 are both partial cloverleaf configurations with a loop off-ramp with access to Midway and Skyway via the extension of Southgate Avenue. The differences between the two alternatives are the configurations of the loop off-ramps and the proposed changes to local roads.

This report identifies existing hydrologic and hydraulic conditions, highway drainage design elements and hydrologic and hydraulic design standards for the Project. The Project design goal is to maintain the existing flow patterns and to minimize increased flow volume to the maximum extent practicable. The proposed drainage systems with in the Project area would be designed to intercept storm water runoff from the roadway and areas adjacent to the State of California right-of-way (R/W). Due to the increase in roadway area as a result of this Project, new longitudinal drainage systems and additional drainage inlets may be necessary to accommodate increases in flow. Detailed hydrologic and hydraulic calculations will be performed as the Project progresses into the final design phase.

There are some existing drainage issues that should be addressed for the implementation of the Project including uncertified levees on Butte Creek, the placement of bridges over Butte Creek and Comanche Creek due to the proposed new frontage roads, the weir in Butte Creek at the proposed Southgate Avenue extension to Skyway, groundwater drainage problems between Midway and Butte Creek, and the railroad embankment that acts as a hydraulic barrier to flooding from Comanche Creek and the Little Chico-Butte Creek Diversion Channel. Recommendations for these issues are addressed in this report and should be further evaluated during the Project Approval/Environmental Document (PA/ED) and Plans, Specifications and Estimates (PS&E) phases of the Project.

Any proposed drainage improvements that affect local drainage systems must meet local agency requirements and regulatory requirements. To meet regulatory requirements, it may be necessary to meter or detain storm water flow prior to discharge into the receiving water body or municipal storm drain system. This Project would not significantly affect the existing drainage patterns and would address the increased roadway runoff caused by the Project by implementing outlet protection and velocity dissipation devices. The increased flows are not significant when compared to the overall

watersheds of the receiving waterbodies of the Project. In addition, the Project will incorporate Best Management Practices, including water quality treatment measures, to address potential temporary and permanent water quality impacts from the Project as necessary.

Acronyms

BCAG	Butte County Association of Governments
Caltrans	California Department of Transportation
CDFG	California Department of Fish and Game
ESA	Environmentally Sensitive Areas
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIS	Flood Insurance Study
HDM	Highway Design Manual
HEC-22	Hydraulic Engineering Circular Number 22
HSG	Hydrologic Soil Group
NWI	National Wetland Inventory
NRCS	Natural Resources Conservation Services
PA/ED	Project Approval/Environmental Document
PS&E	Plans, Specifications and Estimates
USACE	United States Army Corp of Engineers
USGS	United States Geological Survey
RCP	Reinforced Concrete Pipe
R/W	Right of Way
SNC	Sensitive Natural Communities
SR 99	State Route 99

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1 INTRODUCTION

1.1 Purpose of this Study

This Drainage Impact Report defines the hydrologic and hydraulic conditions of the existing highway drainage system within the Project limits, and proposes the hydrologic and hydraulic design standards that would be used for the drainage design of the Project. This report also proposes the procedures, methodology, and criteria to be used in the design phase and will present any unusual aspects of the design that may require special attention.

1.2 Project History

The City of Chico (City), as part of the work for the Skyway Interchange, determined that the existing four-lane overcrossing will not provide acceptable traffic operations to Year 2020. Options for improving the Skyway Interchange operations are to either widen the Skyway overcrossing to six-lanes or to provide improvements to the Southgate Avenue (Southgate)/ State Route 99 (SR 99) Interchange (hereto known as Interchange).

The State Route 99/Southgate Avenue Intersection and Circulation Study was commissioned in 1999 to identify the location of the future interchange and connections of the local circulation system to the interchange. The study objectives were to:

- Identify a preferred interchange design and location;
- Develop improvement alternatives that addressed existing and future roadway deficiencies;
- Integrate local circulation improvements with planned and approved development;
- Integrate public involvement and participation in the development of recommended roadway improvements; and
- Reach a consensus among local jurisdictions, residents, and businesses within the study area on future roadway improvements.

Public participation in the study was encouraged, and three public open houses were held to gain input and present the recommended interim and ultimate circulation improvements. In addition, a Study Advisory Committee was formed and included representatives from public agencies (BCAG, Butte County supervisors, Butte County staff, Caltrans, City of Chico), local residents, and business owners (Norfield Industries, Smucker Quality Beverage).

Eight improvement alternatives for Year 2018 conditions were developed, evaluated, and compared to Year 2018 conditions without the improvements. The results for the alternative analysis were presented to the public at an open house and input from the open house was used in the development of the recommended improvements.

1.3 Project Description

To improve traffic operations, the City is proposing the Interchange be reconfigured. There are three alternatives considered in the *Project Study Report* (PSR), including a no-build alternative. The build alternatives propose an L-8 or L-9 interchange and provide a connection between Midway Avenue and Skyway via Southgate improvements as well as other improvements to local roads to support the interchange. New signals will be provided at each on/off-ramp intersections with Southgate. Southgate Lane will be relocated from its existing intersection further east to increase its distance from the Northbound on/off ramp. The improved capacity of this interchange will meet the needs for Year 2035 development of the City of Chico. Figure 1 shows the Project location and Figure 2 shows the limits of the Project and the major waterways within the Project vicinity.

The Skyway and Southgate extension will be extended to the interchange. The extensions are needed for regional access and to eliminate deficiencies on Skyway and reduce congestion on East Park Avenue.

1.4 Reference Documents

1.4.1 As-Built Record Documents

WRECO reviewed the following list of as-built record documents as part of this drainage impact study.

- File No. E-1718 (County of Butte, 1981)
- Contract No. 03-207-283801 (Caltrans, 1987)
- Job No. 2987 (County of Butte, 1988)
- Contract No. 03-283804 (Caltrans, 1991)
- Contract No. 03-1A6204 (Caltrans, 1999)
- Contract No. 03-0E3104 (Caltrans, 2006)

1.4.2 Preliminary Layout Sheets

- Project plans prepared by Mark Thomas & Company, Sacramento.

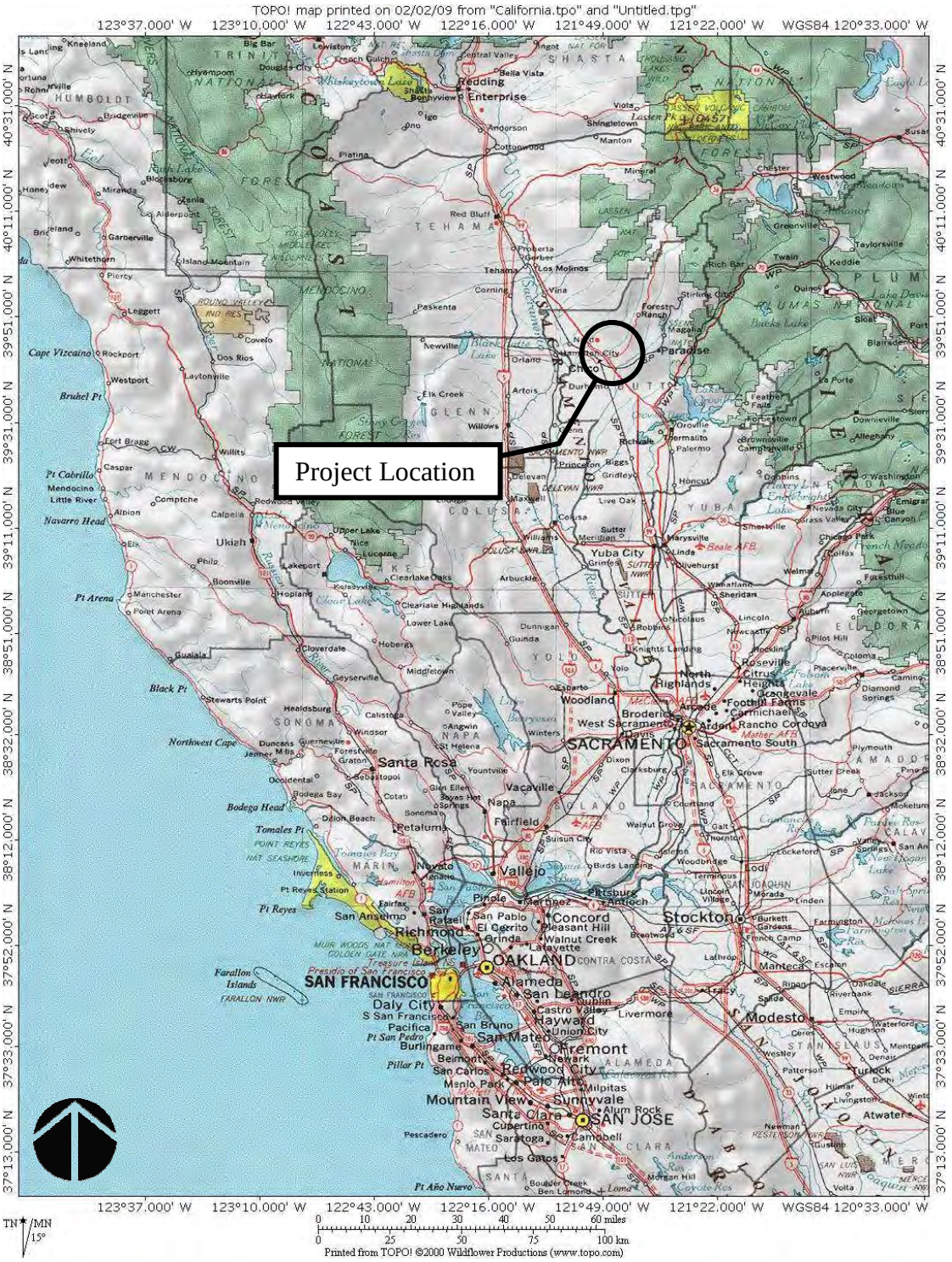

Figure 1-1. Project Location Map

Source: USGS

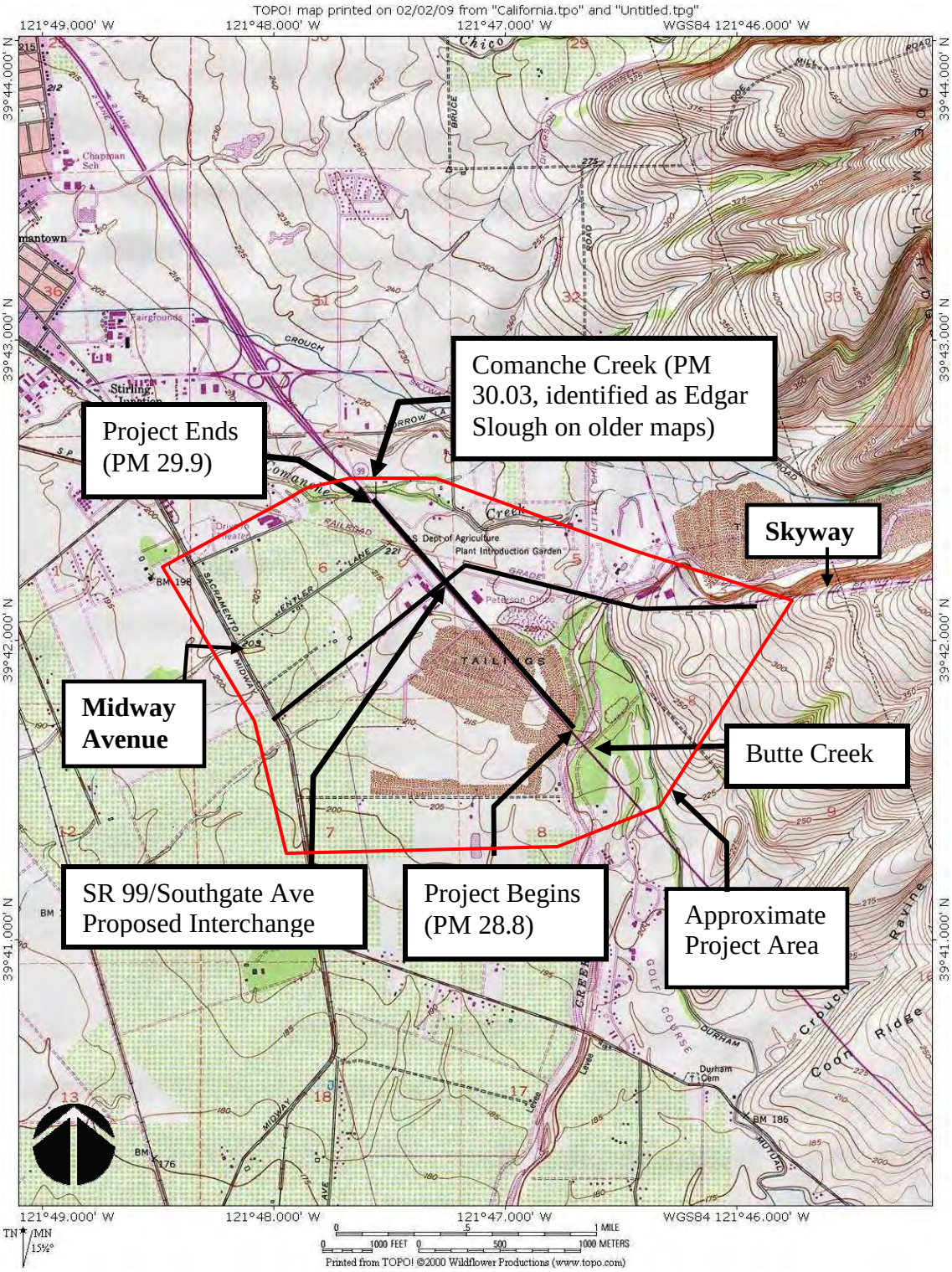

Figure 1-2. Vicinity Map

Source: USGS

1.5 Soil Characteristics

The Web Soil survey from the Natural Resources Conservation Services (NRCS) provides classifications of Hydrologic Soil Groups (HSGs) based on estimates of runoff potential (see Table 1). Three HSGs, Group A, B and C, were found within the Project limits, which indicates that the Project has mostly moderate to high infiltration rates when saturated. There is also an area of slow infiltration in the southeast area of the Project. Figure 1-3 shows the soil survey, classifying the HSGs within the Project vicinity.

Table 1. Soil Survey Summary

Map Unit	Map Unit Name	Surface Texture	Drainage	Hydrologic Soil Group
118	Xerorthents, tailing 0 to 50 Percent Slopes	very gravelly sandy loam	somewhat excessively drained	A
300	Redsluff Gravelly Loam, 0 to 2 Percent Slopes	gravelly loam	moderately well drained	B
301	Wafap-Hamslough Complex, 0 to 2 Percent Slopes	gravelly loam	somewhat poorly drained	C
302	Redtough-Redswale Complex, 0 to 2 Percent Slope	loam	somewhat poorly drained	D
336	Galt Clay, 0 to 1 Percent Slope	clay	poorly drained	B
418	Almendra Loam, 0 to 1 Percent Slope	loam	well drained	B
425	Vina Fine Sandy Loam, 0 to 1 Percent Slopes	fine sandy loam	well drained	B
445	Chico Loam, 0 to 1 Percent Slope	loam	well drained	B
447	Charger fine Sandy Loam, 0 to 1 Percent Slope	fine sandy loam	moderately well drained	B
614	Doemill-Jokerst Complex, 0 to 3 Percent Slope	gravelly loam	somewhat poorly drained	D
615	Doemill-Jokerst Complex, 3 to 8 Percent Slope	gravelly loam	somewhat poorly drained	D
616	Jokerst- Doemill-Typic Haploxeralfs Complex, 8 to 15 Percent Slope	gravelly loam	poorly drained	D
627	Ultic Haploxeralfs Rockstripe-Rock Outcrop,	gravelly loam	well drained	B

	Cliffs Complex, 50 to 70 Percent Slope			
675	Clearhayes-Hamslough Complex, 0 to 2 Percent Slopes	sandy clay loam	somewhat poorly drained	B
991	Xerofluvents, 0 to 4 Percent Slopes Frequently Flooded	sandy loam	somewhat poorly drained	A

Source: USDA – NRCS

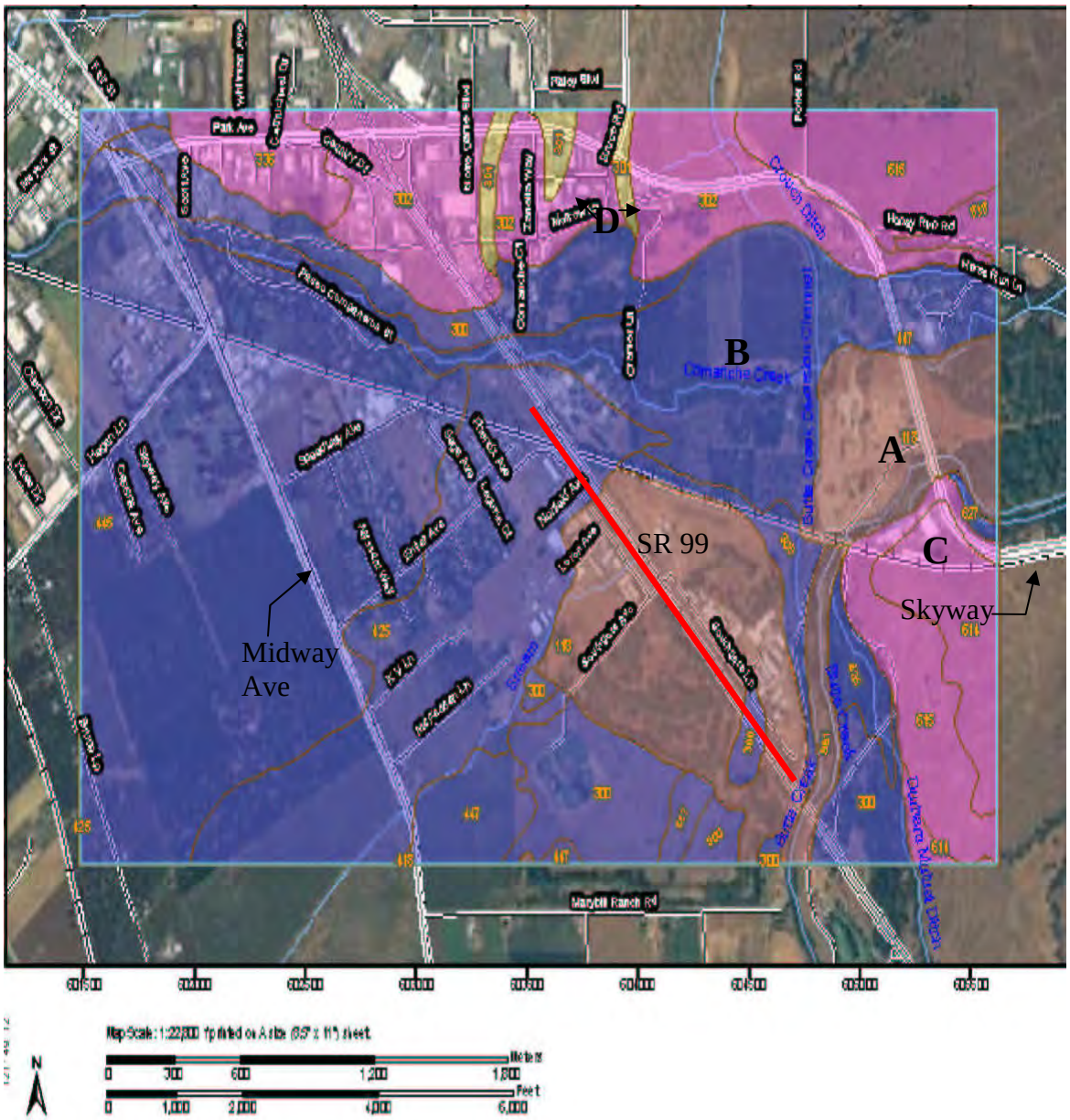

Figure 1-3. Hydrologic Soil Groups within Project Vicinity

Source: USDA-NRCS

1.6 Land Use

The land use in the Project vicinity is comprised largely of manufacturing and warehousing, with some low density residential development on either side of SR 99. Figure 1-5 shows the Zoning Map for the City of Chico.

1.7 Creeks, Streams, and River Crossings

There are two named creeks, Butte Creek and Comanche Creek (identified as Edgar Slough on older maps), a diversion channel, and a flood control levee within the Project vicinity. The locations of these crossings are shown in Figure 1-4. The creeks are the Project's direct receiving water bodies. They were located by reviewing as-built record drawings, site visits, and the United States Geological Survey (USGS). The improvements to SR 99 do not include any work in the creeks, but improvements to the frontage road on the east and west side of SR99 would include a roadway crossing at Butte and Comanche Creeks.

1.8 Existing Drainage and Drainage Design Issues

The existing drainage systems within the Project limits along SR 99 are comprised mostly of longitudinal systems connecting cross culverts that drain toward the creek crossings. Storm water on the west side of SR 99 is collected at the outside shoulders along asphalt concrete (AC) dikes before discharging into over side drains. On the east side of SR 99, there are roadside drainage ditches to collect storm water that flows directly off the edge of the pavement. Existing drainage along local streets has not been thoroughly evaluated since as-built drawings for the local street drainage were not available at the time of this study; these will be studied further during final design.

The principal features of this Project, which would impact existing drainage facilities, are the new partial cloverleaf design, the loop off ramps, the extension of frontage roads on both sides of SR 99, the connection from SR 99 to Midway Avenue along Southgate Ave, and the extension of Skyway and Southgate Avenues. There are some existing drainage issues that should be addressed for the implementation of the Project including uncertified levees on Butte Creek, the placement of the bridges over Butte Creek and Comanche Creek that would be part of the proposed roads, the weir in Butte Creek at the proposed Southgate extension to Skyway, groundwater drainage problems between Midway and Butte Creek, and the railroad embankment that acts as a hydraulic barrier protecting against flooding from Comanche Creek and the Little Chico-Butte Creek Diversion Channel.

Butte Creek is bordered by levees in most of the valley reach, including in the vicinity of the Project. These levees are uncertified by the Federal Emergency Management Agency (FEMA) and were analyzed as failed levees in the FEMA Flood Insurance Study (FIS). As a result, a portion of the proposed Project area is depicted in a Special Flood Hazard Area (SFHA) Zone AE in the Flood Insurance Rate Map (FIRM). The Project would be designed in such a way that the Project would not exacerbate flood risk. A more detailed evaluation of flooding and mitigations proposed for the implementation of the Project are

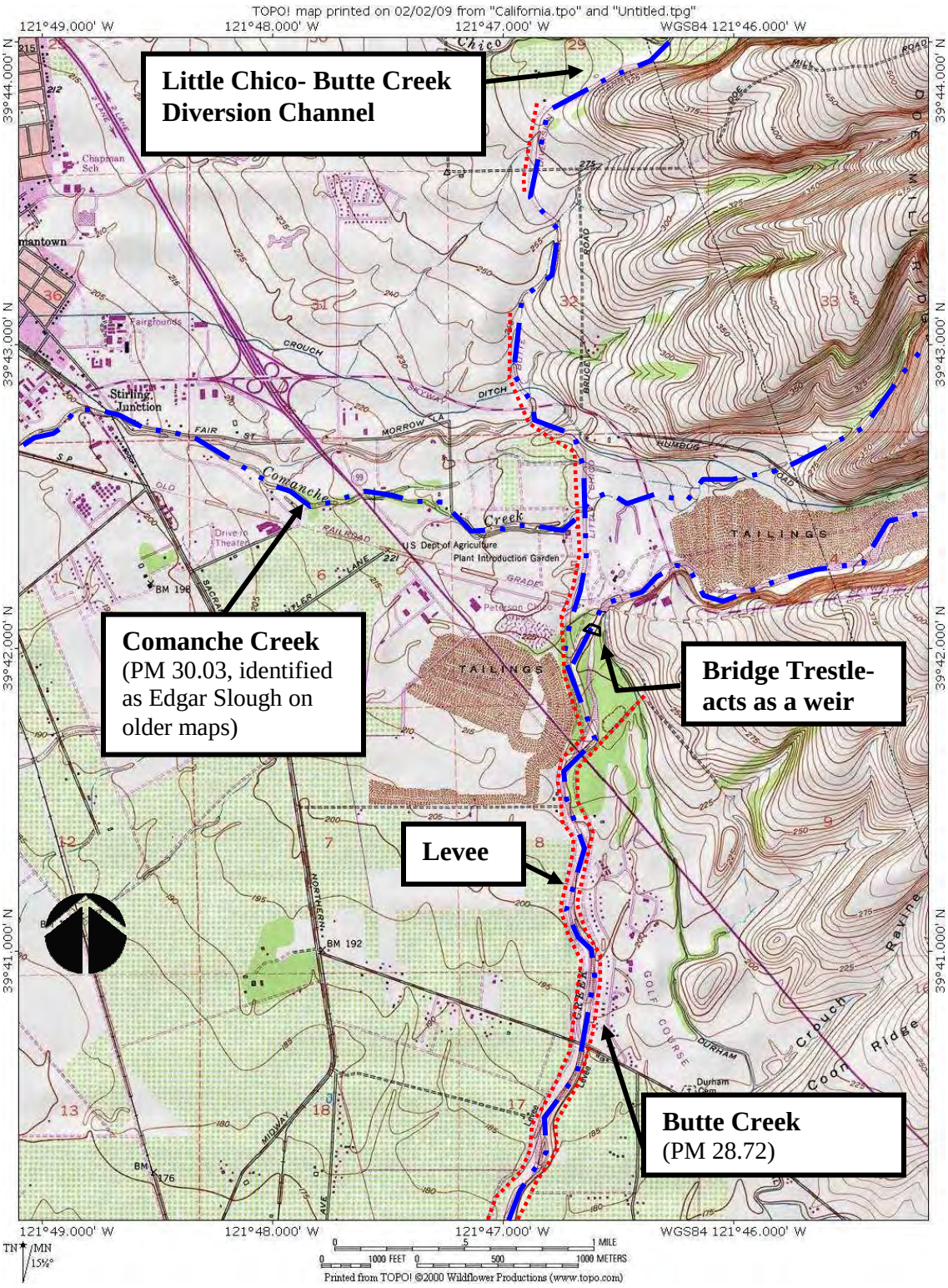

Figure 1-4. Waterway Crossings

Source: USGS

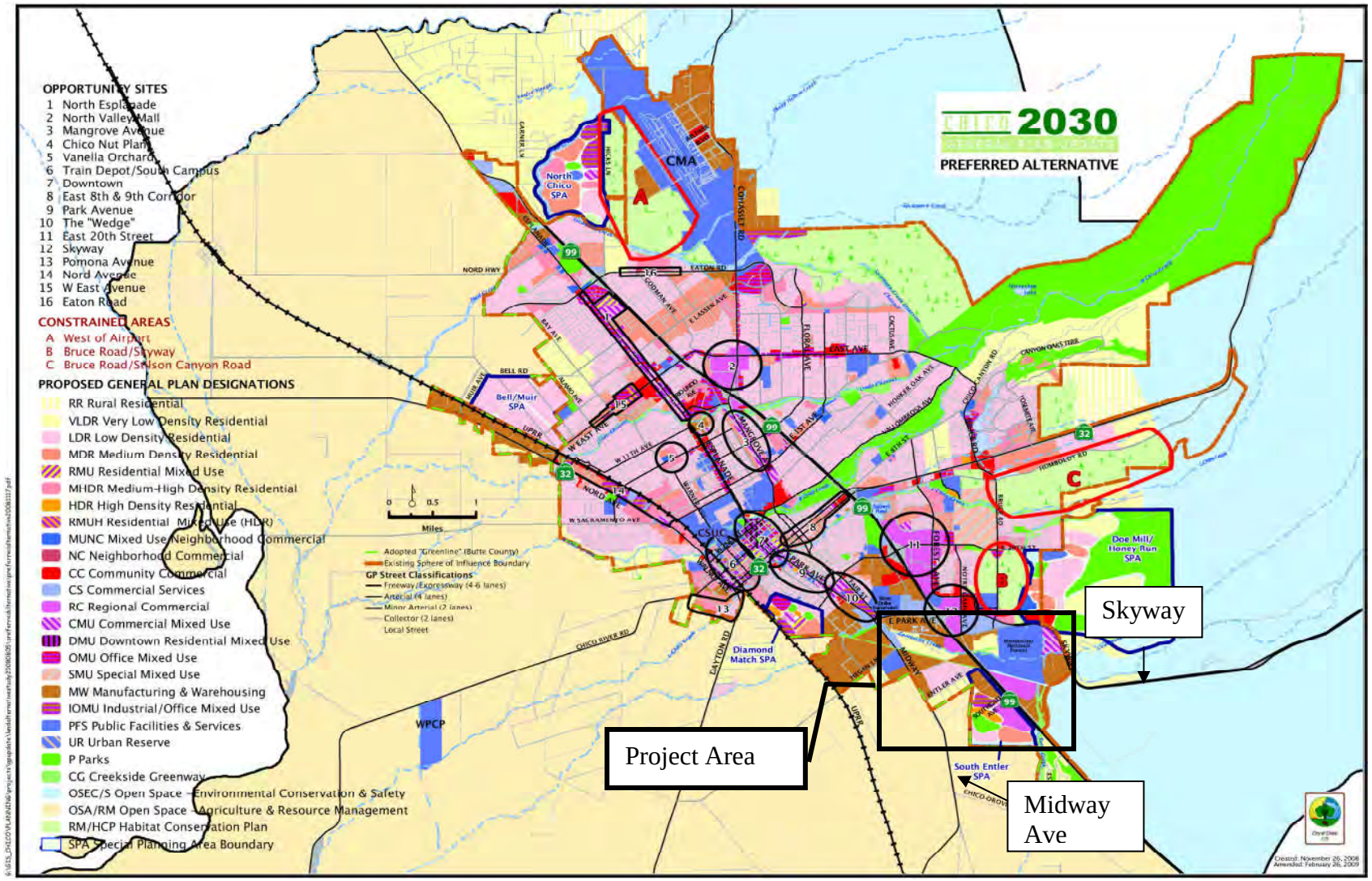

Figure 1-5. Zoning Map within Project Area

Source: City of Chico

available in the Preliminary Floodplain Risk Assessment Memo prepared by WRECO in 2009.

Bridges would need to be designed for the local roads improvement portion of this Project. Alternative L-8 would include bridges at roads on the west side of SR 99: one crossing Butte Creek and another crossing Comanche Creek. The Southgate extension to Skyway would require two bridges to cross the Little Chico-Butte Creek Diversion Channel and Butte Creek. Alternative L-9 would require a bridge on the road on the west side of SR 99 crossing over Butte Creek. According to City of Chico Municipal Code Design Criteria, the bridges must be designed to convey the 0.5% probability of annual exceedance event (i.e. 200-year storm) with a minimum of three feet of freeboard.

There is a railroad trestle and weir on Butte Creek. The proposed Southgate extension to Skyway would require a bridge right through this area. WRECO recommends the railroad trestle be removed and the weir not be removed unless it is necessary to do so. If the trestle is removed, it would remove the flow constriction in that area of Butte Creek.

There are documented groundwater recharge problems in the area of the proposed Project as described in the 2001 report entitled *Investigation of Groundwater Drainage Problems between Speedway Avenue and Oroville-Chico Highway* prepared by Gus Yates, for the Butte County Department of Public Works (Yates 2001). This report, mentions a sump pump at Southgate Acres Subdivision on Entler Avenue. The pump was put in place to decrease the drainage problem in the area by collecting the water and sending it eastward. However, this created an increase in groundwater discharge further south. This issue would need to be addressed before or as part of the implementation of the Project. The report mentions options that could help alleviate this problem including potential drainage alignments evaluated by Butte County Department of Public Works and a short drainage pipe connecting the large tailing area west of SR 99 bridge to the adjacent Butte Creek channel.

In both alternatives some part of the local road improvements would be constructed on the railroad alignment. In the FIRM, the railroad embankment is shown as a feature that protects an area downstream from flooding from Comanche Creek and the Little Chico-Butte Creek Diversion Channel. The proposed road would need to maintain the existing condition alignment and embankment height in order to maintain flood protection from Comanche Creek.

In general, this Project would not significantly alter the existing drainage patterns and would address the increased roadway runoff from the proposed widening by implementing outlet protection, velocity dissipation devices, and possible peak flow attenuation features. The increased runoff would not be significant compared to the overall watershed of the receiving water bodies of the Project. The Project design goal would be to maintain the existing flow pattern and to minimize the increased flow volume to the maximum extent practicable.

1.9 Drainage Design Criteria

In the final design PS&E phase, the drainage design for the Project within the Caltrans R/W would be based on procedures presented in the Highway Design Manual (HDM, 2006) and in the Hydraulic Engineering Circular Number 22 (HEC-22) publication for highway pavement drainage design published by the U.S. Department of Transportation, Federal Highway Administration (FHWA) in 2001. For cross culverts, drainage improvements would be evaluated and designed based on the criteria of being able to pass an entire 10% probability of annual exceedance event (i.e. 10-year storm) within the cross culvert, and a 1% probability of annual exceedance event (i.e. 100-year storm) without headwaters rising above an elevation that would cause objectionable backwater depths or outlet velocities. The final on-site hydrology calculations for this segment would utilize the Rational Method to predict storm water runoff. Roadway drainage design discharges for the longitudinal systems would be based on the 4% probability of annual exceedance event (i.e. 25-year storm) with flow spread no further than the shoulder area permitted, as detailed in Section 830 of the HDM, Table 831.3.

In addition, the HDM recommends a minimum time of concentration of 5 minutes for paved areas and 10 minutes for rural or undeveloped areas. A time of concentration of 5 minutes should be used within the Caltrans R/W for the calculations and an initial time of concentration of 10 minutes should be used for the local roads since the watershed is comprised mostly rural land use.

The drainage improvements proposed for local roads within the City limits would follow the requirements stated in Section *18R.08.050 Storm drainage* in the Chico Municipal Code. The longitudinal systems outside the city limits would be evaluated and designed based on the Butte County criteria of being able to pass a 10% probability of annual exceedance event with no head and the 1% probability of annual exceedance event using available head at the culvert. As mentioned in Section 1.8, all bridges shall be designed using the 0.5% probability of annual exceedance event with 3 ft of headboard. Detailed drainage design has not been finalized at this point of the Project development. Formal drainage reports will be prepared during PS&E phase.

1.10 Special Circumstances

There are several areas with environmental constraints within the Project area including sensitive areas, potential wetlands, special-status habitats and species, and designated sensitive natural communities (SNC). Environmentally Sensitive Areas (ESA) were identified on the southwest and southeast quadrants of the Interchange. Butte Creek, Comanche Creek, the Diversion Channel and several features along the SR 99 corridor were identified by the National Wetland Inventory (NWI). NWI identified about 3.2 acres of potential wetland area within the Project area. Special-status species and habitats identified to potentially occur within the Project area include the giant gartner snake; several elderberry shrubs, habitat for the long the valley elderberry longhorn beetle; and Butte Creek has been identified as a Central Valley steelheand and spring-run Chinook salmon habitat. The California Department of Fish and Game (CDFG) has identified portions of the Project as great valley riparian forest, a SNC, specifically areas east of SR

99. CDFG also owns the Virgin Valley Unit of the Butte Creek Ecological Preserve. For a complete list of the Biological Environments and a complete list of special-status species and habitats refer to the Project Environmental Assessment Report (PEAR) (Gallaway, 2010). The extents of the ESA would need to be evaluated against the two alternatives to determine how the proposed Project would encroach on these areas and how their protection might limit the drainage design. Requirements of environmental permits will be discussed and documented in the Project Environmental Document. Mitigations proposed for the implementation of the Project are available in the Preliminary Floodplain Risk Assessment Memo prepared by WRECO in 2010.

1.11 Agencies Impacting Design

The Project is located in the City of Chico sphere of influence and Butte County. Any drainage improvements proposed for local roads and/or any other off-site drainage systems impacted by the Project will conform to the local agencies' requirements. The main areas where potential water quality impacts may occur are within the creeks/streams that cross SR 99. For the list of potential permits required from these agencies refer to the PEAR (Gallaway, 2010). Surface water resources within the Project limits are under the jurisdiction of these agencies:

- City of Chico
- Butte County
- Caltrans
- State of California Department of Fish and Game (CDFG)
- United Stated Army Corp of Engineers (USACE)
- Central Valley Regional Water Quality Control Board (CVRWQCB)
- National Oceanic and Atmospheric Administration (NOAA)
- U.S. Fish and Wildlife Service (USFWS)
- State Historic Preservation Office (SHPO)
- Federal Highway Administration (FHWA)
- Central Valley Flood Protection Board (CVFPB)

2 OFF-SITE HYDROLOGY

2.1 Watershed and Basin Characteristics

The Project is located within the Butte Creek watershed. The total size of the watershed is approximately 510,000 ac and has average annual precipitation ranging from 18 in along the Sacramento River to 80 in in high elevation areas (FIS 2000). Two receiving waterbodies, Comanche Creek and Butte Creek, are outside the Project limits; however the Project runoff would be carried by these water bodies. Both receiving waterbodies cross underneath SR 99 in bridges located at the north and south ends of the Project limits.

The topography within the Project site generally slopes southwest through the entire site from the foothills of the Sierra to the valley floor. Drainage from the adjacent off-site areas and waterways flows from east to west for Comanche Creek and north to south for Butte Creek. In general, all runoff within the Project limits is conveyed through the Project area by drainage facilities to the receiving waterbodies and eventually to the Sacramento River.

2.2 Estimating Design Discharge

According to the City of Chico Zoning Map, the upper portion of the watersheds draining to the Project is zoned as open space including crops, grazing fields and rural residential lands. Therefore, to estimate off-site discharge for watersheds with drainage areas of up to 320 ac, the Rational Method would be used; otherwise, to estimate off-site discharge for watersheds with drainage area above 320 ac, the NRCS Technical Release (TR-55) Method would be used. Detailed watershed analysis would be completed in the Project design phase.

2.3 Climate

Butte County has a typical Mediterranean climate with hot, dry summers and cool, wet winters. Cooler summers and cold winters are common in the higher elevation areas (FIS 2000). Annual precipitation in the vicinity of the Project is approximately 24 in. Rainfall generally occurs between October and March.

2.4 Rainfall Data and Intensities

Three data sources are available for estimating rainfall intensities for this Project: Win IDF, a program developed by Caltrans to estimate design rainfall intensity which is based on a rainfall intensity database maintained by the California Department of Water Resources; the City of Chico rainfall-intensity-duration-frequency design chart; and the Butte County Rainfall Intensity Table. The methods are described and compared below.

2.4.1 Win IDF

Win IDF, an Intensity-Duration-Frequency (IDF) estimation application developed by Caltrans, was used to estimate rainfall intensities. The Project area is within 3 mi of the

Chico University Farm rain gage. The estimated design rainfall intensity was obtained directly from the Win IDF program by identifying a reference point within this area. The Win IDF report indicates a rainfall intensity of 4.09 in/hr for a 4% probability of annual exceedance, 5-minute duration storm. The program report is attached in Appendix A.

2.4.2 City of Chico Design Storm Data

The design rainfall intensities were also estimated using the IDF graph provided by the City of Chico Department of Public Works. For a 10% probability of annual exceedance, 10-minute duration storm the City of Chico IDF Design Chart resulted in a value of 1.73 in/hr and for a 1% probability of annual exceedance, 10-minute duration storm the chart resulted in a value of 2.5 in/hr. The Chico Area Rainfall Intensity-Duration-Frequency Design Chart is in Appendix A.

2.4.3 Butte County Design Storm Data

The design rainfall intensities were obtained from the Butte County Department of Public Works Improvement Standards. For a 10% probability of annual exceedance, 10-minute duration storm the Butte County table resulted in a value of 1.8 in/hr and for a 1% probability of annual exceedance, 10-minute duration storm the intensity is 2.52 in/hr. The Butte County Rainfall Intensity Table is in Appendix A.

The project design would use Win IDF within the State of California ROW, the City of Chico IDF graph with in the City limits and the Butte County intensities outside both the City limits and the State ROW.

2.5 Points of Concentration and Outfalls

The points of concentration for the cross culverts within the Project would be defined at the upstream ends of the cross culverts. The outfalls would be defined as the points of discharge of the cross culverts. These definitions were obtained from HDM Section 806.2.

3 OFF-SITE HYDRAULICS

The objective of the drainage design would be to limit the design water surface elevations and velocities such that they would be no greater than the existing condition, and to maintain the existing drainage pattern to the maximum extent practicable.

New cross drainage systems would be designed to convey the 1% probability of annual exceedance event without objectionable backwater, and pass the 10% probability of annual exceedance event within culvert cross sections (as required in the HDM). Existing cross culvert systems in good condition that are capable of passing the 10% probability of annual exceedance event without objectionable backwater would be extended to accommodate the proposed roadway widening.

Undersized and/or culverts in poor condition would be replaced as necessary. The cross culvert drainage systems that convey off-site runoff would also need to be evaluated to determine the capacity for the 10% and 1% probability of annual exceedance peak flows, pending additional survey information.

Additional discharge that would be conveyed downstream would be calculated to ensure that pre-construction flows equal post-construction flows. A detailed analysis of the drainage improvements should be made during the PS&E phase when detailed survey data is available.

3.1 Culvert Material

A list of allowable materials would be specified in the contract documents, per recommendations from the Materials Report during the PS&E phase of the Project. Extensions to the existing culverts would generally be specified to be the same material as the respective existing culverts.

3.2 Inlet and Outlet treatment and Energy Dissipation

The documents *Hydraulic Engineering Circular* Number 14 (HEC- 14), “Hydraulic design of Energy Dissipaters for Culvert and Channels” (FHWA 1983), and *Rock Energy Dissipater at Culvert Outlet* (Caltrans District 1, August 1999) would be used as guidelines to determine energy dissipation requirements for the inlets and outlets of each cross culvert. The *California Bank and Shore Rock Slope Protection Design Guide*, (Caltrans 2000) would be used when determining appropriate placement for inlet and outlet treatment.

Typical inlet and outlet treatments for cross culverts are either flared end sections or standard Caltrans headwalls. Rock slope protection is recommended by Caltrans and FHWA at culvert entrances and outfalls to prevent scour and erosion. These treatment options will be specified on the Project Drainage Plans during PS&E.

4 ON-SITE ROADWAY DRAINAGE

4.1 Drainage Elements

The segment of SR 99 within the Project limits consists of a straight segment of SR99 with improvement to the SR 99 Southgate interchange. There are also extensions to Entler Avenue, and Speedway Avenue among others.

The difference between the two alternatives are the location of the loop on- and off-ramps, the length of Entler Avenue with respect to Southgate Avenue, and the extension of McFadden Lane to the Southgate extension to Midway (See Figure 4-1 for Alternative L-8 and Figure 4-2 for Alternative L-9).

Figure 4-1. Alternative L-8

Source: Google Earth

4.1.1 Alternative L-8

- With the extension of Entler Avenue to Fair Street on the west side of SR 99 a new buried longitudinal storm drain system with curb and gutter would need to be designed and would discharge to Comanche Creek. A bridge would need to be designed according to City of Chico standards for the crossing at Comanche Creek.

4.1.2 Alternative L-9

- Part of Entler Avenue would be removed to accommodate off-ramps and a clover leaf configuration. If there is an existing longitudinal storm drain system in place, it may need to be removed, abandoned or modified. The existing flow pattern would be maintained and would discharge to Butte Creek.

- The road from Southgate Avenue to Loren Avenue would require a new buried longitudinal storm drain system and the runoff would discharge to Butte Creek.

Figure 4-2. Alternative L-9

Source: Google Earth

4.1.3 Drainage Elements Common to both Alternatives

As mentioned in Section 1.8 the Project design goal would be to maintain the existing flow patterns. Currently the SR 99/Southgate Avenue interchange discharges to Butte Creek and therefore the proposed interchange should also discharge to Butte Creek.

- A new buried longitudinal storm drain system would need to be designed for the extension of Speedway to the new alignment of Entler Avenue. The alignment of the extension to Speedway Avenue is on the railroad embankment. This embankment would need to be preserved to preserve its function protecting downstream areas from flooding. This system would discharge to Comanche Creek.

- The road south of Southgate Avenue parallel to SR 99 would require a new buried longitudinal storm drain system with a bridge to cross Butte Creek.

- Southgate Lane would also require a new buried longitudinal storm drain system and would discharge to Butte Creek.

- If Entler Avenue is widened, the existing storm drain system in Entler Avenue would need to be examined to ensure adequate capacity.

- The Southgate Avenue extension to Skyway may require a new buried longitudinal storm drain system that would discharge to Butte Creek.

- The 36" reinforced concrete pipe (RCP) at the SR 99 Southgate Avenue intersection would need to be evaluated and possibly moved to incorporate new on- and off- ramps.

- If Midway is widened, it would require an evaluation of the existing drainage systems to ensure adequate capacity.

4.2 Recurrence Interval

SR 99 is a two-lane highway with permitted speed of over 45 mph. According to Table 831.3 of the HDM, the design storm used would be the 4% probability of annual exceedance event, and the road drainage would be designed such that the design gutter flow spread would remain outside of the traveled way. Storm water flows would be concentrated in drainage ditches, roadside gutters, and along dikes, barriers or retaining walls. According to Section 831.4 of the HDM, no more than 0.1 cfs of flow should be allowed to flow across the roadway.

For the local City streets in the Project, following the Butte County/City of Chico Standards, the design storms used would be the 10% probability of annual exceedance event and the 1% probability of annual exceedance event, as discussed in Section 1.9.

4.3 Grate Interception and Gutter Capacity

Spread width and inlet capacities would be estimated using the methods and procedures described in HEC-22.

Within the Project limits, the allowable spread width varies between 8 ft and 10 ft for both travel directions along SR-99, and between 2 ft and 4 ft for both travel directions on various City of Chico roadways. Exact spread widths would depend on the proposed shoulder widths at various locations.

4.4 Storm Water Best Management Practices

The Project Design Team would consider storm water quality treatment measures to address potential temporary and permanent water quality impacts on the Project. For a

description of the BMPs proposed refer to the Storm Water Data Report (SWDR) (WRECO, 2010) prepared for this Project.

4.5 Hydrograph Modification (Hydromodification)

Butte County has no standards for hydromodification mitigation; however the City of Chico and Butte County Improvement Standards require that proposed projects maintain pre-development runoff discharge rates.

5 TEMPORARY DRAINAGE SYSTEM

In general, any proposed work within perennial streams areas may require temporary creek diversion plans or dewatering specifications. Under the current Project design alternatives, drainage work would be proposed within Little Chico-Butte Creek Diversion and Butte Creek for the Interchange Project and Comanche Creek and Butte Creek for the Local Road Improvements. According to the PEAR (Gallaway, 2010), permits, approvals and/or certifications likely to be required include:

- Clean Water Act §404 Permit from USACE
- §401 Water Quality Certification from CVRWQCB
- Waste Discharge Requirements and other related permits and certifications
- Dewatering permits and implementation of applicable BMPs

Temporary drainage systems would be defined in the PS&E phase of the Project when stage construction plans become available. The Storm Water Data Report (WRECO, 2010) provides more detail concerning the temporary Construction Site BMPs anticipated for this Project.

6 PRELIMINARY COST ESTIMATE

According to preliminary cost estimates received from Mark Thomas (March, 2009) the estimated cost to construct the interchange and the Skyway and Southgate extension is approximately $24 million, excluding R/W and local road improvement costs. This cost was the basis for estimating drainage costs. The costs will be updated and revised as the Project progresses through the PS&E phase.

6.1 Alternative L-8

The construction cost for the drainage improvements at this stage of the Project is anticipated to be 10% ($2.4 million) of the Interchange Project construction. This cost includes proposed longitudinal drainage systems, cross culvert adjustments, and improvements to the existing drainage system. The costs were based on the Caltrans Bid Items Lists.

6.2 Alternative L-9

The construction cost for the drainage improvements at this stage of the Project is anticipated to be 10% ($2.4 million) of the Interchange Project construction cost. This cost includes proposed longitudinal drainage systems, cross culvert adjustments, and improvements to the existing drainage system. The costs were based on the Caltrans Bid Items Lists.

7 CONCLUSION

- As stated in Section 1.8, WRECO recommends the railroad embankment, the levees and the weir at Butte Creek be preserved so the flooding in the area would not be exacerbated.
- The groundwater recharge issue would need to be examined and the recommendations made in the Yates 2001 report should be evaluated. The recommendations include:
    - examining potential drainage alignments evaluated by Butte County Department of Public Works
    - constructing a short drainage pipe connecting the large tailing area west of SR 99 bridge to the adjacent Butte Creek channel.
- Bridges designed for the Project would need to be designed to convey the 0.5% probability of annual exceedance event (i.e. 200-year storm) with a minimum of three feet of freeboard as described in City of Chico Municipal Code Design Criteria.
- The Environmental Constraints identified throughout the Project would require evaluation of how the proposed Project would encroach on the ESA and what mitigations for encroachments would need be required.

8 REFERENCES

Butte County Improvement Standards. (2009). <http://www.buttecounty.net/Public%20Works/Divisions/Land%20Development/~/media/County%20Files/Public%20Works/Public%20Internet/Divisions/LandDev/IS-06/ImprovementStd2006-IV.ashx > (Last accessed: May 27, 2009).

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Appendix A Hydrologic Data

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WINIDF 1.0 OUTPUT TABLE 5/5/2009

Input values: Lat.: 39.706 deg. Long.: 121.792 deg. Return Period: 25 yrs.

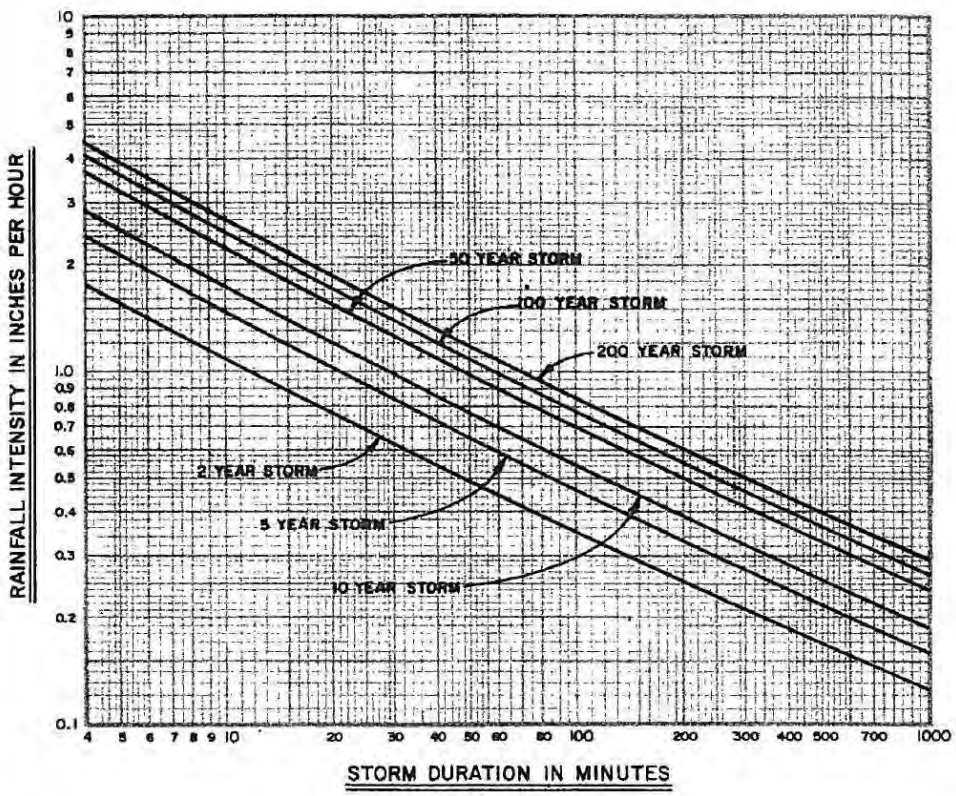
Selected Station(s)	Station ID	Elev. ft	Lat. deg.	Long. deg.	Dist. miles
CHICO UNIV. FARM	A001715000	205	39.700	121.783	0.63

Output table (Intensities in inches/hour):

Dur.\RP	25-yr	2-yr	10-yr	25-yr	50-yr	100-yr	10000-yr
5-min	2.865	2.226	3.467	4.088	4.489	4.927	7.482
10-min	1.996	1.551	2.416	2.849	3.128	3.434	5.214
15-min	1.616	1.256	1.956	2.306	2.533	2.780	4.221
30-min	1.126	0.875	1.363	1.607	1.765	1.937	2.942
60-min	0.785	0.610	0.950	1.120	1.230	1.350	2.050
120-min	0.547	0.425	0.662	0.781	0.857	0.941	1.429
4-hr	0.381	0.296	0.461	0.544	0.597	0.656	0.996
8-hr	0.266	0.206	0.322	0.379	0.416	0.457	0.694
16-hr	0.185	0.144	0.224	0.264	0.290	0.318	0.484
24-hr	0.150	0.116	0.181	0.214	0.235	0.258	0.391

a = 0.7849 b = -0.5210 1.00 min

Figure A-1. WIN IDF Results



NOTES

1. DURATION OF STORM EQUALS TIME OF CONCENTRATION (Tc).
2. MINIMUM Tc = 10 MINUTES. MAXIMUM Tc, INITIAL INLET OF STORM DRAIN SYSTEM, = 20 MIN.
3. THIS CHART IS BASED ON DATA FROM BULLETIN 195 RAINFALL ANALYSIS FOR DRAINAGE DESIGN, STATE OF CALIFORNIA, DEPARTMENT OF WATER RESOURCES, 1976

REV.	DATE	BY

CITY OF CHICO — DEPARTMENT OF PUBLIC WORKS

TABLE 4
CHICO AREA RAINFALL INTENSITY–DURATION–FREQUENCY DESIGN CHART

DRAWN BY R. E. CHECKED BY M.H.
DATE APRIL 1981 SCALE NONE
APPROVED BY DIRECTOR OF PUBLIC WORKS R.C.E. NO.

SHEET 1 OF 1 SHEETS

Figure A-2. City of Chico Intensity Duration Frequency Design Chart

Source: City of Chico Website

RAINFALL INTENSITY IN./HR.

CHICO

Tc	I10	I100	Tc	I10	I100	Tc	I10	I100
10 min.	1.80	2.52	28	1.04	1.46	46	0.82	1.16
11	1.73	2.42	29	1.01	1.42	47	0.81	1.15
12	1.66	2.31	30	0.98	1.38	48	0.80	1.13
13	1.58	2.21	31	0.97	1.37	49	0.79	1.12
14	1.51	2.10	32	0.96	1.35	50	0.78	1.11
15	1.44	2.00	33	0.95	1.34	51	0.77	1.09
16	1.41	1.96	34	0.94	1.33	52	0.76	1.08
17	1.38	1.92	35	0.93	1.31	53	0.75	1.07
18	1.35	1.88	36	0.92	1.30	54	0.74	1.05
19	1.32	1.83	37	0.91	1.28	55	0.73	1.04
20	1.29	1.79	38	0.90	1.27	56	0.72	1.02
21	1.26	1.75	39	0.89	1.26	57	0.71	1.01
22	1.23	1.71	40	0.88	1.24	58	0.70	1.00
23	1.19	1.67	41	0.87	1.23	59	0.69	0.98
24	1.16	1.63	42	0.86	1.22	1 hr.	0.68	0.97
25	1.13	1.59	43	0.85	1.20	2 hrs.	0.49	0.69
26	1.10	1.55	44	0.84	1.19	3 hrs.	0.41	0.58
27	1.07	1.50	45	0.83	1.18	12 hrs.	0.21	0.30
						24 hrs.	0.11	0.21

RAINFALL INTENSITY
COUNTY STANDARD NO.
D–3

Figure A-3. Butte County Rainfall Intensity Table

Source: Butte County Website

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Appendix B Site Photographs

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Photo 1. Ditch on east side of SR 99

Photo 2. SR 99 Bridge over Butte Creek

Photo 3. SR 99 Bridge over Butte Creek

Photo 4. NB and SB SR 99 Bridges over Butte Creek

Photo 5. Levee road embankment

Photo 6. Butte Creek

Photo 7. Culverts at Notre Dame Blvd at Comanche Creek

Photo 8. SR 99 Bridge over Comanche Creek

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Project Memorandum

Date: March 17, 2010
To: Matt Brogan (Mark Thomas & Co.)
From: Ulysses Hillard, P.E., Irene Liu (WRECO)
Project: State Route 99/Southgate Avenue Interchange Project
Re: Preliminary Floodplain Risk Assessment (PID Phase)

Project Description

This project proposes an interchange at the existing intersection of State Route 99 (SR 99) and Southgate Avenue (Southgate) located within the City of Chico. There are three alternatives considered in the *Project Study Report* (PSR), including a no-build alternative. The build alternatives propose an L-8 or L-9 type interchange and provide a connection between Midway and Skyway via Southgate Avenue extension as well as other improvements to local roads to support the interchange. New signals will be provided at each on/off-ramp intersections with Southgate. Southgate Lane will be relocated from its existing intersection further east to increase its distance from the northbound on/off ramp. The Skyway and Southgate extension will be extended to the interchange. The extensions are needed for regional access and to eliminate deficiencies on Skyway and reduce congestion on East Park Avenue. The improved capacity of this interchange will meet the needs for year 2035 development of the City of Chico. Figure 1 shows the Project location and Figure 2 shows the Project limits and the major waterways within the Project vicinity.

Purpose of Study

There are two named creeks, Butte Creek and Comanche Creek (identified as Edgar Slough on older maps), and several flood control facilities within the Project vicinity. The purpose of this technical memorandum is to provide a preliminary floodplain risk assessment using Federal Emergency Management Agency (FEMA) data and information from the City of Chico and Butte County to evaluate impacts from the proposed project to the floodplain development and habitat values.

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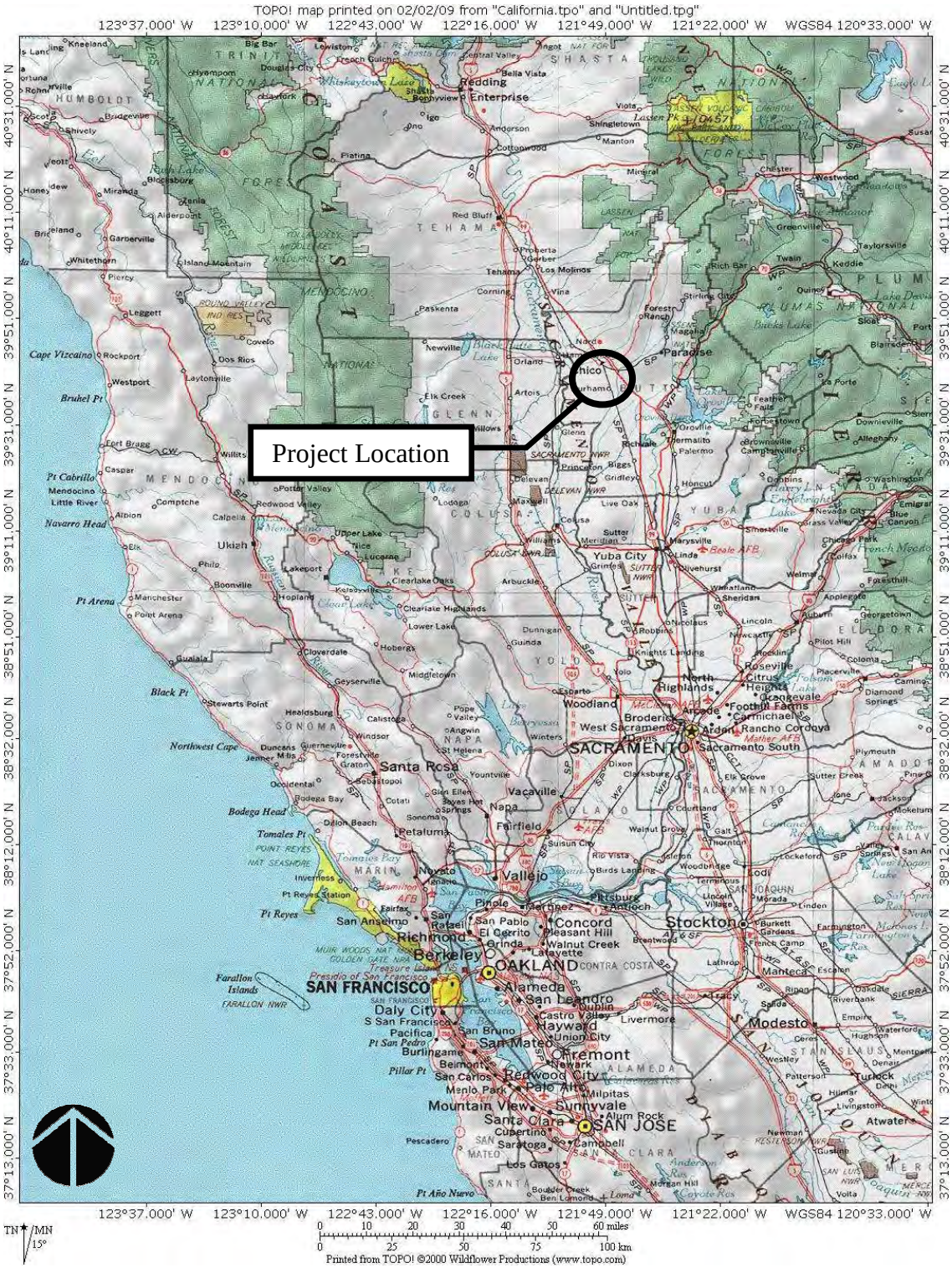

Figure 1. Location Map

Source: USGS

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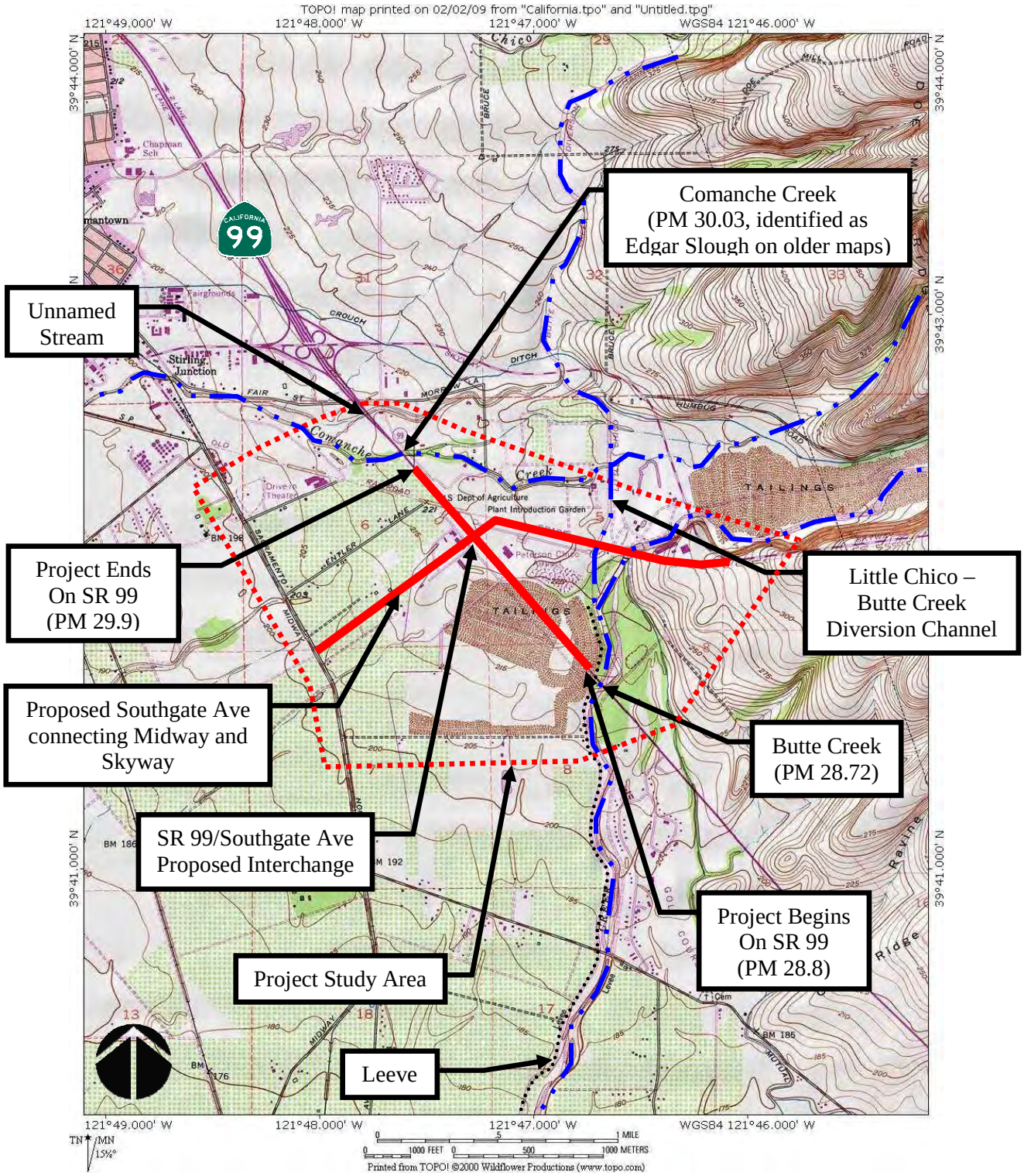

Figure 2. Vicinity Map

Source: USGS

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Figure 3. Alternative L-8

Figure 4. Alternative L-9

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Floodplain Description

The FEMA Flood Insurance Rate Map (FIRM) (Map Number: 06007C0510D) and the Flood Insurance Study (FIS) (Item ID: 06007CV000) of the Butte County, California incorporated areas were reviewed for this Project. According to the FIRM, the majority of the Project site would be located within "Zone X" type special flood hazard areas (SFHAs). "Zone AE" and "Zone AO" type SFHAs exist around the Project site at areas: 1) north of the old railroad; 2) east of the right bank levee of the Little Chico-Butte Creek Diversion Channel; and 3) south of McFadden Lane.

The flood insurance zone designations found within the Project vicinity are described as follows:

Zone AE
Zone AE corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. Whole-foot base flood elevations (BFEs) derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO
Zone AO corresponds to the areas of 100-year shallow flooding (usually sheet flow on gradually sloping terrain) where average depths are between 1 and 3 feet. The "Zone AO" SFHAs within the Project vicinity have an average depth of 1 foot.

Zone X
Zone X corresponds to areas outside of the 100-year floodplain; areas within the 500-year floodplain; areas within the 100-year floodplain with average depths of less than 1 foot or with drainage areas less than 1 square mile; or areas protected from the 100-year flood by levees.

Regulatory floodways were identified along Butte Creek on the east side of Skyway. However, according to the FIS, there are several reaches of Comanche Creek and Butte Creek downstream of Skyway where the top of banks does not confine the flow. In those reaches some of the flow escapes the channel and becomes shallow overland flooding. Consequently, floodways have not been determined within those reaches.

Figure 5 shows the proposed Project geometry on an excerpt of the FIRM within the Project vicinity.

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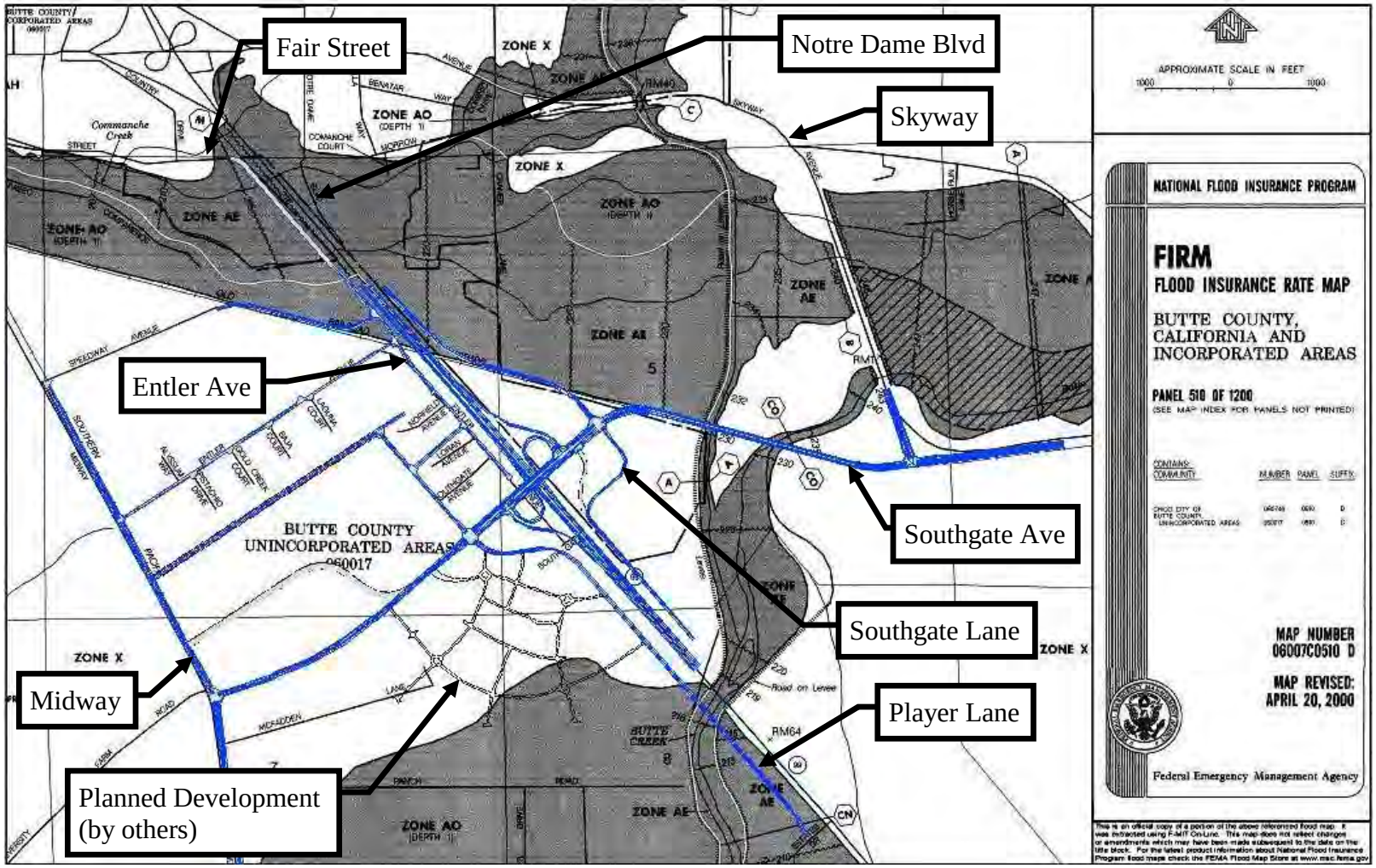

Figure 5. Excerpt of FEMA FIRM within the Project vicinity

Source: FEMA

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Hydrologic and Hydraulic Data

Three named watercourses are located within the Project vicinity: 1) Butte Creek; 2) Little Chico-Butte Creek Diversion Channel; and 3) Comanche Creek. Design discharges were available from the FIS for all three watercourses at locations upstream of SR 99; however, only the drainage area for Butte Creek was available. Table 1 summarizes the flooding sources and locations, and the design discharges of the three watercourses.

Table 1. FEMA Design Discharges

Flooding Source and Location	Drainage Area (sq. mi)	100-year Peak Discharge (cfs)	500-year Peak Discharge (cfs)
Butte Creek (at Skyway)	151.4	25,000	34,000
Little Chico-Butte Creek Diversion Channel (at 2,000 ft below Skyway)	N/A	3,900	6,000
Comanche Creek (at 1 mi. above Midway)	N/A	6,300	16,800

Source: FEMA (2000)

According to the City of Chico design criteria for storm drainage, a design storm frequency of 200 years shall be used for bridges, and a minimum freeboard of three feet shall be provided for bridges and box culverts. Table 2 shows the linear interpolation of the 200-year peak discharges using the 100-year and 500-year discharges from FEMA.

Table 2. Estimated 200-year Peak Discharges

Flooding Source and Location	Estimated 200-year Peak Discharge (cfs)
Butte Creek (at Skyway)	27,250
Little Chico-Butte Creek Diversion Channel (at 2,000 ft below Skyway)	4,425
Comanche Creek (at 1 mi. above Midway)	8,925

BFEs were provided on the FIRM along all three watercourses. The ultimate Project proposes to construct six bridges or box culverts. The locations of the new bridges are as follows:

- Player Lane at Butte Creek
- Southgate Avenue at Butte Creek
- Southgate Avenue at Little Chico-Butte Creek Diversion Channel
- Entler Avenue to Fair Street extension at Comanche Creek
- Entler Avenue to Fair Street extension at unnamed stream (approximately 1,120 ft northwest of the Comanche Creek crossing)
- Southgate Avenue overcrossing at SR 99

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Among these six new bridges, five would be constructed across watercourses. Butte County is a participant in the FEMA's National Flood Insurance Program (NFIP). The minimum NFIP floodplain management requirements would include: 1) all buildings constructed within a riverine floodplain must be elevated so that the lowest floor is at or above the BFE level in accordance with the FIRM; 2) if the area of construction is located within a regulatory floodway as delineated on the FIRM, any development must not increase BFE levels; 3) a hydrologic and hydraulic analysis must be performed prior to the start of development, and must demonstrate that the development would not cause any rise in BFE levels; and 4) upon completion of any development that changes existing SFHAs, the appropriate hydrologic and hydraulic data would need to be submitted to FEMA for a FIRM revision. These requirements, as well as the City of Chico design criteria for storm frequency and minimum freeboard would be evaluated at the Project design phase when bridge designs and detailed survey data become available.

Table 3 shows the proposed bridge locations and the corresponding BFEs as shown on the FIRM. The elevations were converted from the National Geodetic Vertical Datum of 1929 (NGVD 29), by adding a datum shift of 2.33 ft, to the North American Vertical Datum of 1988 (NAVD 88) datum referenced in this Project.

Table 3. Base Flood Elevations

New Bridge Location	Base Flood Elevation NGVD 29 (ft)	Base Flood Elevation NAVD 88 (ft)
At Butte Creek		
Frontage road (Player Lane)	218	220.33
Southgate Avenue	231	233.33
At Little Chico-Butte Creek Diversion Channel		
Southgate Avenue	230	232.33
At Comanche Creek		
Frontage road (Entler Ave to Fair Street)	216	218.33
At unnamed cross culvert		
Frontage road (Entler Ave to Fair Street)	216	218.33

Source: FEMA

Four existing bridges along SR 99 with Caltrans bridge numbers, two over Butte Creek and two over Comanche Creek, are located immediately outside of the current Project limits. Table 4 shows the bridge locations and structure information.

Table 4. Caltrans Bridge Log

Post Mile	Bridge Number	Structure Name	Structure Type
028.72	12 0126L	Butte Creek	Concrete Box Beam or Girders - Multiple
028.72	12 0126R	Butte Creek	Concrete Tee Beam
030.03	12 0128L/R	Edgar Slough	Concrete Slab

Source: Caltrans

Although the FIRM indicates that all bridges are within the base flood zone, the bridges would not be overtopped in a base flood event because the top of bridge elevations are above the base flood elevations. Table 5 shows the top of bridge elevations and base flood elevations at existing bridges.

Table 5. Base Flood at Existing Bridges

Post Mile	Bridge Number	Structure Name	Top of Bridge Elevation (ft)	Base Flood Elevation NAVD 88 (ft)
028.72	12 0126L	Butte Creek	231.1	220.33
028.72	12 0126R	Butte Creek	230.9	220.33
030.03	12 0128L/R	Edgar Slough	220.7/221.1	218.33

Levee Systems

According to the FIRM, floods of record in Butte Creek occurred in 1937, 1955, 1964, and 1986, with recurrence intervals of approximately 20 years, 30 years, 50 years, and 50 years, respectively. The FIS and FIRM indicate that a 100-year storm event would overtop the levees containing Butte Creek throughout an approximately 4,000 foot long reach downstream of SR 99. However, according to the *Butte Creek Watershed Floodplain Management Plan* (Wood Rodgers, 2005), the recent 1997 event with an estimated peak flow of 37,500 cfs, which exceeds the 100-year peak discharge as estimated in the FIS, did not overtop the levees along Butte Creek.

According to the FIS, Butte Creek levees were constructed in the 1950's and there is no documentation to determine the condition of the levees with respect to structural integrity and seepage. As a result, the levees were assumed to fail and were shown on the FIRM as not containing the base flood.

The reach of Little Chico-Butte Creek Diversion Channel within the Project area consists of a levee along its right bank. The portion of this levee upstream of the old railroad embankment could not be reflected as containing the 100-year flood in the FIS; thus, the levee was also assumed to fail. The Little Chico-Butte Creek Diversion Channel crosses Comanche Creek. Therefore, under the failed levee scenario, the discharge in the diversion channel would flow down Comanche Creek instead of being delivered to Butte Creek. FEMA's hydraulic analysis of Comanche Creek for the 100- and

500- year events reflects these conditions including failure of all the levees containing the diversion channel.

Local Flooding History

There have been historic flooding problems in the southeastern portion of the City of Chico. According to the *Investigation of Groundwater Drainage Problems between Speedway Avenue and Oroville-Chico Highway* prepared by Gus Yates, RG PHg, for the Butte County Department of Public Works (Yates, 2001), flooding occurred due to soil drainage problems during periods of prolonged wet weather. The most seriously impacted areas are bounded to the west by Midway Road, to the east by Butte Creek, to the north by Speedway Avenue, and to the south by Blossom Lane. The study concluded that the drainage problem is primarily the result of natural groundwater discharge from a shallow aquifer system and that rainfall recharge strongly influences the water table elevations in this aquifer system.

According to the report, other causes of high groundwater elevation in the study area include:

- creek recharge
- historical filling of natural drainage swales and channels
- operation of the sump pump for the French drain behind the subdivision south of Entler Avenue
- seepage from the water ski lake
- urban development with on-site stormwater runoff disposed of by percolation
- septic systems

A project-specific geotechnical assessment would be required to determine the site soil characteristics and the impacts from the Project to the adjacent groundwater elevations.

Land Use

The Project is located within the City of Chico and the unincorporated area of Butte County. According to the City of Chico *2030 General Plan Preferred Alternative* (City of Chico, 2009), the designated land use within the Project vicinity would consist largely of manufacturing, warehousing, and regional commercial, with some very low density residential developments on the west side of SR 99. The County's *Preferred Land Use Alternative* (Butte County, 2009) appears to maintain the existing land use designation, which consists mainly of industrial use.

Chico Gateway Center, a planned development with a mixed-use component, is proposed at the southwest quadrant of the existing SR 99/Southgate Avenue intersection. It comprises of 211 acres of vacant land and is bounded by Marybill Ranch Road on the south and the city's sphere of influence on the west. This area is designated for regional commercial use on the City of Chico

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General Plan. The southern extent of this development would be within the "Zone AO" type SFHA of Butte Creek's base floodplain.

The development assumes the future roadway support from the SR 99/Southgate Avenue Interchange Project. The internal circulation design for the development consists of multiple connections to the future Southgate Avenue and Player Lane (see Figure 5).

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Project Evaluation

Risk Associated with Implementation of the Action

The main difference between the two build alternatives are the layouts of the interchange design. Both build alternatives propose similar improvements to local streets as part of the interchange improvement. The majority of the Project would be outside of the FEMA-delineated 100-year floodplains, with the exception at the following locations:

- Player Lane
- Southgate Avenue to Skyway connection along the old railroad right-of-way
- Southgate Lane to Notre Dame Boulevard connection
- Entler Avenue to Fair Street connection
- Entler Avenue to Speedway Avenue connection
- Northern extent of the Project along SR 99

Besides the aforementioned potential encroachments to the FEMA-delineated 100-year floodplain, the Project also requires construction of bridges across watercourses at the following locations:

- Southgate Avenue bridge at Little Chico-Butte Creek Diversion Channel
- Southgate Avenue bridge at Butte Creek
- Entler Avenue to Fair Street connection across Comanche Creek
- Entler Avenue to Fair Street connection across unnamed cross channel
- Player Lane (frontage road over Butte Creek)

Bridges constructed within the riverine floodplain would be elevated so that the lowest horizontal structural member is at or above the water surface elevation for the 200-year storm event with three feet of freeboard. In addition, a hydrologic and hydraulic analysis would need to be performed to demonstrate that the development would not cause any rise in BFE levels. No work is proposed for the Project within the regulatory floodway.

This Project would result in an increase in the extent of impervious surfaces, which would increase storm water runoff and would reduce the extent of pervious surfaces available for infiltration of storm water runoff. The net impervious area is approximately 76 ac (0.12 sq. mi.), estimated based on the footprints of both build alternatives including the interchange project and the supporting local roadway improvements. The majority of the Project site would drain to Butte Creek, which has a watershed area of 151.4 sq. mi at the vicinity of the Project. The added impervious areas for the interchange project alone would be approximately 1.6 ac for the L-8 interchange and approximately 5.0 ac for the L-9 interchange. The added impervious areas for the local roadway improvements are yet to be determined; however, the increases in comparison to the overall watershed area are expected to be minimal.

Although the increase in storm water runoff for the Project is expected to be minimal, given the unknown structural integrity and freeboard deficiencies of the existing levees, the Project area cannot be assumed to be safe from flooding despite the present of the levees. The Project may require a

geotechnical investigation to determine the condition of the existing levees and foundations, and an updated hydrologic and hydraulic analysis of the entire waterway systems.

Given the existing soil drainage problems found within the Project vicinity, the roadway and drainage would need to be designed to avoid exacerbating the current drainage condition. For instance, the proposed roadways should not fill or interrupt any natural drainage swales and channels, and the drainage design should avoid on-site stormwater runoff disposed of by percolation.

Impacts on Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values include, but are not limited to: fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and ground water recharge.

Gallaway Consulting, Inc. conducted a preliminary evaluation of the environmental constraints within the Project vicinity (Gallaway Consulting, Inc, 2009). According to the evaluation, the potential impacts to applicable resources or values include:

- Fish: Steelhead chinook habitat is known to exist along Butte Creek within the Project vicinity. Two bridges are proposed across Butte Creek at the old railroad crossing and along the southbound SR 99. Structural designs for the bridges are yet to be determined. Temporary creek diversion would be necessary to minimize water quality impacts during construction.
- Plants: Riparian habitat exists along Butte Creek and Comanche Creek at locations where new bridges are proposed. Bridges should be designed to avoid impacts on the existing vegetation and wildlife habitat to the maximum extent practicable and to restore the natural conditions if needed.
- Wildlife: Environmental sensitive areas (ESAs) were designated in the open space areas southeast of the proposed Southgate Avenue. The ESA along southbound SR 99 extend to the levee along the right bank. Preconstruction surveys would be necessary prior to vegetation clearance to ensure no wildlife is impacted.
- Water Quality Maintenance: The Project and the construction contractor would be required to implement water quality protection measures and comply with related permits.
- Groundwater Recharge: This Project is located within an area of the City of Chico that is subject to flooding due to high groundwater. Although the increase in impervious area for the Project is expected to be minimal, a Project specific geotechnical investigation would be necessary to evaluate the effects on groundwater levels.

Detailed evaluation of impacts on natural and beneficial floodplain values will be provided when the Preliminary Environmental Analysis Report (PEAR) of the Project becomes available.

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Support of Probable Incompatible Floodplain Development

As defined by the Federal Highway Administration, the support of incompatible base floodplain development will encourage, allow, serve, or otherwise facilitate incompatible base floodplain development, such as commercial development or urban growth.

The Project is consistent with the general plans of Butte County and the City of Chico. The proposed interchange and local streets improvements address the needs of the City's growth and long-term needs for the region. Therefore, the Project will not result in support of probable incompatible floodplain development.

Measures to Minimize Floodplain Impacts Associated with the Action

Drainage design improvements would be proposed to accommodate increased peak storm water runoff from the roadway, and to maintain pre-construction storm water discharge to receiving water bodies or Municipal Separate Storm Sewer Systems to the maximum extent practicable. Drainage impacts and design recommendations for the Project are discussed in the *Preliminary Drainage Review* (WRECO, 2009).

Potential wetlands exist in the open areas adjacent to the proposed Southgate Avenue and Skyway intersection. Impacts to wetlands and waters of the United States would be addressed when the PEAR becomes available. Short term impacts are generally from construction activities such as grading work or dewatering. Temporary best management practices (BMPs) would be considered for this project to prevent potential water quality degradation during construction. Long term impacts from the Project could result from floodplain fill and potential increases to velocity and volume of downstream flows due to added impervious area. Permanent BMPs would be considered to reduce erosion and collect and treat roadway runoff. Temporary BMPs and permanent treatment BMPs for the Project are discussed in the *Draft Storm Water Data Report* (WRECO, 2009).

Several roadways would be proposed within "Zone AE" type SFHAs, which would result in impacts from the loss of floodplain storage. Mitigation measure such as re-grading adjacent to the floodplain would be needed. In addition, improvements within "Zone AO" type SFHAs should be designed to avoid shallow ponding. Roadways and other structures should be constructed at existing grade to allow shallow flooding in the form of sheet flow as in the existing condition.

As mentioned previously, bridges constructed within the riverine floodplain as part of the Project would be built so that the lowest horizontal structural member is at or above the water surface elevation for the 200-year storm event with three feet of freeboard, and a hydrologic and hydraulic analysis would be performed to demonstrate that the development would not cause any rise in BFE levels.

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Measures to Restore and Preserve the Natural and Beneficial Floodplain Values Impacted by the Action

The Project would result in added impervious area and loss of vegetation. Environmental impacts would be a result of construction activities and can be minimized with measures such as revegetation. BMPs, or other requirements anticipated as part of the Project permit conditions. According to the PEAR, the environmental document for the Project would likely require the incorporation of a "Floodplain Only Practicable Alternative" finding. The measures to restore and preserve the natural and beneficial floodplain values would be evaluated once the information on the impacts to the floodplain values becomes available.

Practicability of Alternatives to Any Significant Encroachments

As defined by the Federal Highway Administration, risk shall mean the consequences associated with the probability of flooding attributable to an encroachment. It shall include the potential for property loss and hazard to life during the service life of the bridge and roadway.

Encroachments to 100-year floodplains are expected at the following locations:

- Player Lane
- Southgate Avenue to Skyway connection along the old railroad
- Southgate Lane to Notre Dame Blvd connection
- Entler Avenue to Fair Street connection
- Entler Avenue to Speedway Avenue connection
- Northern extent of the Project along SR 99

The majority of the Project area would be outside of the 100-year floodplains. The proposed northern extent along SR 99 may affect the existing floodplain to the northeast of SR 99. The Project would need to evaluate potential impacts to the floodplain and determine mitigation if needed. In general, impacts to the floodplains are expected to be minimal due to the minimal encroachment and negligible increase in impervious area with respect to the overall watershed and the Project is not expected to have a negative impact on the structures and nearby properties within the floodplain; therefore, alternatives were not considered.

Practicability of Alternatives to Any Longitudinal Encroachments

As defined by the Federal Highway Administration, a longitudinal encroachment is an action within the limits of the base floodplain that is longitudinal to the normal direction of the floodplain.

Among the six potential encroachments mentioned in the previous section, only the proposed roadways segments along the old railroad path would be considered a longitudinal encroachment. The existing railroad path is parallel to Comanche Creek. The three locations are as follows:

- Southgate Avenue to Skyway connection
- Southgate Lane to Notre Dame Blvd connection
- Entler Avenue to Speedway Avenue connection

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The 100-year floodplain of Comanche Creek is bounded by the old railroad embankment. Practical alternatives would include designing the proposed roadways segments on the south side of the old railroad.

Coordination with Local, State and Federal Water Resources and Floodplain Management Agencies
The City of Chico should obtain, as necessary, permits or approvals from or consultation with the regional, state, and federal agencies:

- United States Army Corps of Engineers (USACE)
- Central Valley Regional Water Quality Control Board (RWQCB)
- National Oceanic and Atmospheric Administration (NOAA)
- United States Fish and Wildlife Service (USFWS)
- Federal Highway Administration (FHWA)
- California Department of Fish and Game (CDFG)
- Central Valley Flood Protection Board (CVFPB)
- Butte County Department of Development Services (DDS)

The Project's PEAR identifies required coordination with other agencies, as well as any anticipated permits, agreements, or approvals which would be necessary for the Project. Because of the potential impacts to floodplains at various locations for the local roadway improvements supporting the interchange, coordination with FEMA may be required.

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H. Preliminary Environmental Assessment Report

PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT

1. Project Information

District: 03	County: Butte	Route: SR99	PM : 28.1 (28.72 – 30.03)	EA: 4E670
Project Title: State Route 99/Southgate Avenue Interchange				
Project Manager: Bob Greenlaw, Senior Civil Engineer Capital Project Services Dept., City of Chico				Phone # (530)-879-6930
Project Engineer: Matt Brogan, Associate/Division Manager Mark Thomas & Company, Inc.				Phone # (916)-381-9100
Environmental Office Chief/Manager: Christel Little				Phone # (503)-741-4291
PEAR Preparer: Gallaway Consulting/NorthStar Engineering				(530) 343-8327

2. Project Description

Background

State Route 99 (SR99) provides north-south access through Butte County and the City of Chico (Figure 1). Southgate Avenue intersects SR 99 in the southern portion of the City of Chico providing access to surrounding commercial, industrial, residential and agricultural land uses. The SR99/Southgate Avenue Intersection is currently at-grade and signalized. Southgate Avenue extends west from SR99 intersecting with Entler Avenue, which connects to the Midway further to the west. On the east side of SR 99, Southgate Lane serves as a frontage road providing access to commercial and industrial land uses.

The SR99/Skyway Interchange is located approximately 1.25 miles north of the SR99/Southgate Avenue Intersection. Skyway is an arterial highway or expressway providing connectivity between the City of Chico and the Town of Paradise, which is located east of Chico and SR99. In 2010, the SR99/Skyway Interchange was reconfigured to an L-9 partial cloverleaf with signals at the off-ramp intersections.

The SR99/Estates Drive Intersection is located approximately one mile south of the SR99/Southgate Avenue Intersection. Estates Drive provides access to the Butte Creek Country

Club and the adjacent residences west of SR99. Like the SR99/Southgate Avenue Intersection, the SR99/Estates Drive Intersection is currently at-grade and signalized.

Purpose and Need

Write a concise statement of the project purpose and need. It should be consistent with the purpose and need statement in the PSR.

A 2006 Skyway/SR 99 Interchange Study evaluated whether the 1996 Caltrans Project Study Report/Project Report (PSR/PR) Phase 1 improvements would accommodate traffic at acceptable operating levels for 2010 construction year conditions, 2015 design year conditions, and 2030 ultimate conditions. The 2006 Interchange Study indicated that the Skyway will exceed capacity sometime between 2015 and 2030. Additional capacity will be necessary to prevent queue spillback from degrading interchange operations. Review of the City's General Plan and the 1996 Caltrans PSR/PR for the Interchange reveal that construction of the Southgate/SR 99 Interchange would help to provide congestion relief at the SR99/Skyway Interchange.

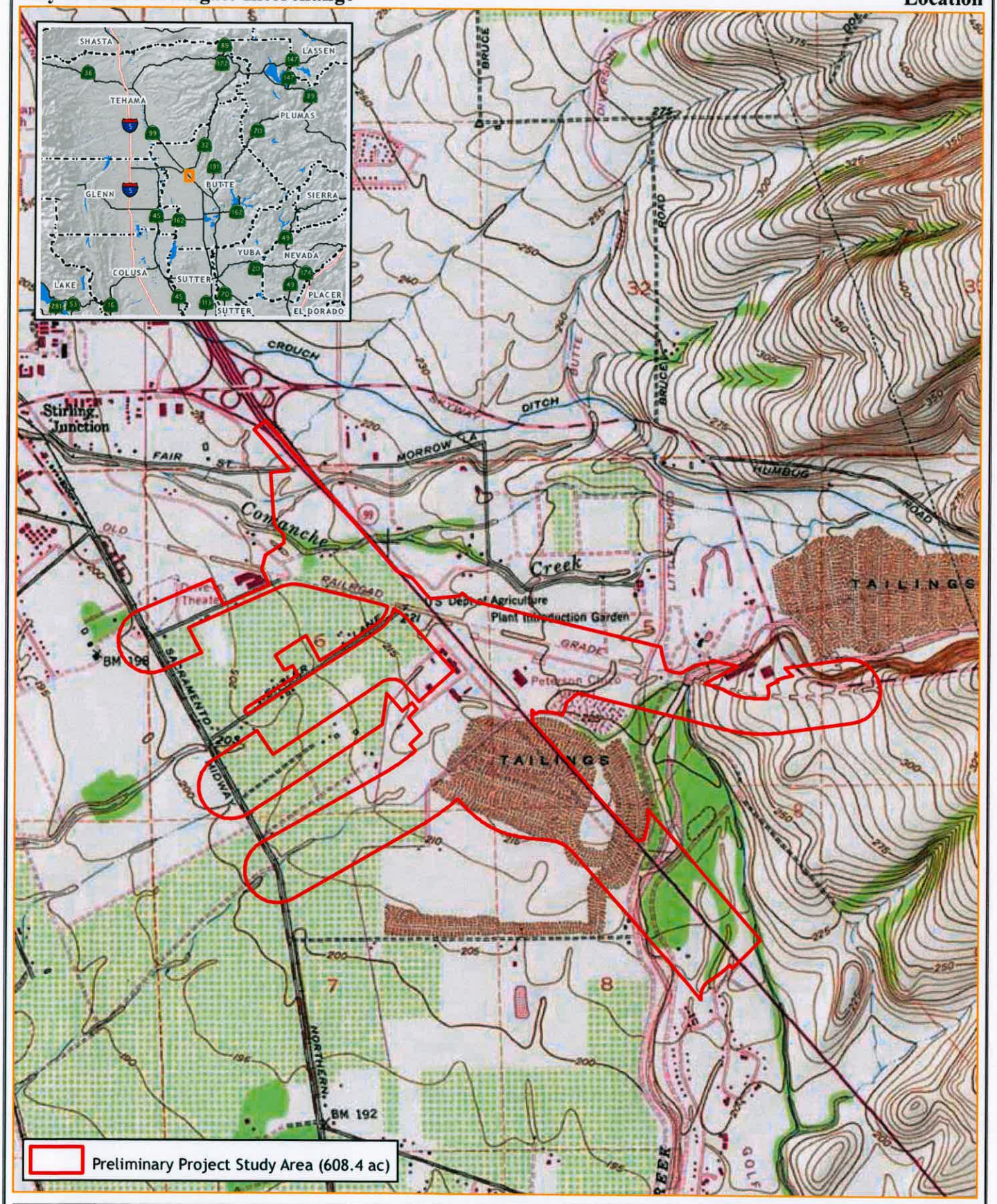
Description of Work

Write a brief summary of the proposed work that will be done. Include work required that is incidental to the project, such as: access roads, utility relocation, de-watering, etc

The proposed project includes improvements to the SR99/Southgate Intersection that meet Caltrans Highway Design Capacity Manual standards for traffic interchanges.
The ultimate Southgate Circulation System improvements are identified in the City of Chico 2030 General Plan and would be constructed as part of a series of subsequent phases/extensions.

City of Chico Southgate Interchange

Location



Preliminary Project Study Area derived from Mark Thomas and Company, Inc. In Section 1 of T21N R1E. Sections 4 - 8 of T21N R2E. Section 31 of T22N & R2E and in the Esquon Land Grant. On Chico USGS 7.5' Quad. Map Date: September 11, 2008

Miles
0 0.25 0.5

GALLAWAY CONSULTING, INC.

Figure 1

Other improvements not included as part of this project include the Speedway Avenue extension to Entler Avenue, Southgate Avenue extension to Midway, Southgate Avenue extension to Skyway, Fair Street Extension to Entler Avenue, and Notre Dame Boulevard Extension to Southgate Avenue.

The Butte County General Plan includes the upgrades to the SR99/Southgate Avenue Interchange and the four-lane Southgate Avenue extension to Skyway. The Butte County General Plan also includes plans for a Midway to Entler Avenue Connection, which would be accompanied by extension of Speedway Avenue and Southgate Avenue.

Alternatives

Identify all project alternatives (including no-build). If alternatives are no longer being considered, state why. Do not select or identify a preferred alternative. Describe each alternative still under consideration.

The alternatives to the proposed SR99/Southgate Avenue Interchange include different interchange configurations within the current project area.

The Draft *Traffic Report for the SR 99/Southgate Avenue Interchange PSR* (Fehr and Peers, 2009) identified and analyzed the following project alternatives:

- No Project Alternative
- With Project Alternatives
    - Alternative 1 - Two-Quadrant, Partial Cloverleaf
    - Alternative 2 - Partial Cloverleaf
    - Alternative 1A - At Grade Intersection
    - Alternative 1B - Spread Diamond with 4-Lanes
    - Alternative 1C - Spread Diamond with 5-Lanes

Descriptions of the no project and five "with project" alternatives analyzed in the 2009 Traffic Report are provided below.

<u>Traffic Report No-Project Alternative</u>

The No-Project Alternative would result in no construction activities or improvements at the SR99/Southgate Avenue Intersection. The existing SR 99/Southgate Avenue intersection would remain signalized and the lane configurations and turn pocket lengths would remain unchanged.

<u>With Project Alternatives</u>

The 2009 Traffic Report analyzed "with project" alternatives propose to either construct a new interchange at the SR 99 /Southgate Avenue Intersection or expand (at least on an interim basis) the existing at-grade intersection.

Alternative 1 - Two-Quadrant, Partial Cloverleaf

Alternative 1 would construct a two-quadrant, partial cloverleaf interchange. This design would incorporate on-ramps and off-ramps in only two intersection quadrants. Alternative 1 would have

the smallest footprint of all the interchange options. The interchange would include four through lanes on the overcrossing and back-to-back left-turn lanes.

Alternative 2 - Partial Cloverleaf

Alternative 2 would construct a partial cloverleaf interchange, which would feature diagonal off-ramps and loop and diagonal on-ramps. As there are no left-turns at the ramp terminal intersections, this interchange design can accommodate high traffic volumes. The SR99/Skyway Interchange, was converted to this design in 2010.

The interchange constructed by Alternative 2 would include four through-lanes on the overcrossing. The loop on-ramps would include right-turn pockets, which would not be part of the overcrossing structure. The off-ramps would be single-lane, widening to three lanes at the ramp terminal intersections.

Alternative 1A - At-Grade Intersection

This alternative includes an at-grade intersection, which would facilitate a phased approach to construction of the ultimate interchange improvements. Alternative 1A would result in the construction of a third through lane on SR99 (northbound and southbound) and dual left-turn lanes on all approaches. In addition, Alternative 1A would make the following modifications to the existing SR 99/Southgate Avenue Intersection:

- Construct a second through lane on the eastbound approach
- Construct a second through lane on the westbound approach
- Construct dual right-turn lanes on the westbound approach
- Relocate the Entler Avenue and Southgate Lane Intersections with Southgate Avenue to accommodate queuing at the SR 99/Southgate Avenue Intersection

Ultimately, Alternative 1A would be converted into an interchange when traffic volumes on SR 99 and Southgate Avenue -acceptable levels.

Alternative 1B - Spread Diamond with 4-Lanes

Alternative 1B would construct a spread diamond interchange at the SR 99/Southgate Avenue Intersection. This design would feature diagonal on-ramps and off-ramps, similar to the SR99/Durham/Pentz Road Interchange approximately 3 miles south of Chico. This alternative would construct single-lane off-ramps, which would widen to three lanes at the ramp terminal intersections. The interchange overcrossing constructed under Alternative 1B would include four through lanes and back-to-back left-turn lanes.

Alternative 1C - Spread Diamond with 5-Lanes

This alternative would be a slight modification of the improvements proposed under Alternative 1B in order to facilitate a phased approach to interchange construction. Alternative 1C would also result in the construction of a spread diamond interchange. However, relative to Alternative 1B, Alternative 1C would construct a narrower overcrossing, which would accommodate: one westbound lane, back-to-back left-turn lanes, and two eastbound lanes.

Alternative 1C includes construction of single-lane off-ramps, which would widen to three lanes at the ramp terminal intersections. This alternative would facilitate a conversion to the Alternative 2 improvements under a future phase. The Alternative 1C improvements are intended to facilitate phasing while minimizing throw-away costs.

3. Anticipated Environmental Approval

Check the anticipated environmental determination or document for the proposed project in the table below.

CEQA		NEPA	
Environmental Determination			
Statutory Exemption	☐		
Categorical Exemption	☐	Categorical Exclusion	☒
Environmental Document			
Initial Study or Focused Initial Study with Negative Declaration or Mitigated ND	☒	Environmental Assessment with Finding of No Significant Impact	☐
Environmental Impact Report	☐	Environmental Impact Statement	☐
CEQA Lead Agency (if determined):		City of Chico	
Estimated length of time (months) to obtain environmental approval:		9	
Estimated person hours to complete identified tasks:		1200	

The proposed project would require the preparation of environmental documentation pursuant to the California Environmental Quality Act (CEQA). Based on the preliminary review it is anticipated that the project would require an Initial Study/Mitigated Negative Declaration in order to satisfy CEQA. The City of Chico would be the CEQA Lead Agency.

At this time, federal funding is not identified for construction of the project. The proposed project is not programmed into the Federal Statewide Transportation Improvement Program (FSTIP), and no federal funding has been identified or requested for the proposed project. In the event that federal funding is used for the project, the project would be required to comply with the National Environmental Policy Act (NEPA) with Caltrans serving as the NEPA Lead Agency on behalf of the Federal Highway Administration (FHWA) (per the SAFETEA-LU Section 6005 MOU). The level of federal involvement would influence the nature of NEPA analysis. Based upon a preliminary review, NEPA approval for the interchange project would likely be a Section 6005 Categorical Exclusion.

4. Special Environmental Considerations

For each viable alternative, summarize below any special processes such as NEPA/404, seasonal constraints, Section 7, Section 4(f) that may affect project delivery and require unusual, exceptional, or extended environmental processes.

With the exception of the No-Project Alternative, each of the identified project alternatives may require the following permits or agency consultation.

Table 1:
Potential Federal and State Regulations and Agencies

Regulation	Section	Agency
Clean Water Act	§404	USACE
	§402	RWQCB
	§401	RWQCB
Federal Endangered Species Act	§7	NOAA
		USFWS
National Historic Preservation Act	§106	SHPO
Migratory Bird Treaty Act	50 CFR	USFWS
Streambed Alteration	§1600	DFG
CA Endangered Species Act	§2050 et seq.	DFG
Fish and Game Code (Raptors)	§3505	DFG
Fish and Game Code (Fully Protected)	§3511	DFG
	§4700	
	§5050	
	§5515	
Fish and Game Code (Rare Plant)	§1900	DFG
CA Code of Regulations (Floodways)	Title 23	CVFPB

The proposed northbound SR 99 auxiliary lane would involve a box culvert on Comanche Creek and the possible discharge of dredged or fill materials in waters of the US and wetlands that are subject to Section 404 of the Clean Water Act. A Nationwide Permit (fill of less than ½-acre of waters of the US) may be needed for this project. Additionally, Section 7 consultation may be required as Comanche Creek is potential habitat for a federally listed species. If Section 7 consultation is needed, involvement by US Fish and Wildlife Service (USFWS) would be required.

5. Anticipated Environmental Commitments

For each viable alternative, briefly summarize the anticipated environmental commitments by impacted resource. If commitments have been made, include a copy of the ECR. For standard PSRs, include a cost estimate for each environmental commitment. Include the total cost of all environmental commitment costs in Item 8. PSR Summary Statement below. Reference PEAR Environmental Commitments Cost Estimate.

The following table identifies anticipated environmental commitments that could influence project implementation:

Table 2:
Anticipated Environmental Commitments

Resource	Potential Issues/Additional Studies Needed
Community	Utility Relocations
Visual/ Aesthetics	Sound Barriers
Cultural Resources	Prehistoric Resources Historic Resources Architectural Resources
Hydrology/ Floodplains	FEMA CVFPB
Water Quality	§401 §402 MS4 NPDES II §402 CASWP
Geology/Soils	Tailings Erosion Expansive
Paleontology	FHWA Involvement, if federal funds are used.
Hazardous Materials	High Risk Sites Medium Risk Sites Low Risk Sites General Risks
Air Quality	Non-Attainment Status Construction Emissions Operational Emissions Sensitive Receptors
Noise/Vibration	Sensitive Receptors
Energy/Climate	Climate Change/Greenhouse Gas Emissions
Biological Environment	Protocol-Level Surveys Federal Agency Permits/Approvals State Agency Permits/Approvals Timing/Avoidance/Minimization Mitigation and Monitoring
Cumulative Impacts	Cumulative Impact Analysis

Additionally, the proposed project is identified in the 2008 Regional Transportation Plan (RTP) as a "locally funded project." Thus, the proposed project was included as part of the traffic model and regional emissions analysis for air quality conformity. However, in the event that the project would require state or federal funds, the RTP would need to be amended to include the project under the Regional Improvement Program (RIP) funds and the Regional Transportation Improvement Program (RTIP) and the State Transportation Improvement Program (STIP).

6. Permits and Approvals

Include timelines for acquiring permits or agreements. Reference PEAR Environmental Commitments Cost Estimate.

Permits and approvals may be required from regional, state and federal agencies:

- <u>§404 Permit:</u> Required if project places fill in Waters of the US, including wetlands (USACE).
- <u>§402 Permit:</u> Required if > 1 acre disturbed; Compliance per NPDES II MS4 (RWQCB).

- §401 Certification: A condition of §404 Permit (RWQCB).
- §7 Consultation: As part of the §404 Permit process (USFWS).
- ESA Incidental Take/Approval: Required under Section 10 of the Endangered Species Act if federally listed species will be impacted (/USFWS).
- CESA Incidental Take Permits, per Fish and Game Code § 2081. Needed if state listed species will be impacted (DFG).
- §1600 Agreement: If Lake/Streambeds impacted (DFG).
- Floodway Encroachment Permit: If project encroaches into designated floodway (CVFPB)
- NPDES Permitting and Approvals: General Construction Permit, Report of Waste Discharge (NPDES), and Construction Dewatering, for activities that occur below the ground surface.

If the project receives federal funding, additional permits and approvals may be needed including:

- NHPA Determinations: Compliance required for federal actions (SHPO)
- §4(f) Use: If FHWA funds used and 4(f) lands impacted (FHWA).

7. Level of Effort: Risks and Assumptions

See Section 5.2 PEAR Handbook regarding important considerations that can affect the level of effort and resources needed not only for the environmental document but also for the PEAR scoping document.

Assumptions that were used in determining factors that would contribute to the project's overall workplan, timeline, cost estimates as well as external factors that may extend the project timeline include:

1. General Assumptions:
    a. Scope of project as defined in the current alternatives.
    b. Local, regional, and state funding available and currently not anticipating use of federal funding.
    c. New right-of-way acquisition would be required for the project.
2. Land Use Assumptions, including Growth, Farmlands/Timberlands, Community Impacts:
    a. Project is consistent with the City and County recently adopted General Plans.
    b. The project would not result in the relocation of existing residential, commercial, or industrial land uses.
    c. The project would not result in the unfair treatment of all people.
3. Visual/Aesthetics Assumptions:
    a. The project may need the preparation of a Scenic Resource Evaluation since the project area is identified as one of the City of Chico's "key city entrances".
4. Cultural Resources Assumptions:
    a. Archaeological Survey Report (ASR), Historical Property Survey Report (HPSR), Historical Resources Evaluation Report (HRER) if structures adjacent to proposed roadway alignments are greater than 50 years old, will need to be completed. The project will also need to comply with Section 106 of the National Historic Preservation Act (NHPA). Depending on the extent of the findings of the above reports will determine if additional surveying or data recovery is needed.

5. Hydrology and Floodplain Assumptions:
    a. Requires Location Hydraulics Studies and/or Floodplain Evaluation Reports.
6. Water Quality and Stormwater Runoff Assumptions:
    a. Portions of the project site are located within the NPDES Phase II Municipal Separate Storm Sewer System Chico Urbanized Area permitting area. The project may be required to obtain a General Construction Permit as well as prepare a Report of Waste Discharge and Construction Dewatering Permit.
    b. Requires a Clean Water Act Section 401, Water Quality Certification.
7. Geology and Soils Assumptions:
    a. Additional subsurface exploration and laboratory testing is required.
8. Paleontology Assumptions:
    a. The project does not involve a National Natural Landmark, or any of the lands administered by the BLM, NPS, USACE, or CDPR.
    b. If the project uses federal funds and thus involves authorizations from FHWA, then a Paleontological Identification Report (PIR) would be necessary.
9. Hazardous Waste/Materials Assumptions:
    a. A Preliminary Site Investigation (PSI) will be required.
    b. Phase II soil and groundwater testing may be required.
10. Air Quality Assumptions:
    a. Air Quality Study Report (AQSR) would be required for the Interchange.
11. Noise and Vibration Assumptions:
    a. A Noise Study Report (NSR) would need to be prepared.
12. Energy and Climate Change Assumptions:
    a. The CEQA document would evaluate and discuss the potential energy impacts associated with the project (per CEQA Guidelines Appendix F).
    b. The CEQA document would require an analysis of greenhouse gas emissions and global climate change.
    c. The project is a congestion relief project and thus would require a quantitative analysis using ARB's EMFAC model to carbon dioxide (CO_2) emissions.
    d. Even if the project uses federal funds, it is not anticipated that an Energy Technical Report would be required.
13. Biological Environment Assumptions:
    a. Project components may result in potential impacts to state and federally listed threatened and endangered species, including giant garter snake (GGS). Impacts on Butte County meadowfoam (BCM) are unlikely.
    b. The project may require a 404 permit as well as Section 7 consultation; a Biological Assessment may be needed. A Natural Environment Study (NES) may also be required.
    c. The project may impact Comanche Creek and associated riparian vegetation and would require a 1600 permit and Revegetation Plan.

Risks considered for this project include the following:

1. Design - Moderate Probability/High Impact:
    a. Design plans change to include activities not currently identified in the request would increase project costs and schedule delays.
    2. External Risks - Moderate Probability/High Impact:

a. Controversial or political factors; threat of lawsuits (as part of environmental review process); reviewing agencies and permits requires extended review time;.

3. Environmental Risks - Low Probability/High Impact:
    a. Additional environmental analysis required after CEQA documentation is complete.
    b. New alternatives required to avoid, mitigate, or minimize impact.
    c. Federal funding would require Section 4(f) evaluations;
    d. If archaeological or historic resources are found eligible for listing then a Finding of Effect (FOE) will be required. If impacts are adverse, a Memorandum of Agreement (MOA) and Historic Property Treatment Plan (HPTP) will address mitigation requirements. This portion of the Section 106 process can take an additional six months.
    e. Unforeseen requests associated with the 404 and Section 7 consultation process.
4. Environmental Risks - Low Probability - High Impact:
    a. If unforeseen issues of hazard waste, visual, air quality, or cumulative impacts due to traffic are encountered, then increased project costs and schedule delays may occur.

8. PEAR Technical Summaries

Use brief paragraphs focused on topics that will need environmental review. Indicate the absence of issues to document that they were considered. Refer to the Environmental Studies Checklist when preparing the following summaries. Make a separate statement for each viable alternative. See the PEAR Handbook Exhibit 3 for examples. These paragraphs should be based upon the technical summary provided by each specialist to the generalist who is writing the PEAR.

8.1 Land Use

The project site is located within portions of the City of Chico and the unincorporated territory of Butte County.

Existing Land Use Designations and Zoning:

City of Chico 2030 General Plan

Land Use Designations	Zoning
Manufacturing/Warehousing (M&W)	Light Manufacturing (ML)
Park (P)	Secondary Open Space (OS2)
Creekside Greenway (CG)	General Manufacturing (MG)
	Primary Open Space (OS1)

County of Butte

Land Use Designations	Zoning
Industrial (I)	Heavy Industrial (M-2)
Agricultural (AG)	Agricultural 20-Acre Min. (A-20)
	Resource Conservation (RC)
	Scenic Highway Overlay (SH)

Local, Regional and State Plan Consistency

The project will need to be evaluated for consistency with the following local and regional plans:

- City of Chico: General Plan, Municipal Code, Urban Area Bicycle Plan
- County of Butte: General Plan, County Code
- Butte County Association of Governments: Regional Transportation Plan, Countywide Bikeway Master Plan, and Butte HCP/NCCP

Parks and Recreation

In addition to lands from historic sites that are of local, state or federal significance, public parks, recreational areas of national, state or local significance and wildlife/waterfowl refuges are considered §4(f) resources. Publicly-owned parks and recreation areas are not expected to be used with implementation of the project. Proximity impacts to publicly-owned parks and recreation areas are also not anticipated.

8.2 Growth

Relative to potential growth-related, indirect impacts, the Caltrans guidelines state: "…an analysis typically will be needed in the environmental document for those highway projects that are built along a new alignment and/or provide new access."

The proposed project would not encourage growth beyond that which is currently planned for in the City and County General Plans.

8.3 Farmlands/Timberlands

The action area is located along the eastern boundary of the Central Valley. There are no timberlands identified within the project area.

No lands enrolled under a Williamson Act contract are located within the action area.

8.4 Community Impacts

Community Cohesion and Character

The SR99 frontage is primarily developed with manufacturing, industrial, and commercial land uses within the project area.

Relocations

Approximately seven businesses occur in the area of the proposed interchange improvements in the northeast and southeast quadrants. The proposed interchange improvements would not result in the relocation of residences.

Environmental Justice

The Project Area coincides with Census Tract 13. It is not likely that the project would result in environmental justice impacts.

Utility/Energy/Public Facilities

The project area is located within the service areas or jurisdictional boundaries of the following providers:

Table 3: Service Areas and Jurisdictions

Service	Service Provider
Education	Chico Unified Butte-Glenn Community College
Parks/Recreation	Chico Area Recreation and Park City of Chico Parks Department
Police Protection	Chico Police Department Butte County Sherriff's Department
Fire Protection	Chico Fire Department Butte County Fire Department CA Department of Forestry and Fire Protection
County Service Areas	90 – Southgate Acres Subdivision 114 – Chico Nitrate Action 118 – Watkins Subdivision 178 – Twin Palms Subdivision 179 – Chambers and Speedway Subdivisions

Other quasi-public uses within the project area include the Neighborhood Church and Chico Christian School[1].

As the project site is located at the city's periphery, there would be little likelihood of potential impacts to public service providers or to any facilities operated by them.

8.5 Visual/Aesthetics

SR 99 is an existing roadway in Butte County and through the City of Chico. Although interchange improvements would be introduced into the viewshed, These improvements are not expected to significantly impact visual resources.

The SR 99 corridor is not a designated scenic highway. The Chico General Plan identifies the project area as one of the city's "key city entrances" that illuminate Chico's regional identity. The SER states that a Scenic Resource Evaluation is the minimum requirement to ensure compliance with CEQA.

8.6 Cultural Resources

The proposed project would be subject to the *Cultural Resources Procedures* established in Chapter 2, Volume 2 of the SER. The procedures ensure project-level compliance with both state and federal regulations related cultural resource protection.

The portion of the project area to the east of SR99 is identified in the Chico General Plan MEA as an area of "High Archaeological Sensitivity." The lands to the west of SR99 are primarily designated as "Low to Moderate Archaeological Sensitivity."

[1] Outside the conceptual improvements/alignments within the Northeast Quadrant

Pacific Legacy conducted a record search and Native American Heritage Commission consultation for the proposed interchange project in 2009. The record search revealed that portions of the action area had been previously surveyed for cultural resources. The action area is larger than the area that would be affected by the proposed project. However, most of these surveys were conducted prior to 1985. Furthermore, approximately 70% of the action area has not been surveyed for cultural resources. The Letter Report documenting Pacific Legacy's record search makes findings related to the potential for cultural resources to occur within the action area. The findings address potentially occurring prehistoric, historic and architectural cultural resources within the project area.

The potential for historic resources to occur within the action area is described in the Pacific Legacy report as "likely high." Currently unidentified historic-era resources would likely be related to mining activities. Currently unidentified architectural resources that may occur within the action area include elements would also be related to mining.

Based on the preliminary record search and consultation conducted by Pacific Legacy, each component of the project would require cultural resources surveys per the applicable state and federal requirements.

8.7 Hydrology and Floodplain

According to the FEMA Flood Insurance Rate Map, the project site is located within the "Zone X" type "Special Flood Hazard Areas". Zone X corresponds to areas outside of the 100-year floodplain; areas within the 500-year floodplain; areas within the 100-year floodplain with average depths of less than 1 foot or with drainage areas less than 1 square mile; or areas protected from the 100-year flood by levees.

The project would likely require additional Location Hydraulics Studies and/or Floodplain Evaluation Reports. In addition, the environmental document for the proposed project would likely require the incorporation of a "Floodplain Only Practicable Alternative" finding.

8.8 Water Quality and Storm Water Runoff

The *Storm Water Data Report* (SWDR) for the proposed project was prepared by WRECO in June of 2009. The SWDR identifies the potential stormwater impacts of the proposed project and applicable BMPs. The report addresses only those portions of the proposed interchange project that would occur within the Caltrans right of way (ROW).

Per the SWDR, the disturbed soil area (DSA) for the proposed project would range from approximately 21.6 acres to 24.5 acres, depending on interchange design. The DSA calculations represent the project footprint excluding existing paved surfaces. An L-8 interchange would result in ±16 acres of impervious areas, while the impervious areas associated with an L-9 interchange would total ±19.4 acres.

Portions of the project site are located within the National Pollution Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) Chico Urbanized Area permitting area.

Butte Creek and Comanche Creek are identified as the two major receiving bodies within the project site.

The following Site Data and Storm Water Quality Design Issues are presented in the SWDR:

Storm Water Quality Design Issues:

- Within the project site, neither Butte Creek nor Comanche Creek are listed *Water Quality Limited Segments* per §303(d) of the Clean Water Act
- No High Risk Areas are identified within the project site per the Caltrans *Central Valley Region 5 Regional Work Plan* (2007)
- No TMDL requirements apply within the project site

Special Design Considerations:

- Open space areas in the southeast quadrant of the project site are described as Environmentally Sensitive Areas (ESAs)
- Anadromous fish and riparian habitat represent potential environmental constraints within the project site

Additional Site-Specific Studies Likely to be Required:

- Groundwater investigation/dewatering requirements within specific areas of the project site
- Erosion potential of soils within the project site and corresponding erosion prevention measures that would be required
- Hazard waste investigations within applicable areas of the site (per the ISA)
- Soil testing for aerially deposited lead

Preliminary Measures for Avoiding or Reducing Storm Water Impacts:

- Minimize disturbances through project phasing and timing construction activities[2]
- Install permanent storm water pollution controls as early as feasible
- Attempt to grade all slopes at 4:1 or flatter

Permits, Approvals and/or Certifications Likely to be Required:

- Clean Water Act §404 Permit
- §401 Water Quality Certification
- 1600 Streambed Alteration Agreement
- Waste Discharge Requirements (NPDES) or other related permits and certifications
- Dewatering Permit (for onsite dewatering, if necessary) and implementation of applicable BMPs

8.9 Geology, Soils, Seismic and Topography

A Preliminary Geotechnical Memorandum for the proposed interchange was prepared by Blackburn Consulting in April of 2009. Based on the conceptual nature of project plans, Blackburn makes the following preliminary recommendations:

[2] The rainy season at the project site is October 15 through April 15 (*Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual*, 2003).

Table 4:
Structure Foundation Recommendations

Location	Type	Recommendation
SR99/ Southgate Ave.	Interchange	Spread Footings in undisturbed Modesto Formation; *or* H-piles ±30 feet below surface (up to 70 tons/pile)

New-cut slopes would be expected to be stable at gradients up to 1.5:1. New-fill slopes would be expected to be stable at gradients up to 2:1. The potential settlement of new embankment was projected to be nominal (±1-inch), and likely to occur during the placement of fill.

During the preliminary analysis, Blackburn staff did not observe any areas of slope instability or soft/compressible soils or indications of shallow ground water.

As mentioned previously, these recommendations are preliminary. Additional subsurface exploration and laboratory testing is required to complete foundation reports for bridge design, geotechnical reports for roadway and wall elements and materials for pavement and culvert design.

8.10 Paleontology

According to Chapter 8 of the SER, a Paleontological Identification Report (PIR) is required if a project: 1) involves a National Natural Landmark, 2) involves lands administered by the Bureau of Land Management, National Park Service, Army Corps of Engineers or CA Department of Parks and Recreation, or 3) requires permits/authorizations from the FHWA or CA Coastal Commission. Therefore, if the project utilizes federal funding, which requires the involvement of FHWA, a PIR would be required for the project.

8.11 Hazardous Waste/Materials

Blackburn Consulting prepared an Initial Site Assessment (ISA) for the proposed interchange in November of 2008. The ISA identifies recognized issues related to hazardous materials within the project area. Specific sites that were determined to have high, medium and low potential risks as well as general potential hazardous materials issues that may be present within the action area are also identified. The following table reflects the number of sites for each level of potential risk identified within the ISA:

Risk Level	Sites / Risks
High	32
Medium	21
Low	11
General	9

The following tables, which are provided for illustrative purposes, represent some of the high and medium risk sites within the Northwest, Southwest, Northeast, and Southeast Quadrants of the proposed interchange.

High Potential Risk

#	APN	#	APN
25	040-020- 091		
26	040-400- 073		
27	040-400-086		
29	040-400-017	40	040-400-088
30	040-400- 021	50	--
--	--	45	040-400-068

Medium Potential Risk

#	APN	#	APN
28	040-400-013		
53	040-400-074	46	040-020-141
54	040-400-091	51	040-020-134
--	--	42	040-400-070
		43	040-400-050
		44	040-400-084

As mentioned previously, the ISA also identifies eleven (11) potential low risk sites, which could require additional inspections and/or analyses. Finally, the ISA identifies the following general issues that may present risks within the action area:

Potential General Issues

Aerially Deposited Lead	Agricultural Chemicals	Asphalt
Building Materials	Gas/Utility Lines	Heating/Fuel/Farm Tanks
Septic/Sewer	Transformers	Traffic Stripes

Therefore, it is likely that a Preliminary Site Investigation will be required, at a minimum, for several components of the proposed project. Right of way acquisition and disturbances within potential high-risk areas would likely require additional, site-specific analyses, as identified within the ISA. The majority of the sites would warrant site inspections and records reviews and/or interviews. Additional, Phase II testing would likely be required within the preponderance of the high-risk sites.

8.12 Air Quality

The *State Route 99/Southgate Avenue Interchange and Corridor Study Preliminary Environmental Analysis Report Air Quality Analysis* was prepared by ICF Jones and Stokes in August of 2009.

The Air Quality Analysis states that an *Air Quality Study Report* (AQSR), per Caltrans, EPA and FHWA standards, would be required for the proposed interchange. The AQSR should document project compliance as it pertains to a variety of air quality factors within a complex regulatory context. Clean Air Act, State Implementation Plan, criteria pollutant emissions, “hotspots” and mobile source air toxics (MSAT) compliance would be identified in the AQSR. ICF Jones and Stokes staff estimates that preparation and approval of the AQSR would take approximately two months.

Based on state standards, Butte County has been designated as a non-attainment area for ozone, PM10 and PM2.5. Relative to federal air quality standards, Butte County is designated as a nonattainment area for ozone and a moderate maintenance area for CO. In addition, Butte County is likely to receive a federal nonattainment designation for PM2.5 in the near future.

The proposed project would require an evaluation of potential air quality impacts per NEPA and CEQA standards. The project is identified in the RTP (BCAG, 2008) that was evaluated for conformity with the State Implementation Plan. The analysis would identify the proposed project's potential to *cause or contribute to any new localized CO, PM10, or PM2.5 violations or increase the frequency or severity of any existing CO, PM10 or PM2.5 violations.*

The Caltrans protocol *Transportation Project-Level Carbon Monoxide Protocol* (Garza et al. 1997) would be used to analyze potential impacts related to CO emissions.

Localized impacts related to PM10 and PM2.5 emissions would be analyzed per the EPA and FHWA protocol *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas* (2006).

Project-level emissions of criteria pollutants and greenhouse gasses (GHG) would be calculated per the Caltrans *CT-EMFAC* model.

The *Interim Guidance on Air Toxic Analysis in NEPA Documents* (FHWA, 2006) would be utilized to determine the potential MSAT impacts. The preliminary findings of ICF Jones and Stokes' *Air Quality Assessment* indicate that the project may be considered to have "low potential MSAT effects" based on projected AADT. As such, a quantitative MSAT analysis is not likely to be required.

Potential air quality impacts would be subject to applicable programmatic and project-level mitigation. Construction activities would be subject to all applicable BCAQMD and city standard mitigation measures. Operational emissions would be evaluated for compliance with BCAQMD criteria pollutant emissions thresholds. Emissions of ≥25 lbs/day of ROG, ≥25 lbs/day of NOX or ≥80 lbs/day of PM10 would result in potentially significant air quality impacts, which would necessitate implementation of all applicable best available mitigation measures (BAMM) and standard mitigation measures (SMM). The BCAQMD recommends implementation of all applicable SMM for projects with projected emissions below these thresholds. Projects that are expected to emit >137 lbs/day of ROG, >137 lbs/day NOX and/or >137 lbs/day PM10 are considered by the BCAQMD to have significant air quality impacts.

8.13 Noise and Vibration

New transportation projects must be analyzed for potential noise impacts, including temporary noise generated by construction and long-term, operational noise. At the PID level, the following issues related to noise are to be identified: Potential receptors within or adjacent to the project, Potential noise impacts, Possible need for noise abatement measures, and Monitoring need.

Temporary vibration impacts can be generated during construction activities, and long-term, operational impacts are often the result of transportation-generated vibration. The Caltrans Vibration Guidance Manual (2004) describes three[3] basic types of receivers that may be affected by vibration: people, structures and equipment.

[3] Potential vibration impacts on fish are addressed in *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish* (Caltrans, 2009).

The *State Route 99/Southgate Avenue Interchange and Corridor Study Preliminary Environmental Analysis Report Noise Analysis* was prepared by ICF Jones and Stokes in August of 2009.

Per Caltrans protocol, potentially significant noise impacts are generated under two circumstances: the projected design year traffic would exceed the specified noise abatement criteria (NAC) or the projected design year traffic noise would substantially exceed existing ambient noise levels. The following table, as recreated from 23 CFR 772, represents activity categories (AC) and the associated NAC:

Table 5:
Activity Categories and Noise Abatement Criteria

AC	NAC[4]	Description of Activities
A	57: Ext.	Lands on which serenity and quiet are extraordinarily significant and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67: Ext.	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72: Ext.	Developed lands, properties, or activities not included in A and B above
D	--	Undeveloped lands
E	52: Int.	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

An increase in existing ambient noise levels would be considered substantial if the "with project" design year noise level projection were to exceed the existing noise level by ≥12 dBA Leq(h). Per the protocol, noise levels would approach an NAC if the projected levels would be within one dBA of said NAC.

Residential land uses typically fall under Activity Category B. Therefore, 66 dBA Leq(h) would "approach" the applicable NAC. Per the protocol, severe noise impacts are generated when exterior noise levels are projected to be ≥75 dBA or ≥30 dBA higher than existing levels.

The potential impacts generated by traffic noise would be analyzed for all surrounding land uses. The analysis would primarily consider exterior noise exposures. However, if no exterior activities would be affected by traffic noise, the interior NAC (Activity Category E) is used.

Typically, noise abatement options are considered in frequently used areas where lowered noise levels would be beneficial. Areas typically considered for noise abatement include residential yards and patios, parks and playgrounds.

Per the protocol, all reasonable and feasible noise abatement measures likely to be incorporated must be identified prior to adoption of the final environmental document for a given project. In addition, all noise impacts for which no available or feasible abatement measures have been identified must be included in the project record.

[4] A-weighted decibel – one hour equivalent sound level dBA – L_{eq}[h]

Extraordinary noise abatement, as identified by Caltrans, may be implemented for locations that would otherwise experience severe traffic noise impacts. Extraordinary noise abatement, which could include non-standard measures or design, is considered on a project-by-project basis.

If the project uses federal funds, then federal aid highway projects are analyzed per *Procedures for Abatement of Highway Traffic Noise* (23 CFR 772). Caltrans protocol for to the implementation of 23 CFR 772 is set forth in the *Traffic Noise Analysis Protocol*. The proposed project would require an evaluation of noise impacts per 23 CFR 772. Furthermore, the proposed interchange project would likely be considered a "Type 1" project because it would result in new alignments near receivers.

In addition to the Caltrans protocol, the proposed project would be analyzed per the applicable local noise standards. The City of Chico Noise Ordinance is set forth in Chapter 9.38 of the Municipal Code. The following maximum noise limits are established by the Noise Ordinance:

> *Residential: 70dBA between…7:00am and 9:00pm or 60dBA between the hours of 9:00pm and 7:00am on any residential property. On multifamily residential property, noise shall not exceed 60dBA three feet from any wall, floor, or ceiling inside any dwelling unit when the doors and windows of the unit are closed, except within the dwelling unit in which the noise source or sources may be located.*
>
> *Commercial and Industrial: 70dBA at any point outside the property plane.*
>
> *Public Property: 60dBA at a distance of 25 feet or more from the source.*

Construction-generated noise is exempt from the provisions of the noise ordinance under the following circumstances: construction occurs between 7AM and 9PM Monday through Saturday, construction occurs between 10AM and 6PM Sundays and holidays, noise does not exceed 83 dBA at 25 feet from the source, and noise does not exceed 86 dBA at any point outside the plane of the project.

Additional noise generation and exposure standards are set forth in the Noise Element of the Chico General Plan. The following table is recreated from "Maximum Allowable Noise Exposure Transportation Noise Sources" (Table 9.5-1) of the Noise Element:

Table 6:
Maximum Allowable Transportation Noise Exposure

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL, dB	L_{eq} dB[2]
Residential	60[3]	45	--
Transient Lodging	60[4]	45	--
Hospitals, Nursing Homes	60[3]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[3]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	60[3]	--	45
Playgrounds, Neighborhood Parks	70	--	--

[1] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.
[2] As determined for a typical worst-case hour during periods of use.
[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
[4] In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply

Noise generated by roadway improvement projects is discussed in the Noise Element. Specifically, Policy N-I-2 states:

> *It is anticipated that roadway improvement projects will be needed to accommodate buildout of the general plan. Therefore, existing noise-sensitive uses may be exposed to increased noise levels due to roadway improvement projects as a result of increased roadway capacity, increases in travel speeds, etc. It may not be practical to reduce increased traffic noise levels consistent with those contained in Table 2. Therefore, as an alternative, the following criteria may be used as a test of significance for the environmental review of a roadway improvement project:*
>
> > *Where existing traffic noise levels are less than 60 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +5 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant; and*
> >
> > *Where existing traffic noise levels range between 60 and 65 dB Ldn at the outdoor activity areas of noise sensitive uses, a +3 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant; and*
> >
> > *Where existing traffic noise levels are greater than 65 dB Ldn at the outdoor activity areas of noise sensitive uses, a +1.5 dB Ldn increase in noise levels due to a roadway improvement project will be considered significant.*

Note: Roadway improvement projects can result in increased travel speeds and/or an increase in roadway capacity. An analysis of noise impacts associated with a roadway improvement project should evaluate the projected future traffic volumes, speeds, traffic distribution and truck mix with and without the project. Therefore, the changes in traffic speeds and traffic volumes along those roadways which are attributed solely to the roadway project will be evaluated with respect to the above-mentioned criteria.

The Noise Analysis prepared by ICF Jones and Stokes identifies the following Activity Category B land uses in the project area:

Table 8: Land Uses in the SR 99/Southgate Avenue Project Area	
Receptor Type	Location
Single-Family Residences	Estates Drive approximately 350 feet west of SR 99
Single-Family Residences	Near Estates Drive approximately 400 feet west of SR 99

The proposed project would require preparation of a Noise Study Report (NSR), which would require approximately two months to prepare. The NSR would identify noise impacts and noise abatement options, if required, in addition to abatement feasibility and abatement reasonableness allowances.

8.14 Energy and Climate Change

Energy:

The CEQA document would evaluate and discuss the potential energy impacts associated with the project (per CEQA Guidelines Appendix F).

Even if the project uses federal funds, it is not anticipated that an Energy Technical Report would be required. Per FHWA guidance (TA-6640.8A), detailed energy studies and BTU computations are rarely warranted at the project level. Chapter 13 of the SER echoes this guidance when it addresses determining the need for detailed, project-level energy studies:

> *Balancing energy used during construction and operation against energy saved by relieving congestion and reducing out of direction travel, most projects, even new highway projects, would not have substantial energy impacts.*

The proposed interchange would be expected to result in energy consumption during construction phases that would exceed the No-Build Alternative. However, as identified by the FHWA, the proposed interchange would likely result in long-term, energy requirements that would be less than the No-Action Alternative, which would be associated with the inefficiencies generated by the failure of the SR99/Skyway Interchange. For example, TA-6640.8A states "post-construction, operational energy requirements of the facility should be less with the build alternative as opposed to the no-build alternative."

Climate Change:

An analysis of greenhouse gas emissions and global climate change is required during the environmental review conducted per CEQA. The proposed interchange is intended to increase efficiency and safety and to prevent LOS impacts that are likely to occur at the SR99/Skyway Interchange. The SER identifies stop-and-go traffic (between 0 and 20 miles per hour) as the source of the most severe emissions of greenhouse gasses. The SER goes on to state that "[r]elieving congestion by enhancing operations and improving travel times in high congestion travel corridors will lead to an overall reduction in GHG emissions."

The project is a congestion relief project and thus would require a quantitative analysis using ARB's EMFAC model to carbon dioxide (CO_2) emissions.

At the federal level, neither the EPA nor the FHWA have established regulations or guidelines related to project-specific climate change analyses. The FHWA promotes the consideration of climate change throughout the planning process, particularly during program development and project delivery stages, often by integrating the issue into other planning principals, such as:

- Economic Vitality
- Global Efficiency
- Environmental Enhancement
- Safety and Mobility
- Energy Conservation
- Quality of Life

In addition to these broad planning principals, the FHWA identifies four specific reduction strategies for greenhouse gas (GHG) emissions:

1. Improve systems & operational efficiency
2. Reduce growth of vehicle miles traveled
3. Transition to lower GHG fuels
4. Improve vehicle technologies

8.15 Biological Environment

Wetlands/Water Features:

A large, vegetated swale separates the SR99 and Southgate Lane alignments in the southeast quadrant. The southwest quadrant is currently undeveloped. The northwest quadrant of the intersection is mostly developed with existing commercial and industrial land uses. The ultimate improvements would result in an auxiliary lane on northbound SR99 that would require a box culvert on Comanche Creek.

Potential Wetlands:

The following features are identified by the NWI within the vicinity of the proposed project:

Table 7: National Wetland Inventory Features

Class	Type	Area of Site	Acres
PUBFx	Freshwater Pond	SE Quadrant of Interchange	0.1
PEMC	Freshwater Emergent Wetland	Adjacent to Southgate Ave	0.63
		Approximate Total:	**3.2**

Special-Status Species:

Comanche Creek is considered a potential movement corridor for the federally and state listed giant garter snake.

Several elderberry shrubs, the sole host plant for the federally listed valley elderberry longhorn beetle, were identified in the lands surrounding the SR99/Southgate Lane Intersection.

The interchange site is largely disturbed with the exception of the southern portion that supports a woodland and some open areas. There is low probability that Butte County meadowfoam (BCM), a state and federal endangered species, occurs within the project area.

The western burrowing owl, a California Species of Special Concern have the potential to occur within the project site.

The northern harrier and osprey, both California fully protected bird species, were observed within the project site during field surveys. In addition, the white-tailed kite, also a California fully protected species, has the potential to occur within the project site.

The Butte County golden clover, a California Native Plant Society List 1B species, has the potential to occur within the project site.

The project site contains suitable foraging habitat for the state listed Swainson's hawk. A known nesting occurrence has been documented within two miles of the project site.

Special-Status Habitats and Communities:

Potential foraging habitat for the state listed Swainson's hawk occurs adjacent to portions of the SR99 alignment.

8.16 Cumulative Impacts

Potential cumulative impacts are difficult to identify in substantial detail at the PID stage. The *PEAR Manual* states that, while cumulative impacts should be considered, "the level of detail should be far less than is required for the CEQA or NEPA document."

As of 2007, the *Regional Transportation Plan Guidelines* call for a programmatic analysis of the potential cumulative impacts generated by implementation of the projects identified within the plan. The plan-level analysis set forth in an RTP can be used at the PID stage to identify potential cumulative impact analyses that will likely be required for a given project. The EIR for the 2008 RTP identifies a series of significant cumulatively considerable impacts that would be generated by plan implementation.

8.17 Context Sensitive Solutions

The proposed project would be developed in a manner that ensures safety and efficiency while enhancing the surrounding community's plans, policies and values. As described in the preceding technical summaries, the project site includes protected natural landscapes, sensitive

habitats and special-status land uses. As a result, the SR99/Southgate Interchange is being proposed within complex social and regulatory contexts. Thoughtful, early and imaginative planning and coordination will be necessary to ensure compliance with policies that require Context Sensitive Solutions outcomes.

9. Summary Statement for PSR or PSR-PDS

For each practicable alternative write a brief summary of key environmental issues, studies required, permits, and anticipated environmental commitments for permanent impacts. Include a time and potential constraints or special considerations, such as construction windows, biological monitoring, Native American monitoring, acquisition of Permits to Enter, etc. For a standard PSR, include cost estimates for environmental permits and commitments. This statement will go directly into the PSR or PSR-PDS.

All build alternatives for the proposed project are expected to have impacts or require additional technical studies with visual resources, cultural resources, hydrology, and floodplain, water quality and storm water runoff, hazardous waste/materials, air quality, noise and vibration, and biological resources. All project alternatives are also expected to require a Clean Water Act Section 404 permit and Section 401 Water Quality Certification, and California Fish and Game Code Section 1602 Streambed Alteration Agreement.

10. Disclaimer

This Preliminary Environmental Analysis Report (PEAR) provides information to support programming of the proposed project. It is not an environmental determination or document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in the Project Study Report (PSR). The estimates and conclusions in the PEAR are approximate and are based on cursory analyses of probable effects. A reevaluation of the PEAR will be needed for changes in project scope or alternatives, or in environmental laws, regulations, or guidelines.

11. List of Preparers

	Specialist	**Date**
Cultural Resources	Pacific Legacy	May 2009
Biologist	Gallaway Consulting, Biologist	August 2009
Community Impacts	Gallaway Consulting, Generalist	August 2009
Noise and Vibration	ICF Jones and Stokes	August 2009
Air Quality	ICF Jones and Stokes	August 2009
Paleontology	Gallaway Consulting, Generalist	August 2009
Water Quality	WRECO	June 2009
Hydrology and Floodplain	Gallaway Consulting, Generalist	August 2009
Hazardous Waste/Materials	Blackburn Consulting	November 2008
Visual/Aesthetics	Gallaway Consulting, Generalist	August 2009
Energy/Climate Change	Gallaway Consulting, Generalist	August 2009
Other: Traffic	Fehr and Peers	February 2009

Attachment A: PEAR Environmental Studies Checklist

Attachment A: PEAR Environmental Studies Checklist

Rev. 11/08

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Land Use	☒	☐	☐	L	
Growth	☒	☐	☐	L	
Farmlands/Timberlands	☒	☐	☐	L	
Community Impacts	☒	☐	☐	L	
Community Character and Cohesion	☒	☐	☐	L	
Relocations	☒	☐	☐	L	
Environmental Justice	☒	☐	☐	L	
Utilities/Emergency Services	☒	☐	☐	L	
Visual/Aesthetics	☐	☐	☒	L	
Cultural Resources:	☐	☐	☒	L	
Archaeological Survey Report	☐	☐	☒	L	
Historic Resources Evaluation Report	☐	☐	☒	L	
Historic Property Survey Report	☐	☐	☒	L	
Historic Resource Compliance Report	☐	☐	☒	L	
Section 106 / PRC 5024 & 5024.5	☐	☐	☒	L	
Native American Coordination	☐	☐	☒	L	
Finding of Effect	☐	☐	☒	L	
Data Recovery Plan	☒	☐	☐	L	
Memorandum of Agreement	☒	☐	☐	L	
Other:	☐	☐	☐	L	
Hydrology and Floodplain	☐	☐	☒	L	
Water Quality and Stormwater Runoff	☐	☐	☒	L	
Geology, Soils, Seismic and Topography	☐	☐	☒	L	
Paleontology	☒	☐	☐	L	
PER	☒	☐	☐	L	
PMP	☒	☐	☐	L	
Hazardous Waste/Materials:	☐	☐	☐	L	
ISA (Additional)	☐	☐	☐	L	done 2008
PSI	☐	☐	☒	L	
Other:	☐	☐	☐	L	
Air Quality	☐	☐	☒	L	
Noise and Vibration	☐	☐	☒	L	Bioacoustics
Energy and Climate Change	☒	☐	☐	L	
Biological Environment	☐	☐	☒	L	
Natural Environment Study	☐	☐	☒	L	
Section 7:	☐	☐	☒	L	
Formal	☐	☐	☒	L	
Informal	☐	☐	☐	L	
No effect	☐	☐	☐	L	
Section 10	☒	☐	☐	L	
USFWS Consultation	☐	☐	☒	L	
NMFS Consultation	☐	☐	☒	L	
Species of Concern (CNPS, USFS, BLM, S, F)	☐	☐	☒	L	CNPS

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Wetlands & Other Waters/Delineation	☐	☐	☒	L	
404(b)(1) Alternatives Analysis	☐	☐	☒	L	
Invasive Species	☒	☐	☐	L	
Wild & Scenic River Consistency	☒	☐	☐	L	
Coastal Management Plan	☒	☐	☐	L	
HMMP	☒	☐	☐	L	
DFG Consistency Determination	☒	☐	☐	L	
2081	☐	☐	☒	L	
Other: Navigable	☐	☐	☒	L	Section 10
Cumulative Impacts	☒	☐	☐	L	CEQA
Context Sensitive Solutions	☒	☐	☐	L	
Section 4(f) Evaluation	☒	☐	☒	L	
Permits:					
401 Certification Coordination	☐	☐	☒	L	
404 Permit Coordination, IP, NWP, or LOP	☐	☐	☒	L	
1602 Agreement Coordination	☐	☐	☒	L	
Local Coastal Development Permit Coordination	☒	☐	☐	L	
State Coastal Development Permit Coordination	☒	☐	☐	L	
NPDES Coordination	☐	☐	☒	L	
US Coast Guard (Section 10)	☒	☐	☐	L	
TRPA	☒	☐	☐	L	
BCDC	☒	☐	☐	L	

Attachment B: Estimated Resources by WBS Code

ATTACHMENT B - Resources by WBS Code

EA:

Description:

NOTE: This WBS resource estimating tool is for Generalist use ONLY when a district-specific WBS estimating tool is not available. Check with your supervisor before using this form.

WBS current 11/2008

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
Project Management														
100.05.05 – Project Init. & Plng.											0			0
100.05.10 – PID Cmpnt Exec. & Ctrl.											0			0
100.05.15 – PID Cmpnt Closeout											0			0
100.10.05 – PA&ED Cmpnt Init. & Plng.											0			0
100.10.10 – PA&ED Cmpnt Exec. & Ctrl.											0			0
100.10.15 – PA&ED Cmpnt Closeout											0			0
100.10.20 – Project Shelving (PA&ED)											0			0
100.10.25 – Project Unshelving (PA&ED)											0			0
100.10.30 – Updd Admtv Rec during PA&ED											0			0
100.10.35 – Execd Coop Agre for PA&ED Process											0			0
100.15.05 – PS&E Cmpnt Init. & Plng.											0			0
100.15.10 – PS&E Cmpnt Exec. & Ctrl.											0			0
100.15.15 – PS&E Cmpnt Closeout											0			0
100.15.20 – Project Shelving (PS&E)											0			0
100.15.25 – Project Unshelving (PS&E)											0			0
100.15.30 – Updd Admtv Rec during PS&E											0			0
100.15.35 – Execd Coop Agre for PS&E Process											0			0
100.20.05 – Const. Cmpnt Init. & Plng.											0			0
100.20.10 – Const. Cmpnt Exec. & Ctrl.											0			0
100.20.15 – Const. Cmpnt Closeout											0			0
100.20.20 – Project Shelving (Construction)											0			0
100.20.25 – Project Unshelving (Construction)											0			0
100.20.30 – Updd Admtv Rec during Const											0			0
100.20.35 – Execd Coop Agre for Const Process											0			0
100.25.05 – R/W Cmpnt Init. & Plng.											0			0
100.25.10 – R/W Cmpnt Exec. & Ctrl.											0			0
100.25.15 – R/W Cmpnt Closeout											0			0
100.25.20 – Project Shelving (Right of Way)											0			0
100.25.25 – Project Unshelving (Right of Way)											0			0
100.25.30 – Updd Admtv Rec during R/W											0			0
100.25.35 – Execd Coop Agre for R/W Process											0			0
100.25.50 – Execd Coop Agre for R/W Rlnmnt											0			0
Total Project Management	0	0	0	0	0	0	0	0	0	0	0			
Perform Preliminary Engineering Studies and Prepare Draft Project Report														
160.05.05 – Approvd PID Review											0			0
160.05.10 – Geotechnical Information Review											0			0
160.05.20 – Traffic Data & Forecasts Review											0			0
160.05.30 – Project Scope Review											0			0
160.10.20 – Value Analysis											0			0
160.10.25 – Hydraulics/Hydro Study											0			0
160.10.30 – Hwy Planting Des Concepts											0			0
160.15.20 – Draft Project Report											0			0
160.15.25 – Draft PR Circ, Rev & App											0			0
160.30.05 – Maps for ESR											0			0
160.30.10 – Surveys/Maps for Env Studies											0			0
160.30.15 – Prop Access Rights for Env/Eng Studies											0			0
160.40 – NEPA Delegation											0			0
Total Prelim Eng Studies	0	0	0	0	0	0	0	0	0	0	0			

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
Perform Environmental Studies and Prepare Draft Environmental Document														
165.05.05 – Project Information Review											0			0
165.05.10 – Pub & Agency Scoping											0			0
165.05.15 – Alts for Further Study											0			0
165.10.15 – CIA, Land Use & Growth											0			0
165.10.25 – Noise Study											0			0
165.10.30 – Air Quality Study											0			0
165.10.35 – Water Quality Studies											0			0
165.10.40 – Energy/Climate Change Studies											0			0
165.10.45 – Sum Geotech Report											0			0
165.10.50 – Preliminary Site Investigation HW											0			0
165.10.55 – Draft R/W Relocation Impact Eval											0			0
165.10.65 – Paleontology Study											0			0
165.10.70 – Wild & Scenic River Coordination											0			0
165.10.75 – Envir Commitments Record											0			0
165.10.99 - Other Env Studies											0			0
165.15.05 – Biological Assessment											0			0
165.15.10 – Wetlands Study											0			0
165.15.15 – Resource Agency Coord											0			0
165.15.20 – NES Report											0			0
165.15.99 – Other Biological Studies											0			0
165.20.05 – Archaeology Survey											0			0
165.20.05.05 – APE Map											0			0
165.20.05.10 – NA Consultation											0			0
165.20.05.15 – Records & Literature Search											0			0
165.20.05.20 – Field Survey											0			0
165.20.05.25 – ASR											0			0
165.20.05.99 – Other Archy Survey Products											0			0
165.20.10 – Extended Phase I Archy Studies											0			0
165.20.10.05 – Native American Consultation											0			0
165.20.10.10 – Extended Phase I Proposal											0			0
165.20.10.15 – XP1 Field Investigation											0			0
165.20.10.20 – XP1 Materials Analysis											0			0
165.20.10.25 – Extended Phase I Report											0			0
165.20.10.99 – Other Phase I Archy Products											0			0
165.20.15 – Phase II Archy Studies											0			0
165.20.15.05 – NA Consultation											0			0
165.20.15.10 – Phase II Proposal											0			0
165.20.15.15 – Field Investigation											0			0
165.20.15.20 – Materials Analysis											0			0
165.20.15.25 – Phase II Report											0			0
165.20.15.99 – Other Phase II Archy Products											0			0
165.20.20 – Hist & Architectural Studies											0			0
165.20.20.05 – Prelim APE/Study Area Maps - Archl											0			0
165.20.20.10 – Hist Res Eval Rpt - Archy											0			0
165.20.20.15 – Hist Res Eval Rpt - Archl											0			0
165.20.20.20 – Bridge Evaluation											0			0
165.20.20.99 – Other H & A Study Products											0			0
165.20.25 – Cultural Res Comp Docs											0			0
165.20.25.05 – Final APE Maps											0			0
165.20.25.10 – PRC 5024.5 Consult											0			0
165.20.25.15 – HPSR/HRCR											0			0
165.20.25.20 – Finding of Effect											0			0
165.20.25.25 – Archy Data Recovery Pln											0			0
165.20.25.30 – MOA											0			0
165.20.25.99 – Other Cult Res Comp Products											0			0
165.25.05 – Draft ED Analysis											0			0
165.25.10 – 4(f) Evaluation											0			0
165.25.15 – CE/CE Determination											0			0
165.25.20 – Env Quality Control & Other Reviews											0			0
165.25.25 – Approval to Circ Resolution											0			0

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
165.25.30 – Env Coordination											0			0
165.25.99 – Other DED Products											0			0
165.30 – NEPA Delegation											0			0
Total Env Studies & Prep DED	0	0	0	0	0	0	0	0	0	0	0			
Permits, Agreements, and Route Adoptions during PA&ED Cmpnt														
170.05 - Required Permits (list)											0			0
170.10.05 - US Army Corps 404 Permit											0			0
170.10.10 - US Forest Service Permit(s)											0			0
170.10.15 - US Coast Guard Permit											0			0
170.10.20 - DFG 1600 Agreement(s)											0			0
170.10.25 - Coastal Zone Development Permit											0			0
170.10.30 - Local Agency Concurrence/Permit											0			0
170.10.40 - Waste Discharge (NPDES) Permit(s)											0			0
170.10.45 - US Fish & Wildlife Service Approval											0			0
170.10.50 - RWQCB 401 Permit											0			0
170.10.60 - Updated ECR											0			0
170.10.95 - Other Permits											0			0
170.45 - MOU from TERO Office											0			0
170.55 - NEPA Delegation											0			0
Total Permits, Agreements & Route Adoptions	0	0	0	0	0	0	0	0	0	0	0			
Circulate Draft Environmental Document and Select Preferred Project Alternative														
175.05.05 – Master Dist & Invitation Lists											0			0
175.05.10 – Notices Pub Hear & DED Avail											0			0
175.05.15 – DED Pub & Circulation											0			0
175.05.20 – Fed Consistency Det (Coastal)											0			0
175.05.99 – Other DED Circulation Products											0			0
175.10.05 – Need for Pub Hearing Determination											0			0
175.10.10 – Pub Hearing Logistics											0			0
175.10.15 – Displays for Pub Hearing											0			0
175.10.20 – 2nd Notice Pub Hear & Avail											0			0
175.10.25 – Map Display & Hearing Plan											0			0
175.10.30 – Display Pub Hear Maps											0			0
175.10.35 – Public Hearing											0			0
175.10.40 – Record of Public Hearing											0			0
175.10.99 – Other Pub Hearing Products											0			0
175.15 – Responses to Pub Hear Comments											0			0
175.20 – Project Preferred Alternative											0			0
175.25 – NEPA Delegation											0			0
Total DED & Preferred Alt	0	0	0	0	0	0	0	0	0	0	0			
Prepare and Approve Project Report and Final Environmental Document														
180.05.10 – Approved Project Rep											0			0
180.05.15 – Updated Stormwater Data Report											0			0
180.10.05 – Approved FED											0			0
180.10.05.05 – Draft FED Review											0			0
180.10.05.10 – Revised Draft FED											0			0
180.10.05.15 – Section 4(f) Evaluation											0			0
180.10.05.20 – Findings Report											0			0
180.10.05.25 – Statement of Overriding Consid											0			0
180.10.05.30 – CEQA Certification											0			0
180.10.05.35 – FHWA and Approval											0			0
180.10.05.40 – Section 106 Cons & MOA											0			0
180.10.05.45 – Section 7 Consultation											0			0
180.10.05.50 – Final Section 4(f) Statement											0			0
180.10.05.55 – Floodplain Only PAF											0			0
180.10.05.60 –Wetlands Only PAF											0			0
180.10.05.65 – Sect 404 Permit Compliance											0			0
180.10.05.70 – Mitigation Measures											0			0
180.10.10 – Public Dist & Resp to Comments											0			0

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
180.10.15 – Final R/W Relo Impact Document											0			0
180.10.99 – Other FED Products											0			0
180.15.05 – ROD (NEPA)											0			0
180.15.10 – NOD (CEQA)											0			0
180.15.20 – Env Commitments Record											0			0
180.15.99 – Other Complete ED Products											0			0
180.20 – NEPA Delegation											0			0
Total App PR & FED	0	0	0	0	0	0	0	0	0	0	0			
Update Project Info for PS&E														
185.05.05 – Project Concept Review for PS&E											0			0
185.05.10 – Updated Project Info for PS&E dev											0			0
Total Update for PS&E	0	0	0	0	0	0	0	0	0	0	0			
ROW & Excess Land														
195.40.25 – Property Maint & Rehab (non-rental)											0			0
195.40.35 – Transfer of Prop to Clear Status											0			0
195.45.05 – Excess Lands Inventory											0			0
195.45.20 – Prop Disp Units less than $15 K											0			0
195.45.25 – Prop Disp Units $15 K -$500 K											0			0
195.45.30 – Prop Disp Units over $500 K											0			0
Total ROW & Excess Land	0	0	0	0	0	0	0	0	0	0	0			
Utility Relocation														
200.15 – Approved Utility Relocation Plan											0			0
200.20 – Utility Relocation Package											0			0
Total Coordinate Utilities	0	0	0	0	0	0	0	0	0	0	0			
Permits, Agreements, and Route Adoptions during PS&E Cmpnt														
205.10.05 - US Army Corps 404 Permit											0			0
205.10.10 - US Forest Service Permit(s)											0			0
205.10.15 - US Coast Guard Permit											0			0
205.10.20 - DFG 1600 Agreement											0			0
205.10.25 - Coastal Development Permit											0			0
205.10.30 - Local Agency Concurrence/Permit											0			0
205.10.40 - Waste Discharge (NPDES) permit											0			0
205.10.45 - US Fish & Wildlife Service Approval											0			0
205.10.50 - RWQCB 401 Permit											0			0
205.10.60 - Updated ECR											0			0
205.10.95 - Other Permits											0			0
205.20.05 – Draft Fwy Agreement											0			0
205.20.10 – Draft Fwy Agree Review											0			0
205.20.15 – Final Fwy Agree											0			0
205.20.20 – Executed Fwy Agreement											0			0
205.40.10 - New Connections & Route Adopt Sbtl											0			0
205.55 - NEPA Delegation											0			0
Total Permits, Agreements, and Route Adoptions	0	0	0	0	0	0	0	0	0	0	0			

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
Right of Way Interests														
225.55.20 – Right of Way Clearance											0			0
Total Right of Way Interests	0	0	0	0	0	0	0	0	0	0	0			
Prepare Draft PS&E														
230.05.45 – Noise Barrier Plans											0			0
230.10.05 – Hwy Planting Plans											0			0
230.10.15 – Plant List											0			0
230.35.10 – Hwy Planting Specs											0			0
230.35.35 – Water Pollution Ctrl Specs											0			0
230.35.40 – Erosion Control Specs											0			0
230.60 – Updated Proj Info for PS&E Package											0			0
230.60.05 - Updated Storm Water Data Report											0			0
230.60.10 – Other Reviews/Updates Proj Info											0			0
230.90 – NEPA Delegation											0			0
Total Prepare Draft PS&E	0	0	0	0	0	0	0	0	0	0	0			
Mitigate Environmental Impacts and Clean-up Hazardous Waste														
235.05.05 – Hist Structures Mitig											0			0
235.05.10 – Archy & Cult Mitigation											0			0
235.05.15 – Biological Mitigation											0			0
235.05.20 – Env Mitigation R/W work											0			0
235.05.25 – Paleontology Mitigation											0			0
235.05.99 - Other Env Mitigation Products											0			0
235.10.10 – Haz Waste Sites Survey											0			0
235.10.15 – Detailed HW Sites Investigation											0			0
235.15 – HW Management Plan											0			0
235.20 – HW PS&E											0			0
235.25 – HW Clean-up											0			0
235.30 – Certification of Sufficiency (HW)											0			0
235.35 – Long Term Mitigation Monitoring											0			0
235.40 – Updated ECR											0			0
235.45 – NEPA Delegation											0			0
Total Mitigation & HW Clean-up	0	0	0	0	0	0	0	0	0	0	0			
Permits for Subsurface Geotechnical Exploration														
240.70 – Site Ready for Subsurface Exploration											0			0
Total Geotechnical Permit	0	0	0	0	0	0	0	0	0	0	0			
Circulate, Review and Prepare Final District PS&E Package														
255.05 – Circ & Rev Draft Dist PS&E											0			0
255.10.25 - Updated Technical Reports											0			0
255.15 – Env Reevaluation											0			0
255.20.05 - Rev Plans for Stds Comp											0			0
255.40 - Res Engs Pending File											0			0
255.45 – NEPA Delegation											0			0
Total PS&E	0	0	0	0	0	0	0	0	0	0	0			

Assigned Unit	Senior	Coord	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	Noise/Air	Paleo	Sup Svcs	Total	Begin Date	End Date	Duration (days)
Prepare Contract Documents														
260.75 - Env Cert at RTL											0			0
Total Prepare Contract Documents	0	0	0	0	0	0	0	0	0	0	0			
Perform Construction Engineering and General Contract Administration														
270.20.50 – Technical Support											0			0
270.55 – Final Inspect & Accept Rec											0			0
270.70 – Update ECR											0			0
270.75 – Permit Renewal & Extension											0			0
270.80 – Long-Term Mitigation Contract											0			0
Total Const Engineering	0	0	0	0	0	0	0	0	0	0	0			
Prepare and Administer Contract Change Orders														
285.05.05 - Need for CCO Determination											0			0
285.10.15 – Other Func Support											0			0
Total CCOs	0	0	0	0	0	0	0	0	0	0	0			
Resolve Contract Claims														
290.35 – Provide Techinical Support											0			0
Total Contract Claims	0	0	0	0	0	0	0	0	0	0	0			
Accept Contract, Prepare Final Construction Estimate & Prepare Final Report														
295.35 – Cert of Env Compliance											0			0
295.40 – Long-Term Mitigation Contract											0			0
Total Final Construction	0	0	0	0	0	0	0	0	0	0	0			
Total Project Hours	0	0	0	0	0	0	0	0	0	0	0			

Attachment C: PEAR Environmental Commitments Cost Estimate (Standard PSR)

Attachment C: PEAR Environmental Commitments Cost Estimate

Standard PSR Only

(Prepare a separate form for each viable alternative described in the Project Study Report)

PART 1 PROJECT INFORMATION *rev. 11/08*

District-County-Route-Post Mile 03-Butte-SR99-28.1(2	EA: 4E670
Project Description: State Route 99/Southgate Avenue Interchange and Extension	
Form completed by (Name/District Office):	
Project Manager: Bob Greenlaw	Phone Number: 5308796930
Date: 12-20-2010	

PART 2 PERMITS AND AGREEMENTS

	Permits and Agreements **($$)**
☒ Fish and Game 1602 Agreement	7000
☐ Coastal Development Permit	0
☒ State Lands Agreement	4000
☒ Section 401 Water Quality Certification	4000
☐ Section 404 Permit – Nationwide (U.S. Army Corps)	0
☒ Section 404 Permit – Individual (U.S. Army Corps)	15000
☒ Section 10 Navigable Waters Permit (U.S. Army Corps)	4000
☐ Section 9 Permit (U.S. Coast Guard)	0
☒ Other: CVFPB	4000
Total (enter zeros if no cost)	38000

PART 3. ENVIRONMENTAL COMMITMENTS FOR PERMANENT IMPACTS

To complete the following information:

- o Report costs in $1,000s.
- o Include all costs to complete the commitment:
  - Capital outlay and staff support. Refer to Estimated Resources by WBS Code. For example, if you estimated 80 hours for biological monitoring (WBS 235.35 Long Term Mitigation Monitoring), convert those hours to a dollar amount for this entry. For current conversion rates from PY to dollars, see the Project Manager.
  - Cost of right of way or easements.
  - If compensatory mitigation is anticipated (for wetlands, for example), insert a range for purchasing credits in a mitigation bank.
  - Long-term monitoring and reporting
  - Any follow-up maintenance
  - Use current costs; the Project Manager will add an appropriate escalation factor.
  - This is an estimating tool, so a range is not only acceptable, but advisable.

Environmental Commitments Alternative All		
	Estimated Cost in $1,000's	Notes
Noise abatement or mitigation	0	
Special landscaping	0	
Archaeological resources	10000	
Biological resources	50000	w/permitting
Historical resources	0	
Scenic resources	5000	
Wetland/riparian resources	50000+	
Res./bus. relocations	0	
Other:	0	
Total (enter zeros if no cost)	115000	

I. Initial Site Assessment and Preliminary Geotechnical Memorandum

INITIAL SITE ASSESSMENT

State Route 99/

Southgate Avenue Interchange

Chico, California

Prepared for:

Mark Thomas & Company, Inc.
7300 Folsom Blvd., Suite 203
Sacramento, CA 95826

September 2011

Prepared by:

BLACKBURN CONSULTING
11521 Blocker Drive, Suite 110
Auburn, CA 95603

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Geotechnical ▪ Construction Services ▪ Forensics

BCI File 961.1
September 29, 2011

Mr. Matt Brogan
Mark Thomas & Company, Inc.
7300 Folsom Blvd., Suite 203
Sacramento, CA 95826

Subject: **Initial Site Assessment**
State Route 99 /Southgate Avenue Interchange Project
Chico, California

Dear Mr. Brogan,

In accordance with our June 11, 2008 agreement, Blackburn Consulting (BCI) prepared this Initial Site Assessment (ISA) for the proposed State Route 99/Southgate Avenue Interchange Project in Chico, California. In general, the project proposes construction of an interchange at SR 99/Southgate Avenue and construction of additional surface roads to improve traffic circulation in this vicinity. The purpose of this assessment is to identify recognized hazardous material issues within an area bounded by the estimated project limits. These findings will be used in planning and design to identify where hazardous materials may affect the project .

Thank you for selecting BCI to assist you on this project. Please call if you have questions or require additional information.

Sincerely,

BLACKBURN CONSULTING,

PROFESSIONAL GEOLOGIST
6/30/12
David J. Buck
No. 1341
Certified
Engineering
Geologist
STATE OF CALIFORNIA

David Buck, P.G., C.E.G
Senior Project Manager

Jeff Patton, P.E.
Principal Engineer

Initial Site Assessment
State Route 99/Southgate Avenue Interchange Project
Chico, California

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FIGURES

Figure 1 – Vicinity Map
Figure 2A – Site Plan
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Appendix A – Historical Aerial Photographs

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Appendix C – EDR Report Executive Summary
Listing of Searched Databases
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Appendix D – Reconnaissance Photos

INVESTIGATIVE SUMMARY

The purpose of this report is to identify historical and present-day indications of the use, misuse, or storage of hazardous and/or potentially hazardous substances that may impact the planned SR 99/Southgate Avenue Interchange Project (project). This section summarizes the key issues identified in this report. The purpose of this assessment is to identify recognized environmental conditions[1] (RECs) and potential RECs within and adjacent to the area being considered for various project alternatives. This assessment identifies sites and REC issues that could potentially impact design and construction. It is for the planners and designers to use to better understand the potential hazardous materials impacts to project development.

Project Location and Description

The project study area is approximately centered on the intersection of SR 99 and Southgate Avenue on the south side of the City of Chico, California. The study area is approximately bordered by Fair Street on the north, Midway on the west, Marybill Ranch Road on the south, and Skyway on the east. Construction of an interchange is proposed at SR 99/Southgate Avenue. In addition to the interchange, other potential roadway improvements are being considered within the study area. A vicinity map is shown in Figure 1 and an overview of the project study area is shown in Figure 1.

Potential Hazardous Materials Impacts

The project is in the preliminary planning stage and we have not been provided a list of parcels planned for either right-of way aquisition or ownership transfer. Therefore we have identified sites throughout the study area with potential RECs that may impact project improvements. We group the sites into high, medium, and low risk categories (in general conformance with Caltrans PA/ED Risk Classification) based on our evaluation of the potential risk they could pose if the project is located on or adjacent to the site. The sites are listed within the report and in Tables 1 through 3. The tables contain assessor's parcel number, address, figure reference, current and/or former use, REC description, and recommended action. Where right-of-way will be acquired, additional site-specific assessment may be warranted. Additional assessment will likely include a more detailed site inspection, thorough regulatory file review, interviews, and building material and soil sample collection and analysis.

---

[1] BCI uses the term Recognized Environmental Condition (REC) in general but not strict compliance with ASTM E1527-05, which defines the meaning as *"the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimus conditions that generally do not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of the appropriate regulatory agencies. Conditions determined to be de minimus are not recognized environmental conditions."* BCI includes this definition to clarify conditions addressed in this ISA but, it does not imply that this ISA is compliant with ASTM E 1527 – 05.

Table 1					
High Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former and/or Current Use**	**Potential REC**	**Recommended Action**
2A #1	2549 Scott Ave.	005-520-010	Card lock and bulk fuel distributer	Petroleum hydrocarbons, Active aboveground storage tanks (AST)	Records review, Phase II sampling
2A #3	2535 Fair St.	005-520-044	Motor vehicle dismantling	Petroleum hydrocarbons, heavy metals	Records review, site inspection, possible Phase II sampling
2A #6	2840 Fair St.	Unknown	Chico Transportation	Petroleum hydrocarbons, underground storage tank (UST)- status unknown	Verify location, records review, site inspection
2A #8	11276 Midway	040-320-002	West Valley Construction	Documented release of petroleum hydrocarbons. Closed USTs	Records review, site inspection, possible Phase II sampling
2A #10	11239 Midway	040-420-002	PG&E Chico Service Center	Documented release of petroleum hydrocarbons. Active USTs, use/storage of solvents, polychlorinated biphenols (PCBs)	Records review, site inspection, possible Phase II sampling
2A #11	11226 Midway	040-320-013	Retail fuel/bulk petroleum products	Documented release of petroleum hydrocarbons, active USTs	Records review, Phase II sampling
2A #12	11204 Midway	040-320-008	Western Petroleum Marketers	Surface release of petroleum hydrocarbons	Records review, site inspection, possible Phase II sampling
2A #13	11128 Midway	040-310-087	Valley Wide Chemical/Cabinet Shop	Ag Chemicals/ Pesticides/Paint/ Solvent	Records review, site inspection, possible Phase II sampling
2A #14	11110 Midway	040-310-080	Capitol Coors/ Valley Rubber & Gasket	Documented release of petroleum hydrocarbons, closed UST	Records review, possible Phase II sampling

Table 1 (Continued)					
High Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former and/or Current Use**	**Potential REC**	**Recommended Action**
2A #15	11096 Midway	040-310-064	Pacific Stihl	Documented release of petroleum hydrocarbons, closed UST	Records review, site inspection, possible Phase II sampling
2A #18	11011 Midway	039-060-134	Agri Electric	Petroleum hydrocarbons, UST-status unknown	Site inspection, records search, possible Phase II sampling
2A #19	127 Speedway	040-310-030	Smuckers plant/former CE Building Products	Trichloroethylene (TCE) Tetrachloroethylene (PCE), Petroleum hydrocarbons	Records review, possible Phase II sampling
2A	NA	NA	Skyway Homes Groundwater Plume	TCE /PCE	Records review, possible Phase II sampling
2A #20	2570 Hegan Ln.	029-050-053	Kinder Morgan/ SFPP Chico Fuel Terminal	Documented release of petroleum hydrocarbons, active ASTs, closed UST	Records review, Phase II sampling
2A #21	2518 Hegan Ln.	Unknown	Bulk Fuel	Petroleum hydrocarbons, active AST	Records review, Phase II sampling
2A #22	594 Paseo Companeros	040-340-015	G.E.Weiss	Petroleum hydrocarbons, UST-status unknown	Site inspection, records review, possible Phase II sampling
2A #25	163 McFadden Ln.	040-020- 091	Residence	Petroleum hydrocarbons, active UST	Records review, site inspection, possible Phase II sampling
2A #26	89 Loren Ave.	040-400- 073	Lumber Company	Petroleum hydrocarbons, USTs-status unknown , solvents	Site inspection, records review, possible Phase II sampling

Table 1 (Continued)					
High Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former and/or Current Use**	**Potential REC**	**Recommended Action**
2A #15	11096 Midway	040-310-064	Pacific Stihl	Documented release of petroleum hydrocarbons, closed UST	Records review, site inspection, possible Phase II sampling
2A #27	71 Loren Ave.	040-400-086	Distributing Co.	Documented release of petroleum hydrocarbons	Records review, possible Phase II sampling
2A #29	701 Entler Ave.	040-400-017	Former Chemtec Agri Chems	Ag Chemicals/ Pesticides	Records review, site inspection, possible Phase II sampling
2A #30	775 Entler Ave.	040-400-021	Former FMC Corp. Agri Chem Group	Ag Chemicals/ Pesticides	Records review, site inspection, possible Phase II sampling
2B #34	3750 Morrow Ln.	002-200-036	Pacific Bell Corp Yard	Documented release of petroleum hydrocarbons, active USTs, solvents	Records review, possible Phase II sampling
2B #38	2741 Cramer Ln.	040-030-074	Tree farm	Petroleum hydrocarbons, active AST, UST- status unknown, solvents	Records review, site inspection, possible Phase II sampling
2B #39	2801 Notre Dame Blvd.	040-030-065	Church	Petroleum hydrocarbons, USTs-status unknown	Records review, site inspection, possible Phase II sampling
2B #40	425 Southgate Ln.	040-400-088	Peterson Tractor	Surface spill of petroleum hydrocarbons, UST-status unknown	Records review, site inspection, possible Phase II sampling
2B #45	3155 Southgate Ln.	040-400-068	Pesticide manufacturer	Ag Chemicals/ Pesticides/Petroleum hydrocarbons, USTs-status unknown	Site inspection, records review, possible Phase II sampling

Table 1 (Continued)					
High Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former and/or Current Use**	**Potential REC**	**Recommended Action**
2A #47	2675 Fair St.	005-500-014 & 011	Auto Dismantlers	Petroleum hydrocarbons, heavy metals	Site inspection, records review, possible Phase II sampling
2A,2B #50	NA	NA	Former SP Railroad Grade	Heavy metals, petroleum hydrocarbons, other chemicals, asbestos	Phase II sampling
2A #27	71 Loren Ave.	040-400-086	Distributing Co.	Documented release of petroleum hydrocarbons	Records review, possible Phase II sampling
2A #29	701 Entler Ave.	040-400-017	Former Chemtec Agri Chems	Ag Chemicals/ Pesticides	Records review, site inspection, possible Phase II sampling
2A #30	775 Entler Ave.	040-400-021	Former FMC Corp. Agri Chem Group	Ag Chemicals/ Pesticides	Records review, site inspection, possible Phase II sampling

Table 2					
Medium Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former or Current Use**	**Potential REC**	**Recommended Action**
2A #2	2569 Scott Ave.	005-520-018	Solid waste transfer station	Various chemicals, hazardous building materials	Records review, site inspection, interview
2A #4	2605 Fair St.	005-520-017	Solid waste transfer station	Various chemicals, hazardous building materials	Records review, site inspection, interview
2A #5	2855 Fair St.	005-580-013	Construction rental yard	Petroleum hydrocarbons, AST	Records review, site inspection, interview

Table 2 (Continued)					
Medium Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former or Current Use**	**Potential REC**	**Recommended Action**
2A #9	11254 Midway	040-320-011	Iron Works (inactive)	Petroleum hydrocarbons, heavy metals	Records review, site inspection, interview, possible Phase II sampling
2A #17	11025 Midway	039-060-135	Roofing company yard w/ old vehicle storage	Petroleum hydrocarbons	Records review, site inspection, interview
2A #28	71 Loren Ave.	040-400-013	Hupp Neon	Solvents handling	Records review, site inspection, interview
2B #42	3097 Southgate Ln.	040-400-070	Waste disposal corp yard	Petroleum hydrocarbons	Records review, site inspection, interview
2B #43	435 Southgate Ct.	040-400-050	Former seed company	Pesticides	Records review, site inspection, interview
2B #44	446 Southgate Ct.	040-400-084	Seed Company	Pesticides	Records review, site inspection, interview
2B #46	1696 Skyway	040-020-141	Gravel mining	Petroleum hydrocarbons	Records review, site inspection, interview
2A #48	631 Country Dr.	005-580-019	Body shop	Heavy metals, petroleum hydrocarbons	Records review, site inspection, interview
2A #49	11196 Midway	040-310-082	Tank and Truck Repair	Petroleum hydrocarbons, AST	Records review, site inspection, interview
2B #51	1856 Skyway	040-020-134	Wood products manufacturing	Petroleum hydrocarbons, AST	Records review, site inspection, interview
2A #52	322 Entler Ave	040-040-010	Residence w/ small tank	Petroleum hydrocarbons, AST	Records review, site inspection, interview

Table 2 (Continued)					
Medium Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former or Current Use**	**Potential REC**	**Recommended Action**
2A #53	629 Entler Ave.	040-400-074	Equipment yard, soil piles	Petroleum hydrocarbons, metals, other chemicals	Site inspection, records review, interview, possible Phase II sampling
2A #54	Southgate Ave.	040-400-091	Asphalt and concrete recycling	Asbestos, petroleum hydrocarbons, heavy metals	Site inspection, interview, records review, possible Phase II sampling
2A,2B	NA	NA	Historic orchards	Persistent pesticides	Phase II sampling
2A,2B	NA	NA	Dredge tailings	Heavy metals	Phase II sampling
2A #17	11025 Midway	039-060-135	Roofing company yard w/ old vehicle storage	Petroleum hydrocarbons	Records review, site inspection, interview
2A #28	71 Loren Ave.	040-400-013	Hupp Neon	Solvents handling	Records review, site inspection, interview
2B #42	3097 Southgate Ln.	040-400-070	Waste disposal corp yard	Petroleum hydrocarbons	Records review, site inspection, interview

Table 3					
Low Risk Sites					
Figure/ ID#	**Address**	**APN**	**Former or Current Use**	**Potential REC**	**Recommended Action**
2A #7	2860 Fair St.	040-310-071	Photoprocessing	Photochemicals	Interview, site inspection
2A #16	11088 Midway	040-310-076	Boat Manufacturing	Solvents	Interview, site inspection
2A #23	496 Entler Ave.	040-640-014	Former cabinet shop	Paint, solvents	Interview
2A #24	1 Baja Ct.	040-480-010	Trucking	Unknown	Interview
2A #31	725 Entler Ave.	040-400-089	Manufacturing	Solvents	Interview, site inspection
2B #32	2580 Notre Dame Blvd.	002-330-013	Home Depot	Pesticides, solvents, other retail chemicals	Interview, site inspection
2B #33	3650 Morrow Ln.	002-330-023	Diagnostic Imaging	Photochemicals	Interview, site inspection
2B #35	3711 Morrow Ln.	040-030-030	Wood fabrication	Petroleum hydrocarbons, other	Interview, site inspection
2B #36	2600 Notre Dame Blvd.	040-030-037	Building supply	Paints, other building products	Interview, site inspection
2B #37	48 Comanche Ct.	040-030-047	Construction company	Waste solvents	Interview, site inspection
2B #41	3075 Southgate Ln.	040-400-066	Manufacturing	Waste solvents	Interview, site inspection

General Issues

Agricultural Chemicals (Pesticides/Herbicides)

Significant portions of the project study area are located on agricultural land historically cultivated in orchards; consequently, there is potential for residual pesticides and/or herbicides. We did not observe evidence of potential historical pesticide/herbicide mixing, storage and/or misuse within the study area (other than sites already identified as possible pesticide manufacturing/handling facilities). Figures 2A and 2B show historic orchard areas active during a period when use of persistent pesticides would be expected to be most prevalent (1950's and earlier).

Aerially Deposited Lead

The presence of aerially deposited lead (ADL) adjacent to heavily traveled roadways, such as SR 99 is not uncommon. Based on review of air photos and topographical maps, SR 99 has been in service since at least 1957. Before SR 99 construction, Midway was the main north-south roadway in the area dating back to at least 1912. Based on our experience, Caltrans will likely require an ADL study for improvements to the SR 99 corridor. This is consistent with their general requirement to require ADL testing along heavily traveled roads in use prior to 1987.

Transformers

The scope of this assessment did not include an inventory of past and present transformers. However, BCI observed many overhead power lines and ground surface or pole-mounted transformers within the project area. Older transformers may contain polychlorinatedbiphenyls (PCBs) and this should be considered if they are removed or relocated during construction. Identification and remediation of old transformers is the responsibility of the utility owner. If the relocation of transformers is required, they should be checked for the presence of PCBs or other hazardous materials by the utility owner, and if present, should be properly remediated and disposed.

Yellow Traffic Stripes

Yellow traffic stripes typically contain heavy metals including lead and chromium at concentrations in excess of the hazardous waste thresholds established by Title 22 of the California Code of Regulations and may produce toxic fumes when heated. Consequently, any yellow traffic striping within the project area will require proper disposal, which may include disposal at a Class 1 disposal facility.

Underground Product Distribution Lines

We observed markers indicating the presence of buried distribution lines for natural gas along the east side of Midway, north of Entler Avenue. The PG&E Service Center on Midway has a large natural gas dispensing facility. No record of contamination resulting from these lines was discovered in our assessment; however, there is the potential for unidentified leaks along buried pipelines. Due to its explosive potential, natural gas is considered a hazardous material. Project design should consider the potential for leaks from underground natural gas distribution lines.

Our investigation did not include a utility survey; therefore we did not attempt to locate all of these lines.

Asphalt
It is anticipated that project improvements will include the removal of existing asphalt. Currently asphalt is not regulated as a hazardous material, but potential contaminants in the asphalt binder are the source of off-site disposal restrictions imposed by the State of California Integrated Waste Management Board. Consequently asphalt removal from the project will need to be disposed in accordance with current regulations.

Building Materials
Asbestos and lead based paint associated with the demolition/modification of existing structures, bridges, and/or roadway may be encountered. Consequently, the resulting debris may be a regulated waste and should be characterized and classified prior to disposal.

Septic Tanks
According to the City of Chico sewer maps and discussion with Butte County Environmental Health Department staff, very little of the study area is served by a public sewer system. Therefore, essentially all of the commercial and residential structures south of Fair Street between Midway and SR 99 are served by on-site sewage disposal systems with septic tanks and leach fields. The commercial complexes located on Southgate Lane and Court (east of SR 99) are also served by septic systems. There is the potential for RECs to be associated with septic systems, especially those serving commercial facilities.

Heating Oil Tanks/ "Farm" Tanks
Older commercial and residential structures in rural areas often have above-ground or below-ground heating oil tanks associated with them. In addition, agricultural sites may contain above-ground or below-ground motor vehicle fuel tanks typically referred to as "farm tanks". Due to regulatory exemptions, some of these tanks may not appear in the searched databases. There is the potential for RECs to be present on sites where heating oil tanks or farm tanks were located.

1 INTRODUCTION

Mark Thomas & Company, Inc. (MTCo) retained Blackburn Consulting (BCI) to perform an Initial Site Assessment (ISA) for the State Route 99/Southgate Avenue Interchange Project (project) in Chico, California.

The purpose of this ISA is to:

- Identify known "recognized environmental conditions" (REC) [2] and potential REC within the study area which may influence planning, design and construction of the proposed project.
- Identify parcels with REC within the project study area and assess the potential impacts to site acquisition and/or construction if portions of these parcels must be acquired to facilitate the planned improvements.

To prepare this ISA, BCI:

- Conducted a limited site inspection of publicly visible portions of properties to observe current land use and indications of hazardous and potentially hazardous substances issues for those parcels that may be impacted by the improvements as well as adjacent parcels which may impact the proposed improvement area,
- Reviewed available information to provide a limited assessment of past and present operations conducted on parcels BCI has identified as having RECs and /or potential RECs,
- Reviewed historical aerial photographic coverage and topographic map coverage of the study area and surrounding properties for indications of potential sources of contamination,
- Performed federal, state, and county records review for indications of the use, misuse, or storage of hazardous and/or potentially hazardous substances at sites within the estimated improvement areas. The federal, state, and county database search was provided by a record check service, and,
- Reviewed the site geology;

[2] BCI uses the term Recognized Environmental Condition (REC) in general but not strict compliance with ASTM E1527-05, which defines the meaning as *"the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimus conditions that generally do not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of the appropriate regulatory agencies. Conditions determined to be de minimus are not recognized environmental conditions."* BCI includes this definition to clarify conditions addressed in this ISA but it does not imply that this ISA is compliant with ASTM E 1527 – 05.

2 PROJECT DESCRIPTION AND LOCATION

2.1 Description

The project is in the early planning stages. At the present time the proposed improvements consist of construction of an interchange at Southgate Avenue and SR 99 in Chico, California. Additional potential roadway improvements are being considered for the surrounding area.

2.2 Geologic Characteristics of Study Area and Vicinity

Topography through the study area is generally flat with a gentle rise toward the east. The elevation varies from approximately 200 feet above mean sea level (MSL) at the western margin of the study area to approximately 250 feet above MSL at the eastern margin.

Two major drainages are mapped in the study area. Commanche Creek (Edgar Slough on early maps) crosses through the northern portion of the study area and Butte Creek crosses the east and southeast portions of the area.

The site lies within the Sacramento Valley portion of the Great Valley geomorphic province. The Cascade and Klamath Ranges border the Great Valley to the north, the Coast Ranges to the west, the Sierra Nevada to the east, and the Transverse Ranges to the south. The Great Valley is an asymmetrical trough with a more gently dipping eastern slope. It was formed by tilting of the Sierran Block with the western side dropping to form the valley and the eastern side being uplifted to form the Sierra Nevada. The valley is characterized by an accumulation of alluvial, lacustrine and marine sediments. The thickness of the sediments varies from a thin veneer at the edges of the valley, to many thousands of feet beneath the central portion of the valley.

Published geologic mapping[3] shows the site as being underlain by recent dredge tailings, Pleistocene-age alluvial deposits of the Modesto Formation, the Pleistocene-age Red Bluff Formation which consists of coarse red gravel with minor interbedded sand and silt, and Pliocene-age volcanic mudflow deposits of the Tuscan Formation. The Red Bluff Formation unconformably overlies the gently westward-dipping Tuscan Formation. The mapped contact between these two formations is generally located to the east of the SR-99 alignment within the study area.

Historical depth to groundwater beneath the site, as reported in California Department of Water Resources Water Level Data Library, averages approximately 80 feet in the western portion of the project area. This depth corresponds to a groundwater elevation of approximately 120 feet above MSL. It is likely that shallower zones of perched groundwater exist in the area, especially near the drainages. Shallow groundwater, generally in the range of 10 to 30 feet bgs is known to exist in the vicinity of the Kinder Morgan Terminal on Hegan Lane based on data from monitoring wells at the site.

[3] Suacedo, GL and Wagner, DL, 1992, Geologic Map of the Chico, California, California Division of Mines and Geology, Regional Geologic Map Series.

2.3 Current Land Use

Current land use within the study area includes:

- Retail gas and petroleum product sales
- Petroleum storage and distribution terminal
- Truck and heavy equipment repair shops
- Light Industrial
- Heavy Industrial
- Construction Yards
- State Highway 99
- Retail nursery
- Rural and suburban residential developments
- Agricultural land including almond and walnut orchards; pasture

Land use in the surrounding area includes commercial, industrial, rural and suburban residential and agriculture.

2.4 Historical Land Use

2.4.1 Summary

Early land use in the project area was predominantly agricultural, including row crops, orchards, and dry farming. Gold dredging was also performed on a significant portion of the area. Gravel mining along Butte Creek has continued to the present day. Gradual infilling of the area with commercial and residential development began in the mid 1950's and early 1960's and has continued to the present.

2.4.2 Aerial Photograph Review

As part of BCI's historical research, aerial photograph collections from the following years were reviewed:

1957 ***Photos by Cartwright, Scale 1"=800'***
1962 ***Photos by Cartwright, Scale 1"=800'***
1970 ***Photos by Western, Scale 1"=800'***
1984 ***Photos by USGS, Scale 1"=800'***
1998 ***Photos by USGS, Scale 1"=800'***
2005 ***Photo by EDR, (Partial area coverage) Scale 1"= 484'***

Copies of aerial photographs are included in Appendix A. The following summary includes the noted conditions and changes for the project area:

1957

SR 99 appears in its present day alignment with an at-grade crossing of the Southern Pacific (SP) tracks. Large areas of dredge tailings are located on both sides of SR 99 south of the intersection with the tracks. The Butte Creek gravel pit is located west of Skyway north of the creek. The SP tracks cross Butte Creek downstream of the gravel pit. Orchards, and to a lesser dry farming, dominate the remaining land use in the study area. A drive-in theatre is located at the northeast corner Midway and Speedway. Commercial development exists at the northwest corner of the study area near Fair Street and Midway and at the southeast corner of Midway and Hegan Lane.

1962

The dredge tailings between SR 99 and the SP tracks are leveled and the Peterson Tractor facility is constructed southwest of the intersection of SR 99 and the SP tracks. Additional commercial development is evident at the Fair Street/Midway area. Large above-ground fuel storage tanks are under construction at the northwest corner of Midway and Hegan Lane ("Chico Terminal"). Commercial development appears south of Butte Creek at Skyway. Commercial development is established on Speedway west of the SP tracks at the present site of the Smuckers plant.

1970

Additional tanks are constructed at the Chico Terminal. Large portions of the dredge tailings west of SR 99 are leveled and a commercial building is constructed south of the SR 99/SP tracks intersection. An airstrip is constructed at Peterson Tractor. Commercial development appears north of the intersection of SR 99 and the SP tracks. Expansion of commercial development is evident north of Midway/Hegan Lane.

1984

Significant further commercial development and road construction is evident at Southgate/Entler Avenue area. A commercial complex is constructed north of the SR 99/SP track intersection and another at Southgate Court on the east side of SR 99. Additional commercial development appears north and southeast of the Midway/Hegan Lane intersection. Residential development appears along Entler Avenue and the south side of Fair Street. A future baseball field complex is under construction at the east end of Southgate Avenue. Significant expansion of the commercial facility at Skyway south of Butte Creek is evident. The SP bridge at Butte Creek is removed.

1998

Additional residential development in the Entler Avenue area and expansion of the commercial development at Southgate Court are noted. The drive-in theatre is gone.

2005

Significant residential development between Entler Avenue and Speedway is evident.

2.4.3 Topographic Map Review

BCI's topographic map review included the USGS 30-minute quad map from 1895, 15-minute quad map from 1949, and 7½-minute quad maps from 1912, 1950, 1969, and 1978. Copies of the topographic maps are included in Appendix B. This summary records the baseline conditions as shown on the 1895 map and includes the noted changes within the project area as recorded on subsequent maps:

1895 Chico Quad, Scale 1:125000

This map shows unnamed roads in the present-day locations of Hegan Lane, Midway, and Fair Street. Butte Creek is shown within the study area.

1912 Durham Quad, Scale 1:31,680

Centerville Road is identified in the location of present-day Fair Street and Morrow Lane. Sterling Junction is identified at the intersection of present-day Hegan Lane and Midway. Butte County Railroad is shown passing through Sterling Junction and continuing eastward along the bluffs south of Butte Creek. The Northern Electric Railroad is located along the east side of Midway. A racetrack is shown southeast of Sterling Junction with an access road in the location of Speedway Avenue. Unimproved unnamed roads are shown, including the Marybill Ranch Road location. The drainage of Edgar Slough is shown located between and parallel to Centerville Road and the Butte County Railroad.

1949 Chico Quad, Scale 1:62500

Improved roads are shown in the location of Entler Avenue and eastern extension of Speedway Avenue. The former Butte County Railroad is now shown as Southern Pacific Railroad. Orchards are indicated in the area of Entler and Speedway, between Edgar Slough and the Southern Pacific tracks, and at the northeast corner of Marybill Ranch Road and Midway. Dredge tailings are shown in the area between the location of Southgate Avenue and Marybill Ranch Road and on the eastern edge of the study area north of Butte Creek. A gravel pit is shown in the tailings area just west of the present-day Skyway crossing of Butte Creek. The race track shown on the 1912 map does not appear here. Development of the Sterling Junction area is indicated with unidentified structures. Midway is identified as 99E.

1950 Chico Quad, Scale 1:24,000

A private airstrip identified as Patrick Airport is shown west of Midway. No other significant changes appear on this map version.

1969 Chico Quad, Photorevised from 1948 Scale 1:24,000

SR 99 is added to the map with an interchange shown at the new Skyway. SR 99 is shown as a four lane divided highway north of Skyway and a two lane highway to the south. The map indicates an at-grade crossing of SR 99 by the SP Railroad tracks. The Sterling Junction area shows additional commercial development. The aboveground fuel storage terminal is shown at the northwest corner of Hegan Lane and Midway. A drive-in theatre is shown at the northeast corner of Speedway Avenue and Midway. A large structure (present-day Smuckers plant) is shown at the east end of Speedway. Patrick Airport is no longer on the map. An airstrip and structure identified as Peterson Chico are shown southeast of the intersection of SR 99 and the

Southern Pacific tracks. Additional dredge tailing are shown in this area as well. The Little Chico Butte Creek Diversion is shown intersecting Butte Creek east of the Peterson Chico facility. Edgar Slough is identified as Comanche Creek.

1978 Chico Quad, Photorevised from 1948 Scale 1:24,000

Additional roads and commercial development appear in the study area including the addition of Southgate, Loren, and Entler Avenues. The SP tracks are removed from the project area and the alignment is referred to as "Old Railroad Grade". Additional orchards are shown south of Entler Lane.

2.4.4 Sanborn® Map Review

According to EDR, Sanborn Maps were not available for the the searched area.

3 RECORDS REVIEW

3.1 Review of County, State, and Federal Records

We requested Environmental Data Resources, Inc. (EDR) of Southport, Connecticut to perform a radius search of county, state, and federal databases for the project area. We reviewed the search results for indications of the use, misuse, or storage of hazardous and/or potentially hazardous substances within or adjacent to the project area. The EDR study has a search radius of 1-1/2 mile from the center of the project. A listing of the searched databases is included in Appendix C.

Sites with adequate address information are plotted on EDR's site plan "EDR Radius Map" included with a copy of the EDR "Executive Summary" in Appendix C. Sites with inadequate address information are listed as "orphan sites" and mapped locations were not provided. BCI reviewed the complete list of 38 "orphan sites" identified by EDR. Several of the orphan sites are located within the project study area and are discussed in this ISA. The complete EDR report including a listing of mapped and orphan sites is provided in CD format in Appendix C.

3.2 Summary of Records Search

To generate this summary, we reviewed the database records for all listed sites within and immediately adjacent to the project study area. We include the site address, figure reference, assessor's parcel number (APN) if known, listed use(s), a brief discussion of why the site is listed, and which database(s) included the site. Sites considered to have significant RECs are plotted on the applicable map in Figures 2A and 2B and summarized in tabular form in Tables 1 through 3 of the Executive Summary section of this report. A listing of databases and acronyms is included in Appendix C.

- **2549 Scott Avenue, Figure 2A #1, APN 005-520-010, Northgate Petroleum, Evergreen Oil, Northland Transportation**
  Waste oil handlers. Transportation of Hazardous waste. 36,000 gallon Above-Ground Storage Tank (AST), contents unknown.

  This site is included on the following databases:
  - FINDS
  - RCRA-CESQG
  - HAZNET
  - CHMIRS
  - CORTESE
  - AST

- **2569 Scott Avenue, Figure 2A #2,APN 005-520-018, USA Waste of California**
  Waste transfer and processing facility. Also listed for abandoned drug lab waste

  This site is included on the following databases:
  - SWLF
  - SWRCY
  - CDL
  - CA WDS
  - FINDS
  - HAULERS

- **2535 Fair Street, Figure 2A #3, Chico Auto & Truck Recycling**
  Motor vehicle dismantling, fluids generated

  This site is included on the following database:
  - HAZNET

- **2605 Fair Street, Figure 2A #4, APN 005-520-017, North Valley Disposal**
  Waste oil disposal;

  This site is included on the following database:
  - HAZNET
  - FINDS

- **2855 Fair Street, Figure 2A #5, APN 005-580-013, United Rentals**
  Waste oil disposal; 2,299 gallon AST, contents unknown.

  This site is included on the following database:
  - AST
  - HAZNET
  - FINDS
  - AIRS

- **2840 Fair Street, Figure 2A #6, Chico Transportation**
  Historic 8,000 gallon diesel UST, status unknown. Address may be in error.

  This site is included on the following databases:
  - HIST UST
  - CA FID UST
  - SWEEPS UST

- **2860 Fair Street, Figure 2A #7, APN 040-310-071, Lifetouch National School Studio**
  Photochemicals/photoprocessing waste.

  This site is included on the following database:
  - FINDS
  - HAZNET
  - RCRA-SQG

- **11276 Midway, Figure 2A #8, APN 040-320-002, West Valley Construction**
  Historical 3,000 gallon gasoline and 1,000 gallon diesel USTs. Leaking diesel UST, affected soil only, case closed.

  This site is included on the following databases:
  - LUST
  - CA FID UST
  - HAZNET
  - SWEEPS UST
  - HIST UST
  - CORTESE
  - GEOTRACKER

- **11254 Midway, Figure 2A #9, APN 040-320-011, North Valley Iron Works**
  Waste oil and other liquid waste disposed at transfer station.

  This site is included on the following database:
  - HAZNET

- **11239 Midway, Figure 2A #10, APN 040-420-002, PG&E Chico Service Center**
  Small quantity generator of spent solvents and electrical equipment. Historical USTs include unleaded gasoline (2-4,000 gallon), diesel (2,000 gallon), and waste oil (4,000 and 550 gallon). Gasoline impact to groundwater discovered in 1987, case closed by Central Valley Regional Water Quality Control Board (CVRWQCB) in 1993. Second case of petroleum impact to groundwater discovered in 2002 during gasoline UST replacement. Case closed by CVRWQCB in 2004. Currently permitted USTs.

  This site is included on the following databases:
  - LUST
  - CA FID UST
  - HAZNET

- SWEEPS UST
- UST
- CORTESE
- HIST UST
- FINDS
- SLIC
- RCRA-SQG
- GEOTRACKER

- **11226 Midway, Figure 2A #11, APN 040-320-013, Jessie Lange Distributing**
  AST(s) totaling over 120,000 gallons, contents unknown. Historical 10,000 gallon gasoline and 10,000 gallon unspecified product USTs. MTBE impact to groundwater and drinking water wells discovered in 1995. Free-product removal performed. Ongoing assessment and remedial action. Status of any active USTs unknown. Site has surface discharge subject to CVRWQCB Waste Discharge Requirements (WDRs). Currently permitted USTs

  This site is included on the following databases:
  - LUST
  - CA FID UST
  - HAZNET
  - SWEEPS UST
  - UST
  - CORTESE
  - HIST UST
  - SLIC
  - CA WDS
  - AST
  - GEOTRACKER

- **11204 Midway, Figure 2A #12, APN 040-320-008, Western Petroleum Marketers**
  Disposal of oil-containing waste at a recycler. Gasoline surface spill in 1997, case closed by CVRWQCB in 2004.

  This site is included on the following databases:
  - HAZNET
  - SLIC
  - CHMIRS
  - GEOTRACKER

- **11128 Midway, Figure 2A #13, APN 040-310-087, Valley Wide Chemical Co./ Oak Ridge Cabinets**
  Handling of agricultural chemicals/fertilizers. Unspecified liquid waste disposal at transfer station.

  This site is included on the following databases:
  - HIST UST
  - HAZNET
  - FINDS
  - AIRS

- **11110 Midway, Figure 2A #14, APN 040-310-080, Capitol Coors**
  Former leaking gasoline UST site; gasoline impact to drinking water aquifer, case closed in 2004 by CVRWQCB.

  This site is included on the following databases:
  - HAZNET
  - LUST
  - CORTESE
  - GEOTRACKER

- **11096 Midway, Figure 2A #15, APN 040-310-064, Pacific Stihl**
  Leaking 1,000 gallon gasoline UST removed in 1992. Gasoline impact to groundwater. Case closed by CVRWQCB in 1996.

  This site is included on the following databases:
  - LUST
  - CORTESE
  - GEOTRACKER

- **11088 Midway, Figure 2A #16, APN 040-310-076, Patio Cruisers, Inc.**
  Air emissions source.

  This site is included on the following database:
  - FINDS

- **11025 Midway, Figure 2A #17, APN 039-060-135, Beam X-Ray, Inc.**
  Notification only.

  This site is included on the following databases:
  - FINDS
  - RCRA-NonGen

- **11011 Midway, Figure 2A #18, APN 039-060-134, Agri Electric**
  Historical gasoline UST. No additional information provided.

  This site is included on the following databases:
  - HIST UST
  - CA FID UST
  - SWEEPS UST

- **37 Speedway, Figure 2A #19, APN 040-310-030, Smuckers Quality Beverages**
  Oil sludge disposal. Air emission source. Address is 127 Speedway in Butte County GIS database.

  This site is included on the following databases:
  - FINDS
  - HAZNET
  - AIRS

- **2570 Hegan Lane, Figure 2A #20, APN 029-050-053, Kinder Morgan/ SFPP Chico Terminal; Shell Oil, Chico Plant**
  Petroleum pipeline terminal with large ASTs. Closed leaking UST. Miscellaneous fuel hydrocarbon spills. Drinking water aquifer impacted with fuel hydrocarbons. Ongoing remedial action under cleanup and abatement order issued by the CVRWQCB.

  This site is included on the following databases:
  - LUST
  - HAZNET
  - SWEEPS UST
  - CORTESE
  - SLIC
  - CHMIRS
  - CA WDS
  - AST
  - FINDS
  - AIRS
  - RCRA-NonGen
  - RCRA-LQG
  - ERNS
  - GEOTRACKER

- **2518 Hegan Lane, Figure 2A #21, Cross Petroleum**
  Above-ground storage tank, unknown contents. Disposal of organic solids at a landfill.

  This site is included on the following databases:
  - HAZNET
  - AST

- **594 Paseo Companeros, Figure 2A #22, APN 040-340-015, G.E.Weiss**
  One or two historical gasoline USTs, no further information.

  This site is included on the following databases:
  - HIST UST
  - CA FID UST
  - SWEEPS UST

- **496 Entler Avenue, Figure 2A #23, APN 040-640-014, Roy Bechhold,**
  No additional information provided.

  This site is included on the following database:
  - CORTESE

- **1 Baja Court, Figure 2A #24, APN 040-480- 010, Greg Kerr Trucking**
  Waste handling, no waste generation. No additional information provided.

  This site is included on the following databases:
  - RCRA-NonGen
  - FINDS

- **163 McFadden Lane, Figure 2A #25, APN 040-020- 091, Bob & Beverly Hartman**
  Historic gasoline UST, 425 gallons, status unknown. Currently permitted UST.

  This site is included on the following databases:
  - UST
  - HIST UST
  - CA FID UST
  - SWEEPS UST
  - GEOTRACKER

- **89 Loren Avenue, Figure 2A #26, APN 040-400- 073, Longfellow Lumber**
  Disposal of solvents at transfer station. Historical UST site: 3,000 gallon gasoline, 10,000 gallon diesel, 3,000 gallon waste oil. No additional information provided.

  This site is included on the following databases:
  - HIST UST
  - HAZNET

- **71 Loren Avenue, Figure 2A #27, APN 040-400-086, Rousser Distributing**
  Two- 8,000 gallon diesel USTs removed in 1995; 350 cu.yds. impacted soil removed and disposed. Closed in 1997 as soil-only case by the CVRWQCB.

  This site is included on the following databases:
  - LUST
  - CORTESE
  - GEOTRACKER

- **71 Loren Avenue, Figure 2A #28, APN 040-400-013, Hupp Neon**
  Handling and disposal of solvents at transfer station.

  This site is included on the following database:
  - HAZNET

- **701 Entler Avenue, Figure 2A #29, APN 040-400-017, Chemtec Agri Chems**
  Small quantity waste generator. No other information provided.

  This site is included on the following databases:
  - FINDS
  - RCRA-SQG

- **775 Entler Avenue, Figure 2A #30,APN 040-400- 021, FMC Corp. Agri Chem Group**
  Small quantity waste generator. Historically, a large quantity waste generator. No other information provided

  This site is included on the following databases:
  - FINDS
  - RCRA-SQG

- **725 Entler Avenue, Figure 2A #31, APN 040-400- 089, Norfield Manufacturing/Industries**
  Handling and disposal of solvents at a transfer station. No other information provided

  This site is included on the following databases:
  - HAZNET
  - FINDS

- **2580 Notre Dame Blvd., Figure 2B #32, APN 002-330- 013, Home Depot**
  Waste generation and disposal to recycler or treatment unit, listed as small quantity generator. Waste materials include pesticides, solvents, corrosives, mercury compounds.

  This site is included on the following databases:
  - RCRA-SQG
  - FINDS
  - HAZNET
  - AIRS

- **3650 Morrow Lane, Figure 2B #33, APN 002-330-023, Diagnostic Imaging, Inc.**
  No waste generation at present. No additional information available.

  This site is included on the following databases:
  - RCRA-NonGen
  - FINDS

- **3750 Morrow Lane, Figure 2B #34, APN 002-200-036, Pacific Bell**
  Generation and disposal of waste oil, solvents, and aqueous waste. Historical USTs include 8,000 gallon gasoline, 4,000 gallon diesel, and 550 gallon waste oil. A minor waste oil release to soil was cleaned up and the case closed by the local agency in 1991. Some or all of the tanks were removed and replaced in 1995 and fuel hydrocarbon impact to soil was discovered. Impacted soil (235 cu. yds.) was removed and disposed. Case closed by the CVRWQCB in 1997. Currently permitted USTs.

  This site is included on the following databases:
  - LUST
  - HAZNET
  - SWEEPS UST
  - CORTESE
  - FINDS
  - CA FID UST
  - UST
  - HIST UST
  - RCRA-SQG
  - GEOTRACKER

- **3711 Morrow Lane, Figure 2B #35, APN 040-030-030, Wood-Ply Forest Products**
  Included in air emissions database

  This site is included on the following database:
  - FINDS

- **2600 Notre Dame Blvd., Figure 2B #36, APN 040-030-037, Payless Building Supply**
  Disposal of latex waste to treatment facility.

  This site is included on the following database:
  - HAZNET

- **48 Comanche Court, Figure 2B #37, APN 040-030-047, Sunseri Construction, Inc.**
  Disposal of waste solvents and alkaline solutions to transfer facility.

  This site is included on the following database:
  - HAZNET

- **2741 Cramer Lane, Figure 2B #38, APN 040-030-074, Chico Tree Improvement Center**
  Disposal of solvents to a transfer station. Historical UST for waste, status unknown.

  This site is included on the following databases:
  - HAZNET
  - HIST UST

- **2801 Notre Dame Blvd., Figure 2B #39, APN 040-030-065, The Neighborhood Church of Chi**
  Historical diesel and gasoline USTs. Status unknown.

  This site is included on the following database:
  - HIST UST

- **425 Southgate Lane, Figure 2B #40, APN 040-400-088, Peterson Tractor Co.**
  Large quantity generator of oil-containing waste disposed to recycler or landfill. Pollution characterization for a diesel spill. No further information available. Historical 500 gallon gasoline UST, status unknown.

  This site is included on the following databases:
  - SLIC
  - HAZNET
  - HIST UST
  - RCRA-LQG
  - GEOTRACKER

- **3075 Southgate Lane, Figure 2B #41, APN 040-400-066, Uniblast Technologies; Universal Equipment Manufacturing**
  Waste generation and disposal of solvents and household waste to transfer station, listed as small quantity generator.

  This site is included on the following databases:
  - RCRA-SQG
  - HAZNET
  - FINDS

- **3097 Southgate Lane, Figure 2B #42, APN 040-400-070, Norcal Waste Systems; Butte County Disposal**
  Disposal of waste oil, oil-water separator sludge, and aqueous solutions to recycler or treatment unit.

  This site is included on the following database:
  - HAZNET

- **435 Southgate Court, Figure 2B #43, APN 040-400-050, Vacaro Seed/California, Inc.**
  Pesticide rinse water disposed at a transfer station. Air emissions source.

  This site is included on the following databases:
  - HAZNET
  - AIRS

- **446 Southgate Court, Figure 2B #44, APN 040-400-084, Vacaro Seed/California, Inc.**
  Included in air emissions database. No additional information available.

  This site is included on the following databases:
  - FINDS

- **3155 Southgate Lane, Figure 2B #45, APN 040-400-068, Chemtec Ag Chemicals, Inc.**
  Pesticide manufacturer. Violations of reporting requirements for pesticide production quantities. Historical USTs containing gasoline (10,000 gal.), diesel (10,000 gal.) and unspecified waste. Status of these tanks is unknown. This site is included on the following databases:
  - FINDS
  - HIST UST
  - SSTS
  - FTTS
  - HIST FTTS

- **1696 Skyway, Figure 2B #46, APN 040-020-141, Butte Creek Rock Co.**
  Listed in Mines Master Index File. No additional information.

  This site is included on the following database:
  - MINES

3.3 Additional Records Not Listed in the EDR Database

- **37 Speedway, Skyway Homes Groundwater Plume; Figure 2A**
  Questionable address. Large PCE and TCE groundwater plume underlying northwest corner of study area. Drinking water wells affected. Investigation and cleanup being overseen by DTSC and CVRWQCB.

  This site is included on the following databases:
  - GEOTRACKER
  - ENVIROSTORE

3.4 Review of Title Documents

BCI was not provided title documents for review.

3.5 Prior Environmental Investigations

We did not review any documents other than those referenced in this report for sites within the proposed project area.

3.6 Well Search

A well search was not completed as part of this work.

4 RECONNAISSANCE INFORMATION

BCI completed a site reconnaissance September 30, 2008. Observations made during the site reconnaissance generally support the land use descriptions and background data above. However, we observed the following features in the project area that are not listed in the information above. We include address, figure reference, APN if applicable, current use, and brief description of potential RECs:

- **Historic Orchards at various locations shown on Figures 2A, 2B**
  Based on aerial photograph interpretation, orchards active in 1957 were identified. Potential for residual persistent pesticides.
- **Dredge Tailings at various locations shown on Figures 2A, 2B**
  Based on aerial photograph interpretation, tailings existing in 1957 (largest extent of tailings) were identified. Potential for residual heavy metals contamination.
- **2675 Fair Street, APN 005-500-014 & 011, Auto Dismantlers; Figure 2A #47**
  Approximately 5-acres of junked cars.
- **631 Country Drive, APN 005-580-019, Vintage Hot Rod; Figure 2A #48**
  Operating body shop.
- **11196 Midway, APN 040-310-082, Omega Tank and Truck Repair; Figure 2A #49**
  Estimated 1,000-gallon AST on concrete slab.
- **Former SP Railroad Grade; Figures 2A, 2B, #50**
  Former railroad alignment with surface features removed. Remnants of bridge abutments at the Butte Creek crossing noted in 1984 aerial photos.
- **1856 Skyway, APN 040-020-134, Sunset Molding; Figure 2B #51**
  Manufacturer of wood products. Estimated 250-gallon AST on stand.
- **322 Entler Ave., APN 040-040-010, Residence; Figure 2A #52**
  Small (approx. 100-gallon) AST on stand and 55- gallon drums at residential property.
- **629 Entler Avenue, APN 040-400-074, Undeveloped property; Figure 2A #53**
  Heavy equipment yard and area of soil stockpiles some of which are covered with plastic sheeting.
- **Southgate Avenue, APN 040-400-091, unnamed asphalt and concrete recycling operation; Figure 2A #54**
  Large stockpiles of ground-up concrete and asphalt, heavy equipment operations.

5 FINDINGS, CONCLUSIONS, & RECOMMENDATIONS

BCI performed an Initial Site Assessment for the State Route 99/Southgate Interchange Project in the Chico, California area. The purpose of this report is to identify recognized soil and/or groundwater contamination/hazardous material issues that may impact the planned improvements. Our assessment identified the following potential hazardous materials issues that should be considered in present and future planning for project improvements.

5.1 Potential Hazardous Materials Sites

The project is in the preliminary planning stage and we have not been provided a list of parcels planned for either right-of way acquisition or ownership transfer. Therefore we have identified the following sites throughout the study area with RECs or potential RECs that may impact project improvements. We group the sites into high, medium, and low risk categories (in general conformance with Caltrans PA/ED Risk Classification) based on our evaluation of the potential risk they could pose to the project if located nearby. Where right-of-way will be acquired, additional site-specific assessment may be warranted. Additional assessment will likely include a more detailed site inspection, thorough regulatory records review, interviews, and building material and soil sample collection and analysis. The following listings include address, figure reference, APN if known, present and/or former use, photo reference (if applicable), a description of the RECs, and recommended action. Photos are contained in Appendix D. We summarize the information presented here in tabular form in Tables 1 through 3 of the Executive Summary section of this report.

5.1.1 Sites with High Potential Risk:

- **2549 Scott Avenue, Figure 2A #1, APN 005-520-010, Northgate Petroleum, Evergreen Oil, Northland Transportation, Photo 1**
  Pacific Pride branded card lock and bulk fuel distributer with above-ground storage tanks (ASTs), waste oil collection and transport. *Recommended Action: Records review, Phase II sampling for petroleum hydrocarbons.*

- **2535 Fair Street, Figure 2A #3, APN 005-520-044, Former Chico Auto & Truck Recycling; Now- John's Towing**
  Motor vehicle dismantling. Automotive fuel, lubricants, and heavy metals are potential contaminants. Site has been active since 1960's based on aerial photos. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons and metals.*

- **2840 Fair Street, Figure 2A #6, Chico Transportation**
  Could not find site at this address. Historic 8000 gallon diesel UST, status unknown. *Recommend Action: Verify location, records review, site inspection.*

- **11276 Midway, Figure 2A #8, APN 040-320-002, West Valley Construction**
  Historical 3000 gallon gasoline and 1000 gallon diesel USTs. Documented diesel leak affected soil only. Case was closed. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **11239 Midway, Figure 2A #10, APN 040-420-002, PG&E Chico Service Center, Photo 2**
  Handling and storage of electrical equipment (including transformers). Use of solvents. Natural gas dispensing facility on site. Historical USTs include unleaded gasoline (2-4,000 gallon), diesel (2,000 gallon), and waste oil (4,000 and 550 gallon). Gasoline impact to groundwater discovered in 1987, case closed by Central Valley Regional Water Quality Control Board (CVRWQCB) in 1993. Second case of petroleum impact to groundwater discovered in 2002 during gasoline UST

replacement. Case closed by CVRWQCB in 2004. Currently permitted USTs. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons, solvents, and PCBs*

- **11226 Midway, Figure 2A #11, APN 040-320-013, Jessie Lange Distributing, Photo 3**
  Shell branded retail fuel facility. Historically over 120,000 gallons of AST tankage, removed sometime after 1984. Historical and currently operational USTs located on site. MTBE impact to groundwater and drinking water wells was discovered in 1995. Free-product removal was performed. Ongoing assessment and remedial action. Site has surface discharge subject to CVRWQCB Waste Discharge Requirements (WDRs). Potential to encounter product in soil or shallow groundwater. *Recommended Action: Records review, Phase II sampling for petroleum hydrocarbons.*

- **11204 Midway, Figure 2A #12, APN 040-320-008, Former Western Petroleum Marketers; Now –Unnamed shop, Photo 4**
  Disposal of oil-containing waste. Gasoline surface spill in 1997, case closed by CVRWQCB in 2004. Reconnaissance observed possible abandoned fuel islands on the south side of the site. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **11128 Midway, Figure 2A #13, APN 040-310-087, FormerValley Wide Chemical Co.; Now - Oak Ridge Cabinets**
  Former handling of agricultural chemicals/fertilizers. Unspecified liquid waste disposal at transfer station. *Recommended Action: Records review, site inspection, possible Phase II sampling for pesticides.*

- **11110 Midway, Figure 2A #14, APN 040-310-080, Former Capitol Coors; Now - Valley Rubber & Gasket**
  Former leaking gasoline UST site; gasoline impact to groundwater, case closed in 2004 by CVRWQCB. *Recommended Action: Records review, possible Phase II sampling for petroleum hydrocarbons.*

- **11096 Midway, Figure 2A #15, APN 040-310-064, Pacific Stihl**
  Leaking 1,000 gallon gasoline UST removed in 1992. Documented gasoline impact to groundwater. Case closed by CVRWQCB in 1996. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **11011 Midway, Figure 2A #18, APN 039-060-134, Agri Electric**
  Historical gasoline UST. No additional information provided. *Recommended Action: Site inspection, records search, possible Phase II sampling.*

- **127 Speedway, Figure 2A #19, APN 040-310-030, Smuckers Quality Beverages**
  Large juice bottling plant. Included in database for oil sludge disposal. Located at eastern (upgradient) end of Skyway Subdivision TCE/PCE groundwater plume.

Formerly (between 1963 and 1976) the site of CE Building Products which utilized TCE in a manufacturing process. High risk for TCE impacted soil and groundwater on the site. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, possible Phase II sampling for TCE, PCE, and petroleum hydrocarbons.*

- **Skyway Homes Groundwater Plume, Figure 2A**
  TCE and PCE contaminated groundwater was discovered in November, 2003 beneath the Skyway Subdivision situated along Hegan Lane just west of the project area. Drinking water wells in the subdivision are impacted. The exact boundaries of the plume are unknown but it is estimated to be at least two miles in length and up to one-half mile wide. The eastern (upgradient) end of the plume is believed to be located in the vicinity of the Smuckers plant on Speedway. Continuing investigation and cleanup is being overseen by DTSC and CVRWQCB. *Recommended Action: Records review, possible Phase II sampling for PCE and TCE.*

- **2570 Hegan Lane, Figure 2A #20, APN 029-050-053, Kinder Morgan/ SFPP Chico Terminal; Shell Oil, Chico Plant, Photo 5**
  Petroleum pipeline terminal with large ASTs. Closed leaking UST. Miscellaneous fuel hydrocarbon spills. Drinking water aquifer impacted with fuel hydrocarbons. Impacted groundwater plume limited to within facility boundaries except for a small area at the west end of the property (based on contours for MTBE and benzene shown in the 1st and 2nd quarter 2007 monitoring reports for the site). Ongoing remedial action under cleanup and abatement order issued by the CVRWQCB. *Recommended Action: Records review, Phase II sampling for petroleum hydrocarbons.*

- **2518 Hegan Lane, Figure 2A #21 Cross Petroleum**
  Adjacent to Kinder Morgan/Chico Terminal. 5,000 gallon above-ground storage tank, unknown contents. *Recommended Action: Records review, Phase II sampling for petroleum hydrocarbons.*

- **594 Paseo Companeros, Figure 2A #22, APN 040-340-015, G.E.Weiss**
  One or two historical gasoline USTs, present status unknown. Potential petroleum hydrocarbon impacts. *Recommended Action: Site inspection, records review, possible Phase II sampling for petroleum hydrocarbons.*

- **163 McFadden Lane, Figure 2A #25, APN 040-020- 091, Bob & Beverly Hartman**
  Historical gasoline UST, 425 gallons, status unknown. A currently permitted UST exists on the site. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **89 Loren Avenue, Figure 2A #26, APN 040-400- 073, Longfellow Lumber**
  Listed on database as historical UST site: 3,000 gallon gasoline, 10,000 gallon diesel, 3,000 gallon waste oil. Disposal of solvents at transfer station. Present status of USTs unkown. Potential petroleum hydrocarbon impacts. *Recommended Action: Site inspection, records review, possible Phase II sampling for petroleum hydrocarbons.*

- **71 Loren Avenue, Figure 2A #27, APN 040-400-086, Rousser Distributing**
  Two- 8,000 gallon diesel USTs were removed in 1995; 350 cu.yds. petroleum hydrocarbon-impacted soil removed and disposed. Closed in 1997 as soil-only case by the CVRWQCB. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, possible Phase II sampling for petroleum hydrocarbons.*

- **701 Entler Avenue, Figure 2A #29, APN 040-400-017, Former Chemtec Agri Chems**
  Listed on database as a small quantity waste generator. No other information was available. Assumed to have been former site of agricultural chemical manufacturing or distribution. *Recommended Action: Records review, site inspection, possible Phase II sampling for pesticides.*

- **775 Entler Avenue, Figure 2A #30, APN 040-400- 021, Former FMC Corp. Agri Chem Group; Now – Cinecon General Contractors**
  Listed on database as a small quantity waste generator; historically a large quantity waste generator. No other information was available. Assumed to have been former site of agricultural chemical manufacturing or distribution. *Recommended Action: Records review, site inspection, possible Phase II sampling for pesticides.*

- **3750 Morrow Lane, Figure 2B #34, APN 002-200-036, Pacific Bell**
  Telephone corporation yard. Currently permitted USTs. Database indicates generation and disposal of waste oil, solvents, and aqueous waste. Historical USTs include 8,000 gallon gasoline, 4,000 gallon diesel, and 550 gallon waste oil. A minor waste oil release to soil was cleaned up and the case closed by the local agency in 1991. Some or all of the tanks were removed and replaced in 1995 and fuel hydrocarbon impact to soil was discovered. Impacted soil (235 cu. yds.) was removed and disposed. Case closed by the CVRWQCB in 1997. Potential petroleum hydrocarbon and solvents impacts. *Recommended Action: Records review, possible Phase II sampling for petroleum and non-petroleum hydrocarbons.*

- **2741 Cramer Lane, Figure 2B #38, APN 040-030-074, Chico Tree Improvement Center, Photo 6**
  Tree farm operation. Database indicates handling and disposal of solvents and an historical waste UST, present status unknown. Observed AST and water treatment facility using some type of chemical oxidizer at the facility headquarters. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **2801 Notre Dame Blvd., Figure 2B #39, APN 040-030-065, The Neighborhood Church of Chi**
  Site of historical diesel and gasoline USTs, present status unknown. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **425 Southgate Lane, Figure 2B #40, APN 040-400-088, Peterson Tractor Co.**
  Heavy equipment maintenance facility listed as a large quantity generator of oil-containing waste. Site of a diesel spill which was the subject of a pollution

characterization overseen by the CVRWQCB. Database lists an historical 500 gallon gasoline UST, status unknown. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, site inspection, possible Phase II sampling for petroleum hydrocarbons.*

- **3155 Southgate Lane, Figure 2B #45, APN 040-400-068, Chemtec Ag Chemicals, Inc./Helena Chemical Co., Photos 7 & 8**
  Pesticide manufacturer with storage yard containing numerous chemical spray tank rigs. Historical USTs containing gasoline (10,000 gal.), diesel (10,000 gal.) and unspecified waste are listed in the database. Present status of these tanks is unknown. Potential petroleum hydrocarbon and pesticide impacts. *Recommended Action: Site inspection, records review, possible Phase II sampling for petroleum hydrocarbons and pesticides.*

- **2675 Fair Street, Figure 2A #47, APN 005-500-014 & 011, Auto Dismantlers**
  Site consists of approximately 5-acres of junked cars. Site has been active since at least 1970 (based on aerial photographs). Potential petroleum hydrocarbon lubricants, heavy metal impacts. *Recommended Action: Site inspection, records review, possible Phase II sampling for petroleum hydrocarbons and metals.*

- **Former SP Railroad Grade, Figures 2A, 2B, #50**
  Former railroad alignment with surface features removed. Remnants of bridge abutments at the Butte Creek crossing noted in 1984 aerial photos. Potential hazardous materials include metals associated with railroad grade ballast, petroleum hydrocarbons and other chemicals, asbestos and leaded paint associated with the remnant bridge abutments. *Recommended Action: Phase II sampling for petroleum hydrocarbons and other chemicals, metals, and asbestos.*

5.1.2 Sites with Medium Potential Risk:

- **2569 Scott Avenue, Figure 2A #2, APN 005-520-018 USA Waste of California**
  Solid waste transfer and processing facility. Also listed for abandoned drug lab waste. Potential for release of a variety of hazardous materials. *Recommended Action: Records review, site inspection, interview.*

- **2605 Fair Street, Figure 2A #4, APN 005-520-017, North Valley Disposal, Photo 9**
  Solid waste transfer and processing facility with waste oil handling/disposal. Large AST with unknown contents. Potential for spills of petroleum hydrocarbons and a variety of other hazardous materials. *Recommended Action: Records review, site inspection, interview.*

- **2855 Fair Street, Figure 2A #5, APN 005-580-013, United Rentals, Photo 10**
  Construction rental yard with fuel dispensing, waste oil handling/disposal; 2299 gallon fuel AST on site. Potential petroleum hydrocarbon impacts. *Recommended Action: Records review, site inspection, interview.*

- **11254 Midway, Figure 2A #9, APN 040-320-011, North Valley Iron Works, Photo 11**
  Inactive iron works. Database indicates waste oil and other liquid waste was handled. Potential for petroleum hydrocarbon and heavy metal contamination. *Recommended Action: Records review, site inspection, interview, possible Phase II sampling for petroleum hydrocarbons, metals.*

- **11025 Midway, Figure 2A #17, APN 039-060-135, Beam X-Ray, Inc; Now – Baird Roofing, Photo 12**
  Roofing company with rear of site being used for storage of motor vehicles. Potential hazardous materials include petroleum hydrocarbons, metals, asbestos-containing roofing supplies. *Recommended Action: Records review, site inspection, interview.*

- **71 Loren Avenue, Figure 2A #28, APN 040-400-013, Hupp Neon**
  Potential hazardous materials include solvents. *Recommended Action: Records review, site inspection, interview.*

- **3097 Southgate Lane, Figure 2B #42, APN 040-400-070, Norcal Waste Systems; Butte County Disposal**
  Waste disposal equipment yard. Potential hazardous materials include waste oil, lubricants, fuels. *Recommended Action: Records review, site inspection, interview.*

- **435 Southgate Court, Figure 2B #43, APN 040-400-050, Former Vacaro Seed/California, Inc.; Now – The Danielson Co.**
  Former use included handling and disposal of pesticides. Present use is a food service company. *Recommended Action: Records review, site inspection, interview.*

- **446 Southgate Court, Figure 2B #44, APN 040-400-084, Vacaro Seed/California, Inc.**
  Potential handling and disposal of pesticides. *Recommended Action: Records review, site inspection, interview.*

- **1696 Skyway, Figure 2B #46, APN 040-020-141, Butte Creek Rock Co., Photo 13**
  Listed in Mines Master Index File. No additional information in database. Potential for contaminants associated with heavy equipment operations including fuels and lubricants. *Recommended Action: Records review, site inspection, interview.*

- **631 Country Drive, Figure 2A #48, APN 005-580-019, Vintage Hot Rod**
  Body shop. Potential hazardous materials include fuels, lubricants, solvents. *Recommended Action: Records review, site inspection, interview.*

- **11196 Midway, Figure 2A #49, APN 040-310-082, Omega Tank and Truck Repair, Photo 14**
  Estimated 1000-gallon AST on concrete slab. *Recommended Action: Records review, site inspection, interview.*

- **Former SP Railroad Grade; Figures 2A, 2B #50**
  Railway issues include potential for slag ballast containing heavy metals, petroleum hydrocarbons and other chemicals. Potential for asbestos-containing materials, lead-based paint associated with the bridge abutment remnants at Butte Creek. *Recommended Action: Phase II sampling for petroleum hydrocarbons, metals, other chemicals, asbestos.*

- **1856 Skyway, Figure 2B #51, APN 040-020-134, Sunset Molding, Photo 15**
  Manufacturer of wood products. Estimated 250-gallon AST on stand. *Recommended Action: Records review, site inspection, interview.*

- **322 Entler Ave., Figure 2A #52, APN 040-040-010, Residence, Photo 16**
  Small (approx. 100-gallon) AST on stand and 55-gallon drums at residential property. *Recommended Action: Interview, site inspection, records review.*

- **629 Entler Avenue, Figure 2A #53, APN 040-400-074, Undeveloped property, Photos 17 & 18**
  Heavy equipment yard and area of soil stockpiles some of which are covered with plastic sheeting. Potential soil contamination. *Recommended Action: Site inspection, records review, interview, possible Phase II sampling for hydrocarbons and metals.*

- **Southgate Avenue, Figure 2A #54, APN 040-400-091, unnamed asphalt and concrete recycling operation, Photo 19**
  Large stockpiles unprocessed and ground-up concrete and asphalt, heavy equipment operations. Potential impacts from asbestos, asphalt grindings, fuels and lubricants. *Recommended Action: Site inspection, interview, records review possible Phase II sampling for petroleum hydrocarbons, and asbestos.*

- **Historic Orchards at various locations shown on Figures 2A and 2B**
  We have identified orchards active in 1957 and earlier when the use of persistent pesticides such as lead arsenate and organochlorine pesticides (OCPs) would be expected to be most prevalent. *Recommended Action: Phase II sampling for metals and OCPs.*

- **Dredge Tailings at various locations shown on Figures 2A and 2B, Photo 20**
  We have Dredge tailings often contain heavy metals including mercury and arsenic. *Recommended Action: Phase II sampling for metals.*

5.1.3 Sites with Low Potential Risk:

- **2860 Fair Street, Figure 2A #7, APN 040-310-071, Lifetouch National School Studio**
  Photochemicals/photoprocessing waste. *Recommended Action: Interview, site inspection.*

- **11088 Midway, Figure 2A #16, APN 040-310-076, Patio Cruisers, Inc.**
  Boat manufacturing. Potential use of solvents, paints. *Recommended Action: Interview, site inspection.*

- **496 Entler Avenue, Figure 2A #23, APN 040-640- 014, Roy Bechhold**
  Reconnaissance indicated former cabinet shop at premises which may be reason for inclusion on database. *Recommended Action: Interview, site inspection.*

- **1 Baja Court, Figure 2A #24, APN 040-480- 010, Greg Kerr Trucking,**
  Database indicates waste handling but no further details are available. *Recommended Action: Interview, site inspection.*

- **725 Entler Avenue, Figure 2A #31, APN 040-400- 089, Norfield Manufacturing/Industries**
  Database indicates handling and disposal of solvents; no further information available. *Recommended Action: Interview, site inspection.*

- **2580 Notre Dame Blvd., Figure 2B #32, APN 002-330- 013, Home Depot**
  Waste generation related to storage and handling of retail merchandise. Potential hazardous materials include pesticides, solvents, corrosives, mercury compounds. *Recommended Action: Interview, site inspection.*

- **3650 Morrow Lane, Figure 2B #33, APN 002-330-023, Diagnostic Imaging, Inc.**
  Potential use of photoprocessing chemicals. *Recommended Action: Interview, site inspection*

- **3711 Morrow Lane, Figure 2B #35APN 040-030-030, Wood-Ply Forest Products, Photo 21**
  Included in air emissions database, reconnaissance indicated shop activities with potential use of solvents, lubricants. *Recommended Action: Interview, site inspection.*

- **2600 Notre Dame Blvd., Figure 2B #36, APN 040-030-037, Payless Building Supply**
  Retail lumber and building supply operation. Potential hazardous materials, e.g. paints, petroleum hydrocarbons, other chemicals associated with building supplies . *Recommended Action: Interview, site inspection.*

- **48 Comanche Court, Figure 2B #37, APN 040-030-047, Sunseri Construction, Inc., Photo 22**
  Use of solvents and alkaline solutions. *Recommended Action: Interview, site inspection.*

- **3075 Southgate Lane, Figure 2B #41, APN 040-400-066, FormerUniblast Technologies; Universal Equipment Manufacturing; Now – Sam's Door Shop**
  Manufacturing and fabrication operations where solvents were handled. *Recommended Action: Interview, site inspection.*

5.2 General Hazardous Materials Issues

5.2.1 Agricultural Chemicals (Pesticides/Herbicides)

Significant portions of the project study area are located on agricultural land historically cultivated in orchards; consequently, there is potential for residual pesticides and/or herbicides. We did not observe evidence of potential historical pesticide/herbicide mixing, storage and/or misuse within the study area (other than sites already identified as possible pesticide manufacturing/handling facilities). Figures 2A and 2B show historic orchard areas active during a period when use of persistent pesticides would be expected to be most prevalent (1950's and earlier).

5.2.2 Aerially Deposited Lead

The presence of aerially deposited lead (ADL) adjacent to heavily traveled roadways, such as SR 99 is not uncommon. Based on review of air photos and topographical maps, SR 99 has been in service since at least 1957. Before SR 99 construction, Midway was the main north-south roadway in the area dating back to at least 1912. Based on our experience, Caltrans will likely require an ADL study for improvements to the SR 99 corridor. This is consistent with their general requirement to require ADL testing along heavily traveled roads in use prior to 1987.

5.2.3 Transformers

The scope of this assessment did not include an inventory of past and present transformers. However, BCI observed many overhead power lines and ground surface or pole-mounted transformers within the project area. Older transformers may contain polychlorinatedbiphenyls (PCBs) and this should be considered if they are removed or relocated during construction. Identification and remediation of old transformers is the responsibility of the utility owner. If the relocation of transformers is required, they should be checked for the presence of PCBs or other hazardous materials by the utility owner, and if present, should be properly remediated and disposed.

5.2.4 Yellow Traffic Stripes

Yellow traffic stripes typically contain heavy metals including lead and chromium at concentrations in excess of the hazardous waste thresholds established by the California Code of Regulations (CCR) and may produce toxic fumes when heated. Consequently, any yellow traffic striping within the project area will require proper disposal, which may include disposal at a Class 1 disposal facility.

5.2.5 Underground Product Distribution Lines

We observed markers indicating the presence of buried distribution lines for natural gas along the east side of Midway, north of Entler Avenue. The PG&E Service Center on Midway has a large natural gas dispensing facility. No record of contamination resulting from these lines was discovered in our assessment; however, there is the potential for unidentified leaks along buried pipelines. Due to its explosive potential, natural gas is considered a hazardous material. Project design should consider the potential for leaks from underground natural gas distribution lines.

Our investigation did not include a utility survey; therefore we did not attempt to locate all of these lines.

5.2.6 Asphalt

It is anticipated that project improvements will include the removal of existing asphalt. Currently asphalt is not regulated as a hazardous material, but potential contaminants in the asphalt binder are the source of off-site disposal restrictions imposed by the State of California Integrated Waste Management Board. Consequently asphalt removal from the project will need to be disposed in accordance with current regulations.

5.2.7 Building Materials

Asbestos and lead based paint associated with the demolition/modification of existing structures, bridges, and/or roadway may be encountered. Consequently, the resulting debris may be a regulated waste and should be characterized and classified prior to disposal.

5.2.8 Septic Tanks

According to the City of Chico sewer maps and discussion with Butte County Environmental Health Department staff, very little of the study area is served by a public sewer system. Therefore, essentially all of the commercial and residential structures south of Fair Street between Midway and SR 99 are served by on-site sewage disposal systems with septic tanks and leach fields. The commercial complexes located on Southgate Lane and Court (east of SR 99) are also served by septic systems. There is the potential for RECs to be associated with septic systems, especially those serving commercial facilities.

5.2.9 Heating Oil Tanks/ "Farm Tanks"

Older commercial and residential structures in rural areas often have above-ground or below-ground heating oil tanks associated with them. In addition, agricultural sites may contain above-ground or below-ground motor vehicle fuel tanks typically referred to as "farm tanks". Due to regulatory exemptions, some of these tanks may not appear in the searched databases. There is the potential for RECs to be present on sites where heating oil tanks or farm tanks were located.

6 LIMITATIONS

The accompanying report summarizes the findings and opinions of Blackburn Consulting (BCI), with regard to the potential for contamination/hazardous materials to be present within the project area at concentrations likely to warrant mitigation under current statutes and guidelines. Our findings and opinions are based on information obtained on given dates or provided by specified individuals, through records review, site review, and related activities. Our information is only as good as the information provided to us. Conditions can change after we have made our observations. We cannot warrant or guarantee that hazardous materials do not exist at the site. To further reduce your risk, an extensive invasive exploration may be necessary.

This report was prepared for the specific use by our client, Mark Thomas & Company, Inc, and their agents for this project and applies only to the area identified as the project area. We are not responsible for interpretations by others of data presented in this report. This report does not represent a legal opinion. No warranty is expressed or implied. We base our conclusions in this report on judgment and experience. We performed this work in accordance with generally accepted standards of practice existing in northern California at the time of the assessment.

The scope of our investigation did not include determining the presence of radon, lead-based paint, or asbestos-containing materials. Identifying endangered species, geologic hazards, archeological sites, or ecologically sensitive areas are also beyond the scope of this report.

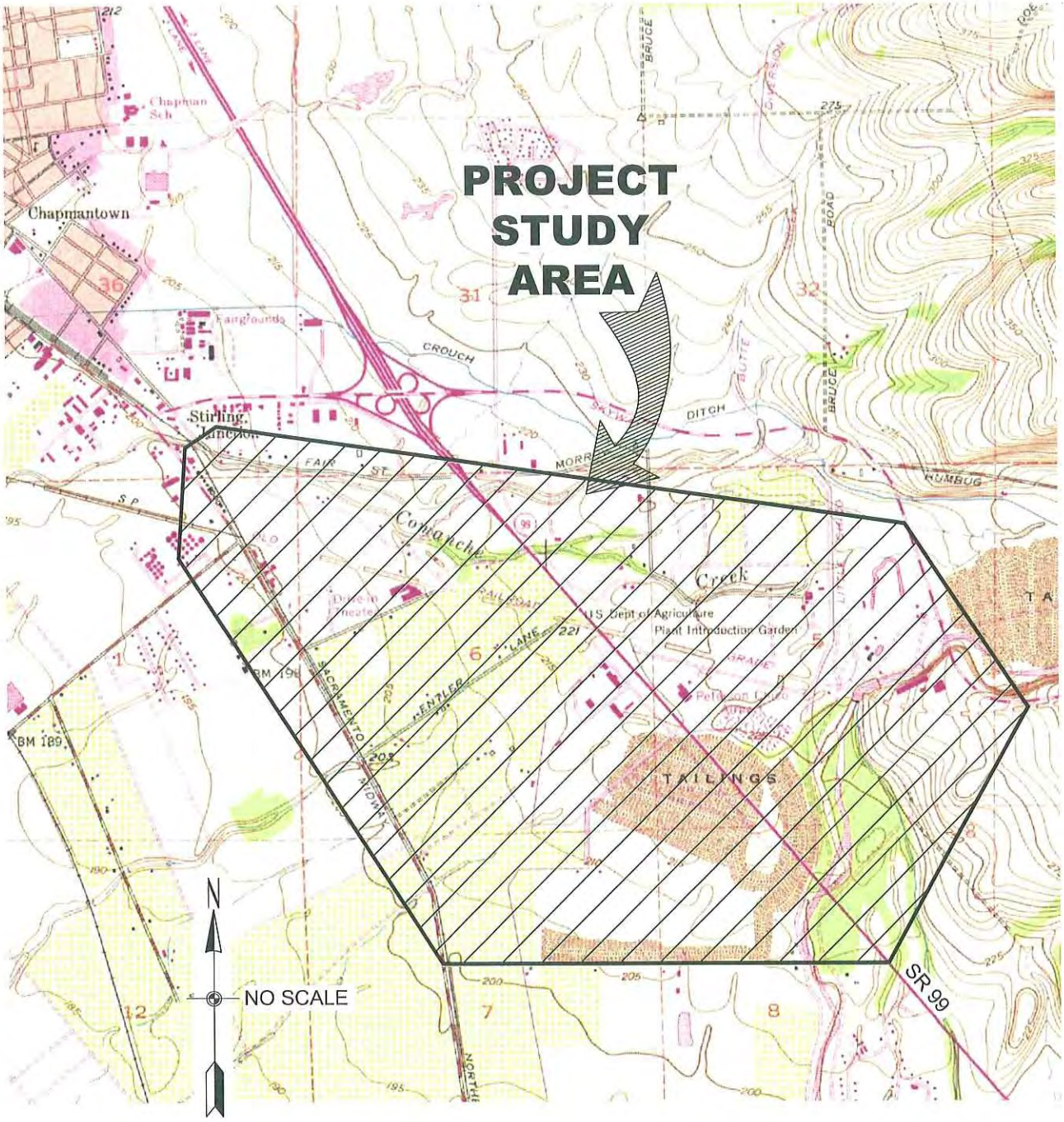
The governmental records portion of this report is derived from public records and is updated on a continual basis. For this reason, we do not advise you to use this information to base a decision after 180 days of the issue date of this report. Also, conditions at the site can and will change over time. Please contact BCI to revise this report to reflect new information.

FIGURES

Figure 1 – Vicinity Map

Figure 2A – Site Plan

Figure 2B – Site Plan



Source: MAPTECH Terrain Navigator Pro, v. 7.01, USGS topographic map, 7.5 minute quadrangle, 1:24000, Chico, CA dated 1948, Photorevised 1978.

blackburn consulting

11521 Blocker Drive, Ste 110
Auburn, CA 95603
Phone: (530) 887-1494
Fax: (530) 887-1495
www.blackburnconsulting.com

VICINITY MAP

Southgate Interchange ISA
Chico, California

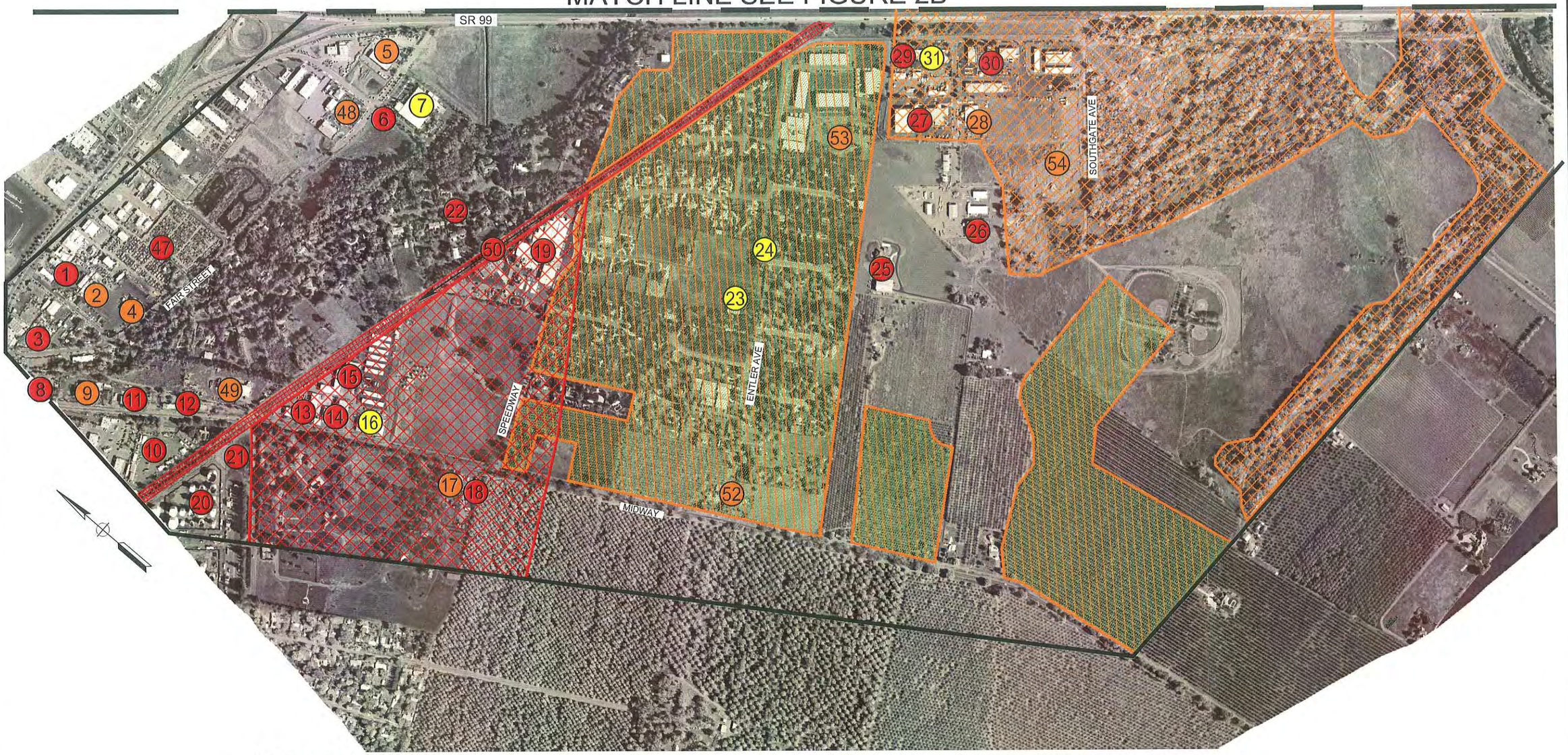
File No. 961.1

November 2008

Figure 1

11/24/2008 961.1 Southgate Interchange Figure 1.dwg

MATCH LINE SEE FIGURE 2B



LEGEND

Approximate Location of Orchards circa 1957.

Approximate Locations of Dredge Tailings circa 1957.

Approximate Location of Skyway Plume Investigation Area.

(50) Former SP Grade.

Approximate Study Area Boundary

(53) Site ID as shown in ISA tables and text. Color indicates PA/ED risk class.

- High
- Medium
- Low

Source: Aerial survey and topology by Radman Aerial Surveys, Sacramento, CA, dated 11-14-07, 1"=200'.

SCALE: 1"=850'

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Auburn, CA 95603
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Fax: (530) 887-1495
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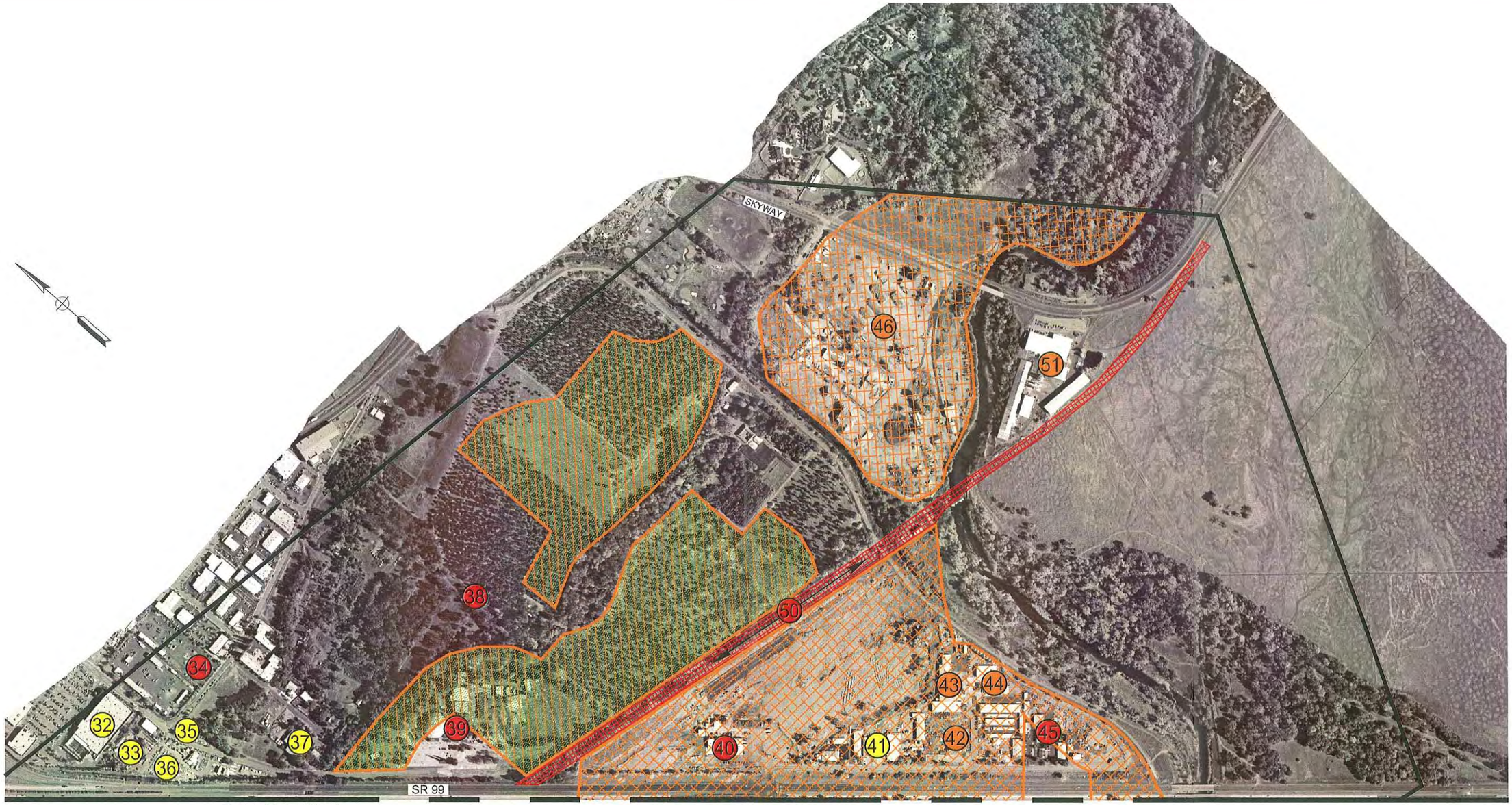
SITE MAP
Southgate Interchange ISA
Chico, California

File No. 961.1
November 2008
Figure 2A

11/24/2008 961.1 Southgate Interchange Figure 2.dwg



MATCH LINE SEE FIGURE 2A

LEGEND

- Approximate Location of Orchards circa 1957.
- Approximate Locations of Dredge Tailings circa 1957.
- Approximate Location of Skyway Plume Investigation Area.
- (50) Former SP Grade.
- Approximate Study Area Boundary
- (53) Site ID as shown in ISA tables and text. Color indicates PA/ED risk class.
  - High
  - Medium
  - Low

Source: Aerial survey and topology by Radman Aerial Surveys, Sacramento, CA, dated 11-14-07, 1"=200'.

SCALE: 1"=850'

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SITE MAP
Southgate Interchange ISA
Chico, California

File No. 961.1
November 2008
Figure 2B

11/24/2008 961.1 Southgate Interchange Figure 2.dwg

APPENDIX

A

Historical Aerial Photographs

Southgate Ave. Interchange
SR99/Southgate Ave.
CHICO, CA 95928

Inquiry Number: 2287908.1
August 11, 2008

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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Date EDR Searched Historical Sources:
Aerial Photography August 11, 2008

Target Property:
SR99/Southgate Ave.
CHICO, CA 95928

Year	*Scale*	*Details*	*Source*
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1957	Aerial Photograph. Scale: 1"=800'	Flight Year: 1957	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1962	Aerial Photograph. Scale: 1"=800'	Flight Year: 1962	Cartwright
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1970	Aerial Photograph. Scale: 1"=800'	Flight Year: 1970	Western
1984	Aerial Photograph. Scale: 1"=800'	Flight Year: 1984	USGS

Year	*Scale*	*Details*	*Source*
1984	Aerial Photograph. Scale: 1"=800'	Flight Year: 1984	USGS
1984	Aerial Photograph. Scale: 1"=800'	Flight Year: 1984	USGS
1984	Aerial Photograph. Scale: 1"=800'	Flight Year: 1984	USGS
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1998	Aerial Photograph. Scale: 1"=800'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=484'	Flight Year: 2005	EDR

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INQUIRY #: 2287908.1
YEAR: 1957
= 800'
N

INQUIRY #: 2287908.1
YEAR: 1957
= 800'
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INQUIRY #: 2287908.1
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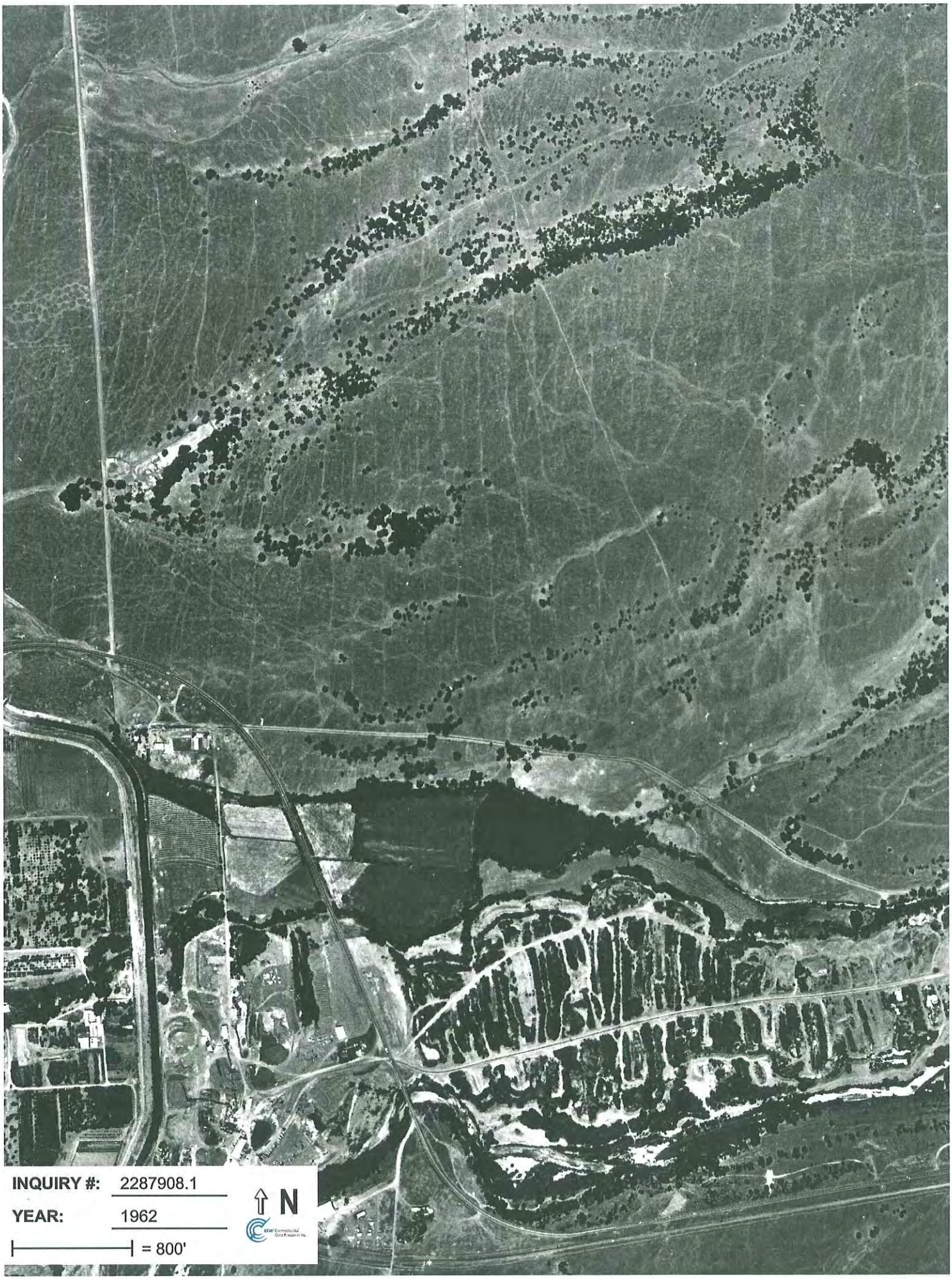
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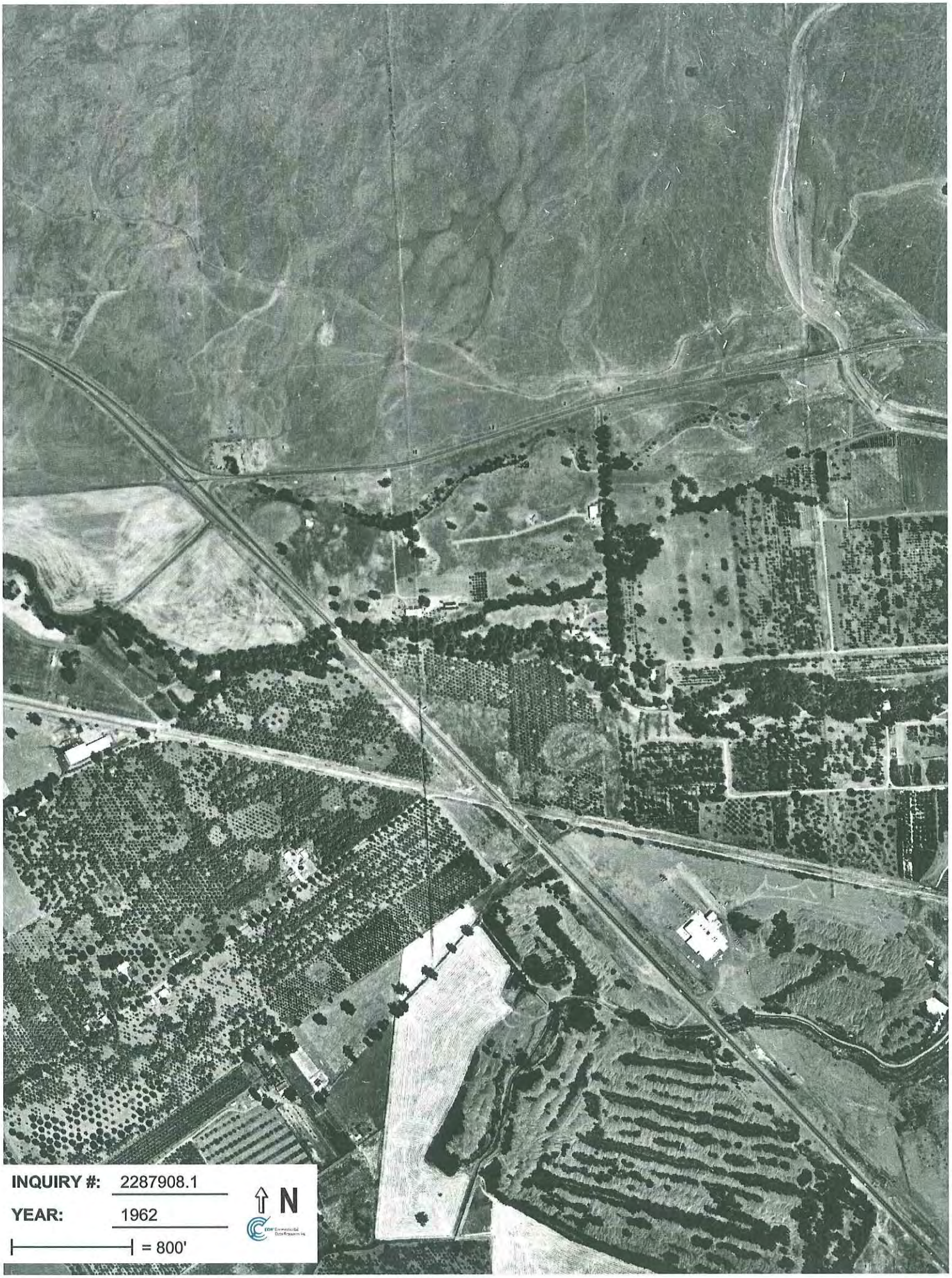
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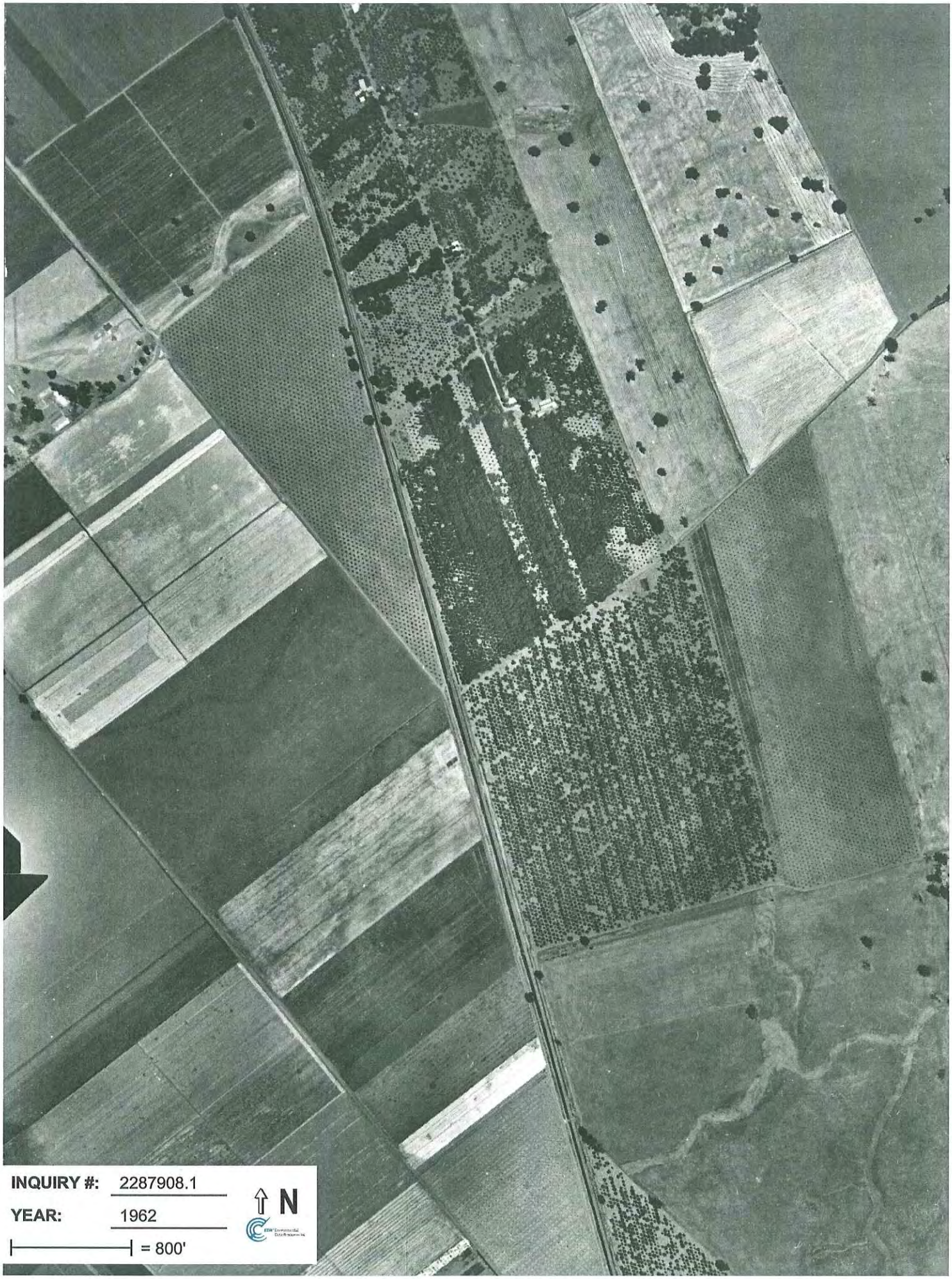
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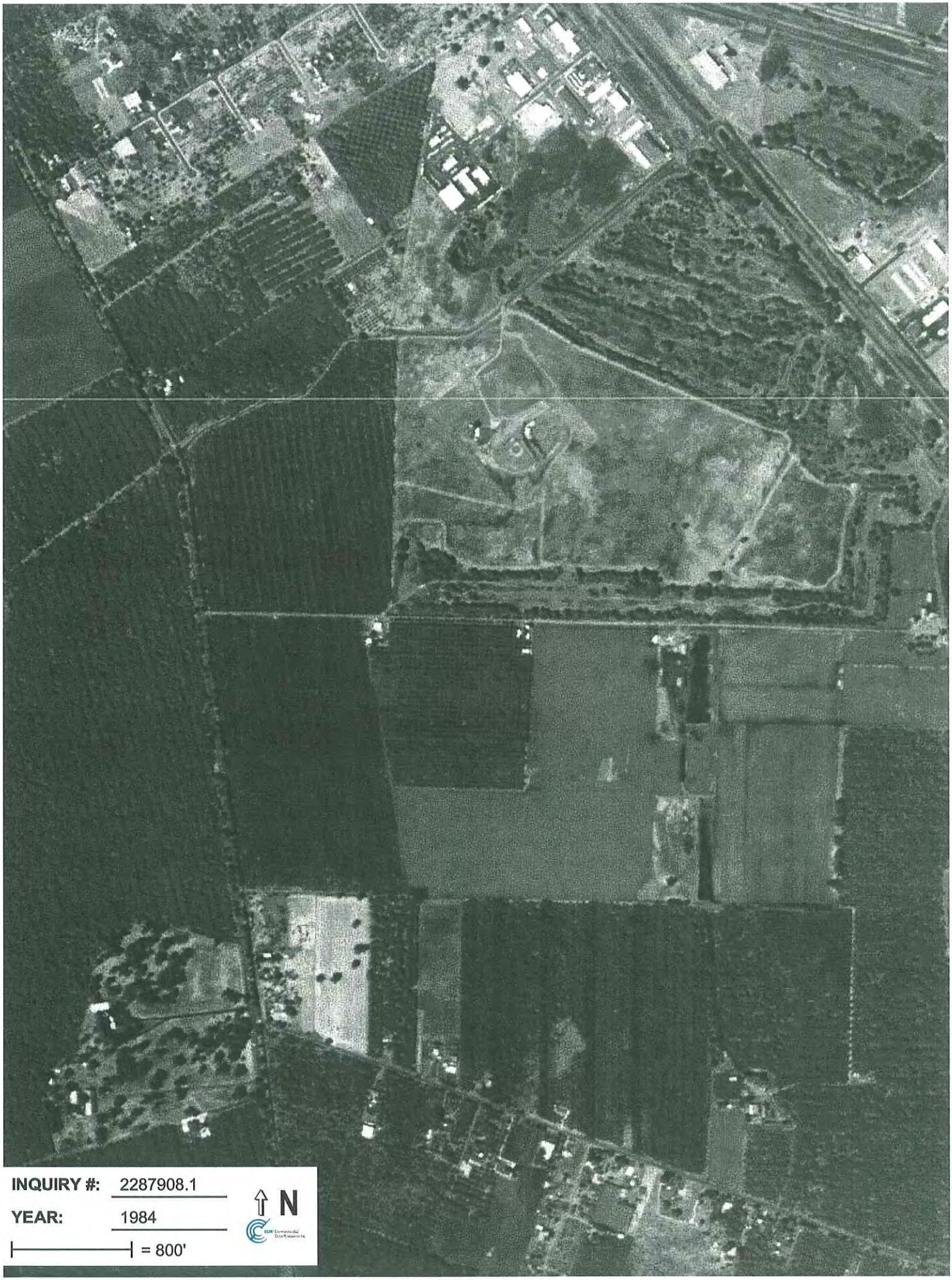
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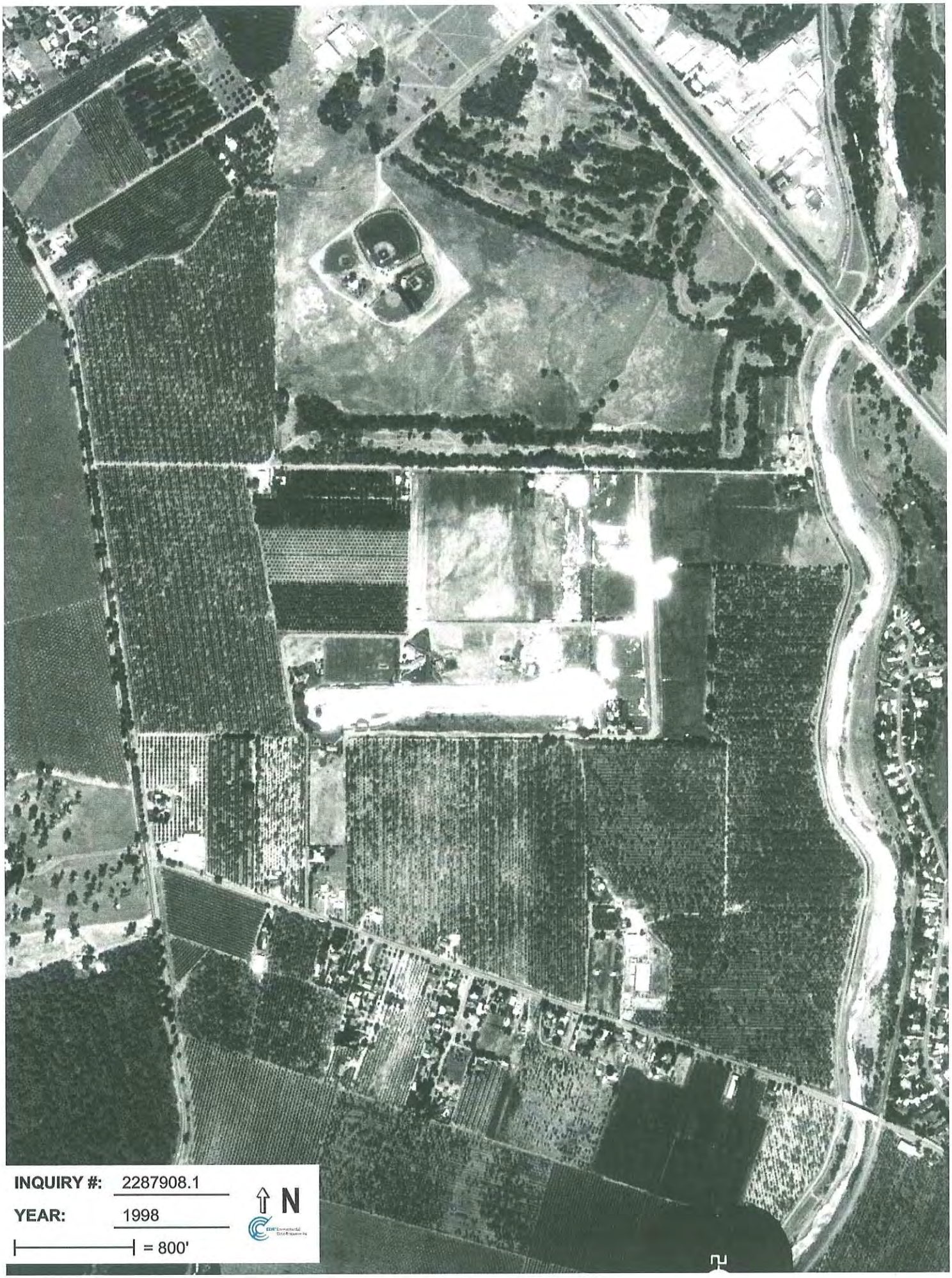
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YEAR: 1998
= 800'
N

INQUIRY #: 2287908.1
YEAR: 2005
= 484'
N

APPENDIX

B

Topographic Maps

EDR Historical Topographic Map Report

Southgate Ave. Interchange
SR99/Southgate Ave.
Chico, CA 95928

Inquiry Number: 2184904.4

April 03, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Rd
Milford, Connecticut 06461

Nationwide Customer Service

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Internet: www.edrnet.com

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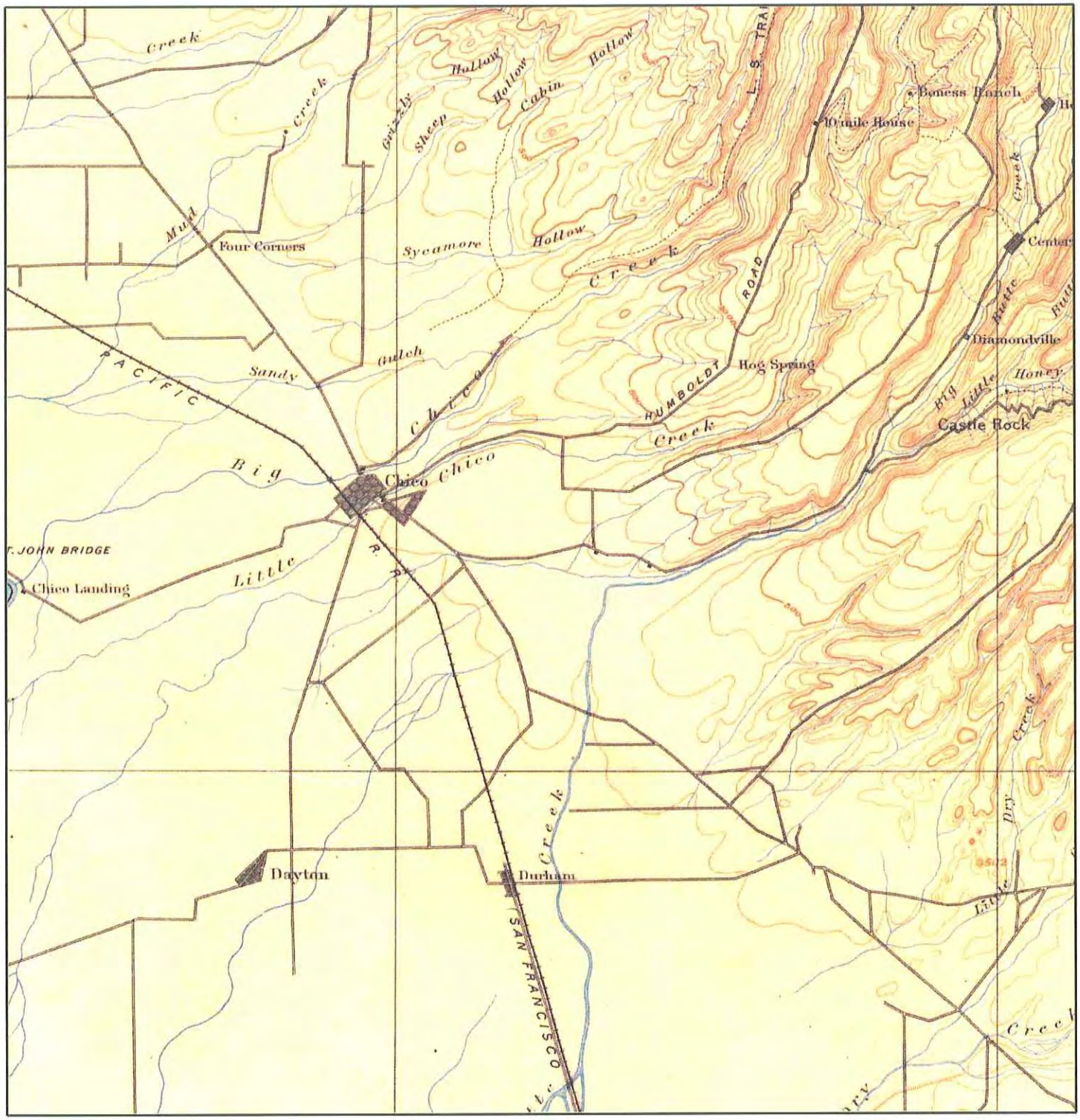
Historical Topographic Map



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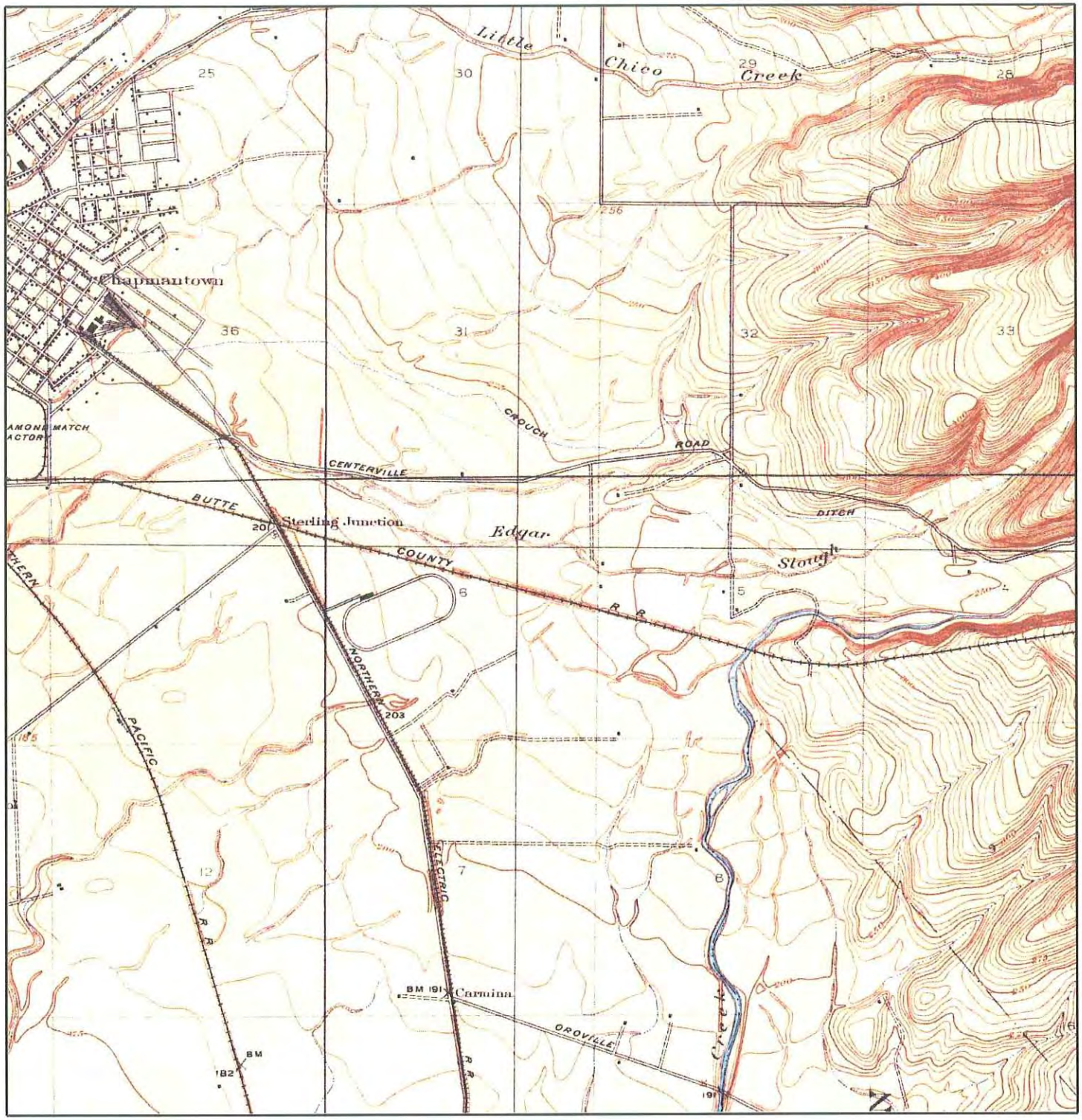
Historical Topographic Map



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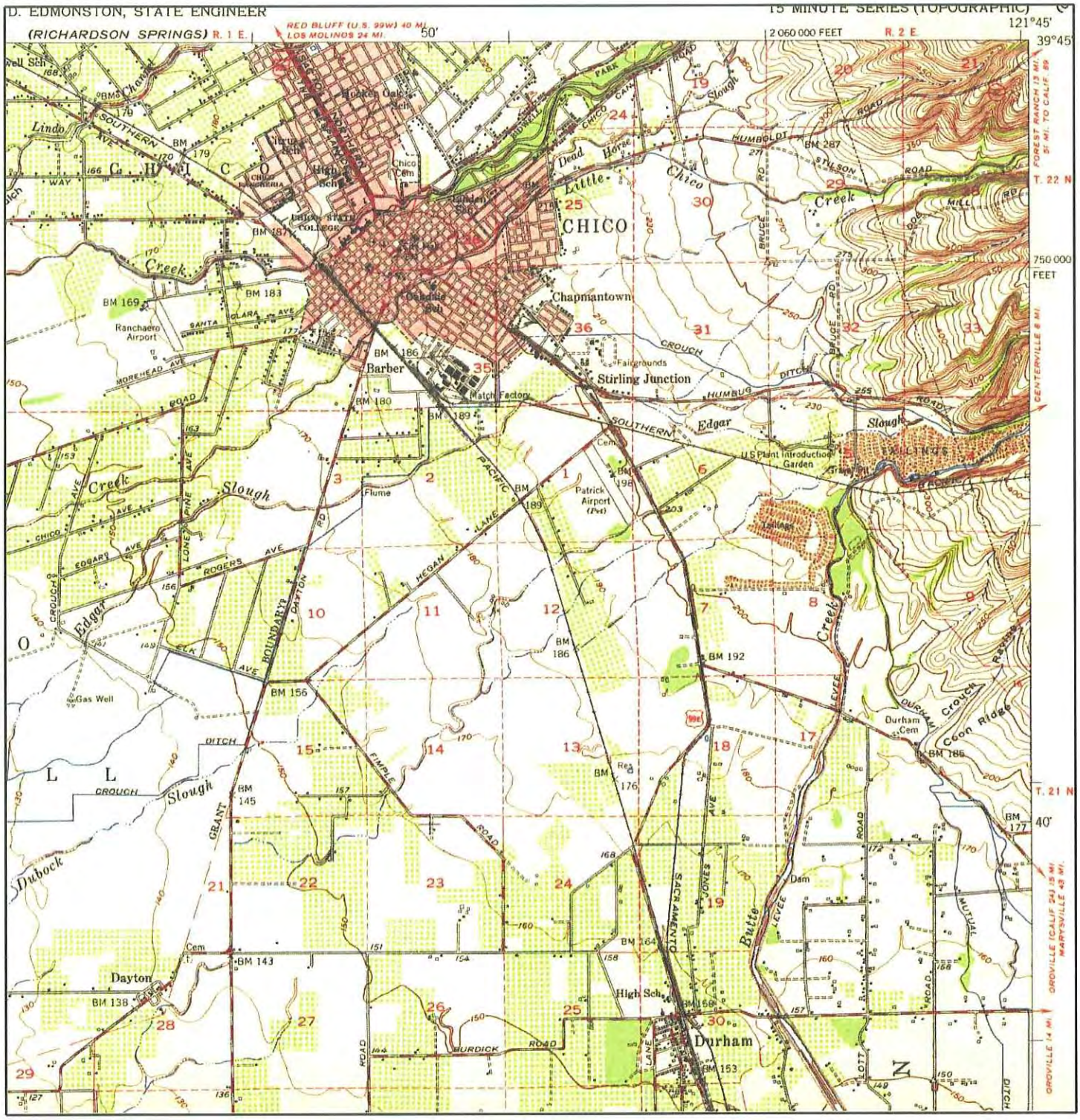
Historical Topographic Map



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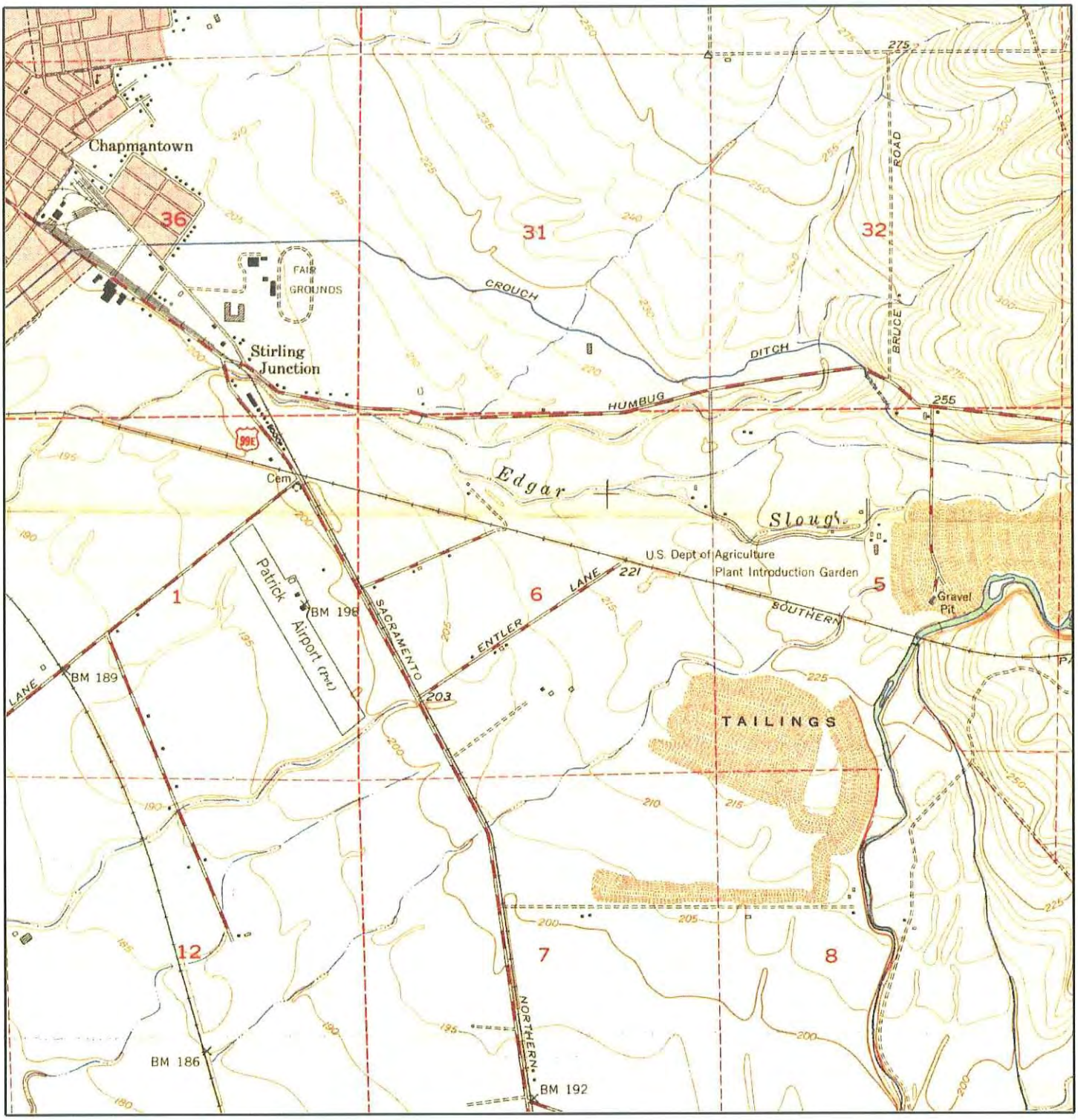
Historical Topographic Map



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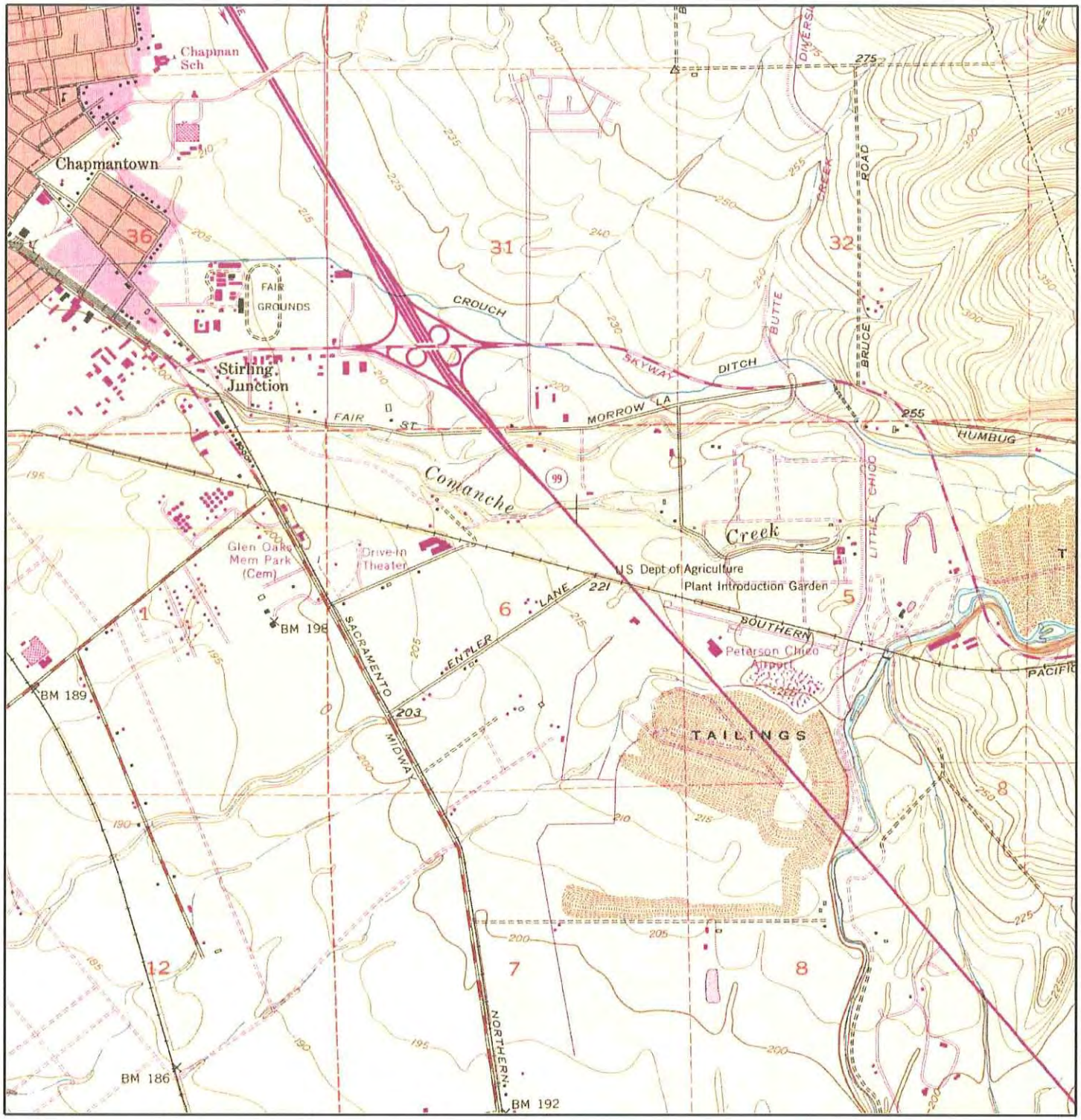
Historical Topographic Map



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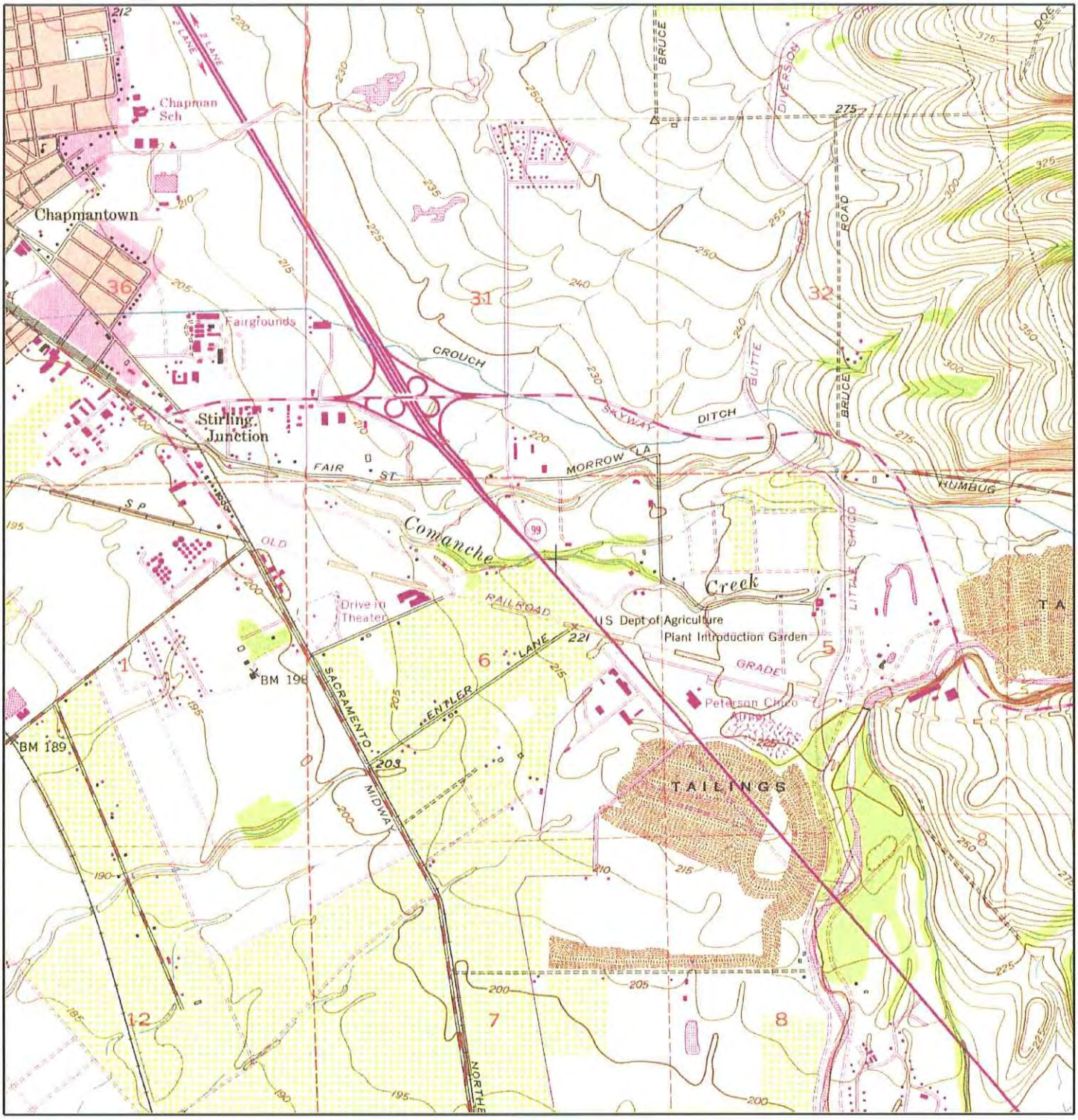
Historical Topographic Map



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APPENDIX

C

EDR Report Executive Summary

Listing of Searched Databases

Full EDR Report on CD

The EDR Radius Map
with GeoCheck®

Southgate Ave. Interchange
SR99/Southgate Ave.
Chico, CA 95928

Inquiry Number: 02206466.1r

April 29, 2008

EDR® Environmental
Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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Orphan Summary	354
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
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Physical Setting Source Records Searched	A-15

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with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

SR99/SOUTHGATE AVE.
CHICO, CA 95928

COORDINATES

Latitude (North):	39.705400 - 39' 42' 19.4"
Longitude (West):	121.793000 - 121' 47' 34.8"
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	603474.7
UTM Y (Meters):	4395547.0
Elevation:	220 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	39121-F7 CHICO, CA
Most Recent Revision:	1978

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

FEDERAL RECORDS

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
Delisted NPL..... National Priority List Deletions
NPL LIENS..... Federal Superfund Liens
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
LIENS 2..... CERCLA Lien Information
CORRACTS..... Corrective Action Report
RCRA-TSDF..... RCRA - Transporters, Storage and Disposal
US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls

EXECUTIVE SUMMARY

DOT OPS..... Incident and Accident Data
US CDL..... Clandestine Drug Labs
US BROWNFIELDS..... A Listing of Brownfields Sites
DOD..... Department of Defense Sites
FUDS..... Formerly Used Defense Sites
LUCIS..... Land Use Control Information System
CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
UMTRA..... Uranium Mill Tailings Sites
ODI..... Open Dump Inventory
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
TSCA..... Toxic Substances Control Act
ICIS..... Integrated Compliance Information System
PADS..... PCB Activity Database System
MLTS..... Material Licensing Tracking System
RADINFO..... Radiation Information Database
RAATS..... RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

HIST Cal-Sites..... Historical Calsites Database
CA BOND EXP. PLAN..... Bond Expenditure Plan
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
WMUDS/SWAT..... Waste Management Unit Database
LIENS..... Environmental Liens Listing
Notify 65..... Proposition 65 Records
DEED..... Deed Restriction Listing
VCP..... Voluntary Cleanup Program Properties
WIP..... Well Investigation Program Case List
RESPONSE..... State Response Sites

TRIBAL RECORDS

INDIAN RESERV..... Indian Reservations
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
INDIAN UST..... Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

FEDERAL RECORDS

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 12/03/2007 has revealed that there is 1 CERC-NFRAP site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
COMSTOCK ROAD-CHICO CHEMICALS	7 COMSTOCK ROAD	1 - 2	N	BA265	293

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/06/2008 has revealed that there are 5 RCRA-LQG sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
Not reported	425 SOUTHGATE AVENUE	1/4 - 1/2	SSE	H27	41
CHICO ENTERPRISE RECORD	400 E PARK AVE	1/2 - 1	NW	AL163	188
SFPP, L.P. CHICO TERMINAL	***2570 HEGAN LANE***	***1 - 2***	***W***	***AO192***	***207***
DUCKBACK PRODUCTS	2644 HEGAN LANE	1 - 2	W	AU245	271
CHEMCRAFT	***311 OTTERSON DR. SUITE***	***1 - 2***	***W***	***BB271***	***299***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/06/2008 has revealed that there are 20 RCRA-SQG sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
CHEMTEC AGRI CHEMS INC	***701 ENTLER AVE***	***1/4 - 1/2***	***SE***	***B10***	***13***
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2***	***N***	***D19***	***22***
FMC CORP AGRI CHEM GROUP	***775 ENTLER AVE***	***1/4 - 1/2***	***SE***	***24***	***33***
MOSER DENTAL MFG CO	2560 DOMINIC DR UNIT I	1/2 - 1	NNE	I35	48
QUADCO PRINTING INC	***2535 ZANELLA WY***	***1/2 - 1***	***N***	***36***	***49***
MIRACLE AUTO PAINTING	***2560 DOMINIC***	***1/2 - 1***	***NNE***	***I37***	***52***
GARY YOUNIE TRK & AUTO INC.	***3871 BENATAR WAY***	***1/2 - 1***	***NNE***	***K47***	***65***
CALTRANS DISTRICT 3	***2535 NOTRE DAME BLVD***	***1/2 - 1***	***NNW***	***L57***	***73***
UNIVERSAL EQUIPMENT MFG CO INC	***3075 SOUTHGATE LANE***	***1/2 - 1***	***SE***	***S77***	***92***
RALEYS 287	***2485 NOTRE DAME BLVD UN***	***1/2 - 1***	***N***	***V88***	***104***

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
WITTMEIER AUTO CENTER	*2288 FOREST AVE*	*1 - 2 NNW*	*AQ218*	*237*

Lower Elevation	Address	Dist / Dir	Map ID	Page
HOME DEPOT USA INC HD 6609	*2580 NOTRE DAME BLVD*	*1/4 - 1/2 NNW*	*F26*	*36*
LIFETOUCH NATIONAL SCHOOL STUD	*2860 FAIR ST*	*1/2 - 1 NW*	*J38*	*54*
PG&E CHICO SERVICE CENTER	*11239 MIDWAY*	*1/2 - 1 WNW*	*AD128*	*139*
PURITZ OIL CO	*2421 VALINE WAY*	*1/2 - 1 NW*	*AG137*	*160*
BUTTE COUNTY PUBLIC HEALTH SER	*2445 CARMICHAEL DRIVE*	*1/2 - 1 NW*	*AK162*	*186*
CHICO COLLISION CTR INC	*275 E PARK AVE*	*1 - 2 NW*	*AT235*	*257*
DUCKBACK PRODUCTS CO INC	*2644 HEGAN LANE*	*1 - 2 W*	*AU239*	*264*
CASCADE ORTHOPEDIC SUPPLY INC	*415 OTTERSON DR STE 70*	*1 - 2 W*	*BF294*	*326*
COSTCO NO 136	*2100 WHITMAN AVE.*	*1 - 2 NW*	*BK312*	*344*

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 03/06/2008 has revealed that there is 1 RCRA-CESQG site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
EVERGREEN OIL CHICO	*2549 SCOTT AVE*	*1 - 2 WNW*	*AS232*	*254*

RCRA-NonGen: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA-NonGen list, as provided by EDR, and dated 03/06/2008 has revealed that there are 10 RCRA-NonGen sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHICO METAL FINISHING INC	*3870 MARROW LANE SUITE*	*1/4 - 1/2 NNE*	*G25*	*35*
SPRAY-CHEM	*3851 MORROW LN #13*	*1/4 - 1/2 NNE*	*G30*	*44*
GRUBER ENTERPRISES	*2170 HUNTINGTON DR*	*1 - 2 N*	*293*	*325*

Lower Elevation	Address	Dist / Dir	Map ID	Page
GREG KERR TRUCKING	*1 BAJA CT*	*1/4 - 1/2 SW*	*3*	*7*
DIAGNOSTIC IMAGING INC	*3650 MORROW LN*	*1/4 - 1/2 N*	*E22*	*32*
BEAM X RAY INC	*11025 MIDWAY*	*1/2 - 1 WSW*	*P69*	*82*
CHEVRON USA INC CHICO CA TERM	*HAGEN LN AT MIDWAY RD*	*1/2 - 1 WNW*	*AD122*	*131*
SHELL OIL CO CHICO PLANT	2570 HEGAN LN	1 - 2 W	AO207	214
ATC/VANCOM OF CALIFORNIA	*326 HUSS DR*	*1 - 2 W*	*BC274*	*306*
3M CHICO	*402 OTTERSON DR*	*1 - 2 W*	*BF288*	*319*

EXECUTIVE SUMMARY

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 12/31/2007 has revealed that there are 37 ERNS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
7 COMSTOCK RD	7 COMSTOCK RD	1 - 2	N	BA266	294

Lower Elevation	Address	Dist / Dir		Map ID	Page
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO174	199
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO175	199
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO177	200
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO178	201
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO179	201
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO180	201
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO181	201
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO183	201
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO184	202
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO185	202
2570 HEGGAN LANE	2570 HEGGAN LANE	1 - 2	W	AO186	202
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO187	202
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO189	206
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO190	206
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO191	207
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO193	212
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO194	212
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO195	212
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO196	212
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO198	213
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO199	213
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO200	213
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO201	213
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO202	213
2570 HAGAN LANE	2570 HAGAN LANE	1 - 2	W	AO203	213
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO204	214
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO205	214
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO206	214
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO208	216
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO209	216
2570 HEGAN LANE	2570 HEGAN LANE	1 - 2	W	AO210	216
2644 HEGAN LANE	2644 HEGAN LANE	1 - 2	W	AU242	268
2446 FAIR STREET	2446 FAIR STREET	1 - 2	WNW	AY259	289
2446 FAIR STREET	2446 FAIR STREET	1 - 2	WNW	AY261	290
2101 WHITMAN AVE	2101 WHITMAN AVE	1 - 2	NW	BK314	347
2334 FAIR ST	2334 FAIR ST	1 - 2	WNW	BH318	350

HMIRS: The Hazardous Materials Incident Report System contains hazardous material spill incidents reported to the Department of Transportation. The source of this database is the U.S. EPA.

A review of the HMIRS list, as provided by EDR, and dated 10/31/2007 has revealed that there are 5 HMIRS sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
2570 HEGEN LN	2570 HEGEN LN	1 - 2	W	AO182	201

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir		Map ID	Page
Not reported	2446 FAIR ST	1 - 2	WNW	AY258	289
Not reported	401 OTTERSON AVE	1 - 2	W	BF281	315
Not reported	401 OTTERSON	1 - 2	W	BF283	315
Not reported	401 OTTERSON DR	1 - 2	W	BF286	318

MINES: Mines Master Index File. The source of this database is the Dept. of Labor, Mine Safety and Health Administration.

A review of the MINES list, as provided by EDR, and dated 02/07/2008 has revealed that there is 1 MINES site within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
BUTTE CREEK ROCK CO		1/2 - 1	E	170	194

TRIS: The Toxic Chemical Release Inventory System identifies facilities that release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III, Section 313. The source of this database is the U.S. EPA.

A review of the TRIS list, as provided by EDR, and dated 12/31/2006 has revealed that there are 2 TRIS sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir		Map ID	Page
DUCKBACK PRODUCTS	***2644 HEGAN LN***	***1 - 2***	***W***	***AU244***	***269***
CHEMCRAFT COATINGS TECHNOLOGY	311 OTTERSON DR SUITE 6	1 - 2	W	BB269	298

FTTS: FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act) over the previous five years. To maintain currency, EDR contacts the Agency on a quarterly basis.

A review of the FTTS list, as provided by EDR, and dated 01/15/2008 has revealed that there are 2 FTTS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
CHEMTEC, INC.	***3155 SOUTHGATE LANE***	***1/2 - 1***	***SE***	***AF129***	***147***
CHEMTEC AG CHEMICALS INC	***3155 SOUTHGATE LN***	***1/2 - 1***	***SE***	***AF130***	***148***

HIST FTTS: A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

A review of the HIST FTTS list, as provided by EDR, and dated 10/19/2006 has revealed that there are 2 HIST FTTS sites within approximately 1.5 miles of the target property.

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHEMTEC, INC.	***3155 SOUTHGATE LANE***	***1/2 - 1 SE***	***AF129***	***147***
CHEMTEC AG CHEMICALS INC	***3155 SOUTHGATE LN***	***1/2 - 1 SE***	***AF130***	***148***

SSTS: Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

A review of the SSTS list, as provided by EDR, and dated 12/31/2006 has revealed that there are 2 SSTS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHEMTEC (INACTIVE	3155 SOUTHGATE LN	1/2 - 1 SE	AF131	149
CHEMTEC	3155 SOUTHGATE LN	1/2 - 1 SE	AF136	152

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 01/04/2008 has revealed that there are 56 FINDS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHEMTEC AGRI CHEMS INC	***701 ENTLER AVE***	***1/4 - 1/2 SE***	***B10***	***13***
NORFIELD MANUFACTURING	725 ENTLER AVE	1/4 - 1/2 SE	B11	14
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
FMC CORP AGRI CHEM GROUP	***775 ENTLER AVE***	***1/4 - 1/2 SE***	***24***	***33***
CHICO METAL FINISHING INC	***3870 MARROW LANE SUITE***	***1/4 - 1/2 NNE***	***G25***	***35***
SPRAY-CHEM	***3851 MORROW LN #13***	***1/4 - 1/2 NNE***	***G30***	***44***
QUADCO PRINTING INC	***2535 ZANELLA WY***	***1/2 - 1 N***	***36***	***49***
MIRACLE AUTO PAINTING	***2560 DOMINIC***	***1/2 - 1 NNE***	***I37***	***52***
GARY YOUNIE TRK & AUTO INC.	***3871 BENATAR WAY***	***1/2 - 1 NNE***	***K47***	***65***
CALTRANS DISTRICT 3	***2535 NOTRE DAME BLVD***	***1/2 - 1 NNW***	***L57***	***73***
UNIVERSAL EQUIPMENT MFG CO INC	***3075 SOUTHGATE LANE***	***1/2 - 1 SE***	***S77***	***92***
KRAGEN AUTO PARTS #1009	2485 NOTRE DAME BLVD	1/2 - 1 N	V83	98
LUBE DEPOT	2485 NORTE DAME BLVD.	1/2 - 1 N	V86	102
RALEYS 287	***2485 NOTRE DAME BLVD UN***	***1/2 - 1 N***	***V88***	***104***
VACARO SEED/CALIFORNIA INC.	446 SOUTHGATE COURT	1/2 - 1 SE	Z102	115
CHEMTEC INC.	3155 SOUTHGATE LANE	1/2 - 1 SE	AF132	150
LOWES COMPANIES, INC.	2350 FOREST AVENUE	1/2 - 1 NNW	AH142	167
CHICO FIRE STATION #4	2405 NOTREDAME BLVD.	1/2 - 1 N	AE144	169
WITTMEIER AUTO CENTER	***2288 FOREST AVE***	***1 - 2 NNW***	***AQ218***	***237***
GRUBER ENTERPRISES	***2170 HUNTINGTON DR***	***1 - 2 N***	***293***	***325***

Lower Elevation	Address	Dist / Dir	Map ID	Page
GREG KERR TRUCKING	***1 BAJA CT***	***1/4 - 1/2 SW***	***3***	***7***

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir	Map ID	Page
WOOD-PLY FOREST PRODUCTS	3711 MORROW LANE	1/4 - 1/2 N	E18	22
DIAGNOSTIC IMAGING INC	***3650 MORROW LN***	***1/4 - 1/2 N***	***E22***	***32***
HOME DEPOT USA INC HD 6609	***2580 NOTRE DAME BLVD***	***1/4 - 1/2 NNW***	***F26***	***36***
LIFETOUCH NATIONAL SCHOOL STUD	***2860 FAIR ST***	***1/2 - 1 NW***	***J38***	***54***
UNITED RENTALS	***2855 FAIR STREET***	***1/2 - 1 NW***	***J40***	***58***
SMUCKER QUALITY BEVERAGES	37 SPEEDWAY AVE	1/2 - 1 W	O65	79
BEAM X RAY INC	***11025 MIDWAY***	***1/2 - 1 WSW***	***P69***	***82***
PATIO CRUISERS, INC.	11088 MIDWAY	1/2 - 1 W	R73	87
OAK RIDGE CABINETS	11128 MIDWAY	1/2 - 1 W	T80	97
WEISS/MCNAIR, INC.	531 COUNTRY DRIVE	1/2 - 1 NW	X94	109
VALLEY TRACTOR, INC.	489 COUNTRY DRIVE	1/2 - 1 NW	AB111	122
CHEVRON USA INC CHICO CA TERM	***HAGEN LN AT MIDWAY RD***	***1/2 - 1 WNW***	***AD122***	***131***
PG&E CHICO SERVICE CENTER	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD128***	***139***
PURITZ OIL CO	***2421 VALINE WAY***	***1/2 - 1 NW***	***AG137***	***160***
BUTTE COUNTY PUBLIC HEALTH SER	***2445 CARMICHAEL DRIVE***	***1/2 - 1 NW***	***AK162***	***186***
CHICO ENTERPRISE RECORD	400 E PARK AVE	1/2 - 1 NW	AL164	189
KINDER MORGAN/SFPP	***2570 HEGAN LANE***	***1 - 2 W***	***AO176***	***199***
SFPP, L.P. CHICO TERMINAL	***2570 HEGAN LANE***	***1 - 2 W***	***AO192***	***207***
SHELL OIL - CHICO PLANT	2570 HEGAN LN	1 - 2 W	AO197	212
NORTH VALLEY DISPOSAL	2605 FAIR ST	1 - 2 WNW	AP214	233
NORTH VALLEY DISPOSAL & RECYCL	2569 SCOTT AVE	1 - 2 WNW	AP227	249
NORTHGATE PETROLEUM COMPANY	2549 SCOTT AVE	1 - 2 WNW	AS230	250
EVERGREEN OIL CHICO	***2549 SCOTT AVE***	***1 - 2 WNW***	***AS232***	***254***
CHICO COLLISION CTR INC	***275 E PARK AVE***	***1 - 2 NW***	***AT235***	***257***
DUCKBACK PRODUCTS CO INC	***2644 HEGAN LANE***	***1 - 2 W***	***AU239***	***264***
CAL-WATER SERVICE CO.-CHICO	2222 WHITMAN AVENUE	1 - 2 NW	AZ263	292
CHEMCRAFT	***311 OTTERSON DR. SUITE***	***1 - 2 W***	***BB271***	***299***
ATC/VANCOM OF CALIFORNIA	***326 HUSS DR***	***1 - 2 W***	***BC274***	***306***
3M CHICO	***402 OTTERSON DR***	***1 - 2 W***	***BF288***	***319***
QWEST CHICO TI	402 OTTERSON DRIVE	1 - 2 W	BF289	322
CASCADE ORTHOPEDIC SUPPLY INC	***415 OTTERSON DR STE 70***	***1 - 2 W***	***BF294***	***326***
LARSON HULLER & DRYER	1035 BRUCE LANE	1 - 2 SW	BI304	335
WREX PRODUCTS INCORPORATED	***25 WREX CT.***	***1 - 2 WNW***	***BJ309***	***339***
COSTCO NO 136	***2100 WHITMAN AVE.***	***1 - 2 NW***	***BK312***	***344***
WESTGATE HARDWOODS, INC	226 MEYERS ST	1 - 2 WNW	BJ320	351

STATE AND LOCAL RECORDS

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, and dated 03/10/2008 has revealed that there is 1 SWF/LF site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
USA WASTE OF CA CHICO	***2569 SCOTT AVE***	***1 - 2 WNW***	***AP226***	***247***

EXECUTIVE SUMMARY

CA WDS: California Water Resources Control Board - Waste Discharge System.

A review of the CA WDS list, as provided by EDR, and dated 06/19/2007 has revealed that there are 10 CA WDS sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
WOODPLY FOREST PRODUCTS	3711 MORROW LN	1/4 - 1/2 N	E16	20
LANGE JESSE M DISTRIBUTING	11226 MIDWAY AVE	1/2 - 1 WNW	AD118	126
CHICO TERMINAL	***2570 HEGAN LN***	***1 - 2 W***	***AO211***	***217***
JOHNS	***381 E PARK AVE***	***1 - 2 NW***	***AR224***	***245***
USA WASTE OF CA CHICO	***2569 SCOTT AVE***	***1 - 2 WNW***	***AP226***	***247***
ALTERNATIVE MATERIALS TECH	311 OTTERSON DR STE 60	1 - 2 W	BB270	298
ATC/VANCOM OF CALIFORNIA	***326 HUSS DR***	***1 - 2 W***	***BC274***	***306***
UPS CHICO - CACHI	401 OTTERSON RD	1 - 2 W	BF285	317
WREX PRODUCTS	***25 WREX CT***	***1 - 2 WNW***	***BJ311***	***341***
FAIRVIEW AUTO WRECKERS	2437 PARK AVE	1 - 2 WNW	322	352

Cortese: The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

A review of the Cortese list, as provided by EDR, and dated 04/01/2001 has revealed that there are 18 Cortese sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
ROUSSER DISTRIBUTING	***71 LOREN RD***	***1/4 - 1/2 SE***	***A5***	***9***
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
WALMART STORE #2044	***2044 FOREST AVE***	***1 - 2 NNW***	***AX256***	***284***

Lower Elevation	Address	Dist / Dir	Map ID	Page
BECHHOLD, ROY E. & JUANIT	496 ENTLER	0 - 1/8 SSW	1	6
PACIFIC STIHL	***11096 MIDWAY AVE***	***1/2 - 1 W***	***R74***	***87***
CAPITOL COORS	***11110 MIDWAY AVE***	***1/2 - 1 W***	***R75***	***89***
LANGE JESSE DISTRIBUTOR I	***11226 MIDWAY***	***1/2 - 1 WNW***	***AD115***	***125***
PG&E CHICO SERVICE CENTER	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD128***	***139***
GAS MART	***480 PARK AVE E***	***1/2 - 1 NW***	***AI154***	***178***
WEST VALLEY CONSTRUCTION	***11276 MIDWAY***	***1/2 - 1 WNW***	***AM169***	***194***
CHICO TERMINAL	***2570 HEGAN LN***	***1 - 2 W***	***AO211***	***217***
WONDER BREAD THRIFT STORE	***385 PARK AVE E***	***1 - 2 NW***	***AR222***	***242***
NORTHLAND TRANSPORTATION	***2549 SCOTT***	***1 - 2 WNW***	***AS231***	***251***
PARK AVENUE MOTORS	***275 PARK AVE E***	***1 - 2 NW***	***AT237***	***262***
FOOD & LIQUOR #159 CHICO	***110 PARK***	***1 - 2 WNW***	***AW250***	***278***
WILLIAMSON G PROPERTIES	***2480 FAIR ST***	***1 - 2 WNW***	***AW257***	***287***
DELTA LINES	***2446 FAIR ST***	***1 - 2 WNW***	***AY262***	***290***
WREX PRODUCTS	***25 WREX CT***	***1 - 2 WNW***	***BJ311***	***341***

SWRCY: A listing of recycling facilities in California.

A review of the SWRCY list, as provided by EDR, and dated 01/07/2008 has revealed that there is 1 SWRCY site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
USA WASTE OF CA CHICO	***2569 SCOTT AVE***	***1 - 2 WNW***	***AP226***	***247***

EXECUTIVE SUMMARY

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 01/07/2008 has revealed that there are 20 LUST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
ROUSSER DISTRIBUTING Facility Status: Case Closed	***71 LOREN RD***	***1/4 - 1/2 SE***	***A5***	***9***
PACIFIC BELL Facility Status: Case Closed Facility Status: Case Closed	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
CHEVRON/FLYERS #50 Facility Status: Pollution Characterization	***2501 NOTRE DAME***	***1/2 - 1 N***	***72***	***84***
FRED MEYER Facility Status: Case Closed	***2350 FOREST AVE***	***1/2 - 1 NNW***	***AH141***	***165***
WALMART STORE #2044 Facility Status: Case Closed	***2044 FOREST AVE***	***1 - 2 NNW***	***AX256***	***284***

Lower Elevation	Address	Dist / Dir	Map ID	Page
PACIFIC STIHL Facility Status: Case Closed	***11096 MIDWAY AVE***	***1/2 - 1 W***	***R74***	***87***
CAPITOL COORS Facility Status: Case Closed	***11110 MIDWAY AVE***	***1/2 - 1 W***	***R75***	***89***
JESSE M. LANGE DISTRIBUTING IN Facility Status: Pollution Characterization	11226 MIDWAY AVE	1/2 - 1 WNW	AD119	127
CHICO SERVICE CENTER Facility Status: Case Closed	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD127***	***136***
PG&E CHICO SERVICE CENTER Facility Status: Case Closed	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD128***	***139***
GAS MART Facility Status: Case Closed	***480 PARK AVE E***	***1/2 - 1 NW***	***AI154***	***178***
WEST VALLEY CONSTRUCTION CO Facility Status: Case Closed	11276 MIDWAY AVE	1/2 - 1 WNW	AM166	190
CHICO TERMINAL Facility Status: Pollution Characterization	***2570 HEGAN LN***	***1 - 2 W***	***AO211***	***217***
WONDER BREAD THRIFT STORE Facility Status: Case Closed	***385 PARK AVE E***	***1 - 2 NW***	***AR222***	***242***
PARK AVENUE MOTORS Facility Status: Case Closed	***275 PARK AVE E***	***1 - 2 NW***	***AT237***	***262***
FOOD & LIQUOR #159 CHICO Facility Status: Case Closed	***110 PARK***	***1 - 2 WNW***	***AW250***	***278***
WILLIAMSON G PROPERTIES Facility Status: Case Closed	***2480 FAIR ST***	***1 - 2 WNW***	***AW257***	***287***
DELTA LINES Facility Status: Case Closed	***2446 FAIR ST***	***1 - 2 WNW***	***AY262***	***290***
CONOVER RESIDENCE Facility Status: Case Closed	2470 VALINE LN	1 - 2 WNW	BE279	312

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir	Map ID	Page
WREX PRODUCTS	***25 WREX CT***	***1 - 2 WNW***	***BJ311***	***341***
Facility Status: Case Closed				

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 20 CA FID UST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
GARY YOUNIE TRUCK & AUTO REPAI	***3871 BENATAR WAY***	***1/2 - 1 NNE***	***K45***	***62***
AAMCO TRANSMISSIONS	3880 BENATAR WAY	1/2 - 1 NNE	K50	67

Lower Elevation	Address	Dist / Dir	Map ID	Page
CHICO TRANSPORTATION	***2840 FAIR ST***	***1/2 - 1 NW***	***J44***	***61***
G.E. WEISS	***594 PASEO COMPANEROS***	***1/2 - 1 WNW***	***N60***	***76***
AGRI ELECTRIC	***11011 MIDWAY***	***1/2 - 1 WSW***	***P67***	***81***
WEISS / MCNAIR INC	***531 COUNTRY DR***	***1/2 - 1 NW***	***X96***	***110***
BOB HARTMAN & BEVERLY	163 MCFADDEN LN	1/2 - 1 S	AA105	117
JESSE M LANGE DISTRIBUTOR INC	11226 MIDWAY	1/2 - 1 WNW	AD116	126
CHICO SERVICE CENTER	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD127***	***136***
PARK AVE TEXACO	***480 E PARK AVE***	***1/2 - 1 NW***	***AI150***	***172***
CHICO UNIF SCHOOL DIST/CORP YD	***2455 CARMICHAEL DR***	***1/2 - 1 NW***	***AK160***	***182***
WEST VALLEY CONSTRUCTION CO. I	***11276 MIDWAY***	***1/2 - 1 WNW***	***AM167***	***192***
WONDER BREAD	***385 E PARK AVE***	***1 - 2 NW***	***AR223***	***244***
PARK AVENUE MOTORS	***275 E PARK AVE***	***1 - 2 NW***	***AT236***	***261***
DONALD E. MARCH	***772 CESSNA AVE***	***1 - 2 W***	***AV247***	***276***
FOOD AND LIQUOR #159	***110 E PARK***	***1 - 2 WNW***	***AW252***	***280***
DELTA LINES	***2446 FAIR ST***	***1 - 2 WNW***	***AY262***	***290***
HESTER G. PATRICK	10381 MIDWAY	1 - 2 S	BD277	311
SILVER DOLLAR FAIR	2357 FAIR ST	1 - 2 WNW	BH297	330

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 01/07/2008 has revealed that there are 6 SLIC sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
PETERSON TRACTOR COMPANY	425 SOUTHGATE AVE.	1/4 - 1/2 SSE	H29	44
Facility Status: Pollution Characterization				
WESTERN PETROLEUM MARKETERS	***11204 MIDWAY***	***1/2 - 1 W***	***AC112***	***123***
Facility Status: Case Closed				
LANGE JESSE DISTRIBUTOR I	***11226 MIDWAY***	***1/2 - 1 WNW***	***AD115***	***125***
Facility Status: Remediation Plan				
PG&E CHICO SERVICE CENTER	***11239 MIDWAY***	***1/2 - 1 WNW***	***AD128***	***139***
Facility Status: Case Closed				
WALLACE J SMITH FAMILY TRUST	2575 SOUTH WHITMAN PLAC	1/2 - 1 NW	AG155	180
CHICO TERMINAL	***2570 HEGAN LN***	***1 - 2 W***	***AO211***	***217***
Facility Status: Remedial Action Underway				

EXECUTIVE SUMMARY

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 01/07/2008 has revealed that there are 11 UST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
FOOTHILL CAR WASH	1020 SKYWAY	1/2 - 1 N	Q71	84
GOLDEN GATE PETROLEUM - CHICO	2036 FOREST AVE	1 - 2 NNW	272	305

Lower Elevation	Address	Dist / Dir	Map ID	Page
BOB & BEVERLY HARTMAN	***163 MCFADDEN LN***	***1/2 - 1 S***	***AA106***	***117***
JESSE M LANGE DISTRIBUTOR INC	***11226 MIDWAY***	***1/2 - 1 WNW***	***AD120***	***129***
PACIFIC GAS & ELECTRIC CO	11239 MIDWAY	1/2 - 1 WNW	AD125	135
CHICO UNIF SCHOOL DIST/CORP YD	***2455 CARMICHAEL DR***	***1/2 - 1 NW***	***AK161***	***184***
TOWER MART #159	110 E PARK AVE	1 - 2 WNW	AW251	280
HESTER G. PATRICK	***10381 MIDWAY***	***1 - 2 S***	***BD276***	***310***
U.P.S.	401 OTTERSON DR	1 - 2 W	BF282	315
SILVER DOLLAR FAIR	***2357 FAIR ST***	***1 - 2 WNW***	***BH299***	***331***

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 40 HIST UST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
LONGFELLOW LUMBER CO., INC.	89 LOREN AVE	1/4 - 1/2 SE	A8	12
LONGFELLOW LUMBER CO. INC.	89 LOREN AVE	1/4 - 1/2 SE	A9	12
CHICO TREE IMPROVEMENT CENTER	***2741 CRAMER LN***	***1/4 - 1/2 ENE***	***C14***	***17***
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
M.E.M. MASONRY, INC.	3851 MORROW LN	1/4 - 1/2 NNE	G31	46
AAMCO TRANSMISSIONS	3880 BENATAR WAY STE I	1/2 - 1 NNE	34	47
GARY YOUNIE TRUCK & AUTO REPAI	3871 BENATAR WAY	1/2 - 1 NNE	K48	66
CAL-TRANS	2535 NOTRE DAME BLVD	1/2 - 1 NNW	L54	70
CHICO	2535 NOTRE DAME BLVD	1/2 - 1 NNW	L55	71
CHEMTEC AGRICULTURAL CHEMICALS	3155 SOUTHGATE LN	1/2 - 1 SE	AF133	150

Lower Elevation	Address	Dist / Dir	Map ID	Page
THE NEIGHBORHOOD CHURCH OF CHI	2801 NOTRE DAME BLVD	1/8 - 1/4 N	2	6
PETERSON TRACTOR CO.	***425 SOUTHGATE AVE***	***1/4 - 1/2 SSE***	***H28***	***42***
CHICO TRANSPORTATION	2840 FAIR ST	1/2 - 1 NW	J43	60
G.E. WEISS	594 PASEO COMPANEROS ST	1/2 - 1 WNW	N61	77
WEISS	594 PASEO COMPANEROS ST	1/2 - 1 WNW	N62	77
AGRI ELECTRIC	11011 MIDWAY	1/2 - 1 WSW	P68	82
VALLEY WIDE CHEMICAL CO., INC.	***11128 MIDWAY***	***1/2 - 1 W***	***T78***	***93***
BIGGERS PLUMBING & HEATING	551 COUNTRY DR	1/2 - 1 NW	U89	105
WEISS/MCNAIR INC	***531 COUNTRY DR***	***1/2 - 1 NW***	***X95***	***109***
WEISS/MC NAIR INC	531 COUNTRY DR	1/2 - 1 NW	X97	111
BOB HARTMAN & BEVERLY	163 MCFADDEN LN	1/2 - 1 S	AA104	116
MID VALLEY TRACTOR CO.	489 COUNTRY DR	1/2 - 1 NW	AB109	119
JESSE M LANGE DISTRIBUTOR INC	***11226 MIDWAY***	***1/2 - 1 WNW***	***AD120***	***129***
CHICO SERVICE CENTER	11239 MIDWAY	1/2 - 1 WNW	AD124	134

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir	Map ID	Page
PARK AVE TEXACO	480 E PARK AVE	1/2 - 1 NW	AI151	175
WEST VALLEY CONSTRUCTION CO. I	11276 MIDWAY	1/2 - 1 WNW	AM168	193
ITT CONTINENTAL BAKING CO.	385 E PARK AVE	1 - 2 NW	AR221	241
JOHNS	***381 E PARK AVE***	***1 - 2 NW***	***AR224***	***245***
GLEN E. BIGGERS	375 E PARK AVE	1 - 2 NW	AR225	247
COURTESY MOTORS BMW/SUBARU	275 E PARK AVE	1 - 2 NW	AT238	264
DONALD E. MARCH	772 CESSNA AVE	1 - 2 W	AV246	276
FOOD AND LIQUOR #159	110 E PARK AVE	1 - 2 WNW	AW253	282
DELTA LINES	2446 FAIR ST	1 - 2 WNW	AY260	289
HESTER G. PATRICK	***10381 MIDWAY***	***1 - 2 S***	***BD276***	***310***
SILVER DOLLAR FAIR	***2357 FAIR ST***	***1 - 2 WNW***	***BH299***	***331***
3RD D.A.A. SILVER DOLLAR FAIR	2357 FAIR ST	1 - 2 WNW	BH300	332
CHICO SUBSTATION	2415 VALINE LN	1 - 2 WNW	BG303	334
PETERS TRUCK LINES	140 MEYERS ST	1 - 2 WNW	BG307	338
WREX PRODUCTS INC. OF CHICO	25 WREX CT	1 - 2 WNW	BJ310	340
FOREMOST RENTS PROPERTY	208 MEYERS ST	1 - 2 WNW	BJ316	348

AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the AST list, as provided by EDR, and dated 11/01/2007 has revealed that there are 10 AST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CALTRANS CHICO M.S. DIST 3	2535 NOTRE DAME BLVD.	1/2 - 1 NNW	L58	75
THE DANIELSEN CO INC	435 SOUTHGATE CT	1/2 - 1 SE	W99	113
HELENA CHEMICAL CO	3155 SOUTHGATE LN.	1/2 - 1 SE	AF134	151
MATHEWS READYMIX	1619 THE SKYWAY	1/2 - 1 ENE	AN172	197

Lower Elevation	Address	Dist / Dir	Map ID	Page
UNITED RENTALS	***2855 FAIR STREET***	***1/2 - 1 NW***	***J40***	***58***
JESSE LANGE DISTRIBUTOR INC.	11226 MIDWAY	1/2 - 1 WNW	AD117	126
CHICO BULK PLANT	2518 HEGAN LANE	1/2 - 1 WNW	AD147	171
CHICO TERMINAL	***2570 HEGAN LN***	***1 - 2 W***	***AO211***	***217***
NORTHLAND TRANSPORTATION	***2549 SCOTT***	***1 - 2 WNW***	***AS231***	***251***
DUCKBACK PRODUCTS	***2644 HEGAN LN***	***1 - 2 W***	***AU244***	***269***

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 22 SWEEPS UST sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
RAUSSER DISTRIBUTING	***71 LOREN AVE***	***1/4 - 1/2 SE***	***A6***	***11***
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
GARY YOUNIE TRUCK & AUTO REPAI	***3871 BENATAR WAY***	***1/2 - 1 NNE***	***K45***	***62***

Lower Elevation	Address	Dist / Dir	Map ID	Page
CHICO TRANSPORTATION	***2840 FAIR ST***	***1/2 - 1 NW***	***J44***	***61***

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir	Map ID	Page
G.E. WEISS	*594 PASEO COMPANEROS*	*1/2 - 1 WNW*	*N60*	*76*
AGRI ELECTRIC	*11011 MIDWAY*	*1/2 - 1 WSW*	*P67*	*81*
WEISS/MCNAIR INC	*531 COUNTRY DR*	*1/2 - 1 NW*	*X95*	*109*
WEISS / MCNAIR INC	*531 COUNTRY DR*	*1/2 - 1 NW*	*X96*	*110*
BOB & BEVERLY HARTMAN	*163 MCFADDEN LN*	*1/2 - 1 S*	*AA106*	*117*
JESSE M LANGE DISTRIBUTOR INC	*11226 MIDWAY*	*1/2 - 1 WNW*	*AD120*	*129*
CHICO SERVICE CENTER	*11239 MIDWAY*	*1/2 - 1 WNW*	*AD127*	*136*
PARK AVE TEXACO	*480 E PARK AVE*	*1/2 - 1 NW*	*AI150*	*172*
CHICO UNIF SCHOOL DIST/CORP YD	*2455 CARMICHAEL DR*	*1/2 - 1 NW*	*AK161*	*184*
WEST VALLEY CONSTRUCTION CO. I	*11276 MIDWAY*	*1/2 - 1 WNW*	*AM167*	*192*
WONDER BREAD	*385 E PARK AVE*	*1 - 2 NW*	*AR223*	*244*
HAL W. CARPENTER	767 SKYWAY AVE	1 - 2 W	233	255
PARK AVENUE MOTORS	*275 E PARK AVE*	*1 - 2 NW*	*AT236*	*261*
DONALD E. MARCH	*772 CESSNA AVE*	*1 - 2 W*	*AV247*	*276*
FOOD AND LIQUOR #159	*110 E PARK*	*1 - 2 WNW*	*AW252*	*280*
DELTA LINES	*2446 FAIR ST*	*1 - 2 WNW*	*AY262*	*290*
HESTER G. PATRICK	*10381 MIDWAY*	*1 - 2 S*	*BD276*	*310*
SILVER DOLLAR FAIR	*2357 FAIR ST*	*1 - 2 WNW*	*BH299*	*331*

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services.

A review of the CHMIRS list, as provided by EDR, and dated 12/31/2005 has revealed that there are 11 CHMIRS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
Not reported Date Completed: 06-AUG-91	24 NEV DAWN CIRCLE	1 - 2 N	234	256

Lower Elevation	Address	Dist / Dir	Map ID	Page
Not reported	11204 MIDWAY RD	1/2 - 1 W	AC113	123
Not reported	EAST PARK AVE/ CARMICHA	1/2 - 1 NW	AI145	169
Not reported	2570 HAGEN LANE	1 - 2 W	AO173	198
CHICO TERMINAL Date Completed: 21-MAY-90	*2570 HEGAN LN*	*1 - 2 W*	*AO211*	*217*
NORTHLAND TRANSPORTATION	*2549 SCOTT*	*1 - 2 WNW*	*AS231*	*251*
Not reported	2644 HEAGAN LANE	1 - 2 W	AU240	266
Not reported	311 OTTERSON DRIVE	1 - 2 W	BB268	296
Not reported	2750 HEGAN LN	1 - 2 W	273	305
Not reported	2449 VALINE CT #B	1 - 2 WNW	BE291	323
Not reported	2334 FAIR STREET	1 - 2 WNW	BH317	348

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, and dated 07/31/2007 has revealed that there

are 3 DRYCLEANERS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PEDEN ENT DBA SKYPARK PLAZA CL	***2485 NOTRE DAME BLVD***	***1/2 - 1 N***	***V84***	***99***
JIFFY LUBE	***2454 NOTRE DAME BLVD***	***1/2 - 1 N***	***103***	***115***

Lower Elevation	Address	Dist / Dir	Map ID	Page
NEWTON AVIATION CONSULTING LLC	2575 S WHITMAN PL	1/2 - 1 NW	AG156	180

CDL: A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

A review of the CDL list, as provided by EDR, and dated 09/30/2007 has revealed that there are 2 CDL sites within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
Not reported	476 E. PARK AVE	1/2 - 1 NW	AI157	181
USA WASTE OF CA CHICO	***2569 SCOTT AVE***	***1 - 2 WNW***	***AP226***	***247***

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency

A review of the HAZNET list, as provided by EDR, and dated 12/31/2006 has revealed that there are 110 HAZNET sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
HUPP NEON LLC	70 LOREN AVE	1/4 - 1/2 SE	A4	8
RAUSSER DISTRIBUTING	***71 LOREN AVE***	***1/4 - 1/2 SE***	***A6***	***11***
LONGFELLOW LUMBER CO	89 LOREN AVE	1/4 - 1/2 SE	A7	11
NORFIELD INDUSTRIES	725 ENTLER AVE	1/4 - 1/2 SE	B12	15
USFS GENIC RESOURCE CENTER	2741 CRAMER LANE	1/4 - 1/2 ENE	C13	16
CHICO TREE IMPROVEMENT CENTER	***2741 CRAMER LN***	***1/4 - 1/2 ENE***	***C14***	***17***
SUNSERI CONSTRUCTION INC	48 COMANCHE CT	1/4 - 1/2 N	D15	19
PACIFIC BELL	***3750 MORROW LANE***	***1/4 - 1/2 N***	***D19***	***22***
MATT ODELL	3750 MORROW LANE	1/4 - 1/2 N	D20	31
PACIFIC BELL TELEPHONE CO DBA	3750 MORROW LN	1/4 - 1/2 N	D21	31
TRI COUNTIES BANK	2560 DOMINIC DR UNIT B	1/2 - 1 NNE	G32	46
KPAY RADIO	2654 CRAMER LANE	1/2 - 1 NE	33	47
QUADCO PRINTING INC	***2535 ZANELLA WY***	***1/2 - 1 N***	***36***	***49***
MIRACLE AUTO PAINTING	***2560 DOMINIC***	***1/2 - 1 NNE***	***I37***	***52***
GARY YOUNIE TRUCK & AUTO REPAI	3871 BENATAR WAY	1/2 - 1 NNE	K46	63
GOLD COUNTRY HYDRAULIC & HOSE	3881 BENATAR WY STE D	1/2 - 1 NNE	K49	67
DOJ CRIMINALISTICS LABORATORY	3870 MORROW LN SUITE A	1/2 - 1 NNE	51	68
MIRACLE AUTO PAINTING & BODY R	2560 DOMINIC	1/2 - 1 NNE	I53	69
CALTRANS DISTRICT 3	2535 NOTRE DAME BLVD	1/2 - 1 NNW	L56	72
AAMCO TRANSMISSION CTR #5270	2540 DOMINIC__DR	1/2 - 1 NNE	M59	75
NORTH VALLEY EMERGENCY VET CLI	2525 DOMINIC DRIVE	1/2 - 1 NNE	M63	78
EUROPEAN MOTORSPORT	2520-D DOMINIC DR	1/2 - 1 NNE	M64	78

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
SKYPARK AUTO WASH	1020 SKYWAY	1/2 - 1	N	Q70	83
CHEVRON/FLYERS #50	***2501 NOTRE DAME***	***1/2 - 1***	***N***	***72***	***84***
UNIBLAST TECHNOLOGIES INC	3075 SOUTHGATE LANE	1/2 - 1	SE	S76	91
KRAGEN AUTO PARTS STORE #1009	2485 NOTRE DAME BLVD	1/2 - 1	N	V82	98
PEDEN ENT DBA SKYPARK PLAZA CL	***2485 NOTRE DAME BLVD***	***1/2 - 1***	***N***	***V84***	***99***
S & J LUBRICATION INC OIL CAN	2485 NOTRE DAME BLVD	1/2 - 1	N	V85	101
RALEY'S #287/249	2485 NOTRE DAME BLVD UN	1/2 - 1	N	V87	102
NORCAL WASTE SYSTEMS OF BUTTE	3097 SOUTHGATE LN #B	1/2 - 1	SE	W90	105
BUTTE COUNTY DISPOSAL	3097 SOUTHGATE LANE	1/2 - 1	SE	W91	106
BUTTE DISPOSAL & RECYCLING INC	3097 SOUTHGATE LANE	1/2 - 1	SE	W92	107
VACCARO SEED CALIFORNIA INC	446 SOUTHGATE CT	1/2 - 1	SE	Z100	113
JIFFY LUBE	***2454 NOTRE DAME BLVD***	***1/2 - 1***	***N***	***103***	***115***
LES SCHWAB TIRE CENTERS OF CA	2420 NOTRE DAME BLVD	1/2 - 1	N	AE121	130
HELENA CHEMICAL COMPANY	3155 SOUTHGATE LN	1/2 - 1	SE	AF135	151
LOWES HIW INC-CHICO #1201	2350 FORREST AVE	1/2 - 1	NNW	AH139	162
FRED MEYER	***2350 FOREST AVE***	***1/2 - 1***	***NNW***	***AH141***	***165***
MATHEWS READYMIX LLC	***1619 SKYWAY***	***1/2 - 1***	***ENE***	***AN171***	***195***
FOREST ANIMAL HOSPITAL	555 FLYING V ST	1 - 2	NNW	AQ216	234
WITTMEIER CHEVROLET	2292 FOREST AVE	1 - 2	NNW	AQ217	236
ED WITTMEIER FORD INC	2288 FOREST AVE	1 - 2	NNW	AQ219	239
WAL-MART STORE #2044	2044 FOREST AVE	1 - 2	NNW	AX255	284
WALMART STORE #2044	***2044 FOREST AVE***	***1 - 2***	***NNW***	***AX256***	***284***

Lower Elevation	Address	Dist / Dir		Map ID	Page
PAYLESS BLDG. SUPPLY	2600 NOTRE DAME BLVD.	1/4 - 1/2	NNW	F23	33
HOME DEPOT USA INC HD 6609	***2580 NOTRE DAME BLVD***	***1/4 - 1/2***	***NNW***	***F26***	***36***
PETERSON TRACTOR CO.	***425 SOUTHGATE AVE***	***1/4 - 1/2***	***SSE***	***H28***	***42***
LIFETOUCH NATIONAL SCHOOL STUD	***2860 FAIR ST***	***1/2 - 1***	***NW***	***J38***	***54***
US RENTALS INC	2855 FAIR ST	1/2 - 1	NW	J39	58
UNITED RENTALS INC #558	2855 FAIR ST	1/2 - 1	NW	J42	60
SMUCKER'S QUALITY BEVERAGES	***37 SPEEDWAY AVE***	***1/2 - 1***	***W***	***O66***	***79***
CAPITOL COORS	***11110 MIDWAY AVE***	***1/2 - 1***	***W***	***R75***	***89***
OAK RIDGE CABINETS INC	11128 MIDWAY	1/2 - 1	W	T79	95
U HAUL CENTER OF CHICO	600 COUNTRY DRIVE	1/2 - 1	NW	U81	97
WEISS-MCNAIR INC	531 COUNTRY DR	1/2 - 1	NW	X93	109
ERICKSON VETERINARY HOSPITAL	11181 MIDWAY	1/2 - 1	W	Y98	112
OMEGA TANK & TRUCK REPAIR INC	11196 MIDWAY	1/2 - 1	W	Y107	118
H C SHAW CO/DBA FISCO	491 COUNTRY DR	1/2 - 1	NW	AB108	119
MIDVALLEY TRACTOR COMPANY	***489 COUNTRY DRIVE***	***1/2 - 1***	***NW***	***AB110***	***120***
WESTERN PETROLEUM MARKETERS	***11204 MIDWAY***	***1/2 - 1***	***W***	***AC112***	***123***
JESSE LANGE DISTRIBUTING INC	11226 MIDWAY	1/2 - 1	WNW	AD114	125
PACIFIC GAS & ELECTRIC	11239 MIDWAY	1/2 - 1	WNW	AD126	135
PG&E CHICO SERVICE CENTER	***11239 MIDWAY***	***1/2 - 1***	***WNW***	***AD128***	***139***
NORTH VALLEY AUTO SERVICE	2545 GILMAN WAY	1/2 - 1	NW	AG138	161
CROSS PETROLEUM INC	2518 HEGAN LN	1/2 - 1	WNW	AD146	170
NORTH VALLEY IRON WORKS INC	11254 MIDWAY	1/2 - 1	WNW	AJ148	171
NORTH VALLEY IRON WORKS	11254 MIDWAY	1/2 - 1	WNW	AJ149	172
GAS MART STATION	480 EAST PARK AVE	1/2 - 1	NW	AI152	177
ROTH TRUST	480 EAST PARK AVENUE	1/2 - 1	NW	AI153	177
CHICO MOBILE A.C. & RADIATOR	2565 S. WHITMAN PLACE	1/2 - 1	NW	AG158	181
COURT YARD BY MARRIOTT LLC	2481 CARMICHAEL DR	1/2 - 1	NW	AI159	182
CHICO UNIF SCHOOL DIST/CORP YD	***2455 CARMICHAEL DR***	***1/2 - 1***	***NW***	***AK160***	***182***
CHICO ENTERPRISE-RECORD	400 E PARK AVE	1/2 - 1	NW	AL165	189
WEST VALLEY CONSTRUCTION	***11276 MIDWAY***	***1/2 - 1***	***WNW***	***AM169***	***194***
SFPP LP (CHICO TERMINAL)	***2570 HEGAN LANE***	***1 - 2***	***W***	***AO188***	***202***

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir		Map ID	Page
TRACTOR SUPPLY CO STORE #793	2475 WHITMAN AVE	1 - 2	NW	AL212	231
NORTH VALLEY DISPOSAL SER INC	2605 FAIR ST	1 - 2	WNW	AP213	232
1X NORTH VALLEY DISPOSAL	2605 FAIR STREET	1 - 2	WNW	AP215	233
INTERSTATE BRANDS CORPORATION	385 E PARK AVE	1 - 2	NW	AR220	240
M J B WELDING SUPPLY	357 E PARK AVE	1 - 2	NW	AR229	250
NORTHLAND TRANSPORTATION	***2549 SCOTT***	***1 - 2***	***WNW***	***AS231***	***251***
CHICO COLLISION CTR INC	***275 E PARK AVE***	***1 - 2***	***NW***	***AT235***	***257***
TAKE OUT COMPANY	2644 HEGAN LN	1 - 2	W	AU243	268
DUCKBACK PRODUCTS	***2644 HEGAN LN***	***1 - 2***	***W***	***AU244***	***269***
DONALD E. MARCH	***772 CESSNA AVE***	***1 - 2***	***W***	***AV247***	***276***
CHICO AUTO & TRUCK RECYCLING	2535 FAIR ST	1 - 2	WNW	248	277
TOWER MART # 159	110 E PARK AVE	1 - 2	WNW	AW249	278
PIRET TIRE CENTER	99 EAST PARK AVE	1 - 2	WNW	AW254	283
THE CALIFORNIA WATER SERVICE C	2222 WHITMAN AVE	1 - 2	NW	AZ264	293
EARTHGRAINS CO OF SACRAMENTO	311 OTTERSON STE 40	1 - 2	W	BB267	295
CHEMCRAFT	***311 OTTERSON DR. SUITE***	***1 - 2***	***W***	***BB271***	***299***
ATC/VANCOM INC.	326 HUSS DRIVE	1 - 2	W	BC275	309
MIKE CONOVER	2470 VALINE CT	1 - 2	WNW	BE278	312
UPS	401 OTTERSON DR.	1 - 2	W	BF280	314
UNITED PARCEL SERVICE, INC	401 OTTERSON DRIVE	1 - 2	W	BF284	315
3M CHICO	***402 OTTERSON DR***	***1 - 2***	***W***	***BF288***	***319***
JOHNS RADIATOR SERVICE	2449 VALINE LN	1 - 2	WNW	BE290	322
WIZARD GRAPHICS, INC	411 OTTERSON DR #20	1 - 2	W	BF292	324
CASCADE ORTHOPEDIC SUPPLY INC	***415 OTTERSON DR STE 70***	***1 - 2***	***W***	***BF294***	***326***
VALINE CARBURETION	127 MYERS ST	1 - 2	WNW	BG295	329
VALINE CARBURETION AND SERVICE	127 MEYERS ST	1 - 2	WNW	BG296	329
FOOTE PHOTO CO	2357 FAIR ST	1 - 2	WNW	BH298	331
3RD DISTRICT AG ASSOCIATION	2357 FAIR STREET	1 - 2	WNW	BH301	333
FOCUS PHOTOGRAPHY	2357 FAIR ST	1 - 2	WNW	BH302	333
BUNGE ELECTRIC	132 E MEYERS STREET	1 - 2	WNW	BG306	337
SEMPER TRUCKING	31 WREX CT	1 - 2	WNW	BJ308	338
WREX PRODUCTS	***25 WREX CT***	***1 - 2***	***WNW***	***BJ311***	***341***
COSTCO WHOLESALE #136	2100 WHITMAN AVENUE	1 - 2	NW	BK313	346
HOMEBASE #38	2101 WHITMAN AVE	1 - 2	NW	BK315	347
GUILLON INDUSTRIAL PROPERTY IN	444 OTTERSON DR	1 - 2	W	321	351

AIRS: Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies

A review of the AIRS list, as provided by EDR, and dated 12/31/2005 has revealed that there are 18 AIRS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
CHEVRON/FLYERS #50	***2501 NOTRE DAME***	***1/2 - 1***	***N***	***72***	***84***
VACARO SEED/CALIFORNIA INC.	446 SOUTHGATE COURT	1/2 - 1	SE	Z101	114
LOWES COMPANIES, INC.	2350 FOREST AVENUE	1/2 - 1	NNW	AH140	164
CHICO FIRE STATION #4	2405 NOTREDAME BLVD.	1/2 - 1	N	AE143	167
MATHEWS READYMIX LLC	***1619 SKYWAY***	***1/2 - 1***	***ENE***	***AN171***	***195***

Lower Elevation	Address	Dist / Dir		Map ID	Page
WOOD-PLY FOREST PRODUCTS	3711 MORROW LANE	1/4 - 1/2	N	E17	21
HOME DEPOT USA INC HD 6609	***2580 NOTRE DAME BLVD***	***1/4 - 1/2***	***NNW***	***F26***	***36***
UNITED RENTALS	2855 FAIR STREET	1/2 - 1	NW	J41	59

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir		Map ID	Page
SMUCKER'S QUALITY BEVERAGES	***37 SPEEDWAY AVE***	***1/2 - 1***	***W***	***O66***	***79***
VALLEY WIDE CHEMICAL CO., INC.	***11128 MIDWAY***	***1/2 - 1***	***W***	***T78***	***93***
MIDVALLEY TRACTOR COMPANY	***489 COUNTRY DRIVE***	***1/2 - 1***	***NW***	***AB110***	***120***
KINDER MORGAN/SFPP	***2570 HEGAN LANE***	***1 - 2***	***W***	***AO176***	***199***
SFPP LP (CHICO TERMINAL)	***2570 HEGAN LANE***	***1 - 2***	***W***	***AO188***	***202***
DUCKBACK PRODUCTS, INC.	2644 HEGAN LANE	1 - 2	W	AU241	267
QWEST CHICO TI	402 OTTERSON DRIVE	1 - 2	W	BF287	318
LARSON HULLER & DRYER	1035 BRUCE LANE	1 - 2	SW	BI305	335
WREX PRODUCTS INCORPORATED	***25 WREX CT.***	***1 - 2***	***WNW***	***BJ309***	***339***
WESTGATE HARDWOODS, INC	226 MEYERS ST	1 - 2	WNW	BJ319	350

HAULERS: A listing of registered waste tire haulers.

A review of the HAULERS list, as provided by EDR, and dated 02/12/2008 has revealed that there are 2 HAULERS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
TREADMASTERS, INC. DBA QUALITY	2560 DOMINIC DRIVE, SUI	1/2 - 1	NNE	I52	69

Lower Elevation	Address	Dist / Dir		Map ID	Page
USA WASTE OF CALIFORNIA, INC.	2569 SCOTT AVENUE	1 - 2	WNW	AP228	250

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 02/26/2008 has revealed that there is 1 ENVIROSTOR site within approximately 1.5 miles of the target property.

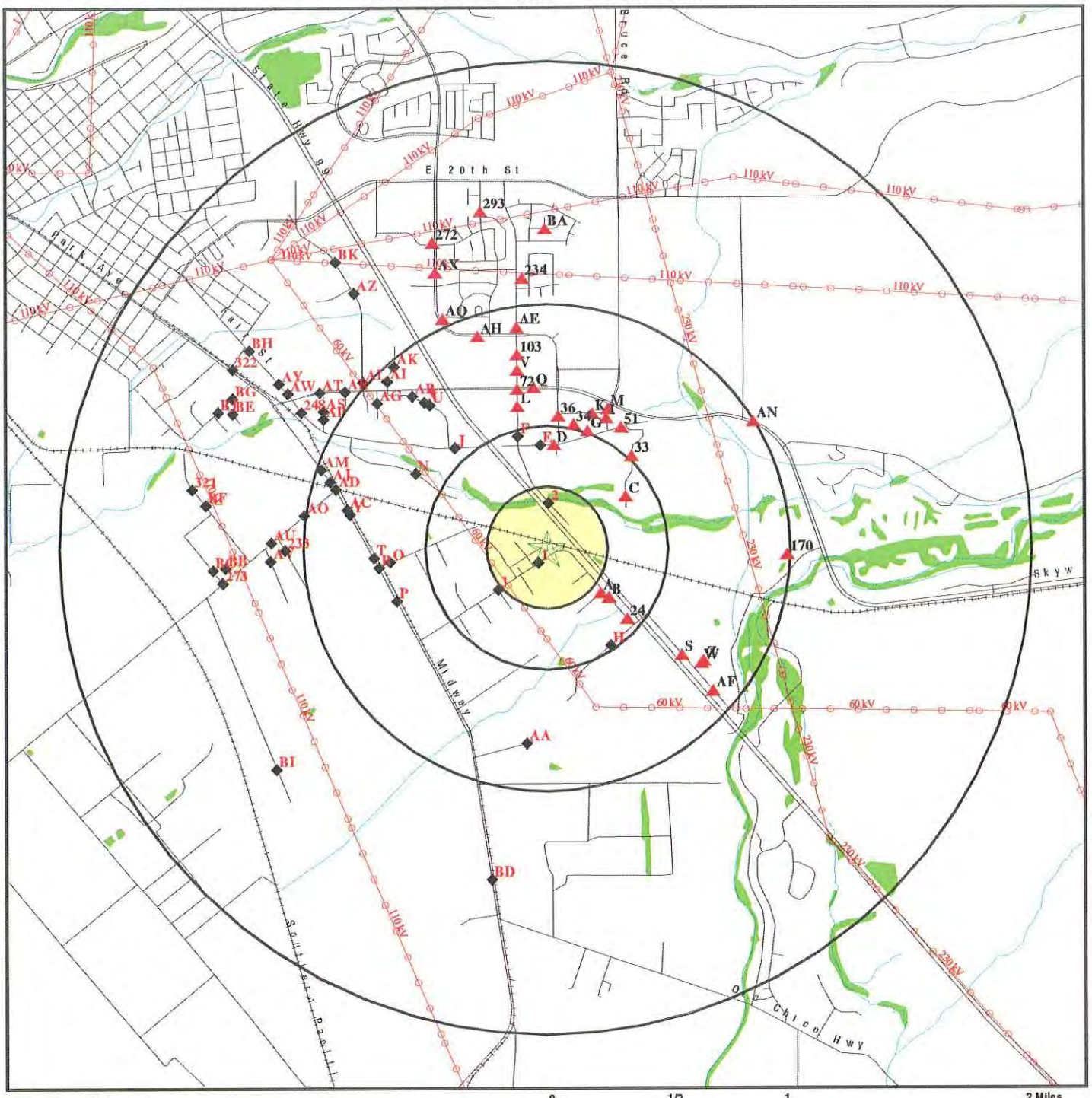
Lower Elevation	Address	Dist / Dir		Map ID	Page
VALLEY WIDE CHEMICAL INC Facility Status: Refer: Other Agency	MIDWAY STREET / HEGAN	1/2 - 1	WNW	AD123	133

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
ANDREW BERTAGNA	CA FID UST, SWEEPS UST
AAMCO TRANSMISSIONS	SWEEPS UST
CUSC UNIVERSITY FARM	SWEEPS UST
BRUCE RD AT PICHOLINE WAY	CDL
ON SKYWAY @ ROCKY BUFTS	CDL
TRAFFIC STOP @ EATON RD / HWY	CDL
MURPHY COMMONS	LUST
MURPHY COMMONS	LUST
OLD FARM ESTATES BRUCE ROAD	VCP, ENVIROSTOR
CORPERATION YARD	HIST UST
CHICO-OTTERSON	AST
CHICO IMPORTS	HAZNET
PEGGY'S LAWN CARE	HAZNET
ROBBIE CATTANACH TRUCKING INC	HAZNET
WEISS-MCNAIR LLC	HAZNET
ACCENTS AUTO BODY	HAZNET
LONE STAR TRUCKING INC	HAZNET
SKYPARK AUTO	HAZNET
NORCAL WASTE SYSTEMS OF BUTTE COUN	HAZNET
TOMS SIERRA CO INC	HAZNET
CRYSTAL CREAM & BUTTER COMPANY	HAZNET
PAUL L BRYNE MEMORIAL FARM	FINDS, RCRA-NonGen
#136 3100 WHITMAN AVE	ERNS
VICTOR INDUSTRIES 20TH STREET PCE	SLIC
HWY 70 SPILL, FALLING ROCK MARKET	SLIC
HWY 99 SPILL, CHICO 04	SLIC
ADAMS, ET AL (APN 002-180-086)	SLIC
BARTIG, ET AL (APN 002-180-084)	SLIC
HAUSSELT PROPERTY	SLIC
EDMOND JOHNSON PROPERTY (APN 011-0	SLIC
HUMBOLDT ROAD PRIVATE PROPERTIES O	SLIC
FUEL SPILL SH 32 AND HUMBOLDT RD.	SLIC
GUTIERREZ TORIBIO	CA WDS
BRUCE RD GAS MAIN	CA WDS
TUSCAN RIDGE GOLF CLUB	CA WDS
HUMBOLDT RD PRIV PROP OP UNIT	CA WDS
HUMBOLDT RD BURN DUMP OP UNIT	CA WDS
JUICE PROCESSING WW PONDS	CA WDS

OVERVIEW MAP - 02206466.1r



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Southgate Ave. Interchange ADDRESS: SR99/Southgate Ave. Chico CA 95928 LAT/LONG: 39.7054 / 121.7930	CLIENT: Blackburn Consulting CONTACT: Dave Buck INQUIRY #: 02206466.1r DATE: April 29, 2008 9:33 am

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Listing of EDR Searched Databases:

- NPL (National Priorities List)
- NPL Proposed
- NPL Delisted
- NPL LIENS (Federal Superfund liens)
- LIENS 2 (Comprehensive Environmental Response, Compensation, And Liability Act Lien Information)
- CERLCIS (Comprehensive Environmental Response, Compensation, And Liability Information System)
- CERC-NFRAP (CERCLIS No Further Remedial Action Planned)
- Notify 65
- Toxic Pits
- CORTESE (Cal EPA Cortese List)
- US ENG CONTROLS (US engineering Controls)
- US INST CONSTROLS (US Institutional Controls)
- CORRACTS (Corrective Action Report)
- AST (Above Ground Petroleum Storage Tank Facilities)
- LUST (Leaking Underground Storage Tank Information System)
- UST (Underground Storage Tank Database)
- HIST UST (Historical UST Registered Database)
- RAATS (RCRA Administrative Tracking System)
- RCRA-CESQG (Resource Conservation and Recovery Act Information)
- RCRA-SQG (Resource Conservation And Recovery Information System, Small Quantity Generator)
- RCRA-LQG (Resource Conservation And Recovery Information System, Large Quantity Generator)
- RCRA-TSDF (Resource Conservation And Recovery Information System, Large Quantity Generator)
- RCRA-NonGen (Resource Conservation And Recovery Information System, Non-Generator)
- HMIRS (Hazardous Materials Information Reporting System)
- SWF/LF (Solid Waste Information System)
- WMUDS/SWAT (Waste Management Unit Database)
- CHMIRS (California Hazardous Materials Information Reporting System)
- DRYCLEANERS (Drycleaner Facilities)
- PADS (PCB Activity Database System)
- ERNS (Emergency Response Notification System)
- FINDS (Facility Index System)
- TRIS (Toxic Chemical Release Inventory System)

- TSCA (Toxic Substances Control Act)
- MLTS (Material Licensing Tracking System)
- HIST CAL_SITES (Former ASPIS database)
- ENVIROSTOR (Site Mitigation and Brownfields Reuse Program Database)
- RESPONSE (State Response Sites)
- CA BOND EXP PLAN (California Bond Expenditure Plan)
- ROD (Records Of Decision)
- CONSENT (Superfund Consent Decrees)
- CA WDS (Waste Discharge System)
- SLIC (CA Statewide SLIC cases)
- HAZNET (Cal EPA's Facility and Manifest Data)
- MINES (Mines Master Index File)
- DEBRIS REGION 9 (Torres Martinez Reservation Illegal Dump Site Locations)
- INDIAN UST (Underground Storage Tanks on Indian Lands)
- INDIAN LUST (Leaking Underground Fuel Tanks on Indian Land)
- INDIAN RESERV (Indian Reservations)
- INDIAN ODI (Open Dumps on Indian Lands)
- UMTRA (Uranium Mill Tailing Sites)
- FUDS (Formerly Used Defense Sites)
- DOD (Department of Defense Sites)
- SSTS (Section 7 Tracking Systems)
- FTTS (FIFRA/TSCA Tracking System)
- HIST FTTS (FIFRA/TSCA Tracking System Administrative Case Listing)
- DEED (List of Deed Restrictions)
- SCH (School Property Evaluation Form)
- US BROWNFIELDS (Brownfield Sites)
- VCP (Voluntary Cleanup Program)
- ODI (Open Dump Inventory)
- ICIS (Integrated Compliance Information System)
- LUCIS (Land Use Control Information System)
- RADINFO (Radiation Information Database)
- DOT OPS (Incident and Accident Data)
- US CDL (Clandestine Drug Labs)
- CDL (Clandestine Drug Labs-California)
- LIENS (Environmental Liens Listing)
- WIP (Well Investigation Program Case List)
- EMI (Emissions Inventory Data)
- CA FID UST (California Water Resource Control Board Facility Inventory Database)

- SWEEPS (Statewide Environmental Evaluation and Planning System)
- SWRCY (Recycling Facilities in California)
- HAULERS (Registered Waste Tire Haulers List)
- AIRS (Air emissions database)
- EDR Manufactured Gas Plants

APPENDIX

D

Reconnaissance Photos

Photo 1 – 2549 Scott Ave., Pacific Pride fueling facility.

Photo 2 – 11239 Midway, PG & E Chico Service Center natural gas dispensing facility.

Photo 3 – 11226 Midway, Jessie Long/Shell fueling distributing facility.

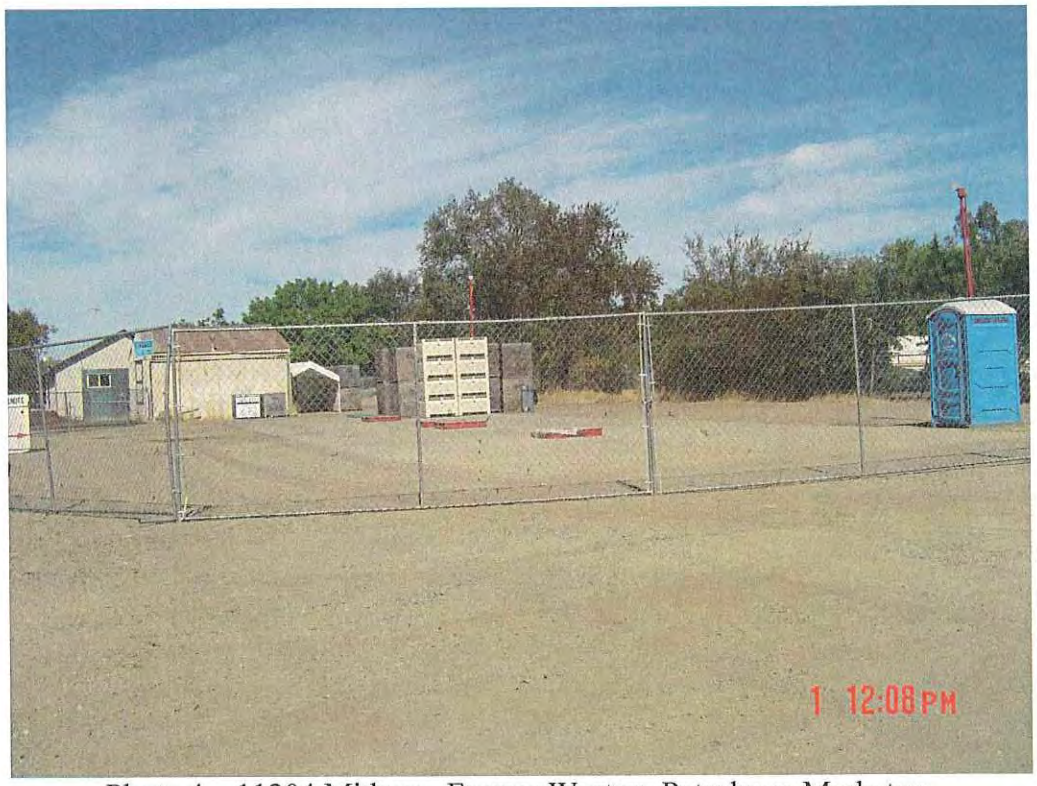

Photo 4 – 11204 Midway, Former Western Petroleum Marketers.
Possible abandoned fuel islands in foreground.

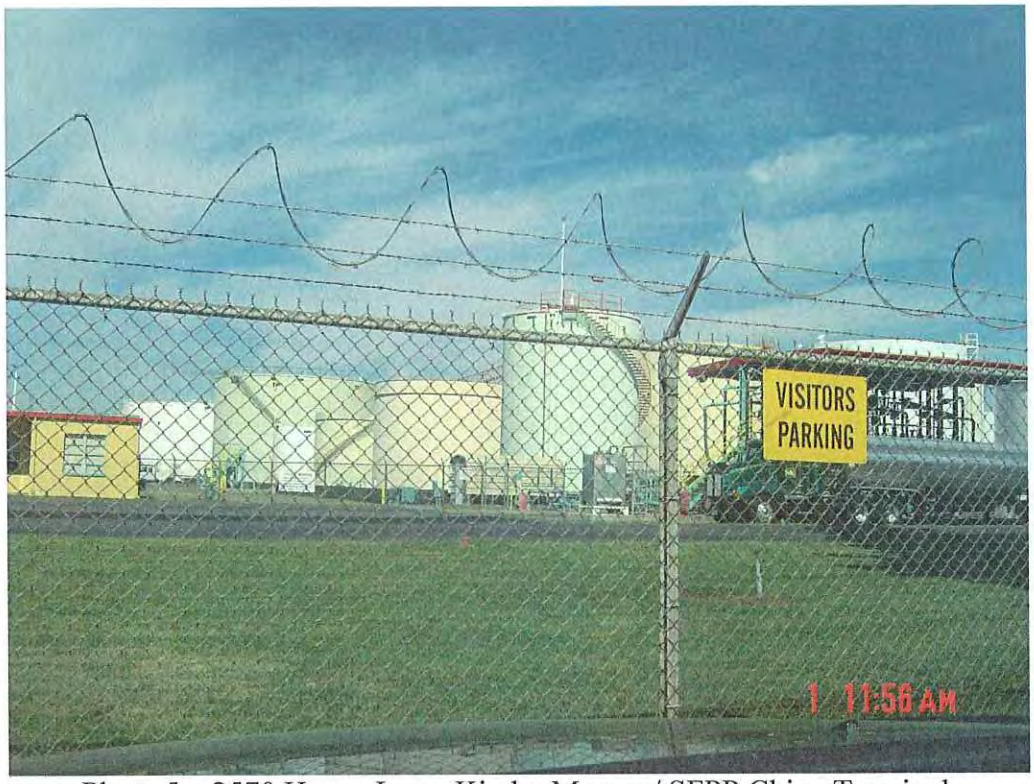

Photo 5 – 2570 Hegan Lane, Kinder Morgan/ SFPP Chico Terminal.

Photo 6 – 2741 Cramer Lane, Chico Tree Improvement Center.
AST in background.

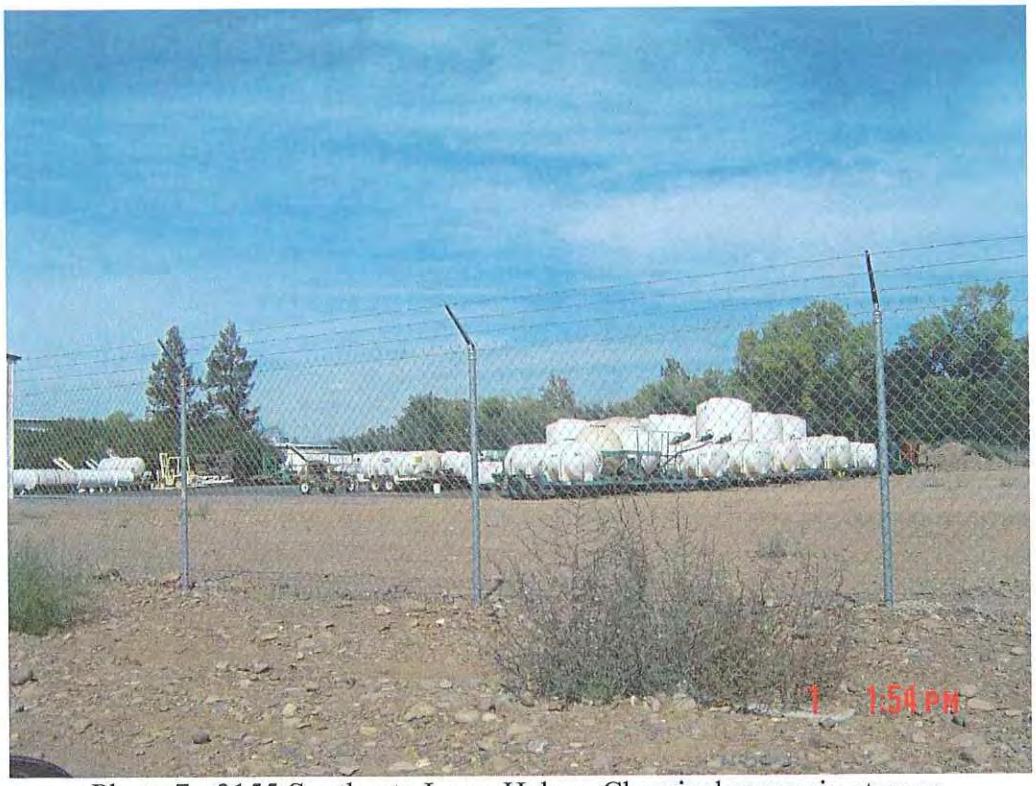

Photo 7 - 3155 Southgate Lane, Helena Chemical spray rig storage.

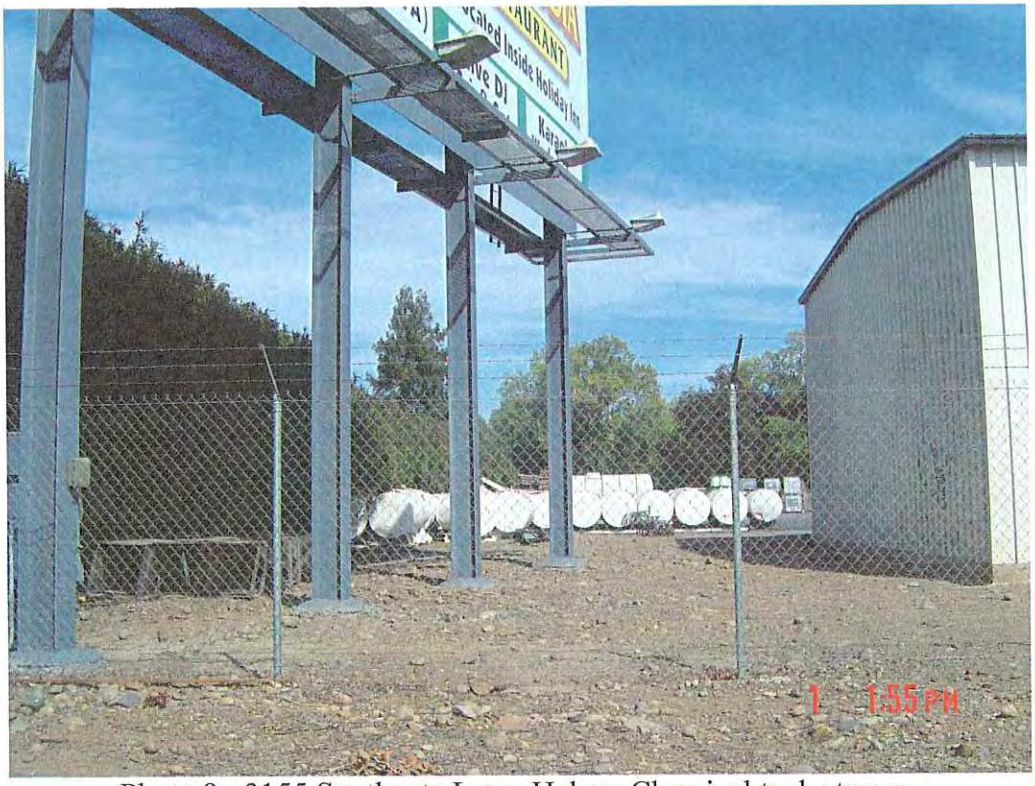

Photo 8 - 3155 Southgate Lane, Helena Chemical tank storage.

Photo 9 – 2605 Fair Street, North Valley Disposal.
Large AST on left.

Photo 10 – 2855 Fair Street, United Rentals.
AST behind trucks.

Photo 11 – 11254 Midway, North Valley Iron Works.

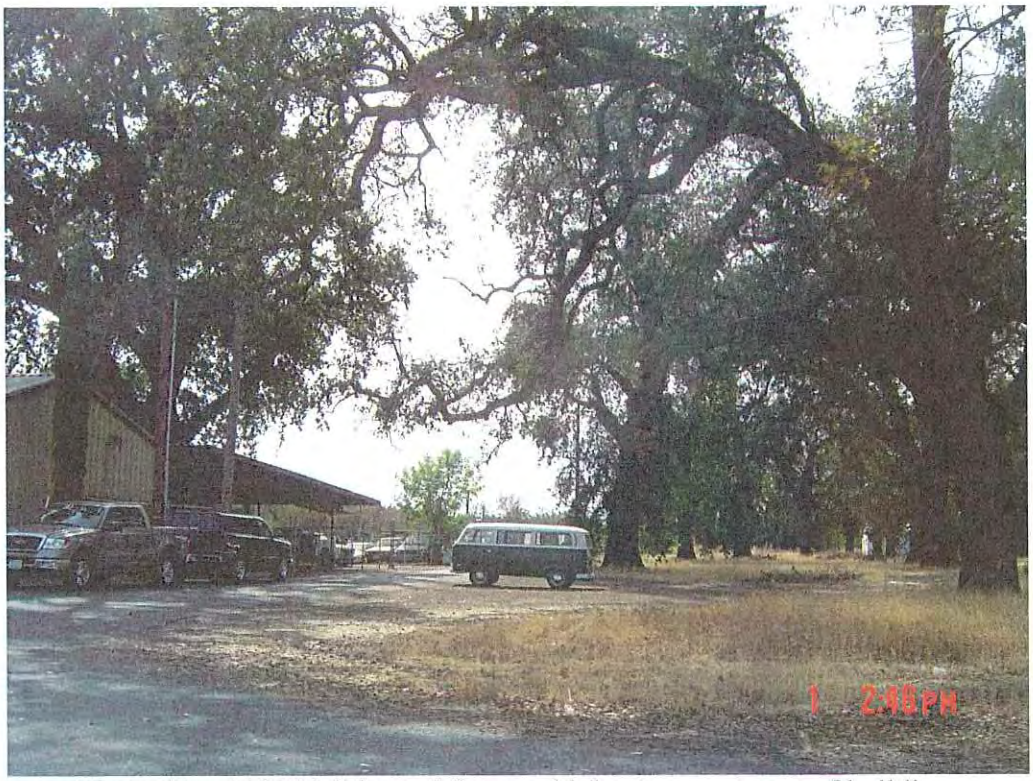

Photo 12 – 11025 Midway, Motor vehicle storage at rear of building.

Photo 13 – 1699 Skyway, Butte Creek Rock Co.

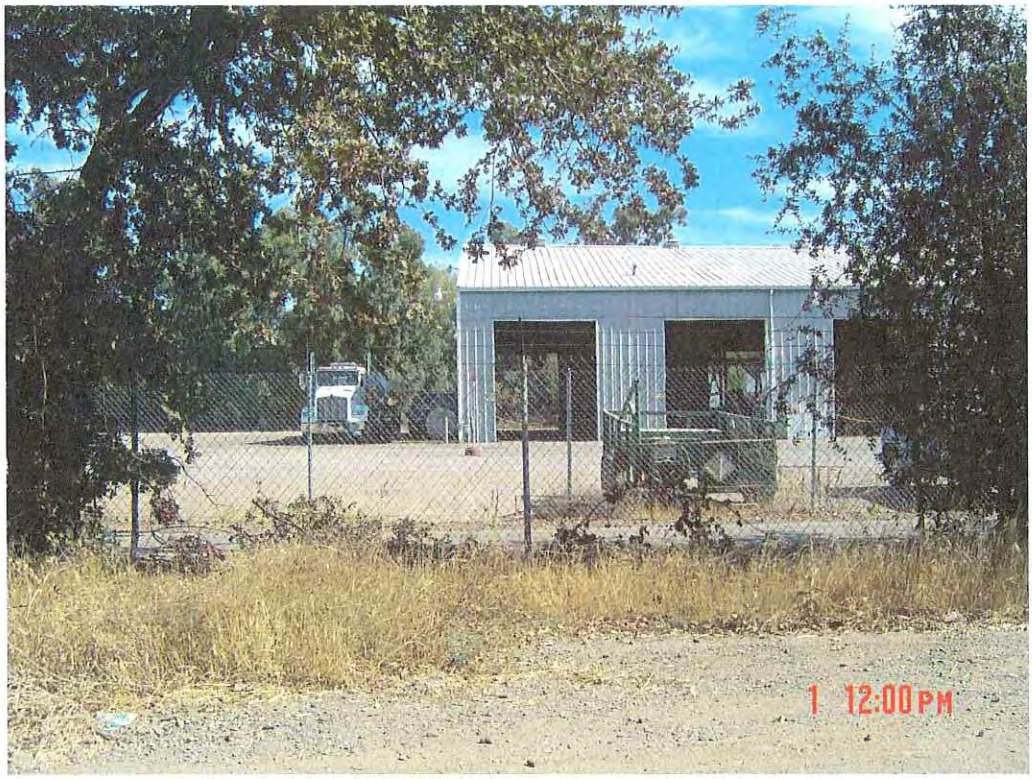

Photo 14 – 11196 Midway, Omega Truck Repair.
AST at left of building.

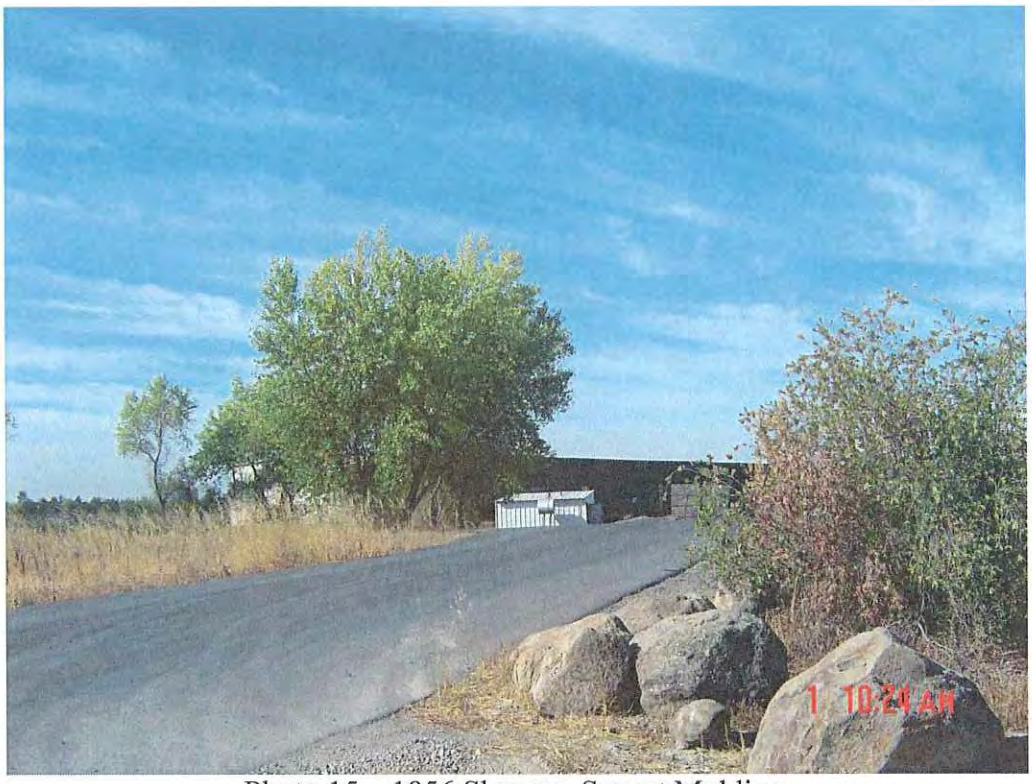

Photo 15 – 1856 Skyway, Sunset Molding.
Small AST next to shed.

Photo 16 – 322 Entler Avenue.
Small AST and drums.

Photo 17 – 629 Entler Avenue, Equipment storage on undeveloped property.

Photo 18 – 629 Entler Avenue, Soil stockpiles on undeveloped property.

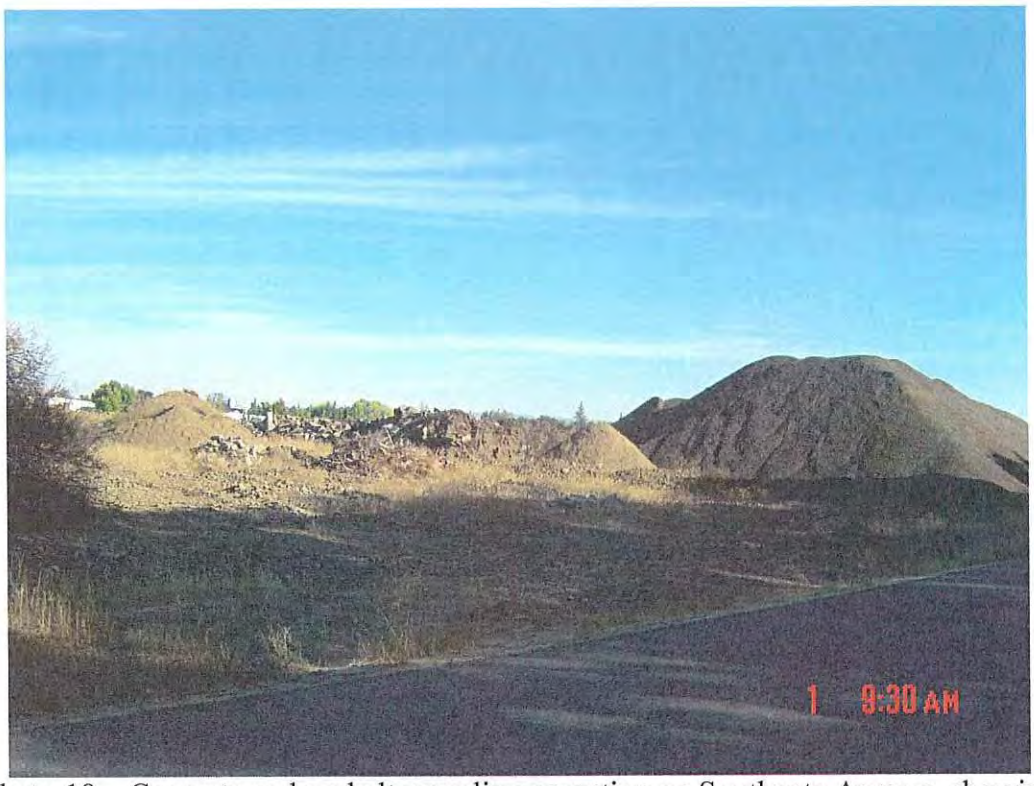

Photo 19 – Concrete and asphalt recycling operation on Southgate Avenue, showing stockpiles of material (processed and unprocessed).

Photo 20 – Remnants of dredge tailings near Southgate Avenue.

Photo 21 – 3711 Morrow Lane, Wood products facility.

Photo 22 – 48 Comanche Court, Construction yard / Storage area.

PRELIMINARY
GEOTECHNICAL MEMORANDUM

SOUTHGATE AVENUE INTERCHANGE PROJECT

CITY OF CHICO, CALIFORNIA

Prepared by:

BLACKBURN CONSULTING
11521 Blocker Drive, Suite 110
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April 2009

For:

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File No. 961.1
April 10, 2009

Mr. Matt Brogan
Mark Thomas & Company, Inc.
7300 Folsom Boulevard, Suite 203
Sacramento, CA 95826

Subject: **PRELIMINARY GEOTECHNICAL MEMORANDUM**
Southgate Avenue Interchange Project
City of Chico, California

Dear Mr. Brogan:

Blackburn Consulting (BCI) prepared this Preliminary Geotechnical Memorandum for the Southgate Avenue Interchange Project in Chico, California. BCI prepared this report in accordance with the June 11, 2008 Agreement between BCI and Mark Thomas &Company, Inc.

Thank you for the opportunity to be part of your design team. Please call if you have questions or require additional information.

Sincerely;

BLACKBURN CONSULTING

Rick Sowers, P.E., C.E.G.
Sr. Project Manager

REGISTERED PROFESSIONAL ENGINEER
RICHARD D. SOWERS
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Thomas Blackburn, P.E., G.E.
Principal

Distribution: 4 (client)

PRELIMINARY GEOTECHNICAL MEMORANDUM

SOUTHGATE AVENUE INTERCHANGE PROJECT

City of Chico, California

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PRELIMINARY GEOTECHNICAL MEMORANDUM

SOUTHGATE AVENUE INTERCHANGE PROJECT

City of Chico, California

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Appendix B: Site Photos

INTRODUCTION

Purpose

Blackburn Consulting (BCI) prepared this Preliminary Geotechnical Memorandum for the proposed Southgate Avenue Interchange Project in Chico, California. This report is based on conceptual project improvements developed by Mark Thomas & Company (MTCo) and is intended for the Advanced Planning Study and Type Selection.

The ultimate project includes a new interchange at Southgate Avenue/SR 99; several miles of new connector, extension and frontage roads; five bridge (or culvert) structures; and possible retaining walls. BCI will prepare the necessary Foundation Reports, Geotechnical Design Report and Materials Reports during future project design phases.

Scope of Services

To prepare this report, BCI:

- Discussed the project with Matt Brogan and others from MTCo, design engineers.
- Attended a project kickoff meeting on March 18, 2008 with representatives from the City of Chico, Butte County, BCAG, Caltrans, and the MTCo design team.
- Reviewed "As-Built" plans for nearby bridges along the SR99 corridor and Skyway.
- Reviewed published maps and literature related to site geologic and seismic conditions.
- Conducted a preliminary geologic site reconnaissance within the project limits.

PROJECT LOCATION

The project study area is approximately centered on the intersection of SR 99 and Southgate Avenue on the south side of the City of Chico, California. The study area is approximately bordered by Fair Street on the north, Midway on the west, Marybill Ranch Road on the south, and Skyway on the east. We show the project location on Figure 1.

PROJECT DESCRIPTION

The project will upgrade SR 99 to freeway status from Skyway to Estates Drive, a distance of approximately two miles. The existing at-grade intersection at Southgate Avenue and SR 99 will be upgraded to a new interchange. Traffic circulation improvements are proposed on both sides of SR 99, including extensions of Southgate Avenue west to Midway and east to Skyway; extension of Player Lane (western frontage road) south to Estates Drive; and extension of Entler Avenue north to Fair Street. The road extensions will vary from two to six lanes and involve both upgraded and new alignment sections.

MTCo has identified six possible new structures for the project, listed below.

1. Southgate Avenue Interchange at SR 99
2. Southgate Avenue bridge at Little Chico Creek Diversion
3. Southgate Avenue bridge at Butte Creek
4. Player Lane bridge at Butte Creek
5. Entler Avenue bridge at Camanche Creek
6. Entler Avenue bridge (or culvert) at Camanche Creek tributary

The conceptual project improvements are based on a MTCo preliminary drawing, attached as Figure 2. We include selected site photos of the project area in Appendix B.

Topography throughout the project area rises gently from the west to east, from a low of about elevation 200 ft, near Midway, to a high of about elevation 275 ft, near Skyway at Butte Creek. We expect relatively low cut/fill (approximately 10 ft or less) for project earthwork along the new road segments.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Geologic Setting

The site is located in the northern portion of the Sacramento Valley that is bounded by the Sierra Nevada on the east and the Coast Ranges on the west. The Sacramento Valley is a structural trough that represents the northern third of the Great Valley Geomorphic Province.

The relatively flat surface of the Sacramento Valley is underlain by alluvial, lacustrine, and marine sedimentary deposits that have accumulated as the structural trough formed and the adjacent mountain ranges were elevated. The thickness of the sediments varies from a thin veneer along the valley margins to thousands of feet at the axis of the trough. The main axis of the trough is oriented north-south along the valley's main drainage axis, approximately 23 miles west of the site. This project is near the east edge of the valley sediments, underlain by relatively thin alluvium over volcanic rock.

We evaluated the geology of the area through available geologic literature and our site review. Based on Saucedo and Wagner (1992) and Helley and Harwood (1985), sediments of the Pleistocene-age Modesto Formation immediately underlie most of the project area. These sediments typically consist of alluvial terraces and fan deposits. Dredge tailings, remnant from historic mining in the area, are present in the area south of Southgate Avenue and along the Butte Creek drainage east of the project area.

The published mapping shows Pliocene-age volcanics of the Tuscan Formation at the east side of the project area. These materials are comprised of interbedded volcanic mudflows and volcanic conglomerate, volcanic sandstone/siltstone and pumiceous tuff.

We show a site Geologic Map, based on Helley and Harwood (1985), on Figure 3.

Subsurface Conditions

We observed sediments consistent with the Modesto Formation within most of the project area. These soils consist of medium dense gravelly clayey sand and stiff to hard sandy clay. Dredge tailings are present in areas south, west and east of the existing Southgate Avenue/SR 99 intersection, including the proposed Southgate alignment east of SR 99 to the Little Chico Creek Diversion. The 1978 USGS topographic map shows the tailings to extend about 1500 ft west along Southgate Avenue, 3000 ft south along SR 99 to near Butte Creek, and several hundred feet east of SR 99 (see Figure 1).

Engeo, Inc. completed a geotechnical report, dated February 2008, for a proposed commercial/residential development at the southwest corner of Southgate Avenue and SR 99. Their study included 12 test pits to a maximum depth of 20 ft below ground surface. The data show dredge tailings to depths of approximately 14 to 18.5 ft below ground surface, underlain by stiff to hard silty clay.

North of the proposed Southgate interchange, Entler Avenue will extend northwest and cross Comanche Creek (formerly "Edgar Slough") immediately downstream from the SR 99 parallel bridges. The Entler Avenue extension will continue northwest and cross a man-made drainage that flows southwest into Comanche Creek. SR 99 crosses the drainage ditch with a triple box culvert, about 24 ft wide and invert about 10 ft below the highway grade. The soils in the area of the Comanche Creek and drainage ditch are mostly granular materials consistent with Modesto Formation sediments.

South of the proposed Southgate interchange, Player Lane will cross Butte Creek immediately downstream from the SR 99 parallel bridges. The creek banks in this area are comprised of unconsolidated sand and gravel with cobbles. We observed tuffaceous siltstone exposed at a few locations within the Butte Creek channel.

East of SR99, the proposed Southgate Avenue extension follows an old railroad grade and crosses Little Chico Creek Diversion and Butte Creek. Remnants of old railroad bridges at both crossings include concrete abutments and piers. We noted mostly coarse alluvium in the area of the Little Chico Creek Diversion, with siltstone (likely Tuscan Formation) exposed along portions of the channel.

At Butte Creek, the old railroad bridge crosses the creek about 50 ft upstream from a concrete diversion dam. Gravelly sediments are deposited behind the dam and volcanic rock is exposed within the channel downstream of the dam. The dam diverts water from Butte Creek into a pipe that flows southwest to a concrete lined ditch, which then flows south (parallel to Butte Creek).

Along the east bank of Butte Creek (near the old east abutment), hard, volcanic mudflow is exposed as isolated surface outcrops. Between Butte Creek and Skyway, the proposed Southgate Avenue alignment crosses relatively flat ground with outcrops of volcanic mudflow (bedrock) and scattered volcanic boulders.

We did not observe signs of significant geologic hazards such as landsliding, settlement, very soft soils or severe erosion within the project area, nor do the published maps show such hazards.

Ground Water

We reviewed groundwater level data made available by the California Department of Water Resources (Historical Data Map Interface website). Well data within the western portion of the project area indicate a regional groundwater table at about elevation 120 ft below mean sea level. This places the regional (or static) water table at about 80 ft below the ground surface. We expect, however, that perched groundwater can be encountered at relatively shallow depths, particularly near the drainages and during or shortly following the winter months.

The County reports that artesian groundwater surfaces during extended periods of rainfall in the cul-de-sac areas south of Entler Avenue (northwest of the Southgate/SR 99 intersection). Pumps have been installed at the rear of the lots to prevent flooding of the yards; these pumps discharge the water via ditches to a discharge basin south of Southgate Avenue (near the existing community ballfield), although the water reportedly dissipates into gravel layers before reaching the basin.

The Engeo report describes groundwater in several of the test pit excavations, dug in January 2008, mostly within the loose dredge tailings. This water is likely "perched" over the underlying clay soils.

SCOUR EVALUATION

Two major drainages are mapped in the study area. Comanche Creek (formerly Edgar Slough) crosses the northern portion of the study area, and Butte Creek crosses the east and southeast portions of the area. We observed evidence of minor scour along the Butte Creek channel and little to none along the Comanche Creek channel. New structure foundations will need to consider scour along Butte Creek during project design, based on the structure hydraulics report.

CORROSION EVALUATION

Caltrans Corrosion Guidelines (2003) considers soils corrosive to foundation elements if one or more of the following conditions exist:

- Chloride concentration is 500 parts per million (ppm) or greater,
- Sulfate concentration is 2000 ppm or greater,
- pH is 5.5 or less.

Based on the generally granular nature of the site soils, we expect low corrosivity conditions. We plan to provide corrosion testing and analyses during the design level foundation investigations.

PRELIMINARY SEISMIC STUDY

Ground Motion Study

Our review of published geologic mapping and preliminary site review did not reveal the presence of Late Quaternary (displacement within the last 700,000 years) or younger faults within or adjacent to the project area. The Chico Monocline fault is shown on California Geological Survey (CGS) database to be located about 3 miles east of the project area, however, is considered older than late Quaternary and is therefore not included on current Caltrans seismic hazard maps. Figure 4 shows the significant seismic sources (per Caltrans) in the project vicinity.

Based on Caltrans' Seismic Hazard Map (1996), the closest recognized Late Quaternary or younger faults are the Big Bend Fault (BBD), located approximately 12 miles east of the site, and the Cleveland Hill Fault (CHL), located approximately 15 miles southeast of the site. The BBD fault has the greatest potential to affect the site, with an estimated maximum moment Magnitude of 6.25. An event of this magnitude, at a distance of 12 miles, would produce a maximum horizontal Peak Bedrock Acceleration (PBA) of about 0.17g (Mualchin, 1996).

Based on our review, we preliminarily classify the site soil profiles as Type D (stiff soil). Type B (moderately hard rock) or Type C (very dense soil and soft rock) may apply to structures at the east side of the project area where shallow volcanic rock may be present (e.g., Southgate crossing at Butte Creek).

For preliminary design, use the 0.2g peak horizontal rock acceleration curve (0.28g peak ground acceleration) from Figure B.7 (Soil Profile Type D for a Magnitude of 6.5$\pm$0.25) of the Caltrans Seismic Design Criteria (2006, Version 1.4). We present a copy of this curve as Figure 5.

The proposed structure is not located within 10 miles of the controlling fault; therefore, no adjustment to the response spectrum is required for fault proximity.

Liquefaction Evaluation

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 feet of the surface) are subjected to ground shaking. Except for the area of dredge tailings, we expect the project area is underlain by dense/hard sediments and volcanic rock, which we consider to be non-liquefiable or to have a very low potential for liquefaction. The dredge tailings might be liquefiable where saturated; liquefaction of these soils can be mitigated by project grading and extending the structure foundations below the depth of these materials.

Fault Rupture Study

The site does not lie within or adjacent to an Alquist–Priolo Earthquake Fault Zone for fault rupture hazard and no known active faults cross the site. We therefore consider the potential for fault rupture and ground displacement to adversely affect the project as very low to non-existent.

Seismic Settlement

During a seismic event, ground shaking can cause densification of granular soil above the water table that can result in settlement of the ground surface. Based on our review, with the possible exception of the dredge tailings and weak/loose soils along the channel banks, we consider the probability of detrimental seismic settlement within the project area to be very low.

Seismic Slope Instability

We consider the potential for seismic slope instability in the form of landslides and mudslides at this site to be very low to nonexistent. Similarly, we consider the potential for seismically induced slides on engineered fill slopes constructed at 1.5:1(horizontal: vertical) to be very low.

AS-BUILT FOUNDATION DATA

We reviewed the 1991 Caltrans As-Built plans for SR 99 construction (west widening) from Pentz Road to near Skyway, a distance of about 6.2 miles, including five bridges (at Hamlin Slough, Nance Canyon, Scrub Creek, Butte Creek and Edgar Slough). We also reviewed 1977 Butte County As-Built plans for the Skyway bridges at Little Chico Creek Diversion and at Butte Creek. We summarize the foundation data below.

SR 99 @ Hamlin Slough

This bridge is a 120 ft long, 4-span, flat-slab concrete structure with concrete diaphragm abutments and 5-column concrete bents. The abutments are supported on strip footings established in engineered fill. The bent columns are supported on isolated footings established 6-8 ft below channel bottom and within materials identified as "tuffaceous sandstone".

SR 99 @ Nance Canyon

This bridge is an 89 ft long, 3-span, flat-slab concrete structure with concrete diaphragm abutments and 7-column concrete bents. The abutments are supported on strip footings established in engineered fill. The bent columns are supported on isolated footings established about 6 ft below channel bottom and within materials identified as "stiff to very stiff sandy clay with boulders" and "slightly compact sand with boulders". "Tuffaceous sandstone" is logged about 20 ft below channel bottom.

SR 99 @ Scrub Creek

This structure is a double 10'x6' reinforced concrete box culvert, with base established in "tuffaceous sandstone". The plans show the sandstone below the culvert base removed to a depth of about one foot and backfilled with Structure Backfill.

SR 99 @ Butte Creek

This bridge is a 324 ft long, 5-span, reinforced concrete box girder with concrete diaphragm abutments and solid-wall piers. Foundations at all supports are steel piles (HP10x57) with 70 ton design loads. As-Built plans show the piles driven to an average elevation about 178 ft to 184 ft, which is about 16-22 ft below channel bottom. The Log of Test Borings drawing describes the materials at this level as tuffaceous sandstone.

SR 99 @ Comanche Creek

This bridge is a 53 ft long, 3-span, flat-slab concrete structure with concrete diaphragm abutments and 4-column concrete bents. The abutments are supported on strip footings established in material identified by the Log of Test Borings drawing as dense sandy gravel, at elev. 206-207 (near channel bottom and about 10 ft below original ground surface). The bent columns are supported on isolated footings established at elev. 200 (about 8 ft below channel bottom) and within similar sandy gravel materials. The plans indicate design footing pressures of 1.7 tsf at the abutments and 3 tsf at the bents.

Skyway @ Little Chico Creek Diversion

This bridge is a 113 ft long, 4-span, flat-slab concrete structure with concrete diaphragm abutments and 5-column concrete bents. The abutments and bents are supported on concrete piles (Alternative "V" 14-inch diameter steel shells filled with concrete) with 45 ton design loads. The bent columns are pile extensions to the deck. The As-Built plans show the piles driven to about 24 ft below channel bottom, bearing in dense to very dense silty and sandy gravel.

Skyway @ Butte Creek

This bridge is a 221 ft long, 3-span, reinforced concrete box girder structure with concrete diaphragm abutments and solid-wall piers. Foundations at the abutments and Pier 2 (north side of channel) are steel piles (HP10x57) with 45 ton design loads. Pier 3 (south side of channel) is supported by a spread footing on volcanic mudflow ("bedrock") with design footing loads of 5 tsf. The Log of Test Borings drawing shows a variable rock line with dense sandy gravel overlying the rock.

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

Discussion of Foundation Alternatives

Spread Footings: Support is generally available for spread footing foundations established within undisturbed Modesto Formation sediments. These materials are generally present near ground surface throughout most of the project area and appear to underlie the dredge tailings near the SR99/Southgate interchange. At the channel crossings, footings would need to be placed below scour depths and bearing capacity would be limited by the soil conditions and permissible settlement. For these reasons, the use of spread footings may be undesirable for heavily loaded bridge foundations.

Volcanic rock is exposed at the east side of the project, between Butte Creek and Skyway. Spread footing foundations appear feasible at the Southgate Avenue bridge over Butte Creek, especially at the east abutment.

H-Piles: Steel H-piles (e.g., HP10x57, similar to the existing Butte Creek bridge foundations at SR99 and Skyway) are likely feasible with penetration into the anticipated dense soils and/or volcanic rock. Hard rock observed at the east side of Butte Creek near the proposed Southgate Avenue bridge may limit the ability to drive piles to adequate depth for lateral and/or tensile resistance.

Cast-In-Drilled-Hole (CIDH) Piles: CIDH pile foundations or large diameter drilled-shafts appear feasible and can develop high capacity for axial, lateral and uplift loads. Difficult drilling may be encountered in hard, volcanic rock and through soils containing cobbles. Minimum 24-inch diameter excavations would be required if ground water or caving soils are encountered. CIDH pile tip elevations would depend on pile/shaft diameter and defined compressive, tensile and lateral loading requirements.

Driven Concrete Piles and Steel Pipe Piles: These pile types may be acceptable depending on the soil profile; however, as displacement type piles, they may experience very hard driving within dense soils (possibly resulting in damage to the pile). Pre-drilling may be necessary to achieve adequate penetration for stability. These pile types are not appropriate in areas of shallow, volcanic rock (e.g., east project area).

Preliminary Structure Foundations

Based on the above, we consider the following foundations as appropriate for preliminary structure design and type selection:

1. Southgate Avenue Interchange at SR 99: Spread footings in undisturbed Modesto Formation materials; alternatively, H-piles driven to about 30 ft below existing ground surface, developing capacities up to 70 tons per pile.

2. Southgate Avenue bridge at Little Chico Creek Diversion: H-piles, driven to about 40 ft below existing old railroad grade, developing capacities up to 70 tons per pile.

3. Southgate Avenue bridge at Butte Creek: H-piles likely with 70 ton capacity at depths about 30-40 ft at the west abutment. At the east abutment, likely footing foundation in rock. Bent foundations may be either short H-piles (about 20 ft long) or spread footings, depending on the rock line and design scour levels.

4. Player Lane bridge at Butte Creek: H-piles, driven to about 30 ft below channel bottom, developing capacities up to 70 tons per pile.

5. Entler Avenue bridge at Camanche Creek: Spread footings in undisturbed Modesto Formation materials, similar to the SR99 bridges immediately upstream. Alternately, H-piles driven about 20-30 ft below channel bottom with design capacities to 70 tons per pile.

6. Entler Avenue culvert (or bridge) at Camanche Creek tributary: A box culvert similar to the SR99 triple box appears reasonable, bearing into undisturbed Modesto Formation soils. For a bridge structure, spread footings appear feasible with preliminary design loads to 2 tsf.

Roadway Grading

We expect that, in general, new cut slopes will be stable at gradients of about 1.5H:1V, or flatter, and new fill slopes at gradients of 2H:1V. We anticipate that settlement of new embankment established on appropriately prepared subgrade will be nominal (on the order of 1-inch), occurring rapidly during fill placement.

We did not observe areas of slope instability, shallow ground water or soft/compressible soils as part of this review, although these issues may require consideration where dredge tailings are present. In the tailings areas, measures such as over-excavation and replacement may be required, depending on fill heights and grading details. Areas of significant fill over tailings will require consideration of possible soft clays ("slickens") within the tailings that may be present as a byproduct of the dredging operations.

Retaining Walls

We expect foundation support for typical Caltrans standard walls (e.g., Type 1), to about 10 ft in height, is generally available on strip or spread footing foundations established in undisturbed, native soils. Soil bearing is likely available for design pressures up to 5 ksf for footings established at least 2 ft into undisturbed bearing material. Support in the tailings area may require subexcavation and replacement of loose gravel, cobbles and "slickens" to provide suitable foundation support.

Lateral forces may be resisted by friction developed between the base of the footing and the underlying undisturbed sediments or engineered fill. For preliminary design, use a coefficient of friction to resist sliding of 0.30. Additional resistance to lateral loads is available from passive pressure; for preliminary design, use an equivalent fluid weight of 300 pcf below a depth of one foot.

ADDITIONAL FIELD WORK AND LABORATORY TESTING

Additional subsurface exploration and laboratory testing is required to complete the Foundation Reports for bridge design, Geotechnical Design Report for roadway and wall elements, and Materials Reports for pavement and culvert design. We plan to drill and sample test borings at each new bridge structure to depths of about 60-80 ft, depending on the depth to rock, structure types and loading conditions. For roadway segments and retaining walls, test borings will extend to depths of about 10-30 ft, depending on embankment/wall heights. We will note groundwater encounters and collect bulk and relatively undisturbed soil samples from the borings for laboratory testing.

We plan to conduct the following laboratory tests on selected soil samples retrieved from the test borings.

- Moisture Content/Unit Weight for bearing capacity, lateral capacity and settlement analysis
- Unconfined compressive, direct shear and/or triaxial shear strength tests for bearing capacity and lateral capacity analysis
- Corrosivity (pH, sulfates/chlorides and minimum resistivity) for soil reaction to steel and concrete
- Sieve Analysis and Hydrometer tests for scour analysis (by others)
- R-value tests for pavement design

LIMITATIONS

This Preliminary Geotechnical Report is based on available information provided to BCI and is not intended for final design. Do not use or rely on this report for different locations or improvements without the written consent of BCI.

Additional study, including subsurface exploration and laboratory testing is required for final design. BCI performed these services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. We do not warranty our services.

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  - *Hamlin Slough Bridge, No. 12-131*
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FIGURES

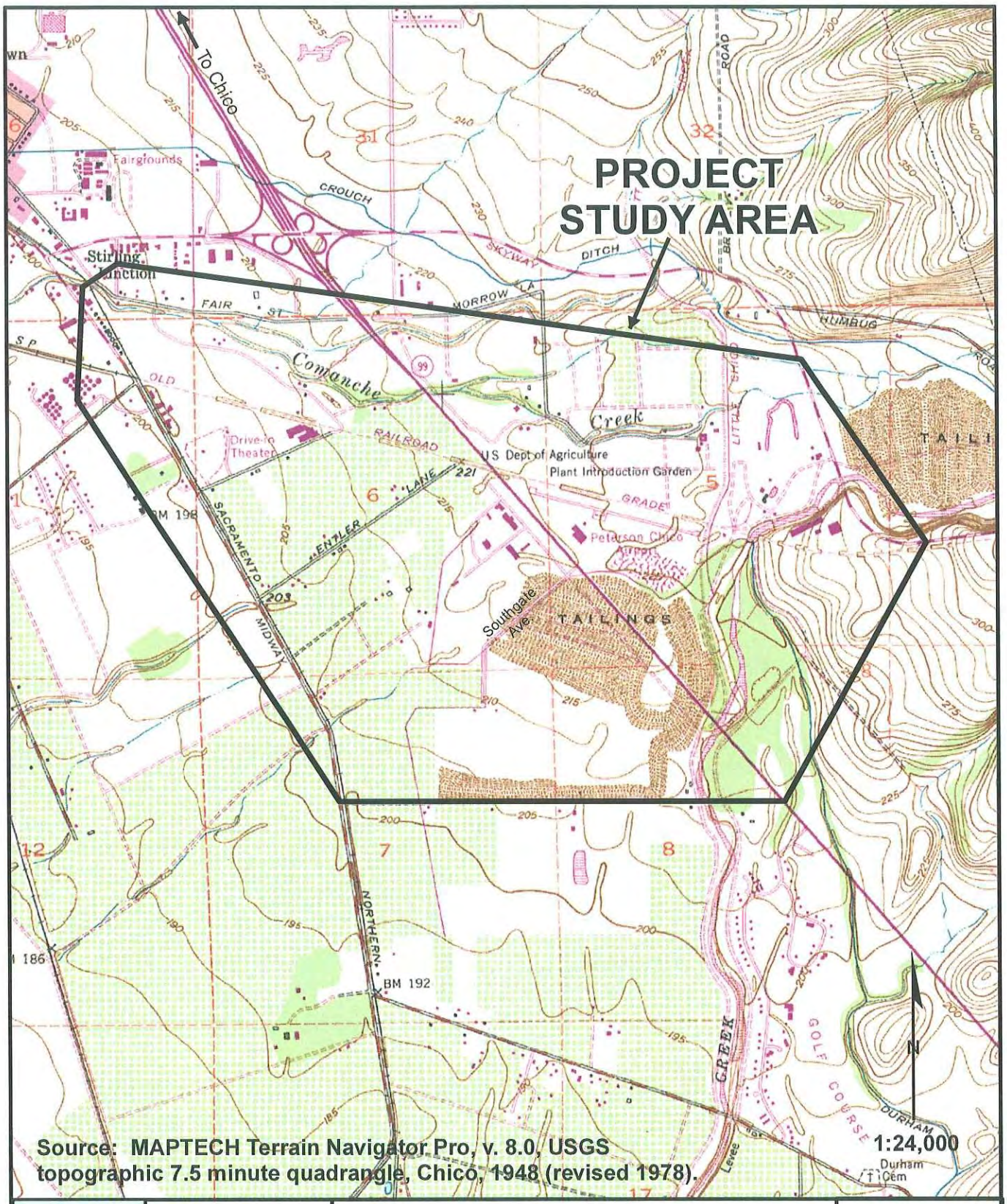
Figure 1 Vicinity Map

Figure 2 Conceptual Project Improvements Map

Figure 3 Geologic Map

Figure 4 Fault Map

Figure 5 ARS Curve



Source: MAPTECH Terrain Navigator Pro, v. 8.0, USGS topographic 7.5 minute quadrangle, Chico, 1948 (revised 1978).

blackburn consulting
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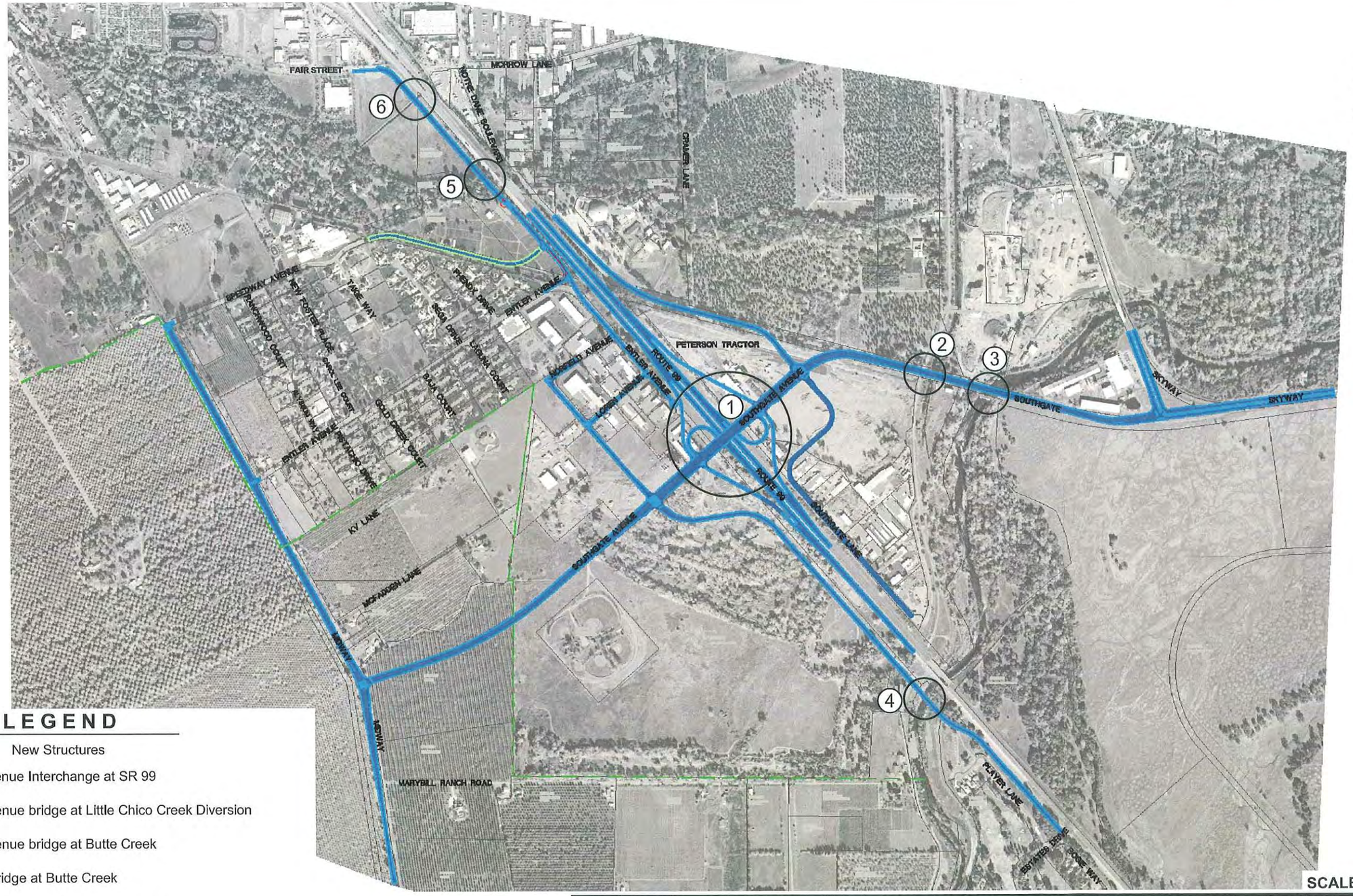
Auburn, CA 95603
Phone: (530) 887-1494
Fax: (530) 887-1495-Fax
www.blackburnconsulting.com

VICINITY MAP

Southgate Interchange Project
Chico, California

File No. 961.1
April 2009
Figure 1



LEGEND

New Structures

1. Southgate Avenue Interchange at SR 99
2. Southgate Avenue bridge at Little Chico Creek Diversion
3. Southgate Avenue bridge at Butte Creek
4. Player Lane bridge at Butte Creek
5. Entler Avenue bridge at Camanche Creek
6. Entler Avenue bridge (or culvert) at Camanche Creek tributary

Source: Conceptual Project Improvements, Exhibit A by Mark Thomas & Company, Inc.

SCALE: 1"=850'

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Auburn, CA 95603
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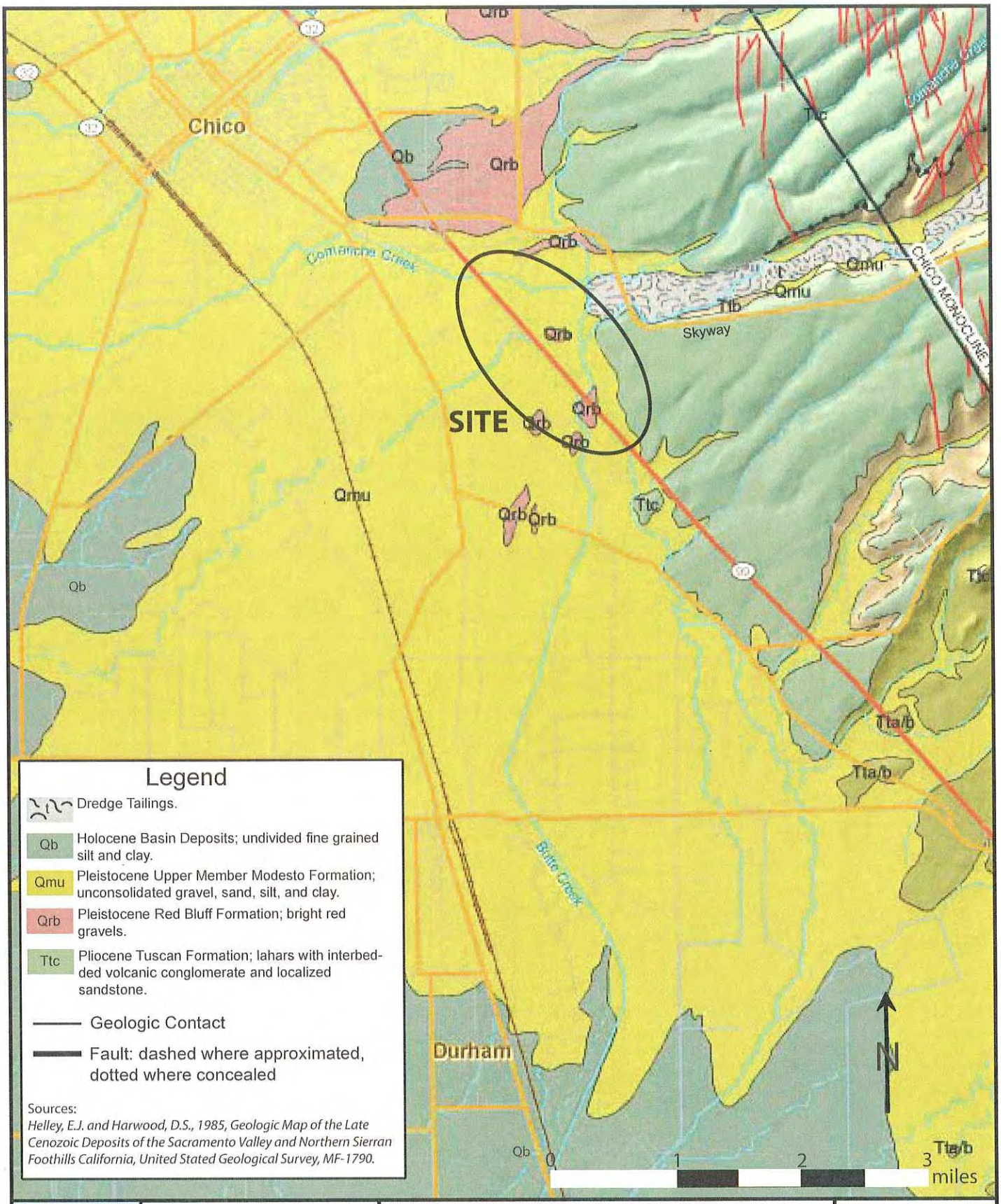
CONCEPTUAL PROJECT IMPROVEMENTS

Southgate Avenue Interchange Project
Chico, California

File No. 961.1
April 2009
Figure 2

4/6/2009 961.1 Southgate Avenue Interchange Project Figure 2.dwg



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(530) 887-1495-Fax
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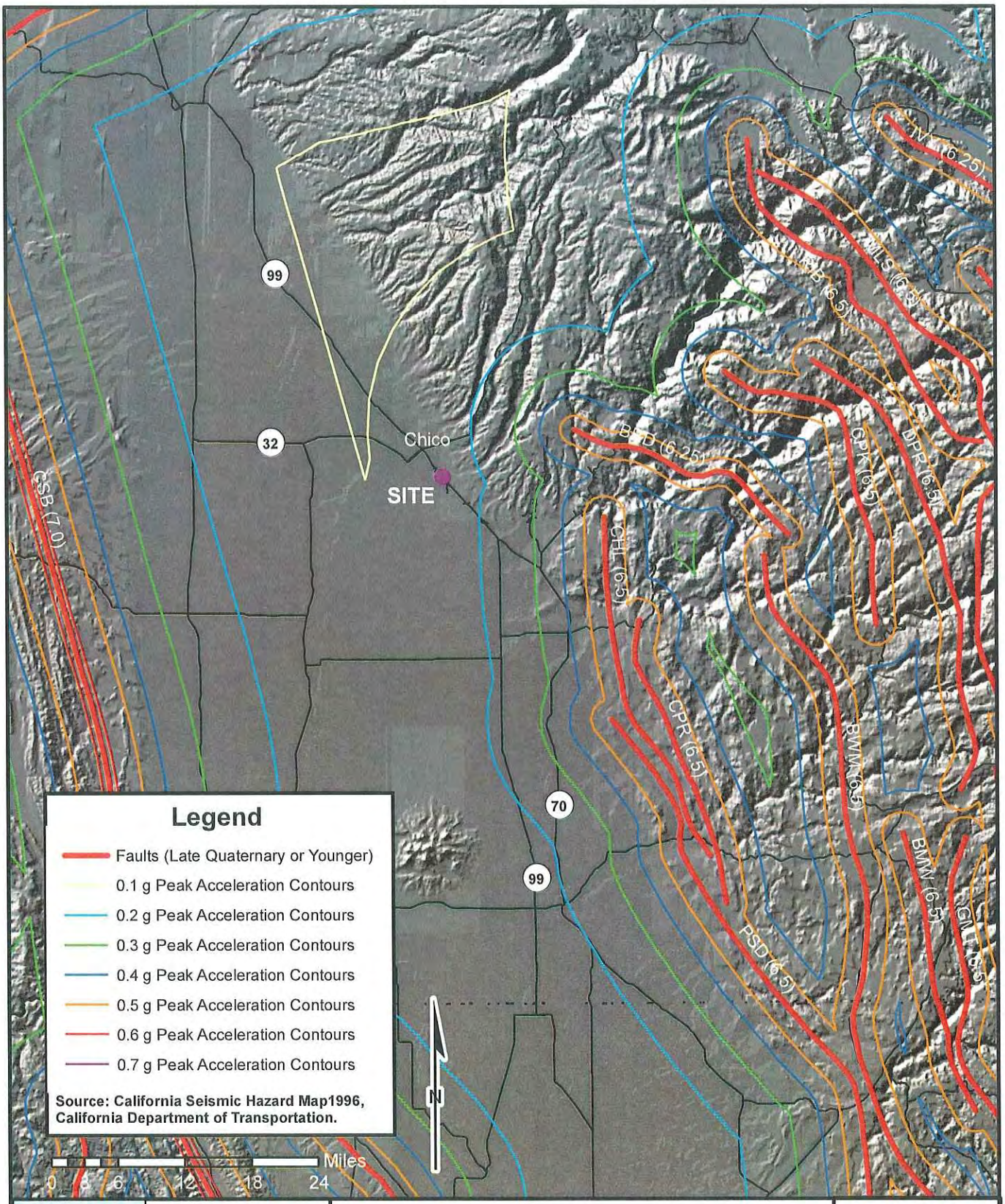
GEOLOGIC MAP

Southgate Interchange Project
Chico, California

File No. 961.1

April 2009

Figure 3



blackburn consulting

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Fax: (530) 887-1495-Fax
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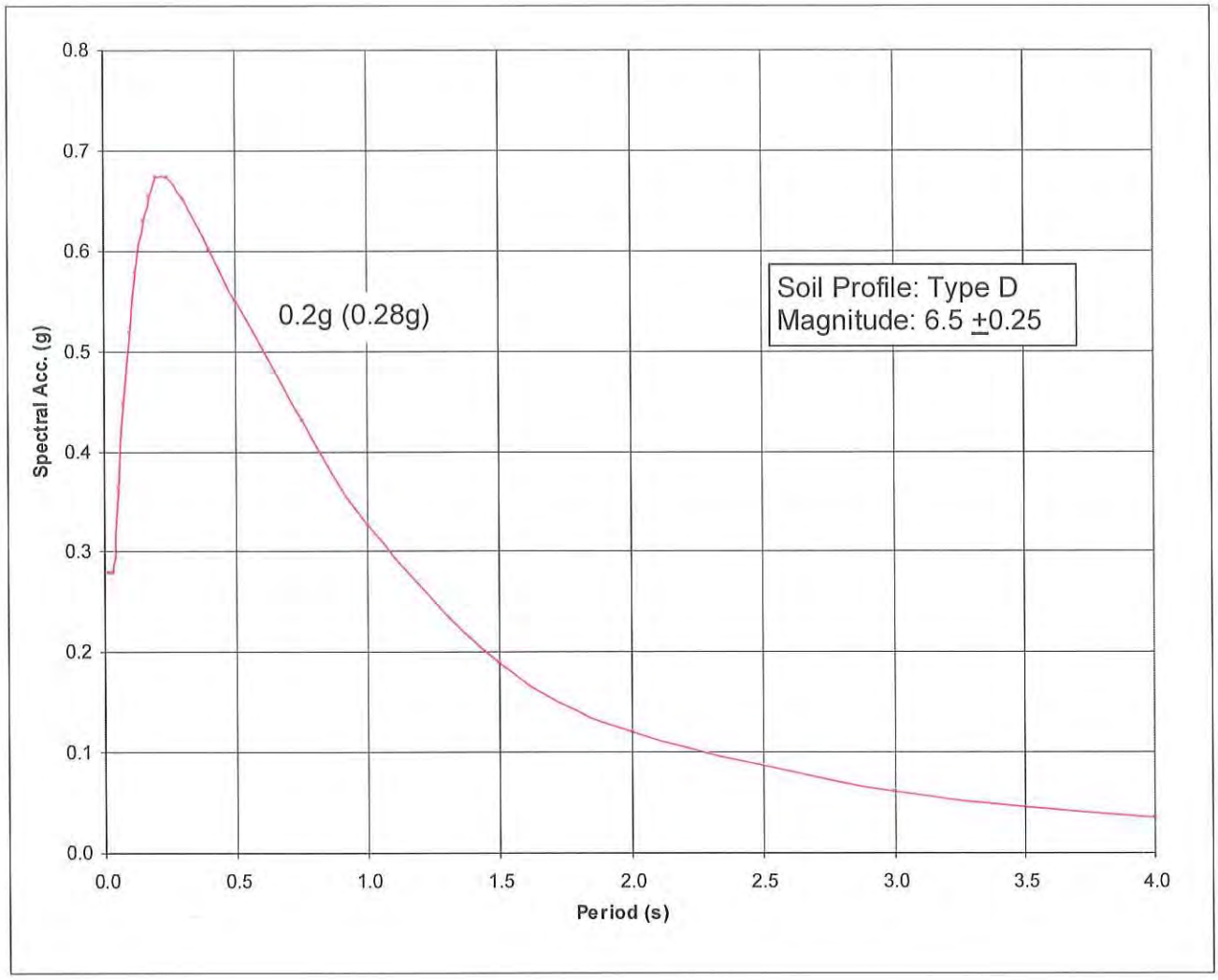
REGIONAL FAULT MAP

Southgate Interchange Project
Chico, California

File No. 961.1

April 2009

Figure 4



Reference: Figure B.7, Caltrans Seismic Design Criteria, Ver. 1.4, June 2006

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Fax: (530) 887-1495
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ARS CURVE

Southgate Avenue Interchange Project
Chico, California

File No. 961.1

April 2009

Figure 5

APPENDIX

A

Log of Test Boring Sheets

SR 99 @ Hamlin Slough

SR 99 @ Nance Canyon

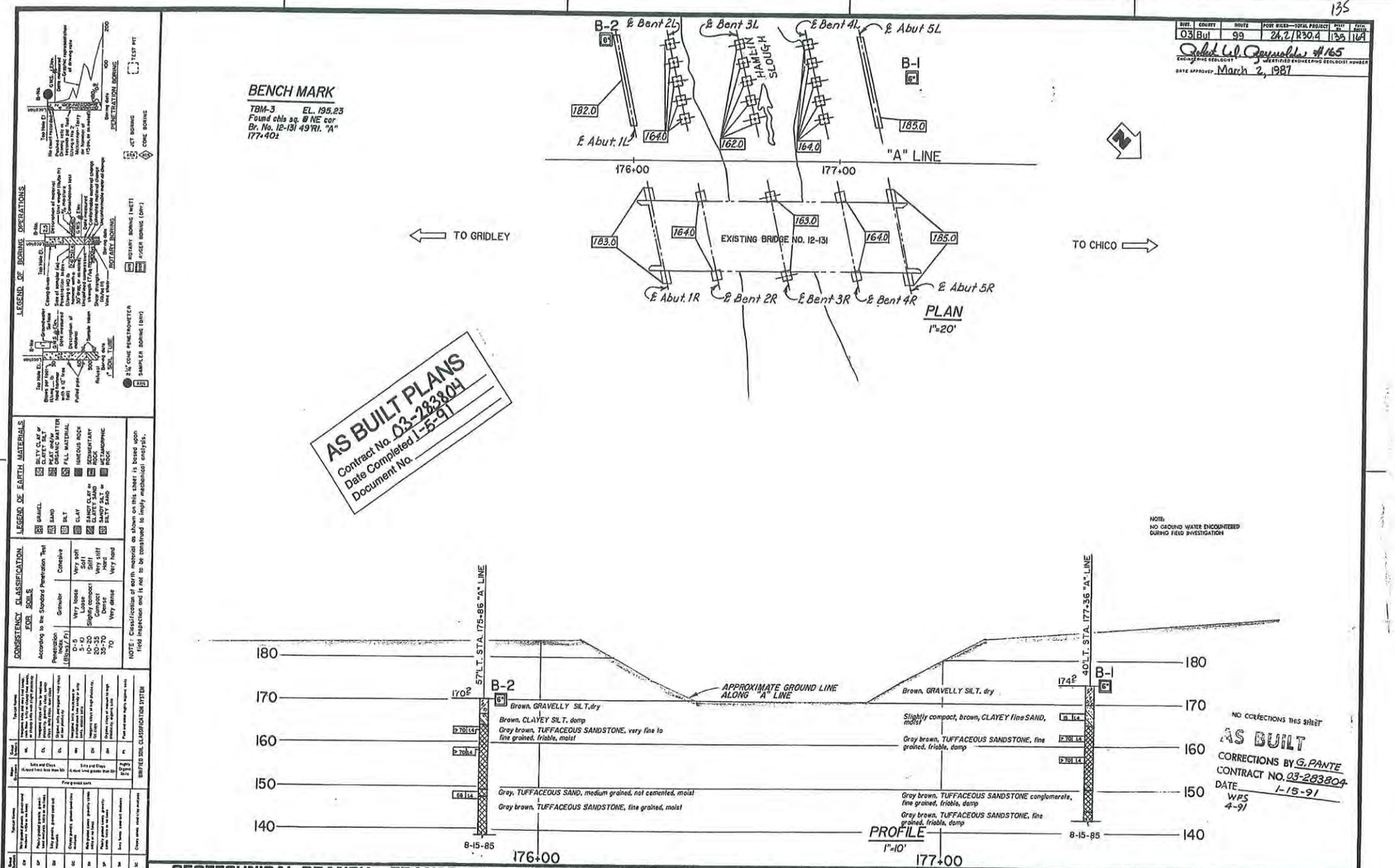
SR 99 @ Scrub Creek

SR 99 @ Butte Creek

SR 99 @ Edgar Slough

Skyway @ Little Chico Diversion

Skyway @ Butte Creek



DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	Bul	99	24.2/R30.4	135	164

Robert W. Reynolds #165
ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER
DATE APPROVED March 2, 1987

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	JKD	9/85	Ronald L. Richman 39869	R.C. Wilhelms 560	CHARGE UNIT / EXPEND. AUTHOR. / SPEC. DESIGN.
CHECKED BY	RLR	10/85	PROJECT ENGINEER	ENGINEERING GEOLOGIST	

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 5

A. Marquez 35074
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 12-131 R/L
POST MILE 25.4

HAMLIN SLOUGH BRIDGE:
LOG OF TEST BORINGS 1 of 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 03207
WO 283801

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY) 12/13/86

SHEET 13 OF 14

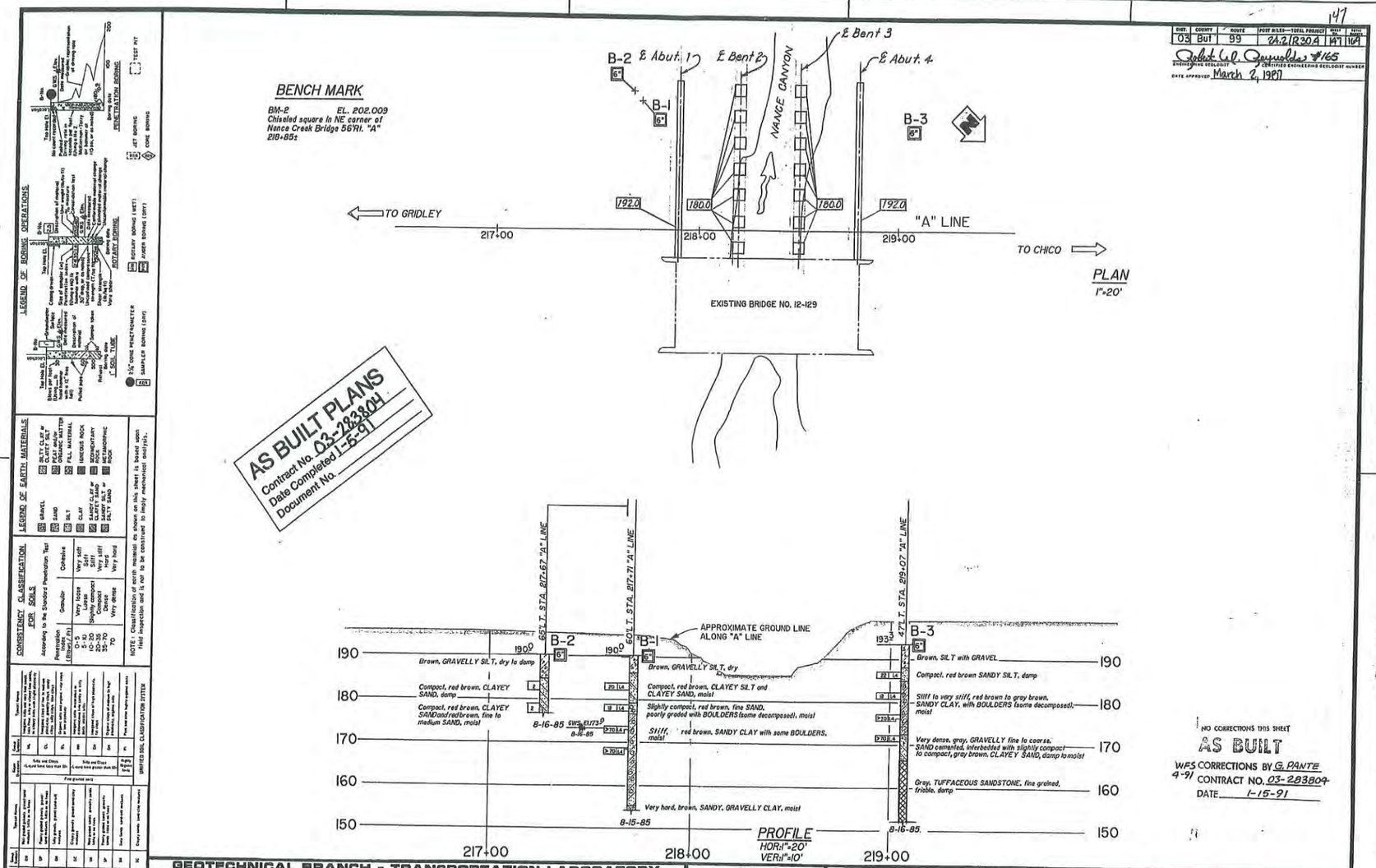
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 5-10-91 SIGNATURE Donald Blackfield TITLE SUPERVISOR OF UNDERGROUND SERVICES

135

135

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1"=50' SCALE 1"=20' SCALE 1"=10' or 1"=100' SCALE 1"=40'



147

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	But	99	24.2/R30.4	147	164

Robert W. Reynolds #165
ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER
DATE APPROVED March 2, 1987

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	JKD	10/85	Ronald L. Rubin 39869	R.C. Wilhelms 560	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN
CHECKED BY	RLR	10/85	PROJECT ENGINEER	ENGINEERING GEOLOGIST			

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 5

A. Marquez 35074
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 12-129
POST MILE 26.1

NANCE CANYON BRIDGE
LOG OF TEST BORINGS 1 of 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 03207
WO 283801

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 11 OF 12

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 5-10-91 — SIGNATURE Donald Blackfield — TITLE SUPERVISOR OF MICROFILM SERVICES

147

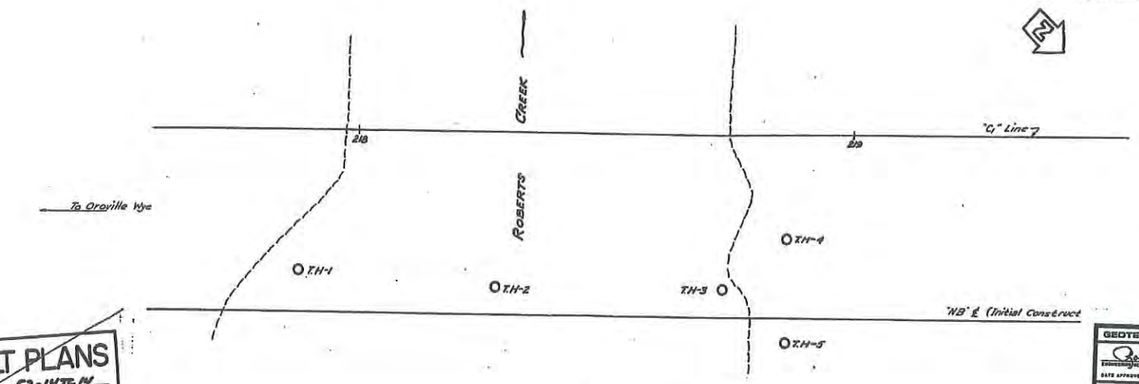
SCALE 1"=50' — MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM — SCALE 1"=20'
SCALE 1"=10' or 1"=100' — MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM — SCALE 1"=40'

DIST.	COUNTY	ROUTE	POST MILE	TOTAL PROJECT	SHEET	TOTAL SHEETS
03	But	99	24.2/R30.4	148/167	2	148

to accompany plans dated March 2, 1987

Bridge 3 C 52 56

SEPTEMBER 11 1987



AS BUILT PLANS
Contract No. 52-147E.N
Date Completed
Document No. 30001305

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

Robert W. Reynolds #165

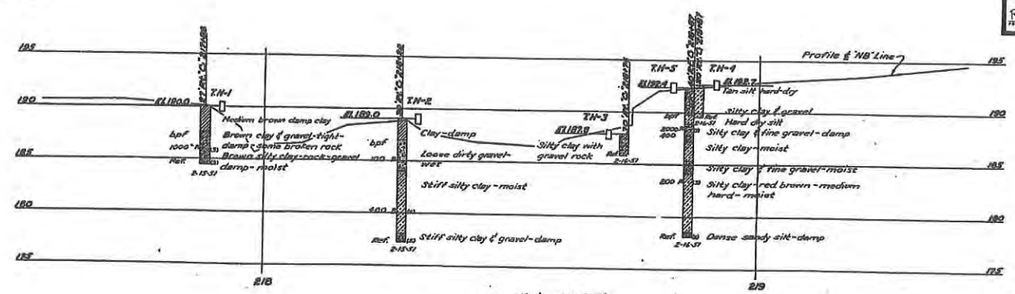
DATE APPROVED

NANCE CANYON BRIDGE

LOG OF TEST BORINGS 2 of 2

Ronald J. Rudnicka — PROJECT GEOLOGIST
R.C. Wilkins — GEOTECHNICAL BRANCH CHIEF
CU: 03207 WO: 283801
BRIDGE No. 12-129

B.M. No. 212 "G"
Chiseled square in top South Headwall @ East end Culvert 12.5' Rt. Station "G" 211+90
Elevation 191.66



Note: Blows per foot were made using a 28lb hand hammer with a 12" free fall.

NO CORRECTIONS THIS SHEET
AS BUILT
WFS 4-91 CORRECTIONS BY G. PANTE
CONTRACT NO. 03-283804
DATE 1-15-91

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

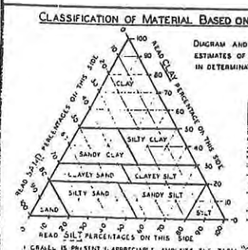


DIAGRAM AND TABLE SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.

GROUPING USED IN TRIANGULAR CLASSIFICATION			
CLASS NAME	PERCENTAGE OF SIZES PRESENT		
	SAND	SILT	CLAY
SAND	80-100	0-20	0-20
SILTY SAND	45-80	0-55	0-20
SANDY SILT	0-45	55-80	0-20
SILT	0-20	80-100	0-20
CLAYEY SAND	30-80	0-42	20-30
CLAYEY SILT	0-38	42-80	20-30
SANDY CLAY	50-70	0-40	30-50
SILTY CLAY	0-30	20-70	30-50
CLAY	0-30	0-30	50-100

GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, AS "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE GRAVEL, SAND AND SILT REFER TO STANDARD GRAVEL SIZE LIMITS

LEGEND OF BORING OPERATIONS

- PLAN OF ANY BORING
- 1" SAMPLER BORING
- ROTARY WASH BORING
- 1" CLOSED SAMPLER DRIVEN
- CORE BORING
- 2½" PENETROMETER DRIVEN
- 1¾" SAMPLER BORING
- 2" TO 5" AUGER BORING
- 6" TO 20" AUGER BORING
- CASING DRIVEN
- JET BORING
- (S) SAMPLE TAKEN
- 1⅜" A-ROD DRIVEN

THE APPROPRIATE BORING SYMBOLS DESIGNATING THE METHOD OF OPERATION ARE SHOWN AT THE UPPER RIGHT-HAND CORNER OF THE RESPECTIVE BORING. WHERE TOOL CHANGES WERE MADE DURING THE BORING OPERATION SYMBOLS ARE SHOWN AT THE POINT OF CHANGE.

LEGEND OF EARTH MATERIALS

- GRAVEL—G
- SAND—S
- SILT—Si
- CLAY—C
- SILTY SAND—Si S
- CLAYEY SAND—C S
- SANDY SILT—S Si
- CLAYEY SILT—C Si
- SANDY CLAY—SC
- SILTY CLAY—Si C
- PEAT & ORGANIC CLAY—O
- SANDSTONE—SS
- SHALE—Sh
- BROKEN ROCK (FRAGMENTS)—Br
- ROCK—R

ABBREVIATIONS

EL. 69.4	ELEVATION OF GROUND AT TEST HOLE
bpf	BLOWS PER FOOT—(SEE NOTE ABOVE)
P	PULLED PIPE
M	MOISTURE AS % DRY WEIGHT
EL. 44.3, 8-12-46	ELEVATION OF GROUND WATER AND DATE

NOTES

- THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 2, ARTICLE (c) OF THE STANDARD SPECIFICATIONS AND TO THE SPECIAL PROVISIONS ACCOMPANYING THIS SET OF PLANS.

CLASSIFICATION OF EARTH MATERIAL AS SHOWN ON THIS SHEET IS BASED UPON FIELD INSPECTION AND IS NOT TO BE CONSTRUED TO IMPLY MECHANICAL ANALYSIS.

MICROFILMED

NANCE CANYON
BRIDGE ACROSS ~~ROBERTS CREEK~~
LOG OF TEST BORINGS
SCALE As Shown
BRIDGE NO. 12-129
DRAWING NO. B-2639-52

SHEET 12 OF 12

148

AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

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DATE 5-10-91 SIGNATURE Donald Blackfield TITLE SUPERVISOR OF MICROFILM SERVICES

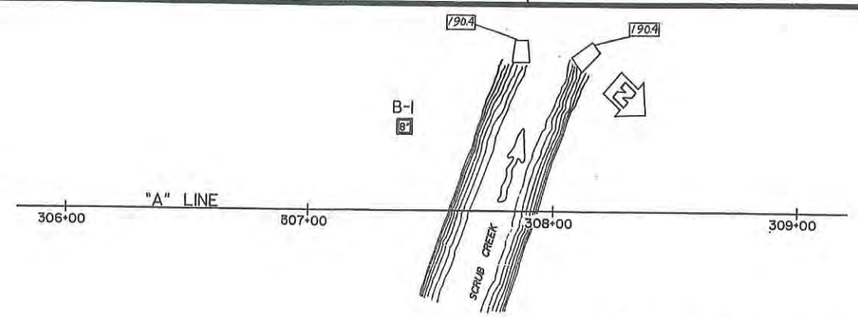
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 50' 0 50 100 200 300 400 500 600 700
SCALE 1" = 20' 0 100 200 300
SCALE 1" = 10' or 1" = 100' 0 10 20 30 40 50 60 70 80 90 100 150
SCALE 1" = 40' 0 100 200 300 400 500 600

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	Bul	99	24.2/2304	154	169

Robert L. Reynolds #165
ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER
DATE APPROVED March 2, 1987

BENCH MARK

BM NO. 9 - CHISELED SQUARE IN NE CORNER OF SCRUB CREEK BRIDGE 56' RT. STA. 307+86±. ELEV. 204.328'.

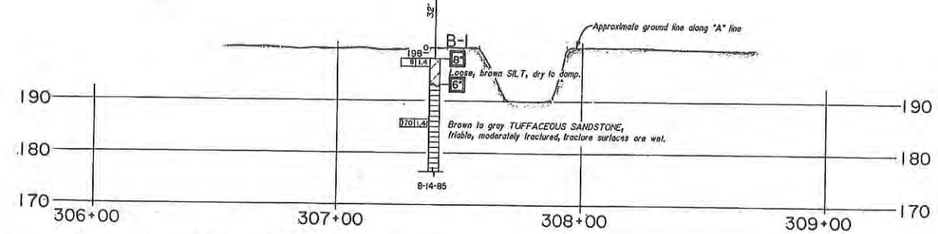


PLAN
1" = 20'

Note:
Bottom of footing elev. shown thus:

AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

NOTE:
NO GROUND WATER ENCOUNTERED DURING FIELD INVESTIGATION



NO CORRECTIONS THIS SHEET
AS BUILT
WFS CORRECTIONS BY G. PANTE
4-91 CONTRACT NO. 03-283804
DATE 1-15-91

PROFILE
HOR. 1"=20' VERT. 1"=10'

154

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY							
DRAWN BY	Leony L. Lopez 10/85	Ronald L. Richards 39869	R.C. Wilhelms 560	CHARGE UNIT	EXPEND. AUTHOR.	SPEC. DESIGN.	
CHECKED BY	RLR 10/85	PROJECT ENGINEER	ENGINEERING GEOLOGIST				

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 5
A. Marquez 35074
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 12-125
POST MILE 27.8

SCRUB CREEK BRIDGE (WIDEN)
LOG OF TEST BORINGS 1 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 03207
WO 283801

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 6 OF 7

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DATE 5-10-91 — SIGNATURE Donald Blackford — TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

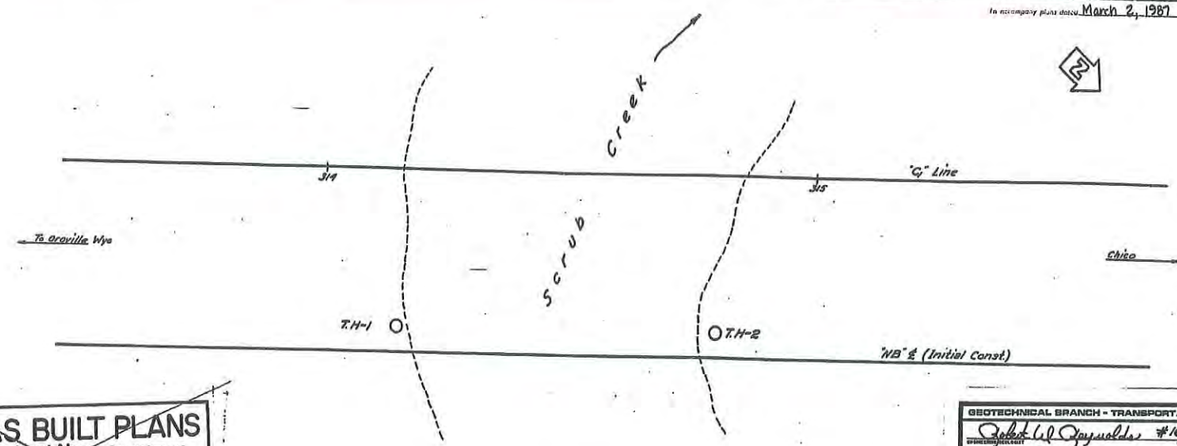
DIST.	COUNTY	ROUTE	POST MILES-TOTAL PROJECT	SHEET	TOTAL SHEETS
03	But	99	24.7/R30.4	155	164

2 | CAL | 155

To accompany plans dated March 2, 1987

III But 3 C 33 56

SEPTEMBER 1 1 1951

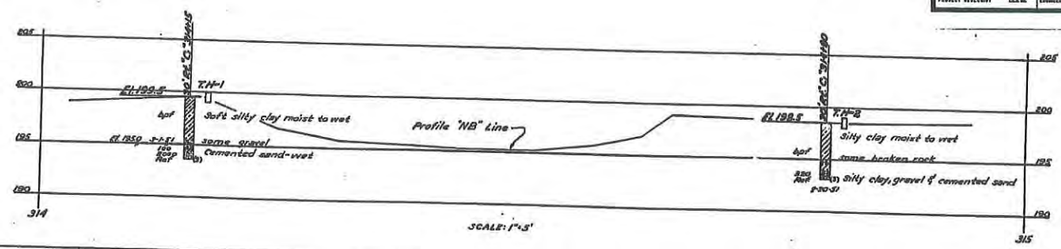


AS BUILT
WPS 4-91 CORRECTIONS BY G. PANTE
CONTRACT NO. 03-283804
DATE 1-15-91

AS BUILT PLANS
Contract No. 52-147E.W
Date Completed
Document No. 3000-305

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY
Robert W. Raymolds #165
SCRUB CREEK BRIDGE
LOG OF TEST BORINGS 2 of 2

Project Engineer	Approved Recommended By	CU: 03207 WO: 283801	BRIDGE No. 12-125



Classification of Material Based on Standard Grade Size Limits

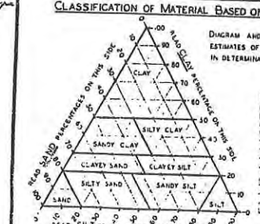


Diagram and table showing the basis for estimates of grade size distribution used in determination of class names.

Grouping Used in Triangular Classification			
Class Name	Percentage of Sizes Present		
	Sand	Silt	Clay
Sand	80-100	0-20	0-20
Silty Sand	43-80	0-55	0-20
Sandy Silt	0-45	55-80	0-20
Silt	0-20	80-100	0-20
Clayey Sand	38-80	0-42	20-32
Clayey Silt	0-38	52-80	20-30
Sandy Clay	50-70	0-40	30-50
Silty Clay	0-30	50-70	30-50
Clay	0-50	0-30	50-100

If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, i.e. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe gravel, sand and silt refer to standard grade size limits.

Legend of Boring Operations

- Plan of any boring
- 1" Sampler boring
- Rotary wash boring
- 1" Closed sampler driven
- Core boring
- 2½" Penetrometer driven
- 1⅜" Sampler boring
- 2" 105° Auger boring
- 6" to 20" Auger boring
- Casing driven
- Jet boring
- (S) Sample taken
- 1⅜" A-Rod driven

The appropriate boring symbols designating the method of operation are shown in the upper right-hand corner of the respective boring. Where tool changes were made during the boring operation symbols are shown at the point of change.

Legend of Earth Materials

- Gravel – G
- Sand – S
- Silt – Si
- Clay – C
- Silty Sand – S S
- Clayey Sand – C S
- Sandy Silt – S Si
- Clayey Silt – C Si
- Sandy Clay – SC
- Silty Clay – Si C
- Peat & Organic Clay – O
- Sandstone – SS
- Shale – Sh
- Broken Rock (Fragments) – Br
- Rock – R

Abbreviations

EL. 69.4	Elevation of ground at test hole
bpf	Blows per foot – (see note above)
P	Filled pipe
M	Moisture as % dry weight
EL. 64.3 4-12-49	Elevation of ground water and date

Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

MICROFILMED

Bridge Across Scrub Creek
LOG OF TEST BORINGS
Scale As shown
Bridge No. 12-125
Drawing No. 8-2639-53

Sheet	of
7	7

155

AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 5-10-91 | SIGNED Harold Blackfield | TITLE Supervisor of Microfilm Services

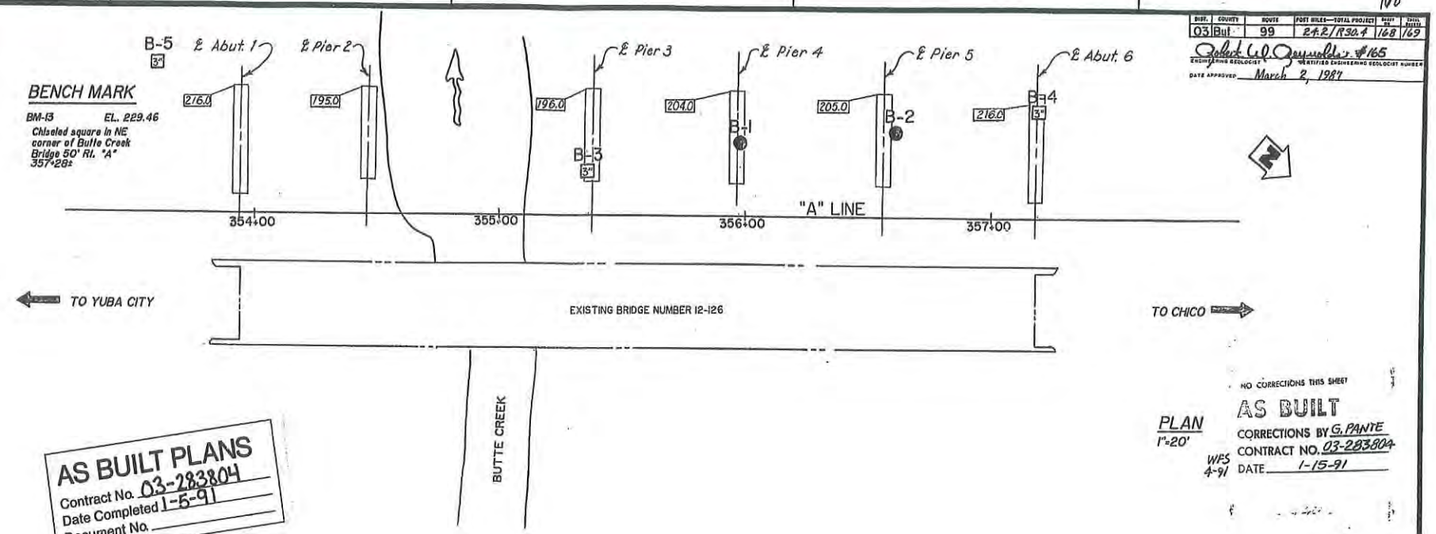
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

168

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	But	99	24.2/R30.4	168	169

ENGINEERING GEOLOGIST Robert W. Gaumnitz #165 CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED March 2, 1987



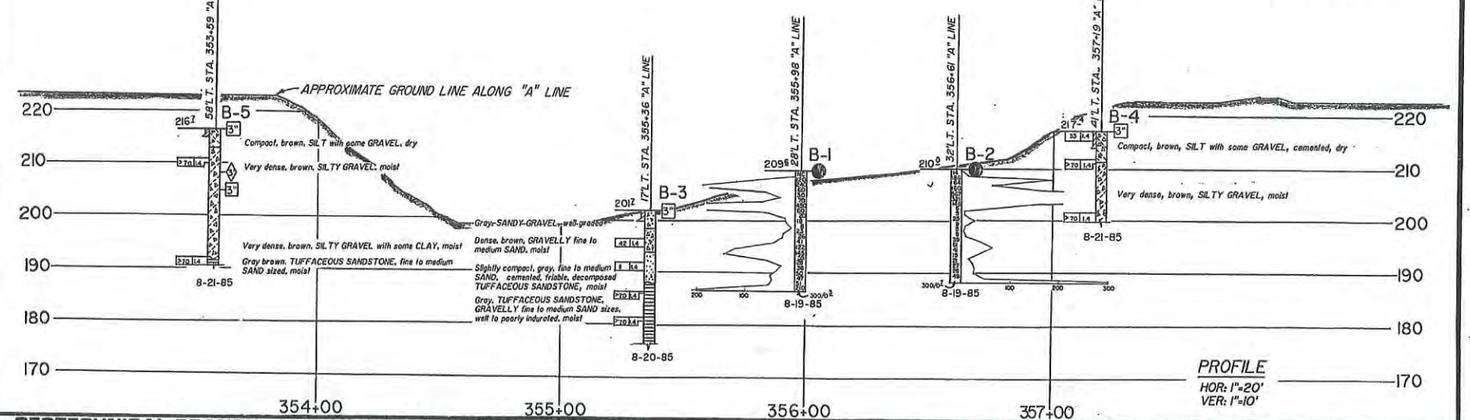
AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

PLAN
1"=20'

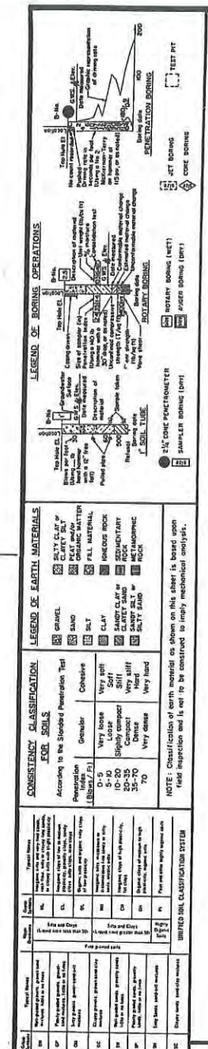
NO CORRECTIONS THIS SHEET
AS BUILT
CORRECTIONS BY G. PANTE
CONTRACT NO. 03-283804
WFS 4-91 DATE 1-15-91

NOTE:
NO GROUND WATER ENCOUNTERED DURING FIELD INVESTIGATION

Water level in Butte Creek 198.8 on 7/10/85



PROFILE
HOR: 1"=20'
VER: 1"=10'



168

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY					
DRAWN BY JKD 10/85	Ronald L. Rushton 39869 PROJECT ENGINEER C.E.A. NO.	Approved Recommended by R.C. Wilhelms 560 ENGINEERING GEOLOGIST C.E.G. NO.	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN.
CHECKED BY RLR 10/85					

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER R. Wagner 35074 REGISTERED CIVIL ENGINEER NO.

CU 03207
WO 283801

Disregard prints bearing earlier revision dates

BRIDGE NO. 12-126L
POST MILE 28.7

BUTTE CREEK BRIDGE
LOG OF TEST BORINGS I of 2

REVISION DATES (PRELIMINARY STAGE ONLY) 9/19/91

SHEET 13 OF 14 3

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 5-10-91 SIGNED Donald Blackfield TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

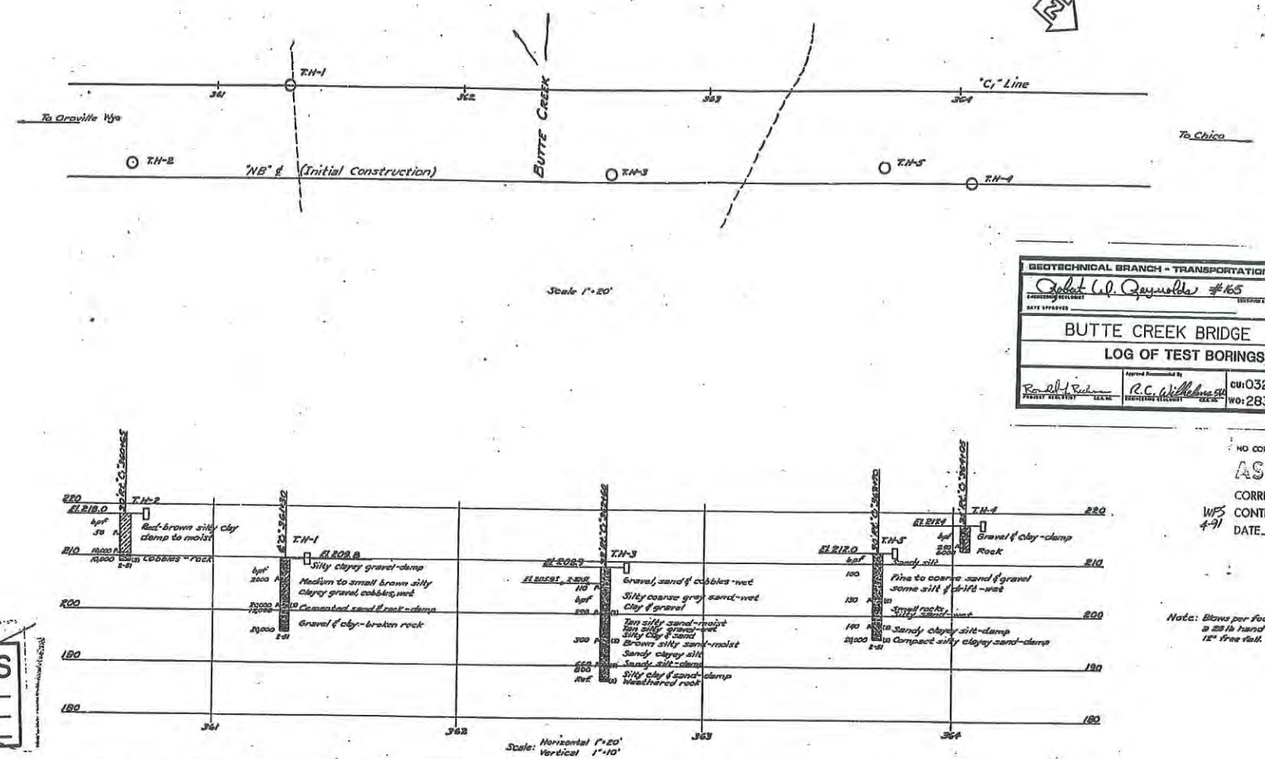
DIST.	COUNTY	ROUTE	POST MILE-TOTAL PROJECT	POST	TOTAL
03	But	99	24.2/R30.4	169	169

2 CAL. 169

To Accompany Plans Dated March 2, 1987

Br. But 3 C 54 56

SEPTEMBER 1 1 1951



BIOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

Robert W. Reynolds #165

BUTTE CREEK BRIDGE

LOG OF TEST BORINGS 2of2

R. C. Williams

CU: 03207
WO: 283801

BRIDGE No. 12-126L

NO CORRECTIONS THIS SHEET

AS BUILT

CORRECTIONS BY G. PANTE

WBS 4-91

CONTRACT NO. 03-283804

DATE 1-15-91

B.M. No. 363'C₁'

Railroad spike in 48" Oak
165' Lt. Station "C" 363+35
Elevation 216.33

Note: Blows per foot were made using a 29 lb hand hammer with a 12" free fall.

AS BUILT PLANS
Contract No. 52-147E.N
Date Completed
Document No. 3000 1305

Classification of Material Based on Standard Grade Size Limits

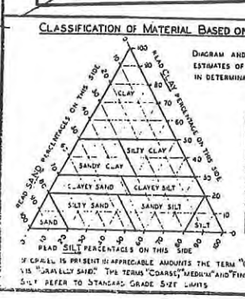


Diagram and table showing the basis for estimates of grade size distribution used in determination of class names.

Grouping Used in Triangular Classification			
Class Name	Percentage of Sizes Present		
	Sand	Silt	Clay
Sand	80-100	0-20	0-20
Silty Sand	45-80	0-55	0-20
Sandy Silt	0-45	55-80	0-20
Silt	0-20	80-100	0-20
Clayey Sand	55-80	0-45	20-35
Clayey Silt	0-35	55-80	20-35
Sandy Clay	55-70	0-45	35-50
Silty Clay	0-35	20-70	35-50
Clay	0-20	0-50	50-100

If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, i.e. "gravelly sand". The terms "coarse," "medium" and "fine" when used to describe gravel, sand and silt refer to Standard Grade Size Limits.

Legend of Boring Operations

- Plan of any boring
- 1" Sampler boring
- Rotary wash boring
- 1" Closed sampler driven
- Core boring
- 2½" Penetrometer driven
- 1⅜" Sampler boring
- 2" to 5" Auger boring
- 6" to 20" Auger boring
- Casing driven
- Jet boring
- (S) Sample taken
- 1⅜" A-Rod driven

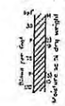
The appropriate boring symbols designating the method of operation are shown at the upper right-hand corner of the respective boring. Where tool changes were made during the boring operation symbols are shown at the point of change.

Legend of Earth Materials

- Gravel — G
- Sand — S
- Silt — Si
- Clay — C
- Silty Sand — Si S
- Clayey Sand — C S
- Sandy Silt — S Si
- Clayey Silt — C Si
- Sandy Clay — SC
- Silty Clay — Si C
- Peat and Organic Clay — O
- Sandstone — SS
- Shale — Sh
- Broken Rock (Fragments) — Br
- Rock — R

Abbreviations

El. 69.4	Elevation of ground at test hole
bpf	Blows per foot — (see note above)
P	Pulled pipe
M	Moisture as % dry weight
El. 64.1 6-12-49	Elevation of ground water and date



Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

MICROFILMED

BRIDGE ACROSS BUTTE CREEK

LOG OF TEST BORINGS

Scale As Shown

File No.

Bridge No. 12-126

Drawing No. B-2639-54

Sheet 14 of 14

169

AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

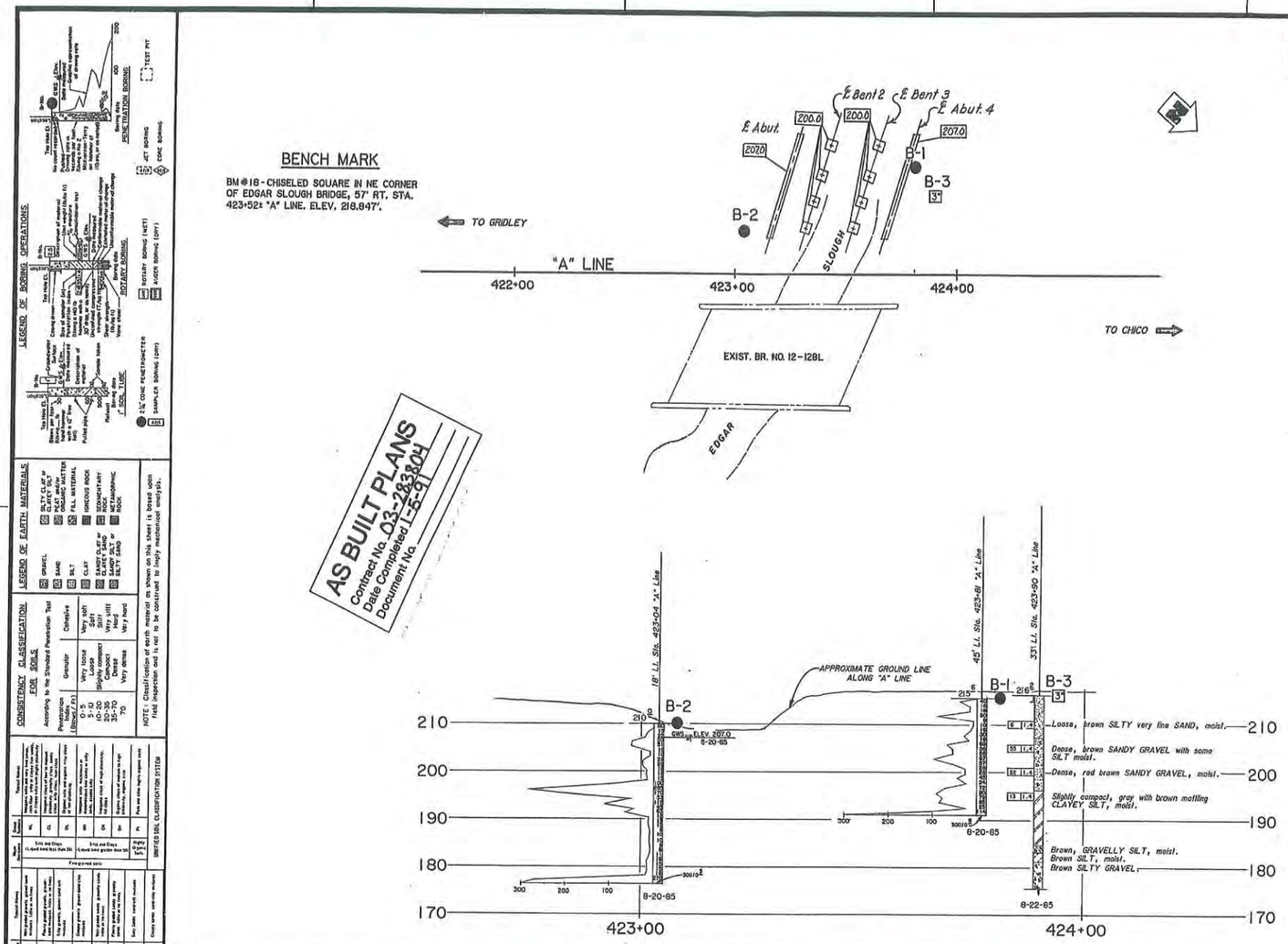
DATE 5-10-91 SIGNATURE Donald Bischofield TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

121

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	Bul	99	24.2/R30.4	121	169

Robert L. Reynolds #165
ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER
DATE APPROVED March 2, 1987



AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

NO CORRECTIONS THIS SHEET
AS BUILT
WFS CORRECTIONS BY G. PANTE
4-91 CONTRACT NO. 03-283804
DATE 1-15-91

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

121

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	Leony L. Lopez	10/85
CHECKED BY	RLR	10/85

Ronald L. Rickman 39869 — PROJECT ENGINEER — CEG NO.
R.C. Wilhelms 560 — ENGINEERING GEOLOGIST — CEG NO.

CHARGE UNIT | EXPEND. AUTHOR. | SPEC. DESIGN.

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
A. Mangus 35074
PROJECT ENGINEER — REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 12-128L
POST MILE 30.03

EDGAR SLOUGH BRIDGE
LOG OF TEST BORINGS 1 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 03
WO 283801

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY) 9/11/86

SHEET 11 OF 12

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

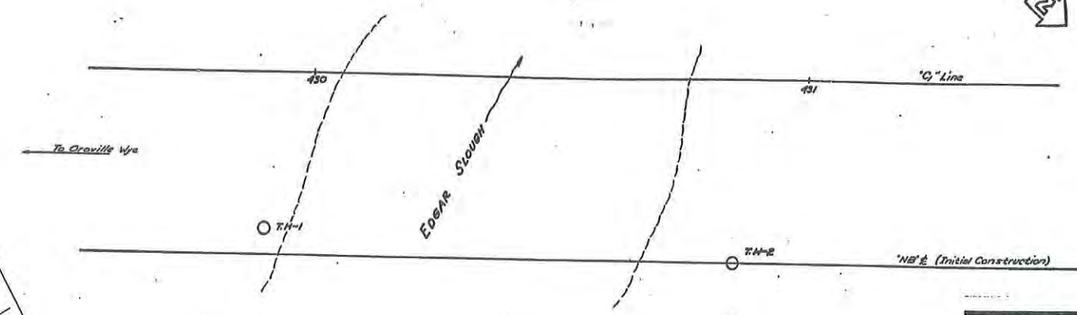
DATE 5-10-91 — SIGNATURE Donald Blackford — TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

To Accompany Plans Dated March 2, 1987

DIST.	COUNTY	ROUTE	POST MILE-TOTAL PROJECT			
03	But	99	24.2/R30.4	122	169	2

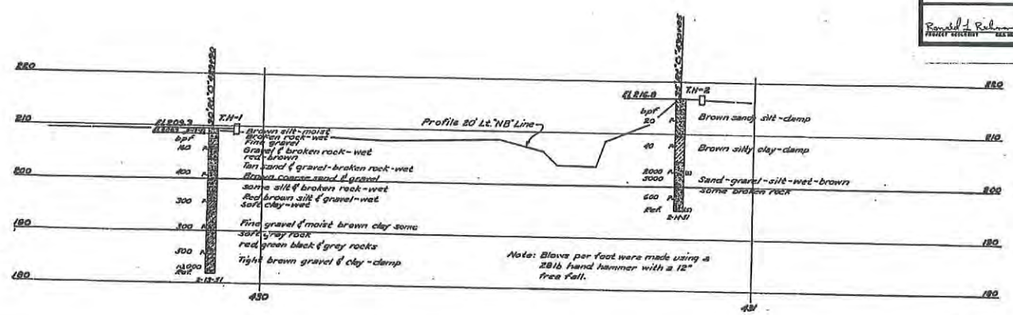
But 3 C 55 56
Jan publication
SEPTEMBER 1 1 1951



AS BUILT PLANS
Contract No. 03-283804
Date Completed 1-5-91
Document No.

AS BUILT PLANS
Contract No. 82-147E.14
Date Completed
Document No. 3000126E

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY
Robert W. Reynolds #165
EDGAR SLOUGH BRIDGE
LOG OF TEST BORINGS 2 of 2
Ronald L. Rolen — RC Wilhelmus 560 — 03 / 283801 — 12-128



BM
Railroad spike in 48" Oak
250' Rt. Station "Q" 130+18
Elevation 217.59

NO CORRECTIONS THIS SHEET
AS BUILT
WFS 4-91 CORRECTIONS BY G. PANTE
CONTRACT NO. 03-283804
DATE 1-15-91

Classification of Material Based on Standard Grade Size Limits

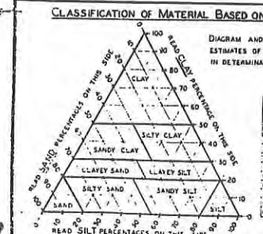


Diagram and table showing the basis for estimates of grade size distribution used in determination of class names.

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Class Name	Percentage of Sizes Present:		
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Sandy Silt	0-45	55-80	0-20
Silt	0-20	80-100	0-20
Clayey Sand	45-80	0-42	20-30
Clayey Silt	0-38	42-80	20-30
Sandy Clay	50-70	0-40	30-50
Silty Clay	0-30	40-70	30-50
Clay	0-30	0-50	30-100

If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe gravel, sand and silt refer to Standard Grade Size Limits.

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- Silty Sand-Si S
- Clayey Sand-C S
- Sandy Silt-S Si
- Clayey Silt-C Si
- Sandy Clay-SC
- Silty Clay-Si C
- Peat & % Organic Clay-O
- Sandstone-SS
- Shale-Sh
- Broken Rock (Fragments)-Br
- Rock-R

Abbreviations

El. 69.4	Elevation of ground at test hole
bpf	Blows per foot-(see note above)
P	Pulled pipe
M	Moisture as % dry weight
El. 64.3 4-9-49	Elevation of ground water and date

Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

MICROFILMED

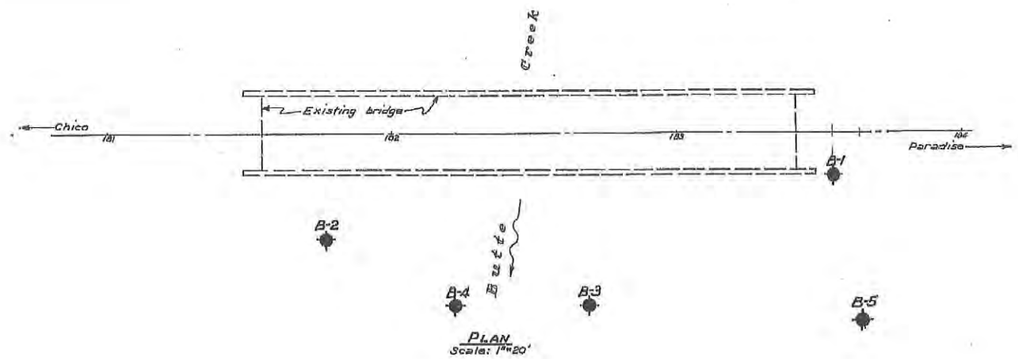
Bridge Across Edgar Slough-Upper Crossing
LOG OF TEST BORINGS
Scale 1" = 10'
Structure No. 12-128
Drawing No. 0-2639-55
Sheet 12 of 12

122

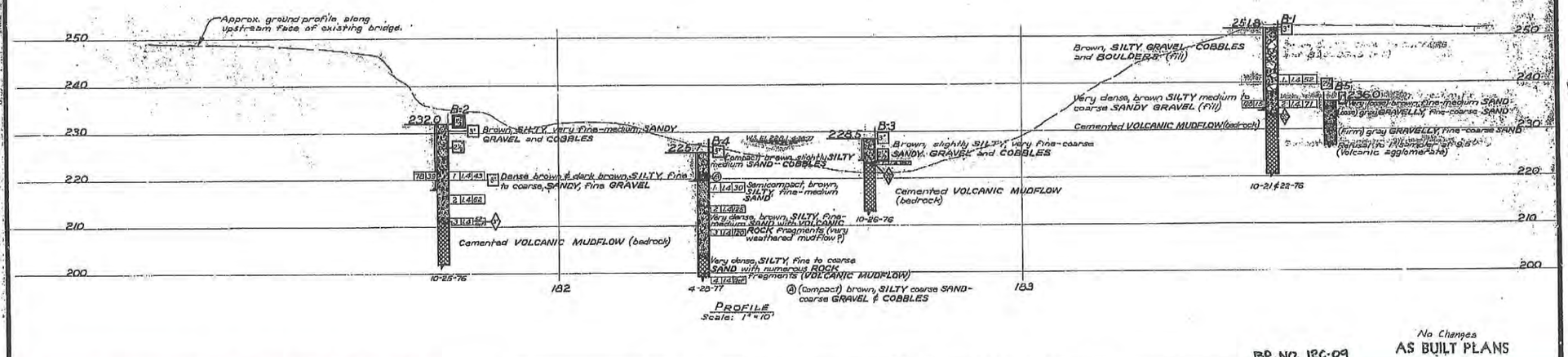
I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 5-10-91 — SUPERVISOR OF MICROFILM SERVICES

MICROFILM – STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION – MICROFILM

RETURN TO STRUCTURES PLAN FILE BRK 3450



PLAN
Scale: 1"=20'



PROFILE
Scale: 1"=10'

BR. NO. 12C-09

No Changes
AS BUILT PLANS

LEGEND OF EARTH MATERIALS

UNIFIED SOIL CLASSIFICATION

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit greater than 50			Silts and clays Liquid limit less than 50			Sands with fines >12% fines		Clean sands <5% fines		Gravels with fines >12% fines		Clean gravels <5% fines	
	Fine grained soils (More than 50 % is smaller than #200 sieve)						Sands - more than 50% of coarse fraction is smaller than #4 sieve.				Gravel - more than 50% of coarse fractions larger than #4 sieve.			
							Coarse grained soils (More than 50 % is larger than #200 sieve)							

LABORATORY CLASSIFICATION CRITERIA

GW and SW - $C_u = \frac{D_{60}}{D_{10}}$ greater than 4 for GW & 6 for SW, $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3.

GP and SP - Clean gravel or sand not meeting requirements for GW and SW.

GM and SM - Atterberg limits below "A" line or P.I. less than 4.

GC and SC - Atterberg limits above "A" line with P.I. greater than 7.

Fines (silt or clay)	Fine sand	Medium sand	Coarse sand	Fine gravel	Coarse gravel	Cobbles	Boulders
Sieve sizes	#200	#40	#10	#4	3/4"	3"	12"

Classification of earth materials shown on this sheet is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

MATERIAL SYMBOLS

Gravel
Sand
Silt
Clay
Sandy clay or clayey sand
Sandy silt or silty sand
Silty clay or clayey silt
Peat or organic matter
Fill material
Shale
Sandstone
Limestone
Metamorphic rock
Igneous rock

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

No. of blows	Granular	Cohesive
0-5	Very loose	Very soft
6-10	Loose	Soft
11-20	Semicompact	Stiff
21-35	Compact	Very stiff
36-70	Dense	Hard
>70	Very dense	Very hard

LEGEND OF BORING OPERATIONS

Plan of any boring
Rotary boring
Diamond core boring
Auger boring
Sample boring
Jet boring
Test pit
2 1/4" Cone penetrometer
2 1/2" Cone penetrometer

ROTARY BORING

Location
B-No.
Top hole elev.
Moisture (% dry wt.)
Dry density (lbs/cu.ft.)
Unconfined compressive strength (tons/sq.ft.)
Designates other soils tests
C - Consolidation
S - Direct shear
E - Expansion
T - Triaxial compression
Casing
Soil
Elevation Data
Sample number
Size of sample (inches)
Blows per foot (Using a 140 lb. hammer with a 30" drop)
Conformable material change
Approximate material change
Unconformable material change
Date of boring

PENETRATION TEST

Location
B-No.
Top hole elev.
Pushed
Blows per foot (Using 140 lb. hammer with 30" drop)
Graphic representation of driving rate.
Date
Blows per foot

MOORE & TABER NORTHERN CALIFORNIA
CONSULTING ENGINEERS AND GEOLOGISTS

APPROVED C. J. Vary Abstract
REGISTERED CIVIL ENGINEER No. 17296

JOB No. 376/33-5.2

BUTTE COUNTY
CHICO SKYWAY BRIDGE
ACROSS
BUTTE CREEK

LOG OF TEST BORINGS

Scale: As shown	Date: December 1976	By: J.O.D. Check by: F.R.T.	PROJECT NUMBER 51261-76-2

SHEET 10 OF 10

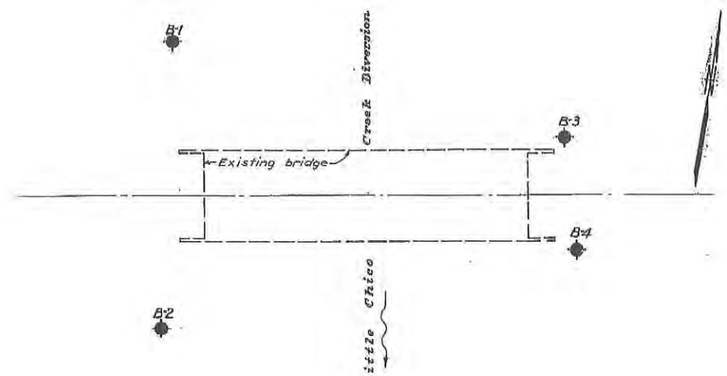
FILE NO. E-1382

AS BUILT PLANS
Contract No. Unknown
Date Completed
Document No. 3000 5844

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

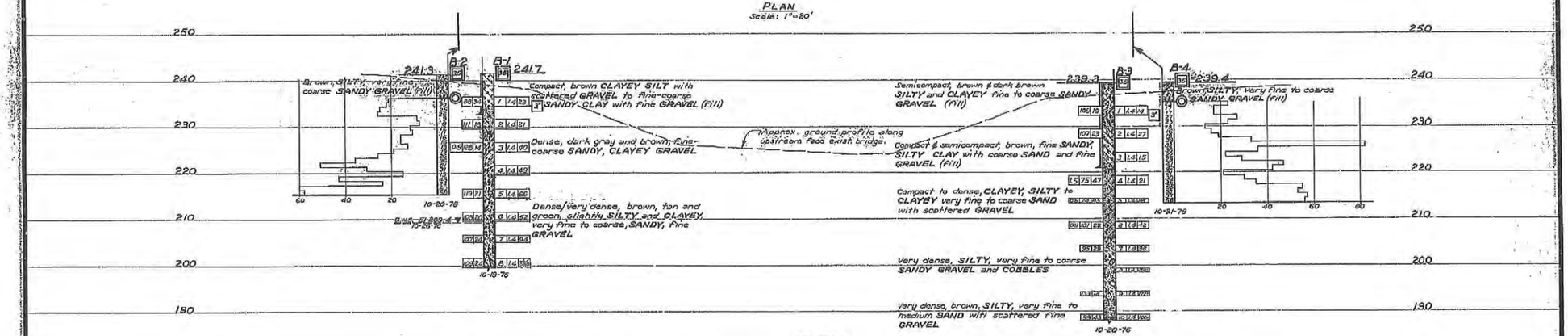
DATE 3-3-80 SIGNATURE Joseph M. Cota TITLE SUPERVISOR OF HIGHFILL SERVICES

DAR-58-70



PLAN
Scale: 1"=20'

BM #6
Chiseled "x" on SW corner bridge abut.
Elev. 239.93 USC&GS datum



PROFILE
Scale: 1"=10'

BR. NO. 12C-216
AS BUILT PLANS

LEGEND OF EARTH MATERIALS

UNIFIED SOIL CLASSIFICATION

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit greater than 50			Silts and clays Liquid limit less than 50			Sands with fines (>12% fines)		Clean sands (<5% fines)		Gravels with fines (>12% fines)		Clean gravels (<5% fines)	

Fine grained soils (More than 50% is smaller than Nº 200 sieve)

Coarse grained soils (More than 50% is larger than Nº 200 sieve)

LABORATORY CLASSIFICATION CRITERIA

GW and SW - $C_u = \frac{D_{60}}{D_{10}}$ greater than 4 for GW & for SW, $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3.

GP and SP - Clean gravel or sand not meeting requirements for GW and SW.

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GC and SC - Atterberg limits above "A" line with P.I. greater than 7.

Fines (silt or clay)	Fine sand	Medium sand	Coarse sand	Fine gravel	Coarse gravel	Cobbles	Boulders
Sieve sizes	#40	#10	#4	3/8"	3"	12"	

Classification of earth materials shown on this sheet is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

MATERIAL SYMBOLS

Gravel, Sand, Silt, Clay, Sandy clay or clayey sand, Sandy silt or silty sand, Silty clay or clayey silt, Peat or organic matter, Fill material, Shale, Sandstone, Limestone, Metamorphic rock, Igneous rock

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

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11-20	Semicompact	Stiff
21-35	Compact	Very stiff
36-70	Dense	Hard
>70	Very dense	Very hard

LEGEND OF BORING OPERATIONS

Plan of any boring
Rotary boring
Diamond core boring
Auger boring
Sample boring
Jet boring
Test pit
2 1/4" Cone penetrometer
2 1/2" Cone penetrometer

ROTARY BORING

Moisture (% dry wt.)
Dry density (lbs./cu.ft.)
Unconfined compressive strength (tons/sqft.)
Designates other soils tests
C - Consolidation
S - Direct shear
E - Expansion
T - Triaxial compression

Location B-No.
Top hole elev.
Casing Set
Sample number
Size of sample (inches)
Blows per foot (Using a 140 lb. hammer with a 30" drop)
Conformable material change
Approximate material change
Unconformable material change
Elevation Date
Date of boring

PENETRATION TEST

Location B-No.
Top hole elev.
Pushed
Blows per foot (Using 140 lb. hammer with 30" drop)
Graphic representation of driving rate.
Date
Blows per foot

MOORE & TABER NORTHERN CALIFORNIA CONSULTING ENGINEERS AND GEOLOGISTS

APPROVED H. R. Taber 12-6-76 REGISTERED CIVIL ENGINEER No. 9166 JOB No. 3716/23-G.F.

BUTTE COUNTY
CHICO SKYWAY BRIDGE
ACROSS
LITTLE CHICO CREEK DIVERSION
LOG OF TEST BORINGS

Scale: As shown | Date: October, 1976 | By: J.O.D. Check by: R.A.T. | PROJECT NO. 5126-76-3

FILE NO. E-1863

SHEET 6 OF 6

AS BUILT PLANS
Contract No. Unknown
Date Completed
Document No. 3000 5841

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 3-31-80 SIGNATURE Joseph M. Cota TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

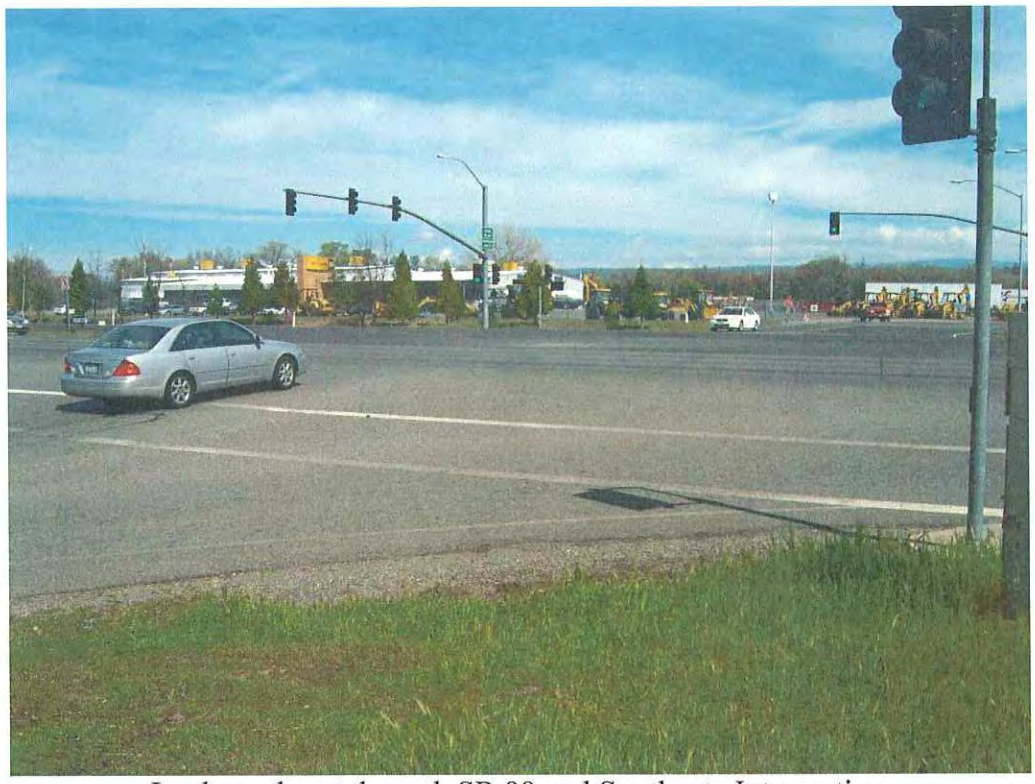
APPENDIX

B

Site Photos

Look NW from Southgate Ln. Toward Interchange.

Look W through Southgate Intersection @ SR 99.

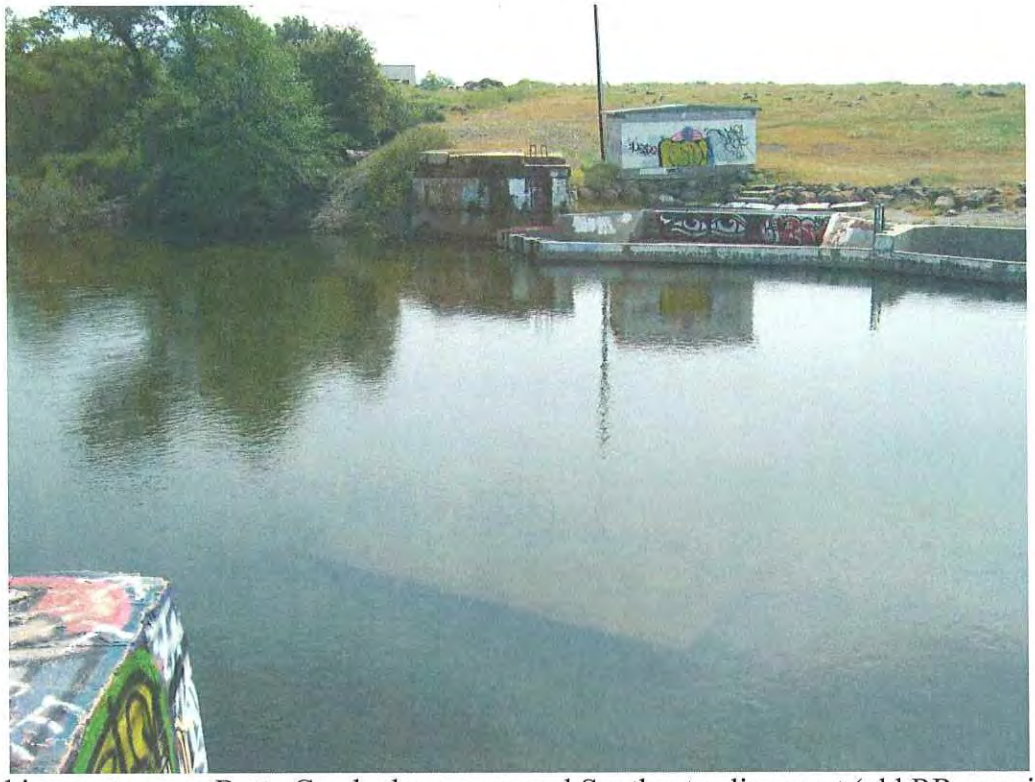


Look northeast through SR 99 and Southgate Intersection.

Look north at SR 99 from Southgate Ave.

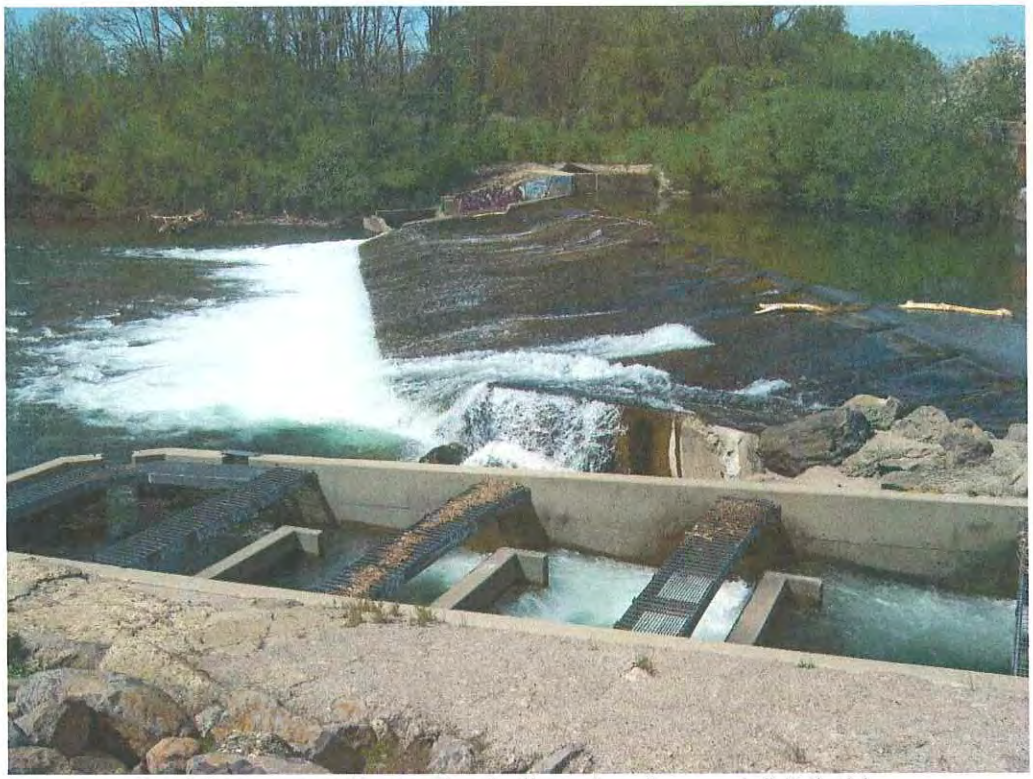
Looking east toward SR 99 at Butte Creek.

Looking northeast (upstream) at SR 99 and Butte Creek.

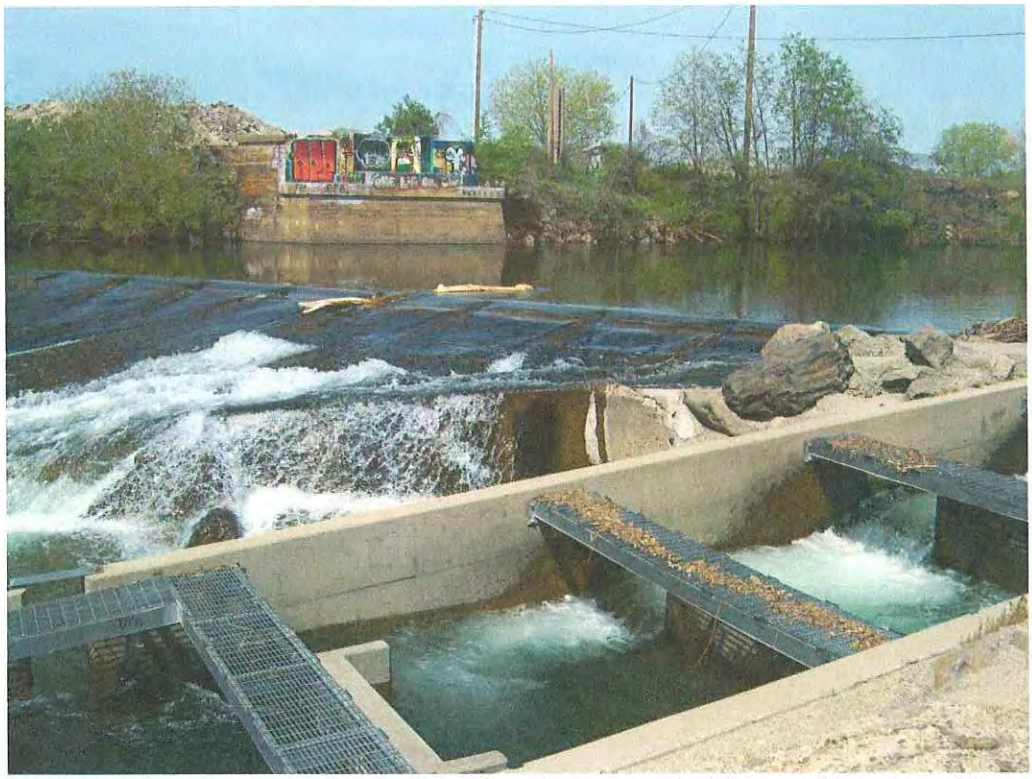


Looking east across Butte Creek along proposed Southgate alignment (old RR crossing).

Looking west across Butte Creek (old RR crossing).



Looking west at Butte Creek diversion dam and fish ladder.



Looking northwest across Butte Creek diversion dam toward old west abutment of RR crossing.

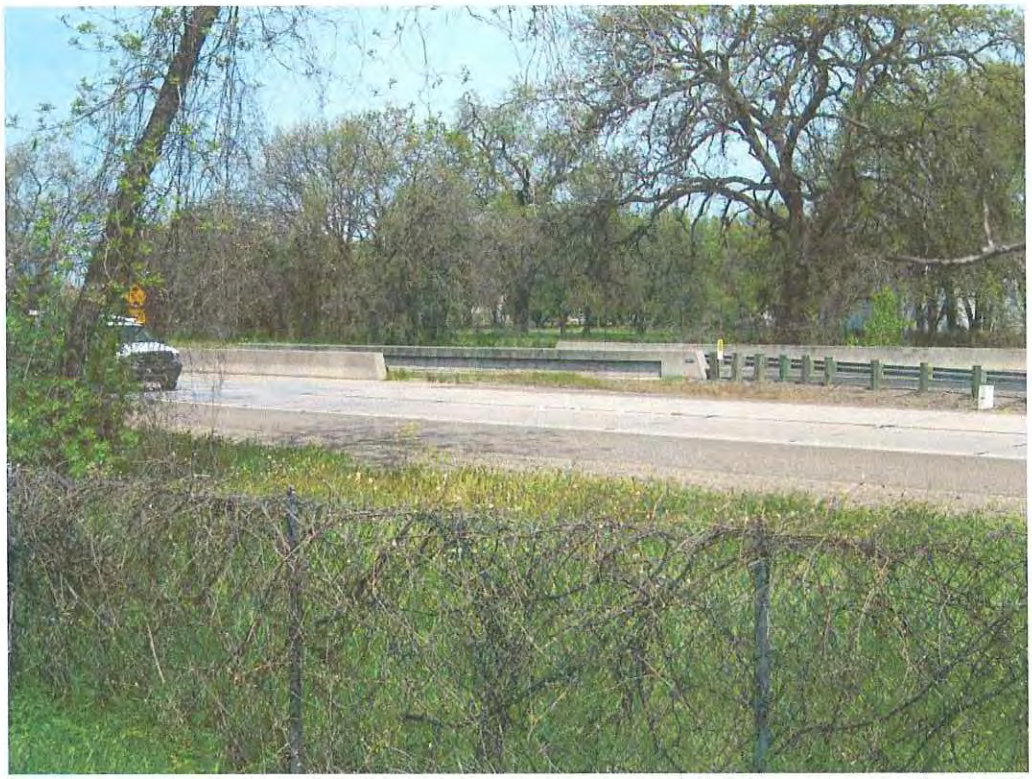
Looking east from Butte Creek toward Skyway, along proposed Southgate alignment.

Looking west from L. Chico diversion along proposed Southgate Ave. alignment.

Looking east across L. Chico diversion (old RR grade).

Looking west across L. Chico diversion.

Looking north toward Entler Ave. extension at Comanche Creek.



Looking northeast from Entler Ave. extension toward SR 99 at Comanche Creek.

Looking southeast from Comanche Creek tributary along Entler Ave. extension.

Looking northeast (upstream) toward SR 99 crossing at Comanche Creek tributary.

J. Public Workshop Comments

CITY OF CHICO
INC. 1872

Comment Card

(Please note that this document will be part of the public record.)

Date: November 5, 2008
Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): Beverly Chambers

Mailing Address: 576 Esther Ave Chico, 95928

Phone Number: 891-1066

Resident, Business, Organization, etc.: Resident

Comments: widening Esther to 4 lanes is the dumbest thing I've ever heard.
Widening the road along the Compton ditch by the Little League Field makes much more sense.
There is No room along Esther to widen it to 4 lanes.

Please submit comments by Friday, November 21, 2008

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Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): Barbara Vlamis

Mailing Address: 116. W. Second St. #3 95928

Phone Number: 891-6424

Resident, Business, Organization, etc.: BEC

Comments: The presentation of this project is premature. Approvals should not be sought in 2009 How the Chico, Paradise, & Butte County general plans implement SB32 takes priority.

Please submit comments by Friday, November 21, 2008

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Date: November 5, 2008
Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): Becky Milani

Mailing Address: 14 Baja Ct 95928

Phone Number: 898-8008

Resident, Business, Organization, etc.: Resident

Comments:

1) NO on expanded road at Entler

2) noise & light control

3) factor in Big Picture - development, utility, etc.

Please submit comments by Friday, November 21, 2008

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Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): Dick Cory

Mailing Address: 1265 Oak Way, Chico 95926

Phone Number: (530) 342-4959

Resident, Business, Organization, etc.: Little Chico Creek Educators Consortium

Comments: This project interests me immensely. I think the exchange along Southgate will definitely improve the Skyway traffic from and to Paradise. The plan does not go far enough by addressing the traffic from Hamilton City on Highway 32. I would like to see traffic diverted from both Arnold Road south on Meridian Road and Highway 32 to connect on Southgate.
As I understand it, the greenway protects land from commercial development, not roads. The greenline would protect the road from commercial development

Please submit comments by Friday, November 21, 2008

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INC. 1872

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Date: November 5, 2008
Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): STEVE MYERS

Mailing Address: 19 SEGA DRIVE, CHICO, CA. 95928

Phone Number: (530) 894-2789

Resident, Business, Organization, etc.: RESIDENT - RETIRED LAW ENFORCEMENT

Comments:

(1) WITH THIS EXPANSION - ON SOUTHGATE AVENUE AND ON SR 99 THERE IS A NEED FOR SOUND BARRIER WALLS -

(2) I'M OPPOSED OF CLOSING OFF ENTER AVE FROM SR 99 - FROM THE NEW DESIGN PROJECT.

(3) I'M OPPOSED OF WIDENING ENTER AVE TO FOUR LANES OF TRAFFIC. CURRENTLY, THERE IS NOT ENOUGH ROOM FOR NEW ROADS DUE TO RESIDENCES ARE ESTABLISHED

(4) THE INCONVENIANCE OF GETTING THROUGH ROAD CONSTRUCTION TO RESIDENCES FROM SR 99 -

Please submit comments by Friday, November 21, 2008

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(5). OPPOSED TO NEW DEVELOPMENT OFF OF SOUTHGATE PAST THE BASEBALL FIELD

(6) THE IMPACT ON MY WELL FROM THE DEVELOPMENT - WATER TABLE -

7) opposed to Increased property taxes.

City of Chico
Capital Project Services Department
Attn: Jeff Jukkola
411 Main Street
P.O. Box 3420
Chico, CA 95927

Place
Postage
Here

City of Chico
Capital Project Services Department
Attn: Jeff Jukkola
411 Main Street
P.O. Box 3420
Chico, CA 95927

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Comment Card

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Date: November 5, 2008
Location: City of Chico Council Chambers Building
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #1

Name (Please Print): Kathryn Clements Coots

Mailing Address: 505 Rhapis Dr Chico CA 95928

Phone Number: (530) 898-1799

Resident, Business, Organization, etc.: resident

Comments: I am not convinced that our area will experience a significant increase in traffic over the next decade or two to warrant an interchange at Hwy 99 and Southgate.

Given that there truly is a need for this giant expense, I do not support a widening of Entler to a 4-lane primary connection between Hwy 99 & the Midway. Such a project would cause a significant impact to the neighborhood & require removal of numerous trees along Entler & the Midway.

Please submit comments by Friday, November 21, 2008

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K Clements Coots 11-16-08

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Comment Card

(Please note that this document will be part of the public record.)

Date: April 2, 2009
Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): Vivienne Rystrom

Mailing Address: 5 Pistachio Dr Chico 95928

Phone Number: 345-4700

Resident, Business, Organization, etc.:

Comments: I was at the meeting Thurs night. my main comment is that Entler Ave is a family neighborhood with young families with small children, old couples, people walking their dogs + riding bikes at all times of the day. Using Entler as a main thru from 99 to midway would destroy our neighborhood.

Thanks
VRystrom

Please submit comments by Friday, April 17, 2009

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Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): Becky Milani

Mailing Address: 14 Baja Ct. Chico 95928

Phone Number:

Resident, Business, Organization, etc.: Resident

Comments: The best solution at this stage - seems to be to correctly fix Skyway & Park and run it through the intersection of Park/Midway to the Hagan business park and as feeder for future Diamond Match.

Residents off Entler prefer to remain County.

Meetings need to address future development considerations & infrastructure the disconnect at these mtgs is a frustration for meeting participants.

Please submit comments by Friday, April 17, 2009

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Date: April 2, 2009
Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): Michael Murphy

Mailing Address: 1 Gold creek way

Phone Number: 893-8843

Resident, Business, Organization, etc.: Resident

Comments: I have lived in chico since 1973.
I would rather see the city spend money on road improvements in the city limits I can name several.
As a county resident I would rather the county spend its money in the much needed dump of oroville. That part of the county looks like it has no control and no improvements at all.
I am against any changes to my neighborhood.

Please submit comments by Friday, April 17, 2009

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Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): Stella Held

Mailing Address: 345 Entler Ave Chico

Phone Number: 345-5386

Resident, Business, Organization, etc.:

Comments: ALL options re: Road Access Should be present @ once so one can make a good decision.
The way info was presented it seems like City wants this option so ADD'L Development will be allowed eventually City will take over entire area* City needs to stay in their current city limits + leave County alone. If issue is w/ Paradise traffic then the Skyway needs to be re-designed
*This has to do w/ money + allowing the New Development for which the City & Developer will profit from!

Please submit comments by Friday, April 17, 2009

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CITY OF CHICO
INC. 1872

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Date: April 2, 2009
Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): Karen Murphy

Mailing Address: 1 Gold Creek WAY

Phone Number: 893-8843

Resident, Business, Organization, etc.: Resident

Comments: Since you are going to shove this on us like it or not I would like Exhibit A to start with. That would give us time to move out of this town & state. There are much better things that the city could improve on. As far as the county they need to fix roads in Oroville & get rid of the trash. If the city and county had better eye appeal we might attract jobs that pay better than min. wage.

Please submit comments by Friday, April 17, 2009

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Jeff Jukkola - Southgate & Skyway change comments

From: "Ric Morrison" <ric@sunsetmoulding.com>
To: "Jeff Jukkola" <JJukkola@ci.chico.ca.us>
Date: 4/3/2009 11:26 AM
Subject: Southgate & Skyway change comments
CC: <jolene@chicochamber.com>, "Bob Greenlaw" <bgreenla@ci.chico.ca.us>, "Tom Varga" <tzvarga@ci.chico.ca.us>, "Matt Brogan" <mbrogan@markthomas.com>, "John Morrison" <john@sunsetmoulding.com>, "Tom Maclean" <tom@sunsetmoulding.com>

Jeff:

I felt the meeting last night was very well presented. I definitely look forward to being a part of your task force committee on this issue. Please let me know the dates/times of the meetings well in advance as my calendar fills up quickly.

I am choosing to provide my comments via e-mail as opposed to using the comment cards due to my poor handwriting (I want you to be able to read my comments).

Comments relative to the Southgate/Skyway proposed changes:

1. Sunset cannot afford to have the Skyway interchange take any of our land. We are also extremely concerned about being boxed in by Butte Creek, Southgate and Skyway. The extension of Southgate is something that we have never heard of before and I will address that in point 2. We request that you follow Skyway's current path to connect into Southgate rather than running across our land. That land is the site of our new solar field and I know that the city, county and state are just as concerned about environmental issues as Sunset is and therefore feel you will understand the necessity of leaving that solar field intact.

2. Sunset has just closed the Cottonwood, CA Division and moved all of that production to our Chico Division at great expense. This will definitely increase our payroll at the Chico Division and provide more jobs in the greater Chico area. We are currently negotiating with the railroad to purchase the right-of-way so that we can build another storage building on that land to support the product line we have just moved there. I know that Chico wants to work with us to keep employment at our facility. Therefore, we request that you realign the Southgate connection to Skyway south of the railroad right-of-way to allow us to continue with our plans to construct an extremely necessary building on that land.

Thank you again for working with us to keep our company intact and to allow us to remain as a strong employer in the Chico area.

Ric Morrison
Production Coach
Sunset Moulding Company
P.O. Box 326
Yuba City, CA 95992
-
2200 Paseo Avenue
Live Oak, CA 95953
Direct 530-790-2742
Fax: 530-695-1041
ric@sunsetmoulding.com

Southgate Stakeholders

Southgate Special Planning Area

December 4, 2008

Mr. Matt Brogan, PE
Senior Project Manager
Southgate Interchange TAC
7300 Folsom Blvd., Suite 203
Sacramento, CA 95826

Dear Mr. Brogan:

I am writing on behalf of the owners of land represented by the Southgate Stakeholders located within the Southgate Special Planning Area. As you may be aware, the City recently declined to alter the greenline in any location including our property. We believe that this decision was both short sighted and may have been made without complete information.

It is my understanding, through attending the Southgate interchange meetings, that new roads are needed to improve connectivity from the Midway to State Highway Route 99. Without improved connectivity, both East Park Avenue and the Skyway will fail to meet the needs for projected traffic in the next ten years - unless lanes are added. In ten years, additional lanes may be infeasible and would certainly be a major expense. Unless the City plans to route this traffic through Entler and/or the Speedway (currently neighborhood streets), the logical connection is through our properties. We recognize that the need for a road connecting Southgate and the Midway is perhaps a decade into the future. While I have no desire to run a road through an economically viable orchard, this particular orchard has approximately 10 productive years left in its useful life. In addition, it is my understanding that the general plan staff report to the City Council does NOT include enough land to handle the 2030 projected population growth. The combination of a new connector road, elimination of the heavy traffic demands on Entler and Speedway plus the additional land for the city of Chico represent a win-win-win for everyone.

We hope that the Southgate Interchange traffic study would be provided to the City Council prior to their final deliberations on the 2030 General Plan. Your traffic study demonstrates both the need and logic to <a> utilize our properties for the new connector road and <b> the need to move the greenline to follow the Midway and Marybill Ranch Road boundary. Until the greeline is moved and our properties are annexed to the city of Chico, we are unwilling to accommodate the necessary roadways. Thank you for addressing our concerns and suggestions for a practical solution to Chico's transportation and traffic issues.

Respectfully yours,

George Nicolaus

George Nicolaus
cc Steve Lambert

66 Marybill Ranch Road
Chico, California 95928-9563
Phone 530-894-6171 Fax 530-345-9585

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Comment Card

(Please note that this document will be part of the public record.)

Date: April 2, 2009
Location: City of Chico Council Conference Room No. 1
421 Main Street, Chico, CA
Project: State Route 99/Southgate Avenue Interchange and Corridor Study
Meeting: Public Information Workshop #2

Name (Please Print): STEVE MUDERS

Mailing Address: 19 SEGA DRIVE, CHICO, CA 95928

Phone Number: (530) 894-2789

Resident, Business, Organization, etc.: RESIDENT/HOMEOWNER

I am adamantly opposed to the future connection and expansion of Morrow Lane, Comanche Creek Culvert, Fair Street Extension Phase, Comanche Creek Bridge, and Speedway Avenue to Entler Avenue. This huge expansion phase would funnel traffic past our neighborhood which is located only two blocks away from this new freeway development...commercial vehicles, as well as commute traffic diverted from Park Avenue and the above listed roads, streets, and bridges. This traffic would funnel through Entler Avenue to Norfield and Loren Avenues where the streets are narrow and not designed for such heavy traffic. This increased traffic would greatly affect our neighborhood through noise and fuel pollution, additional traffic, lost in property value of our homes, as well as wear on our county roads. I strongly suggest that both the east and westbound lanes Park Avenue be widened and an additional freeway overcrossing be built over SR 99 linking traffic to Skyway. As a Butte County resident and tax payer, I am opposed any future development on Entler Avenue which would increase any traffic or noise pollution in our neighborhood. I feel that the City Chico, Caltrans, Butte County, and the Planning Commission are not interested in revisiting any alternate routes and only want a quick resolution in this matter. They are not concerned about the property owners who live in this neighborhood who have to live with this mess....put the traffic around your own home and not ours!

Please submit comments by Friday, April 17, 2009

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S. Muders
4/10/2009

K. TMP Data Sheet

TRAFFIC MANAGEMENT PLAN CHECKLIST

District / EA: 03 / 4E670
Date Prepared: 8/19/2011
Prepared By: Jake Weir
Stage of Project: PSR

Co.-Rte-KP: BUT-99- R28.8/29.9

Description: SR 99 / Southgate Avenue Interchange

	COMPLETED	REQUIRED	RECOMMENDED	NOT APPLICABLE	COMMENTS
1.0 Public Information					
1.1 Brochures and Mailers			X		
1.2 Media Releases (& minority media sources)		X			
1.3 Paid Advertising				X	
1.4 Public Information Center		X			
1.5 Public Meetings/Speakers Bureau		X			
1.6 Project Telephone Hotline				X	
1.7 Local cable TV and News				X	
1.8 Traveler Information Systems (CHIN/Internet)				X	
1.9 Project Web Page			X		
2.0 Motorist Information Strategies					
2.1 Changeable Message Signs		X	~~X~~	~~X~~	
2.2 Trailer CMS's		X			
2.3 Ground Mounted Signs		X			
2.4 Commercial Traffic Signs				X	
2.5 Highway Advisory Radio (fixed and mobile)				X	
2.6 Planned Lane Closure Web Site				X	
2.7 Radar Speed Message Sign				X	
3.0 Incident Management					
3.1 Call Boxes				X	
3.2 COZEEP or MAZEEP		X			COZEEP During Construction
3.3 Freeway Service Patrol				X	
3.4 Traffic Surveillance Stations (loops or CCTV)				X	
3.5 911 Cellular Calls				X	
3.6 Transportation Management Center		X			
3.7 Traffic Control Inspector		X			
3.8 CHP Officer in TMC during construction		X			
3.9 Traffic Management Teams		X			
3.10 On-site Traffic Advisor (contractor)		X			
3.11 CHP Helicopter				X	
4.0 Construction Strategies					
4.1 Incentive/Disincentive Clauses			X		
4.2 Delay damage clause		X			
4.3 Off peak/Night work		X			
4.4 Weekend Work		X			
4.5 Planned Lane/Ramp Closures		X			
4.6 Project Phasing			X		Undercrossing Construction
4.7 Temporary Traffic Screens			X		
4.8 Total Facility Closure				X	

	COMPLETED	REQUIRED	RECOMMENDED	NOT APPLICABLE	COMMENTS
4.9 Truck Traffic Restrictions				X	
4.10 Variable Lanes				X	
4.11 Extended Weekend Closures				X	
4.12 Reduced Speed Zones		X			
4.13 Coordination with adjacent construction		X			
4.14 Traffic Control Improvements		X			
4.15 Contingency Plans		X			
4.15.1 Material Plant on standby				X	
4.15.2 Extra Critical Equipment on site				X	
4.15.3 Material Testing Plan				X	
4.15.4 Alternate Material on site				X	
(In case of failure or major delays)				X	
4.15.5 Emergency Detour Plan		X			
4.15.6 Emergency Notification Plan		X			
4.15.7 Weather Conditions Plan		X			
4.15.8 Emergency Funding Plan				X	
4.15.9 Delay Timing and Documentation Plan				X	
4.15.10 Late Closure Reopening Notification		X			
4.16 Ramp metering				X	
4.17 HOV Lanes/ramps				X	
4.18 Signal timing modification				X	
5.0 Demand Management					
5.1 HOV Lanes/Ramps				X	
5.2 Park-and-Ride Lots				X	
5.3 Parking Management/Pricing				X	
5.4 Rideshare Incentives				X	
5.5 Rideshare Marketing				X	
5.6 Transit, Train, or Light-Rail Incentives				X	
5.7 Transit Service Improvements				X	
5.8 Variable Work Hours				X	
5.9 Telecommute				X	
6.0 Alternate Route Strategies					
6.1 Ramp Closures				X	
6.2 Street Improvements				X	
6.3 Reversible Lanes				X	
6.4 Temporary Lanes or Shoulders Use				X	
6.5 Freeway to freeway connector closures				X	
7.0 Other Strategies					
7.1 Application of new technology				X	
7.2 Improved specifications				X	
7.3 Staff Training/Development				X	
7.4 Upgraded Equipment				X	

Approved by (Concurrance Only):

Sergio Aceves, Chief of Traffic Management Branch