9.5 FINAL APPENDICES

APPENDIX F1.0

F1.0

Public Outreach Materials

PLAZA LINDA VERDE

SAN DIEGO STATE UNIVERSITY

Invites you to attend an

OPEN HOUSE

to learn more about the
Plaza Linda Verde project
and provide your comments on the
Draft Environmental Impact Report.

Wednesday, November 3, 2010

5:00 - 7:30 pm

Parma Payne Goodall Alumni Center
1897 Aztec Walk

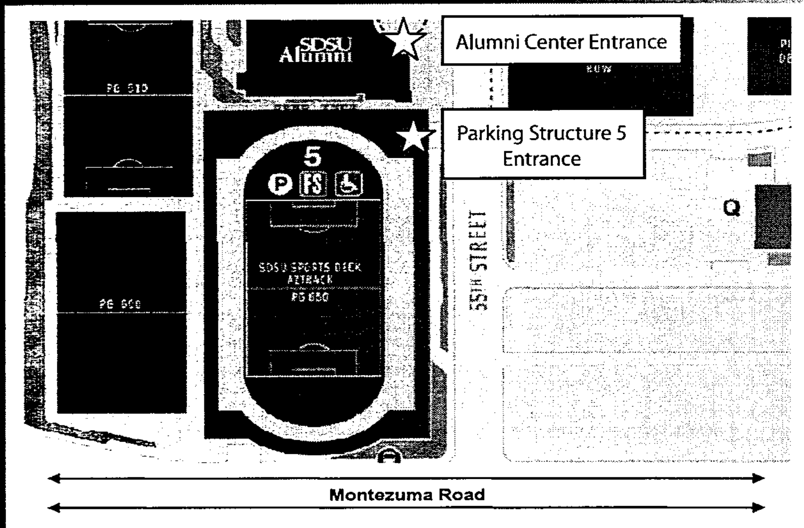
Complimentary parking is available
in Parking Structure 5.

For more information, please contact Tyler Sherer
at (619) 594-2522 or tsherer@mail.sdsu.edu.

www.sdsu.edu/plazalindaverde
www.facebook.com/PlazaLindaVerde

OPEN HOUSE

PLAZA LINDA VERDE OPEN HOUSE



Directions from I-8:

Take the College Avenue South exit. Turn right on Montezuma Road. Turn right on 55th Street. Turn left into Parking Structure 5.
You may park in any space except those marked "SP or Faculty/Staff."

PLEASE JOIN US

SAN DIEGO STATE UNIVERSITY
5500 Campanile Drive
San Diego, CA 92182

Kelly Ulrich

Subject: FW: Open House Materials (1 of 2)

Attachments: 238323_PLV Open House Postcard.pdf; Fact sheet 092910.pdf; PLV Open House Welcome Board.pdf; PLV Station signs.pdf; PLV Open House Hand Out.pdf; PLV Open House Proj Devlpmnt Timeline.pdf; PLV Open House Comment Card 2x.pdf; PLV Open House Endorsement Card.pdf

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From: Tyler Sherer [mailto:tsherer@mail.sdsu.edu]
Sent: Wednesday, March 16, 2011 1:38 PM
To: Michael Haberkorn
Subject: Fwd: Open House Materials (1 of 2)

Here is some more:

-A general description of the scope of the mailing (e.g. all residences within zip code xxxxx) and the approximate number of mailings:

The mailing included 16,964 households in these zip codes: 91942, 92115, 92119, 92120. The boundaries were Waring/Navajo Roads to the north, Baltimore Dr/70th St to the east, Collwood Avenue to the west and University Ave to the south.

PLAZA LINDA VERDE

SAN DIEGO STATE UNIVERSITY

Open House
November 3, 2010

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
SLOAN LOHSE	5365 ADAMS AVE S.D, CA 92115	SLOHSE@PACBELL.NET		X
MITCH YOUNKER	5446 Collier AVE	YounkerFAMILY@SBCGLOBAL.NET		
ROBERT MONTANA	6223 MARYLAND DR		619.757.9544	
Randy Goehler	4726 Adelphi place	randygoehler@cox.net		X
Michael Gerber	6151 Dorothy Drive S.D. 92115	mikecubs4@aol.com	619-229-1219	
Don Teemsma	5534 Trinity Way S.D. 92120		619-582-7995	
Greg Hopps	5230 Manhasset SD 92115			
Peggy Murphy	4747a 61th St. San Diego, Ca 92115		(760) 957-6775	
Adam Chimowicz	7767 Margerum Ave #251 SD, CA 92120	Chimowicz@gmail.com		
Cameron Tabler	5428 Redding Rd SD, CA 92115			

PLAZA LINDA VERDE

SAN DIEGO STATE UNIVERSITY

Open House
November 3, 2010

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
Dustin Canada	1668 Grand Ave. 92109	D.Canada3@yahoo.com	(602) [illegible]	
Justin Hanson	4623 Mississippi Street 92116	hanson.justinw@gmail.com	619.980.2699	✓
Ken Appel	5187 College Ave 92115	ken@kbbooks.com ~~kappel~~	(619) 993-8398	✓
Sandy Eader	5522 Dorothy Dr.	—	—	✓
John C. Hundley	1641 Sixth St. Coronado 92118	(PDF of SDSU Aerial Sept. 2009) johnchundley@gmail.com	619-325-9110	✓
Anna Tran	5129 La Dorna St.	vballsetter@gmail.com	—	
Quinsey Masanta				
Deanna Duncan	San Diego CA 5804 Kent Pl. 92120		619-583-8885	
Michael Bloom	5505 Mary Lane Drive San Diego CA 92115	bloomins@cox.net	619 2651775	✓
Ginger & Richard Fox	5460 Redding Rd. 92115	92tecvaultec@ cox.net	—	

PLAZA LINDA VERDE

Open House
November 3, 2010

SAN DIEGO STATE UNIVERSITY

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
BOB CRAIG	731 ZAMZIBAR CT. S. DIEGO	RCRAIG@ABBAE.COM	858-692 8868	YES
Teresa Spoulos		tspoulos@mail.sdsu.edu	594-4401	NO
Steven Alivio		hamblasto@cox.net	(619) 829-6597	Yes
David Parsons				NO
Christine Day		dayc8288@gmail.com		NO
Kerry TABLER				
Michael TABLER		DALMADOR@YAHOO.COM		YES
JIM LARSON	619-795-8505	jmlglass@cox.net	4959 COLLEGE AVE	yes
TONY DUPUY				
Jude Hopps	CACC, etc.			

PLAZA LINDA VERDE

Open House
November 3, 2010

SAN DIEGO STATE UNIVERSITY

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
Javier Ramos	4465 McClintock ST APT#6 San Diego, CA 92116	Jpknows.how@gmail.com	619-752-5805	
Peter Doran	Student	pdoran_9@yahoo.com		
Matt McManus	1663 grand ave pacific beach CA 92109	matt.p.mcmanus@gmail.com		
Jimmy Mejia	4312 W Point Loma Blvd APT J San Diego, CA 92107	jimmymejia27@yahoo		
George Foudgis [illegible]	6174 BERNADETTE LANE	MARTHA lb @ COX.NET	619-286-4757	—
Andrea Cantrell		andyalli73@yahoo.com		
Clarissa Chu	6006 Camino [illegible] SD 92120			
Blanca B. Lemm	8052 Beaver Lk Dr SD. 92119			
Dennis Alviso	Chicago Title Co.	Dennis.Alviso@CTT.com	619-561-5143	yes

PLAZA LINDA VERDE

Open House
November 3, 2010

SAN DIEGO STATE UNIVERSITY

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
Luanne & Dick Reid	4938 College Gardens Ct S.D 92115	dickandluanne@sbcglobal.net	619 583-1081	
Susan Morrison	4739 63rd St SD 92115		619-582-6319	
M Devine	3122 GREGORY ST SAN DIEGO CA 92104			
NORMAN BANKS	4776 Campanile	nsbanks@pacbell.net	619 286-5056	
SUSAN BANKS	"	"	"	
Walt & Marilyn Tom	Arno Dr			

PLAZA LINDA VERDE

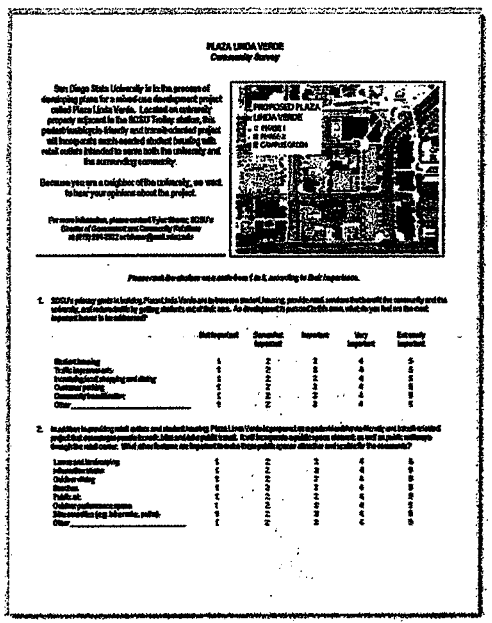
SAN DIEGO STATE UNIVERSITY

Open House
November 3, 2010

NAME	ADDRESS	EMAIL	PHONE	MORE INFO?
Sarah Mathy	4634 Alice St San Diego 92115	Smathy@gmail.com	619-886-7595	
ELLEN BEVIER	5738 BAJA DR SD 92115	ebevier@cox.net	—	
Mary Beauperland	5346 E. Falls View Dr		619 582-3546	

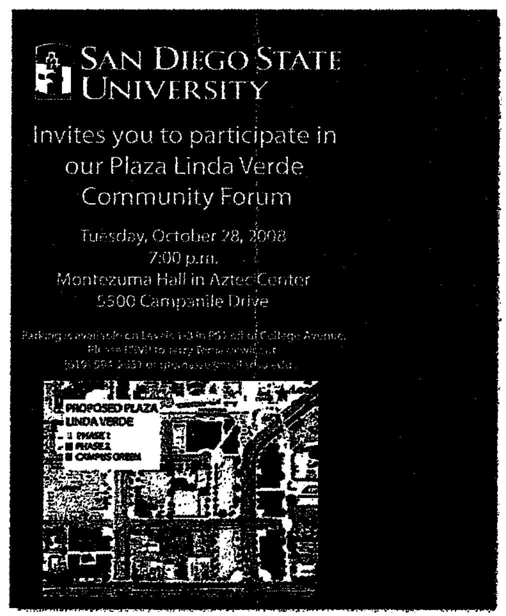
Engaging the Community

Working with its neighbors on Plaza Linda Verde is priority for SDSU. A number of opportunities have been provided for members of the community to provide input on the project.



COMMUNITY SURVEY
More than 1,500 neighbors shared their opinions about what they wanted to see in the project

COMMUNITY FORUM
Residents provided input on project elements and discussed results of the community survey



OPEN HOUSE
Comments were sought on issues to be studied in the project's environmental review

Incorporating Community Input

The plans for Plaza Linda Verde have been directly shaped by input received from the community.

Community Input	Project Elements
Include retail that will serve the community	A community market, national brand full-service restaurant, and other shops are proposed
Beautify the community	Project will incorporate tree-lined streets, pedestrian walkways, outdoor dining and a community green to revitalize the area
Provide opportunities for more students to live on campus	On-campus housing for 1,600 students is included
Incorporate traffic improvements	SDSU will pay a fair share contribution for traffic improvements in the surrounding community

Benefits of Living On Campus

Research has shown that students living on campus have a higher success rate than those who live off-campus.

	Off-campus	On-campus for one year	On-campus for more than one year
Make it through to junior year	63.4%	72.7%	85.9%
Grade point averages	2.39	2.8	2.94
Academic probation	30.2%	13.6%	9.4%

"Having spent three years commuting ... I never had the kind of connection that I made in just my first few weeks at SDSU ... There is always someone to study with; plus the library is right across the street. I love living so close to everything I need."

- Bethany Pontsler, SDSU junior living on-campus

Plaza Linda Verde: A Sustainable Project

Continuing SDSU's commitment to environmental sustainability, Plaza Linda Verde will be a sustainable development with a minimum of LEED Silver certification.

Location

Close proximity to SDSU Transit Center
Pedestrian/bicycle accessible
Infill development in urban area

Water/Wastewater

Improved stormwater management
Drought tolerant landscaping
Reclaimed water-ready
Low-flow devices to reduce water use

Recycling

Recycling program for construction/demolition waste
Recycled content in building materials where possible
Designated areas for storage/collection of recyclables

Energy

Exceed CA Energy Standards by 15%
Energy Star appliances
Natural light to reduce energy consumption

SAN DIEGO STATE UNIVERSITY

Plaza Linda Verde

☒ I support the Plaza Linda Verde Project.
You may use my name as a supporter.

Name Ellen Bevier

Address 5738 Baja DR.

City San Diego Ca Zip 92115

Phone 619-287-1154

Email elbevier@cox.net

SAN DIEGO STATE UNIVERSITY

Plaza Linda Verde

☒ I support the Plaza Linda Verde Project.
You may use my name as a supporter.

Name Justin Hanson

Address 4623 mississippi st

City San Diego Zip 92116

Phone 619.980.2699

Email hanson.justin.w@gmail.com

SAN DIEGO STATE UNIVERSITY

Plaza Linda Verde

[x] I support the Plaza Linda Verde Project.
You may use my name as a supporter.

Name Javier RAMOS

Address 4465 McClintock ST Apt #6, San Diego, CA 92116

City San Diego Zip 92116

Phone 619 752-5805

Email jpknows.how@gmail.com

F1.0

Notice of Availability of Draft Environmental Impact Report for Plaza Linda Verde

NOTICE OF AVAILABILITY
OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR
PLAZA LINDA VERDE

Notice of Availability. California State University/San Diego State University ("CSU/SDSU") has prepared a Draft Environmental Impact Report ("EIR") (SCH No. 2009011040) to analyze the potential environmental effects of the proposed Plaza Linda Verde project ("proposed project").

The proposed project is a mixed-use student housing project that would be constructed on property located immediately south of the existing SDSU Campus Master Plan boundary, generally between Aztec Walk and Montezuma Road, and College Avenue and Campanile Drive. The project would include approximately 90,000 gross square feet of ground-floor university/community-serving commercial/retail uses, and upper-floor student housing, containing approximately 294 apartments to house approximately 1,216 students. The project also would include: student apartment buildings, with approximately 96 apartments to house an additional 416 students approximately; parking facilities for approximately 500 vehicles; a Campus Green featuring a public promenade; and pedestrian malls (in place of existing streets/alleys) to facilitate a pedestrian-friendly atmosphere and link the project site to the main campus. The proposed project also would include the demolition of existing structures and parking lots, and development of portions of the project would be contingent upon the vacation of certain existing vehicular rights-of-way and the acquisition of properties. In conjunction with the proposed project, CSU/SDSU also is proposing to amend the SDSU Campus Master Plan boundary, such that the southern campus boundary between 55th Street and one block east of College Avenue would be extended south generally from the existing boundary at Aztec Walk to Montezuma Road.

The Draft EIR determined that the proposed project would result in significant and unavoidable impacts to Transportation/Circulation due to the uncertainty of available funding for improvements that would mitigate the project's impacts. With respect to the following environmental impact categories, the Draft EIR determined that any potentially significant impacts would be mitigated to a level below significant: Aesthetics and Visual Quality; Air Quality and Global Climate Change; Geotechnical/Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Noise; Archaelogical/Palentological Resources; Population and Housing; and, Public Services and Utilities. The Draft EIR also determined that impacts to Historic Resources and Land Use and Planning would be less than significant.

Public Review Period. The Draft EIR will be available for public review and comment for a 45-day period, beginning September 27, 2010, and ending on November 10, 2010. Written comments regarding environmental issues raised in the Draft EIR must be received by mail or facsimile no later than 5:00 P.M. on November 10, 2010. Please direct all comments to:

Lauren Cooper
Director, Department of Facilities Planning, Design and Construction
Administration Building, Room 130
San Diego State University
5500 Campanile Drive
San Diego, California 92182-1624
Fax: (619) 594-4500

Copies of the Draft EIR are available for review at the following locations: (1) Benjamin Branch Library, 5188 Zion Avenue, San Diego, California; (2) College Rolando Branch Library, 6600 Montezuma Road, San Diego, California; and (3) SDSU Love Library, Government Publications, 3rd Floor. Copies of the Draft EIR and reference materials also are available for review at SDSU Department of Facilities Planning, Design and Construction, Administration Building, Room 130, contact person: Lauren Cooper, Project Manager, (619) 594-5224. The Draft EIR also is available for review on the internet at www.sdsu.edu/plazalindaverde. Copies of the Draft EIR may be purchased by contacting Esquire Litigation Solutions, Bryan Woelfle, 110 W. "C" Street, Suite 1600, San Diego, California 92101, (619) 234-0660.

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Plaza Linda Verde Draft Environmental Impact Report Website

Home | The Project | FAQs | Approval Process | Community Outreach

San Diego State University has recently completed a thorough environmental review for Plaza Linda Verde. The Draft Environmental Impact Report (EIR) was released for public review and comment on September 27, 2010. The public is encouraged to review the document and submit comments in writing through November 10, 2010. Comments may be submitted to Lauren Cooper, Director-Facilities Design, Planning & Construction, SDSU, 5500 Campanile Drive, Mail Code 1624, San Diego, CA, 92182.

Draft Environmental Impact Report (September 2010)

- Volume 1 Cover and Table of Contents
- Volume 2 Cover and Table of Contents
- Introduction and Executive Summary
- Section 1.0 Project Description
- Section 2.0 Cumulative Impacts
- Section 3.1 Aesthetics and Visual Quality
- Section 3.2 Air Quality and Global Climate Change
- Section 3.3 Historical Resources
- Section 3.4 Geotechnical Soils
- Section 3.5 Hazards and Hazardous Materials
- Section 3.6 Hydrology and Water Quality
- Section 3.7 Land Use and Planning
- Section 3.8 Noise
- Section 3.9 Archaeological Paleontological Resources
- Section 3.10 Population and Housing
- Section 3.11 Public Utilities and Service Systems
- Section 3.12 Transportation Circulation and Parking
- Section 4.0 Significant Irreversible Environmental Changes
- Section 5.0 Alternatives
- Section 6.0 Growth Inducement
- Section 7.0 List of Preparers
- Section 8.0 References

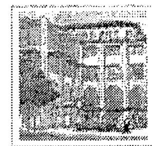
- Appendices
- Appendix 1.0
- Appendix 2.0

- Appendix 3.1
- Appendix 3.2
- Appendix 3.3
- Appendix 3.4
- Appendix 3.5
- Appendix 3.6
- Appendix 3.8
- Appendix 3.9
- Appendix 3.10
- Appendix 3.11
- Appendix 3.12

Other Project Documents

- Revised Notice of Preparation (April 2009)
- Notice of Preparation - Initial Study (January 2009)

Construction of Plaza Linda Verde could begin as early as summer 2011 with restaurants, stores and student housing opening by fall 2013.



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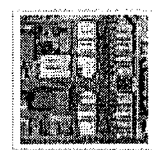

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Affidavit of Publication

The San Diego Union-Tribune. SIGN ON SAN DIEGO Union-Tribune enlace. Union-Tribune Classifieds

P.O. Box 120191, San Diego, CA 92112-0191

AFFIDAVIT OF PUBLICATION

GATZKE DILLON & BALLANCE LLP
1525 FARADAY AVENUE, SUITE 150
CARLSBAD, CA 92008

STATE OF CALIFORNIA} ss.
County of San Diego}

The Undersigned, declares under penalty of perjury under the laws of the State of California: That she is a resident of the County of San Diego. That she is and at all times herein mentioned was a citizen of the United States, over the age of twenty-one years, and that she is not a party to, nor interested in the above entitled matter; that she is Chief Clerk for the publisher of

SignonMobile/The San Diego Union-Tribune

a newspaper of general circulation , printed and published daily in the City of San Diego, County of San Diego, and which newspaper is published for the dissemination of local news and intelligence of a general character, and which newspaper at all the times herein mentioned had and still has a bona fide subscription list of paying subscribers, and which newspaper has been established, printed and published at regular intervals in the said City of San Diego, County of San Diego, for a period exceeding one year next preceding the date of publication of the notice hereinafter referred to, and which newspaper is not devoted to nor published for the interests, entertainment or instruction of a particular class, profession, trade, calling, race, or denomination, or any number of same; that the notice of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

Sep 27, 2010

[signature]
Chief Clerk for the Publisher

10-15-10
Date

Affidavit of Publication of

Legal Advertisement
Ad # 0010434360
ORDERED BY: MICHAEL S. HABERKORN

NOTICE OF AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR PLAZA LINDA VERDE

Notice of Availability.

California State University San Diego State University (CSU/SDSU) has prepared a Draft Environmental Impact Report (EIR) (SCH No. [illegible]) to analyze the potential environmental effects of the proposed Plaza Linda Verde project (proposed project).

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Lauren Cooper
Director, Department of Facilities Planning, Design and Construction
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San Diego State University
5500 Campanile Drive
San Diego, California 92182-1624
Fax: (619) 594-[illegible]

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F1.0

County Clerk Notice of Availability Posting

GATZKE DILLON & BALLANCE LLP
ATTORNEYS & COUNSELORS AT LAW
EMERALD LAKE CORPORATE CENTRE
1525 FARADAY AVENUE, SUITE 150
CARLSBAD, CALIFORNIA 92008
TELEPHONE 760.431.9501
FACSIMILE 760.431.9512

OF COUNSEL
MICHAEL SCOTT GATZKE
ANTHONY T. DITTY

September 24, 2010

By Overnight Mail

Office of the Clerk
County of San Diego
County Administration Center
1600 Pacific Highway, Suite 260
San Diego, California 92101

Re: *Posting of Notice of Availability of Draft Environmental Impact Report, State Clearinghouse No. 2009011040*

Dear Clerk:

Enclosed please find one copy of the Notice of Availability of Draft Environmental Impact Report for Plaza Linda Verde, SCH No. 2009011040 ("NOA") and one copy of the EIR Introduction and Executive Summary. In accordance with the requirements of California Environmental Quality Act ("CEQA") Guidelines Section 15087(d), please post the NOA in the Office of the County Clerk for a period of thirty (30) days. Section 15087(d) requires that the NOA be posted within 24 hours of receipt.

Thank you for your attention to this matter. Please do not hesitate to contact me if you have any questions.

Very truly yours,

Michael S. Haberkorn
of
Gatzke Dillon & Ballance LLP

MSH/kku

Enclosures

FILED
David Butler, Recorder/County Clerk
SEP 27 2010
BY L. Kesian
DEPUTY

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PLAZA LINDA VERDE

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FILED
David Butler, Recorder/County Clerk
SEP 27 2010
BY L. Kesian
DEPUTY

FILED IN THE OFFICE OF THE COUNTY CLERK
San Diego County on SEP 27 2010
Posted SEP 27 2010 Removed
Returned to agency on
Deputy L. Kesian

Lauren Cooper
Director, Department of Facilities Planning, Design and Construction
Administration Building, Room 130
San Diego State University
5500 Campanile Drive
San Diego, California 92182-1624
Fax: (619) 594-4500

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F1.0

Notice of Availability Proof of Mailing

PROOF OF MAILING

I declare that I am employed with the law firm of Gatzke Dillon & Ballance LLP, whose address is 1525 Faraday Avenue, Suite 150, Carlsbad, California 92008. I am over the age of eighteen years.

I further declare that on September 24, 2010, I mailed a copy of the:

NOTICE OF AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR PLAZA LINDA VERDE

to the attached mailing list by placing a true copy thereof enclosed in a sealed envelope with postage thereon fully prepaid, addressed as provided on the mailing list, for collection and mailing at Gatzke Dillon & Ballance LLP, 1525 Faraday Avenue, Suite 150, Carlsbad, California 92008 in accordance with Gatzke Dillon & Ballance LLP's ordinary business practices.

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed at Carlsbad, California, on September 24, 2010.

Kelly Ulrich

Kelly Ulrich

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Office of the Clerk County of San Diego 1600 Pacific Highway Suite 260 San Diego, CA 92101	Cover Letter (1) NOA (1) Intro/Exec Summary	September 24, 2010 by GSO	Time 9:27 a.m. Signed for by: V. Lomigeo September 27, 2010
Redevelopment Agency of the City of San Diego Eliana Barreiros, Project Manager William Anderson, Asst. Executive Director 1200 Third Avenue, 14th Floor San Diego, CA 92101	(1) EIR Transmittal letter	September 27, 2010 by Advanced	Time 9:30 a.m. Signed for by: Marilou Fedilizo September 27, 2010

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San Diego State University,
Measuring the Economic Impact on the Region, Final Report
(July 19, 2007)

San Diego State University

Measuring the Economic Impact on the Region

Final Report

July 19, 2007

07-032

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San Diego State University

Measuring the Economic Impact on the Region

Final Report

July 19, 2007

Prepared for:
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07-032

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1. Executive Summary

1.1. SDSU's Economic Impact on the San Diego Region: Model-Based Analysis

The social and economic impact of San Diego State University (SDSU) on the San Diego region (San Diego and Imperial County) is significant. Serving roughly 34,305 students in 2006/2007, SDSU is a critical component to the region's higher education system. Moreover, the University is currently the 8th largest employer in San Diego,[1] and as it plans to expand its student body to roughly 44,826, its impact on the region will only grow. The San Diego region is one of the most dynamic and innovative in the nation, in part due to its higher education system. This 2006 study demonstrates that SDSU is a critical foundation to the region's success.

Traditionally, the impact of a university rests on the incalculable value of knowledge and learning. While education is indeed valuable in its own right, the economic impact of a university can be identified, in monetary terms, due to the spending and life-time income improvements as well as social value to the community. This report takes a two-pronged approach to explaining those impacts.

Part I uses an economic model to calculate the quantifiable impacts of university and student spending and the higher earning power of SDSU graduates. ICF used the IMPLAN 509-industry input-output model to measure the inter-industry effects of university and student spending and alumni earnings on the regional economy. IMPLAN calculates the flow of expenditures from various sectors--e.g., university and personal spending--using a model specific to the regional economy of San Diego and Imperial counties. By tracking SDSU-related spending throughout the economy, the model then calculates the indirect and induced impacts due to the expenditures by and on the current students, which are then used to estimate the total dollar amount per full-time student (or Full-Time Equivalent, referred to as FTE in this report).

The analysis in Part I builds upon a previous study conducted by ICF in 2004 that used a similar methodology to analyze the impact of the California State University system on the state's economy. The report calculated the impact of the CSU system on the State of California as well as each individual campus on 8 California regions. According to the Impact Report, in 2004 SDSU contributed a total of $1.6 billion in direct, indirect and induced output into the San Diego regional economy from university and student spending. Moreover, in 2004 more than $2.6 billion in earnings by SDSU alumni could be attributed to their CSU degrees.

In the second part of the analysis in Part I, results obtained for the regional economic impacts due to current students were then extrapolated to estimate the impacts of SDSU in 2025, at which point the University expects to have expanded by an additional 10,000 FTEs. IMPLAN is a static model, therefore the growth projections are based on the assumption that the conditions that were true in 2006 would also be valid in 2025 (e.g., macroeconomic conditions of the regional economy). As a result, these estimates are based on a simple linear extrapolation due to increased student population and projected increases in per FTE University spending, without consideration of structural shifts in the regional economy.

The tables below and subsequent text summarizes the impacts calculated in Part I of this report:

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[1] *San Diego Business Journal/Special Report*, June 11, 2007. See Appendix for excerpted list of the top 20 employers.

Table 1. Summary: SDSU Annual Net Economic Impact on the San Diego Region

	Output Impact		Tax Impact		Employment Impact
	Total Impact ($)	Impact per FTE	Total Impact ($)	Impact per FTE	Total Impact
University Spending					
Direct SDSU Institutional Expenditures	$ 705.5 million				8,967
Spending Multiplier	x1.56				3,219
Total (direct, indirect, induced) Impact	$1.1 billion	$39,000	$153.5 million	$5,400	12,186
Student and Alumni Spending					
Direct Student Spending (out-of-region students only)	$143.3 million				776
Spending Multiplier	x1.41				454
Total (direct, indirect, induced) Impact	$201.4 million	$7,100	$24.5 million	$870	1,230
Direct Alumni Spending	$738.9 million				3,963
Spending Multiplier	x1.40				2,330
Total (direct, indirect, induced) Impact	$1.0 billion	$43,800	$130.3 million	$4,600	6,293
Total Impact of Student and Alumni Spending	$1.2 billion				7,523
Grand Total	**$2.4 billion**	**$89,900**	**$308.3 million**	**$10,870**	**19,709**
Regional Impact					
San Diego Regional Totals	$145.6 billion				1,346,154
SDSU Impact Percentage	2%				1.5%

Note: Totals may not add up due to rounding. Figures are expressed in 2006 dollars.
Full Time Equivalents (FTE) were 28,261 for Fall 2006.

Total SDSU institutional expenditures (including auxiliary spending) amount to roughly $705.5 million, in 2006 dollars. Using IMPLAN to calculate the secondary impacts of such spending, it was determined that SDSU expenditures indirectly contribute a total of $1.1 billion worth of additional spending in the San Diego regional economy, giving the University a local output multiplier of 1.56. Furthermore, the University's $1.1 billion output impact is associated with an additional 12,186 jobs in the regional economy and $153.5 million in tax revenue. A concise way of evaluating this impact is to consider the total impact per student (or Full-Time Equivalent). Each SDSU student is associated with roughly $39,000 of regional output.

However, these impacts only display a portion of total impact that SDSU has on the region. Beyond SDSU expenditures are the economic impacts associated with student spending and the increased earning potential of SDSU alumni. By including these integral elements of the SDSU-related impact the significance of the University is even more impressive. Out-of-region students who, without SDSU, might otherwise not reside in the region, spend roughly $143.3 million in the regional economy. Additionally, SDSU graduates have additional earning power due to their degree. This difference in earning power translates to $738.9 million annually spent in the local economy. Again, using IMPLAN to calculate the secondary impacts of this spending, it was determined that SDSU student and alumni indirectly contribute $1.2 billion into the regional economy, with multipliers of 1.41 and 1.40 respectively. Combining the impacts, SDSU contributes an additional $2.4 billion worth of spending annually into the San Diego regional economy. This equates to roughly $89,900 of regional output and $10,870 of tax revenue per FTE student at SDSU. Clearly, the University has an enormous impact on its surrounding community. In total, roughly 700 jobs are created in the regional economy for every 1,000 SDSU FTEs.

SDSU is a major contributor to regional gross product and employment. The University is currently the 8th largest employer in San Diego.[2] SDSU's 8,967 direct employees represent 0.67% of the region's employment, and the University's $705 million direct spending represents 0.48% of the region's total output (gross product). However, these numbers indicate only a portion of the University's impact. When taking into account SDSU's impact of $2.4 billion in indirect and induced spending and 19,709 in secondary employment impacts, the University represents 2.0% of regional output (gross product) and 1.5% of regional employment.

A second analysis was conducted to *project* the impact of the University with an additional 10,000 FTE. The University expects to increase its total enrollment to 35,000 FTE by the year 2025. In addition to this growth in student population, the University also estimates that its per FTE spending will increase by 2.2% per year[3]. The results of these increases are shown in the table below.

Table 2. Summary: SDSU 2025 Forecasted Annual Impact on the San Diego Region

	Output Impact		Tax Impact		Employment Impact
	Total Impact ($)	Impact per FTE	Total Impact ($)	Impact per FTE	Total Impact
University Spending					
Direct SDSU Institutional Expenditures	$ 1.3 billion				16,792
Spending Multiplier	X1.56				
Total (direct, indirect, induced) Impact	$2.1 billion	$58,800	$287.5 million	$8,200	22,820
Student and Alumni Spending					
Direct Student Spending (out-of-region students only)	$263 million				1,426
Spending Multiplier	X1.41				
Total (direct, indirect, induced) Impact	$370 million	$10,600	$45.1 million	$1,300	2,260
Direct Alumni Spending	$1.5 million				7,763
Spending Multiplier	x1.40				
Total (direct, indirect, induced) Impact	$2.0 billion	$58,000	$255.2 million	$7,300	12,327
Grand Total	**$4.5 billion**	**$127,400**	**$587.7 million**	**$16,800**	**37,407**

Note: Totals may not add-up due to rounding. Figures are expressed in 2006 dollars.
The 2025 Full Time Equivalents (FTE) is projected to be 35,000.

It was forecasted that in 2025, the growth of student body and increase in University spending would generate $4.5 billion of annual direct, indirect, and induced output into the San Diego regional economy, almost doubling the 2006 impact. Furthermore, this 2025 estimated impact equates to roughly $127,400/FTE injected into the economy annually. Consequently, there would

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2 *San Diego Business Journal/Special Report,* June 11, 2007.

3 According to SDSU budget analysis, over the last 10 years the marginal cost per FTE has increase by an average of 2.2%. This average represents an average over time of the general fund, auxiliary organization and capital budgets. Since 2004, there has been a noticeable increase in the per FTE budget. In light of CSU's revenue growth plan and recently agreed upon salary increases, continued growth can be anticipated; therefore, the 2.2% annual increase represents a conservative estimate.

also be a significant increase in tax revenues, both at the federal and state/local levels. Lastly, all of these spending impacts translate to a total of 37,407 jobs created in the local economy.

The table below summarizes the growth in SDSU output, tax and employment impact anticipated for the year 2025. The total employment impact grew from 19,709 in 2006 to an estimated 37,407 in 2025. The employment impact/per FTE shown in the table below indicates that for every 100 SDSU students in 2006, 70 jobs are supported. Conversely in 2025, we estimate every 100 SDSU students will support roughly 107 jobs.

Table 3. Comparison Table: SDSU's Current (2006) Impact on the San Diego Region Compared to the 2025 Forecast

Year	FTEs	Output Impact/FTE	Tax Impact/FTE	Employment Impact/FTE
2006	28,261	$ 89,900	$ 10,870	.70
2025	35,000	$ 127,400	$ 16,800	1.07
% Change–Increase	24%	42%	55%	53%

Note: Figures are expressed in 2006 dollars.

1.2. SDSU's Impact on San Diego's Economic Foundations: Qualitative Analysis

The first half of this report analyzes the economic impact that San Diego State University's revenues and expenditures have on income and employment in the San Diego region. This approach, called the "economic base approach," is valuable in capturing all of the cumulative monetary effects of the university on the regional economy, but it inherently treats the university like any other firm in the economy and does not address the vast range of economic effects that the university has on the surrounding region that are not easily measured in dollars.

In order to grasp the full significance of the economic impact of SDSU on the San Diego economy, a "foundation impact analysis" is needed that considers the range of University impacts that have a visible impact on the city's economy but are not easily revealed in a model. The foundation impact analysis presented here considers the contributions of the University to the regional economy in each of the following categories: workforce development; innovation and entrepreneurship; quality of life; housing and healthcare; transportation, energy, police, and other services; and image and marketing. These categories represent the major "foundations" of any region's economy, because it is by creating advantages in these foundation categories that a region makes itself a competitive place to grow, expand, and attract business.

There is no well-developed standard for measuring the foundation impacts of the university. In some instances, these impacts will be described quantitatively, and in other instances the impacts will be qualitative and not easily lend themselves toward quantification—this is the very nature of capturing all of the economic impacts of an active, wide-reaching university. The theme throughout the analysis is that SDSU makes invaluable contributions to San Diego's foundations, strengthening the region as a desirable place to do business, and creating a strong positive impact on the regional economy.

The following sections highlight SDSU's most important impacts on San Diego's regional economy in each of the six foundation categories.

1.2.1. Workforce Development

What are we measuring? *The University's role in creating and renewing a qualified and job-ready workforce for the region's industries, and providing an accessible higher education to populations that may not otherwise receive one.*

A successful regional economy has a strong pipeline of educational providers that carries the region's residents through growth (K-12), advancement (higher education), and renewal (continuing education) so that they are prepared—and constantly updating their skills—to match the most current needs of the region's economy.

SDSU is providing quality higher education, involving top-level research and training, in the industries that drive San Diego's globally-competitive economy, such as bioscience, information technology, and international business. Its impact on regional workforce development is astounding—the University is providing services at each segment of the workforce pipeline, from growth to advancement to renewal. The University is partnering with area schools to make tangible improvements in the advancement of the region's K-12 students to higher education at SDSU through such groundbreaking programs as the Compact for Success, and through such efforts the University is focusing on San Diego's most disadvantaged and underrepresented populations. SDSU is also tailoring higher education curricula and programs that respond to the unique challenges of the San Diego region, such as in healthcare, education, and social work. And finally, the University is providing far-reaching opportunities for thousands of San Diegans to renew their skills to remain competitive through the College of Extended Studies.

Preparing the Workforce for San Diego's Key Economic-Driving Industries

The numbers below represent SDSU bachelor, master and doctoral graduates for 2005/2006. See the textbox to the right for overall graduation trends over the past 5 years.

- 254 graduates in BioScience-related disciplines.
- 102 graduates in Defense & Transportation Equipment-related disciplines.
- 557 graduates in Engineering & Design-related disciplines.
- 303 graduates in Entertainment & Amusement-related disciplines.
- 63 graduates in Environmental Technology-related disciplines.
- 357 graduates in Information Technology-related disciplines.
- 489 graduates in Financial Services-related disciplines.
- 1,540 graduates in International Business-related disciplines.
- 99 graduates in Tourism-related disciplines.

Year	Total Graduates
2001-2002	7,109
2002-2003	7,686
2003-2004	7,963
2004-2005	8,046
2005-2006	8,162

Preparing the Workforce to Meet the Local Needs of San Diego and its Residents

- 306 *additional* new nurses added to the San Diego region since the inception of the Nurses Now program in 2000. Currently SDSU graduates 205 nurses each year, and this number is rising.
- 79 percent increase in math and science credentials awarded by SDSU between 2003 and 2006 since the start of the Mathematics and Science Teacher Initiative.

- 40 percentage points higher increase in math and science teacher credentials at SDSU over the CSU system-wide average between 2003 and 2006.
- 80 percent of the College of Education's credential program graduates teach in San Diego. More than half of these teach in the San Diego Unified School District, the eighth largest district in the country and second largest in the state.

Creating Partnerships with San Diego's K-12 Educators

- 104 percent increase in enrollment of students from Sweetwater Union High School (California's largest and most diverse 7-12 system) at SDSU since implementation of Compact for Success in 2000.
- 26 percent increase in Average Academic Performance (based on California Department of Education's Academic Performance Index) at Rosa Parks Elementary School in San Diego's City Heights area since implementation of the City Heights K-16 Education Pilot.
- 40+ new science curricula developed for San Diego County elementary school teachers through the Partnerships Involving the Scientific Community in Elementary Schools (PISCES) Project.

Serving San Diego's Underrepresented Populations

- 45 percent of admitted first-time freshmen are students of color.
- 3,802 transfer students accepted in Fall 2006, representing 42 percent of the incoming class and indicative of an aggressive acceptance of transfer students.

Advancing and Renewing San Diego's Workforce

- 53,000 students take advantage of classes in the College of Extended Studies each year, ranging from single-day sessions to multi-year certificate programs, to degree programs for working adults.
- Approximately 500 continuing education students are served each year by SDSU to renew their skills in response to the changing needs of the region's marketplace.

1.2.2. Innovation and Entrepreneurship

What are we measuring? *The University's contribution to an innovative culture that engages in applied research, R&D, technology commercialization, new business start-ups and spin-offs, and subsequently creates opportunities for employment in the region.*

All successful regional economies must have a healthy level of innovation activities that take place to ensure a constant turnover of ideas, technologies, and companies that keep the region competitive. A successful economy has a regional system for performing basic scientific research (discovery), turning research results into industrial applications and technologies (development), and commercializing those technologies for the creation of start-up and spin-off companies and new employment opportunities for the region (deployment). A smooth and well-supported "Innovation Pipeline" that carries innovation from discovery, through development, and into deployment is essential to the success of the regional economy—it is only though this process that a region fully enjoys the economic benefits of its innovation, in the form of new businesses, employment, and revenues.

San Diego State University is a leader in the region in supporting San Diego's Innovation Pipeline in every phase. The research capabilities at SDSU have reached new levels of growth, and the University is performing research and development and supporting technology commercialization and start-ups in San Diego's most important, economy-driving industries—in addition to driving innovation results in the industries that are meeting San Diego's most important local challenges. These efforts are generating intellectual property that is forming the basis for new businesses, employment, and wealth in San Diego.

Establishing a World-Class Research Institution

- Classification as a research university with "high research activity" by the Carnegie Foundation for the Advancement of Teaching will attract greater distinction, attention, and research talent to SDSU in the future.
- #1 small research university in the nation, according to 2005 Faculty Scholarly Productivity Index (FSP Index) based on faculty productivity, publications, citations, and awards.[4]
- $200 million in revenues in SDSU Research Foundation in 2005-06, including $130 million in awards from 300 different organizations.
- 1,500 active research grants, most of which are engaged in innovation in San Diego's major economy-driving industries or in creating solutions to San Diego's local challenges.

Performing Research in San Diego's Key Industries

- Almost $3 million in industry-sponsored research in FY 2005-2006.
- New $14.3 million BioScience Center affirms SDSU and the San Diego region as centers of innovation in this rapidly-growing industry.
- Over $9.5 million from prestigious five-year Program Project Grant for the SDSU Heart Institute makes SDSU a center of new research in the preservation of heart cells during a heart attack.
- New $11 million Coastal Waters Laboratory is a center of public-private collaborative innovation in marine science.
- $25,126,570 invested in innovation at SDSU in Bioscience, one of San Diego's most important growing industries.

Performing Research to Meet the Needs of San Diego and its Residents

- New grant of $10 million from the National Institutes of Health addresses local issues in Latino health.

Turning Research into Technologies, Start-Up Companies, and Employment Opportunities in San Diego

- 13 disclosures, $198,626 in royalties, and 3 start-up companies in the past year alone.

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4 http://advancement.sdsu.edu/marcomm/news/releases/spring2007/pr060107.html

- 97 disclosures, $1,254,550 in royalties, and 13 start-up companies in the past 9 years, since the inception of the Technology Transfer Office.
- Of the 13 SDSU start-ups since 1998, 10 are still in existence, representing a survival rate of higher than 75 percent.
- SDSU's successful start-ups have collectively created over 45 new jobs and over $1.1 million in revenues for the San Diego economy in biotechnology, medical, software, and other industries.
- The Center for Commercialization of Advanced Technology (CCAT), a public-private collaboration of which SDSU is a partner, has overseen 300 commercialization awards valued at over $18 million to 134 defense/homeland security-related technologies developed in private companies, government laboratories, and universities in the San Diego region.
- The SDSU Entrepreneurial Management Program is a NASDAQ Center of Excellence, placing it among the top eight such programs in the country.
- Ranks in the top 25 in entrepreneurship among regional universities in the U.S.

1.2.3. Quality of Life

What are we measuring? *The University's enhancement of the region's educational, community, arts, sports, and entertainment options, and their effect on residents' quality of life and engagement with their community and tourism to the region.*

Quality of life is an essential foundation to any successful regional economy, because—though quality of life is a rightful end unto itself—it is also a major and necessary tool in attracting businesses, employees, and residents to the region. Quality of life is the mix of arts, cultural offerings, sports and entertainment in a region, and San Diego—consistently described as having one of the nation's top qualities of life—is well benefited by San Diego State University's vast array of offerings.

SDSU provides programs and services that on a daily basis make San Diego a better region to live, work, and play, from its libraries to its cultural performances, and from its sporting events to the thousands of hours of volunteering its students contribute to the region. These amenities are creating real impacts on the San Diego economy. For those who come from within the San Diego region, SDSU is providing a huge and immeasurable public good to the region's quality of life. For those who come to SDSU from outside the San Diego region, SDSU is serving as a wealth generator for the San Diego economy by attracting visitors and their spending dollars from elsewhere.

Providing Public Access to Academic Resources

- 6,400,000 items in library collections and available for public access.
- 685 public-access computers.
- 2,600,000 annual visits to the library, including those from the general public.
- 6,827 attendees to annual series of 195 library lectures.
- Estimated 74,000 visitors (prospective students and families and other non-SDSU affiliated) to campus each year for new student orientation, year-round campus tours, "Explore SDSU" in March, and graduation—and their spending dollars.

Creating a Center for Lectures, Arts, and Performances

- KPBS, the local PBS radio and television station based at SDSU, is the most-watched public television station in the country during prime time.
- Estimated 65,800 annual attendees to SDSU Cultural Arts and Special Events (CASE), which includes noontime concerts, coffee house performances, open mic, homecoming, AzFest, and other special events. Approximately 10 percent of attendees are from the general public.
- 3,899 total attendees to Guest Art series and University Art Gallery each year. Between 15-35 percent are from the general public.
- 12,500 attendees to theatre performances each year, between Powell Theatre and Experimental Theatre. Approximately 45 percent are from the general public.
- 20,000-25,000 attendees to music and dance performances each year. This includes paid and free concerts and recitals by student, faculty, and guest artists throughout the year in Recital Hall, Rhapsody Hall, and Dance Studio Theatre.
- Estimated 208,295 attendees to Cox Arena (excluding athletic events) and 23,805 attendees to Open Air Theatre for major concerts, performances, and events for a total of 117 event days during 2005-06, of whom an estimated 85-90 percent is from the general public.

Fielding Sports Teams for Regional Fans

- Estimated 375,000 total attendance for all campus home sports games for 2006-07 school year, up from 300,000 in recent years.
- Estimated 75 percent of attendance at SDSU athletic events, or over 280,000 people, are visitors from the general public.

Offering the Public Use of Facilities

- 39,606 bed nights offered by SDSU Conference Center to summer youth and adult programs.
- 80+ organizations use SDSU facilities each year, ranging from industry associations to summer youth camps to church organizations.
- 16,778 members of Aztec Recreation Center, including 1,469 members from the general public.

Enriching the San Diego Region with Community Service

- 175,000 hours of community service performed by SDSU students each year.
- 152,000 internship hours, or the equivalent of 73 full-time equivalent employees, are provided each year to San Diego social service agencies by students in the SDSU School of Social Work.
- 180 community agencies are partners with SDSU's Center for Community-Based Student Learning.

1.2.4. Housing and Healthcare

What are we measuring? *The University's role in providing housing and healthcare options and its simultaneous role in preparing individuals who make better-informed decisions about health for themselves and their families and are less likely to require public assistance.*

Housing and healthcare are essential foundations to any regional economy. A region must provide the housing and healthcare options that its population needs in order to support a successful regional economy. San Diego State University contributes to the region's supply of housing and healthcare with its own programs that support its students, faculty, and staff, and reduce demand on public services.

Offering Medical Care

- 55,000 patient visits provided by SDSU Student Health Services in 2005-2006.

Providing Housing

- 5,000 students and 14 faculty/staff housed in campus-owned or managed housing.

Providing Childcare for SDSU Families and the Public

- 246 children are cared for in the SDSU Children's Center.

1.2.5. Transportation, Energy, Police, and other Services

What are we measuring? *The University's role in aiding transportation, police, and other services that lower the strain on other regional providers, and the university's simultaneous role in preparing individuals who have a statistically lower rate of participation in crime.*

Transportation, energy, and police are all part of the public infrastructure that is critical for a region to build and maintain in order to serve the needs of businesses and residents and to be economically competitive. This infrastructure in San Diego—while typically provided by public agencies—is in fact partially supported by San Diego State University.

The University is making active contributions to the transit, energy, and public safety needs of the region. SDSU is engaged in assisting the transportation needs of students, faculty and staff, and visitors to and from campus, preserving the public safety of those on its campus, and even in producing and providing energy to the grid. All of these activities contribute to the creation of a unified infrastructure network to support San Diego's regional economy, while simultaneously reducing SDSU's impact on the public provision of these services.

Aiding the Transportation Needs of Students, Faculty, Staff, and the Public

- 9,264 subsidized transit passes sold in FY2005-2006, one year after the opening of SDSU's new multimodal transit center, evidence of the University's dedication to transit-oriented growth in the San Diego region.
- An estimated 12,000 students, faculty and staff can be accommodated by the SDSU trolley station. The University's dedication to smart transit growth resulted in a change from a "commuter campus" to a "community campus."[5]

[5] http://www.scup.org/about/Awards/2006/San_Diego_State.html

Providing Police Protection

- 27,948 total calls responded to by the SDSU police in 2006, of which 8,943 were called in by the community, contributing to the maintenance of public safety in the 1-mile jurisdiction around campus and reducing the use of the city police force.

Providing Energy to the Grid

- 100 percent of SDSU's electric needs are met by its own clean, efficient power plant. It creates no burden on the grid.

- 120,000 kWh/month exported to the grid (with a capacity to export as much as 1.0-1.5 megawatts in a demand-response scenario), reducing San Diego's energy use "footprint."

- 5 solar photovoltaic arrays and two demonstration solar projects at SDSU indicate its leadership in the deployment of clean and renewable energy sources.

1.2.6. Image and Marketing

What are we measuring? *The University's contribution to the elevation of the image of San Diego in news media and other outlets, and the subsequent rippling effects on marketing, business attraction, and inflow of visitors and new residents.*

Marketing is an essential foundation of any successful regional economy. Marketing relates to the packaging of a region's assets and advantages into a tight and consistent message about the region for promotion other businesses, investors, and the population in general. A successful region is able to coordinate and bundle its advantages into a comprehensive package that is consistently promoted by all coordinating organizations in the region, and is used to successfully attract businesses, investors, and others to the region, looking to take advantage of the region's strengths.

SDSU is more than a source of workforce, innovation and entrepreneurship, culture and recreation, and infrastructure. SDSU is an asset in the marketing of the San Diego region to the rest of California, the U.S., and even the world. The University's research, education, events, and activities draw news media and public attention on a daily basis, promoting the San Diego region as a place attractive to not only students and faculty, but employers who see the area as a good place to live and work.

- 200,000+ people receive SDSU marketing materials each year, acting as advertising for the San Diego region as well.
- $1,000,000+ in advertising value is generated by SDSU's cooperative media efforts each year, indicative of the scope of reach of SDSU in the news.

Together, the institution, students, faculty, and staff of SDSU have an almost immeasurable impact on the San Diego region—its economy, workforce, innovation and entrepreneurship, social services, image, and quality of life. The purpose of this report is to highlight those impacts.

page

2. SDSU's Economic Impact on the San Diego Region: Model-Based Analysis

2.1. Overview

San Diego State University provides a significant source of benefit to the San Diego region by generating revenues and creating jobs throughout the local economy, yet the enormity of this impact is often under-appreciated. The impacts associated with SDSU originate with the institution itself—its faculty, students, and alumni—but then percolate through the economy generating successive rounds of economic activity because of the inter-linkages between different economic sectors.

Direct spending by the University, faculty, and students is the first and most obvious economic impact of SDSU. Not only does SDSU purchase goods and services from the surrounding economy, it also is an important regional employer. The out-of-town student body represents residents who might not otherwise live in the region; therefore, the money they spend off-campus generates income and employment for local businesses that would not exist if not for the University. Moreover, this direct spending is indicative of only a portion of University-related spending. The full economic impact that SDSU has on the regional economy, including its impact on other seemingly unrelated sectors beyond those in which it is directly related (education, retail, construction), can be shown through a regional economic impact analysis.

Regional economic modeling is based on the relationships between industry sectors and is founded on the principle that industries are interdependent; one industry purchases inputs from other industries and households (e.g., labor) and then sells outputs to other industries, households, and government. Therefore, economic activity in one sector impacts other sectors and causes an increased flow of money throughout the economy. For the purpose of this analysis, the modeling software IMPLAN was used to calculate these impacts.

In addition to the direct, indirect, and induced impacts resulting from spending and job creation, the University makes a tremendously important non-direct economic contribution to San Diego and its future. A university education is vital to pursuing a lifelong professional career and achieving greater economic security. SDSU keeps this avenue of economic opportunity open to everyone in the region by providing a quality, affordable university education.

A university education changes the trajectory of people's lives. It helps them fulfill their aspirations to become artists, engineers, teachers, health care professionals and more. Its recipients are better prepared to succeed in, adapt to, and appreciate the rapidly changing world around them. In addition, a university education is widely recognized as an investment that pays a lifetime of dividends in the form of better jobs and higher incomes.

What is less well understood, however, is that the investment in higher education is also a good investment for the region. When regions make the investment in their public university systems, the region as a whole receives a lifetime earnings boost. Regional per capita income is systematically higher in locations where a higher percentage of the population has an undergraduate university degree. Investments made by locations in their public universities benefit everyone in those areas. This is because the U.S. economy, particularly in states such as California, has shifted from one dependent upon manufacturing to one driven by knowledge-based services and high-technology manufacturing. In such an economy, locations that have a well-educated workforce are more attractive locations for these fast-growing, high-paying industries. Workers in these regions benefit from higher wages and greater economic opportunities while everyone benefits from the greater level of public services these places can afford.

2.2. Model-Based Analysis

As explained above, direct spending and employment constitute only a portion of the economic impact of a university on its surrounding economy. To indicate the full economic effect of SDSU on the San Diego region it is critical to calculate the impacts of not only direct spending and employment, but also indirect and induced money flow and jobs.

To illustrate with a simple everyday example, if you spend $30,000 to purchase a car, that affects not only the automobile industry, but also the steel, glass, and paint industries that supply the automobile industry. Thus, your spending on a car helps sustain other secondary jobs in inter-linked industries. Money flows from one industry to another to a varying degree depending on region and originating industry. Coefficients that measure the magnitude of the secondary impacts are called "multipliers." A unit increase in demand (an additional dollar of spending or one additional job in the sector) results in a total increase in output, income, or employment in the economy equal to its multiplier. That is, multipliers estimate the amount of direct, indirect, and induced effects on income or employment that result from each additional dollar of output, additional job, and additional dollar of employee compensation in a sector.

In this analysis, the indirect and induced impacts were calculated using the IMPLAN[6] (IMpact analysis for PLANning) input-output model. IMPLAN is created and maintained by the Minnesota IMPLAN Group (MIG). The IMPLAN model is a static input-output framework used to analyze the effects of an economic stimulus on a pre-specified economic region; in this case, the region comprises San Diego and Imperial Counties. IMPLAN is considered static because the impacts calculated by any scenario by the model estimate the indirect and induced impacts for one time period (typically a year).

The IMPLAN model is based on the input-output data from the U.S. National Income and Product Accounts (NIPA) from the Bureau of Economic Analysis. The model includes 509 sectors based on the North American Industry Classification System (NAICS). The specific modeling region used for this analysis included San Diego and Imperial counties. The model uses region-specific multipliers to trace and calculate the flow of dollars from the industries that originate the impact to supplier industries. These multipliers are thus coefficients that "describe the response of the [local] economy to a stimulus (a change in demand or production)."[7] Three types of multipliers are used in IMPLAN:

- **Direct**: Represents the jobs created due to the expenditures by people associated with the University, for example, students, faculty, staff, etc.
- **Indirect**: Represents the jobs created due to the industry inter-linkages caused by the iteration of industries purchasing from industries, brought about by the changes in final demands.
- **Induced**: Represents the jobs created in all local industries due to consumers' consumption expenditures arising from the new household incomes that are generated by the direct and indirect effects of the final demand changes.

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[6] IMPLAN was developed by the Minnesota IMPLAN Group (MIG). There are over 1,500 active users of MIG databases and software in the United State as well as internationally. They have clients in federal and state government, universities, as well as private sector consultants. More information is available at www.implan.com.

[7] Ibid.

The total impact is simply the sum of the multiple rounds of secondary indirect and induced impacts that remain in the region (as opposed to "leaking out" to other areas). IMPLAN then uses this total impact to calculate subsequent impacts such as total jobs created and tax impacts. This methodology, and the software used, is consistent with similar studies conducted across the nation.

2.3. Methodology

Inputs and Model Parameters: The direct economic impacts presented in the report are based on 2006 public financial data for SDSU and/or from calculations based on assumptions that will be discussed in greater detail in the following sections. The direct economic impacts include annual (2006) SDSU operational expenditures, capital expenditures, auxiliary expenditures, and average student expenditures. All data were collected from San Diego State University and presented to ICF through the office of Business and Financial Affairs.

In this assessment of San Diego State University's economic impact, all SDSU-related expenditures, off-campus spending by out-of-county students, and the alumni earning potential differential were included in the model. Below is a list of the model input data.

SDSU-related expenditures include:

- Operational expenditures of SDSU;
- Capital expenditures of SDSU;
- Operational and capital expenditures of SDSU auxiliary institutions such as bookstores, campus restaurants, foundations, etc.

SDSU student-related expenditures include:

- Off-campus expenditures of students who moved to the region to attend SDSU.

SDSU alumni earnings-related impacts are explained below:

- SDSU alumni earnings-related impact refers to the total economic impacts (direct, indirect and induced) of the earnings differential of all SDSU alumni currently in the San Diego labor force, between their current salary and what they would have earned without their degree from SDSU.

University Spending: This study used 2006 SDSU financial statements provided by the University to estimate annual SDSU expenditures. All operational expenditures were coded as IMPLAN sector #462 (Higher Education). Again, IMPLAN uses county-specific data to assign expenditures that originate from the Higher Education industry to supplier industries. The construction-related capital expenditures were coded as such (IMPLAN sector #38—Commercial and Institutional Buildings) and all remaining capital expenditures were coded as #462.

Information regarding the impact of auxiliary organizations also came from internal SDSU financial reports. The following expenditure categories were included for auxiliaries:

- Salaries and Wages;
- Benefits;
- Other Student Scholarships/Grants;
- Interest on Bonds and Notes;
- Expenses-Other.

These were not broken down by the type of auxiliary enterprise, e.g., retail store, food service area, research institute, etc. The following assumptions were made regarding expenditures in each IMPLAN sector:

- 25% Retail Trade (IMPLAN sector #411);
- 25% Eating and Drinking Places (IMPLAN sector #481);
- 50% Rental Housing (IMPLAN sector #431).

The region impacted by SDSU has been defined as San Diego and Imperial counties. The main SDSU campus is in the City of San Diego, in San Diego County. This analysis therefore assumes that most of the impact will occur in San Diego County; however, SDSU has off-site campuses in Imperial County and therefore it is important to include the ripple affects of the students and spending that occurs in Imperial County. However, the San Diego main campus has a significantly greater impact as it has the majority of the population at 98% (Fall 2006 – 27,631 FTE) verses Imperial County at 2% (Fall 2006 – 630 FTE).

Student Spending: A full accounting of student expenditures attributable to SDSU operations required an estimate of off-campus student expenditures. First, it was assumed that a portion of SDSU student expenditure occurs at auxiliary organizations (e.g., campus housing, book stores, campus food services, and parking) which are incorporated in the auxiliary organization spending noted above. Second, it was assumed that since many resident students work in San Diego and therefore would likely make similar local expenditures whether or not they attended SDSU, the conservative assumption (e.g., an assumption that underestimates student spending impacts compared to many traditional impact calculations) was made to exclude these expenditures from the total student spending. Therefore only SDSU students who came from outside of the San Diego region were counted in this analysis.

In order to create these estimates, the following calculations were made:

1. The CSU system maintains a data set called *Residence of Total Enrollment by Campus.* This data set contains the number of students by campus and by county of residence. The number of out-of-region students for each region was calculated. The number of out-of-region students at SDSU in 2004 was used to extrapolate the number of out-of-region students in the current student body (2006).
2. The SDSU Office of Financial Aid and Scholarships provided information on estimated student spending for the 2007-2008 academic year. We used these data to estimate the amount a student will typically spend, excluding items from on-campus and auxiliary organizations, such as food, housing, and books. By multiplying this average off-campus spending by the number out-of-region students, we determined the total spending (excluding food, housing, and books) by out-of-region students. Our calculation will apply this 2007-2008 per student spending projection to the current 2006 student body, to present the most up-to-date, accurate estimate of current (2006 dollars) and future (2025) direct spending.
3. We assumed that all expenditures for books (retail) would occur under the auxiliary category, and therefore, were excluded from the additional student spending estimate. We assumed this category of expenditure was already accounted for as part of the auxiliary organization spending.
4. Some students live in on-campus housing while others live off-campus. We assumed that for students staying in on-campus housing, all food and housing expenditures would occur at

auxiliaries. For students not staying in on-campus housing, we assumed that none of their food and housing budget was spent at auxiliaries.

5. SDSU provided information on student housing that contained the number of students residing in on-campus housing.
6. The number of out-of-region students exceeded the number of students living in on-campus housing. Therefore, it was assumed that 100 percent of the on-campus housing was occupied by out-of-region students.

The "left-over" out-of-region students were assumed to reside in off-campus housing. Data relating to financial aid were used to estimate housing and food expenditures, which were then added to the total calculated above. This sum of spending described above became the total direct impact of student expenditures and was used as input into IMPLAN similarly to the other direct spending impacts of SDSU. The calculation applies the most recent available data, the projected 2007-2008 student spending estimates to the current (2006) study body to get the most accurate figures for current and future spending. *As previously noted, the assumptions used in this analysis to generate the additional student spending were intentionally conservative; that is, they are believed to understate the total additional student spending impact. Thus the results of this study should be treated as a lower bound of the total economic impacts of SDSU.*

Alumni Spending: Alumni impacts are treated differently than the other spending impacts in IMPLAN, as they are not expenditures by SDSU, but by SDSU graduates. Thus, instead of treating the direct impact as originating from the Higher Education sector, these expenditures were assumed to originate in the household sector, categorized by different income brackets in IMPLAN.

The method used to assess the direct impact of alumni consisted of the following steps:

1. SDSU data on the number of resident (living in San Diego County) alumni were collected. It was estimated that roughly 50% of each graduating class, remains a local alumni.

2. Data from the Census Bureau American FactFinder, 2005 for San Diego County, *Earnings by Educational Attainment--Workers 25 Years Old and Over,* was used to estimate the average salary of a bachelor's and master's degree alumnus compared to a high school graduate. These Census data provide average salary for San Diego County residents of different levels of educational attainment, including high school graduates, those with some college education, bachelor's graduates, and more advanced graduates.

3. The amount of earnings that is attributable to the alumnus's SDSU degree is the difference between the average salary associated with his/her degree and the average salary for an individual with a high school degree. For bachelor's degree holders, it is the difference between the average bachelor's degree salary and the average salary for either a high-school graduate or transfer student who already had some college credit.

4. It was estimated that 35 percent of income would be spent locally. This assumption was based on spending/saving patterns and data on regional purchase coefficients in IMPLAN.[8] Note: This calculation is based upon the additional degree-generated income to ensure that the alumni spending impact includes only added impact of an SDSU degree.

[8] RPCs indicate the share of the regional demand purchased from local suppliers, and these typically vary by IMPLAN sectors and modeling regions.

5. To produce the most conservative estimate, ICF assumed that all alumni were single wage-earner households (IMPLAN code 10005, household annual income $35K-$50K). Actual household income is expected to be much higher as it is likely that many SDSU alumni are part of double-income households.

2025 Forecast: A second round of analysis was conducted to project the impact of SDSU in 2025, at which point the University expects to have a student body of 35,000 FTE. Additionally, the University projects that it will increase its per FTE spending 2.2 percent per year. The 2025 impact forecast takes only these events into consideration and builds upon the 2006 IMPLAN model. It was assumed that all of the assumptions and conditions used to estimate the 2006 impacts would remain valid in the 2025. The methodological assumptions ICF used to determine the 2025 direct impact projections are outlined below:

1. The 2025 direct University expenditures were calculated based on the projected increase in University spending. Information from SDSU indicated that it will increase its per FTE spending 2.2 percent per year. ICF compounded the 2.2 percent growth rate and calculated the projected 2025 per FTE and total direct amount. According to SDSU budget analysis, over the last 10 years the marginal cost per FTE has increase by an average of 2.2%. Since 2004, the increase has been significantly more, marking an increase in spending. In light of CSU's revenue growth plan and recently agreed upon salary increases, continued growth can be anticipated; therefore, the 2.2% annual increase represents a conservative estimate.
2. The projected 2025 direct student spending expenditure was calculated according to the 2006 student budget, demographic and spending pattern assumptions. The 2025 estimates incorporate the increased student population and on-campus housing capacity.
3. The estimated 2025 alumni population was calculated by compounding the average per year local (San Diego resident) graduates from 2007 to 2025. These 'new' graduates were added to the existing 110,000 resident alumni. The 2006 model's alumni earning potential and spending pattern assumptions were kept constant in the 2025 projected calculations.
4. The induced and indirect impacts were calculated by ICF based on the 2006 model and using linear extrapolations.

Output: Whenever new income is injected into an economy, it starts a ripple effect that creates a total economic impact that is much larger than the initial input. This is because the recipients of the new income spend some percentage of it within the region, and the recipients of that share, in turn, spend some of it within the region, and so on. The *total spending impact* of the new income is the sum of these progressively smaller rounds of spending within the economy. This total economic impact creates a certain number of jobs, called the *total employment impact*, and also creates tax revenue for federal and local governments, which we characterize as the *total fiscal impact.*

Thus, three impact results are presented in this report: total spending, total employment, and total fiscal (tax) impact. The numbers that are presented in this report represent a conservative estimate of the University's impact, as the IMPLAN model was run based on the most conservative assumptions and inputs.

2.4. SDSU Spending-Related Impacts

This analysis provides quantitative estimates of the total economic impact of San Diego State University on the San Diego region (San Diego and Imperial Counties) in terms of direct, indirect, and induced spending related to University capital, operational and auxiliary expenditures, and student spending, as well as jobs that the University supports both within the institution and in the surrounding economy (e.g., through indirect and induced effects).

Direct SDSU-related expenditures for wages and salaries, capital equipment and supplies, and an array of other items related to its educational mission totaled roughly $705.5 million in 2006 dollars. This total includes:

- $401.2 million in University expenditures on wages and salaries, services, supplies, and related ongoing needs;
- $54.8 million in average annual construction and capital expenditures;
- $249.5 million in expenditures by campus auxiliary organizations such as bookstores, campus restaurants, research institutes, etc. This category captures the bulk of student expenditures for books, on-campus food purchases, and related purchases.

The IMPLAN model was used to calculate the indirect and induced impacts for each of the expenditures. It is important to note that each expenditure category represents a different mix of direct impact industries. All of the SDSU direct impacts were modeled as originating in the Higher Education industry (sector #462 in IMPLAN). Auxiliary expenses were attributed predominantly to the retail, housing, and food establishment sectors, and capital expenditures were assigned to construction and institutional codes. Because of these differences, a separate impact scenario was constructed for each SDSU expense type.

The total spending impact is calculated at over $1.1 billion in expenditures within the region. This level of spending activity supports over 12,186 regional jobs annually and generates over $153.5 million in annual taxes. Stated another way, SDSU has a local multiplier of 1.56, meaning that for every dollar the University spends in the local economy an additional 56 cents is generated (Note: All reported results are in 2006 dollars).

These impacts are better understood in the context of per student (or Full-Time Equivalent) value. The total impact of all SDSU-related expenditures equates to roughly $39,000 per FTE of spending to the economy and $5,432 per FTE in tax revenue. Additionally, SDSU-related spending currently corresponds to 431 employees per 1,000 students. These impressive impacts based on SDSU-related expenditures confirm that the University is a large and significant presence in the San Diego region with a spending profile and an economic impact to match.

The total impacts can be seen below in greater detail. (Note: Whenever assumptions or estimation was required, ICF used the most conservative estimate).

Total Output Impact

Table 4 below shows how direct spending in each category causes indirect and induced spending throughout the economy. This spending ripples through numerous industry sectors throughout the region. As a result, the combined total impact is far greater than the initial direct spending. Initial direct spending of a little over $700 million leads to an additional $174 million in secondary (indirect) spending due to the industry inter-linkages, and an additional $220 million in induced spending due to the consumption expenditures arising from the new household incomes.

Table 4. Output Impact

SDSU Expenditure	Direct	Indirect	Induced	Total
Operational	$401,234,154	$106,936,967	$119,161,929	$625,963,172
Capital	$54,777,257	$13,726,644	$23,736,211	$92,240,113
Auxiliary	$249,487,305	$53,452,295	$77,228,673	$380,168,278
Total SDSU	**$705,498,716**	**$174,115,906**	**$220,126,813**	**$1,098,371,563**

Totals may not add up due to rounding. Figures are expressed in 2006 dollars.

Employment Impacts

IMPLAN uses the total spending impact in each industry to calculate the subsequent impact on regional employment. As shown in Table 5, SDSU spending supports over 3,200 non-University jobs. These jobs are a result of the economy-wide indirect and induced spending and therefore affect numerous industries within the region. Some of the major sectors where these secondary jobs are created include wholesale and retail trade, food services and restaurants, hotels, entertainment, and healthcare services—sectors that typically benefit from a vibrant local economy.

Table 5. Employment Impact

SDSU Expenditure	Direct	Indirect	Induced	Jobs Created
Total SDSU	8,967	1,370	1,849	**12,186**

Totals may not add up due to rounding.

Fiscal Impact

The fiscal (tax) impacts were estimated based on the spending across all industries in the local economy as a result of institutional and auxiliary spending.[9] Table 6 below shows two types of tax revenue streams—federal and state/local. Based on the $1.1 billion total regional economic activity attributable to SDSU, the federal government collects roughly $85.4 million in taxes, of which 47 percent, or $40 million, comes from income tax (corporate and personal). Additionally, the state and local governments collect another $68.1 million in taxes, of which property and sales tax comprise 56 percent or $38 million. Tax impacts of SDSU spending are shown below.

Table 6. Tax Impact for Total SDSU Expenditures (includes Operational, Capital, and Auxiliary Expenditures)

	Total Tax Impact
Federal Tax Revenues	$ 85,439,788
State and Local Tax Revenues	$ 68,073,577
Total	**$ 153,513,365**

Totals may not add up due to rounding. Figures are expressed in 2006 dollars.

9 The tax impacts are not part of the GDP accounting framework used for the other impacts. These are calculated in IMPLAN using standard assumptions about tax rates.

2.5. SDSU Student Expenditure-Related Impacts

SDSU student spending on textbooks, meals, and housing for the 2006-2007 academic year totaled $143.3 million. These expenses include additional off-campus spending by out-of-region students who are in San Diego or Imperial Counties to attend SDSU. Expenditures on a region-wide basis for housing and other living expenses by resident students were assumed to exist with or without SDSU and therefore were not considered an incremental benefit.

Using IMPLAN, it is estimated that the total (direct plus secondary) spending impact of SDSU student expenditures is $201.4 million. This level of spending activity is associated with roughly 1,230 additional regional jobs, of which about 430 are in support sectors. Moreover, SDSU student expenditures also generate over $24.5 million in annual taxes, half of which is at the state and local level.

As stated previously, impact is often better understood in the context of per student equivalent. In the case of student spending, each SDSU student corresponds to roughly $7,100 in total regional output and $870 in tax revenue annually.

Tables 7 and 8 below provide additional detail. (Note: Whenever assumptions or estimation were required, ICF used the most conservative estimates).

Total Output and Economic Impact

Student spending patterns were modeled in IMPLAN to calculate the total secondary impact of off-campus expenditures by out-of-region students. Because student expenditures affect different industry sectors than do the University expenditures discussed above, the multiplier value estimated from student spending is 1.41, which is slightly lower than the 1.56 for University spending. Thus, every dollar spent by students contributes an additional 41 cents into the regional economy because of its impact on secondary support sectors.

Table 7. Output and Employment Impact

	Direct	Indirect	Induced	Total
Output Impact	$ 143,291,504	$ 28,634,251	$ 29,507,402	$ 201,433,157
Employment Impact	776	209	224	1,230

Totals may not add up due to rounding. Dollar figures are expressed in 2006 dollars.

Fiscal Impact

The fiscal (tax) impact of off-campus student spending was estimated to be roughly $24.5 million, split relatively evenly between federal and state tax revenues. Of the totals, the largest tax revenues were federal corporate and personal income tax at $6 million, and state property and sales tax at $7 million.

Table 8. Tax Impact for Out-of-Town SDSU Student Spending

	Total Tax Impact
Federal Tax Revenues	$ 12,465,867
State and Local Tax Revenues	$ 12,067,389
Total	**$ 24,533,256**

Totals may not add up due to rounding. Figures are expressed in 2006 dollars.

2.6. SDSU Alumni-Related Impacts

Expenditures alone tell us nothing about the impact of SDSU in terms of providing an affordable, quality university education to residents of San Diego and Imperial Counties who might not otherwise attend a university and obtain a bachelor's, master's, or Ph.D. degree. One of the ways that the value of a SDSU education can be estimated is by focusing on the higher earnings power of college and professional degree graduates. The U.S. Census Bureau estimates that bachelor's degree holders earn, on average, nearly one million dollars more than high-school graduates[10] over the course of their working life.

University education has a powerful economic impact, and the increased earnings power of university graduates needs to be considered for a holistic analysis of SDSU's economic impact on the local region.

Each year the 110,000 SDSU alumni that remain residents of the San Diego region earn an estimated $5.2 billion[11] in income. Not all of this income is attributable to their university education, however, it is estimated that $2.1 billion of this total is attributable to the enhanced earnings power of their SDSU degree.

When the spending habits of the SDSU alumni are considered, a total annual direct impact of $738.9 million in additional revenues is added to the San Diego regional economy[12]. Moreover, this spending also has indirect and induced effects on regional output, employment, and taxation. Again, IMPLAN was used to calculate these secondary impacts.

As Table 9 below indicates, SDSU alumni's enhanced earning power adds an additional $1.0 billion to the regional economy. This level of economic activity supports roughly 6,290 jobs and generates $130.3 million in annual tax revenue.

Average Annual Earnings
in San Diego County,
Full-time Year-Round Workers, 2005

- High school: **$28,318**
- Some College: **$36,078**
- Bachelor's: **$ 47,492**
- Master's or higher: **$65,422**

Source: US Census Bureau

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10 Bachelor's degree holders that work full-time, year-round throughout their career can expect to earn an average of $2.1 million over their lifetime, compared to $1.2 million for workers with a high school diploma only. Source: U.S. Census, *The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings*

11 This current estimate is based on the assumption that 100 percent of local alumni are bachelor's degree graduates and therefore the figure may be underestimating their total earnings potential.

12 It was estimated that 35% of the additional income ($2.1 billion) would be spent locally. See Methods section above for more information.

The tables below provide additional detail on the results summarized in the above discussion.

Total Output and Employment Impact

The difference in the purchasing power of a SDSU graduate due to education was modeled in IMPLAN to calculate the total secondary output and employment impacts of the additional spending. We assumed that alumni spending would affect different sectors than those affected by current student spending, because generally alumni belong to a higher income bracket and purchase a different bundle of goods than current students. Despite these differences, the multiplier value of alumni spending was determined to be 1.40, similar to that estimated for current student spending. As Table 9 below shows, alumni spending supports over 2,300 secondary jobs in the local economy due to the indirect and induced effects.

Table 9. Total Output Impact

	Direct	Indirect	Induced	Total
Output Impact	$ 738,866,500	$ 145,653,518	$ 150,778,250	$ 1,035,298,271
Employment Impact	3,963	1,082	1,247	6,293

Totals may not add up due to rounding. Dollar figures are expressed in 2006 dollars.

Fiscal Impact

The fiscal (tax) impact of alumni spending was determined to be about $130.3 million, split almost equally between the federal and state/local governments. Of the $65.0 million of federal tax revenue, a little less than half, or $32 million, is in corporate and personal income taxes. Similarly, of the $65.3 million of state/local tax revenue, just over half, or roughly $36 million, is generated through property and sales taxes.

Table 10. Fiscal Impact

	Total Tax Impact
Federal Tax Revenues	$ 65,023,720
State and Local Tax Revenues	$ 65,249,231
Total	**$ 130,272,951**

Totals may not add up due to rounding. Figures are expressed in 2006 dollars.

2.7. 2025 Forecasts

San Diego State University estimates that its FTE student population will expand to 35,000 by 2025. This growth comes during a period in which the University also estimates that its per FTE spending will increase by an average of 2.2 percent per year. The growth in population in tandem with the increase in expenditure results in a significant additional impact for the San Diego region. The section below explains in detail the direct, secondary (indirect and induced), and total impacts from the expected 2025 University, student and alumni spending.

Total Output and Employment Impact

Using the 2006 IMPLAN model created to assess SDSU's current impact; ICF calculated the projected 2025 impacts. The calculations take into account the University's forecasted growth in FTE and increased per FTE spending. Spending impacts were calculated for the University, current students, and alumni. The direct, indirect, induced, and total impacts are detailed in the tables below for each category of spending. The below calculations rely on all assumptions used in the 2006 model and those discussed in the methodology section above. Because the same model was used, the 2006 and 2025 multipliers for each category are identical, 1.56 for University spending, 1.41 for student spending and 1.40 for alumni spending. That said, there is a significant increase in total and per FTE impact.

Table 11. 2025 Forecasted SDSU Expenditures: Output and Employment Impact

	Direct	Indirect	Induced	Total
Output Impact	$ 1,321,133,912	$ 326,053,647	$ 412,214,780	**$ 2,059,402,339**
Employment Impact	16,792	25,65	3,462	**22,820**

Dollar figures are expressed in 2006 dollars.

Table 12. 2025 Forecasted SDSU Student-Related Expenditures: Output and Employment Impact

	Direct	Indirect	Induced	Total
Output Impact	$ 263,274,937	$ 52,610,800	$ 54,215,074	**$ 370,100,811**
Employment Impact	1,426	384	412	**2,260**

Dollar figures are expressed in 2006 dollars.

Table 13. 2025 Forecasted SDSU Alumni-Related Expenditures: Output and Employment Impact

	Direct	Indirect	Induced	Total
Output Impact	$ 1,447,323,764	$ 285,312,431	$ 295,350,978	**$ 2,027,907,173**
Employment Impact	7,763	2,119	2,443	**12,327**

Dollar figures are expressed in 2006 dollars.

Fiscal Impact

The fiscal (tax) impact of the 2025 University, student-related and alumni-related spending was estimated to be roughly $587.7 million, in 2006 dollars. This sum is split relatively evenly between federal and state and local tax revenues. The tables below detail the projected federal, state/local, and total taxes for each spending category. Increased tax revenue can be seen for both student and alumni spending, adding to the overall estimated impact on the region of the University in 2025.

Table 14. Tax Impact for 2025 Forecasted SDSU Institutional Spending

	Total Tax Impact
Federal Tax Revenues	$ 159,996,608
State and Local Tax Revenues	$ 127,476,222
Total	**$ 287,472,830**

Figures are expressed in 2006 dollars.

Table 15. Tax Impact for 2025 Forecasted SDSU Student-Related Spending

	Total Tax Impact
Federal Tax Revenues	$ 22,904,012
State and Local Tax Revenues	$ 22,171,873
Total	**$ 45,075,886**

Figures are expressed in 2006 dollars.

Table 16. Tax Impact for 2025 Forecasted SDSU Alumni-Related Spending

	Total Tax Impact
Federal Tax Revenues	$ 127,371,285
State and Local Tax Revenues	$ 127,813,025
Total	**$ 255,184,310**

Figures are expressed in 2006 dollars.

2.8. Summary of Results

This chapter has presented a quantitative assessment of the economic impact of SDSU on the surrounding San Diego region. The tables below summarize the main findings from the regional economic modeling and projected 2025 calculations in terms of total output impact, employment impact, and fiscal (tax) impact. While the 2006 numbers have been calculated using exact expenditure data provided by the University and region-specific models, because of some of the assumptions we made (both with the SDSU-supplied data and the local economy data in IMPLAN), results presented here should be considered as providing a representative picture of the overall economic impact of SDSU in the San Diego region, and not as the exact numbers of jobs created, etc. Additionally it should be remembered that the estimated 2025 results are based on the 2006 model using similar assumptions and calculation methodology. That said, the results summarized in Tables 17 and 18 below do indicate the magnitude of the current and projected economic impact of SDSU on the San Diego region.

SDSU's current presence in the San Diego region is associated with about $2.4 billion in economic activity, and supports close to 20,000 local jobs, including those in secondary activities that depend on the spending of SDSU students, faculty, staff, and alumni. SDSU's activities also generate significant tax revenue streams, both for the federal and state/local governments, and the total fiscal impact is estimated to be close to $250 million. The enormity of this impact can also be explained in per student impact; University (operational, capital and auxiliary) and current student-related and alumni-related expenditures create an *aggregate* annual impact of $89,900 per FTE. Additionally, University expenditures have a multiplier of about 1.56, indicating that every dollar spent by SDSU creates an additional 56 cents of economic activity in the local economy.

Table 17. Summary of SDSU Impacts on the San Diego Regional Economy

	Output Impact		Tax Impact		Employment Impact
	Total Impact ($)	Impact per FTE	Total Impact ($)	Impact per FTE	Total Impact
University Spending					
Direct SDSU Institutional Expenditures	$ 705.5 million				8,967
Spending Multiplier	x1.56				3,219
Total (direct, indirect, induced) Impact	$1.1 billion	$39,000	$153.5 million	$5,400	12,186
Student and Alumni Spending					
Direct Student Spending (out-of-region students only)	$143.3 million				776
Spending Multiplier	x1.41				454
Total (direct, indirect, induced) Impact	$201.4 million	$7,100	$24.5 million	$870	1,230
Direct Alumni Spending	$738.9 million				3,963
Spending Multiplier	x1.40				2,330
Total (direct, indirect, induced) Impact	$1.0 billion	$43,800	$130.3 million	$4,600	6,293
Total Impact of Student and Alumni Spending	$1.2 billion				7,523
Grand Total	**$2.4 billion**	**$89,900**	**$308.3 million**	**$10,870**	**19,709**
Regional Impact					
San Diego Regional Totals	$145.6 billion				1,346,154
SDSU Impact Percentage	2%				1.5%

Note: Totals may not add up due to rounding. Figures are expressed in 2006 dollars.

Furthermore, SDSU's impact on San Diego will only grow over time as it adds to its student body and increases per student spending. The summary table below details the forecasted impacts of the University in 2025 if it adds an additional 10,000 FTE and increases its per student spending. In 2025, it is projected that the University will generate $4.5 billion in direct, indirect, and induced impacts, nearly $600 million in taxes and roughly 37,400 jobs. Each SDSU student is projected to induce $127,400 of spending in the local economy.

Table 18. Summary: SDSU 2025 Forecasted Annual Impact on the San Diego Region

	Output Impact		Tax Impact		Employment Impact
	Total Impact ($)	Impact per FTE	Total Impact ($)	Impact per FTE	Total Impact
University Spending					
Direct SDSU Institutional Expenditures	$ 1.3 billion				16,792
Spending Multiplier	x1.56				
Total (direct, indirect, induced) Impact	$2.1 billion	$58,800	$287.5 million	$8,200	22,820
Student and Alumni Spending					
Direct Student Spending (out-of-region students only)	$263 million				1,426
Spending Multiplier	x1.41				
Total (direct, indirect, induced) Impact	$370 million	$10,600	$45.1 million	$1,300	2,260
Direct Alumni Spending	$1.5 million				7,763
Spending Multiplier	x1.40				
Total (direct, indirect, induced) Impact	$2.0 billion	$58,000	$255.2 million	$7,300	12,327
Grand Total	**$4.5 billion**	**$127,400**	**$587.7 million**	**$16,800**	**37,407**

Note: Totals may not add-up due to rounding. Figures are expressed in 2006 dollars.
The 2025 Full Time Equivalents (FTE) is projected to be 35,000.

There is no denying that the University currently has and will continue to have a measurable and significant fiscal impact on the surrounding San Diego regional economy, through secondary output, employment, and tax revenue impacts from direct spending, and the higher income associated with a SDSU-degree. The remainder of the report will focus on the equally-significant qualitative impacts that, when combined with the fiscal impacts described above, present a full picture of the University's importance to the region and its residents.

page

3. SDSU's Impact on San Diego's Economic Foundations: Qualitative Analysis

3.1. Introduction and Methodology

The first half of this report has analyzed the economic impact that San Diego State University's revenues and expenditures have on income and employment in the San Diego region. This approach, the "economic base approach," is valuable in capturing the cumulative monetary effect—both direct and indirect—of the University on the regional economy. It reveals the economic effects of the University as tracked through its operational expenditures, construction and capital spending, student expenditures, and earnings potential of graduates, and each of their respective rippling effects throughout the economy.

While the economic base approach used in the preceding chapter is valuable for estimating the impact of a university on the economy in dollar terms, it treats a university like any other firm and ignores the vast range of economic effects that a university has on the surrounding region that are not as easily measured in dollars.[13] In order to grasp the significance of the economic impact of SDSU on the San Diego economy, a "foundation impact analysis" is needed that considers the range of ways the University visibly impacts the city's economy that are not easily revealed in a model. The foundation impact analysis presented here considers the contributions of the University to the regional economy in each of the following categories:

- **Workforce Development**: The University's role in creating and renewing a qualified and job-ready workforce for the region's industries, and providing an accessible higher education to populations that may not otherwise receive one.
- **Innovation and Entrepreneurship**: The University's contribution to an innovative culture that engages in applied research, R&D, technology commercialization, new business start-ups and spin-offs, and subsequently creates opportunities for employment in the region.
- **Quality of Life**: The University's enhancement of the region's educational, community, arts, sports, and entertainment options, and their effect on residents' quality of life and engagement with their community *and* tourism to the region.
- **Housing and Healthcare**: The University's role in providing housing and healthcare options and its simultaneous role in preparing individuals who make better-informed decisions about health for themselves and their families and are less likely to require public assistance.
- **Transportation, Energy, Police, and other Services**: The University's role in aiding transportation, police, and other services that lower the strain on other regional providers, *and* the university's simultaneous role in preparing individuals who have a statistically lower rate of participation in crime.
- **Image and Marketing**: The University's contribution toward elevating the image of San Diego in news media and other outlets, and subsequent rippling effects on marketing, business attraction, and inflow of visitors and new residents.

In the sections that follow, ICF will assess San Diego State University's impacts on the economy in each of the foundation categories listed above. While the economic base approach is a well-

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13 Nagowski, Matthew P. "Assessing the Economic Impact of Higher Education Institutions In New England." Federal Reserve Bank of Boston, February 22, 2006.

established model for measuring the monetary impacts of the University as seen in Module I, there is no equally well-developed standard for measuring the foundation impacts of the university. In some instances, these impacts will be described quantitatively, and in other instances the impacts will be qualitative and not easily lend themselves toward quantification—this is the very nature of any attempt to capture the full range of economic impacts of an active, wide-reaching university.

The theme throughout the analysis is that SDSU makes invaluable contributions to San Diego's foundations, strengthening the region as a desirable place to do business, and creating a strong positive impact on the regional economy.

3.2. SDSU and San Diego's Workforce Development

3.2.1. Summary of SDSU's Impact on Workforce Development

Workforce development is essential to the success of any regional economy—some will argue that it is more important to a region's economic success than any other individual foundation. A successful region has a strong pipeline of educational providers that carries the region's residents through growth (K-12), advancement (higher education), and renewal (continuing education) so that they are prepared—and constantly updating their skills—to match the most current needs of the region's industries.

SDSU is providing quality higher education, involving top-level research and training, in the industries that drive San Diego's globally-competitive economy, such as bioscience, information technology, and international business. Its impact on regional workforce development is astounding—the University is providing services at each length of the workforce pipeline, from growth to advancement to renewal. The University is partnering with area schools to make tangible improvements in the advancement of the region's K-12 students to higher education at SDSU through such groundbreaking programs as the Compact for Success, and through such efforts the University is focusing on San Diego's most disadvantaged and underrepresented populations. SDSU is also tailoring higher education curricula and programs that respond to the unique challenges of the San Diego region, such as in healthcare, education, and water resources. And finally, the University is providing far-reaching opportunities for thousands of San Diegans to renew their skills to remain competitive through the College of Extended Studies.

Highlights of SDSU's Impact on San Diego's Workforce Development

- 254 graduates in BioScience-related disciplines in 2005/06.
- 102 graduates in Defense & Transportation Equipment-related disciplines in 2005/06.
- 557 graduates in Engineering & Design-related disciplines in 2005/06.
- 303 graduates in Entertainment & Amusement-related disciplines in 2005/06.
- 63 graduates in Environmental Technology-related disciplines in 2005/06.
- 357 graduates in Information Technology-related disciplines in 2005/06.
- 489 graduates in Financial Services-related disciplines in 2005/06.
- 1,540 graduates in International Business-related disciplines in 2005/06.
- 99 graduates in Tourism-related disciplines in 2005/06.
- 306 *additional* new nurses added to the San Diego region since the inception of the Nurses Now program in 2000. Currently SDSU graduates 205 nurses each year, and this number is rising.
- 79 percent increase in math and science credentials awarded by SDSU between 2003 and 2006 since the start of the Mathematics and Science Teacher Initiative.
- 40 percentage points higher increase in math and science teacher credentials at SDSU over the CSU system-wide average between 2003 and 2006.
- 80 percent of the College of Education's credential program graduates teach in San Diego. More than half of these teach in the San Diego Unified School District, the eighth largest district in the country and second largest in the state.
- 104 percent increase in enrollment of students from Sweetwater Union High School (California's largest and most diverse 7-12 system) at SDSU since implementation of Compact for Success in 2000.
- 26 percent increase in Average Academic Performance (based on California Department of Education's Academic Performance Index) at Rosa Parks Elementary School in San Diego's City Heights area since implementation of the City Heights K-16 Education Pilot.
- 40+ new science curricula developed for San Diego County elementary school teachers through the Partnerships Involving the Scientific Community in Elementary Schools (PISCES) Project.
- 45 percent of admitted first-time freshmen are students of color.
- 3,802 transfer students accepted in Fall 2006, representing 42 percent of the incoming class and indicative of an aggressive acceptance of transfer students.
- 53,000 students take advantage of classes in the College of Extended Studies each year, ranging from single-day sessions to multi-year certificate programs, to degree programs for working adults.
- Approximately 500 continuing education students are served each year by SDSU to renew their skills in response to the changing needs of the region's marketplace.

The sections below detail SDSU's impacts on San Diego's workforce development.

3.2.2. Preparing the Workforce for San Diego's Key Economic-Driving Industries

San Diego State University is feeding thousands of graduates each year into San Diego's skilled workforce, and the University has a particularly important role in maintaining tight relationship with the export-oriented industries that are driving San Diego's economy in order to produce the degrees, programs, and curricula that create graduates with the skills in demand by these industries, such as bioscience, coastal and marine science, international business, healthcare, and tourism industries. Through its development of the workforce for these economy-driving industries, SDSU is creating and retaining high-quality jobs and wealth in the San Diego region, and is contributing to the attraction of new employers to the region who want access to the skills in these rapidly-growing industries.

What follows is an assessment of the impact of SDSU on workforce development in the broadly-categorized, export-oriented industries that drive San Diego's economy. These industries have been selected based on their a) generation of new wealth for the San Diego region through the export of goods/knowledge to other regions, and b) identification as major industry clusters in the San Diego region.[14]

The table below presents a summary of the economy-driving industries in San Diego, and the corresponding academic programs at SDSU that are producing graduates with the key expertise needed to enter the workforce of San Diego's most important exporting industries.

Table 19: San Diego's Economy-Driving Industries and the SDSU Programs that Support Them

Economy-Driving Industry in San Diego Region	Related Academic Programs at SDSU	Total Bachelors, Masters, and Doctoral Graduates from SDSU in 2005/06
BioScience	Biology, Chemistry/Biochemistry, Microbiology, and Molecular Biology	254
Defense & Transportation Equipment	Aerospace Engineering, Civil Engineering, Engineering Sciences/ Applied Mechanics	102
Engineering & Design	Aerospace Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Sciences/Applied Mechanics, Environmental Engineering, Mechanical Engineering, Graphic Design, Interior Design	557
Entertainment & Amusement	Recreation Administration, Television, Film, and New Media Production, Theatre Arts, Theatre Arts – MFA, Music, Music-Liberal Arts, Music-Performance, Dance, Dance – BFA, Art, Art - MFA	303
Environmental Technology	Environmental Engineering, Ecology, Environmental Science, Geological Sciences	63
Information Technology	Computational Science, Computer Science, Electrical Engineering, and Information Systems	357
Financial Services	Accounting/Accountancy, Finance, Financial and Tax Planning, and Taxation	489

[14] San Diego Association of Governments, "Traded Clusters in the San Diego Region," September 2006 http://www.sandag.cog.ca.us/uploads/publicationid/publicationid_1255_5879.pdf

Economy-Driving Industry in San Diego Region	Related Academic Programs at SDSU	Total Bachelors, Masters, and Doctoral Graduates from SDSU in 2005/06
International Business	International Economics, International Security and Conflict Resolution, International Business (in the Arts & Letters School), International Business (in the Business School), Accounting/ Accountancy, Business Administration, Entrepreneurship, Finance, Financial and Tax Planning, Human Resource Management, Information Systems, Management, Marketing, Production Operations Management, Real Estate, and Taxation	1,540
Tourism	Hospitality Tourism Management and Recreation Administration	99

Bioscience

- **SDSU is a leader in statewide efforts in bioscience education and research**: SDSU is the home campus for the California State University Program for Education and Research in Biotechnology (CSUPERB), a multi-campus program created in 1987 to provide a coordinated and amplified development of bioscience research, research training, and education within the CSU. CSUPERB fosters the workforce development and training of a sufficient number of bioscience technicians and scientists to meet the needs of this growing industry in California. CSUPERB does this by catalyzing interdisciplinary, inter-campus endeavors between Chemistry and Biology departments on all campuses and between faculty from a number of allied academic and research units such as biomedical engineering, agricultural biotechnology, environmental and natural resources, molecular ecology, and marine biotechnology.

Table 20: Biotechnology Academic Programs at San Diego State University[15]

Biotechnology/Bioinformatics	
Certificate (Undergrad)	Certificate in Biotechnology
MS	Biotechnology Graduate Internship Program with an MS in Molecular Biology
PhD/MBA	Joint Ph.D./MBA in Life Sciences
Certificate (Graduate)	Certificate in Biotechnology
Biochemistry	
BS	BS in Chemistry with Emphasis in Biochemistry
Cell and Molecular Biology	
BS	Cell and Molecular Emphasis of the BS in Biology
Minor	Cell Biology and Genetics in the Minor in Biology
MS	MS in Molecular Biology
Ph.D.	Cell and Molecular in the Doctoral Program in Biology
PhD/MBA	Joint Ph.D./MBA in Life Sciences
Microbiology	
BS	BS in Microbiology
MS	MS in Microbiology

15 CSUPERB, http://www.csuchico.edu/csuperb/BiotechCampusSDSU.htm.

Biotechnology/Entrepreneurship-Related Business Programs	
MBA	MBA with a Specialization in Entrepreneurship
MSBA	MSBA with a Concentration in Entrepreneurship
PhD/MBA	Joint Ph.D./MBA in Life Sciences
Regulatory Affairs-Biotechnology	
Certificate (Graduate-Extended Ed)	Advanced Certificate in Regulatory Affairs
MS (Extended Ed)	MS in Regulatory Affairs
Biomedical and Engineering	
BS	Bioengineering Emphasis within the BS in Biology
Certificate (Graduate-Extended Ed)	Advanced Certificate in Biomedical Quality Systems
MS (Extended Ed)	Master of Science in Biomedical Quality Systems

- **SDSU is updating the workforce with cutting-edge skills in biotech, pharmaceuticals, and biodevices**: The Center for Bio/Pharmaceutical and Biodevice Development meets the continuing education and training needs of the pharmaceutical, biotechnology, and medical device industries. Programs and courses are designed to give those who are already employed in these industries a foundation for effectively addressing the real-world challenges encountered during the development, manufacture, and commercialization of FDA-regulated therapeutic and medical device products. Most courses are available through distance learning and designed to afford students a high degree of flexibility in integrating their studies with their professional responsibilities.
- **SDSU is leading the new convergence of scientific fields**: The SDSU Macromolecular Structural Analysis Resource Center (MSARC) works to produce exceptional graduates from CSU in bioinformatics and cheminformatics. The MSARC is designated a CSU Bioinformatics Core Resource Facility. As such, it works to incorporate CSU system-wide course and curricula changes that will produce graduates who can perform sequence editing, fragment assembly, mapping, comparison, database searching, multiple sequence analysis, evolutionary analysis, patter recognition, RNA secondary structure, translation, manipulation, display, and sequence exchange.
- **SDSU produced 254 graduates in BioScience-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Biology, Chemistry/Biochemistry, Microbiology, and Molecular Biology.

Coastal and Marine Science

- **SDSU is producing graduates in marine studies**: The Marine Studies Program at SDSU is a multi-disciplinary program coordinated by the Coastal and Marine Institute (CMI). Students can emphasize marine studies within the traditional science departmental degree programs and have access to SDSU's laboratory facilities and research opportunities—particularly those of the new Coastal Waters Laboratory. The undergraduate and graduate programs allow students working within traditional degree programs to emphasize marine studies. Furthermore, SDSU just finished construction of the new $11 million Coastal Waters Laboratory which brings in concert the activities of SDSU and U.S. Geological Survey (USGS) researchers.

Information Technology

- **SDSU is preparing a high-tech workforce with skills in computer modeling and simulations**: The Computational Science Research Center educates students in real-world computer modeling and simulation applications. Computational science is enjoying tremendous popularity of late; computer modeling and simulations play a pivotal role in virtually every area of pure and applied research. The goal of the SDSU computational science program is the training of science professionals capable of effectively utilizing modern computing facilities and appropriate computational methods in the variety of real-world applications in which they are needed. SDSU incorporates high-tech learning into all aspects of its teaching.
- **SDSU is keeping its students on the leading edge of skills in computational science**: The Education Center on Computational Science and Engineering (ECCSE) works to create a well-prepared technical workforce through design of the undergraduate curriculum. The ECCSE designs curricula and trainings that prepare SDSU students for work in fields that demand collaborative interdisciplinary teams, sophisticated computer tools, and effective communication in a research and problem-solving environment.
- **SDSU produced 357 graduates in IT-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Computational Science, Computer Science, Electrical Engineering, and Information Systems.

International Business

- **SDSU is responding to the needs of the international business industry**: Located ideally on the Pacific Rim and bordering with Mexico, San Diego is attributed with natural assets that prepare it to be a competitive region in international business. Still, global competition requires San Diego to be savvy in creating and replenishing the skills to compete in international business. San Diego State University is responding to the challenge by developing an international business program widely acclaimed as one of the nation's biggest and best.
- **SDSU ranks in the top 10**: SDSU ranks in the top 10 in the U.S. in international business programs according to *U.S. News & World Report.*
- **SDSU is among the top six internationalized campuses**: SDSU is among the top six internationalized campuses in the U.S., as named by the Association of International Educators and the Bureau of Educational and Cultural Affairs of the U.S. State Department.
- **SDSU has one-of-a-kind program in international business**: SDSU is the first and only university in the U.S. to offer a transnational triple degree program in International Business—one with Canada and Mexico, and one with Mexico and Chile.
- **SDSU creates some of the best opportunities for its students to learn internationally**: SDSU ranks 2nd for study-abroad opportunities among universities of its type according to the Institute of International Education.
- **SDSU is home to one of only five Centers for International Business Education and Research**: The SDSU Center for International Business Education and Research (CIBER) is one of the five original centers founded by the U.S. Department of Education to be "centers of excellence" in international business education. CIBER performs activities to impact interdisciplinary education in the U.S. while enhancing U.S. competitiveness abroad, by proving grants to fund faculty research and student internships abroad, performing outreach

and development programs for the business community, and offering training programs for language and business faculty from institutions across the country.

- **SDSU provides unique training in global conflict resolution**: The International Security and Conflict Resolution (ISCOR) program at SDSU is the only program of its kind in California. ISCOR is an innovative program housed across three colleges at SDSU and designed to provide students with an understanding of world affairs and a commitment to conflict resolution. ISCOR challenges students to examine the increasingly interdependent and interconnected global system, analyze a world experiencing both increased cooperation and conflict, and assess international issues from a variety of viewpoints and perspectives.
- **SDSU is one of only nine national sites for language resources**: The Language Acquisition Resource Center is one of only nine sites nationwide that serves as a National Language Resource Center as selected by the U.S. Department of Education.
- **SDSU attracts foreign students**: SDSU is host to 1,494 international students from 89 nations, providing strong opportunities for international connection and exchange among students—in addition to their contribution to the San Diego economy during their education here.
- **SDSU produced 1,540 graduates in International Business-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in: International Economics, International Security and Conflict Resolution, International Business (in the Arts & Letters School), International Business (in the Business School), Accounting/Accountancy, Business Administration, Entrepreneurship, Finance, Financial and Tax Planning, Human Resource Management, Information Systems, Management, Marketing, Production Operations Management, Real Estate, and Taxation.

Tourism

- **SDSU is creating new programs to respond to the tourism and hospitality industry**: The Hospitality and Tourism Management Program is in its second year and offers students a unique learning approach to one of San Diego's largest industries (and the world's fastest-growing industry).
- **SDSU produced 99 graduates in Tourism-related disciplines in 2005/06**: These include Bachelors graduates in Hospitality Tourism Management and Recreation Administration.

3.2.3. Preparing the Workforce to Meet the Local Needs of San Diego and Its Residents

In addition to its major contributions to the development of the workforce for San Diego's export-oriented, economy-driving industries, SDSU has a commitment to identifying the unique challenges facing the San Diego region, and addressing them with workforce solutions. By developing a workforce that addresses San Diego's local challenges in healthcare, education, and environment, SDSU is serving its residents' needs and ultimately creating a region that is more competitive to start, grow, and attract business.

The table below presents a summary of the industries that are driven by the most critical, locally-demanded needs of San Diego residents, and the corresponding academic programs at SDSU that are producing graduates with the key expertise needed to enter the workforce to meet San Diegans' needs.

Table 21: Critical Locally-Demanded Industries by San Diego Residents and the SDSU Programs that Support Them

Locally-Demanded Industries by San Diego Residents	Related Academic Programs at SDSU	Total Bachelors, Masters, and Doctoral Graduates from SDSU in 2005/06
Healthcare	Gerontology, Health Science, Nursing, and Public Health	364
Education	Counseling, Education, Educational Leadership, Educational Technology, Elementary Curriculum and Instruction, Math Ed K-8, Policy Studies in Language and Cross-Cultural Education, Reading Education, Rehabilitation Counseling, Secondary Curriculum and Instruction, Special Education, Teaching and Learning, and Vocational Education	412
Social Work	Counseling, Rehabilitation Counseling, Social Work, Social Work and Juris Doctor, Social Work and Public Health, and Speech, Language and Hearing Science	352
Law Enforcement	Criminal Justice Administration and Criminal Justice and Criminology	340

Healthcare

- **Since inception of the "Nurses Now" program in 2000, SDSU has provided 306 *additional* nurses to the San Diego region**: SDSU is responding to San Diego (and California's) severe nursing labor shortage with the SDSU "Nurses Now" program, a community partnership to address the nursing shortage. The Nurses Now partnership calls upon local hospitals to support the University so that it can expand the number of nursing students admitted to the undergraduate program. This financial support, totaling several million dollars, has enabled SDSU to significantly boost enrollment. Since program inception in 2000, the SDSU School of Nursing has almost doubled its admittances and has injected an *additional* 306 graduates into the San Diego region. SDSU currently graduates 205 nurses each year (2005-06) and this number is rising. The school is continuing to look for financial support to increase its enrollment even further and still maintain focus on the quality of its education; SDSU's nursing students earn among the highest pass rates in the state on the NCLEX exam for RN licensure.
- **SDSU produced 364 graduates in Healthcare-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Gerontology, Health Science, Nursing, and Public Health.

Education

- **SDSU has increased math and science teacher credentials by 79 percent over 3 years**: The SDSU College of Education Math and Science Teacher Initiative is a comprehensive program to significantly increase its credential enrollments in mathematics and science. The program has three components: 1) Expanding the numbers of candidates seeking other credentials (e.g., liberal studies majors) who also obtain mathematics or subject-matter authorizations; 2) Creating new pathways for community college transfer students and graduates students to receive math and science credentials; and 3) Attracting new pools of students to SDSU by identifying and mentoring high school students interested in teaching mathematics or science. The numbers reveal the success of this program:

  - 105 percent increase in math teacher credentials between 2003 and 2006 (from 20 to 41 awarded).
  - 57 percent increase in science teacher credentials between 2003 and 2006 (from 23 to 36 awarded).
- **The SDSU Math and Science Teacher Initiative has produced some of the best results, not only in the CSU system but among all universities in California**: SDSU far exceeded the CSU system-wide average in its percentage increase in math and science teacher credentials. As shown in the chart below, its percentage increase in math teacher credentials exceeded the CSU average by 41 percentage points, and for science teacher credentials SDSU exceeded the CSU average by 40 percentage points. SDSU is a leading institution in the CSU system in the training and development of math and science teachers.

Table 22: Percentage Increase in Teacher Credentials between 2003 and 2006

	CSU System-Wide Average	SDSU
Math	63.9	105.0
Science	15.8	56.5

- **SDSU uses innovative programs to prepare its teachers for San Diego classrooms**: This program connects SDSU student teachers for one year with local schools, including Hoover High School, Monroe Clark Middle School, and at Rosa Parks Elementary School. The credential candidates in the program learn state-of-the-art applications of educational technology, how to develop and implement curricula for diverse learners in urban classrooms, how to ensure literacy development across different subject areas, and more. In turn, the students and schools of City Heights benefit from the presence of a highly-motivated group of student teachers committed to providing the best tools to help them attain academic success.
- **SDSU produces nationally-recognized teachers**: Alumni of the SDSU College of Education made up two of the last eight National Teachers of the Year and a finalist for National Principal of the Year.
- **SDSU produces teachers who stay in San Diego**: A recent survey found that more than 80 percent of the College of Education's credential program graduates teach in San Diego. More than half of these teach in the San Diego Unified School District, the eighth largest district in the country and second largest in the state.
- **SDSU produced 412 graduates in Education-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Counseling, Education, Educational Leadership, Educational Technology, Elementary Curriculum and Instruction, Math Ed K-8, Policy Studies in Language and Cross-Cultural Education, Reading Education, Rehabilitation Counseling, Secondary Curriculum and Instruction, Special Education, Teaching and Learning, and Vocational Education.

Social Work

- **SDSU produced 352 graduates in Social Work-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Counseling, Rehabilitation Counseling, Social Work, Social Work and Juris Doctor, Social Work and Public Health, and Speech, Language and Hearing Science.

Law Enforcement

- **SDSU produced 340 graduates in Law Enforcement-related disciplines in 2005/06**: These include Bachelors, Masters, and Doctoral graduates in Criminal Justice Administration and Criminal Justice and Criminology.

3.2.4. Creating Partnerships with San Diego's K-12 Educators

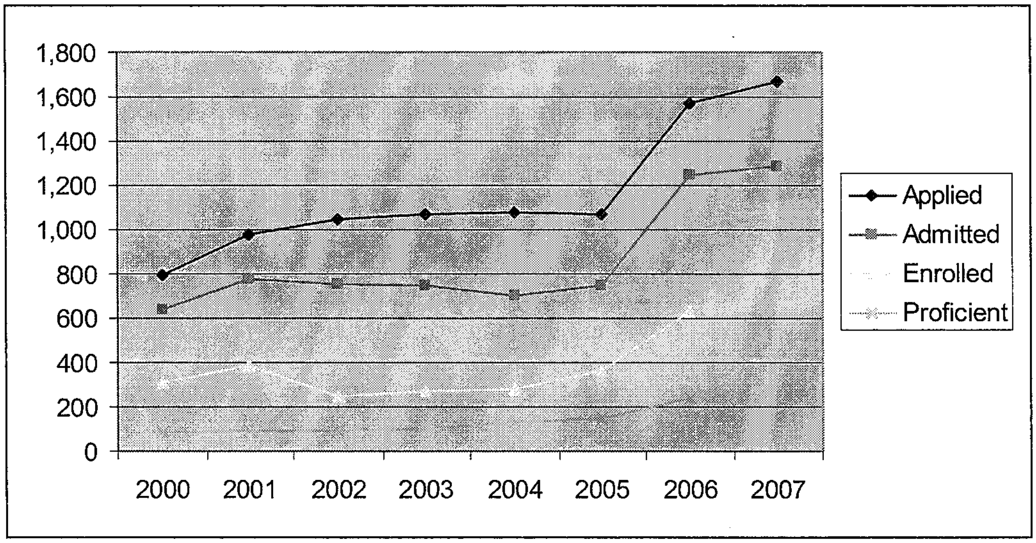
San Diego State University is renowned for the partnerships and synergies it creates between its School of Education and local K-12 schools in need. SDSU's efforts are not only improving the quality of the K-12 education in the San Diego region, but simultaneously strengthening the skills and experiences of SDSU's graduating teachers. At the same time, SDSU is making groundbreaking efforts in delineating a clear path for high school graduates to enroll at SDSU in order to strengthen the pipeline between K-12 education and higher education.

> **The Compact for Success is One of its Kind in the U.S.**
>
> "The Compact is an agreement like no other in the nation. San Diego State University has extended an invitation to our graduates, that if they work hard, there will be a place for them at the university. The Compact is our promise to Sweetwater students that we will give them the tools they need to be successful in college. The Compact is the chance to impact an entire generation."
>
> –Sweetwater Union High School District

- **SDSU strengthens the pipeline between K-12 and higher education**: The Compact for Success is a one-of-its-kind guaranteed admissions program and partnership between SDSU and Sweetwater Union High School District. The Compact for Success is a clear roadmap—supported with mentors, tutors, college preparation, and orientations—for students in the Sweetwater Union High School District to gain admittance to SDSU. The district is situated 15 miles from SDSU campus and is the largest and most diverse 7-12 system in California. Because of the Compact, there has been an unprecedented pipeline created between the school district and the University, providing the support and information for many students who may not have gone to college otherwise. The numbers show the impact of this remarkably successful program on the Sweetwater Union High School District graduates at SDSU:
  - 99 percent increase in applications to SDSU.
  - 96 percent increase in admittances to SDSU.
  - 104 percent increase in enrollment to SDSU.
  - 169 percent increase in proficiency at SDSU.[16]

[16] Proficiency is defined as having passed the EPT and ELM portion of the California Standards Test or having scored 550 on the SAT; or having received ACT scores of 24 in English and 23 for math.

Figure 1: Sweetwater Union High School District Applicants to SDSU



- **SDSU science majors create hands-on science curricula in local elementary schools**: The Partnerships Involving the Scientific Community in Elementary Schools (PISCES) Project has served over 150 classrooms in San Diego County. PISCES is a joint program of SDSU, the San Diego Science Alliance (SDSA), and San Diego County Office of Education. Elementary school teachers are partnered with SDSU science majors to plan and implement standards-based science unit using hands-on instruction. The effect of these programs are evidenced in the numbers:
  - 150+ classrooms served in San Diego County alone.
  - 10,980+ hours of support provided to San Diego County teachers through classroom intervention and professional development institutes.
  - 40+ hands-on science curriculum kits developed for teachers.
  - 500+ books and DVDs in PISCES resource library for teachers.
- **SDSU student teachers improve the academic performance of local schools**: Average Academic Performance (based on California Department of Education's Academic Performance Index) at Rosa Parks Elementary School has risen by nearly 26 percent since the start of the City Heights K-16 Education Pilot. City Heights K-16 Education Pilot is a six-year partnership between SDSU, Price Charities, San Diego City Schools, and San Diego Education Association to connect student teachers in the SDSU College of Education with classrooms in the City Heights area of San Diego, an area with a growing immigrant population and overcrowded classrooms.
- **SDSU performs outreach to prospective students**: In the 2005-2006 academic year SDSU conducted 244 visits to make contact with 18,821 prospective students at high schools, community colleges, and other sites within the local SDSU area.

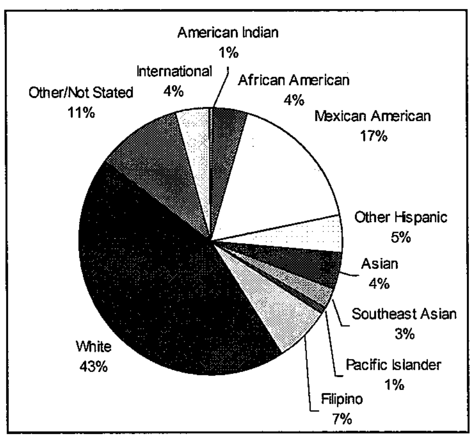
3.2.5. Serving San Diego's Underrepresented Populations

Part of the San Diego State University mission is to further social justice on campus and off campus in the San Diego region, and to promote a diverse student body. In pursuit of this mission, SDSU has made great accomplishments, and has achieved third-party recognition, for the education it provides to a diverse student body that draws from many of San Diego's most underrepresented communities and populations.

- **SDSU is committed to creating educational opportunities for underrepresented populations**: SDSU is consistently recognized for its ethnic and racial diversity. In the fall of 2006, 45 percent of admitted first-time freshmen were students of color.
- **SDSU is exceptional in the education it provides to San Diego's increasing Hispanic population**: SDSU is particularly recognized for the education it provides to Hispanics; SDSU ranks 9th in the nation and 4th in California for bachelor's degrees awarded to Hispanics (2004).
- **SDSU is aggressive in its acceptance of transfer students**: SDSU accepted 3,802 transfer students (on the San Diego and Imperial Valley campuses) in the Fall 2006, representing 42 percent of the incoming class (incoming class including first-time freshmen and transfer students).

Figure 2: Enrollment by Ethnicity (Spring 2007)

Total Enrollment, San Diego & Imperial Valley Campuses: 32,259



3.2.6. Advancing and Renewing San Diego's Workforce

San Diego State University helps to ensure that its workforce remains competitive by providing continuing education and extended studies to thousands of San Diego residents each year. These opportunities—frequently offered online or in other flexible scenarios—allow San Diegans to renew their skills and remain cutting-edge in San Diego's major industries.

- **SDSU is one of California's largest continuing education providers**: The College of Extended Studies at SDSU is one of the largest providers of continuing education in California.

- **SDSU is serving 53,000 students through the College of Extended Studies**: Each year more than 53,000 students take advantage of programs offered by the College of Extended Studies, ranging from single-day sessions to multi-year certificate programs, to degree programs for working adults.
- **SDSU offers seven fully-online degrees**: Seven Extension degree programs are offered fully online that focus on areas of regional employment growth:
  - MS, Biomedical Quality Systems
  - MA, Education
  - MA, Educational Technology
  - BA, Interdisciplinary Studies
  - MS, Regulatory Affairs
  - MS, Rehabilitation Counseling
  - BS, Vocational Education.
- **SDSU serves approximately 500 continuing education students each year**: Continuing education provides the San Diego workforce with a valuable venue for renewing its skills in response to the changing needs of the region's marketplace.

3.3. SDSU and San Diego's Innovation Economy

3.3.1. Summary of SDSU's Impact on Innovation

All successful regional economies must have healthy levels of innovation activities taking place that ensure a constant turnover of ideas, technologies, and companies to keep the region competitive. A successful economy has a regional system for performing basic scientific research (discovery), turning research results into industrial applications and technologies (development), and commercializing those technologies for the creation of start-up and spin-off companies and new employment opportunities for the region (deployment). A smooth and well-supported "Innovation Pipeline" that carries innovation from discovery, through development, and into deployment is essential to the success of the regional economy—it is only though this process that a region fully enjoys the economic benefits of its innovation, in the form of new businesses, employment, and revenues.

San Diego State University is a leader in the region in supporting San Diego's Innovation Pipeline in every phase. The research capabilities at SDSU have reached new levels of growth, and the University is performing research and development and supporting technology commercialization and start-ups in San Diego's most important, economy-driving industries—in addition to driving innovation results in the industries that are meeting San Diego's most important local challenges. These efforts are generating intellectual property that is forming the basis for new businesses, employment, and wealth in San Diego.

Highlights of SDSU's Impact on San Diego's Innovation

- Classification as a research university with "high research activity" by the Carnegie Foundation for the Advancement of Teaching will attract greater distinction, attention, and research talent to SDSU in the future.
- #1 small research university in the nation, according to 2005 Faculty Scholarly Productivity Index (FSP Index) based on faculty productivity, publications, citations, and awards.[17]
- $200 million in research revenues in SDSU Research Foundation in 2005-06, including $130 million in awards from 300 different organizations.
- Almost $3 million in industry-sponsored research in FY 2005-2006.
- $25,126,570 invested in innovation at SDSU in Bioscience, one of San Diego's most important growing industries.
- 1,500 active research grants, most of which are engaged in innovation in San Diego's major economy-driving industries or in creating solutions to San Diego's local challenges.
- Over $9.5 million from prestigious five-year Program Project Grant for the SDSU Heart Institute will make SDSU a center of new research in the preservation of heart cells during a heart attack.
- New $14.3 million BioScience Center will affirm SDSU and the San Diego region as centers of innovation in this rapidly-growing industry.
- New $11 million Coastal Waters Laboratory will be a center of public-private collaborative innovation in marine science.
- New grant of $10 million from the National Institutes of Health will address local issues in Latino health.
- 13 disclosures, $198,626 in royalties, and 3 start-up companies in the past year alone.
- 97 disclosures, $1,254,550 in royalties, and 13 start-up companies in the past 9 years, since the inception of the Technology Transfer Office.
- Of the 13 SDSU start-ups since 1998, 10 are still in existence, representing a survival rate of higher than 75 percent.
- SDSU's successful start-ups have collectively created over 45 new jobs and over $1.1 million in revenues for the San Diego economy in biotechnology, medical, software, and other industries.
- The Center for Commercialization of Advanced Technology, a public-private collaboration of which SDSU is a partner, has overseen 300 commercialization awards valued at over $18 million to 134 defense/homeland security-related technologies developed in private companies, government laboratories, and universities in the San Diego region.
- The Entrepreneurial Management Program is a NASDAQ Center of Excellence, placing it among the top eight such programs in the country.
- Ranks in the top 25 in entrepreneurship among regional universities in the U.S.

The sections below detail SDSU's impacts on San Diego's regional levels of innovation.

[17] http://advancement.sdsu.edu/marcomm/news/releases/spring2007/pr060107.html

3.3.2. Establishing a World-Class Research Institution

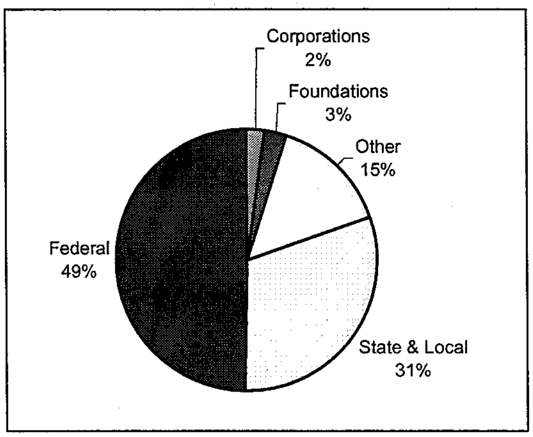
SDSU is becoming a premier research institution—and this research is concentrated around on the concrete needs of San Diego's industries, workforce, and economy. SDSU separates itself among teaching institutions and research institutions in that it performs leading-edge research *and* creates learning opportunities for its students with each project. SDSU is rapidly expanding its efforts to generate intellectual property that will form the basis for new sources of innovation, businesses, and employment in San Diego. The following is a summary of the recent distinctions that San Diego State University has received for its research and innovation.

- **SDSU is newly-classified as a research institution**: SDSU was newly classified as a research university with "high research activity" by the Carnegie Foundation for the Advancement of Teaching, a distinction that attracts stronger faculty, provides students with greater research opportunities, and establishes SDSU as a prestigious university and degree to bring to the workplace.
- **SDSU has been named the #1 small research university in the nation**: This ranking is according to the 2005 Faculty Scholarly Productivity Index (FSP Index) based on faculty productivity, publications, citations, and awards.[18] This recognition will only serve to accelerate SDSU's national recognition, prestige, and ability to attract top faculty, students, and research dollars in the future.
- **SDSU is growing its number of research faculty**: In 2006 alone, SDSU hired 88 new faculty members engaged in research and solidifying SDSU's reputation as a world-class research institution.
- **SDSU is attracting millions of research dollars to the region**: SDSU Research Foundation had 2005-2006 revenues of $130 million in awards (contracts and grants) from 300 different organizations. These research dollars stay in San Diego, which makes university research a large scale economic engine.

[18] http://advancement.sdsu.edu/marcomm/news/releases/spring2007/pr060107.html

Figure 3: SDSU Research Awards by Sponsor Type (Fiscal Year 2005-2006)

Total Awards: $130,363,547



- **SDSU is engaged in thousands of active research grants and contracts**: There are 1,500 active research grants and contracts administered by SDSU Research Foundation.

Figure 4: A Sampling of Corporate Sponsors of SDSU Research (FY 2003-2004)

Advanced Bionutrition Corporation	Menon and Associates
Advantage Interlock	Miyazaki
Air France	NCB English Language Institute
Applied Micro Circuits Corporation	Nokia
Aqua Bounty Pacific	Pacific Resources for Education and Learning
Bitterroot Restoration Incorporated	Personal Products Company
Boehringer Ingelheim Pharmaceuticals, Inc.	Pfizer La Jolla
Compass Learning, Inc.	Philips Electronics
Cox Cable San Diego	Prentice Hall
CVAC Systems	ProPharmaCon, LLC.
Eastman Kodak Corporation	Pyxis Corporation
ENCAD, Inc.	QUALCOMM Inc.
For Placement, Inc.	Science Applications International Corporation
General Atomics Corporation	Sea World of California
Geo-Centers	Social Policy Research Associates
IDEC Pharmaceuticals Corporation	Sorrento Electronics
Innovative Inclosures	Sullivan Consulting
Institute for Matching Person and Technology	Sun Microsystems
Knoll Pharmaceutical Company	Systems Integration and Management
KV Pharmaceutical Company	Tenera Environmental
Lawrence Frank and Company, Inc.	Union Bank Vitivity, Inc.
LifeScore	Websense, Inc.
McGraw-Hill Companies	

- **SDSU is attracting millions in external research funding**: SDSU faculty members have secured more than $800 million in external funding since 2000, to perform research that is more likely to have ties to industry and engage in issues of importance to San Diego than would research at other universities.
- **SDSU is a key resource for industry-sponsored R&D**: There was $2,963,857 in industry-sponsored research at SDSU in fiscal year 2005-2006, and this number is rising.

3.3.3. Performing Research in San Diego's Key Economy-Driving Industries

SDSU is an important innovation resource for San Diego's export-oriented industries. More than ever before, advanced and applied science is taking place at San Diego State University on complex issues that directly apply to San Diego's most important economy-driving industries. As noted above, SDSU had almost $3 million in industry-sponsored research in fiscal year 2005-2006; the University is actively working with corporations and public agencies to create research outcomes that are making San Diego's main industries more competitive. SDSU is active in research across a wide range of disciplines, from managing heart disease to probing the universe, and protecting our homeland to developing new antibiotics, and other areas in which advances are vital to San Diego and our nation.

The chart below shows the research dollars that SDSU has invested in each of San Diego's key export-oriented industries. SDSU is a clear leader in bioscience research, and has key research happening in coastal and marine science, aerospace and defense, international business, and information technology.

Table 23: SDSU Research Dollars in San Diego's Key Economy-Driving Industries

Aerospace and Defense	$2,043,536
Bioscience	$25,126,570
Coastal and Marine Science	$8,699,729
Information Technology	$76,074
International Business	$106,285

Source: SDSU Research Foundation

What follows is an assessment of the impact of SDSU's research and innovation in broadly-categorized, export-oriented industries that drive San Diego's economy:

Aerospace and Defense

- **SDSU is performing research with naval/defense applications**: The Cognitive Ergonomics Research Facility conducts basic research that uses eye-tracking measures to investigate aspects of cognitive processing and decision-making. The research has been applied to the context of Navy officers making tactical decisions in near-warfare situations and other defense applications. Sponsors include the Office of Naval Research, Air Force Office of Scientific Research, National Science Foundation, and National Institute of Education. In the course of the research, the CERF team has developed a joint venture, EyeTracking, Inc., that has patented and exclusively licensed several eye-tracking breakthroughs.

Bioscience

- **SDSU is helping make San Diego a global leader in biotechnology**: SDSU is a part of a special group of bioscience-focused research institutions that contribute to making the San Diego region a global leader in the biotechnology industry. That is no small contribution to the regional economy. This distinctive and growing activity not only adds to core knowledge of human health care, it reinforces and grows the surrounding bioscience economy—helping to form and attract new quality jobs at many levels from lab technicians and software programmers to engineers and scientists as well as those that supply these industries, including legal, accounting, management, logistics, technical services, marketing and finance.
- **SDSU's research covers a range of bioscience applications**: SDSU is conducting research on leading edge ways to improve human health and life expectancy. Research at SDSU is focusing on topics that range from the potential of stem cells to retard cardiac aging, to the use of gene transfer to interfere with the hardening of arteries, to the development of new vaccine delivery systems that have the potential to protect against disease-causing infections.
- **SDSU is a statewide leader in biotechnology and biomedicine**: SDSU's emergence as a significant life sciences research center has paralleled the development of a world-class biotechnology industry cluster in San Diego.
- **SDSU is home base to the CSU biotechnology program**: SDSU is the home base for California State University Program for Education and Research in Biotechnology (CSUPERB). CSUPERB is a broadly-based program designed to coordinate and amplify biotechnology research and education within the CSU, including activities that foster economic competitiveness, facilitate the training of the scientific and bio-manufacturing workforce, catalyze technology transfer and improve IP protection, and facilitate the acquisition of state-of-the art biotechnology resources.
- **SDSU's BioScience Center is a hub of cutting-edge research**: In 2005, SDSU completed the $14.3 million, 37,000 square-feet BioScience Center, a facility that brings together University researchers and biotechnology professionals from the private sector under one roof. The mission of the facility is to translate scientific discoveries into new, effective ways of treating human diseases. This facility houses research related to reducing the prevalence of cardiovascular disease, analyzing the organisms considered most likely to be agents of biological warfare, and addressing other critical health issues related to diabetes and cancer. The BioScience Center is home to several institutes, including:
  - **The Heart Institute:** This special organization is a multidisciplinary institute of 55 faculty and staff—from SDSU and other San Diego institutions—that perform research related to heart and cardiovascular system performance in health and disease. It is jointly sponsored by the College of Sciences and the College of Health and Human Services. In 2006, the Heart Institute won a prestigious five-year Program Project Grant from the National Heart, Lung and Blood Institute totaling almost $10 million to study how protecting mitochondria can preserve heart cells during a heart attack.
  - **The Center for Microbial Sciences:** The Center for Microbial Sciences (CMS) develops new applications of microorganisms in human health and the biotech industry. The CMS also promotes homeland security by researching the prevention, detection, and treatment of infectious diseases related to bioterrorism. The CMS is staffed by a multidisciplinary group of scientists from SDSU and several other institutions in San Diego.

- **SDSU is performing collaborative research in genomics**: The Center for Applied and Experimental Genomics promotes collaborative, multidisciplinary approaches to solving biological problems through the use of genomic, bioinformatic, and proteomic approaches.
- **SDSU is an R&D resource to San Diego's biomedical companies**: Numerous San Diego biotech companies such as Genentech, Integra Life Sciences, and Lpath Therapeutics sponsored research at SDSU in fiscal year 2005-2006. The level of industry-sponsored research at SDSU is rising and evidence of the strong and interconnected relationship between the University's research and the competitiveness of the bioscience industry in San Diego.
- **SDSU is performing research in a range of molecular biology applications**: The Molecular Biology Institute (MBI) has research grants in excess of $3 million per year from such sources as the National Institutes of Health, the National Science Foundation, National Aeronautics and Space Administration (NASA), the American Heart Association, the Muscular Dystrophy Association, Sea Grant, and the Air Force. The MBI faculty performs research that spans a wide range of biological issues.
- **SDSU houses specialized bioscience tools**: The CSUPERB Microchemical Core Facility is located on the SDSU campus and performs automated fluorescent sequencing services to support research by students and faculty at SDSU and other CSU campuses. DNA sequencing is done on the ABI Prism 3100 capillary electrophoresis DNA sequencer.

Coastal and Marine Science

- **The Coastal Waters Laboratory will be a center of collaborative research in marine science**: SDSU just finished construction of the new $11 million Coastal Waters Laboratory, which provides 10,500 square feet of indoor and 12,000 square feet of outdoor space for research focused on the environmental and ecological problems caused by urbanization in the coastal environment (at the land-water interface). The laboratory brings in concert the activities of SDSU and U.S. Geological Survey (USGS) researchers, and—with the Metropolitan Wastewater Department (MWWD) of the City of San Diego constructing an adjacent laboratory—this will be a site of mutual access and sharing of innovation among SDSU, USGS, and MWWD.
- **SDSU is active in research in the preservation of the region's coastal and marine environments**: The Coastal Marine Institute, whose home is in the Coastal Waters Laboratory, is a multidisciplinary research institute that studies the processes that affect the coastal and marine environment, educates students and the public, and provides advice on the wise use and management of natural resources.
- **SDSU is active in research specific to San Diego's coastal areas**: The Pacific Estuarine Research Laboratory performs research in coastal wetland restoration and wastewater management. Research topics range across coastal vegetation, invertebrates, fish, and birds in such places as Tijuana Estuary, Sweetwater Marsh National Wildlife Refuge, San Diego River Estuary, the wetlands of Mission Bay and Famosa Slough, Los Peñasquitos Lagoon, and San Elijo Lagoon.
- **SDSU provides marine mammal behavioral trainings to Sea World and the Navy**: The Cetacean Behavior Laboratory (CBL) performs research in the behavioral training of marine mammals. The CBL has taught training techniques to marine mammal behavioral trainers for such linchpins of the San Diego economy as Sea World and the U.S. Navy.

Information Technology

- **SDSU contributes to San Diego's leadership in information technology and engineering**: SDSU is actively engaged in helping the San Diego region stay at the top of the information age. Information technology and engineering are among the best known areas of California's innovation leadership, and SDSU focuses on understanding the IT and engineering needs of companies in the region and building research programs that are securing increasing levels of company participation. SDSU's Center for Information Technology and Infrastructure is an example of a growing number of centers in these fields.

> **The Center for Information Technology and Infrastructure (CITI) Was Born Out of Joint Projects with Local San Diego Agencies**
>
> CITI was born out of projects with local San Diego agencies that demonstrated the importance of new technologies to the San Diego region:
>
> - **Shadow Bowl**: A community readiness event planned around the Super Bowl to prepare local San Diego emergency medical providers with "what-if" scenarios.
> - **FairSher**: Demonstration for the San Diego County Fair of the use of various technologies to enhance communication between emergency responders and decision makers. Participants included the County Sheriff's Department, several high-tech companies, and SDSU and UCSD as university partners.
> - **Demonstration of homeland security capabilities**: Demonstration with the County Hazardous Materials group of local homeland security capabilities using wireless interaction among first responders in the field, SDSU's Visualization Center, and the Sheriff's Department Operations Center.
>
> Bob Welty, Co-Director of CITI, says that says that these events gave CITI the opportunity to showcase technologies that could be developed and scaled throughout the San Diego region. "The knowledge we gain in creating a smart campus," he says, "will be extended through our participation in development of a smart community."

- **SDSU is leading innovation in computational science**: The Computational Science Research Center (CSRC) fosters research, develops educational programs, and promotes industrial interaction, outreach, and partnership activities in computational science. Real world applications (and the educational opportunities they provide for students) are the focus of research projects undertaken at the CSRC. Computer modeling and simulations play a pivotal role in virtually every area of pure and applied research.

- **SDSU is a leader in visualization**: The SDSU Visualization Center is a new type of infrastructure for the visualization of scientific data, and has a broad range of possible applications in the future. The SDSU Visualization Center, and its sister facility at the University of California San Diego, are the result of a unique effort sponsored by the California Institute for Telecommunications and Information Technology, $CAL(IT)^2$, along with academic and industrial partners. The centers are used for research in environmental change, seismicity, climatological change, and natural disasters. Future applications (e.g., medical and pharmaceutical research, command-and-control functions for crisis response) are unlimited.

- **University-industry partnerships allow sharing of next-generation tools**: SDSU's relationship with $CAL(IT)^2$ was the foundation for an enhanced relationship with Sun Microsystems, which designated the SDSU Visualization Center a "Sun Center of Excellence for Collaborative Visualization." More recently, Sun donated a Sun "Zulu" high-end graphics system to that facility.

- **SDSU promotes new technologies to keep the region's IT industry competitive**: The Center for Information Technology and Infrastructure (CITI) has a mission to promote the use of emerging tools to increase San Diego's competitiveness in the industry. CITI promotes the use of optical networking, wireless communication, and human-computer interactions through visualization, in order to pursue projects in the themes of homeland security, natural disaster mitigation and response, global sharing of information and collaborative visualizations, and remote sensing and environmental monitoring. CITI has an explicit mission to use its resources to increase San Diego's competitive ability to retain and attract people, businesses, and jobs.

International Business

- **SDSU is a national leader in innovation around international business issues**: SDSU has the largest undergraduate international business program in the country, supported by the Center for International Business Education and Research (CIBER). CIBER is one of 30 centers nationwide that performs activities to enhance U.S. competitiveness abroad. CIBER is funded in part by a grant from the U.S. Department of Education. The Center's activities include providing grants to fund faculty research and student internships abroad, performing outreach and development programs for the business community, and offering training programs for language and business faculty from institutions across the country.
- **SDSU is performing research with international distinction**: Research is focusing on topics of international importance in the International Security and Conflict Resolution (ISCOR) program. The only program of its kind in California, ISCOR performs research in topics that range from the role of women-run non-governmental organizations in the reconstruction of Afghanistan, to the migration and ethno-religious violence in the Russian Federation.

3.3.4. Performing Research to Meet the Needs of San Diego and Its Residents

SDSU is highly involved in innovative research on the issues facing everyday San Diego, from meeting education needs to managing water resources to meeting energy needs to managing healthcare. SDSU is committed to identifying and addressing the unique challenges facing the San Diego region. This stewardship of the region is one of the main facets of SDSU's contribution to the San Diego region.

The research that is taking place at SDSU will create solutions for San Diego and its residents (in education, public health, environmental quality, and energy) that will make San Diego a more competitive place to start, grow, and attract business. And, in many cases, the research being performed to address San Diego-specific issues is producing results that have state, national, or even international consequence, and the knowledge that is exported may be the basis for future industries to drive the San Diego economy.

SDSU is long-recognized for forging strong community partnerships in education and public health. Research is also being performed in such topics of regional importance as addressing obesity, nurturing youth, monitoring water quality, and eliminating air pollution.

Education

- **SDSU is a leading institution in the research of math and science education**: The Center for Research in Mathematics & Science Education (CRMSE) brings together faculty members from the College of Sciences and the College of

Education in the study of how individuals acquire knowledge in mathematics and science. CRMSE serves as the headquarters for the Association of Mathematics Teacher Educators (AMTE), the leading organization devoted to supporting mathematics teacher education. CRMSE performs research in such topics as the teaching and learning of mathematics and science; the development of mathematics and science curriculum for elementary, secondary, and tertiary education; the development of materials for the professional development of teachers; and community involvement in education.

Energy

- **SDSU research is working to address regional energy issues**: The Center for Energy Studies facilitates interdisciplinary research into energy issues of particular concern to the San Diego region, including the border region with Mexico. Research has been performed in such topics as using photovoltaics to meet peak demand in San Diego County, and analyzing the emissions from trucking across the California-Mexico border. Sponsors include San Diego Association of Governments (SANDAG) and Southwest Center for Environmental Research and Policy.

Environment

- **SDSU is working on global environmental issues**: The Global Change Research Group is conducting research to elucidate the responses of plants and ecosystems to elevated CO_2 in order to aid the understanding of potential changes and inform policy decisions that affect the world's biological future.
- **SDSU's field stations provide protected areas for collaborative environmental research**: The SDSU Field Stations Program provides a network of protected lands and facilities to support research and innovation in global climate change, watershed studies, and innovative education programs. The SDSU Field Stations Program was one of the country's first field-based programs to invest in wide-area wireless telecommunications and sensor networks for new ways to discover the natural world.
- **SDSU is developing innovations in the ecosystem dynamics of arid lands**: The SDSU Soil Ecology and Restoration Group (SERG) focuses on ecosystem dynamics of arid and semiarid lands. SERG is a research group within the biology department of SDSU and administrated by the SDSU Research Foundation. Research emphases include restoration techniques, soil chemistry, soil microbial ecology, and plant-microorganism relationships. Grants have come from such federal agencies as U.S. DOE, EPA, and NSF, such state agencies as California Department of Transportation, Department of Fish and Game, and Department of Parks and Recreation, and such corporations as Southern California Edison, AMEC, and EDAW.

Public Health

- **SDSU is active in issues that are of importance to San Diego**: Faculty have won prestigious grants in the past year to study topics that directly affect San Diego, including $10 million from the National Institutes of Health to study Latino health.
- **SDSU's Graduate School of Public Health (GSPH) is deeply engaged in San Diego public health issues**: The GSPH has a number of affiliated research centers that conduct clinical and community-based health research, most of which are housed off-campus in the San Diego community.

- **Center for Injury Prevention Policy and Practice**: Serves as a resource center to San Diego public health agencies and programs on child and adolescent injury prevention strategies.
- **California Distance Learning Health Network**: A non-profit organization under the GSPH that researches, develops, and transmits public health media campaigns, particularly related to immunization and bioterrorism preparation.
- **Center for Behavioral and Community Health Studies**: Promotes interdisciplinary research in the applications of behavioral science to medicine and healthcare, working in collaboration with other San Diego institutions.
- **Center for Behavioral Epidemiology and Community Health**: An interdisciplinary, extramurally-funded research organization that studies behavior that prevents or contributes to the causes of disease and injury.
- **Institute for Public Health**: Serves as the bridge in developing mutually-beneficial partnerships between GSPH research and local, regional, and statewide public and private health and social services agencies.
- **San Diego Prevention Research Center**: An academic-community partnership committed to conducting research and education to promote physical activity and improve the health of Latino populations.
- **Center for Public Health Security**: Partners with public-private community leaders—such as San Diego County, Health and Human Services—to promote preparedness for infectious disease epidemics and other global disasters.

Water Resources

- **SDSU is tackling critical water resources issues**: The Center for Inland Waters fosters interdisciplinary research into solutions for increasingly serious economic, environmental, and political problems concerning water supply in southern California. Major regional focuses for the Center are the Salton Sea, the lower Colorado River, and the Coachella, Imperial and Mexicali Valleys.

3.3.5. Turning Research into Technologies, Start-Up Companies, and Employment Opportunities in San Diego

Research and innovation would be for naught for the regional economy, if not for the infrastructure in place that works to turn basic research into commercial products and eventually into new employment opportunities through start-ups or spin-offs. SDSU carries out research to advance knowledge *and* provides the means to apply these ideas to grow the economy. SDSU could be described as an "ivory tower with entrepreneurial muscle." Research at SDSU has historically focused on real-world, commercial applications, and the University has a wide variety of programs and facilities in place to accelerate and amplify the economic impact of SDSU research on San Diego's economy. The University also provides a wide range of trainings and services to promote entrepreneurial skills across California's communities.

- **SDSU trains world-class entrepreneurs**: The College of Business' Entrepreneurial Management Center (EMC) is a NASDAQ Center of Excellence, placing it among the top eight such programs in the country. The Center was founded in 1986 with the objective of seeding the local business community with graduates well-grounded in entrepreneurial skills and methods. The Center has helped the SDSU College of Business attain leadership stature by continually developing and enhancing coursework and complementary experiential outreach programs. The EMC maintains a clear focus on the three essential areas of research, curriculum, and outreach.

- **SDSU is a recognized center of entrepreneurship**: SDSU ranks in the top 25 in entrepreneurship among regional universities in the U.S. according to *Entrepreneur Magazine*.
- **SDSU speeds the commercialization of defense/homeland security technologies**: The Center for Commercialization of Advanced Technology (CCAT) is a public-private collaborative that provides commercialization support to technologies that meet critical defense and homeland security needs. CCAT is supported by Congress and funded through the Office of Naval Research. Partners include the SDSU Research Foundation and Entrepreneurial Management Center, the University of California, San Diego (UCSD) Jacobs School of Engineering, the von Liebig Center for Entrepreneurialism, CONNECT, and the Space and Naval Warfare Systems Center Pacific. CCAT collaborates with military services and other DOD and DHS agencies to determine critical needs, translates these needs into CCAT-sponsored solicitations, employs a vast network of subject matter experts to review submissions, and then fast-tracks the most promising technologies to market. Since inception in 2001, CCAT has achieved the following:
  - Sponsored 30 nationwide competitive solicitations inviting industry, government laboratories, and academic research institutions to submit proposals for new technologies responding to topics of critical interest.
  - Accepted and evaluated 925 proposals for new technologies responding to solicitations.
  - Awarded 300 commercialization awards valued at over $18 million to 134 technologies developed in private companies, government laboratories, and universities.
  - Awards range from product development, market studies, and case studies to mentoring, financial forums, and technology springboards.

Table 24: Technology Transfer Results at SDSU

	Activity in the Past 1 Year (2006-2007)	Activity in the Past 9 Years (1998-2007)
Disclosures (Patents and copyrights)	13	97
Royalties	$198,626	$1,254,550
Start-up companies	3	13

Source: Technology Transfer Office, SDSU Research Foundation

- **SDSU turns ideas into disclosures, royalties, and start-up companies in San Diego**: Since July 1, 2006 alone, the SDSU faculty has filed 13 disclosures (patents and copyrights), generated $198,626 in royalties, and started 3 companies.
- **SDSU R&D and commercialization activities have resulted in 13 new companies since 1998**: Since 1998, SDSU faculty has produced 97 disclosures (patents and copyrights), $1,254,550 in royalties, and started 13 companies.

- **Of the 13 start-ups since 1998, 10 are still in existence, representing a survival rate higher than 75 percent**: These successful start-ups to have emerged from SDSU since 1998 are shown in the table below. Their high survival rate can in great part be attributed to the support of the SDSU Technology Transfer Office. The majority of these start-ups are in biotechnology and San Diego's other major economy-driving industries.

Table 25: Selected SDSU Start-Up Companies Since 1998

Company	City	Business	Stage	Employees	Revenue
Novaphage	San Diego	Biotechnology	Development	2	None
LPath	San Diego	Biotechnology, public company	Revenue-generating	20+	$411,000
Vaxion	San Diego	Biotechnology	Research	4	None
Pure-O-Tech	Escondido	Environmental engineering, water purification	Spin-off, $1,500,000 R&D grant	3	None
Eyetracking	San Diego	Software	Unknown	Unknown	$46,500 (includes revenues and grants)
SPARK	Atlanta, GA	Sports and Fitness Education	Acquired by Sportime	Unknown	$290,000
Software Partners	San Diego	Electronic medical registry	Unknown	Unknown	Unknown
E-Chug/E-Toke	San Diego	Alcohol and Drug Abuse Testing/Software	Revenue-generating	6	$390,000
Fluorotronics	San Diego	Analytical Devices	R&D grants	5	None
EXIGE	San Diego	Language Testing	Operated within the University	4	$26,000
SD CHI	San Diego	Exercise and Nutrition Counseling	Grant-funded R&D company, Relocated to UCSD	6	$6,000 (includes revenues and grants)

- **SDSU's start-ups have collectively contributed over 45 jobs and over $1.1 million in revenues to the San Diego economy**. These ten SDSU start-ups (in the table above) that have survived since 1998 have contributed in new employment, innovations, and revenues to San Diego's biotechnology, medical, software, and other industries.

3.4. SDSU and San Diego's Quality of Life

3.4.1. Summary of SDSU's Impact on Quality of Life

Quality of life is an essential foundation to any successful regional economy, because—though quality of life is a rightful end unto itself—it is also a major and necessary tool in attracting businesses, employees, and residents to the region. Quality of life is the mix of arts, cultural offerings, sports and entertainment in a region, and San Diego—consistently described as having one of the nation's top qualities of life—is well benefited by San Diego State University's vast array of offerings.

SDSU provides programs and services that on a daily basis make San Diego a better region to live, work, and play, from its libraries to its cultural performances, and from its sporting events to the thousands of hours of volunteering its students contribute to the region. These amenities not only represent a huge contribution by SDSU to the public good for San Diego residents, but they also attract visitors and their spending dollars to the San Diego economy each year.

Highlights of SDSU's Impact on San Diego's Quality of Life

- 6,400,000 items in library collections and available for public access.
- 685 public-access computers.
- 2,600,000 annual visits to the library, many of whom are from the general public.
- 6,827 attendees to annual series of 195 library lectures.
- Estimated 74,000 visitors (prospective students, families, and other non-SDSU affiliated) to campus each year for new student orientation, year-round campus tours, "Explore SDSU" Open House in March, and graduation—and their spending dollars.
- KPBS, the local PBS radio and television station based at SDSU, is the most-watched public television station in the country during prime time.
- Estimated 375,000 total attendance for all campus home sports games for 2006-07 school year, up from 300,000 in recent years.
- Estimated 75 percent of attendance at SDSU athletic events, or over 280,000 people, are visitors from the general public. For those who are coming from within the San Diego region, SDSU is providing a large but as yet unquantifiable public good to the region's quality of life. Yet, for those who are coming from outside the San Diego region, SDSU is serving as a wealth generator for the San Diego economy by attracting visitors and their spending dollars from elsewhere.
- Estimated 65,800 annual attendees to SDSU Cultural Arts and Special Events (CASE), which includes noontime concerts, coffee house performances, open mic, homecoming, AzFest, and other special events. Approximately 10 percent of attendees are from the general public.
- 3,899 total attendees to Guest Art series and University Art Gallery each year. Between 15-35 percent are from the general public.
- 12,500 attendees to theatre performances each year, between Powell Theatre and Experimental Theatre. Approximately 45 percent are from the general public.
- 20,000-25,000 attendees to music and dance performances each year. This includes paid and free concerts and recitals by student, faculty, and guest artists throughout the year in Recital Hall, Rhapsody Hall, and Dance Studio Theatre.
- Estimated 208,295 attendees to Cox Arena (excluding athletic events) and 23,805 attendees to Open Air Theatre for major concerts, performances, and events for a total of 117 event days during 2005-06, of whom an estimated 85-90 percent is from the general public.
- 175,000 hours of community service performed by SDSU students each year.
- 152,000 internship hours, or the equivalent of 73 full-time equivalent employees, are provided each year to San Diego social service agencies by students in the SDSU School of Social Work.
- 180 community agencies are partners with SDSU's Center for Community-Based Student Learning.
- 39,606 bed nights offered by SDSU Conference Center to summer youth and adult programs.
- 80+ organizations use SDSU facilities each year, ranging from industry associations to summer youth camps to church organizations.
- 16,778 members of Aztec Recreation Center, including 1,469 members from the general public.

The sections below detail SDSU's impacts on San Diego's quality of life.

3.4.2. Providing Public Access to Academic Resources

SDSU provides a public good to the community in the library resources and academic lectures it provides. In addition, the visitors who come to the SDSU campus to explore and utilize its academic resources, including prospective students and their families, bring an influx of spending dollars into the San Diego economy.

- **SDSU provides leading-edge library resources to San Diego residents**: The SDSU Library is an open facility, welcoming the general public to use its resources on an in-house basis. Certain services such as research assistance are available to community members, though priority is given to affiliates of the University. Guest library cards are available on an annual basis to residents of San Diego and Imperial Counties, allowing guests to borrow up to five books at a time. Resources that are available to the public include 6,400,000 total items in the collections, 685 public-access computers, and 195 annual orientations/lectures.

Table 26: SDSU Library Statistics

Total items in collections	6,400,000
Total public access computers	685
Annual visits	2,600,000
Weekly reference questions	6,005
Annual orientations/lectures held	195
Annual attendance at orientations/lectures	6,827
Number of library cards issued to general public	1,231

- **SDSU attracts non-SDSU affiliated visitors and their spending dollars**: SDSU attracts an estimated 74,000 non-SDSU affiliated visitors to the campus each year (including prospective students and their families) for new student orientation, year-round tours for prospective students, "Explore SDSU" Open House in March, and graduation. These visitors, frequently coming from outside of San Diego represent an injection of spending dollars into the regional economy.

Table 27: Major Academic and Other Events and Estimated Number of Visitors

Event	Estimated Number of Visitors (Non-SDSU Affiliated)
New student orientation (August)	28,000
Tours by prospective students and families (Year-round)	15,000
"Explore SDSU" Open House for prospective students (March)	11,000
Graduation (May)	20,000
TOTAL	**74,000**

3.4.3. Creating a Center for Lectures, Arts, and Performances

SDSU delivers an amazing variety of culture resources and entertainment to San Diego residents and in doing so adds quality-of-life assets to the region that are measured by businesses, families, and individuals when deciding whether to locate in San Diego. SDSU is a cultural resource used by thousands of San Diego residents of all ages for its diverse offerings. SDSU is an important and highly-regarded provider of cultural events and other information resources including newspapers, radio, and television stations that reach large student and community audiences.

- **SDSU offers art gallery and lectures**: The School of Art, Design, and Art History reports 1,200 attendees to the Guest Art series and 2,699 visitors to the University Art Gallery (2003-2004). Between approximately 15-35 percent of these attendees are from the general public, revealing SDSU's impact on quality of life and—in the case of visitors who come to the gallery and lectures from outside the San Diego region—wealth generation for the region.
- **SDSU attracts theater-goers**: Theater performances attract approximately 12,500 people per year, between the Powell Theatre and the Experimental Theatre. It is estimated that approximately 45 percent of attendees are from the general public.
- **SDSU has a variety of music and dance offerings**: Music and dance performances have attendance of 20,000 to 25,000 each year. This includes paid and free concerts and recitals by student, faculty, and guest artists throughout the year in Recital Hall, Rhapsody Hall, and Dance Studio Theatre.
- **SDSU offers a range of cultural arts and special events**: Cultural Arts and Special Events (CASE) on campus have an annual attendance of 65,800—10 percent of whom are estimated to be from the general public.

Table 28: Cultural Arts and Special Events (CASE) and Estimated Attendance

Event	Estimated Annual Attendance[19]
Noontime concerts (40 per year)	20,000
Coffee House performances (60 per year)	3,000
Open Mic (30 per year)	1,800
Homecoming	5,000
AzFest	5,000
Special Events	10,000
TOTAL	**65,800**

[19] Attendance numbers do not differentiate between one-time and multiple attendees; nor do they differentiate between SDSU students and visitors, though most attendees are SDSU students.

Dead Sea Scrolls Exhibition

San Diego State University makes tremendous contributions to our region's culture and economy through the work of its highly talented faculty. The current Dead Sea Scrolls exhibition at the San Diego Natural History Museum was the brainchild of Dr. Risa Levitt Cohn, director of SDSU's Jewish Studies program. Dr. Kohn is curator of the exhibit, which has already sold more than $1 million in tickets to people in 47 states, Washington D.C., England, Scotland, and Canada.

By the time the six-month exhibition closes its doors, the museum expects more than 450,000 people to have visited. The Dead Sea Scrolls exhibit has caused membership at the museum to skyrocket and has brought in dozens of new donations. Already, there have been more than $3 million in donations to support the exhibit. In addition, there will be dozens of lectures about the history and origins of the scrolls, as well as discussion of the many controversies and theories surrounding the biblical manuscripts. The catalog to describe the exhibition was written by Dr. Kohn and it is being published and paid for by SDSU.

- **SDSU offers large concerts, performances, and events**: Beyond hosting approximately 126,000 attendees to 18 basketball games each year, Cox Arena is a major venue for large concerts, performances, and events; it had approximately 208,295 attendees to 106 non-athletic events in fiscal year 2005-2006. In addition, Open Air Theatre had a total attendance of 23,805 for 11 event days during fiscal year 2005-2006. Of the attendees to these large events, it is estimated that 85-90 percent are from the general public. For those attendees making the trip from within the San Diego region, SDSU is providing an as yet unquantifiable public good to the region's quality of life, and for those visitors making the trip from outside the region, SDSU is serving as a net wealth generator for the San Diego economy by attracting the spending dollars of visitors from elsewhere.
- **KPBS, the local PBS radio and television station based at SDSU, is nationally-renowned**: KPBS is the most-watched public television station in the country during prime time, according to Nielson ratings. The station's daytime schedule—made up mostly of children's programs—ranked third in the country among public television stations. In 2005-2006, KPBS received a cumulative $7.7 million in contributions from its 50,000 members.

3.4.4. Fielding Sports Teams for Regional Fans

San Diego State University attracts hundreds of thousands of attendees to its home sports games each year, creating regional loyalty and entertainment and attracting visitors and their spending dollars into the San Diego regional economy.

- **SDSU sports teams attract an increasing number of fans each year**: Total attendance for all sports homes games is estimated to reach 375,000 during the 2006-2007 school year, up from 300,000 in recent years. This includes the 150,000 who attend home football games (played at QUALCOMM Stadium).
- **Visitors from the general public come to SDSU from in and around the region for sports**: Of the 375,000 estimated visitors to SDSU athletic events, the general public (people not classified as students, faculty, or staff) constitutes approximately 75 percent, or over 280,000 general public visitors per year. This number is important; for those visitors who are making the trip to SDSU from within the region, SDSU is providing a large and as yet unquantifiable public good to the region's quality of life, and for those visitors making the trip

to SDSU athletic events from outside the region, SDSU is serving as a net wealth generator for the San Diego economy by attracting the spending dollars of visitors from elsewhere.

- **SDSU raises San Diego's visibility by hosting prominent sports events**: In 2006 SDSU's Cox Arena was host to six games in the first and second rounds of the NCAA Men's Basketball Tournament. Cox Arena also hosted games in the Tournament in 2001. Hosting nationally-televised events such as the NCAA Men's Basketball Tournament represents an important contribution by SDSU to San Diego's nationwide visibility.

3.4.5. Offering the Public Use of its Facilities

San Diego State University offers public use of its recreational and conference facilities to a wide range of community organizations, youth groups, and industry associations. The rental of these facilities enriches the abilities of these social-fabric organizations to operate, and they are greater evidence of SDSU's contribution to San Diego's quality of life.

- **SDSU Conference Center provides space for summer camps and other groups**: This facility offers the use of its facilities for a total of 39,606 bed nights in the summer to a variety of youth programs and adult conferences.

Table 29: Summer Use of SDSU Conference Center (2004)

Group Type	Number of Groups	Bed Nights
Youth Sports	14	6,499
Youth Religious	3	11,579
Youth Educational	15	17,277
Youth Leisure	5	2,307
Adult Educational	7	1,944
TOTAL	44	39,606

- **SDSU provides community use of facilities year-round**: More than 80 different organizations rent facilities during the year at SDSU, varying from industry associations to summer youth camps to church organizations (2004).
- **SDSU offers recreational facilities/gyms to its affiliates and the public**: Aztec Recreation Center has 16,778 members, including 1,469 from the general public.

Table 30: Recreation Facilities and Annual Membership

	Aztec Recreation Center	Mission Bay Aquatic Center
SDSU students	14,381	6,003
SDSU faculty/staff	460	156
SDSU alumni	468	1,415
Non-affiliated (general public) use	1,469	7,401[20]
TOTAL	**16,778**	**14,975**

- **SDSU offers field trips to its field stations**: The four SDSU Field Stations provide a wealth of environmental education and interactive learning opportunities for the public, including public tours, lectures, public art projects, and volunteer opportunities. The field stations also partner with San Diego schools for field trips and other learning for K-12 students.

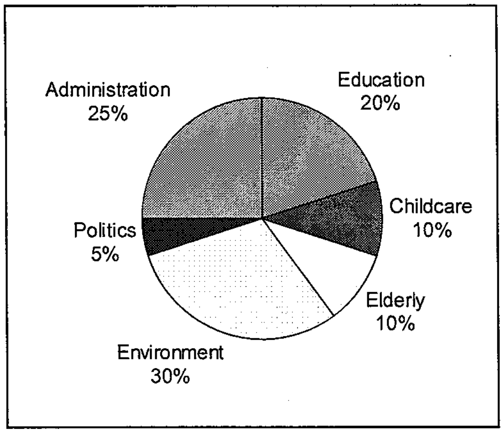
3.4.6. Enriching the San Diego Region with Community Service

San Diego State University provides a difficult-to-measure value to San Diego residents in its students' ongoing community service. These hours to the community, which can be assigned a fair market value, are being provided to the San Diego region at no cost, and represent a public good. These volunteer services would likely not otherwise be performed in the absence of the University; SDSU is dedicated to civic engagement and service through its mission and actions. SDSU instills students with a call to engage with the community and facilitates their volunteer activities in a variety of campus organizations, activities, and services.

- **SDSU students provide major levels of community service to the community**: It is estimated that SDSU students volunteer 175,000 hours of service to 1,400 community projects annually, ranging from K-12 education to nutrition to social services. This number is an estimate; official numbers do not accurately represent the actual number of community service hours that SDSU students perform. SDSU records 10,058 hours of community service by students involved in Greek organizations and 6,000 hours from students in community service organizations (2005-2006). It is estimated that 20 percent of SDSU students perform community service.

[20] Includes UCSD students, faculty, and staff and SDSU Extended Studies students.

Figure 5: Student Community Service by Type



- **SDSU course offerings foster service learning**: SDSU offers 20 courses with service learning components.
- **SDSU actively encourages students to be engaged with the community**: The Center for Community-Based Student Learning (CCBSL) serves as a resource to encourage SDSU students to be actively engaged with the San Diego community, and to assist SDSU students in developing the skills necessary to be civically-responsible citizens and to take action on social issues that are important to them. Since its inception in 1998, CCBSL has partnered with more than 180 community agencies in which students have performed community service.
- **SDSU students provide care to San Diego residents in need**: Students in the School of Social Work provide over 152,000 internship hours to local San Diego social services agencies per year—this equates to a little over one hour each week per student, or the equivalent of 73 full-time equivalent employees in San Diego social service agencies (2005/06).

3.5. SDSU and San Diego's Transportation, Energy, Police, and Other Services

3.5.1. Summary of SDSU's Impact on Transportation, Energy, Police, and other Services

Transportation, energy, and police are all part of the public infrastructure that is critical for a region to build and maintain in order to serve the needs of businesses and residents and to be economically competitive. This infrastructure in San Diego—while typically provided by public agencies—is in fact partially supported by San Diego State University.

The University is making active contributions to the transit, energy, and public safety needs of the region. SDSU is engaged in assisting the transportation needs of students, faculty and staff, and visitors to and from campus, preserving the public safety of those on its campus, and even in producing and providing energy to the grid. All of these activities contribute to the creation of a unified infrastructure network to support San Diego's regional economy, while simultaneously reducing SDSU's impact on the public provision of these services.

Highlights of SDSU's Impact on San Diego's Transportation, Energy, Police, and Other Services

- 9,264 subsidized transit passes sold in FY2005-2006, one year after the opening of new multimodal transit center at SDSU, evidence of the University's dedication to transit-oriented growth in the San Diego region.
- An estimated 12,000 students, faculty and staff can be accommodated by the SDSU trolley station. The University's dedication to smart transit growth resulted in a change from a "commuter campus" to a "community campus."
- 27,948 total calls responded to by the SDSU police in 2006, of which 8,943 were called in by the community, contributing to the maintenance of public safety in the 1-mile jurisdiction around campus and reducing the use of the city police force.
- 100 percent of SDSU's electric needs are met by its own clean, efficient power plant. It creates no burden on the grid.
- 120,000 kWh/month exported to the grid (with a capacity to export as much as 1.0-1.5 megawatts in a demand-response scenario), reducing San Diego's energy use "footprint."
- 5 solar photovoltaic arrays and two demonstration solar projects at SDSU indicate its leadership in the deployment of clean and renewable energy sources.

The sections below detail SDSU's impacts on San Diego's transit, police, energy, and other services.

3.5.2. Aiding Transportation Needs of Students, Faculty, Staff, and the Public

- **SDSU is a leader in innovative, transit-oriented development**: SDSU worked with San Diego Metropolitan Transit System in the development of a new, groundbreaking, multimodal transit center in the heart of the SDSU campus that opened in 2005 with a mind for offering convenient mass transit and a "community campus" rather than a "commuter campus." The trolley can accommodate12,000 students, faculty and staff.[21] SDSU has been recognized as an example to other institutions seeking growth in already heavily-built out areas.

- **SDSU contributes to the graduation of civil engineers who can go on to work on San Diego's regional transportation issues**: SDSU graduated 81 civil engineers in 2005/06, who are able to move onto meet key regional transportation needs for San Diego.

Table 31: Number of SDSU Transit Passes Sold in Fiscal Year 2005-2006

Students	5,902
Faculty and Staff	3,362
TOTAL	**9,264**

[21] http://www.scup.org/about/Awards/2006/San_Diego_State.html

3.5.3. Providing Police Protection

- **SDSU helps keep the campus and surrounding area safe**: The SDSU police responded to 27,948 total calls in 2006, of which 8,943 were called in by the community, contributing to the maintenance of public safety in the 1-mile jurisdiction around campus and reducing the use of the city police force.

3.5.4. Providing Energy to the Grid

- **SDSU provides 100 percent of its own electric energy**: SDSU uses a clean, efficient power plant to meet 100 percent of its own electric needs. It creates no burden on the grid.

- **SDSU is a net exporter to the grid, helping to reduce San Diego's energy "footprint"**: SDSU exports 120,000 kWh/month to the grid and has the capacity to export 1.0-1.5 megawatts in a demand-response scenario.

- **SDSU is leading the deployment of clean and renewable energy sources**: SDSU has 5 solar photovoltaic arrays and two demonstration solar projects.

3.6. SDSU and San Diego's Housing and Healthcare

3.6.1. Summary of SDSU's Impact on Housing and Healthcare

Housing and healthcare are essential foundations to any regional economy. A region must provide the housing and healthcare options that its population needs in order to support a successful regional economy. San Diego State University contributes to the region's supply of housing and healthcare with its own programs that support its students, faculty, and staff, and reduce demand on public services.

Highlights of SDSU's Impact on San Diego's Housing and Healthcare

- 55,000 patient visits provided by SDSU Student Health Services in 2005-2006.
- 5,000 students and 14 faculty/staff housed in campus-owned or -managed housing.
- 246 children are cared for in the SDSU Children's Center.

The sections below detail SDSU's impacts on San Diego's housing and healthcare.

3.6.2. Offering Medical Care

- **SDSU provides medical care to its students, faculty, and staff**: SDSU Student Health Services provided for 55,000 patient visits in the 2005-2006 fiscal year, a number that has grown by almost 8 percent over the past two years. SDSU Student Health Services provides medical care for the student population and initial care for occupational injuries among faculty and staff.

3.6.3. Providing Housing

- **SDSU provides campus housing for students, faculty, and staff**: 5,000 students and 14 faculty/staff are housed in campus-owned or -managed housing.
- **SDSU offers guest housing on campus**: Guest housing on campus provides for approximately 40 guests for a total of 134 bed nights (2003-2004).

3.6.4. Providing Childcare for SDSU Families and the Public

- **SDSU helps fill the childcare needs of students, faculty, staff, and the public**: The SDSU Children's Center provides childcare to 246 children each year, of which 104 are related to students, 77 are related to faculty and staff, 41 are related to alumni, and 24 are related to the general public. All families are welcome. Priority is granted to families of SDSU students, faculty, and staff. Subsidized fees are available for income-eligible student families.

3.7. SDSU and San Diego's Image and Marketing

3.7.1. Summary of SDSU's Impact on Marketing

Marketing is an essential foundation of any successful regional economy. Marketing relates to the packaging of a region's assets and advantages into a tight and consistent message about the region for promotion other businesses, investors, and the population in general. A successful region is able to coordinate and bundle its advantages into a comprehensive package that is consistently promoted by all coordinating organizations in the region, and is used to successfully attract businesses, investors, and others to the region, looking to take advantage of the region's strengths.

SDSU is more than a source of workforce, innovation and entrepreneurship, culture and recreation, and infrastructure. SDSU is an asset in the marketing of the San Diego region to the rest of California, the U.S., and even the world. The University's research, education, events, and activities draw news media and public attention on a daily basis, promoting the San Diego region as a place attractive to not only students and faculty, but employers who see the area as a good place to live and work.

Highlights of SDSU's Impact on San Diego's Marketing

- 200,000+ people receive SDSU marketing materials each year, acting as advertising for the San Diego region as well.
- $1,000,000+ in advertising value is generated by SDSU's cooperative media efforts each year, indicative of the scope of reach of SDSU in the news.

Appendix: San Diego's 20 Largest Employers

Rank	Company	Total Number of Employees, 2007
1	State of California	40,500
2	Federal Government	39,900
3	UC San Diego	26,924
4	County of San Diego	16,147
5	San Diego Unified School District	14,555
6	Sharp HealthCare	13,872
7	Scripps Health	12,196
8	**San Diego State University**	**11,247**
9	City of San Diego	11,195
10	Qualcomm, Inc.	8,008
11	Kaiser Permanente	7,330
12	U.S. Postal Service, San Diego District	6,946
13	San Diego Community College District	5,722
14	Sempra Energy	5,264
15	General Dynamics Nassco	4,680
16	Science Applications International Corp.	4,588
17	Northrup Grumman Corp.	4,165
18	Barona Valley Ranch Resort and Casino	3,453
19	Rady Children's Hospital, San Diego	3,260
20	University of San Diego	3,198

Source: San Diego Business Journal/Special Report, June 11, 2007.

page

F1.0

California State University,
The California State University, Working for California

CSU The California State University
WORKING FOR CALIFORNIA

San Diego State University

San Diego State is the oldest and largest university in San Diego. SDSU provides each student with opportunities for direct contact with his/her professors and to earn a degree with an international emphasis. SDSU ranks among the top 25 public research universities in the nation and is No. 1 among those with 14 or fewer Ph.D. programs.

High Magnitude Economic Impact

San Diego State's annual impact on the San Diego region and the State of California is enormous:

- Annual spending related to San Diego State ($893 million) generates a total impact of $1.07 billion on the regional economy, and more than $1.5 billion on the statewide economy.
- This impact sustains nearly 10,500 jobs in the region and statewide more than 13,000 jobs.
- Per year, the impact generates nearly $76 million in local and more than $105 million in statewide tax revenue.
- Even greater—nearly $4.2 billion of the earnings by alumni from San Diego State are attributable to their CSU degrees, which together with campus spending creates an additional $6.7 billion of industry activity throughout the state.

San Diego State University enhances California's economy with research, innovation and entrepreneurship.

- SDSU is home to top-ranked programs in education, international business, social work, speech-language pathology, biology, and public administration. Overall, SDSU students can choose from 84 undergraduate majors, 76 master's programs, 16 joint doctoral degree programs, and two independent doctoral degree programs.
- SDSU ranks No. 2 among universities of its type nationwide and No. 1 in California for students studying abroad as part of their college experience. In addition, SDSU's undergraduate international business program is the largest in the United States and ranks No. 11 in the nation, according to *U.S. News and World Report*'s "America's Best Colleges 2010."
- California's biotechnology industry is both a national and world-wide model. SDSU serves as host institution for CSUPERB, the official liaison between CSU and industry, government, the Congressional Biotechnology Caucus, and the public arena in all biotechnological matters.

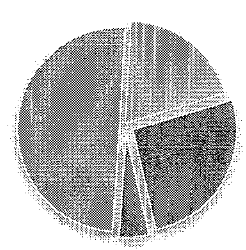
San Diego State University – Serving the San Diego Region

SDSU serves more than 30,000 students.

San Diego State's Annual Spending

Total $893 Million

Out-of-Region Student Spending: $175 million
Auxiliary (bookstore, food services): $236 million
Capital (construction, improvements): $39 million
Operations (salaries, services): $442.6 million



The California State University
WORKING FOR CALIFORNIA

"My decision to attend San Diego State as a freshman in 1978 was a defining event in my life. The education I received became the foundation for my business career, and one of the amazing experiences I had there became the inspiration for Rubio's Fresh Mexican Grill, which now employs almost 3,000 people. SDSU has influenced my life in a wonderful and dramatic way."

Ralph Rubio
Founder/CEO
Rubio's Fresh Mexican Grill

San Diego State University
5500 Campanile Drive
San Diego, CA 92182
(619) 594-5000
www.sdsu.edu

- SDSU is home to the Center for Commercialization of Advanced Technology. Sponsored by the Department of Defense, CCAT seeks out and provides commercialization services for technologies that meet critical homeland security needs.
- The SDSU Entrepreneurial Management Center seeds the business community with graduates well-grounded in entrepreneurial skills and methods.
- The nationally recognized L. Robert Payne School of Hospitality and Tourism Management at San Diego State University is the driving force behind one of the region's most important industries. Since it was established in 1999, 99 percent of the Payne School's 400 graduates have found employment in their chosen industry.

San Diego State University improves life in the San Diego region through research, arts and community service.

- San Diego State students volunteer thousands of hours of service to the community annually, in projects ranging from K-12 education, to nutrition, to social services, to homeland security.
- The estimated annual attendance for sports home games at San Diego State is 300,000, including football games played at QUALCOMM Stadium.
- San Diego State's music, dance, and theater programs draw about 40,000 patrons each academic year.

A University for All Californians—

San Diego State University ranks tenth in the nation for bachelor's degrees awarded to Latinos, and in the nation's top 20 for bachelor's degrees awarded to minority groups overall.

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San Diego Region, The Impact of the California State University

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GO

Regional Impacts

Bay Area Region

Central Coast Region

Inland Empire Region

Los Angeles Region

North Coast Region

Sacramento Valley Region

San Diego Region

San Joaquin Valley Region

San Diego Region

The San Diego region consists of San Diego and Imperial counties. CSU San Marcos and San Diego State are the two CSU campuses in the region.

Together, these campuses have a direct impact of nearly $1.1 billion on the San Diego regional economy, including:

- $557 million in operational expenditures;
- $57 million in capital expenditures;
- $259 million in auxiliary expenditures;
- $209 million in off-campus spending by out-of-region students who moved to the San Diego area to study at the CSU.

The CSU campuses in the San Diego region create a total spending impact of $1.3 billion. This spending supports nearly 13,000 jobs in the region, and generates more than $90 million in tax revenue for state and local governments. The San Diego region campuses generated a positive return on investment, meaning that for every dollar the campuses spent, $1.20 is generated in the regional economy. Moreover, $4.5 billion of the earnings by alumni from the two San Diego area campuses can be attributed to their CSU degrees.

In addition to the regional impact that CSU San Marcos and San Diego State have on the region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide the San Diego region campuses create a total spending impact of $1.8 billion and support nearly 16,000 jobs. Furthermore, the campuses generate roughly $125.5 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of CSU San Marcos and San Diego State alumni is considered, the campuses produce a combined total direct annual impact of $5.6 billion for the state economy, which creates a total spending impact of $7.6 billion. This level of economic activity supports nearly 52,000 jobs annually in the state and generates more than $542 million in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled roughly $313 million to CSU San Marcos and San Diego State, and for every dollar invested, $4.16 in regional and $5.88 in statewide spending is generated. When the impact of the enhanced earnings of CSU San Marcos and San Diego State graduates is included, the ratio rises to nearly $24 in total spending impact for every dollar the state invests.

"My decision to attend San Diego State as a freshman in 1978 was a defining event in my life. The education I received became the foundation for my business career, and one of the amazing experiences I had there became the inspiration for Rubio's Fresh Mexican Grill, which now employs almost 3,000 people. SDSU has influenced my life in a wonderful and dramatic way."

- Ralph Rubio
Founder/CEO
Rubio's Fresh Mexican Grill

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San Diego State University,
The Impact of the California State University

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Impacts by Campus

San Diego State University

San Diego State is the oldest and largest university in San Diego. SDSU provides each student with opportunities for direct contact with his/her professors and to earn a degree with an international emphasis. SDSU ranks among the top 25 public research universities in the nation and is no. 1 among those with 14 or fewer Ph.D. programs.

High Magnitude Economic Impact

San Diego State's annual impact on the San Diego region and the State of California is enormous:

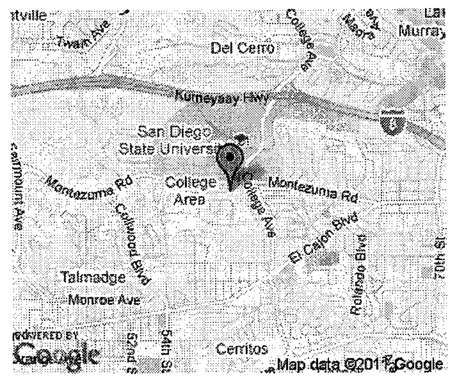
- Annual spending related to San Diego State ($893 million) generates a total impact of $896 million on the regional economy, and more than $1.2 billion on the statewide economy.
- This impact sustains more than 9,000 jobs in the region and statewide more than 11,400 jobs.
- Per year, the impact generates more than $62 million in local and nearly $86.7 million in statewide tax revenue.
- Even greater—nearly $4.2 billion of the earnings by alumni from San Diego State are attributable to their CSU degrees, which creates an additional $6.5 billion of industry activity throughout the state.

San Diego State University enhances California's economy with research, innovation and entrepreneurship.

- SDSU is home to top-ranked programs in education, international business, social work, speech-language pathology, biology and public administration. Overall, SDSU students can choose from 84 undergraduate majors, 76 master's programs and 16 joint doctoral degree programs and two independent doctoral degree programs.
- SDSU ranks No. 2 among universities of its type nationwide and No. 1 in California for students studying abroad as part of their college experience. In addition, SDSU's undergraduate international business program is the largest in the U.S. and ranks No. 11 in the nation, according to *U.S. News and World Report's* "America's Best Colleges 2010."
- California's biotechnology industry is both a national and world-wide model. SDSU serves as host institution for CSUPERB, the official liaison between the CSU and industry, government, the Congressional Biotechnology Caucus and the public arena in all biotechnological matters.
- SDSU is home to the Center for Commercialization of Advanced Technology. Sponsored by the Department of Defense, CCAT seeks out and provides commercialization services for technologies that meet critical homeland security needs.
- The SDSU Entrepreneurial Management Center seeds the business community with graduates well-grounded in entrepreneurial skills and methods.
- The nationally recognized L. Robert Payne School of Hospitality and Tourism Management at San Diego State University is driving force behind one of the region's most important industries. Since it was established in 1999, 99 percent of the Payne School's 400 graduates have found employment in their chosen industry.

San Diego State University improves life in the San Diego region through research, arts and community service.

Campus Location and Impacts



"My decision to attend San Diego State as a freshman in 1978 was a defining event in my life. The education I received became the foundation for my business career, and one of the amazing experiences I had there became the inspiration for Rubio's Fresh Mexican Grill, which now employs almost 3,000 people. SDSU has influenced my life in a wonderful and dramatic way."

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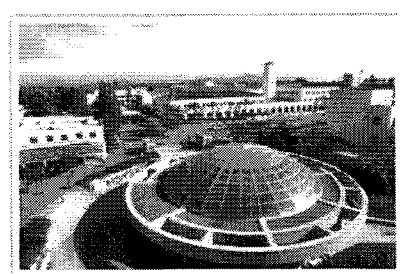

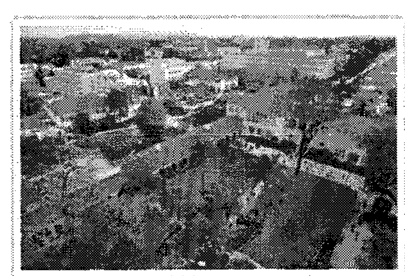

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Office of the Chancellor, *Working for California: The Impact of the California State University System* (May 2010)

Office of the Chancellor

Working for California: The Impact of the California State University System

May 2010

Prepared for

Office of the Chancellor

Prepared by

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Executive Summary

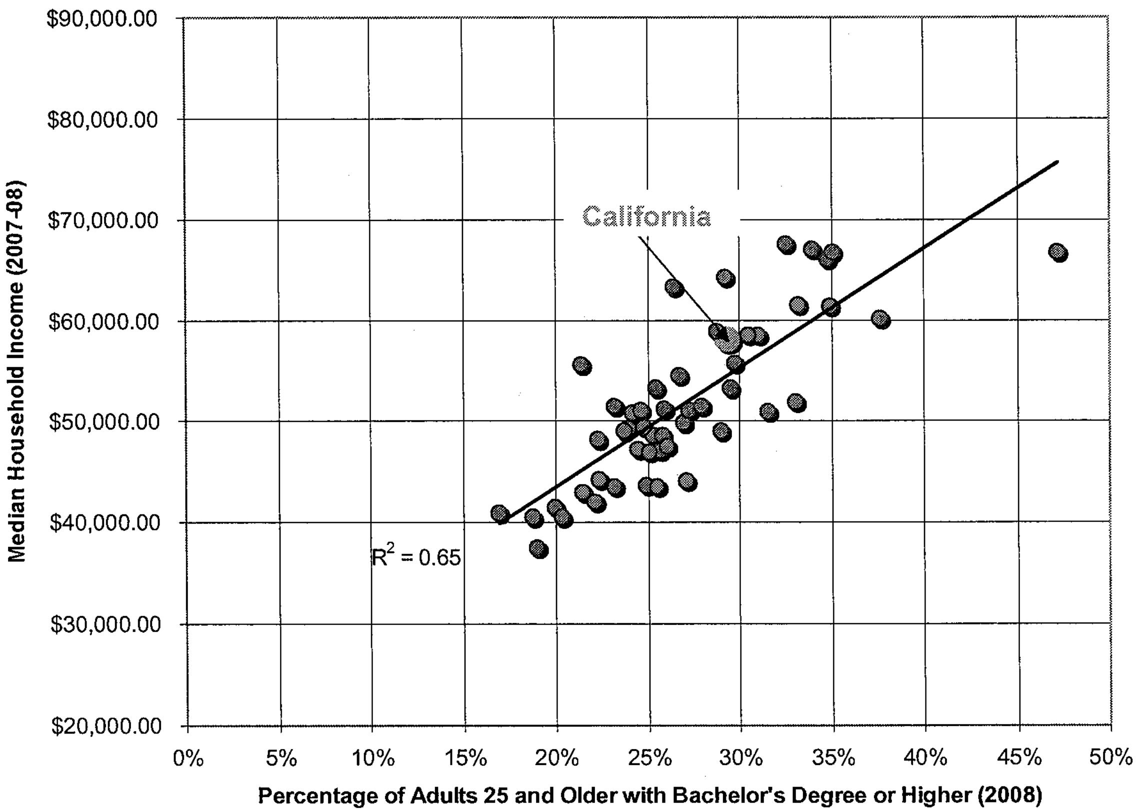
California's dynamic, knowledge-based economy is envied the world over. As the California State University (CSU) prepares to celebrate its 50th anniversary, it is an important time to be reminded of the enormous impact that the CSU has on the state of California and its economy. This analysis, an update to the CSU systemwide economic impact assessment conducted by ICF International in 2004, provides a current picture of the CSU's economic contributions related to workforce and the growing areas of sustainability and applied research. Both reports underscore that the CSU is central to California's economy and directly or indirectly impacts *everyone* in the state.

How the CSU Impacts California's Economy

A university education changes the trajectory of people's lives. It helps them fulfill their aspirations to become artists, engineers, teachers, health care professionals and more. Its recipients are better prepared to succeed in, adapt to, and appreciate the rapidly changing world around them. In addition, a university education is widely recognized as an investment that pays a lifetime of dividends in the form of better jobs and higher incomes.

What is less well understood, however, is that the investment in higher education is also *a strong investment for states.* When states invest in their public university systems, the state as a whole receives a lifetime earnings boost. As shown in Figure 1, average household income is systemically greater in states where a higher percentage of the population has an undergraduate university degree. The chart demonstrates a strong correlation, showing even a relatively modest increase of 5 percent in the bachelor's degree percentage yields about an $8,000 increase in household median income statewide.

Figure 1. State Median Household Income by Adult Education Attainment Rate, All U.S. States, 2007-2008.



Source: Current Population Survey, U.S. Census 2006-08

Figure 1 is a clear indicator of how investment in public education benefits all people. As knowledge-based services and high-technology production have transformed the U.S. economy, a well-educated workforce has become a more valuable asset to a state than ever before. Workers in regions with fast-growing, high-paying industries benefit from higher wages and greater economic opportunity. In turn, they are able to fund a greater level of public services that benefit all of a state's citizens.

Conventional economic impact assessments focus on estimating the direct and indirect expenditures of the organization being studied—the so-called "multiplier effect" created by the multiple rounds of spending triggered by new income into a region. As in those traditional economic impact assessments, the direct spending by the CSU—spending that is funded by both state and non-state sources—and the multiplier effect of this direct spending is a major part of the university's overall economic impact on the state. However, the value of the CSU is much more than just the total impact of its direct, indirect, and induced spending because of what the CSU *does*. Specifically, the CSU's 23 campuses provide tens of thousands of job-ready graduates each year who contribute significantly to California and its economy.

The CSU's primary mission is to provide access to baccalaureate, post-baccalaureate, master's level and applied doctorate education. The success of the university in fulfilling this responsibility has been decisive in providing California's advanced industries with the skills they need. In academic year 2006-07, the most recent year comparative data is available, the CSU conferred almost 71,000 bachelor's degrees, nearly half of all the bachelor's degrees awarded by all of the universities, public and private, in the entire state. In that same year, the CSU conferred roughly 18,000 master's degrees, or almost one-third of all the master's degrees awarded in that year in California. In addition, in partnership with other institutions (most notably the University of California), the CSU offers joint doctorate programs.

While producing university graduates has been the most visible way that the CSU supports the state's knowledge-based economy, it is not the only way. The CSU's applied research helps California's industries remain innovative and competitive, and the university provides an array of services and facilities to assist entrepreneurial start-ups.

The CSU's cultural and recreational programs and its focus on environmental sustainability help make California's communities more livable and contribute to their overall quality-of-life. This encourages creative and talented people to move into and remain in the state, which is a major advantage in an increasingly mobile society.

California's economic future is largely tied to the competitiveness of its knowledge-based industries. Consequently, all Californians share a common interest in the foundations that make these industries strong. There is no element of that foundation that is more important than the state's public university systems. *Because the California State University provides more well-educated, job-ready graduates to California's knowledge-based industries than any other institution of higher education in the state, it has a strategic role at the absolute center of California's economy.*

The Magnitude of the CSU's Economic Impact

> **In 2006-07, the CSU awarded:**
> 46% of all Bachelor's Degrees in California
> 32% of all Master's Degrees in California

The CSU provides a significant source of benefit to the California economy by generating revenues and creating jobs throughout local economies. The impacts associated with the CSU originate with the institution itself—its faculty, staff, students, and alumni—then percolate through the economy, generating successive rounds of economic activity because of the interlinkages between different economic sectors.

Direct spending by the CSU, faculty, staff, and students is the most obvious economic impact of the system. Not only does each CSU campus and the Chancellor's Office purchase goods and services from the surrounding economy, they are also important regional employers.

This direct spending represents only a portion of university-generated spending. The full economic impact of the CSU on the state's economy, including its impact on other seemingly unrelated sectors beyond those in which it directly participates (education, retail, construction), can be assessed through regional economic impact analysis. Regional economic modeling is founded on the principle that industry sectors are interdependent: one industry purchases inputs from other industries and households (e.g., labor) and then sells outputs to other industries, households, and government. Therefore, economic activity in one sector causes an increased flow of money throughout the economy. For the purpose of this analysis, the modeling software IMPLAN was used to calculate these impacts.

In this assessment of the California State University's economic impact, two types of economic impacts are presented: the impacts generated by CSU-related expenditures and the impact of earnings of CSU alumni that are attributable to their degree. The impact associated with CSU alumni earnings constitutes the total economic impact of CSU alumni who are currently California-based and thus contributing to and spending their income in the California economy. The value of their CSU degree is evaluated in the differential between their current salary and what they would have earned without their CSU degree.

The CSU-related expenditures for wages and salaries; capital equipment and supplies; student spending on textbooks, meals and housing; and an array of other items related to its educational mission for the 2008-09 academic year totaled $7.96 billion.

The full economic impact of this $7.96 billion of direct CSU-related expenditures is estimated at nearly $17 billion. Simply stated, each dollar of direct spending by the CSU "grows" to $2.13 when indirect and induced spending is considered. This level of spending activity supports almost 150,000 California jobs annually and generates over $995 million in annual taxes for state and local governments. Assessing the impact of CSU-related expenditures alone confirms that the university is a large and significant institution in California with a spending profile and an economic impact to match.

CSU-related expenditures and the enhanced earnings of its graduates in the workforce:

- Generate a $70 billion total annual spending impact in the state,
- Support more than 485,000 jobs in the state, and
- Create $4.9 billion in tax revenue for the state and local governments.

The economic impact of direct CSU-related expenditures, however, does not capture the full impact of what the university actually does: provide an affordable, accessible quality university education to hundreds of thousands of Californians who would not otherwise be able to attend a university. One of the ways that the full economic impact of the CSU enterprise can be estimated is by focusing on the higher earning power of its graduates. In 2008-09, it was estimated that 1.96 million CSU bachelor's and master's alumni living and working in California earned an estimated $122 billion in income. Of this $122 billion in total wages, it is estimated that *$42 billion is attributable to their higher level of educational attainment; i.e., their CSU degrees*.

The combined direct CSU-related expenditures and the alumni earnings attributable to their degrees have a full economic impact of $70.4 billion when modeled in IMPLAN. This level of economic activity supports roughly 485,000 jobs annually in the state and generates $4.9 billion in annual tax revenue for state and local governments.

California's Return on Investment in the CSU

The magnitude of the CSU's economic impact on California can be compared to the state's annual investment in the university system. In 2008-09, the state's investment in the CSU (operating and average capital appropriations) totaled $3.12 billion. For every dollar the state invests in the university, the impact of CSU-related expenditures alone creates $5.43 in total spending impact. When the impact of the enhanced earnings of CSU graduates is included, the ratio rises to $23 in total spending impact for every dollar the state invests in the CSU.

For each $1 invested by the state, the CSU generates $5.43 for California's economy annually.

When enhanced earnings by graduates are taken into account, the annual return rises to more than $23 for each $1 invested.

These figures show that the CSU has a massive economic impact on California with state and local governments—annually getting back more in taxes than the state's annual investment in the CSU, making the CSU increasingly valuable every year.

CSU and California's Workforce Needs

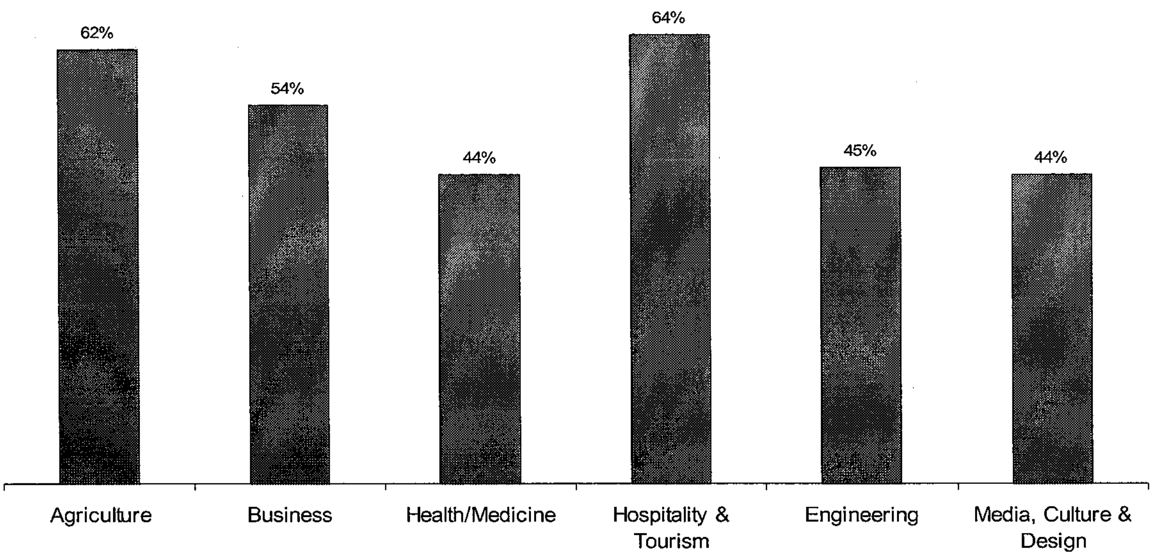
As the largest source of the state's skilled, diverse workforce, the California State University provides thousands of graduates in hundreds of fields each year. This workforce has and will continue to provide the foundation for California's success in the global economy. CSU graduates have the skills, expertise, and preparation to succeed and excel in emerging knowledge-based fields like life sciences, information technology, and the emerging "green" industries. The CSU is also an important contributor to the public sector workforce, educating a substantial number of teachers, criminal justice employees, social workers, and policymakers. For all of these fields, the CSU strives to build a workforce based in a range of backgrounds and experiences, and to provide educational opportunities to students regardless of their financial means.

This analysis focuses on key knowledge-based and service industries that account for nearly five million jobs in California:

- Agriculture, Food and Beverages;
- Business and Professional Services;
- Life Sciences and Biomedicine;
- Engineering, Information Technology and Technical Disciplines;
- Media, Culture, and Design;
- Hospitality and Tourism;
- Education;
- Criminal Justice;
- Social Work;
- Public Administration.

The CSU's contribution to these industries is evident when analyzing the percentage of graduates in California who receive their degrees from the CSU. Figure 2 demonstrates the CSU's strong showing across California's key industries.

Figure 2. Percentage of California Bachelor's Degrees awarded by CSU, 2007



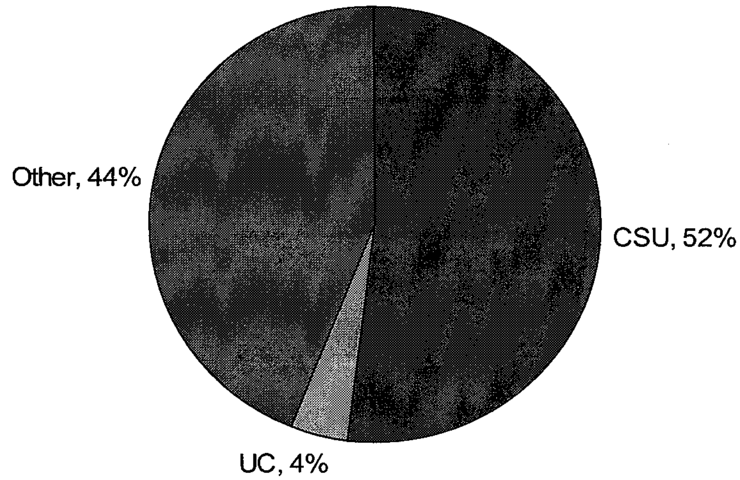
Source: California Postsecondary Education Commission

Of particular note is the CSU's significant contribution to graduates in the fields of Hospitality and Tourism, Business, and Agriculture. In each of these fields, the CSU produces well over 50 percent of the bachelor's degrees awarded in California.

But the CSU's strategic importance to California's workforce is not limited to supplying the state's industries with well-prepared professionals. The CSU is an even more important producer of workers for critical occupations in the public and non-profit sector, from education and social work to public administration and criminal justice.

In fact, the CSU remains California's largest source of educators. More than half the state's newly credentialed teachers in 2007-08—52 percent—were CSU graduates, expanding the state's ranks of teachers by more than 12,500 per year.

Figure 3. Newly Issued California Teaching Credentials (regular credentials and internships) by University, 2007-08



Source: California Commission on Teacher Credentialing

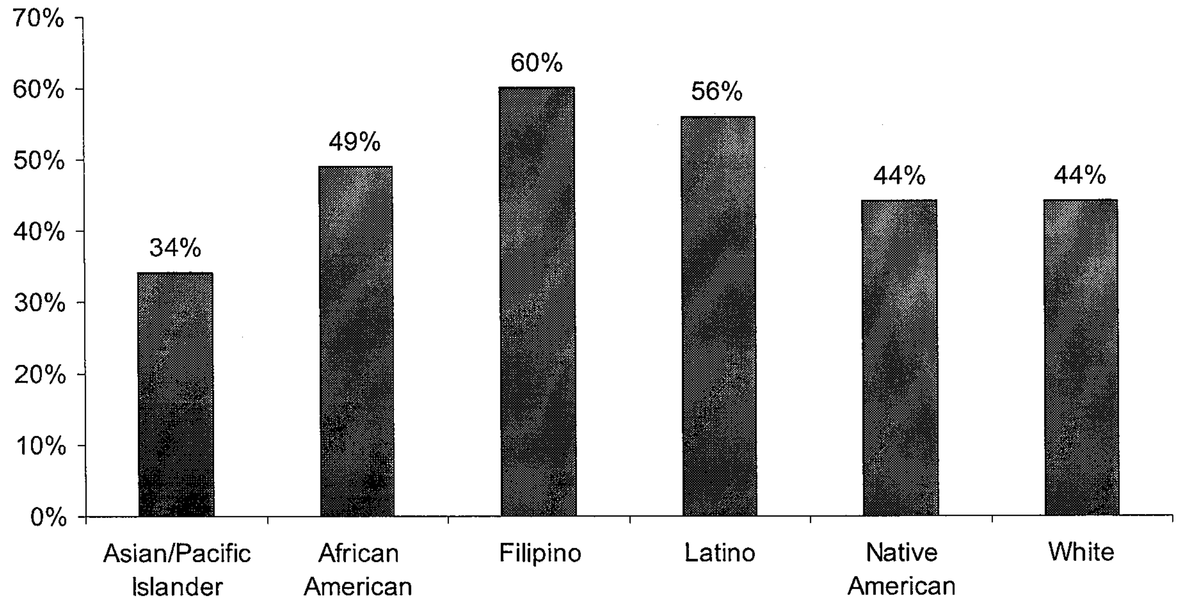
The full report contains a more detailed breakdown of each industry as well as notable examples of programs and contributions from various CSU campuses.

Making Higher Education Accessible

In every industry, California thrives on a workforce based in a range of backgrounds and perspectives. To that end, the CSU has a long tradition of providing access to higher education to Californians from different ethnic, socioeconomic, and educational backgrounds, making it the most diverse university system in the country. Over the last 10 years, the CSU has significantly enhanced its academic preparation and outreach efforts to underserved communities through a variety of programs and partnerships with the goal of increasing college readiness for K-12 students. Equally as important, the CSU is also focusing on helping students succeed and persist to a degree once they reach the university and has recently launched a Graduation Initiative aimed at increasing the graduation rate and halving the achievement gap of underrepresented students.

As of 2006-07, 56 percent of all bachelor's degrees granted to Latinos in California were CSU degrees. The numbers for other ethnic groups in the state were similar as shown in the following graph.

Figure 4. CSU Bachelor's Degrees Recipients as a Percentage of All California Public and Private University Bachelor's Recipients, 2006-07.



Source: California Postsecondary Education Commission

The CSU has also continued efforts to offer a university education to disabled students. More than 10,000 disabled students are currently enrolled at the CSU, and more than 95 percent graduate. This success rate is in part due to the wide range of services provided to assist disabled students.

CSU campuses also provide comprehensive services that ensure the admission, retention, and graduation of foster youth. Foster youth are provided direct contact with staff members, ongoing academic monitoring and intervention, opportunities to build relationships in a community setting, and connections to campus clubs and organizations.

The CSU works to welcome students who enter college from community college or non-traditional avenues. In fall 2008, about 42 percent of students entering the CSU began their academic careers in community college. This is coupled with the CSU's programs that allow students to engage in learning later in life. Approximately 1 in 5 CSU students is older than 30, and one-quarter of students attend the CSU part-time. Programs and services like child care, veteran's offices, financial aid, and counseling and advising support help students successfully engage while in college.

Numerous online and distance learning programs also allow access to the CSU for students who otherwise may not have the opportunity. In addition, the CSU Extended Education units on every campus address the educational and training needs of California's workforce. Individuals can pursue degrees, take classes, complete credentials, earn certificates, and explore professional and career development opportunities. Extended Education partners with business and industry to design and deliver high-quality programs that enable people to excel in a competitive environment.

Beyond the wealth of programs designed to promote access to higher education, the CSU remains one of the most affordable public education systems in the nation. With federal and state aid, loans, and scholarships, students have many options to help them afford a college education. While state funding cuts have forced the CSU to find new ways to maintain quality, including raising fees, the CSU's in-state fees remain the second lowest among comparable institutions nationally.

In addition, about one-third of revenues from increased fees help bolster financial aid. In 2008, the CSU awarded more than $2 billion in financial aid, including loans, work study, and grants, helping to maintain its legacy as a uniquely affordable option for higher education. More than 250,000, or 54 percent, of CSU students received some form of aid in 2008.

California faces a complex web of challenges in the 21st century, including growing a nimble economy founded on agriculture and propelled by innovative technologies, while also providing essential social services to a broad array of citizens. In this environment, a large, dynamic workforce of job-ready university graduates is essential.

The CSU is by far the state's largest and most affordable educator of California's workforce. No other California university provides as many well-prepared graduates for knowledge-based industries. At the same time, the CSU's education of public professionals in criminal justice, education, and public administration lays the foundation for future economic growth and protects citizens in need.

CSU on Sustainability: Environmental Consciousness and Energy

The CSU is cognizant of its responsibility to serve as a guardian of the state's natural resources—not only as a consumer of these resources but also as an institutional leader. This report describes the different means through which the CSU has integrated sustainability across all campuses. The CSU campuses have committed to sustainability initiatives such as the Presidents' Climate Commitment, and the international higher education-sponsored Talloires Declaration, and have also joined associations and voluntary green programs. Sustainability and related fields of study are offered as undergraduate majors as well as graduate degree programs to prepare the next generation of environmental leaders.

> In April 2009, the U.S. Environmental Protection Agency recognized the CSU in the Top 20 list of the largest national green power purchasers. CSU ranked fifth among EPA's Top 20 College and University Green Power Partners.

The CSU campuses have adopted creative measures to incorporate sustainability in their everyday operations. The broad scope of green initiatives committed to by the CSU campuses discussed in this report are closely aligned with the statewide Integrated Energy Policy, which includes energy efficiency, water conservation, alternative transportation, local food options, recycling/waste reduction, green outreach/community action, green building/sustainable design, and renewable energy.

> CSU currently has Leadership in Energy and Environmental Design (LEED™) certified projects across 16 campuses.

The CSU has adopted renewable energy generation to help achieve energy independence for its campuses. Statewide policy requires California to reduce its carbon emissions to 80 percent of its 1990 levels by 2050. As electric power generation accounts for 22 percent of California's carbon emissions, the CSU is utilizing renewable power generation to achieve a reduction in its carbon emissions. Currently 23 percent of the CSU's electric power is from renewable sources.

The CSU Board of Trustees has set a goal for the CSU to double its on-campus renewable generation by 2014, and the CSU is well on its way to exceed this target. In 2005, the CSU partnered with the Department of General Services to lead a statewide effort to install solar-powered generation systems on university campuses and state facilities. This is expected to offset an amount of carbon dioxide that is equivalent to removing nearly 1,200 cars from the road annually or providing annual electricity for 800 homes.

Students play a key role in the design and implementation of various innovative "green" initiatives that not only raise environmental awareness in the local community, but also ensure that graduates will join the community tomorrow with a deeper understanding of sustainability and an increased environmental sensibility. Key examples of the latter are Chico's annual "This Way to Sustainability" conference, the nation's largest student-run conference focusing on sustainability, and Humboldt State University students' creation of a fee to fund student-led energy efficiency projects.

Community education and action is a key component of the CSU's mission to raise environmental awareness on a local and regional level. The CSU offers specialized centers for community use such as Cal Poly Pomona's AGRIscapes, which integrates farming and urban landscaping practices that are sustainable, environmentally beneficial, economically viable, and technologically sound. San Francisco State University's Industrial Assessment Center provides small- and medium-sized manufacturers with free assessments of their plant's energy, waste and productivity efficiency, and offers recommendations for improvements.

The CSU will continue to meet the sustainability challenges of the 21st century using creative and feasible solutions that can be adopted across its campuses.

Impact on Innovation and Entrepreneurship

Applied research and innovation is a productive and burgeoning economic engine for California. The CSU's research capabilities have an enormous impact on California's economy, with CSU research and project sponsored expenditures from federal, state, local, and private sources amounting to over half a billion dollars annually, and employing 6,000 students in fiscal year 2007-08.

The CSU actively pursues research and sponsored program opportunities as evidenced by the 5,100 proposals it submitted to federal and state agencies and private foundations in 2007-08. That same year CSU campuses received grant or contract awards varying from approximately $2 million to $131 million from federal, state, foundation, and private sources. Academic units that benefit from such grant and contract awards broadly include Agriculture, Arts and Letters, Business Administration, Education, Engineering and Computer Science, Health and Human Services, Science and Mathematics, Social Science, and Liberal Arts, among others. The CSU's applied research projects focus on multiple industries such as Energy and the Environment, Biotechnology and Health Care, Agriculture, Information Technology and Engineering, and Physical Sciences/Advanced Sciences.

This report includes examples of initiatives in each of these areas that demonstrate the innovative and broadly applicable nature of CSU research. One such example is the CSU Council on Ocean Affairs, Science, and Technology (COAST), which was established in 2008 to promote marine and coastal science research and education throughout the CSU and disseminate this information to the public. Research partnerships and entrepreneurial initiatives are implemented not only through the CSU's centers and institutes but through faculty-led and student-supported programs and projects, and multicampus consortiums. Examples of such projects include the California Seafloor Mapping project, the Biocompass project, and the California Vehicle Launch Education Initiative.

The aforementioned research activities are indicative of the CSU's growing economic impact across California. The CSU's expanding research agenda is complementing and stimulating its educational mission, while providing new solutions for and new forms of partnership with industry.

Guide to the Report

In the full report that follows, Chapter 1 documents the quantifiable economic impact that the CSU's campuses have on their particular region as well as other regions throughout the state. Chapters 2-4 explore the tremendously important contributions of the CSU to California and its future including workforce, access, sustainability, and applied research.

Introduction

California is unique compared to the rest of the country. From Hollywood to Silicon Valley, it is known throughout the world for its multi-sector knowledge-based economy. *University-educated workers fuel this economy* and many industries are located in California precisely for this reason—access to a highly skilled workforce. California serves the world's technology and cultural needs because its workforce has accumulated an unparalleled pool of know-how and skill.

Conventional economic impact assessments traditionally focus on estimating the direct and indirect expenditures of the organization being studied—the so-called "multiplier effect" created by the multiple rounds of spending triggered by new income into a region. As in those conventional economic impact assessments, the direct spending by the CSU—spending that is funded by both state and non-state sources—and the multiplier effect of this direct spending is a major part of the university's overall economic impact on the state. However, the value of the CSU is much more than just the impact of its own direct, indirect, and induced spending because of what the CSU *does*. Specifically, the CSU's 23 campuses provide tens of thousands of job-ready graduates each year who contribute significantly to California and its economy.

The CSU's primary mission is to provide access to baccalaureate, post-baccalaureate, master's level and doctorate level education. The success of the university in fulfilling this responsibility has been decisive in providing California's advanced industries with the skills they need. CSU students also have a tremendous impact on California in their roles as students and as degree- or certificate-earning graduates. As students, their educational-related spending provides an economic stimulus to the campus and surrounding communities.

Moreover, as California's population grows in diversity, the CSU provides access to a quality, affordable education and focuses on reaching those populations for whom higher education has traditionally been inaccessible.

Over the past decade there has also been an increasing awareness about the importance of environmental conservation and sustainability. From job creation and innovation to energy conservation and more sustainable business practices, the "green revolution" has provided critical opportunities for the state's economy and therefore has increasingly become an area of focus for the CSU.

While producing university graduates has been the most visible way that the CSU supports California's knowledge-based economy, it is not the only way. The CSU's applied research helps California's industries remain innovative, and the university provides an array of services and facilities to assist entrepreneurial start-ups and tackle environmental challenges. The expanding research work of CSU faculty and their students is solving critical problems for the state, creating solutions for California industry, and helping to ensure that university curricula are current and relevant. The CSU's research and innovation both complement and extend the university's core educational mission and represent an emerging dimension of its economic impact.

This report provides an update to the CSU's systemwide economic impact assessment conducted by ICF International in 2004 and focuses on the CSU's current economic contributions related to workforce and the growing areas of sustainability and applied research.

Both reports underscore that the CSU is central to California's economy and directly or indirectly impacts *everyone* in the state.

This report is divided into two main sections. The first section focuses on understanding the quantitative economic impact of university and student spending as well as contributions from alumni earnings. The second section contains three chapters that together present a more complete account of the full impact of the CSU to the regions, the state, and the populations it serves—including workforce development, environmental sustainability measures and CSU-generated applied research and innovation.

1. The Magnitude of the CSU's Economic Impact

With 466,075[1] students served in 2008-09, the CSU is the largest university system in the United States and has a significant social, cultural, and economic impact on the state of California.

This chapter provides an overview of the quantitative estimates of the total economic impact of the California State University system. Two types of economic impacts are presented: the impacts of CSU-related expenditures, and the impact of CSU alumni earnings that are attributable to their CSU degree.

Details about the methodology used in assessing the CSU's systemwide and regional economic impact can be found in Appendix B.

1.1. Impacts of the CSU on the State of California

Whenever new income is injected into an economy, it starts a ripple effect that creates a total economic impact that is larger than the initial influx. This is because the recipients of the new income spend some percentage of it within the region, and the recipients of that share, in turn, spend some of it within the region, and so on. The *total spending impact* of the new income is the sum of these progressively smaller rounds of spending within the economy. This total economic impact creates a certain number of jobs, called the *total employment impact*, and also creates tax revenue for state and local governments, which is called the *total fiscal impact*.

By treating the total expenditures of the university system and its affiliated entities as "new spending" in the economy, the total spending, job, and fiscal impacts of the university can be estimated.

In this assessment of the California State University's economic impact, all CSU-related expenditures, including the expenditures of the university itself, those of its auxiliary organizations, and those of the students who moved to California or specific regions throughout the state to attend a CSU, have been calculated. The economic modeling package, IMPLAN, was used to calculate this total economic impact. This methodology, and the model used, is consistent with similar studies conducted across the nation and ICF's 2004 CSU economic impact assessment.

Direct CSU-related expenditures for wages and salaries, capital equipment and supplies; student spending on textbooks, meals, and housing; and an array of other items related to its educational mission for the 2008-09 fiscal year totaled $7.96 billion. This total includes:

- $5.48 billion in university expenditures on wages and salaries, services, supplies, and related ongoing needs;
- $987 million in average annual construction and capital expenditures;
- $1.29 billion in expenditures by campus auxiliary organizations such as bookstores, campus restaurants, foundations, research institutes, and other entities. This category captures the bulk of student expenditures for books, on-campus food purchases, etc.;

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1 Source: CSU Analytic Studies Statistical Reports: *Total Headcount Enrollment by Term, 2008-09 College Year, Total Enrollment by Sex and Student Level, Fall 2008 Profile,* All campuses, men and women.

- $203 million in additional off-campus spending by out-of-state students who are in California to attend the CSU. Expenditures on a statewide basis for housing and other living expenses by resident students were assumed to exist with or without the CSU and therefore were not considered an incremental benefit. On a regional basis, residential expenses were counted for out-of-area students as being an incremental benefit to that region.

The total spending impact of this $7.96 billion of direct CSU-related expenditures is estimated at nearly $17 billion. This level of spending activity supports almost 150,000 California jobs annually[2]. In addition, over $995 million in annual taxes was generated in 2008-09 for the state and local governments. Simply stated, the CSU generates $2.13 for each dollar of direct spending from all sources, up from $1.83 in 2002-03. Assessing the impact of CSU-related expenditures confirms that the university is a large and significant institution in California with a spending profile and an economic impact to match.

Average annual earnings in California, Full-time Year-Round Workers, 2008:

- High school: $32,003
- Some College: $37,120
- Bachelor's: $56,670
- Master's or higher: $64,634

Source: US Census Bureau

Expenditures alone, however, provide an incomplete picture of the impact of the university in terms of what *it actually does*—provide an affordable, accessible quality university education to tens of thousands of Californians who would not otherwise attend a university in the state and obtain a bachelor's or master's degree. One of the ways that the value of a CSU education can be estimated is by focusing on the higher earning power of university graduates. The U.S. Census Bureau has estimated that bachelor's degree holders earn, on average, nearly $1 million more than high school graduates[3] over the course of their working life. This means that a university education has a powerful economic impact, and the increased earning power of university graduates needs to be considered in a complete accounting of the CSU's impact on California.

In 2008-09, the 1.96 million CSU bachelor's and master's degree alumni working in California earned an estimated $122 billion in income. While not all of this $122 billion is attributable to their university education, roughly $42.1 billion of this total represents the enhanced earnings power *that is attributable to their CSU degree*.

This particular impact of the CSU also has indirect and induced effects on spending, jobs, and taxation. When CSU-related expenditures and the enhanced earning power of CSU alumni impacts are considered together, they produce a combined direct annual impact of $50 billion in the California economy. When the indirect and induced impacts of this direct impact are modeled in IMPLAN, the total spending impact of the CSU is $70.4 billion. This level of

2 Despite an increase in the overall magnitude of CSU spending impacts, the total number of supported jobs reported is fewer than what was reported in the 2004 analysis due to national, economy-wide increases in worker productivity. Increased worker productivity implies for each dollar invested, more worker output is produced, but by fewer employees. More information on these calculations can be found in Appendix B.

3 Bachelor's degree holders that work full-time, year-round throughout their career can expect to earn an average of $2.1 million over their lifetime, compared to $1.2 million for workers with a high school diploma only. Source: U.S. Census, *The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings.*

economic activity supports roughly 485,000 jobs annually in the state and generates $4.9 billion in annual tax revenue for state and local governments.

Lastly, the CSU contributes to the state significantly in terms of in-kind service across an array of industries. The CSU was the first higher education system in the country to establish a system office supporting service learning and community engagement, the Center for Community Engagement (formerly the Office of Community Service Learning). According to the Center, roughly 50 percent of CSU students participate in community service, up from 40 percent 10 years ago. Systemwide, that constituted roughly 32 million hours of service in 2007-08, which led to an in-kind economic impact of $624 million.[4]

The magnitude of the CSU's economic impact on California can also be viewed in relation to the state's annual investment in the university system. In 2008-09, the state investment in the CSU (operating and average capital appropriations) totaled $3.12 billion. For every dollar the state invests in the university, the impact of CSU-related expenditures alone creates $5.43 in total spending impact. When the impact of the enhanced earnings of CSU graduates is included, the ratio rises to $23 in total spending impact for every dollar the state invests in the CSU. These findings show that the CSU has a massive economic impact on California with state and local governments annually getting back more in taxes than the state's annual investment in the CSU, making the CSU increasingly valuable.

For each $1 invested by the state, the CSU generates $5.43 for California's economy annually.

When enhanced earnings by graduates are taken into account, the annual return rises to more than $23 for each $1 invested.

1.2. Impact of the CSU on California's Regions

In addition to the statewide impacts described above, the impact of the CSU was also calculated on a "regional" basis. The campuses in each region contribute to the regional as well as the statewide economy. All campuses purchase goods and services from outside their immediate region, and some more than others. This loss of local impact is captured by the model as a regional "leakage" that impacts neighboring regions. By assessing both the local, regional, and statewide impact, the total impact of each campus can be fully understood.

This section of the report presents the key direct and total economic impacts for each of the eight regions defined by this study on their immediate local economy, neighboring regions and the state as a whole. The regions were defined primarily on geographical and economic grounds, by grouping together California counties with a common economic base, and follow the same regions that were defined in the CSU's 2004 economic impact analysis. The impacts for the regions vary based on total magnitude of direct spending by the campuses, the proportional spending by category by the campuses, the percent of spending that is local, and the proportion of out-of-area students and alumni.

[4] The Independent Sector determines the value of volunteer time each year, by state. The most recent estimate for 2007 is $19.51/hour. http://www.independentsector.org/programs/research/volunteer_time.html.

Details of the economic impact calculations for each campus and region, and for the state as a whole, are provided in Appendix C.

Bay Area Region

The Bay Area region consists of the nine Bay Area counties of San Francisco, Alameda, Santa Clara, San Mateo, Contra Costa, Marin, Sonoma, Napa, and Solano, along with Santa Cruz and Lake Counties.

The CSU has five campuses in the Bay Area Region: San Francisco State, San José State, Sonoma State, CSU East Bay, and Cal Maritime.

Together, these campuses have a direct impact of nearly $1.7 billion, including:

- $1.1 billion in operational expenditures;
- $163 million in capital expenditures;
- $178 million in auxiliary expenditures;
- $254 million in off-campus spending by students not from the Bay Area.

The direct impact of the CSU campuses in the Bay Area created a total spending impact of $2.6 billion. This spending supports over 20,000 jobs in the region, and generates $156 million in tax revenue for state and local governments. The Bay Area campuses generated a positive return on investment, meaning that for every dollar the campuses spend, $1.52 is generated in the regional economy. Moreover, an additional $9 billion of the earnings of Bay Area campus alumni can be attributed to their CSU degrees.

In addition to the regional impact that San Francisco State, San José State, Sonoma State, CSU East Bay and Cal Maritime have on the Bay Area region, there are statewide impacts associated with leakages from spending beyond the immediate region. Including the impacts on other regions, Bay Area campuses create a total spending impact of $3.5 billion, support nearly 30,600 jobs, and generate $210 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of Bay Area alumni is considered, the campuses produce a combined total direct annual impact of $10.7 billion in the California economy, which creates a total spending impact of $15 billion. This level of economic activity supports roughly 103,000 jobs annually in the state and generates over $1 billion in annual tax revenue for the state government and local governments.

The impact generated by Bay Area campuses can be compared to the state's annual investment to determine the return on investment. In 2008-09, state appropriations totaled nearly $617 million to Bay Area campuses, and for every dollar invested, $4.17 in regional and $5.74 in statewide spending is generated. When the impact of the enhanced earnings of Bay Area CSU graduates is included, the ratio rises to $24 in total spending impact for every dollar the state invests.

Central Coast Region

The Central Coast region comprises the Monterey, San Luis Obispo, Santa Barbara, and Ventura counties. There are three CSU campuses in this region: Cal Poly San Luis Obispo, CSU Monterey Bay, and CSU Channel Islands.

As a group, these campuses have a direct impact of over $947 million, including:

- $437 million in operational expenditures;
- $198 million in capital expenditures;
- $150 million in auxiliary expenditures;
- $162 million in off-campus spending by students who are living in the region because they attend a CSU campus.

This direct impact of the CSU campuses creates a total spending impact of $804 million on the Central Coast's economy. This impact sustains over 8,600 jobs in the region and generates over $52 million in tax revenue. Moreover, $2.5 billion of the earnings by alumni from the three Central Coast campuses can be attributed to their CSU degrees.

In addition to the regional impact that Cal Poly San Luis Obispo, CSU Monterey Bay, and CSU Channel Islands have on the Central Coast region, there are statewide impacts associated with leakages from spending beyond the immediate region. Including the spending in other regions, Central Coast campuses create a total spending impact of $1.6 billion, support more than 14,000 jobs, and generate $105 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of Central Coast CSU alumni is considered, the campuses produce a combined total direct annual impact of $3.5 billion for the state's economy, which creates a total spending impact of $4.9 billion. This level of economic activity supports roughly 34,500 jobs annually in the state and generates over $340 million in annual tax revenue for the state government and local governments.

In 2008-09, state appropriations totaled just over $288 million to Central Coast campuses, and for every dollar invested, $2.79 in regional and $5.71 in statewide spending is generated. When the impact of the enhanced earnings of Central Coast CSU graduates is included, the ratio rises to nearly $17 in total spending impact for every dollar the state invests.

Inland Empire Region

For the purposes of this study, the Inland Empire was defined to include San Bernardino and Riverside counties. Cal Poly Pomona and CSU San Bernardino are the two CSU campuses serving the region.

Together, these two campuses have a direct impact of $854 million, including:

- $474 million in operational expenditures;

- $98 million in capital expenditures;
- $100 million in auxiliary expenditures;
- $182 million in off-campus spending by students from outside the region.

The CSU campuses in the Inland Empire have a total regional spending impact of more than $515 million. This impact creates more than 5,700 jobs in the region, and generates more than $30 million in tax revenue for state and local governments. $3.2 billion of the earnings by alumni from the Inland Empire campuses is attributable to their CSU degrees.

In addition to the regional impact that Cal Poly Pomona and CSU San Bernardino have on the Inland Empire region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide, Inland Empire campuses create a total spending impact of $1.5 billion, support more than 12,500 jobs, and generate nearly $93 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of Inland Empire CSU alumni is considered, the campuses produce a combined total direct annual impact of $4.6 billion for the state economy, which creates a total spending impact of $5.5 billion. This level of economic activity supports nearly 38,000 jobs annually in the state and generates close to $386 million in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled nearly $277 million to Inland Empire campuses, and for every dollar invested, $1.89 in regional and $5.39 in statewide spending is generated. When the impact of the enhanced earnings of Inland Empire CSU graduates is included, the ratio rises to nearly $20 in total spending impact for every dollar the state invests.

Los Angeles Region

For the purpose of this study, the Los Angeles region was defined as Los Angeles and Orange Counties. There are five CSU campuses in this region: CSU Northridge, CSU Dominguez Hills, CSU Los Angeles, CSU Fullerton, and CSU Long Beach. In addition, the CSU Chancellor's Office is located in the region and has a substantial economic impact on its own.

As a group, these CSU campuses and the Chancellor's Office have a direct impact of over $2.6 billion, including:

- $1.73 billion in operational expenditures;
- $260 million in capital expenditures;
- $275 million in auxiliary expenditures;
- $308 million in off-campus spending by students who are living in the Los Angeles region because they attend a CSU institution there.

This direct impact of the CSU campuses and Chancellor's Office creates a total spending impact of nearly $4.4 billion on the Los Angeles regional economy. This impact sustains more than 39,000 jobs in the region, and generates close to $252 million in tax revenue. The Los

Angeles region campuses generated a positive return on investment, meaning that for every dollar the campuses spend, $1.70 is generated in the regional economy. Moreover, $13.3 billion of the earnings by alumni from Los Angeles area campuses is attributable to their CSU degrees.

In addition to the regional impact that CSU Northridge, CSU Dominguez Hills, CSU Los Angeles, CSU Fullerton, CSU Long Beach, and the Chancellor's Office had on the Los Angeles region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide, Los Angeles campuses create a total spending impact of $4.5 billion, support nearly 40,000 jobs, and generate $271 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of Los Angeles CSU alumni is considered, the campuses produce a combined total direct annual impact of $15.9 billion for the state economy, which creates a total spending impact of $21.3 billion. This level of economic activity supports more than 145,500 jobs annually in the state and generates $1.5 billion in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled nearly $968 million to Los Angeles campuses, and for every dollar invested, $4.53 in regional and $4.66 in statewide spending is generated. When the impact of the enhanced earnings of Los Angeles region CSU graduates is included, the ratio rises to more than $22 in total spending impact for every dollar the state invests.

North Coast Region

The North Coast region consists of all of the coastal and adjacent mountain counties in Northwestern California, north of Sonoma and Lake Counties. Humboldt State is the only CSU campus in this region.

Humboldt State has an annual direct impact of $232 million on the North Coast's economy, including:

- $127 million in operational expenditures;
- $30 million in capital expenditures;
- $33 million in auxiliary expenditures;
- $42 million in off-campus spending by students that reside outside the North Coast.

The total spending impact of Humboldt State on the North Coast economy is $190 million annually. This impact sustains over 2,200 jobs in the region, and generates nearly $10.6 million in tax revenue for state and local governments. $951 million of the earnings by Humboldt State alumni is attributable to their Humboldt State degrees.

In addition to the regional impact Humboldt State has on the North Coast region, there are additional leakages from spending beyond the region that impact the state. Statewide, Humboldt State creates a total spending impact of nearly $401,000, supports more than 3,400 jobs, and generates $25 million in tax revenue for state and local governments. Moreover, when the enhanced earning potential of Humboldt State alumni are considered, the campus produces a total direct annual impact of $1.2 billion for the state economy, which creates a total spending impact of $1.6 billion. This level of economic activity supports more than 11,000 jobs annually in the state and generates over $113 million in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled more than $80 million to Humboldt State, and for every dollar invested, $2.36 in regional and $4.99 in statewide spending is generated. When the impact of the enhanced earnings of Humboldt graduates is included, the ratio rises to more than $20 in total spending impact for every dollar the state invests.

Sacramento Valley Region

This study defines the Sacramento Valley region as all of the Central Valley counties north of San Joaquin Valley and all of the mountain counties of northeastern California. There are two CSU campuses in this region: CSU Chico and CSU Sacramento.

Together these two CSU campuses have a direct impact of more than $1.9 billion on the Sacramento Valley's economy, including:

- $532 million in operational expenditures;
- $102 million in capital expenditures;
- $169 million in auxiliary expenditures;
- $216 million in off-campus spending by students who moved to the region to attend the CSU.

This direct impact of the CSU campuses in the Sacramento Valley creates a total spending impact of $1.4 billion, and sustains nearly 15,000 jobs in the region. The total tax impact of the two campuses is $88 billion annually. Moreover, $5 billion of the earnings by alumni of the CSU campuses in this region can be attributed to their CSU degrees.

In addition to the regional impact CSU Chico and CSU Sacramento have on the Sacramento region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide, Sacramento Valley campuses create a total spending impact of $1.7 billion, support nearly 15,000 jobs, and generate nearly $113 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of Sacramento Valley CSU alumni is considered, the campuses produce a combined total direct annual impact of $6 billion for the state economy, which creates a total spending impact of $8 billion. This level of economic activity supports nearly 45,500 jobs annually in the state and generates more than $573 million in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled roughly $290 million to CSU Chico and CSU Sacramento, and for every dollar invested, $4.74 in regional and $6.02 in statewide spending is generated. When the impact of the enhanced earnings of CSU Chico and CSU Sacramento graduates is included, the ratio rises to nearly $28 in total spending impact for every dollar the state invests.

San Diego Region

The San Diego region consists of San Diego and Imperial counties. CSU San Marcos and San Diego State are the two CSU campuses in the region.

Together, these campuses have a direct impact of nearly $1.1 billion on the San Diego regional economy, including:

- $557 million in operational expenditures;
- $57 million in capital expenditures;
- $259 million in auxiliary expenditures;
- $209 million in off-campus spending by out-of-region students who moved to the San Diego area to study at the CSU.

The CSU campuses in the San Diego region create a total spending impact of $1.3 billion. This spending supports nearly 13,000 jobs in the region, and generates more than $90 million in tax revenue for state and local governments. The San Diego region campuses generated a positive return on investment, meaning that for every dollar the campuses spent, $1.20 is generated in the regional economy. Moreover, $4.5 billion of the earnings by alumni from the two San Diego area campuses can be attributed to their CSU degrees.

In addition to the regional impact that CSU San Marcos and San Diego State have on the region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide, the San Diego region campuses create a total spending impact of $1.8 billion and support nearly 16,000 jobs. Furthermore, the campuses generate roughly $125.5 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of CSU San Marcos and San Diego State alumni is considered, the campuses produce a combined total direct annual impact of $5.6 billion for the state economy, which creates a total spending impact of $7.6 billion. This level of economic activity supports nearly 52,000 jobs annually in the state and generates more than $542 million in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled roughly $313 million to CSU San Marcos and San Diego State, and for every dollar invested, $4.16 in regional and $5.88 in statewide spending is generated. When the impact of the enhanced earnings of CSU San Marcos and San Diego State graduates is included, the ratio rises to nearly $24 in total spending impact for every dollar the state invests.

San Joaquin Valley

For the purpose of this study, the San Joaquin Valley region was defined as San Joaquin and the southern Central valley through to Kern County, and the adjacent mountain counties of eastern California. There are three CSU campuses in this region: Fresno State, CSU Bakersfield, and CSU Stanislaus.

As a group, these CSU campuses have a direct impact of nearly $754 million on the San Joaquin Valley region, including:

- $492 million in operational expenditures;
- $79 million in capital expenditures;
- $124 million in auxiliary expenditures;
- $59 million in off-campus spending by students who are living in the region to attend the CSU.

This direct impact of the CSU campuses creates a total spending impact of $829 million for the regional economy. This impact sustains close to 10,000 jobs in the region, and generates over $45.5 million in tax revenue. The San Joaquin Valley campuses generated a positive return on investment, meaning that for every dollar the campuses spent locally, $1.10 was generated in the regional economy. Moreover, $3.5 billion of the earnings by alumni from the three San Joaquin Valley area campuses can be attributed to their CSU degrees.

In addition to the regional impact that Fresno State, CSU Bakersfield, and CSU Stanislaus have on the region, there are statewide impacts associated with leakages from spending beyond the immediate region. Statewide, the San Joaquin Valley campuses create a total spending impact of $1.3 billion and support more than 11,600 jobs. Furthermore, the campuses generate $82 million in tax revenue for state and local governments. Moreover, when the enhanced earning power of San Joaquin Valley CSU alumni is considered, the campuses produce a combined total direct annual impact of $4.3 billion for the state economy, which creates a total spending impact of $5.8 billion. This level of economic activity supports nearly 40,000 jobs annually in the state and generates nearly $409,000 in annual tax revenue for the state and local governments.

In 2008-09, state appropriations totaled more than $293 million to San Joaquin Valley campuses, and for every dollar invested, $2.83 in regional and $4.50 in statewide spending is generated. When the impact of the enhanced earnings of San Joaquin Valley CSU graduates is included, the ratio rises to nearly $20 in total spending impact for every dollar the state invests.

1.3. Conclusion

As the largest university in the world's leading knowledge economy, the California State University's impact tells an incredible story. The impact of CSU-related expenditures alone is nearly $17 billion annually, and the CSU returns $5.43 to the California economy for every dollar the state invests. Nearly 150,000 California jobs are supported by these expenditures.

When the impact of the higher earnings of CSU graduates is considered, the impact rises to $70.4 billion annually, and supports more than 485,000 jobs. The tax impact of this combined spending impact is 1.7 times greater than the state's annual investment in the CSU, making continued support of the CSU by the state critical to the future of California.

2. CSU and California's Workforce Needs

The California State University is the largest source of the state's skilled workforce. Providing tens of thousands of graduates in hundreds of fields each year, CSU alumni help sustain the Golden State economy and lay the foundation for new growth.

The CSU's job-ready graduates are trained in vital industries and graduate with expertise in emerging knowledge-based fields like life sciences and information technology, which provide opportunities for innovative and sustainable growth. CSU graduates also make up the core of the state's public service sector. The thousands of teachers, criminal justice employees, social workers, and policymakers educated at the CSU help the state adapt to the complex needs of its citizens and provide for future generations.

2.1. Industrial Drivers of California's Knowledge-Based Economy

California's economic success is dependent on its core industries, a set of globally competitive, export-oriented or service-driven business drivers that reflect the diversity of the state's economy and fuel its growth. While some are regionally focused, others are important sources of innovation and growth across the state. To remain competitive, each of these industrial drivers relies on a highly skilled, adaptable workforce. The CSU cultivates partnerships with industry leaders in each of the sectors, on a systemwide basis or through campus advisory councils.

Accounting for nearly 5 million jobs, the following nine industries drive California's economic growth:

- **Agriculture, Food and Beverages**—This sector represents one of the largest, most pervasive industries in the state. Nearly every region (as it is defined in this report), except Los Angeles, has some specialty in agriculture. California's more than 200,000 agricultural employees provide a significant portion of the nation's produce and represent the center of American winemaking.
- **Information Technology and Electronics**—The Bay Area's Silicon Valley is famous as the birthplace of dozens of the world's premier technology firms and as a hub of technological entrepreneurship. Additionally, aerospace engineering in Southern California and telecommunications work in San Diego represent high-tech industrial hubs. About 750,000 programmers, engineers, and technicians work in these industries.
- **Media and Cultural Industries**—Los Angeles is one of the world's major entertainment centers and a nexus for film, fashion, publishing, television, and music. Its dominance of cultural industries attracts thousands of artists, writers, musicians, and technical experts.
- **Business and Professional Services**—Representing the interconnected nature of California enterprise, professional services are important to marketing, selling, advising, and improving the state's businesses. They are found statewide but are primarily located in large metropolitan areas such as Los Angeles, San Diego, and the Bay Area.
- **Hospitality and Tourism** —From the Pacific Coast Highway to the state's famous parks, restaurants, and hotels, California is a draw for millions of people. In a state with such geographic diversity, nearly every region offers a different experience to travelers the world over.

- **Life Sciences**—As new discoveries make life sciences a field of growing importance, California has been at the forefront of research, pharmaceutical production, healthcare, and biotechnology. More than 100,000 people are employed in pure life sciences production and research, with an additional 1 million working in healthcare.
- **Transportation Services, Heavy Manufacturing, and Resource-based Manufacturing--** These are key historic sectors that support the base of the state economy. Given their historical importance and the fact that more than 900,000 people are employed in production capacities, they are mentioned here. However, they are not an area of focus in this analysis because of the more limited number of jobs requiring degrees and because heavy manufacturing is no longer as significant an industrial driver as it once was in the United States.

2.2. Education for California's Critical Knowledge-Based Industries

The CSU is a leader in supplying graduates with the necessary technical and personal skills to establish a workforce in these nine critical industries as follows:

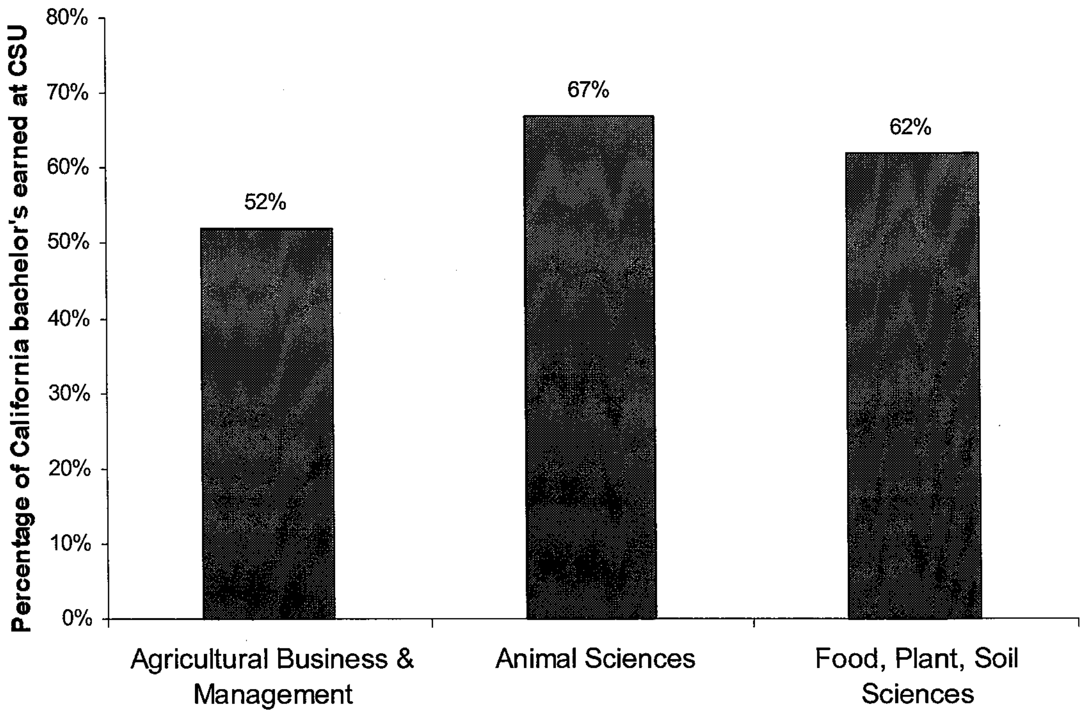
Agriculture, Food and Beverages: California's Historic Strength

The Agriculture, Food, and Beverage industry plays a pivotal role in the California economy. As recently as 2007, California's largest private sector industry consisted of Food Services. Furthermore, Beverage Manufacturing is considered one of California's largest growing sub-sectors.

The CSU has always been a strong contributor to this field. In 2007, 62 percent of Californians with bachelor's degrees in agriculture-related fields graduated from the CSU as did 36 percent of the states master's degrees in agricultural fields.

The following graph demonstrates the workforce contribution of some of the agriculture specialties in which the California State University is a major educator.

Figure 5. CSU Bachelor's Degrees as a Percent of Agricultural Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

Examples of the role CSU campuses play in California's agricultural economy include:

- CSU Chico is helping agriculture adapt to rapidly changing public policy issues by developing the Irrigation Training Facility located at the CSU Chico Agricultural Teaching and Research Center. The facility was developed in collaboration with Cal Poly San Luis Obispo, Fresno State, and the California Public Utility Commission and serves agriculture water users of Northern California by demonstrating new technologies that can be used to improve water delivery and irrigation efficiencies.
- Operating the first licensed and bonded commercial winery on a university campus in the United States, Fresno State students have the opportunity to study the art and science of grape-growing and winemaking. Fresno State wines have won scores of medals in commercial competitions.
- Humboldt State is collaborating on partnerships with the largest timber producers in California, a healthy regional dairy and beef industry, and a strong regional fishing and mariculture industry. Industrial partners include the largest California producer of oysters, lily and orchid growers, and small ranches and dairies.
- Cal Poly Pomona's Collins College of Hospitality Management and College of Agriculture combine resources and expertise to produce Horsehill Vineyards Zinfandel and Zinfandel

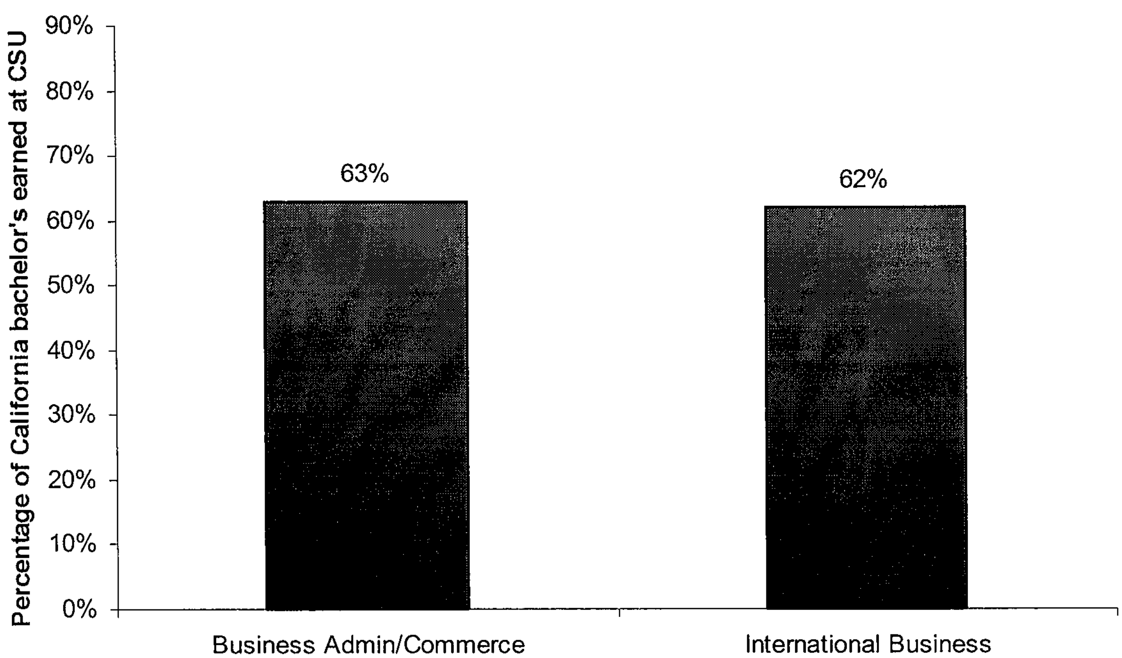
Rose. A self-sustaining project, the wine is sold at the campus Farm Store and proceeds also support a culinary garden for The Restaurant at Kellogg Ranch on the campus.

Business and Professional Services: Educating to Manage

With California's ever-growing Business and Professional Services sector, it is important to have an educational system that supports that growth. This sector is all the more relevant because it contributes to other sectors in the economy. One out of every five CSU graduates in 2009 completed a bachelor's degree in business/management. Furthermore, the fact that 54 percent of all business bachelor's degrees awarded in California in 2007 were earned at the CSU underscores the CSU's vital role in supplying the workforce. Many interdisciplinary majors involving business concepts were developed as a result of input from industry partners.

The figure below demonstrates the importance of the CSU in contributing to the Business and Management fields.

Figure 6. CSU Bachelor's Degrees as a Percent of Business/Management Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

Programs that directly prepare CSU students for careers in business and professional services include:

- Accounting;
- Advertising;

- Business;
- Business Administration and Management;
- Managerial Economics;
- Human Resources Management;
- International Business.

There are currently 24 Professional Science Master's (PSM) programs within the CSU—innovative, interdisciplinary programs that combine business and management training with rigorous academic preparation integrated through an industry internship. These programs currently enroll more than 500 students and are on track to train more than 1,200 professionals in the state's highest growth sectors over the next five years.

One example of a cross-cutting business major is CSU Channel Islands' dual master's degree in Biotechnology and Business Administration. This innovative and interdisciplinary curriculum blends key components of biological sciences and business at the graduate level. Most courses are currently offered through the existing MS in Biotechnology and MBA programs. Several CSU campuses have implemented this "21st Century MBA" program.

Other examples of innovative business programs include:

- San Francisco State University brought affordable graduate business education to the heart of the city's business district in 2007 with the opening of its new downtown campus to accommodate working professionals.
- CSU Northridge graduate students have created the *Tax Development Journal*, the first student-run online publication that serves as a forum for intellectual discourse on emerging issues for tax practitioners and policymakers.
- Humboldt State houses the lead center for 10 Small Business Development Centers across Northern California. The centers provide one-on-one business mentoring to more than 4,500 small businesses each year and are funded through grants, including $2.6 million from the federal government.
- CSU Bakersfield's Business Research and Education Center (BREC), Public Service Institute (PSI), and its recently created Small Business Development Center (SBDC) provide professional development training to individuals and assist organizations with strategic planning, program evaluation, and comprehensive consulting services.

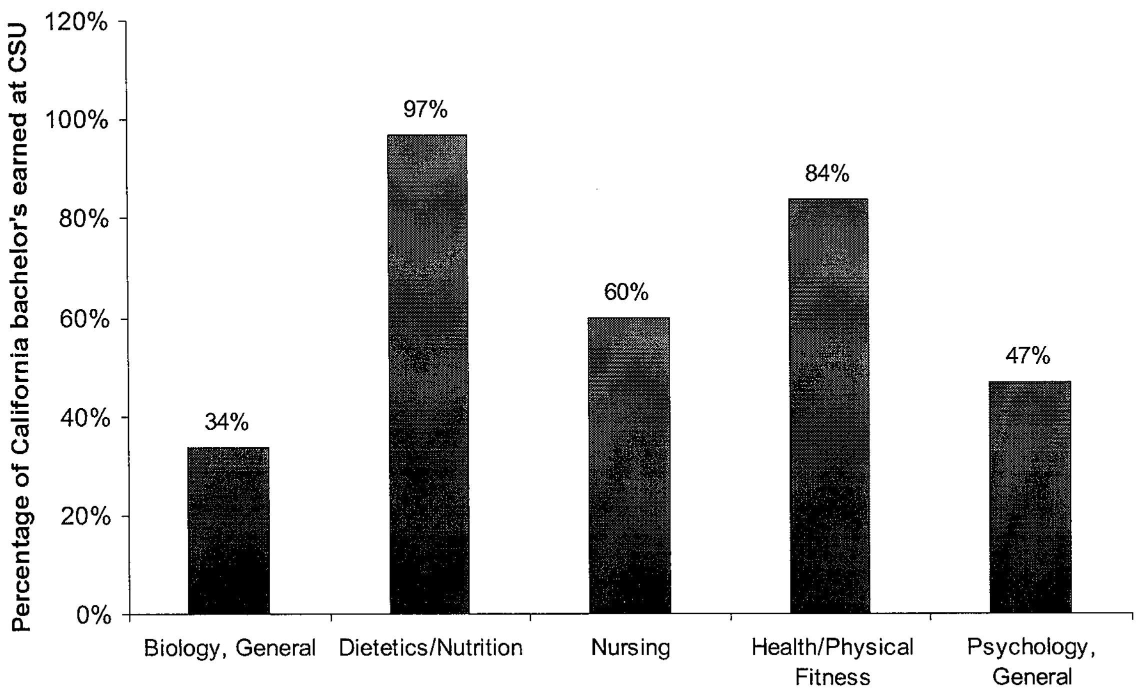
Life Sciences and Biomedicine: Meeting a Growing Need

As of 2007, 8.7 percent of people employed in California worked in Healthcare and Social Assistance. This contributes to Ambulatory Health Care Services and Hospitals being, respectively, the fifth and sixth largest sub-sectors of the California economy. The CSU has been a consistent supporter of these industries by graduating 44 percent of all health- or medical-related bachelor's students in California and 37 percent of all master's students.

That said, these numbers only tell part of the story. The CSU also is growing the number of graduates supporting the health fields: 33 percent more CSU students are studying biological sciences in 2009 than in 2003. Furthermore, 77 percent more CSU students are studying health professions than did in 2003. Nearly 1 in 10 CSU graduate students studied health sciences in the 2008-09 academic year.

The following figure demonstrates the importance of the CSU in contributing to the Life Sciences and Biomedicine fields.

Figure 7. CSU Bachelor's Degrees as a Percent of Health Sciences Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

A Renowned Health Program at CSU Dominguez Hills Grows in a Time of Need

In a time of two wars, CSU Dominguez Hills is using one of its leading programs to improve the lives of soldiers coming home. In August 2009, the campus's Orthotics & Prosthetics (O&P) Program, in collaboration with the Long Beach Veteran's Hospital, opened a 10,000-square-foot facility dedicated to training students in prosthetic care in a real-world environment.

The program, which has conducted research and training for more than two decades, is the only one of its kind in California and one of nine nationwide. One in five professionals in orthotics and prosthetics is a CSU Dominguez Hills graduate. Until now, much of the hands-on training happened at a local prosthetics manufacturer, but with demand for prosthetics increasing because of war and obesity rates, the new, dedicated facility will provide students the ability to work in closer contact with patients.

More specifically, individual CSU campuses have offered important contributions to the biomedical sciences.

- Fifteen CSU campuses are partners to the biomedical industry in Professional Science Master's (PSM) programs. Rigorous preparation is provided in such fields as bioengineering, bioinformatics, biostatistics, biotechnology, computational sciences, medical product development management, assistive and rehabilitative technologies, and medical product development management. Students are trained in the sciences and in the skills needed in for the global biomedical industry.
- Three CSU campuses (Channel Islands, Dominguez Hills, and San Diego) are responding to California's workforce demand for biotech professionals with a new online certificate for Biotechnology Project Management in Quality Assurance. The programs were made possible by a grant from the U.S. Small Business Administration that is managed by the CSU Program for Research and Education in Biotechnology (CSUPERB). The grant will serve the needs of the regional life sciences industry in the greater Los Angeles area.
- San Francisco State University is a new training ground for future stem cell researchers, with support from a $1.7 million grant from the California Institute of Regenerative Medicine (CIRM). The program provides master's students with intensive research internships at partner institutions, including the University of California's Berkeley and San Francisco campuses and the Buck Institute for Age Research. Humboldt State also has a $1.6 million grant from CIRM, and partner institutions include Stanford University and the University of California, San Francisco.
- CSU Bakersfield's Nursing program has been awarded a five-year, $10.4 million grant from the National Institute of Child Health and Human Development (NICHD) to study children's health and development. The project is an integral part of the National Children's Health Study, the largest longitudinal study of child health ever undertaken in the United States.
- CSU Stanislaus is helping to meet a growing demand in California with its Genetic Counseling Master's Degree program established in collaboration with San Francisco State, UC San Francisco, and Kaiser Permanente. Genetic counselors in this Professional Science Master's program develop combined expertise in human genetics and knowledge of important medical discoveries to work with families dealing with genetic disorders and inherited health conditions.
- CSU East Bay has teamed with healthcare provider John Muir Health to more than double the number of students earning bachelor's of science degrees (to about 150 per year) in the nursing program at the CSUEB Concord Campus. John Muir is contributing $3.8 million over seven years, including the cost of retrofitting facilities and the donation of sophisticated mannequins for a simulation lab.

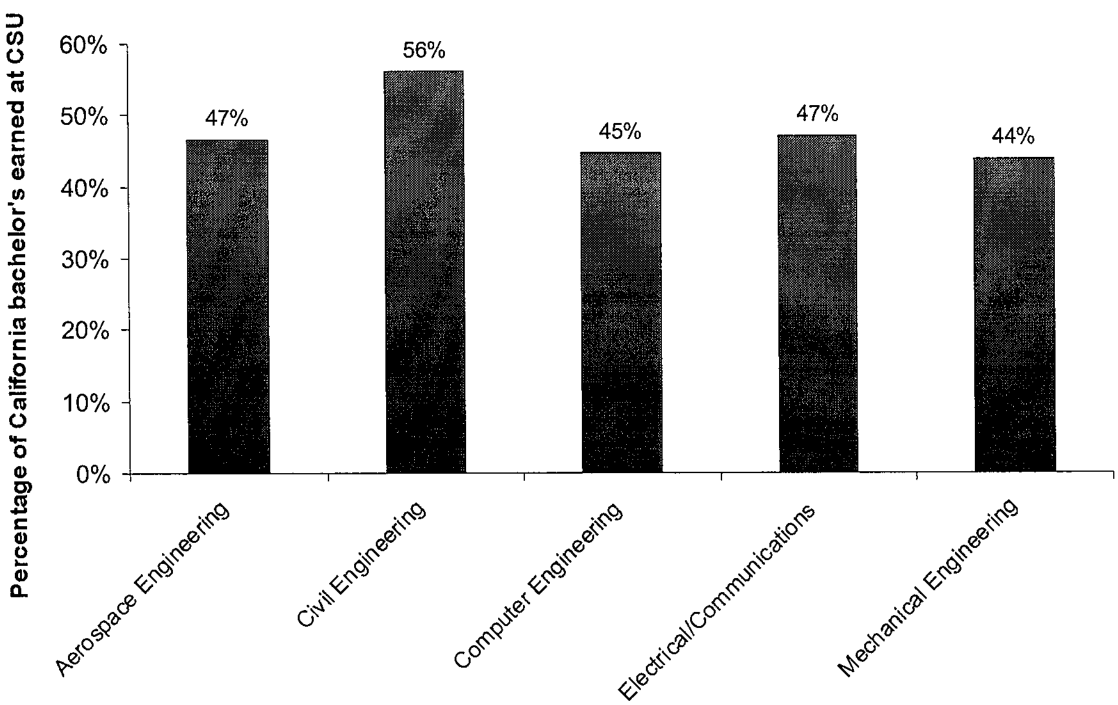
Engineering, Information Technology, and Technical Disciplines

Engineering, Information Technology, and Technical Disciplines are a vital part of California's economy with Technical Services being part of the second largest sub-sector.

The CSU is an important contributor to these fields with 45 percent of the state's engineering and information technology majors graduating from the system. Part of this influence can be attributed to the 31 percent increase in engineers graduating from the CSU in 2009 from 2003. CSU also graduates 45 percent of the state's computer engineering bachelor's degrees. The CSU has made a concerted effort to help the industry reflect California's diversity by reaching out to underserved students and women to increase their participation in engineering programs and related studies. This has been accomplished by creating numerous partnerships with organizations in the Science, Technology, Engineering, and Math (STEM) fields.

The following figure demonstrates the importance of the CSU in contributing to Engineering, Information Technology, and other technical fields.

Figure 8. CSU Bachelor's Degrees as a Percent of Engineering Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

CSU campuses offer a broad range of engineering programs that are addressing industry demands:

- CSU Dominguez Hills conducts research in the use of intelligent decision support systems in emergency response, airport security, border security, cargo security, and national infrastructure protection applications; and the development of secure policies for robotic and human agents patrolling airports, performing border patrol, or protecting critical infrastructure.

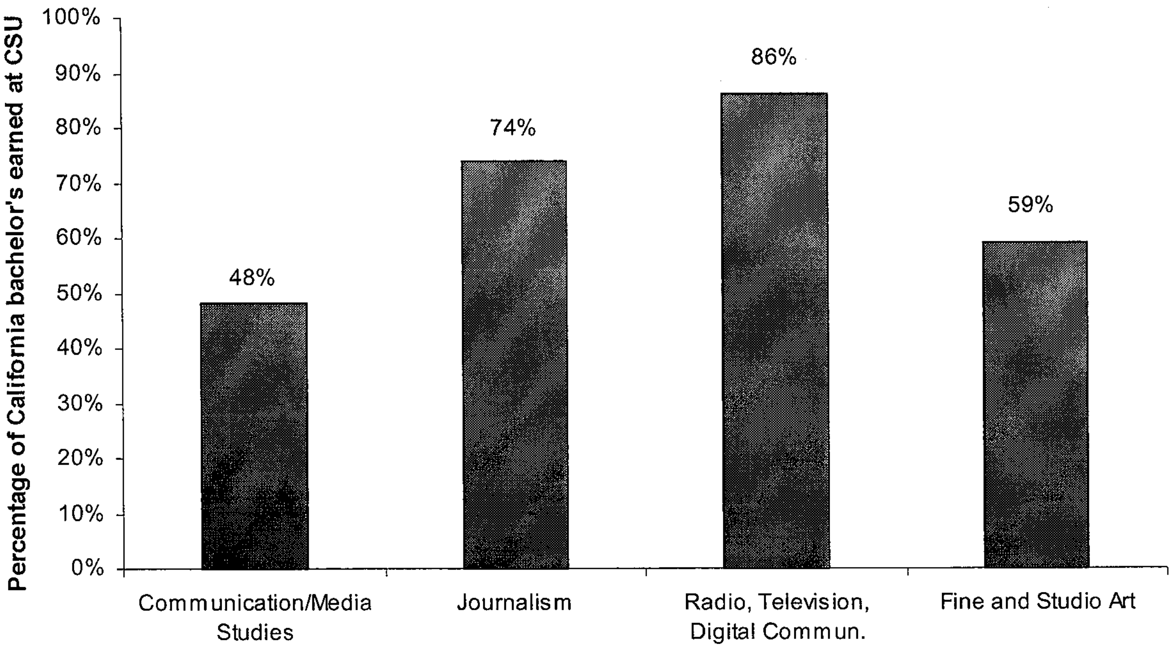
- CSU San Bernardino students and faculty combined to create the Xbox game "Vector Force," which made the list of top Indie Games in the online Xbox Live Marketplace.
- San Diego State's "Communication Systems and Signal Processing Institute" is internationally recognized for leading innovations in technologies that support wireless communication. Telecommunications giants Qualcomm, SAIC, Cubic Corporation, and Northrop Grumman collaborate in this unique partnership and use the opportunity to draw San Diego State graduates as employees.
- Along with its strong engineering programs, the California Maritime Academy prepares students to serve California's maritime trade and transportation sector in ports and on ships. One-third of all the marine pilots on the West Coast and two-thirds of the pilots in the San Francisco Bay area are graduates of Cal Maritime.
- CSU East Bay has added a Bachelor's and Master's of Science in Construction Management. The curriculum was developed in collaboration with experts from major construction companies as well as governmental agencies in anticipation of a projected increase in California's transportation-infrastructure projects as the economy recovers.

Media, Culture, and Design: California's Best-Known Export

Hollywood is practically synonymous with the film and television industry, which has been instrumental in popularizing and marketing California around the world. The CSU is as critical a supplier of job-ready graduates in this industry as it is in the other drivers of California's knowledge-based economy: 44 percent of California's bachelor's degrees in media, culture, and design studies graduated from the CSU. Journalism is a prized program, with 74 percent of California's communications bachelor's degrees awarded by the CSU as well as 86 percent of the graduates in radio and television broadcasting.

The following figure demonstrates the importance of the CSU in contributing to the media, culture, and design fields.

Figure 9. CSU Bachelor's Degrees as a Percent of Media, Culture, and Design Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

Beyond these overarching statistics, individual schools offer tremendous programs that drive California's Media, Culture, and Design Industries:

- The Multimedia Graduate Program at CSU East Bay trains artists, musicians, and other creative professionals together, forging new media and interactive content that speaks to the intersection of technology and communication central to the region's industry. Graduates work at leading Bay Area new media companies such as Electronic Arts, Google, and Game House.
- CSU Fullerton's Art Department teams with both the Disney Company and Warner Brothers Feature Animation to offer an animation and entertainment arts program whose graduates are pursuing careers at DreamWorks, Nickelodeon, and Walt Disney Feature Animation, among others. The Theatre and Dance Department has graduated the likes of *Criminal Minds* actress Kirsten Vangsness, *Desperate Housewives* creator/executive producer Marc Cherry, and Linda Woolverton, who wrote the screenplays for *Beauty and the Beast, The Lion King, and Alice in Wonderland.*
- CSU Long Beach's College of the Arts has more art and design majors than any other public university in America.
- Other branches of the media and cultural industries are also well-represented in the CSU's curricula. The CSU has educated many well-known and influential writers. San Francisco State's Creative Writing Department, for example, is one of the oldest and most respected in the country. Over the years, it has boasted such professors as Wright Morris, Kay Boyle,

Gina Berriault, Frances Mayes (an alumna), and Molly Giles. Alumni include best-selling authors Anne Rice, Ernest Gaines, and Po Bronson, as well as Pulitzer Prize-winning poets Philip Schultz and Rae Armantrout. CSU Los Angeles has had Dorothy Parker and Christopher Isherwood as professors, and its alumni ranks include Joseph Wambaugh.

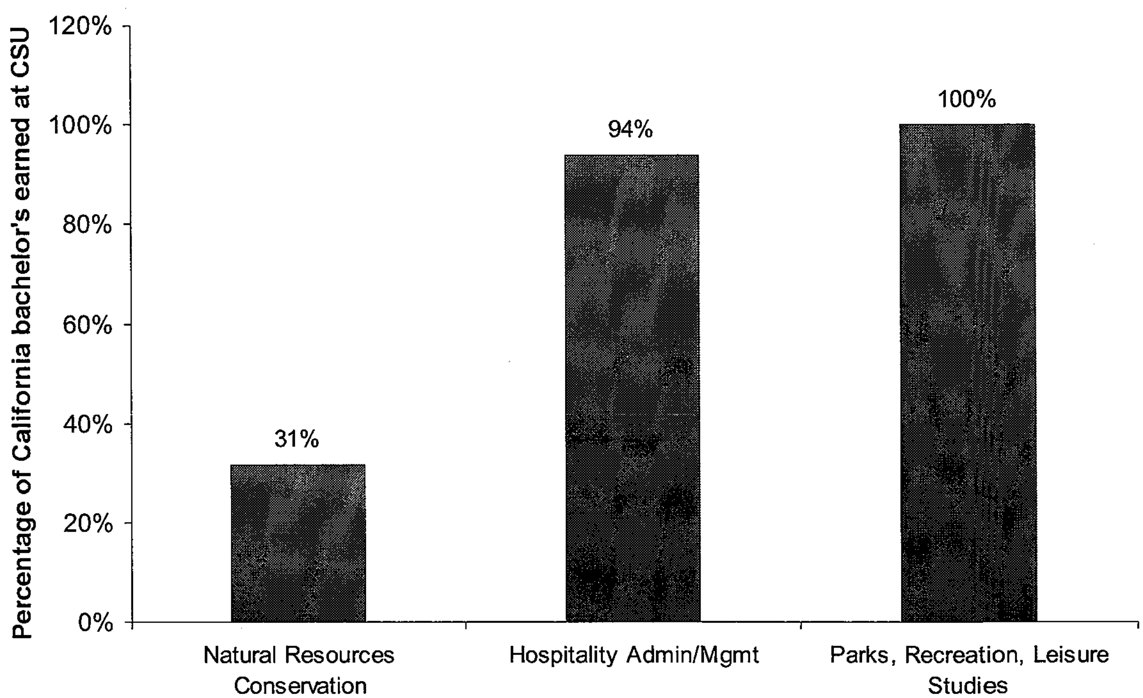
- CSU Los Angeles's "Reel Rasquache" film festival brings notable artists to campus and showcases filmmaking that focuses on the Latino experience in the U.S.

Hospitality and Tourism: Packaging the California Experience

Hospitality and Tourism is a crucial industry in California. Degrees in this field serve those who ultimately work in hotels, resorts, restaurants, spas, casinos (tribal gaming), special events (conventions, conferences, weddings, or meetings), tourism, travel, institutional food services, or customer service. The CSU actively works to support this industry by producing 64 percent of the tourism graduates in California. Furthermore, roughly 94 percent of hospitality administration and management graduates come from the CSU system. With 445 students graduating in 2007, the CSU is the only university in California with a bachelor's degree program in Parks, Recreation, and Leisure Studies.

The following figure demonstrates the importance of the CSU in contributing to the Hospitality and Tourism fields.

Figure 10. CSU Bachelor's Degrees as a Percent of Hospitality and Tourism Degrees Awarded in California, 2007



Source: California Postsecondary Education Commission

- The Collins College of Hospitality Management at Cal Poly Pomona is the first and largest four-year hospitality management degree program in California. Building on its renowned undergraduate program, the college is launching the state's first Master of Science in Hospitality Management. The school serves approximately 1,000 ethnically diverse students.
- The Sports, Entertainment and Hospitality Management program offered by the College of Business Administration and Public Policy at CSU Dominguez Hills capitalizes on the high demand in Southern California for sports, entertainment and hospitality professionals, as well as its partnership with the high-profile Anschutz Entertainment Group and The Home Depot Center located on campus. The program offers a bachelor's degree in business administration with a concentration in Sports, Entertainment, and Hospitality Management.
- San Diego State University's School of Hotel and Tourism Management has more than 500 students from all over the world. The curriculum has a strong focus on business skills in a hospitality setting. The school offers emphases in hotels, restaurants, meetings and events, tribal gaming and sustainable tourism.

2.3. Key Service Industries

In addition to the critical knowledge-based industries discussed above, California State University has educated many of the Golden State's public professionals, including teachers, criminal justice employees, social workers, and public officials.

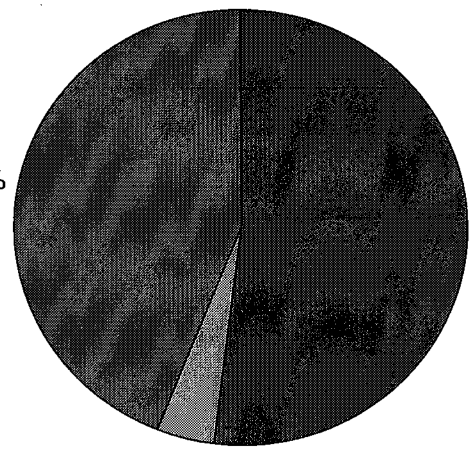
In total, the CSU graduated about 75 percent of the state's college degrees in criminal justice and prepared more than half its teachers.

Educating Teachers: Building the Future Generation

Education is the foundation for future generations of Californians' success and is routinely cited as one of the major drivers of economic growth. The CSU is by far the state's primary source of teachers; more than half of California's teachers are graduates of its campuses.

In addition, education is growing as a field of study at the CSU. In 2007-08, nearly 13,000 CSU alumni received California teaching credentials. Mathematics and science teachers are especially important in preparing the workforce for the state's high-growth sectors. The CSU has increased its preparation of teachers in these fields by more than 85 percent in the past five years. Furthermore, 11 CSU campuses offer a three-year EdD program designed to equip leaders with the necessary knowledge and skills to develop reforms to improve student achievement.

Figure 11. Newly Issued California Teaching Credentials (regular credentials and internships) by University, 2007-08



Source: California Commission on Teacher Credentialing

The Urban Teaching Academy: One of the CSU's Innovative Approaches to Educating Teachers

It started with a nationally competitive grant from the National Commission on Teaching and America's Future, and it has grown into an innovative program for teacher education. CSU Long Beach's Urban Teaching Academy (UTA) is modeled after doctors' hospital residency programs and calls on veteran teachers to mentor master's students. In UTA, students also learn in K-16 classrooms, providing a real-world environment to hone their craft.

In recent years, program leaders Linda Symcox and Felipe Golez have led six cohorts through several area schools in the Long Beach and ABC Unified School Districts. These groups learn within the context of the school in which they are working. For example, in a sciences magnet school, the master's student takes science-related electives. In addition, students spend two days a week on scholarly work.

CSU campuses have demonstrated leadership in improving American education and developing groundbreaking teacher education programs:

- CSU Northridge is one of four universities in the U.S. selected by the Carnegie Corporation of New York to participate in its Teachers for a New Era Initiative. Jointly funded by the Carnegie, Ford, and Annenberg Foundations, the program is designed to ensure teacher preparation that is evidence-based and of the highest quality.
- With a five-year $8.8 million grant from the U.S. Department of Education, CSU Los Angeles in 2009 launched the Los Angeles Urban Teacher Residency Program to strengthen teacher preparation and student academic achievement. It places students who are seeking to become teachers as resident-teachers at middle and high schools in the Los Angeles Unified School District (LAUSD), where they are prepared to teach math, science, and special education at high-need public schools.

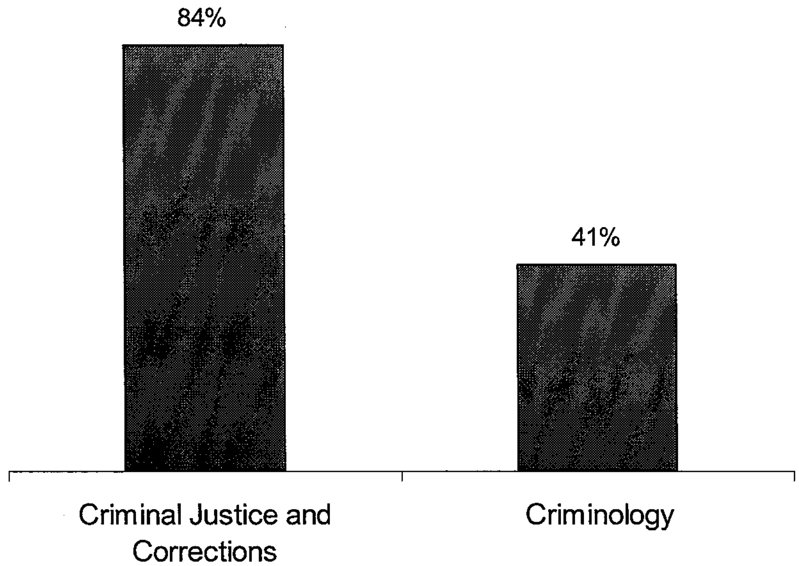
- CSU Bakersfield, CSU Chico, CSU Dominguez Hills, and CSU Los Angeles as well as Cal Poly San Luis Obispo are among only 28 universities nationwide to receive a prestigious Teacher Quality Partnership grant from the U.S. Department of Education in its first-time award of these grants.
- CSU Stanislaus organized the Central Valley Dual Language Consortium to support 11 dual language immersion elementary schools in its service area that focus on teaching students English and Spanish. Bolstered by a recent grant that provides resources to prepare future education leaders and improve dual language education in the region, the program features regular support meetings and parent conferences that help integrate bilingual students into the school.
- The North Orange County Beginning Teacher Support and Assessment Induction Program is a collaborative partnership of CSU Fullerton, the Fullerton School District, La Habra City School District, and Buena Park School District. The partnership offers multifaceted support, including an experienced teacher-partner for teachers during their first two years in the classroom.
- CSU Dominguez Hills received a five-year Title V grant for over $2.7 million from the U.S. Department of Education to establish a new success program for Latino students, "Encuentro Hacia El Exito" (Encounter to Excellence).

Criminal Justice: Providing Leadership and Security

California has the largest and one of the most complex criminal justice and corrections systems in the United States. The CSU's criminal justice programs prepare the trained professionals needed to administer and improve the state's courts and corrections system: 84 percent of Californians granted bachelor's degrees in criminal justice and 41 percent with degrees in criminology in 2007 studied at the CSU. The CSU awarded 70 percent of the master's degrees in criminal justice in 2007.

The following figure demonstrates the importance of the CSU in contributing to the Criminal Justice field.

Figure 12. Percent of Criminal Justice Graduates in California with Degrees from CSU, 2007



Source: California Postsecondary Education Commission

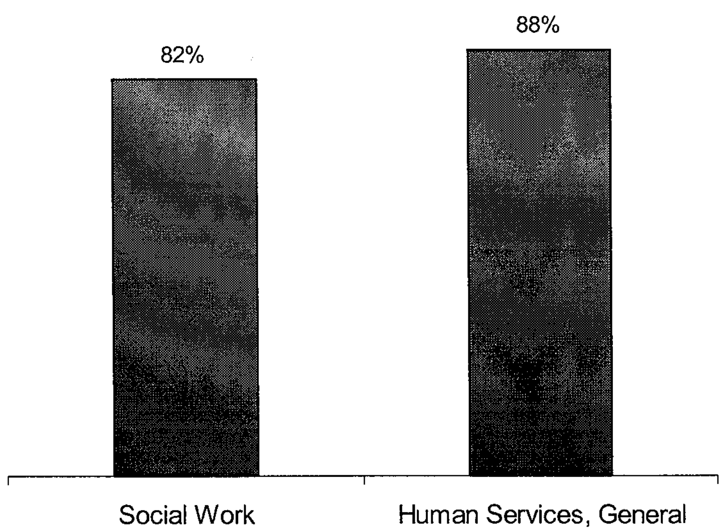
- San José State was the first institution in the United States to offer degrees in criminal justice, and Fresno State houses an on-campus crime lab.
- The Hertzberg-Davis Forensic Science Center on the CSU Los Angeles campus is unique as it combines academic teaching and research programs with the operating crime laboratories of the Los Angeles Sheriff's and Police Departments, providing forensic crime laboratory services to serve justice.
- CSU San Bernardino serves as the lead institution for a seven CSU campus consortium to operate the CSU Intelligence Community Center of Academic Excellence, teaching students in language acquisition, critical thinking and writing, foreign studies, GIS-related skills, national security, and intelligence studies.
- CSU Sacramento's Criminal Justice program is one of the largest in the nation, with more than 1,500 undergraduate pre-majors and majors and 80 graduate students. CSU Sacramento graduates occupy key positions in local, state, and federal law enforcement and correctional agencies. A substantial number have gone on to law school and the practice of law, in both the court system and in private practice.
- The Negotiation, Conflict Resolution, and Peacebuilding (NCRP) undergraduate and graduate programs at CSU Dominguez Hills are dedicated to the advancement of interest-based negotiation as well as peaceful approaches to conflict management/resolution and peacebuilding in all areas of human interaction. The program also offers a joint JD/MA program enabling graduate students to complete a J.D. at Southwestern Law School while earning an MA degree.

Social Work

With growing elderly and immigrant populations, there is a significant demand nationwide for qualified social workers. Social workers provide a vast array of services for California's families and represent a link between state services and community action. The CSU is by far the state's largest source of these vital experts. The CSU awarded 82 percent of bachelor's degrees in social work and 69 percent of the master's degrees in 2007.

The following figure demonstrates the importance of the CSU in contributing to the Social Work field.

Figure 13. Percent of Social Work Graduates with Bachelor's Degrees from CSU, 2007.



Source: California Postsecondary Education Commission

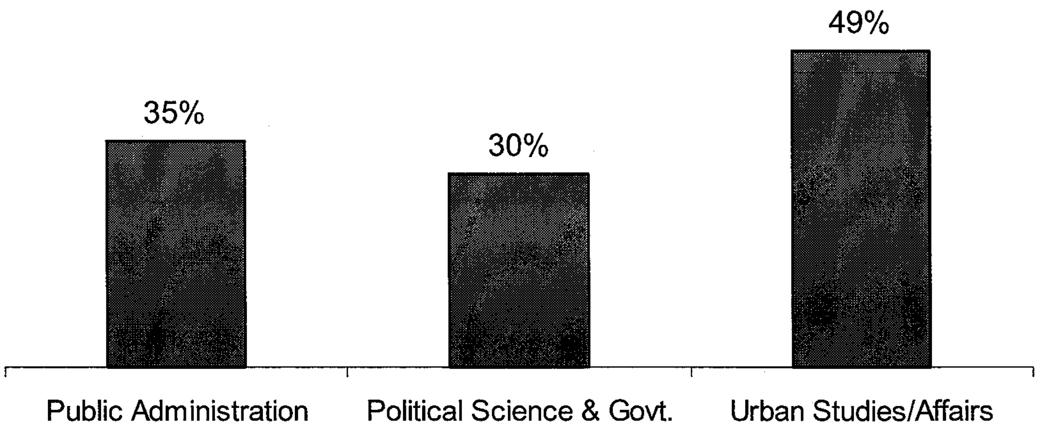
Public Administration: Leadership and Service

As the most populous state in the union and one of the world's 10 largest economies, California's governance relies on trained policy professionals who understand the methods and practice of public administration and are imbued with a commitment to public service. Particularly in a time of difficult budget decisions, California relies on its leaders and policymakers— the majority of whom were trained at the CSU.

Seven hundred people, or 64 percent of Californians with master's degrees awarded in public administration in 2007, studied at the CSU. Forty-nine percent of Californians with bachelor's degrees in city, urban, community, and regional planning studied at the CSU in 2007.

The following figure demonstrates the importance of the CSU in contributing to the Public Administration field.

Figure 14. Percent of Public Administration Graduates with Bachelor's Degrees from CSU, 2007



Source: California Postsecondary Education Commission

- CSU Sacramento's Center for California Studies is one of the state's only multidisciplinary, university-based institutes addressing California policy issues. The center administers the Capital Fellows Program internship, which was named one of the top 10 internships in the nation by Vault.com, a career management research and information website.
- San Francisco State University is a major training ground for lawyers and lawmakers in California. It ranks among the top 20 undergraduate schools whose alumni go on to be admitted to the State Bar. Many attorneys who trace their undergraduate years to San Francisco State have advanced to holding public office.
- Cal Poly Pomona ranks second in the nation for Best Urban & Regional Planning undergraduate programs among private and public schools, according to *Planetizen*, a leading online publication for the urban planning, design, and development community.
- The Pat Brown Institute at CSU Los Angeles is a non-partisan public policy center that convenes public policy forums, engages multi-sector stakeholders and diverse communities, and conducts policy research and community-driven initiatives.

"Green" Jobs

There is currently an effort throughout academia in the United States to make universities more sustainable. This involves implementing strategies such as building more energy efficient buildings and using renewable resources. The CSU is taking this one step further by investing in its students to be the leaders of tomorrow's green workforce. These efforts are particularly important in a state where "green" businesses increased by 45 percent over the past 15 years.

CSU campuses are offering students programs focused on "green" industries. Following is a sampling.

- The Green and Sustainable Building Certificate Program offered by the CSU Long Beach College of Continuing and Professional Education provides contractors, builders, and a new class of "green collar" workers an understanding of cutting-edge advancements in building science, processes and materials, promoting preservation of natural resources, and energy efficiency.
- In partnership with The Boeing Company, CSU Northridge is constructing a first-of-its-kind 100-kilowatt photovoltaic installation whose efficiency will nearly double that of the campus' existing energy producing solar panels. The unique solar arrays employ a dual axis tracking system that automatically moves to follow the sun. Engineering and Computer Science students are participating in the project.
- CSU San Marcos Extended Learning offers a certificate program in Green Business Operations for those in local industry and organizations seeking to gain a deeper understanding of the problems and potential solutions for "going green," including how to reduce associated costs and comply with new legislation to preserve the environment.
- CSU East Bay offers a new interdisciplinary certificate in sustainable resource management open to undergraduates and professionals to help support green workforce development in the region. The Division of Continuing and International Education offers eight new online professional certificate programs in areas including energy, green building, and air quality.
- CSU Fullerton's Center for Sustainability and Environmental Studies Program received a $300,000 grant from the FIPSE program of the U.S. Dept. of Education to develop innovative models for the recruitment and retention of Hispanic American graduate students. The funding will support the establishment of the first Transdisciplinary Virtual Community of Practice (TVCoP) related to sustainability. The TVCoP will reach out to environmental practitioners to advance training and promote interaction between those practitioners and current and potential environmental studies students, and provide opportunities for experiential learning.
- Through an innovative partnership with Aera Energy LLC and other industry stakeholders, CSU Bakersfield's Environmental Resource Management program met regional needs for occupational safety and health managers through the development of a new concentration within the Environmental Resource Management program.
- Humboldt State University's Schatz Energy Research Center has been conducting research on clean energy technologies for more than 30 years. Faculty and students at the center designed the nation's first street-legal hydrogen fuel cell vehicle and recently designed an on-campus hydrogen fueling station.

Meeting California's Professional Workforce Needs

California faces a complex web of challenges in the 21st century, including growing a nimble economy founded on agriculture and propelled by innovative technologies, while providing essential social services to a broad array of citizens. In this environment, a large, dynamic workforce of job-ready university graduates is essential. The CSU is by far the state's largest educator of California's workforce. No other California university provides as many graduates for knowledge-based industries. At the same time, the CSU's education of public professionals in criminal justice, education, and public administration lays the foundation for future economic growth and protects citizens in need. The CSU's development of this professional workforce reflects a long-standing commitment to higher education, represented in the state's 1960 Master Plan for Higher Education, and has helped form the backbone of one of the world's most prosperous and innovative economies.

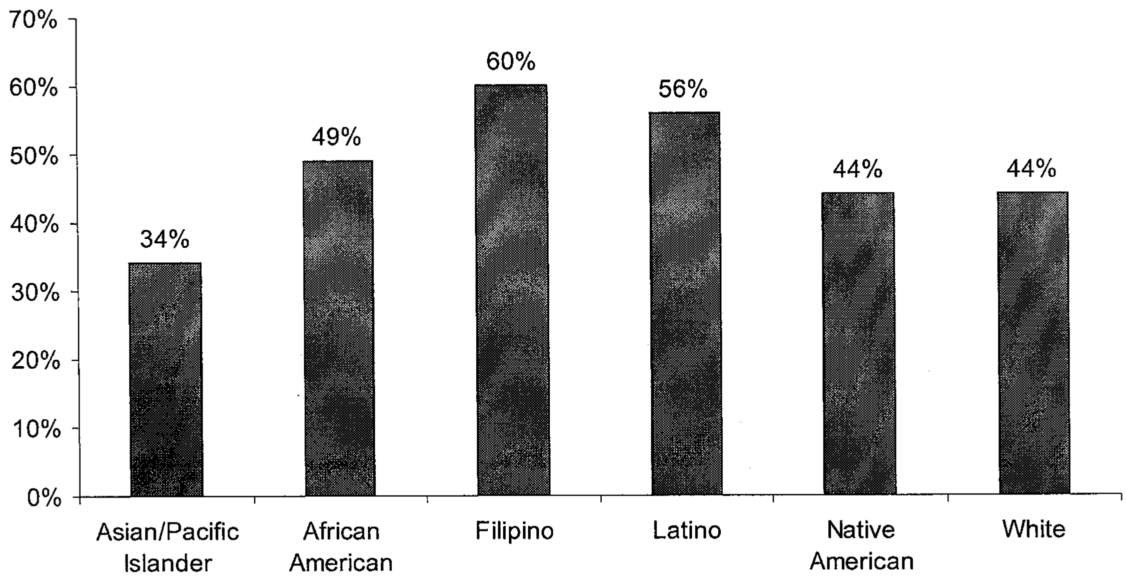
2.4. Ensuring Access to Higher Education

Ensuring affordable access to higher education for all Californians is critical to the state's future, especially during times of economic distress. A cornerstone of the CSU's mission is educating all Californians, regardless of background. More than ever, the campuses reflect California's changing population, offering curricula and programs that recognize the state's diverse students. The CSU's efforts in this arena are indicative of its core belief that education can dramatically change lives by opening new careers, unconsidered perspectives, novel avenues of discovery, and critical life skills.

Open to All Californians

Nearly half of all degrees granted in 2006-07 in California to people of color were earned at the CSU. As of 2006-07, 56 percent of all bachelor's degrees granted to Latinos in California were CSU degrees. The numbers for other ethnic groups in the state were similar, as shown in the following graph.

Figure 15. CSU Bachelor's Degrees Recipients as a Percentage of All California Public and Private University Bachelor's Recipients, 2006-07.



Source: California Postsecondary Education Commission

These traditionally underserved students compose 65 percent of California's public school population yet often are in school districts where college preparatory courses are not required and pre-college advising is unavailable. It is incumbent upon the CSU to help prepare these students for college and graduate them into the state's workforce. During the past 10 years, the CSU has taken significant steps to prepare these emerging populations for college and has formed partnerships and created innovative programs for African American, Latino, Asian, and Native American families.

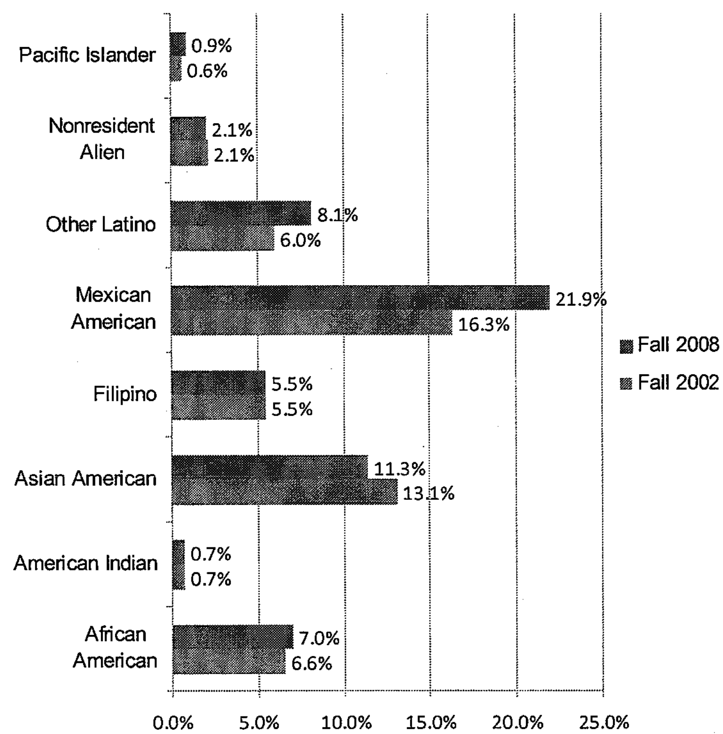
A sampling of the CSU's initiatives includes:

- Super Sunday: The CSU partners with African American churches to underscore the need for early college preparation and readiness. The CSU's leaders speak from the pulpit in February to reach families in communities throughout the state.
- Parent Institute for Quality Education (PIQE): The CSU has partnered with PIQE, an organization that teaches primarily Latino parents how to help their children prepare for college and successfully navigate the public education system.
- Troops to College: The CSU is leading a statewide program established to assist military men and women transition to college after exiting the service. The program includes academic outreach, admissions, and enrollment planning for the approximately 60,000 veterans exiting military service each year.

- Early Assessment Program: The CSU created this nationally acclaimed program to help 11th graders determine their proficiency in college-level English and mathematics. The test results enable the students to identify the need for additional preparation in English and mathematics during the senior year so they enter the CSU fully prepared for college level coursework.
- "How to Get to College" Poster: The CSU has distributed more than 3 million copies of this award-winning, multilingual poster, which serves as a roadmap for middle and high school students to prepare for college.
- The Road to College Tour: Supported by a grant from AT&T, the CSU annually deploys a mobile "college on wheels" campaign to underserved students in communities throughout California.
- The CSU recently joined with Univision and the Bill and Melinda Gates Foundation to form a national media campaign titled Es El Momento (The Moment Is Now), a series of programs and announcements designed to promote college readiness among Latino families.

As a result of these efforts, minority enrollment at the CSU has improved for several groups, as indicated in the following chart.

Figure 16. CSU First-Time Freshman Enrollment by Ethnicity, Fall 2002 and 2008.



Source: CSU Analytic Studies

CSU campuses reflect their communities and provide access to underserved populations more than ever before. Campuses across the CSU system have made accomplishments in opening their doors to students of color:

- Cal Poly Pomona is among the top 10 schools in the nation in granting degrees to Hispanic, Asian American, and other minority students in agriculture, architecture, and engineering.
- CSU Fullerton is ranked sixth in the nation in bachelor's degrees awarded to minority students, according to *Diverse Issues in Higher Education.*
- CSU Long Beach's undergraduate programs in health have seen 9 percent growth in minority graduates over 2007. The programs rank fifth in the nation for minority graduates.
- Six CSU campuses rank among the 15 colleges awarding the most bachelor's degrees to Latino students each year, according to *Hispanic Outlook* magazine.
- The CSU enrolls several thousand Native Americans, and campuses engage in programs designed to attract Native Americans and celebrate local tribal cultures. For example, Humboldt State sponsors American Indian College Motivation Day each year, bringing in about 200 high school students from 30 local schools to highlight higher education opportunities in Northern California. Humboldt, as well as other campuses, also offers curricula in studying tribal cultures and programs that promote Native American participation in education and the sciences. In 2006, CSU San Marcos signed a memorandum of understanding with the Santa Ysabel Band of Diegueño Indians to help prepare their youth for higher education.

The CSU also works to offer higher education to students with physical and mental disabilities. More than 10,000 disabled students are currently enrolled at CSU campuses. More than 95 percent of disabled students who enroll at the CSU graduate. Many of these students take advantage of campus services designed to help students pursue a college education, including campus-provided screen reader software, Braille embossers, note-takers, sign language interpreters, and infrastructure for the disabled.

CSU campuses also provide a wide range of services that ensure the admission, retention, and graduation of foster youth. Foster youth are provided direct contact with staff members, ongoing academic monitoring and intervention, opportunities to build relationships in a community setting, and connections to campus clubs and organizations. Offered in collaboration with student support offices and community services, these programs have proven successful.

The CSU is actively engaged in helping veterans, active-duty military personnel, and their dependents get an affordable education. The CSU offers numerous benefits to service personnel such as waiving of non-resident fees and the ability to use Department of Defense tuition assistance waivers at all campuses. Each CSU campus also has a veteran service representative to help military personnel take advantage of the university's opportunities.

One of the most successful ways to promote access is by providing students opportunities to enter the CSU through multiple avenues. While about 18 percent of public high school students matriculate after graduating high school, other students transfer into the CSU most often out of California's community colleges. Last year, about 42 percent of students entering the CSU were students who originally began their academic careers in community colleges, and 55 percent of last year's CSU graduates have also earned an associate's degree at a California community college.

The CSU is dedicated to offering programs that allow students to engage in lifelong learning. Approximately 20 percent of the CSU's population is over the age of 30, and one-quarter of students are part-time. In addition, some campuses, such as CSU Fullerton, offer programs that waive fees in space-available courses for senior citizens.

Because life for many students has demands beyond the classroom, the CSU has many offices, services, and programs designed to help students take full advantage of their educational experience. These include:

- Career centers;
- Child care programs and facilities;
- Evening and weekend courses;
- Counseling and advising support;
- Financial aid;
- Student health centers;
- Women's centers;
- Veterans' offices.

Online and distance learning gives many students the flexibility they need to engage with the CSU, earning certificates and degrees in a variety of subjects at their own pace.

- CSU Dominguez Hills offers the largest distance learning program in California, teaching courses for nine academic degrees and seven certificates, and broadcasting more than 20 hours of live, interactive programming each week on TV and the Internet.
- CSU Chico's satellite campus in Redding offers face-to-face courses in business, nursing, and education.
- San José State, CSU Channel Islands, and CSU San Marcos have collaborated to offer online graduate and continuing education courses in biotechnology.
- With 20 percent of its total enrollment in online courses and programs, CSU East Bay is expanding the reach of higher education to Californians and responding to the need for alternatives to conventional classroom teaching. The university offers seven degree programs online, as well as 40 certificate programs and 60 online courses, including 37 continuing education courses for new teachers.

Equally as important as early preparation and providing support services is ensuring that students persist to a degree once they reach the university. The CSU has launched a

Graduation Initiative aimed at increasing six-year graduation rates by 8 percent by 2016, as well as cutting in half the existing gap in degree attainment by the CSU's underrepresented students. This effort is boosted by the CSU's recent adoption of an "Early Start" policy that focuses on improving student achievement in English and mathematics so students are prepared for college-level coursework and can make faster progress toward their degree.

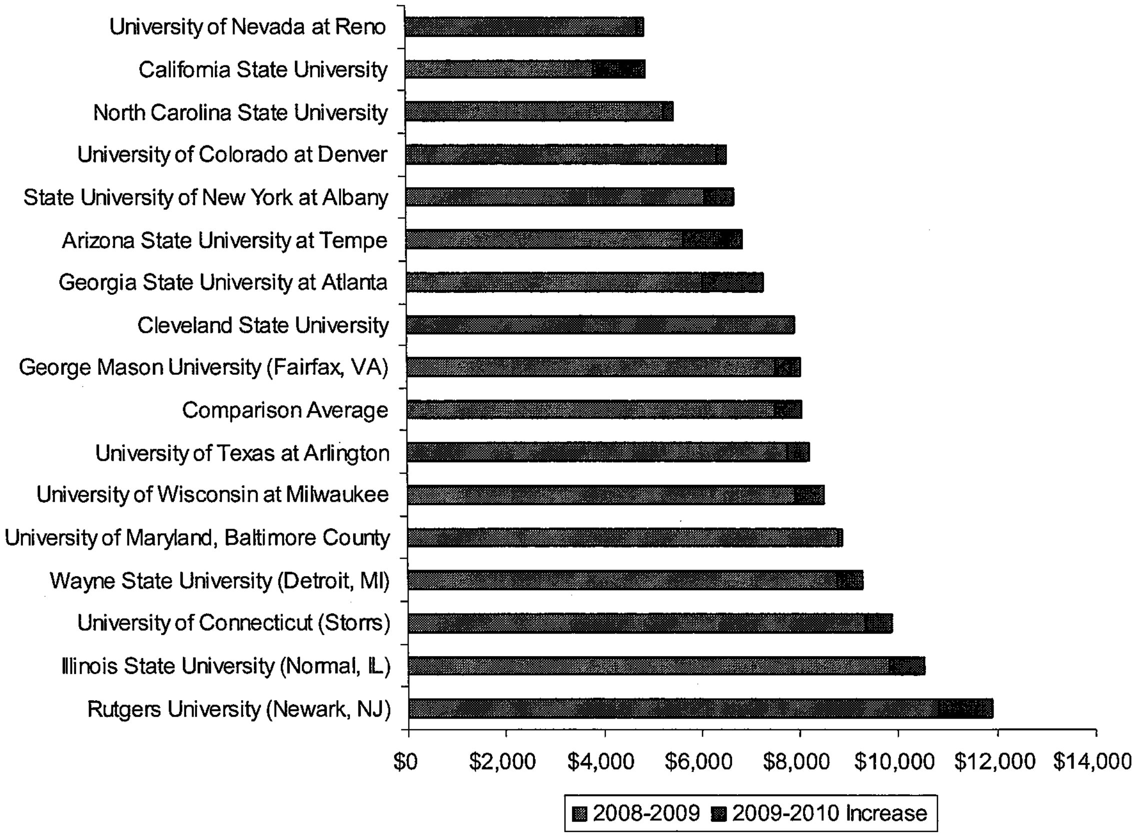
Providing Affordable Education

As one of the most affordable public education systems in the nation, the CSU has long recognized that it is imperative to offer education to all Californians regardless of their financial means. By offering flexibility through financial aid, students who a generation ago would not have conceived of a college education for themselves, are now CSU graduates.

With the country in the midst of an economic downturn, providing affordable education has become more challenging—but also more critical than ever. State funding cuts have forced the CSU to find new ways to maintain quality, including raising student fees, cutting enrollment, freezing salaries, and tightening budgets.

While increased costs are difficult for many students, about one-third of revenues from increased fees—now more than $300 million—has been set aside to increase financial aid. In 2008, more than 250,000 CSU students received financial aid totaling more than $2 billion. This aid, which includes loans, work study, and nearly $1 billion in grants, helps improve educational access for Californians. Additionally, the CSU's in-state fees remain the second lowest among comparable institutions nationally, as indicated in the following chart.

Figure 17. Comparison Institution Academic-Year Resident Undergraduate Fee Levels, 2008-09 to 2009-10



Source: CSU

2.5. Conclusion

The CSU is guided by the core value of offering access to higher education to all Californians, regardless of background or circumstance. This commitment to diversity and access improves communities, helps expand the state's workforce, and opens new opportunities for many Californians. The state's dynamic economy requires a pool of talented people who have the skills to perform and adapt, and who possess the unique perspectives needed to innovate in new areas of economic growth.

The CSU makes many important institutional contributions to California and is committed to being accountable for its mission by providing information and data on student learning, engagement, enrollment and graduation through the national initiative called the Voluntary System of Accountability. The CSU has provided leadership in accountability and reporting by expanding its information to include "College Portrait" and "Public Good" web pages that offer unprecedented information to address the contributions of the CSU's students and graduates to the workforce.

3. CSU on Sustainability: Environmental Consciousness and Energy

Sustainability implies meeting present societal needs without compromising the ability of future generations to meet their own needs. It is a comprehensive term that finds applicability in several forms including green technology, renewable energy, green building, sustainable agriculture, and sustainable individual lifestyles via changes that help conserve natural resources.

Universities serve as effective platforms where a vast amount of knowledge related to sustainability, and the conception and application of feasible sustainable measures, can take place. This is particularly important given the growth of green jobs over the past 15 years. From 1995 to 2008, core green economy employment in California grew 36 percent. This is almost triple California's total employment growth of only 13 percent over the same period.

As a leading university system with 23 campuses and the ability and responsibility to positively enhance the lives of students, the CSU serves as a guardian of the state's natural resources and green economy. This section provides a comprehensive picture of how the CSU has integrated sustainability across all 23 campuses. It also provides examples of on-the-ground initiatives being taken to achieve sustainability goals as well as how the CSU is preparing the environmental professionals of tomorrow by offering sustainability focused degree programs.

CSU students are active participants in many campus initiatives, and examples of their projects are provided. Green community outreach programs also are presented, as community education and action is an integral component of the CSU's approach to sustained environmental awareness.

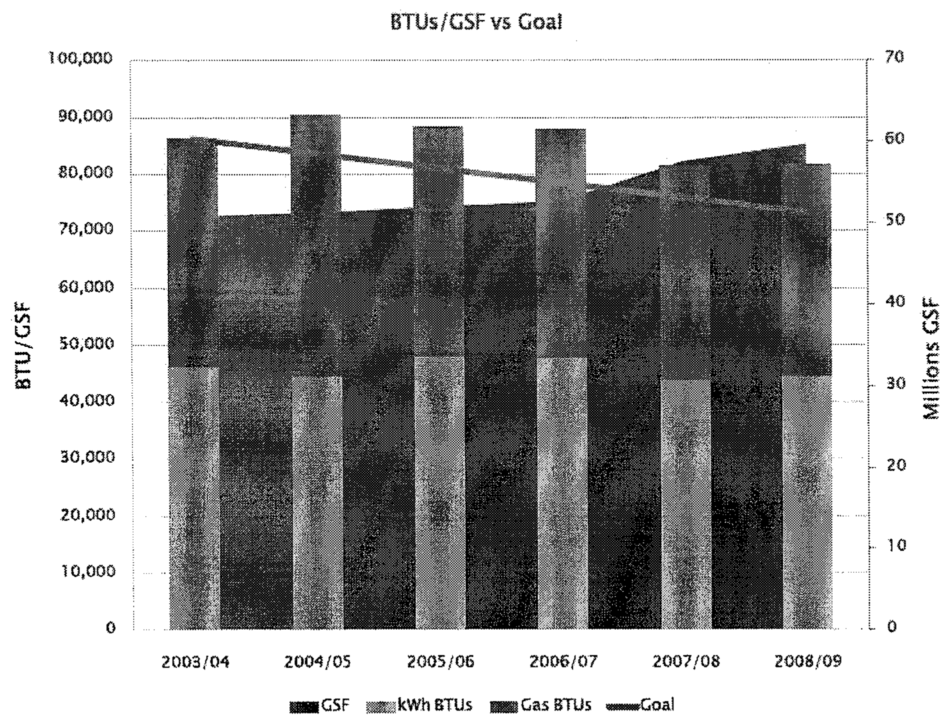
Infrastructure: Energy and Sustainable Design

The CSU has focused resources on increasing the generation and use of green energy as well as environmental design in new campus buildings. These efforts have helped the CSU to minimize a potential increase in its carbon footprint due to growing enrollment and technology usage. With California employment in the Energy sector growing 63 percent from 1995 to 2008, the CSU is providing a platform for the future leaders of the green economy.

The CSU sources the majority of its electric power from utilities and, whenever possible, utilizes cogeneration, a very efficient means of producing electricity and thermal energy through the same process. San Diego State University has a co-generation 15 megawatt power plant that uses waste heat to produce power and operates at 72 percent efficiency as compared with most utilities, which operate at only 30 to 40 percent efficiency. This $22 million investment saves nearly $6.5 million in energy costs each year. The San Francisco State campus also operates 2.0 megawatts of cogeneration that produces electricity for campus use and reuses the waste heat for campus heating. Through the combined efficiency of the cogeneration plant, the campus realizes $500,000 to $600,000 annually in savings over the direct purchase of electricity and gas.

Furthermore, as the campuses have grown, the CSU has successfully offset the potential environmental impacts of this growth by decreasing energy usage per square foot. The following figure depicts the actual energy consumption as measured by British Thermal Units (BTUs) per Gross Square Feet (GSF) versus the consumption goal of the CSU system. As shown, there have been improvements in per square foot energy consumption, despite increases in area, meaning that the CSU has become more efficient in its energy use. That said, for the CSU to reach its goal, additional measures are needed.

Figure 18. CSU Energy Consumption in BTU/GSF versus Goal.



Green Energy

California's Global Warming Solutions Act AB 32 requires the state to reduce its carbon emissions to 80 percent of 1990 levels by 2050. Renewable energy generation is an effective tool to help meet this goal as the California Energy Commission has identified electric power generation as a source of 22 percent of California's carbon emissions.

The CSU has actively pursued the development of renewable energy sources to meet on-campus energy needs. Currently, 23 percent or 170 million kilowatt-hours (kWh) of the CSU's electric power come from renewable sources. CSU Northridge has one of the largest fuel cell systems at a public university in California, generating 1.3 megawatts of ultra-clean energy and capturing the carbon emissions for recycling and research in its campus subtropical rainforest project. CSU East Bay has one of the largest solar installations in Northern California, generating 1.45 million kilowatt hours of electricity annually, enough to power 1,000 homes. In

April 2009, the U.S. Environmental Protection Agency (EPA) recognized the CSU in the Top 20 list of the largest national green power purchasers.

The CSU has a plan to achieve a total of 50 megawatts of ultra-clean, clean, and renewable energy generation. Of this 50 megawatts, the CSU Board of Trustees has set a goal for the CSU to increase on campus renewable generation from the current 4.9 megawatts to 10 megawatts by 2014. The CSU is well on its way to exceed this target. The CSU's longer-term goal to achieve energy independence for its campuses has significantly progressed over the past few years, with a key development being the Green Power Partnership with the Department of General Services launched in October 2005. This statewide program to install 21 megawatts in new solar capacity will increase that total from 23 percent to 33 percent from green sources. Through this innovative public-private partnership, the power purchase agreement would allow the CSU to buy renewable power at or below current retail rates, while avoiding the cost of installing the system. Under the program, 15 CSU campuses will have solar panels installed on roofs, atop parking canopies and in ground-mounted arrays, offsetting approximately 6,500 metric tons of carbon dioxide, the equivalent of removing nearly 1,200 cars from the road annually or providing annual electricity for 800 homes.

Sustainable Design

The CSU has taken notable action to implement energy use reduction measures and improve sustainability across its campuses. A very effective and successful example is the construction of Leadership in Energy and Environmental Design or LEED™ qualified buildings on various CSU campuses over the last several years. The following figure provides a list of LEED™ projects at CSU campuses that have either achieved LEED™ certification or are working toward LEED™ certification. (In addition to these LEED-certified or in-process projects, the CSU has many other completed or in-process projects that are equivalent to all LEED levels but due to certification costs have chosen not to pursue LEED certification.)

Table 1. CSU LEED™ Projects.

Campus	Building (LEED™ Certification) (Status)
Chico	• Student Services (Gold) (Completed and Certified) • Wildcat Activity Center (Silver) (Completed) • Housing and Dining (Silver) (Construction) • Natural History Museum (Silver) (Completed)
Fullerton	• Student Recreation Center (Gold) (Completed and Certified) • Student Housing (Design)
Humboldt	• Behavioral and Social Sciences (Gold) (Completed and Certified) • Schatz Energy Center: (Gold)(Construction) • Kinesiology & Athletics Building (Silver) (Completed)
Long Beach	• Recreation Center (Silver) (Construction)
Los Angeles	• LEED™ Existing Buildings(EB) Pilot Portfolio- 21 Projects • Hydrogen Fueling Station (Certified) (Construction)
Monterey Bay	• Library (Certified) (Completed and Certified)
Northridge	• Performing Arts (Silver) (Construction) • Student Recreation Center (Gold) (Construction)
Pomona	• Residential Suites (Silver) (Construction) • College of Business Administration (Silver) (Construction)
Sacramento	• Recreation and Wellness Center (Silver) (Construction) • Student Housing Phase 1 (Silver) (Completed and Certified) • Science II (Silver) (Design)
San Bernardino	• Palm Desert Campus Phase 3 (Gold) (Completed)
San Diego	• Manchester Hall (LEED™ EB) (Completed and Certified) • Aztec Center (Platinum) (Design)
San Francisco	• Performing Arts (Gold) (Design)
San José State	• Moss Landing Facility (LEED™ EB-Gold Pilot Program) (Completed and Certified) • Health Center (Silver) (Design) • Student Union (Silver) (Design) • King Library (Silver) (Completed and Awaiting Certification)
San Luis Obispo	• Poly Canyon Village Student Housing (Gold) (Completed and Certified) • Mathematics and Science Building (LEED™ EB) (Completed and Certified) • Recreation Center (Silver) (Construction)
San Marcos	• Social & Behavioral Sciences Building (Silver) (Construction)
Stanislaus	• Science 2 (Certified) (Completed and Certified)

On-Campus Sustainability Efforts

The previous section on Energy and Sustainable Design provided a detailed discussion of energy conservation measures related to green power and green construction projects that the CSU has undertaken to create a healthier and more sustainable environment. This section describes other measures that have been adopted by the campuses and students to help meet the CSU's sustainability goals. The following examples highlight the diversity and creativity of CSU sustainability efforts but are by no means exhaustive.

Recycling/Waste Reduction

The U.S. Environmental Protection Agency reported an average waste generation rate of 4.5 pounds of waste per person per day in 2001[5]. Typical waste generated at a college campus includes paper, food scraps, plastics, metals, and glass. CSU campuses have implemented a variety of measures to reduce waste at the source, recycle the waste generated, and educate the campus community on the importance of adopting waste reduction measures.

For example, a cooperative effort between CSU Northridge Associated Students and the university administration led to the establishment of a recycling program. As part of this program, students support a campaign that educates the campus community on the importance of recycling paper, cardboard, glass, plastic bottles, ink cartridges, and cell phones. San Francisco State University is working hand in hand with the City of San Francisco to achieve the city's goal of zero waste by 2050. In 2008, San Francisco State's on-campus recycling efforts diverted more than 76 percent of waste from landfills.

- CSU San Marcos was the 2010 Grand Champion of the RecycleMania contest, for the sixth consecutive win. They had a recycling rate of 72 percent and beat more than 600 other colleges and universities.
- Cal Poly Pomona recycles about 3,500 tons of waste annually—about 300 pounds for every person on campus. In 2009, the Los Angeles Regional Agency presented the university with the Excellence in Environmental Practices Award for its sustainability efforts, which are not limited to recycling cans and bottles but also include the use of biodiesel fuel in landscaping equipment, a street sweeper, and a campus shuttle. The Cal Poly Pomona Broncos in all sports collect and recycle bottles, cans, and plastics in order to donate to the Make-A-Wish Foundation and assist in keeping their environment green.
- CSU Channel Islands has achieved more than 65 percent waste diversion from landfills through recycling and reuse efforts.
- Through a redesign of its Central Plant, CSU Los Angeles has prevented the creation of more than 1,300 metric tons of greenhouse gases.
- During the Electronic Waste Recycling event held by the CSU Bakersfield Office of Safety and Risk Management in January 2008, more than 99,000 pounds of recyclables from business, commercial interests, and residents were collected and sold to a recycler. The proceeds were used to enhance environmental sustainability efforts and other CSU Bakersfield programs.

Water Conservation

Water is undoubtedly a precious resource, especially in California. The governor of California has called for Californians to reduce their per capita water consumption by 20 percent by the

[5] U.S. Environmental Protection Agency. 2010. Region 7 Solid Waste. Online at http://www.epa.gov/region07/waste/solidwaste/ (accessed February 22, 2010)

year 2020[6]. To help meet this consumption reduction goal and considering the undeniably urgent need to conserve water, the CSU system and its campuses have been implementing measures to conserve water and reduce consumption.

At the system level, the CSU has developed the Water Resources and Policy Initiatives to address the complex water issues facing California, primarily focused on sustainable water resource management. The goals of the initiatives include: partnerships with the water industry and government agencies; education, training, and professional capacity building; and technology and economic development.

At the campus level, several initiatives have been developed. For instance, San Luis Obispo retrofitted over 700 plumbing fixtures with low-flow fixtures, waterless fixtures, and touch-free sensors. This retrofit reduced total campus potable water consumption by 15 percent, each year saving over 29 million gallons, enough for 165 California homes, and avoiding $240,000 in water and sewer charges. San Diego State University has installed a Central Control Irrigation System and CSU Dominguez Hills installed a wireless Weather Sensor Irrigation Control System, which enables the campuses to conserve water, reduce runoff, and maintain plant health while saving money.

Alternative Transportation

Alternative transportation such as buses and subways reduces carbon dioxide emissions, saves time and money, and avoids the stress of navigating traffic. It is also an area of the California economy where employment has grown 152 percent since 1995. The CSU has undertaken initiatives on its campuses to provide its students and faculty with alternative transportation, which not only saves money, but also benefits the community and the environment.

For example, U-PASS, a partnership between CSU Long Beach and Long Beach Transit (LBT), allows students, faculty, and staff unlimited free ride privileges on all LBT buses and Passport shuttles with the swipe of their university ID cards through bus fare boxes. The program was initiated in response to rising gasoline prices and campus parking congestion. Before the U-PASS program was launched, LBT reported that campus-related boardings averaged 1,400 per day, but since implementation have averaged 3,200 per day, sometimes surpassing 4,000. It is estimated that changing a 10-mile commute from car to bus just twice a week for one year reduces carbon dioxide emissions by 876 pounds, saving 45 gallons of gasoline. A similar partnership between CSU Fullerton and the Orange County Transportation Authority has been in operation since 2003.

Sonoma State University was recognized among the top environmental campuses by Princeton Review's new Green rating in 2008 for 15 percent of students' trips using alternative transportation such as bicycles, which saves money, reduces greenhouse gas emissions, and protects the environment.

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6 Department of Water Resources 2008. Drought 2008. Online at http://www.water.ca.gov/drought/docs/2009drought_actions.pdf (accessed February 23, 2010)

Local Food Options

The CSU campuses have made a conscious effort to facilitate local and organic food offerings at dining halls, reducing the transportation impact that would otherwise be incurred. For example, Humboldt State connected with the Humboldt County chapter of the Community Alliance with Family Farmers (CAFF) four years ago to increase its local food options. Through its partnership with CAFF, Humboldt State is able to offer local, organic, and sustainable food to its students, which during the growing season is between 50 and 100 percent of the produce offered.

The CSU Chico Organic Vegetable Project has staked out a section of the University Farm and grows fruits and vegetables for the Associated Students (A.S.) Dining Services. The A.S. Dining Services incorporates all of the projects' produce into its program. In addition, CSU Chico's College of Agriculture has the only university-based organic dairy in the western United States.

Student-led Initiatives

Expanding their learning experience at the CSU beyond the classroom, CSU students have actively engaged in on-campus collaborative efforts with their colleagues and faculty, and have reached out to their local community to not only increase awareness about environmental responsibility, but also to apply their acquired knowledge. The examples below illustrate the commitment of CSU students to becoming environmentally responsible leaders of tomorrow.

- The Humboldt Energy Independence Fund Committee awarded its first $68,000 in grants in 2008 for three student grant proposals focused on energy independence for the Humboldt State campus. The grants funded a retrofit of the heating, ventilating and air conditioning system (HVAC) in two of the Science Complex buildings, installations of two solar thermal panels for the rooftop of the student-run eco-demonstration house called the Campus Center for Appropriate Technology (CCAT), and the hiring of a two-year student energy intern. The financial benefits from avoided energy costs from HVAC retrofits alone are estimated to be at least $390,000 over a 20-year period.
- CSU Chico has a dedicated team of engineering students working to build an automated biodiesel processor. In 2007, 22 engineering students from Chico won the grand prize at the Western Tool Exposition and Conference (WESTEC) for creating and presenting the processor that turns animal fats and vegetable oils into fuel. Current Chico students are working on a more sophisticated version of a biodiesel processor that can run automatically. The plan for the finished product is to use it to fuel a tractor at the University Farm that provides tours to grade school students and other visitors.
- In 2000, Cal Poly San Luis Obispo student Terry Hooker initiated a Community Supported Agriculture (CSA) program at the university. The CSA has grown from its initial membership of 25 to its current 300. Through the CSA, farmers sell "shares" in the farm to community members who are then entitled to a portion of the harvest distributed in weekly allotments over a pre-determined period of time. Memberships sold prior to the start of the harvest period provide up-front capital to the farmer, and members benefit by receiving fresh produce in times of full production.

In 2007, the American Society of Landscape Architects awarded seven Cal Poly Pomona graduates the Award of Excellence in Community Service, which is the highest honor the society gives to college students. This award recognized the students' hard work in designing and building a native garden at Lassalette Middle School in La Puente.

Community Education and Action

Community involvement and education on environmental issues has allowed the CSU to not only extend its teaching beyond the campus but also to participate in the improvement and conservation of California's environment on a local and regional level. The following are some examples of community outreach and environmental education initiatives by CSU campuses across the state.

- Humboldt State University hosted the Sustainability Leadership Drive in February 2009 that involved about 250 high school students from the San Francisco Bay area, the Sacramento Valley, and north to the Redwood Coast. The theme of the forum was "Focus on Sustainability: Recycling, Conserving, Reducing, and Rethinking." The goal of the conference was to train "Nor-Cal Generation Y" students in leadership skills, activism, and community involvement and to help them think critically and find solutions to advance greater environmental consciousness.
- In 2009, San Diego State launched the Center for Regional Sustainability to further sustainability on campus through academic engagement programs, faculty training, research, and community outreach. The center's initiatives include a faculty institute for course design and a service learning project/community engagement project "Public Conversations for a Sustainable Future," which engages students and faculty in intergenerational, community discussions.
- Cal Poly Pomona's AGRIscapes, which is located on 40 acres, integrates and showcases farming and urban landscaping practices that are sustainable, environmentally beneficial, economically viable, and technologically sound. It promotes agricultural and environmental literacy through research, education and demonstrations of alternative methods to grow food, conserve water, reduce energy needs, and recycle agricultural and urban waste. Through the College of Agriculture and community partners, AGRIscapes hosts formal college courses, workshops, community events, and training sessions.
- San Francisco State University's Industrial Assessment Center provides small- and medium-sized manufacturers with free assessments of their plant's energy, waste and productivity efficiency, and offers recommendations for improvements. The center has served more than 340 manufacturers in northern and central California since 1992. The U.S. Department of Energy funds the program in an effort to transfer new, efficient, environmentally sound technologies to industry. The San Francisco State center is one of only 26 in the United States.

- The Fullerton Arboretum, a 26-acre preserve on the CSU Fullerton campus operated through an agreement with the City of Fullerton, serves the community as a resource for ecological, horticultural, and historical education. The arboretum features low-water sections of drought-tolerant plants and offers classes for the public on low-water gardening.

3.1. Educating the Next Generation of Sustainable Leaders

CSU program offerings align with the CSU's educational and leadership goals with numerous undergraduate majors and graduate degree programs related to sustainability and environmental studies. These programs serve as crucial platforms where knowledge is imparted, intellectually stimulating discussions are encouraged, and healthy debates are had, to prepare environmentally conscious leaders of tomorrow.

Examples of environmental undergraduate majors offered at CSU include: environmental biology; organismal and conservation biology; ecology; earth sciences; bioresource and agricultural engineering; environmental engineering; environmental resources engineering; environmental engineering technology; environmental policy; environmental resource management; environmental science; natural resources planning and interpretation; and watershed management. Examples of sustainability related graduate degree programs offered at the CSU include some of the programs listed above and others such as: ecology and sustainability-ecological conservation; ecology and sustainability-ecological economics; energy, environment, and society; environmental systems; and waste water utilization.

One program of note is the Moss Landing Consortium in Monterey Bay. Administered by San José State at the Moss Landing Marine Laboratory, the consortium consists of seven campuses that offer an MS in Marine Sciences. The laboratory operates three research vessels and delivers courses to undergraduate students.

Another notable program is Cal Poly Pomona's Regenerative Studies master's degree, which prepares students to find successful solutions to environmental problems. A key feature is its focus on integrating knowledge from a variety of university programs into a multidisciplinary approach to research and practice in the interest of advancing sustainability.

In addition, nearly 70 courses are offered at Northridge related to sustainability, ranging from "Human Impact on the Environment," "Conservation Biology" and "Environmental Impact Studies" to "Social Policy and Environmental Justice" and "The Built and Natural Environment." The courses cover a broad array of disciplines, from geography to urban studies to recreation and tourism management. A degree with an emphasis in sustainability could be realized by the end of the 2011-12 academic year.

The broad array of environmentally-related program offerings at the CSU demonstrates the university's commitment to engaging students, faculty members, and staff in an industry that is vital for the viability of California's economy. More detailed examples of the CSU's commitment to growing a green workforce can be found in the Workforce chapter of this report.

4. Impact of Innovation and Entrepreneurship

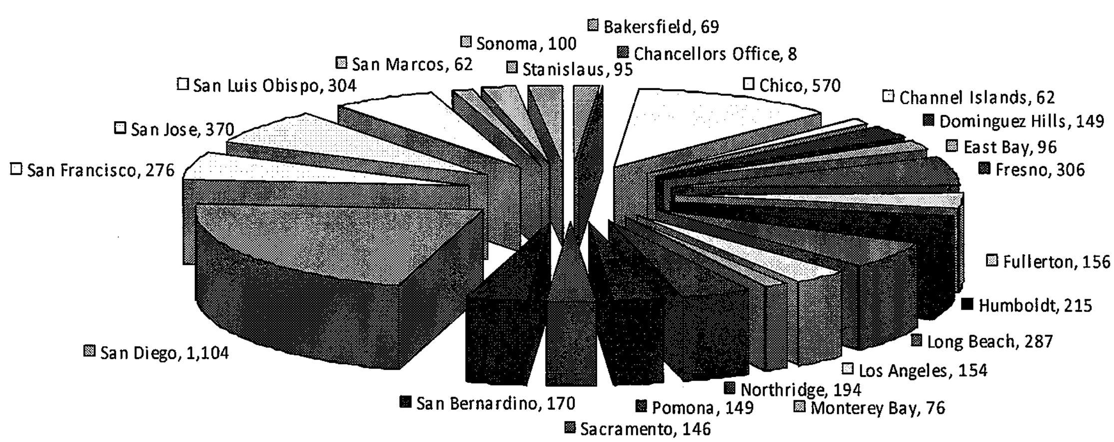
The CSU's research capabilities have an immense impact on California's economy. In the fiscal year 2007-08, CSU research and project sponsored awards from federal, state, local, and private sources amounted to over half a billion dollars employing more than 6,000 students who earned nearly $23 million as a result during the year. Increasingly collaborative efforts with industry in the areas of applied research and technology development have ensured that the CSU is continually able to serve the constituencies of the state. The following section discusses the growing applied research, entrepreneurship, and innovative activities at CSU campuses that continue to positively impact the California economy.

4.1. Applied Research: Innovation for California's Needs

Investment in the CSU's research efforts continues to pay dividends as the CSU successfully generates intellectual property that acts as seed for new entrepreneurship opportunities and provides support for existing ventures. These efforts also lead to significant contributions to both individual industries and Californians as a whole. Sources for CSU research funding range from the winning work of individual faculty members to expanding research centers and institutes and various federal, state, and local agencies. The CSU's research focuses on creation of new knowledge to provide solutions and innovations to meet the needs of a changing California economy. The university remains true to its historical role as a teaching institution by investing in faculty research and advancement to ensure the availability of the most up-to-date research insights to its students as well as opportunities for students to participate in important research experiences.

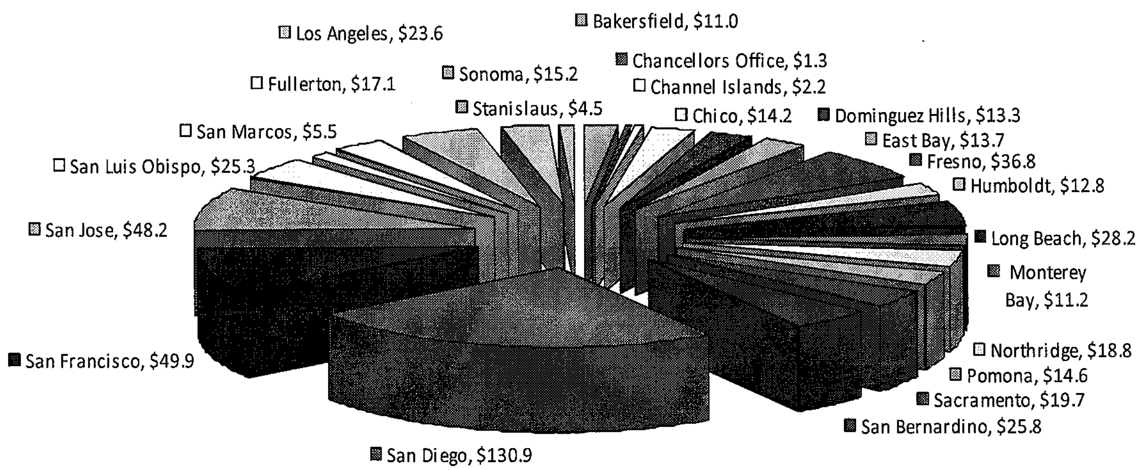
A measure of the CSU's active engagement in pursuing research and entrepreneurial opportunities is the number of proposals that the CSU campuses submit to bring in funding for research initiatives and related activities. The figure below shows the per campus distribution of the 5,100 proposals submitted by campuses in 2007-08.

Figure 19. 2007-08 Proposals Pursued by Campus.



Research funding to campuses totaled over $541 million dollars in 2007-08. Figure 20 shows awards by campus for 2007-08.

Figure 20. 2007–08 Awards by Campus (in millions)



In 2007-08, the annual research investment at CSU campuses varied between approximately $2 million and $131 million from a variety of federal, state, foundation, and private sources, with San Diego State University remaining the top recipient of research dollars. San Francisco and San José were the next highest dollar recipients at about $50 million each.

Many academic units benefit from research awards. In 2007-08, Science and Mathematics had the highest research investment of all academic units. Table 2 provides an illustration of 2007-08 awards by academic units.

Table 2. 2007–08 Awards by Academic Unit.

Academic Unit	Percentage of Awards
Agriculture	4%
Arts & Letters	2%
Business Administration	2%
Education	11%
Engineering & Computer Science	5%
Health & Human Services	19%
Science & Math	26%
Social Science/Liberal Arts	8%
Other	22%

The CSU has focused its efforts and resources to serve its students and faculty and educate local communities across the state to strengthen California's economy. The following section serves to update the important research areas discussed in the 2004 systemwide economic impact report (agriculture, aerospace, and biotechnology) and also highlight the CSU's promising research related to the environment and physical and applied sciences.

Agricultural Research

Agricultural research remains an important focus of CSU faculty and students. The California Agricultural Technology Institute (CATI), based at Fresno State, is a nonprofit educational institution dedicated to improving California agriculture. The institute administers the CSU Agricultural Research Initiative (CSU/ARI), which is a diversified applied agricultural and environmental sciences research consortium between CATI and the four CSU campuses with colleges of agriculture—Fresno State, Cal Poly San Luis Obispo, Cal Poly Pomona, and CSU Chico. CATI is made up of The Center for Agricultural Business, the Center for Irrigation Technology, the Center for Food Science and Nutrition Research, and the Viticulture and Enology Research Center. CSU/ARI continues to facilitate member campus collaborations and encourage strong CSU research member partnerships with other qualified university and professional research organization faculty and scientists, such as those from the University of California, the University of California Cooperative Extension, and the United States Department of Agriculture Agricultural Research Service.

Examples of diverse projects include Eco-Friendly Water Systems, which will benefit the food processing industry and the environment; Biological Control of Invasive Pests to improve rice production in the Central Valley while reducing the use of chemicals; Use of Crops to Create Biofuels while Reducing Harmful Soils Chemicals; and Study and Improvement of Agricultural Air Quality to reduce ammonia emissions due to the use of fertilizer and dairy production.

Additional examples of agricultural research include:

- CSU Chico's work with Sierra Nevada Brewery, the emerging North State olive oil industry, and grass-fed beef producers exemplifies how students and faculty have helped in the creation of new markets for producers.
- At the Irrigation Training and Research Center (ITRC) of Cal Poly San Luis Obispo, Dr. Stuart Styles is conducting research related to accurate calibration of the flow rates that correspond to device readings. The goal of this project is for the ITRC to improve calibration procedures and accuracy for irrigation applications, and transfer that information to a wide range of users.

Biotechnology and Health Care Research

The CSU graduates a significant percentage of students into the biotechnology and healthcare fields. As part of their training, the CSU provides students the opportunity to participate in life science research related to biotechnology, health services, and biomedical science. California

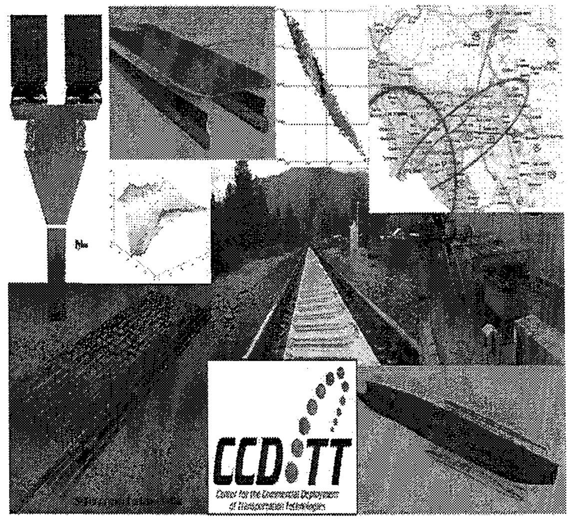
State University Program for Education and Research in Biotechnology (CSUPERB) continues to play a vital role in coordinating and furthering the development of biotechnology research and education within the CSU. The CSUPERB directive includes fostering the economic competitiveness of California by facilitating the training of the scientific and bio-manufacturing workforce, catalyzing technology transfer and improving intellectual property protection, and facilitating the acquisition and long-term maintenance of state-of-the art biotechnology resources.

CSU campuses have shown advancement in the biomedicine and biotechnology areas over the past few years. Examples include:

- The CSU has an 11-campus initiative to study stem cell technology and advance the field of regenerative medicine. The university provides research-intensive internship opportunities for advanced students, supports on-campus stem cell research, and has expanded stem cell courses for undergraduates and graduates.
- CSU Fullerton Assistant Professor of Kinesiology Dr. Daniella Rubin is the lead researcher of a study exploring childhood obesity's links to Prader-Will Syndrome. Supported by $4 million in federal funding, researchers at CSU Fullerton's Center for the Promotion of Healthy Lifestyles and Obesity Prevention are collaborating with the University of Florida's College of Medicine to explore exercise interventions to combat the syndrome.
- CSU Long Beach Professor of Biological Sciences, Dr. Editte Gharakhanian's research laboratory has created new knowledge in the field of protein trafficking, and trained over 70 undergraduate and 20 graduate students. Dr. Gharakhanian and her team have not only identified proteins involved in the final stages of protein trafficking to lysosomes, but also defective mutants.
- CSU Northridge Center of Achievement for the Physically Disabled and the Abbott and Linda Brown Western Center for Adaptive Aquatic Therapy have a national reputation for providing compassionate adapted therapeutic exercise programs to people with disabilities. Under faculty supervision, CSU Northridge students train to be professionals in adapted exercise and fitness while assisting community clients.
- Dr. Karen Jensen, Associate Professor of Nursing, heads the CSU Channel Islands Nursing Pipeline Program, which aims to provide a consistent stream of prepared, qualified, and culturally diverse students applying to the BSN program.
- The Central Valley Health Policy Institute at Fresno State, funded by a $4 million grant from The California Endowment in partnership with the university, facilitates regional research, leadership training, and graduate education programs to address emerging health policy issues affecting people living in Central California.
- CSU San Bernardino is partnering in the National Children's Health Study, a multimillion dollar National Institute of Health grant, which will enable tracking of about 1,000 San Bernardino County children from birth through age 21 in the largest study of its kind ever undertaken across America.

Information Technology and Engineering Research

The CSU's information technology research involves not only individual faculty projects, but also corporate partnerships and campus-directed programs. The CSU has partnered with industry leaders such as Sun Microsystems, Lockheed Martin, and Agilent Technologies. San José State has campus laboratories that are sponsored by Applied Materials, Cisco, and Hewlett-Packard.



The CSU's focus on research in Information Technology and Engineering has allowed graduates to gain employment with Qualcomm, SAIC, and other industry leaders. Other examples of collaborative research programs in information sciences include:

- The Center for the Commercial Deployment of Transportation Technologies (CCDoTT) chartered under the CSU Long Beach College of Engineering is administering a $2.6 million program of seven research and development projects in dual use of commercial/military maritime goods movement.
- CSU Fullerton conducts research on Web-based telecommunications link and orbital analysis, simulation and operation for NASA-JPL. Other research areas include GPS Local Area Augmentation, Global Navigation Satellite System, Intelligent Vehicle High System for automobile navigation with GPS, and Inertial Navigation System.
- CSU Dominguez Hills Professor and Chair of the Computer Science Department, Dr. Mohsen Beheshti, directs the "Geospatial Data Analysis Using Wireless Sensor Networks" project through a $130,000 grant funded by the NGA-National Geospatial-Intelligence Agency. This grant provides a state-of-the-art Computer Security Research laboratory where undergraduate and graduate students are working on network security related research. Graduates from this program have been hired by Raytheon and Boeing.
- Cal Poly Pomona Associate Professor of Computer Science Dr. Amar Raheja and two undergraduate students worked with L3 Interstate Electronics Corporation (IEC) to develop software to support Advanced 3D Locator Base Stations in 2007 and 2008. This software works with a patented Integrated GPS Indoor Navigation Technology developed by IEC, which will enable first responders in an emergency situation to see the 3-D position of all personnel in the response team, especially when they are within buildings and structures.
- CSU San Bernardino physics professors Paul Dixon and Tim Usher invented a classroom computer-based electronic measurement system called NI ELVIS, licensed by National Instruments to replace several lab measuring components with a specially designed laptop system.

- San Francisco State University has partnered with technology corporations to better monitor critical environmental data about oceans as it relates to earthquake and tsunami detection.

Environmental Research

The CSU actively continues research to better understand California's environment and how to protect the state's water, air, land and wildlife resources. Research is designed to address the important environmental challenges facing California today.

An example of a collaborative and interdisciplinary research initiative is the establishment of the CSU Council on Ocean Affairs, Science and Technology (COAST). COAST was established in 2008 as a systemwide initiative to promote marine and coastal science research and education throughout the CSU and disseminate this information to the public to promote sound, comprehensive policy statewide. The collaboration brings together the collective resources of the CSU to provide coordinated, integrated solutions to state and national marine environmental challenges. COAST has initiated a program to promote new research collaborations among CSU campuses and to increase the competitiveness of proposals for extramural funding. In 2009 and 2010, COAST distributed over $150,000 in assigned time funding to 14 teams of researchers comprising 37 faculty members at 16 of the campuses. This program has the potential to create a massive return on investment—to date $650,000 has been requested in external funds, and the number is expected to grow to the millions of dollars over the next one to two years.

Additional examples of environmental research initiatives at the CSU include:

- San Francisco State, Fresno State, CSU Los Angeles, Cal Poly Pomona, CSU Chico, Humboldt State, CSU Northridge, and CSU Stanislaus have joined with the University of California and federal agencies in the California Cooperative Ecosystems Studies Unit partnership to provide research and educational assistance for federal management, conservation, and environmental research agencies.
- CSU Chico is contributing to the sustainability of the agriculture industry through collaborations with the University of California on crop variety trials (including walnut, almonds and field crops), agricultural waste management and by-product development trials (rice straw composting, food processing waste management, and olive oil processing waste by-product development), use of DNA markers to improve meat quality, and evaluation of potential new crops for Northern California including vegetables and pecans.
- CSU Fullerton conducts environmental engineering research that focuses on investigating technological options for reducing non-CO2 greenhouse gas emissions, funded by the California Air Resources Board, and the evaluation of disinfection technologies for wastewater treatment, funded by the Water Environment Research Foundation.
- Half of the nation's research and development activity in water technology occurs within a 100-mile radius of Fresno State. The campus is home to the $60 million International Center for

Water Technology, a joint venture with industry in the San Joaquin Valley, and to a Water and Energy Technology Center, where innovative ideas are turned into productive businesses.

- Dr. Brandon Pratt, Assistant Professor of Biology at CSU Bakersfield, is funded by the National Science Foundation and the Andrew W. Mellon Foundation to advance knowledge of plant physiology, particularly mechanisms governing the vascular transport as well as vascular evolution in native California shrubs. His work has been directly applied to the recovery of Southern California and South African plants from wildfires.
- Cal Poly Pomona's Dr. Pablo La Roche (Architecture), Professor Michael Fox (Architecture) and Dr. Phyllis Nelson (Engineering) collaborated on a People, Prosperity, and Planet (P3) grant funded by the Environmental Protection Agency, intended to address the impact of building design on energy consumption in Southern California climates. The faculty worked with students in architecture and engineering to develop a "Green Kit" that focused on passive and low-energy techniques to optimize heating and cooling performance of buildings.
- CSU East Bay Assistant Professor Erik Helgren in the Department of Physics is exploring organic polymers as an alternative to silicon solar cells. In the renewable energy resource lab, Helgren works on improving the polymer efficiency rates by adding carbon nanotubes. He is aided by a team of student assistants who are gaining lab skills and experience with solar technologies.
- In 2009, CSU Los Angeles was awarded a $5 million, five-year grant from the National Science Foundation to establish the Center for Energy and Sustainability. The project will train students, support research, and increase public awareness in the fields of biofuels, carbon sequestration, photovoltaics and fuel cells.
- Humboldt State University Professor Steve Sillett has conducted groundbreaking research on redwood forest canopies, and was featured in a 2009 cover story in *National Geographic*. Sillett and other researchers at Humboldt State are studying how redwoods respond to rapid climate change.

Physical Sciences/Advanced Sciences Research

CSU research efforts related to the physical sciences and advanced sciences are also examples of the CSU's commitment to academic excellence. Examples of such research include:

- CSU Northridge Center for Supramolecular Studies, which includes faculty members and post-doctoral research associates from the Departments of Physics and Chemistry, is an active interdisciplinary program in experimental biophysics, bio-physical-chemistry, and biochemistry.
- Dr. William Gearhart and Dr. Angel Pineda at Fresno State direct the Applied Mathematics Graduate Project, funded by GE Healthcare as part of a comprehensive research agreement between GE and Fresno State in the area of magnetic resonance imaging (MRI). Twelve students were involved in a 2008 project that focused on developing a mathematical explanation for a new method of imaging blood flow using MRI.

4.2. CSU Research Partnerships and Entrepreneurial Initiatives

CSU Centers and Institutes

Remaining true to its commitment to provide students with the infrastructure and support system to develop into entrepreneurs, the CSU has established several centers and institutes focusing on a variety of disciplines, including business and entrepreneurship, environmental sustainability, economics, biotechnology, and engineering. These collaborative centers benefit not only CSU faculty and staff but also the local, regional, and state economy. Examples of these centers are presented below. See Appendix F for a more extensive listing.

- **CSU Chico—Cleantech Innovation Center:** The Cleantech Innovation Center at Oroville's mission is three-fold: to incubate and attract new cleantech businesses and help existing businesses transition to cleantech; to support and fast track applied research in emerging cleantech areas; and to support workforce development and readiness in Northern California.
- **Lyles Center for Innovation and Entrepreneurship:** The Fresno State Lyles Center for Innovation and Entrepreneurship creates strong ties between student enterprises and businesses and individuals in the community, improving career success for graduates. The Lyles Center delivers assistance through applied learning, professional consulting, and managed problem solving.
- **Office for Economic, Community, & Business Development:** Humboldt State University's Office for Economic, Community & Business Development brings together local business leaders, community leaders and economic development professionals with faculty, staff and students to address the economic development challenges of the North Coast. It provides collaborative project planning and development, applied research, technical assistance and training, public forums, and information dissemination.
- **Center of Leadership Innovation and Mentorship Building (CLIMB)**: CLIMB at CSU San Marcos was established in 2004 to serve the leadership development needs of the surrounding community through innovative research and collaboration with students, faculty in other colleges, businesses, and community organizations. The center serves as a catalyst for local businesses to collaborate with the College of Business Administration and the university.
- **CSU Fullerton Center for Successful Aging**: Combining educational, research and service activities, the Center for Successful Aging promotes health, vitality and well-being in later years. Its Fit 4 Life, Fall Proof and Health Promotion for Older Adults programs have become staples of community senior centers and have provided research data for numerous studies.
- **John T. Lyle Center for Regenerative Studies:** The Cal Poly Pomona John T. Lyle Center for Regenerative Studies, the only center of its kind in the world, is a 16-acre demonstration community showcasing regenerative strategies and technologies, such as low-energy architecture, water treatment, organic agriculture, ecological restoration and sustainable community development. The center educates the public on sustainable practices, offering tours and hands-on workshops.

CSU Applied Research and Entrepreneurial Projects

The large scope and creativity of CSU research partnerships and entrepreneurial initiatives is also implemented through faculty-led and student-supported programs and projects, and collaborative multicampus initiatives. Below are examples of such projects that have fostered research partnerships and entrepreneurial associations through collaboration with the industry and companion campuses.

- **California Seafloor Mapping Project:** CSU Monterey Bay faculty member Dr. Rikk Kvitek of the Division of Science and Environmental Policy formed a collaborative partnership involving industry, state and federal resource agencies, and academia to design and execute the California Coastal Conservancy's California Seafloor Mapping Project (CSMP). The CSMP mission is to produce the first comprehensive bottom map covering all California state waters in high detail. The Seafloor Mapping Laboratory engages undergraduate and graduate students in research while providing comprehensive online access to 3D visualization of seafloor topography, fish habitats and environmental change in unprecedented detail from high-resolution acoustic imaging. The Seafloor Mapping laboratory has developed educational partnerships with key industry leaders, including CARIS Marine Information Systems, Hypack Inc., IVS Incorporated, Trimble Navigation, Triton Imaging Inc., and Reigl Laser Measurement Systems.
- **The Biocompass Project:** Eight CSU campuses in Southern California—Pomona, Channel Islands, Dominguez Hills, Fullerton, Long Beach, Los Angeles, Northridge, and San Bernardino—have entered in a public-private partnership in "The Biocompass Project" with the Southern California Biomedical Council, the Pasadena Bioscience Collaborative, and Pasadena City College. Biocompass offers practical, cutting-edge laboratory experiences, short-term workshops, specialized courses, and programs taught within the context of the regulated business environment unique to the biotech industry. The project is funded by a grant from the U.S. Small Business Administration (SBA) and is part of the CSU Program for Education and Research in Biology (CSUPERB).
- With collaboration from more than 30 public and private sector partners and a combination of students, faculty and program staff, the **CSU San Bernardino Inland Empire Center for Entrepreneurship (IECE)** delivers consulting, training, mentoring, and project-based services delivered to nearly 10,000 individuals and business owners. The center was established in 1999.
- **California Vehicle Launch Education Initiative:** CSU Long Beach continues mechanical and aerospace engineering research with its unique California Vehicle Launch Education Initiative (CALVEIN) in partnership with Long Beach-based Garvey Spacecraft Corporation. Since the inception of CALVEIN, students have launched a dozen rockets traveling as fast as 800 miles per hour and as high as 10,000 feet with higher altitudes planned in the future, developed a Nanostat Launch Vehicle (NLV), worked on Reusable NLV demonstrations and responsive space operations, and developed and flight-tested a 1,000 pound-force thrust liquid oxygen/methane rocket engine.

- **Hydrogen Highway:** Humboldt State University faculty and students designed the nation's first street-legal hydrogen fuel cell vehicle. More recently, they designed an on-campus hydrogen fueling station, and are testing the performance of two hydrogen-powered Toyota vehicles. The new hydrogen fueling facility is the first rural station on California's "Hydrogen Highway," and a crucial link between renewable energy and transportation fuel.
- **California Environmental Legacy Project:** Humboldt State University and CSU Sacramento were awarded $3 million from the National Science Foundation to enhance public understanding of the state's environment. The project includes a PBS special, an online education portal, and multimedia programs at various parks. Partners include the California State Parks, the National Park Service, the U.S. Geological Survey, and the California Public Television Consortium.

4.3. Conclusion: Growing Economic Impact

Owing to its innovative ideas and applicable research, the CSU continues to bring in over $500 million annually to its campuses in research and education grants and contracts from federal, state, local, and private sources.

The preceding sections describe how the CSU has successfully and actively engaged the talent of its students and the expertise of its faculty to collaborate and innovate in a local and regional manner. Given the current difficult economic times, the CSU is committed to expand the reach of its applied research and teaching system to positively impact California and its constituencies.

Appendix A: CSU Facts and Statistics

23	Campuses
9	Off-Campus Centers
1	Systemwide Headquarters (Downtown Long Beach, CA)
466,075	Students (Annualized Headcount, College Year [CY] 2008-09)
372,393	Full Time Equivalent Students (FTES CY 2008-09)
2,100	Bachelor's and Master's Degree Programs (all campuses)
1961	Year the CSU was constituted as a statewide system. Forerunner of the oldest campus in the system, San José State University, founded in 1857.
25	Members of the Board of Trustees
47,029	Total Employees
23,581	Total Faculty
12,019	Total Full-Time Faculty
74,643	Bachelor's Degrees Conferred (CY 2008-09)
19,011	Master's Degrees Conferred (CY 2008-09)
85	Joint Doctorate Degrees Conferred (CY 2008-09)
24	Average Age of Undergraduate Students
53%	Students of Color
194,000	Students Participating in Community Service Annually (based on CY 2007-08)

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Appendix B: Impact Analysis Methodology

This section describes the methodology and data sources used to conduct the impact analysis in Chapter 2.

Calculating Total Economic Impacts

The direct economic impacts presented in the report are based on public financial data for the CSU and/or from calculations based on assumptions discussed in the following sections. The direct economic impacts included annual CSU operational expenditures, average (four-year) capital expenditures, auxiliary expenditures, and student expenditures.

The total economic impacts, including total spending, total job, and total tax impacts, were calculated using the IMPLAN economic impact software package. Within a defined study region, IMPLAN uses average expenditure data from the industries that originate the impact on supplier industries to trace and calculate the multiple rounds of secondary indirect and induced impacts that remain in the region (as opposed to "leaking out" to other areas). IMPLAN then uses this total impact to calculate total job and tax impacts.

Despite an increase in the magnitude of the CSU's impact, the total number of supported jobs that is reported is fewer than what was reported in the 2004 analysis due to national, economy-wide increases in worker productivity. The 2004 analysis used the IMPLAN model, version 2, which relied on the most recently available data from 2001. The model used the 2001 data and industry trade flows to create industry multipliers that were used to estimate the direct job impacts associated with direct spending. The current (2010) analysis uses version 3 of the IMPLAN model, which relies on 2008 data (also the most recently available). The difference in direct employment generated by the model can be explained by changes in the underlying data that is not related to CSU specifically, but to economy-wide, increased productivity. Worker productivity increased substantially over the past decade. According to the IMPLAN model, 2003 US output per worker for the higher education sector was $58,450. In 2008, the output per worker for this sector jumped to $75,500. This change in output per worker (worker productivity) means that for each dollar invested, more worker output is produced, but by fewer employees and thus equivalent levels of direct investment generates fewer jobs (but more labor income and industry activity).

In this study, IMPLAN runs were made using California as the study region, and separately for each of the eight sub-regions defined in the report. The current (version 3) of the IMPLAN model allows for the assessment of regional interaction, and therefore can account for impact that spending in one region has on surrounding regions. Because of this enhanced capability, ICF calculated the regional impact, calibrating the model to take into account only those dollars that would be spent locally, as well as the impact on other regions and the state as a whole. All of the CSU's direct impacts were modeled as originating in the Higher Education industry (sector #392 in IMPLAN, NAICS # 6112-3).

Operational and Capital Expenditures

This study used CSU financial statements provided by each campus and the Chancellor's Office to estimate annual CSU expenditures systemwide as well as at the campus level. Because campus capital expenditures vary significantly from year-to-year, four years of financial statements were used to calculate an average annual capital expenditure for each campus.

Auxiliary Expenditures

Information regarding the impact of auxiliary organizations also came from internal CSU financial reports. Because the data were not broken down by the type of auxiliary enterprise; i.e., retail store, food service area, research institute, etc. The following assumptions were made regarding expenditures in each IMPLAN sector:

- 25% Retail Trade
- 25% Eating and Drinking Places
- 50% Rental Housing

Student Expenditures

A significant portion of CSU student expenditures occur at auxiliary organizations (e.g., campus housing, bookstores, campus food services and parking), which are incorporated in the auxiliary organization spending as noted above.

A full accounting of student expenditures attributable to CSU operations required an estimate of off-campus student expenditures. First, it was assumed that since many students would be working in California and their region and making similar expenditures whether or not they were attending a CSU campus, the conservative assumption (i.e., an assumption that underestimates student spending impacts compared to many traditional impact calculations) was made to exclude these expenditures from the total student spending.

Only out-of-state students were counted in the statewide analysis, and only students who came from outside of the region where they attended a CSU campus were counted in the regional analysis.

In order to create these estimates, the following calculations were made:

1. The CSU maintains a data set called *Residence of Total Enrollment by Campus.* This data set contains the number of students by campus and by county of residence, with a separate accounting of out-of-state students. The number of out-of-region students for each region was calculated, as well as the number of out-of-state students for California as a whole.
2. The CSU's *Cost of Attendance* 08-09 was then used to estimate, by campus, how much a student typically spends, excluding items from on-campus and auxiliary organizations, such as food, housing, and books. By multiplying this average off-campus spending by the number out-of-state/out-of-region students, the total spending (excluding food, housing, and books) by out-of-state/out-of-region students was determined.

3. It was assumed that all expenditures for books would occur at auxiliaries, and therefore, were excluded from the additional student spending estimate because this category of expenditure was accounted for as part of the auxiliary organization spending.
4. Some students live in on-campus housing and some live off-campus. It was assumed that for students staying in on-campus housing, all food and housing expenditures would occur at auxiliaries. For students not staying in on-campus housing, it was assumed that none of their food and housing budget was spent at auxiliaries.
5. The CSU's Housing Occupancy database was used to determine the percentage of students living in on-campus housing.

On every campus, the number of out-of-region students exceeded the number of students living in on-campus housing. Therefore, except for San Francisco and Los Angeles who specified numbers of in-region residents on campus, it was assumed that 100 percent of the on-campus housing was occupied by out-of-region students. The "left-over" out-of-region students were assumed to reside in off-campus housing. Data relating to financial aid was used to estimate housing and food expenditures, which were then added to the total calculated above. This sum of spending described above became the total direct impact of student expenditures and was provided as input into IMPLAN like the other direct spending impacts of the CSU. As previously noted, the assumptions used in this analysis to generate the additional student spending were intentionally conservative; that is, they are believed to significantly understate the total additional student spending impact.

Alumni Impacts

Alumni impacts are treated differently than the other spending impacts in IMPLAN because they are not expenditures by the CSU but by CSU graduates. Thus, instead of treating the direct impact as originating from the Higher Education sector, these expenditures were assumed to originate from the Household Expenditure sector.

The method used to assess the direct impact of alumni consisted of the following steps:

1. Data on CSU degrees granted by campus were collected, dating back to 1970-1971. It was assumed that CSU graduates from that year and later years who were still residents of the state would still be in the labor force.
2. In order to determine the percentage of CSU graduates still residing in California and having an impact on the California economy, an average annual "out-migration rate" was calculated using Census data for two periods: 1985-1990 and 1995-2000. The out-migration rate was relatively close in magnitude for both time periods. It was assumed that CSU graduates were as likely to move out of the state as other Californians. This rate was compounded to estimate the cumulative probability of having left California to determine the percentage of each year's CSU graduating class that remains in the state.
3. It was assumed that CSU graduates were 25 years old upon graduation. This was assumed in order to determine the age of each year's graduating class and the number of CSU graduates who remained in California in each of several age cohorts: 25-34, 35-44, 45-54, and 55-64.

Table 3. Migration Analysis

Location	Bachelor's Degrees Granted	Master's Degrees Granted	Bachelor's Graduates Remaining	Master's Graduates Remaining	Bachelor's Graduates Lost	Master's Graduates Lost
Bakersfield	27,394	7,220	22,587	5,943	4,807	1,277
Channel Islands	2,873	139	2,768	136	105	3
Chico	103,323	10,484	80,412	8,241	22,911	2,243
Dominguez Hills	49,200	21,803	39,649	18,055	9,551	3,748
Fresno	109,865	19,875	85,506	15,767	24,359	4,108
Fullerton	155,122	32,493	124,071	25,903	31,051	6,590
Hayward	76,894	25,033	60,347	20,538	16,547	4,495
Humboldt	47,045	5,360	36,591	4,167	10,454	1,193
Long Beach	179,333	38,438	139,765	30,448	39,568	7,990
Los Angeles	100,610	34,227	76,627	26,278	23,983	7,949
Maritime Academy	1,369	0	1,265	0	104	0
Monterey Bay	5,360	376	4,983	356	377	20
Northridge	157,187	32,518	124,251	25,914	32,936	6,604
Pomona	98,041	10,888	77,698	8,718	20,343	2,170
Sacramento	142,416	30,674	112,335	24,307	30,081	6,367
San Bernardino	55,262	16,664	46,018	14,045	9,244	2,619
San Diego	198,174	50,790	154,793	40,520	43,381	10,270
San Francisco	146,683	47,391	115,719	37,100	30,964	10,291
San José	155,312	51,768	119,612	41,758	35,700	10,010
San Luis Obispo	114,920	10,742	90,582	8,449	24,338	2,293
San Marcos	17,420	1,816	15,850	1,672	1,570	144
Sonoma	46,655	6,913	36,895	5,400	9,760	1,513
Stanislaus	34,175	4,331	27,833	3,563	6,342	768
Entire CSU	**2,024,633**	**459,943**	**1,596,156**	**367,280**	**428,477**	**92,663**

4. Data from the U.S. Census Bureau's Current Population Survey (CPS) were used to estimate the weighted average salary of CSU bachelor's and master's degree-level alumni based on their age.[7],[8] The CPS data provide average salary, by age and sex, for Californians of different levels of educational attainment, including high school graduates, individuals with some college but not

7 Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements, Table P-28, Educational Attainment—Workers 18 Years Old and Over by Mean Earnings, Age, and Sex: 1991 to 2008

8 The weights for the weighted average earnings calculations were the number of male and female workers in each age cohort earning sex-specific mean earnings.

holding degrees, bachelor's degree recipients, and master's degree recipients. The weighted average salaries for each age cohort are presented below.

Table 4. Weighted Average Salaries

Age Cohort	Educational Attainment			
	High School	Some College, No Degree	Bachelor's Degree	Master's Degree
25-34	$28,224	$31,956	$48,445	$55,635
35-44	$36,917	$42,558	$70,054	$84,491
45-54	$35,338	$41,742	$64,810	$72,603
55-64	$27,533	$32,218	$43,378	$45,805

5. For each graduation year, the total earnings of CSU alumni were calculated by multiplying the number of bachelor's degree recipients remaining in California by the weighted average bachelor's degree salary for that year. The calculation was repeated for master's degree holders, and the two totals were summed. This total, summed for every year back to 1970-1971, provides an estimate of the total annual earnings of CSU alumni still living in California.
6. The amount of total earnings that is attributable to the alumni's CSU degree is the difference between the weighted average salary associated with their final educational level minus the weighted average salary associated with their previous educational level. For individuals with master's degree, for example, the amount of earnings that is attributable to the alumni's CSU master's degree is the weighted average master's salary minus the weighted average bachelor's salary. For bachelor's degree holders, the amount of earnings attributable to the alumni's CSU degree is the average bachelor's salary minus the average salary for either a high school graduate or transfer student who already had some college credit.
7. Some students come to the CSU with a high school diploma only; others transfer after completing some college. The salary differences between bachelor's degree recipients and high school graduates were calculated as well as the salary difference between bachelor's degree recipients and transfer students with some college credits. These two differences were weighted based on historical data for the split between the two sources of students to the CSU (first-time freshmen with a high school diploma and transfer students). Lastly, a total earnings differential attributable to the CSU degrees was calculated.

Appendix C: Calculation Details by Campus and Region

This appendix provides details of the economic impact calculations, for each campus in the CSU, each region in the analysis, and the state as a whole.

CSU Economic Impact Results: All of California

Impact Category	Data inputs	Entire CSU 2008-2009
1. Operational Expenditures	**Total Operational Expenditures**	**$5,477,539,292**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 987,425,575**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 1,287,550,320**
4. Student Spending	Number of Students	435,663
	Number of Students Residing in Campus Regions	419,889
	Number of Students Residing Outside Campus Region	15,774
	Average On-Campus student budget less fees, books and supplies, and food and housing	$ 3,471
	Total Out-of-State student spending less fees, books and supplies, and food and housing	$ 54,751,554
	Number of Students in Student Housing	33,180
	Percentage of On-Campus Housing Units Occupied by Out-of-State students	100%
	Number of Out-of-State students in Off-Campus housing	14,573
	Average Off-campus food and housing budget	$ 10,165
	Total Out-of-State student spending on off-campus food and housing	$ 148,131,044
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**202,882,598**
TOTAL IMPACTS	1. Operational Expenditures	$ 5,477,539,292
	2. Capital Expenditures	$ 987,425,575
	3. Auxillary Expenditures	$ 1,287,550,320
	4. Student Spending	$ 202,882,598
	GRAND TOTAL not including Alumni Impact	**$ 7,955,397,785**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$ 16,962,692,096
	IMPLAN Estimate: Total Impact on Employment	$ 148,523
	IMPLAN Estimate: Total Impact on State and Local Taxes	$ 994,735,780
	Total alumni earnings attributable to CSU education	**$ 42,052,829,511**
	GRAND TOTAL including Alumni Impact	**$ 50,008,227,296**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$ 70,351,855,616
	IMPLAN Estimate: Total Impact on Employment	484,746
	IMPLAN Estimate: Total Impact on State and Local Taxes	$ 4,878,169,300
	Total State Appropriations	**$ 3,124,824,054**
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 5.43
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 22.51

CSU Economic Impact Results: Bay Area Region

Impact Category	Data inputs	Bay Area Region: East Bay	Maritime	San Francisco	San Jose	Sonoma	Bay Area Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 187,870,722**	**$ 32,423,851**	**$ 402,692,957**	**$ 353,142,225**	**$ 137,582,268**	**$ 1,113,712,023**
2. Construction Project -capital expenditures	Four-year average capital expenditures	**$ 45,030,753**	**$ 8,805,611**	**$ 48,353,516**	**$ 19,412,113**	**$ 41,875,128**	**$ 163,477,121**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 13,773,359**	**$ 1,063,305**	**$ 34,991,455**	**$ 118,525,120**	**$ 9,636,166**	**$ 177,989,405**
4. Student Spending	Number of Students	14,167	875	30,014	32,746	8,921	86,723
	Number of Students Residing in Campus Regions	12,026	362	20,523	25,695	5,655	64,261
	Number of Students Residing Outside Campus Region	2,141	513	9,491	7,051	3,266	22,462
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 4,176	$ 3,990	$ 4,278	$ 3,990	$ 3,990	$ 4,085
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 8,940,816	$ 2,046,870	$ 40,602,498	$ 28,133,490	$ 13,031,340	$ 91,752,778
	Number of Students in Student Housing	1,127	517	2,397	3,270	2,325	7,311
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	**68%**	100%	100%	94%
	Number of Out-of-Region students in Off-Campus housing	1,014	513	**7,857**	3,781	941	12,826
	Average Off-campus food and housing budget	$ 10,152	$ 11,472	$ 11,500	$ 11,472	$ 11,472	$ 11,214
	Total Out-of-Region student spending on off-campus food and housing	$ 10,294,128	$ 5,885,136	$ 90,355,500	$ 43,375,632	$ 10,795,152	$ 143,825,634
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**$ 19,234,944**	**$ 7,932,006**	**$ 130,957,998**	**$ 71,509,122**	**$ 23,826,492**	**$ 253,460,562**
TOTAL IMPACTS	1. Operational Expenditures	$187,870,722	$32,423,851	$402,692,957	$353,142,225	$137,582,268	$1,113,712,023
	2. Capital Expenditures	$ 45,030,753	$ 8,805,611	$ 48,353,516	$ 19,412,113	$ 41,875,128	$ 163,477,121
	3. Auxillary Expenditures	$13,773,359	$1,063,305	$34,991,455	$118,525,120	$9,636,166	$177,989,405
	4. Student Spending	19,234,944	7,932,006	130,957,998	71,509,122	23,826,492	253,460,562
	GRAND TOTAL not including Alumni Impact	**$265,909,778**	**$50,224,773**	**$616,995,926**	**$562,588,580**	**$212,920,054**	**$1,708,639,111**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$414,944,000	$77,260,528	$930,220,416	$840,570,624	$329,584,096	$2,596,533,504
	IMPLAN Estimate: Total Impact on Employment	3,262.90	594.4	7,063.80	6,541.70	2,566.50	20,170.80
	IMPLAN Estimate: Total Impact on State and Local Taxes	$23,799,214	$4,426,888	$55,438,390	$54,502,890	$18,998,683	$157,685,016
	GRAND TOTAL not including Alumni Impact	**$265,909,778**	**$50,224,773**	**$616,995,926**	**$562,588,580**	**$212,920,054**	**$1,708,639,111**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$472,052,896	$88,409,920	$1,071,928,256	$969,939,072	$376,114,816	$3,543,573,760
	IMPLAN Estimate: Total Impact on Employment	4,099.70	747.10	8,969.00	8,503.10	3,229.50	30,585.00
	IMPLAN Estimate: Total Impact on State and Local Taxes	$26,782,320	$4,986,509	$63,246,161	$63,934,223	$21,425,860	$209,888,592
	Total alumni earnings attributable to CSU education	**$ 1,629,135,381**	**$ 27,137,781**	**$ 3,118,732,745**	**$ 3,314,952,835**	**$ 941,550,301**	**$ 9,031,509,043**
	GRAND TOTAL including Alumni Impact	**$ 1,895,045,159**	**$ 77,362,554**	**$ 3,735,728,671**	**$ 3,877,541,415**	**$ 1,154,470,355**	**$ 10,722,266,004**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$2,540,359,424	$122,354,160	$5,031,388,672	$5,178,514,944	$1,571,481,856	$15,009,735,680
	IMPLAN Estimate: Total Impact on Employment	17,125.10	960.9	33,904.00	35,007.00	10,757.50	102,794.10
	IMPLAN Estimate: Total Impact on State and Local Taxes	$177,227,289	$7,455,554	$351,250,435	$370,058,698	$108,374,779	$1,043,917,370
	Total State Appropriations	**115,712,526**	**16,944,438**	**219,766,138**	**188,448,283**	**76,081,568**	**616,952,953**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni Impact	$ 3.59	$ 4.56	$ 4.23	$ 4.46	$ 4.33	$ 4.21
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni Impact	$ 4.08	$ 5.22	$ 4.88	$ 5.15	$ 4.94	$ 5.74
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni Impact	$ 21.95	$ 7.22	$ 22.89	$ 27.48	$ 20.66	$ 24.33

CSU Economic Impact Results: Central Coast Region

Impact Category	Data inputs	Central Coast Region			
		Channel Islands	Monterey Bay	San Luis Obispo	Central Coast Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 69,138,124**	**$ 79,008,754**	**$ 288,553,568**	**$ 436,700,446**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 49,017,003**	**$ 31,375,724**	**$ 117,967,007**	**$ 198,359,734**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 9,031,983**	**$ 29,277,340**	**$ 111,496,367**	**$ 149,805,690**
4. Student Spending	Number of Students	3,783	4,340	19,471	27,594
	Number of Students Residing in Campus Regions	2,568	1,418	4,457	8,443
	Number of Students Residing Outside Campus Region	1,215	2,922	15,014	19,151
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 3,400	$ 3,672	$ 3,147	$ 3,406
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 4,131,000	$ 10,729,584	$ 47,249,058	$ 65,234,690
	Number of Students in Student Housing	802	2,454	5,362	8,618
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	100%	100%
	Number of Out-of-Region students in Off-Campus housing	413	468	9,652	10,533
	Average Off-campus food and housing budget	$ 10,200	$ 10,710	$ 9,369	$ 10,093
	Total Out-of-Region student spending on off-campus food and housing	$ 4,212,600	$ 5,012,280	$ 90,429,588	$ 106,309,569
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**$ 8,343,600**	**$ 15,741,864**	**$ 137,678,646**	**$ 161,764,110**
TOTAL IMPACTS	1. Operational Expenditures	$69,138,124	$79,008,754	$288,553,568	$436,700,446
	2. Capital Expenditures	$ 49,017,003	$ 31,375,724	$ 117,967,007	$ 198,359,734
	3. Auxillary Expenditures	$9,031,983	$29,277,340	$111,496,367	$149,805,690
	4. Student Spending	8,343,600	15,741,864	137,678,646	161,764,110
	GRAND TOTAL not including Alumni Impact	**$135,530,710**	**$155,403,682**	**$655,695,588**	**$946,629,980**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$114,424,552	$132,938,592	$469,222,976	$804,097,472
	IMPLAN Estimate: Total Impact on Employment	1,288.00	1,454.90	5,219.60	8,682.70
	IMPLAN Estimate: Total Impact on State and Local Taxes	$6,281,532	$8,454,443	$29,645,878	$51,576,459
	GRAND TOTAL not including Alumni Impact	**$135,530,710**	**$155,403,682**	**$655,695,588**	**$946,629,980**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$240,489,568	$269,500,416	$951,120,064	$1,646,456,704
	IMPLAN Estimate: Total Impact on Employment	2,099.00	2,369.70	8,493.80	14,110.40
	IMPLAN Estimate: Total Impact on State and Local Taxes	$13,787,085	$17,293,955	$61,078,057	$104,905,447
	Total alumni earnings attributable to CSU education	**$ 48,842,494**	**$ 97,290,364**	**$ 2,401,299,930**	**$ 2,547,432,788**
	GRAND TOTAL including Alumni Impact	**$ 184,373,204**	**$ 252,694,046**	**$ 3,056,995,518**	**$ 3,503,842,916**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$302,498,752	$391,192,256	$3,999,747,072	$4,880,609,792
	IMPLAN Estimate: Total Impact on Employment	2,489.50	3,136.00	27,692.80	34,477.70
	IMPLAN Estimate: Total Impact on State and Local Taxes	$18,297,525	$26,145,611	$282,829,846	$340,152,063
	Total State Appropriations	**55,469,212**	**62,324,053**	**170,521,135**	**288,314,400**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 2.06	$ 2.13	$ 2.75	$ 2.79
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 4.34	$ 4.32	$ 5.58	$ 5.71
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 5.45	$ 6.28	$ 23.46	$ 16.93

CSU Economic Impact Results: Inland Empire Region

Impact Category	Data inputs	Inland Empire Region		
		Pomona	San Bernardino	Inland Empire Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 265,431,334**	**$ 208,131,760**	**$ 473,563,094**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 53,986,935**	**$ 44,159,394**	**$ 98,146,329**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 61,795,976**	**$ 38,537,879**	**$ 100,333,855**
4. Student Spending	Number of Students	21,190	17,646	38,836
	Number of Students Residing in Campus Regions	5,259	15,621	20,880
	Number of Students Residing Outside Campus Region	15,931	2,025	17,956
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 2,286	$ 3,282	$ 2,784
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 36,418,266	$ 6,646,050	$ 49,989,504
	Number of Students in Student Housing	1,819	1,376	3,195
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	100%
	Number of Out-of-Region students in Off-Campus housing	14,112	649	14,761
	Average Off-campus food and housing budget	$ 9,390	$ 10,188	$ 9,789
	Total Out-of-Region student spending on off-campus food and housing	$ 132,511,680	$ 6,612,012	$ 144,495,429
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**$ 168,929,946**	**$ 13,258,062**	**$ 182,188,008**
TOTAL IMPACTS	1. Operational Expenditures	$265,431,334	$208,131,760	$473,563,094
	2. Capital Expenditures	$ 53,986,935	$ 44,159,394	$ 98,146,329
	3. Auxillary Expenditures	$61,795,976	$38,537,879	$100,333,855
	4. Student Spending	168,929,946	13,258,062	182,188,008
	GRAND TOTAL not including Alumni Impact	**$550,144,191**	**$304,087,095**	**$854,231,286**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$319,003,744	$189,511,520	$515,041,888
	IMPLAN Estimate: Total Impact on Employment	3,456.80	2,217.50	5,764.50
	IMPLAN Estimate: Total Impact on State and Local Taxes	$19,454,407	$10,245,945	$30,305,698
	GRAND TOTAL not including Alumni Impact	**$550,144,191**	**$304,087,095**	**$854,231,286**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$916,467,456	$536,539,616	$1,490,144,768
	IMPLAN Estimate: Total Impact on Employment	7,559.00	4,745.60	12,534.70
	IMPLAN Estimate: Total Impact on State and Local Taxes	$57,974,617	$32,252,405	$92,781,018
	Total alumni earnings attributable to CSU education	**$ 2,027,855,297**	**$ 1,193,311,716**	**$ 3,221,167,013**
	GRAND TOTAL including Alumni Impact	**$ 2,566,252,598**	**$ 1,497,398,811**	**$ 4,635,220,245**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$3,490,978,048	$2,051,537,024	$5,519,217,664
	IMPLAN Estimate: Total Impact on Employment	23,772.30	14,286.50	37,908.10
	IMPLAN Estimate: Total Impact on State and Local Taxes	$245,240,046	$142,450,656	$385,848,665
	Total State Appropriations	**161,917,377**	**114,612,247**	**276,529,624**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 1.97	$ 1.65	$ 1.86
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 5.66	$ 4.68	$ 5.39
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 21.56	$ 17.90	$ 19.96

CSU Economic Impact Results: Los Angeles Region

Impact Category	Data inputs	Los Angeles Region						
		Chancellors Office	Dominguez Hills	Fullerton	Long Beach	Los Angeles	Northridge	Los Angeles Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 249,588,853**	**$ 137,326,366**	**$ 342,665,991**	**$ 387,074,685**	**$ 243,829,142**	**$ 372,286,993**	**$ 1,732,772,030**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 10,062,853**	**$ 21,774,437**	**$ 73,573,434**	**$ 63,811,351**	**$ 32,736,473**	**$ 57,572,772**	**$ 259,531,320**
3. Auxillary Expenditures	**Total Auxillary Expenditures**		**$ 20,417,601**	**$ 78,809,248**	**$ 98,914,220**	**$ 37,346,660**	**$ 52,118,283**	**$ 274,683,620**
4. Student Spending	Number of Students		12,851	36,996	37,891	20,743	36,208	144,689
	Number of Students Residing In Campus Regions		11,673	28,669	30,258	18,138	28,731	117,469
	Number of Students Residing Outside Campus Region		1,178	8,327	7,633	2,605	7,477	27,220
	Average On-Campus student budget less fees, books, supplies, food, housing		$ 3,156	$ 3,800	$ 3,174	$ 2,970	$ 3,920	$ 3,404
	Total Out-of-Region student spending less fees, books, supplies, food, housing		$ 3,717,768	$ 31,642,600	$ 24,227,142	$ 7,736,850	$ 29,309,840	$ 92,656,880
	Number of Students In Student Housing		538	818	1,962	888	2,453	6,659
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students		100%	100%	100%	63%	100%	93%
	Number of Out-of-Region students In Off-Campus housing		640	7,509	5,671	2,046	5,024	20,890
	Average Off-campus food and housing budget		$ 10,300	$ 10,872	$ 10,152	$ 10,152	$ 10,152	$ 10,326
	Total Out-of-Region student spending on off-campus food and housing		$ 6,592,000	$ 81,637,848	$ 57,571,992	$ 20,770,992	$ 51,003,648	$ 215,701,784
	TOTAL Out-of-Region Non-Auxillary Student Expenditure		**$ 10,309,768**	**$ 113,280,448**	**$ 81,799,134**	**$ 28,507,842**	**$ 80,313,488**	**$ 308,358,664**
TOTAL IMPACTS	1. Operational Expenditures	$249,588,853	$137,326,366	$342,665,991	$387,074,685	$243,829,142	$372,286,993	$1,732,772,030
	2. Capital Expenditures	$ 10,062,853	$ 21,774,437	$ 73,573,434	$ 63,811,351	$ 32,736,473	$ 57,572,772	$ 259,531,320
	3. Auxillary Expenditures	$0	$20,417,601	$78,809,248	$98,914,220	$37,346,660	$52,118,283	$274,683,620
	4. Student Spending	0	10,309,768	113,280,448	81,799,134	28,507,842	80,313,488	308,358,664
	GRAND TOTAL not including Alumni Impact	**$259,651,706**	**$189,828,172**	**$608,329,121**	**$631,599,390**	**$342,420,117**	**$562,291,536**	**$2,575,345,634**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$467,591,712	$328,390,240	$1,010,893,952	$1,058,046,848	$587,735,552	$954,244,480	$4,381,313,536
	IMPLAN Estimate: Total Impact on Employment	4,309.40	2,960.40	8,776.20	9,307.40	5,258.30	8,416.10	38,831.20
	IMPLAN Estimate: Total Impact on State and Local Taxes	$24,171,797	$18,545,690	$60,116,605	$63,080,134	$33,490,293	$54,658,635	$251,763,173
	GRAND TOTAL not including Alumni Impact	**$259,651,706**	**$189,828,172**	**$608,329,121**	**$631,599,390**	**$342,420,117**	**$562,291,536**	**$2,575,345,634**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$469,162,848	$335,295,904	$1,050,176,512	$1,095,558,400	$602,094,784	$982,173,952	$4,505,238,528
	IMPLAN Estimate: Total Impact on Employment	4,120.30	2,949.30	8,947.10	9,516.70	5,257.70	8,421.70	38,950.50
	IMPLAN Estimate: Total Impact on State and Local Taxes	$24,950,463	$19,880,666	$65,529,013	$68,957,904	$36,000,829	$58,764,249	$271,248,171
	Total alumni earnings attributable to CSU education	**$ -**	**$ 1,093,223,530**	**$ 3,167,769,567**	**$ 3,696,227,987**	**$ 2,116,603,438**	**$ 3,192,754,254**	**$ 13,266,578,777**
	GRAND TOTAL including Alumni Impact	**$ 259,651,706**	**$ 1,283,051,702**	**$ 3,776,098,688**	**$ 4,327,827,377**	**$ 2,459,023,555**	**$ 3,755,045,790**	**$ 15,854,846,803**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*		$1,723,224,192	$5,071,891,456	$5,788,189,696	$3,249,566,720	$5,036,610,624	$21,348,141,056
	IMPLAN Estimate: Total Impact on Employment		11,689.90	34,274.20	39,069.00	21,930.40	33,948.60	145,020.10
	IMPLAN Estimate: Total Impact on State and Local Taxes		$120,836,140	$358,061,594	$410,291,842	$228,573,291	$353,604,108	$1,496,371,030
	Total State Appropriations	**55,121,846**	**88,114,569**	**203,897,512**	**248,591,855**	**151,731,474**	**220,339,913**	**967,797,170**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 8.48	$ 3.73	$ 4.96	$ 4.26	$ 3.87	$ 4.33	$ 4.53
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 8.51	$ 3.81	$ 5.15	$ 4.41	$ 3.97	$ 4.46	$ 4.66
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ -	$ 19.56	$ 24.87	$ 23.28	$ 21.42	$ 22.85	$ 22.06

CSU Economic Impact Results: North Coast Region

Impact Category	Data inputs	North Coast Region	
		Humboldt	North Coast Total
1. Operational Expenditures	Total Operational Expenditures	$ 127,134,393	$ 127,134,393
2. Construction Project /capital expenditures	Four-year average capital expenditures	$ 30,118,316	$ 30,118,316
3. Auxillary Expenditures	Total Auxillary Expenditures	$ 32,980,090	$ 32,980,090
4. Student Spending	Number of Students	7,800	7,800
	Number of Students Residing in Campus Regions	3,030	3,030
	Number of Students Residing Outside Campus Region	4,770	4,770
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 3,180	$ 3,180
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 15,168,600	$ 15,168,600
	Number of Students in Student Housing	1,612	1,612
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%
	Number of Out-of-Region students in Off-Campus housing	3,158	3,158
	Average Off-campus food and housing budget	$ 8,550	$ 8,550
	Total Out-of-Region student spending on off-campus food and housing	$ 27,000,900	$ 27,000,900
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	$ 42,169,500	$ 42,169,500
TOTAL IMPACTS	1. Operational Expenditures	$127,134,393	$127,134,393
	2. Capital Expenditures	$ 30,118,316	$ 30,118,316
	3. Auxillary Expenditures	$32,980,090	$32,980,090
	4. Student Spending	42,169,500	42,169,500
	GRAND TOTAL not including Alumni Impact	$232,402,299	$232,402,299
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$189,582,960	$189,582,960
	IMPLAN Estimate: Total Impact on Employment	2,280.80	2,280.80
	IMPLAN Estimate: Total Impact on State and Local Taxes	$10,589,027	$10,589,027
	GRAND TOTAL not including Alumni Impact	$232,402,299	$232,402,299
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$400,790,272	$400,790,272
	IMPLAN Estimate: Total Impact on Employment	3,425.40	3,425.40
	IMPLAN Estimate: Total Impact on State and Local Taxes	$25,239,050	$25,239,050
	Total alumni earnings attributable to CSU education	$ 951,203,181	$ 951,203,181
	GRAND TOTAL including Alumni Impact	$ 1,183,605,480	$ 1,183,605,480
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$ 1,608,412,416	$1,608,412,416
	IMPLAN Estimate: Total Impact on Employment	11,030.50	11,030.50
	IMPLAN Estimate: Total Impact on State and Local Taxes	$ 113,079,393	$113,079,393
	Total State Appropriations	80,243,402	80,243,402
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	2.36	$ 2.36
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	4.99	$ 4.99
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	20.04	$ 20.04

CSU Economic Impact Results: Sacramento Valley Region

Impact Category	Data inputs	Sacramento Valley Region		
		Chico	Sacramento	Sacramento Valley Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 208,778,903**	**$ 323,280,168**	**$ 532,059,071**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 40,633,973**	**$ 61,165,906**	**$ 101,799,879**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 72,205,155**	**$ 96,950,013**	**$ 169,155,168**
4. Student Spending	Number of Students	17,132	29,011	46,143
	Number of Students Residing in Campus Regions	8,135	19,817	27,952
	Number of Students Residing Outside Campus Region	8,997	9,194	18,191
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 2,900	$ 3,414	$ 3,157
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 26,091,300	$ 31,388,316	$ 57,428,987
	Number of Students in Student Housing	1,935	987	2,922
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	100%
	Number of Out-of-Region students in Off-Campus housing	7,062	8,207	15,269
	Average Off-campus food and housing budget	$ 9,300	$ 11,472	$ 10,386
	Total Out-of-Region student spending on off-campus food and housing	$ 65,676,600	$ 94,150,704	$ 158,583,834
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**$ 91,767,900**	**$ 125,539,020**	**$ 216,012,821**
TOTAL IMPACTS	1. Operational Expenditures	$208,778,903	$323,280,168	$532,059,071
	2. Capital Expenditures	$ 40,633,973	$ 61,165,906	$ 101,799,879
	3. Auxillary Expenditures	$72,205,155	$96,950,013	$169,155,168
	4. Student Spending	91,767,900	125,539,020	216,012,821
	GRAND TOTAL not including Alumni Impact	**$413,385,931**	**$606,935,107**	**$1,019,026,939**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$761,432,384	$816,022,976	$1,370,428,928
	IMPLAN Estimate: Total Impact on Employment	8,424.10	8,931.90	14,872.20
	IMPLAN Estimate: Total Impact on State and Local Taxes	$46,609,845	$52,475,623	87688559
	GRAND TOTAL not including Alumni Impact	**$413,385,931**	**$606,935,107**	**$1,019,026,939**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$960,029,568	$1,031,916,544	$1,743,196,672
	IMPLAN Estimate: Total Impact on Employment	8,226.80	8,858.40	14,825.70
	IMPLAN Estimate: Total Impact on State and Local Taxes	$59,757,840	$67,068,163	$112,827,831
	Total alumni earnings attributable to CSU education	**$ 2,088,106,525**	**$ 2,900,067,588**	**$ 4,988,174,113**
	GRAND TOTAL including Alumni Impact	**$ 2,501,492,456**	**$ 3,507,002,695**	**$ 6,007,201,052**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$3,611,033,088	$4,713,765,376	$8,076,048,896
	IMPLAN Estimate: Total Impact on Employment	24,921.80	32,045.20	54,707.30
	IMPLAN Estimate: Total Impact on State and Local Taxes	$252,587,162	$334,879,498	$573,468,440
	Total State Appropriations	**123,863,994**	**165,510,477**	**289,374,471**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 6.15	$ 4.93	$ 4.74
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 7.75	$ 6.23	$ 6.02
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 29.15	$ 28.48	$ 27.91

CSU Economic Impact Results: San Diego Region

Impact Category	Data inputs	San Diego Region		
		San Diego	San Marcos	San Diego Total
1. Operational Expenditures	Total Operational Expenditures	$ 442,565,237	$ 114,516,281	$ 557,081,518
2. Construction Project capital expenditures	Four-year average capital expenditures	$ 39,054,820	$ 18,339,455	$ 57,394,275
3. Auxillary Expenditures	Total Auxillary Expenditures	$ 236,122,869	$ 22,579,227	$ 258,702,096
4. Student Spending	Number of Students	35,832	9,148	44,980
	Number of Students Residing in Campus Regions	21,338	6,267	27,605
	Number of Students Residing Outside Campus Region	14,494	2,881	17,375
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 3,935	$ 4,297	$ 4,116
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 57,033,890	$ 12,379,657	$ 71,515,500
	Number of Students in Student Housing	2,600	625	3,225
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	100%
	Number of Out-of-Region students in Off-Campus housing	11,894	2,256	14,150
	Average Off-campus food and housing budget	$ 9,930	$ 9,486	$ 9,708
	Total Out-of-Region student spending on off-campus food and housing	$ 118,107,420	$ 21,400,416	$ 137,368,200
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	$ 175,141,310	$ 33,780,073	$ 208,883,700
TOTAL IMPACTS	1. Operational Expenditures	$442,565,237	$114,516,281	$557,081,518
	2. Capital Expenditures	$ 39,054,820	$ 18,339,455	$ 57,394,275
	3. Auxillary Expenditures	$236,122,869	$22,579,227	$258,702,096
	4. Student Spending	175,141,310	33,780,073	208,883,700
	GRAND TOTAL not including Alumni Impact	$892,884,236	$189,215,036	$1,082,061,589
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$1,071,188,480	$228,627,776	$1,299,778,432
	IMPLAN Estimate: Total Impact on Employment	10,473.20	2,291.30	12,764.20
	IMPLAN Estimate: Total Impact on State and Local Taxes	$75,842,784	$14,265,943	$90,105,750
	GRAND TOTAL not including Alumni Impact	$892,884,236	$189,215,036	$1,082,061,589
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$1,509,593,984	$327,502,560	$1,837,038,592
	IMPLAN Estimate: Total Impact on Employment	13,088.00	2,791.90	15,879.60
	IMPLAN Estimate: Total Impact on State and Local Taxes	$105,327,909	$20,222,047	$125,545,962
	Total alumni earnings attributable to CSU education	$ 4,190,164,877	$ 323,458,466	$ 4,513,623,343
	GRAND TOTAL including Alumni Impact	$ 5,083,049,113	$ 512,673,502	$ 5,595,684,932
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$6,718,227,968	$738,156,800	$7,567,416,320
	IMPLAN Estimate: Total Impact on Employment	45,966.50	5,378.00	51,967.10
	IMPLAN Estimate: Total Impact on State and Local Taxes	$491,873,688	$50,092,323	$542,363,570
	Total State Appropriations	239,154,239	73,388,125	312,542,364
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 4.48	$ 3.12	$ 4.16
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 6.31	$ 4.46	$ 5.88
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 28.09	$ 10.06	$ 24.21

CSU Economic Impact Results: San Joaquin Valley Region

Impact Category	Data inputs	San Joaquin Valley Region			
		Bakersfield	Fresno	Stanislaus	San Joaquin Valley Total
1. Operational Expenditures	**Total Operational Expenditures**	**$ 106,618,115**	**$ 268,238,026**	**$ 116,738,184**	**$ 491,594,325**
2. Construction Project /capital expenditures	**Four-year average capital expenditures**	**$ 16,738,513**	**$ 39,404,858**	**$ 22,455,232**	**$ 78,598,603**
3. Auxillary Expenditures	**Total Auxillary Expenditures**	**$ 10,046,645**	**$ 108,531,552**	**$ 5,322,199**	**$ 123,900,396**
4. Student Spending	Number of Students	7,884	22,613	8,601	38,898
	Number of Students Residing in Campus Regions	6,241	18,840	7,674	32,755
	Number of Students Residing Outside Campus Region	1,443	3,773	927	6,143
	Average On-Campus student budget less fees, books, supplies, food, housing	$ 3,537	$ 2,752	$ 3,096	$ 3,128
	Total Out-of-Region student spending less fees, books, supplies, food, housing	$ 5,103,891	$ 10,383,296	$ 2,869,992	$ 19,217,352
	Number of Students in Student Housing	319	1,166	590	1,756
	Percentage of On-Campus Housing Units Occupied by Out-of-Region students	100%	100%	100%	100%
	Number of Out-of-Region students in Off-Campus housing	1,124	2,607	337	4,387
	Average Off-campus food and housing budget	$ 9,342	$ 9,800	$ 8,361	$ 9,168
	Total Out-of-Region student spending on off-campus food and housing	$ 10,500,408	$ 25,548,600	$ 2,817,657	$ 40,218,554
	TOTAL Out-of-Region Non-Auxillary Student Expenditure	**$ 15,604,299**	**$ 35,931,896**	**$ 5,687,649**	**$ 59,435,905**
TOTAL IMPACTS	1. Operational Expenditures	$106,618,115	$268,238,026	$116,738,184	$491,594,325
	2. Capital Expenditures	$ 16,738,513	$ 39,404,858	$ 22,455,232	$ 78,598,603
	3. Auxillary Expenditures	$10,046,645	$108,531,552	$5,322,199	$123,900,396
	4. Student Spending	15,604,299	35,931,896	5,687,649	59,435,905
	GRAND TOTAL not including Alumni Impact	**$149,007,572**	**$452,106,332**	**$150,203,264**	**$753,529,229**
REGIONAL	*IMPLAN Estimate: Total Impact on Spending*	$163,395,104	$484,065,408	$168,920,624	$828,568,064
	IMPLAN Estimate: Total Impact on Employment	1,973.10	5,769.00	2,086.70	9,987.00
	IMPLAN Estimate: Total Impact on State and Local Taxes	$8,249,687	$28,469,787	$8,016,324	$45,563,770
	GRAND TOTAL not including Alumni Impact	**$149,007,572**	**$452,106,332**	**$150,203,264**	**$753,529,229**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$262,687,920	$780,909,888	$268,606,336	$1,317,795,840
	IMPLAN Estimate: Total Impact on Employment	2,267.20	6,958.40	2,348.20	11,618.00
	IMPLAN Estimate: Total Impact on State and Local Taxes	$15,231,952	$51,968,551	$14,891,148	$82,476,873
	Total alumni earnings attributable to CSU education	**$ 576,399,755**	**$ 2,279,611,444**	**$ 677,130,054**	**$ 3,533,141,253**
	GRAND TOTAL including Alumni Impact	**$ 725,407,327**	**$ 2,731,717,776**	**$ 827,333,318**	**$ 4,286,670,483**
STATEWIDE	*IMPLAN Estimate: Total Impact on Spending*	$994,469,440	$3,675,043,840	$1,128,272,512	$5,803,375,104
	IMPLAN Estimate: Total Impact on Employment	6,875.60	25,184.50	7,762.00	39,866.30
	IMPLAN Estimate: Total Impact on State and Local Taxes	$68,460,471	$262,482,739	$77,421,776	$408,750,228
	Total State Appropriations	**58,617,213**	**168,195,070**	**66,257,386**	**293,069,670**
	Regional Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 2.79	$ 2.88	$ 2.55	$ 2.83
	Statewide Spending Impact per Dollar of State Appropriations, excluding Alumni impact	$ 4.48	$ 4.64	$ 4.05	$ 4.50
	Statewide Spending Impact per Dollar of State Appropriations, including Alumni impact	$ 16.97	$ 21.85	$ 17.03	$ 19.80

Appendix D: Campus-specific Impact Examples by Topic Area

Agriculture, Food and Beverages: California's Historic Strength

Chico

- CSU Chico works closely with industry advisory groups and agricultural organizations to identify and solve critical problems. Highlights of CSU Chico activities include:
  - Contributing to the sustainability of the agriculture industry through collaborations with the University of California on crop variety trials (including walnut, almonds and field crops), agricultural waste management and by-product development trials (rice straw composting, food processing waste management, and olive oil processing waste by-product development), use of DNA markers to improve meat quality, and evaluation of potential new crops for Northern California including vegetables and pecans. Supporting the local industry and food network, the CSU Chico College of Agriculture coordinates and hosts the annual Chico Organic Farming and Food Conference.
  - Each year, hundreds of agriculturists are attracted to the Agricultural Teaching and Research Center to take part in seminars, trainings, and field days.
  - Contributing to youth agricultural leadership development by actively supporting Future Farmers of America (FFA) and 4-H programs and hosting workshops and field days, including a statewide FFA Career Development Event that attracts 1,000 high school students annually. CSU Chico also supports California Agricultural Education by managing resource websites and data collection for the secondary agricultural programs and FFA membership.
  - Helping producers become competitive and financially viable by conducting financial planning workshops in counties throughout northern California in cooperation with the USDA Natural Resources Conservation Service and county rural conservation districts.

Fresno

- Highlights of Fresno State agricultural activities include:
  - Operating the California Agricultural Technology Institute, dedicated to improving California agriculture. Projects address regional and statewide priority issues such as air quality, food safety, agricultural drainage, farm worker safety, production and marketing, and conversion of agricultural lands.
  - Collaborating with community colleges, CSU campuses, and UC Davis on the Central Valley Ag Literacy Initiative to educate K-12 and community college students about agriculture and career opportunities.
  - Participating with Future Farmers of America (FFA) to host the annual FFA Field Day competition and California State FFA Convention.

Humboldt

- Humboldt State faculty members and graduate students embark on research projects directly related to agricultural production, such as the impact of pesticide use in rural communities, wildlife impacts on alfalfa production, tissue culture techniques for orchid growers, embryo transfer to dairy cows, management of stump sprouting in Coast Redwoods, silvicultural treatments for wildfire hazards, sprout competition and soil compactions effects on redwood seedlings, GIS surveys of invasive plants, production economics for small wood, nonindustrial private forests, watershed monitoring protocols, genetics and management of Chinook salmon at Trinity River Hatchery, and monitoring pollinating bee populations.

Stanislaus

- The CSU Stanislaus Agricultural Studies major is a unique 2+2 multidisciplinary program that allows students to complete their baccalaureate education by taking lower-division agriculture courses at a California community college. Keeping with the interdisciplinary theme of the program, the Agricultural Studies Department is housed in the CSU Stanislaus College of Humanities and Social Sciences, and includes courses in Agriculture Studies, Economics, Business, Ecology, Botany, Biology, Geography, and Political Science. Concentrations within the program include Agricultural Economics, Agricultural Biology, Sustainable Agriculture, and a Special Concentration that allows students to target a particular career area not covered in the concentration.

Business and Professional Services: Educating to Manage

Chico

- CSU Chico's Center for Economic Development produces profiles of economic and demographic characteristics for each of 23 Northern California counties. More than 2,000 profiles are distributed to county offices, grant writers, businesses and nonprofit organizations, and workshops addressing the data are held in each county.

Dominguez Hills

- CSU Dominguez Hills provides online delivery of accredited Master of Business Administration and Master of Public Administration programs that are designed for working professionals. The online degree programs are ranked among the most affordable and robust curriculums in the United States.

East Bay

- The Human Investment Research and Education (HIRE) Center at CSU East Bay researches and evaluates programs and policies designed to further employment and educational opportunities. The center provides information and insights to administrators, policymakers, academicians, and the community at large to strengthen public and private programs, improve results and maximize societal benefits.

- CSU East Bay's College of Business has revised its curricula to meet the needs of the 21st century global economy. Its undergraduate and graduate programs emphasize global business issues, ethics and sustainability, and students can specialize in options including entrepreneurship and international business.

Fresno

- Fresno State is the lead organization for the Fresno Regional Jobs Initiative (RJI), an innovative regional economic development effort. The RJI is a partnership of private businesses and public/nonprofit agencies in 12 industry clusters. The Office of Community and Economic Development at Fresno State and key staff loaned from participating organizations coordinate leadership for the coalition.

Fullerton

- CSU Fullerton's Mihaylo College of Business and Economics, the state's largest accredited business college, is home to 15 centers, including the Center for Corporate Reporting and Governance, which annually hosts an SEC conference with more than 400 attendees. The Center for Insurance Studies is the largest insurance and risk management program west of the Mississippi, with more than 17 insurance partners on its board of directors.
- The annual Economic Forecast Conference by Dean Anil Puri, held in conjunction with the Orange County Business Council, attracts more than 800 attendees.
- The Family Business Council, one of the largest and most successful such organizations nationally, supports the economically vital family-owned businesses sector.

Humboldt

- Humboldt State faculty and students produce the Humboldt Economic Index, the only monthly source of broad-based economic indicators for the county.

Los Angeles

- CSU Los Angeles' Entrepreneurship Institute provides programs and conducts research for small businesses in the product and service sectors. The institute provides seminars on topics such as new venture management and the development of entrepreneurial talent among students and external stakeholders.

Long Beach

- The CSU Long Beach Office of Economic Research presents the annual Regional Economic Forecast Conference for Southern California and its counties. The conference addresses topics such as employment growth rates, the unemployment forecast, and housing market trends.

Northridge

- Hundreds of CSU Northridge business students each year provide free tax preparation assistance through CSU Northridge's Wayne and Roberta Colmer Volunteer Income Tax Assistance program to low-income families and individuals, non-English speakers, senior citizens, and the disabled.
- Students in CSU Northridge's MBA program are given the option for their culmination project of serving as consultants to local and internationally-based small businesses and nonprofits, developing strategic plans, marketing programs, and long-range plans, and providing other assistance.
- CSU Northridge accounting majors rank among the top three California college and university programs in pass rates for every section of the CPA exam.

Pomona

- Cal Poly Pomona is home to the Real Estate Research Council of Southern California, a nonprofit organization that develops and distributes information about conditions affecting real estate in Southern California, from housing to mortgage lending and construction.

San Bernardino

- CSU San Bernardino's graduate-level entrepreneurship program is ranked nationally. In addition to traditional business programs such as accounting, finance, management and marketing, the business school provides concentrations in supply chain management, real estate, entrepreneurship and public administration.

San Diego

- The San Diego State Center for International Business Education and Research (CIBER) is one of five original centers founded by the U.S. Department of Education to be "centers of excellence" in international business education. CIBER provides grants to fund faculty research and student internships abroad, performs outreach and development programs for the business community, and offers training programs for language and business faculty from institutions across the country.
- The International Security and Conflict Resolution (ISCOR) program at San Diego State is designed to provide students with an understanding of world affairs and conflict resolution. ISCOR challenges students to examine the increasingly interdependent and interconnected global system, analyze a world experiencing both increased cooperation and conflict, and assess international issues from a variety of perspectives.
- San Diego State's College of Extended Studies brings supervisory, managerial, and executive level leadership programs to adult learners representing a broad spectrum of industries. Instructors include Holly Green, former president of the Ken Blanchard Companies, and Jeff Campbell, former CEO of Burger King, who also serves as an Executive-in-Residence for SDSU's Hospitality & Tourism Management program.

- The health care management program in the Graduate School of Public Health is home to the John J. Hanlon Executive Scholar, an endowed position bridging the university with the local health care system and currently held by the director of the San Diego County Health and Human Services Agency.

San José

- San José State College of Business' Silicon Valley Center for Entrepreneurship sponsors a series of competitions linking student innovators with world-renowned venture capitalists.
- San José State's Norman Y. Mineta International Institute for Surface Transportation Policy Studies is one of only 10 centers nationwide conducting research on surface transportation issues.

San Marcos

- CSU San Marcos' Senior Experience Program matches teams of students with projects submitted by local businesses and organizations. To date, more than 1,100 projects have been completed for 500 local businesses and organizations.
- A new interdisciplinary Global Studies degree program at CSUSM will teach students how to understand the world as an integrated whole and relate knowledge of the language, culture, history, society and politics of a particular region to larger trends and issues that affect all peoples worldwide.

Sonoma

- The first MBA program for Wine Business in the nation was launched at Sonoma State, stimulated by the wine advisory board that guides the program. The program provides students with the financial and analytical skills required of wine business management and focuses on the wine industry through specialized classes and related case studies.

Stanislaus

- The CSU Stanislaus Executive Master of Business Administration Degree program, which has attracted students from all over Central California to serve workforce needs, has enabled more than 100 working professionals to achieve career advancement since its 2007 startup.

Life Sciences and Biomedicine: Meeting a Growing Need

Bakersfield

- To address the severe nursing shortage in the San Joaquin Valley, CSU Bakersfield's Nursing Department has obtained multiple grants to expand admissions capacity and implement accelerated programs. The nursing program has been awarded a five-year, $10.4 million grant from the National Institute of Child Health and Human Development

(NICHD) to study children's health and development. The project is a partnership with UC Irvine, UC Berkley, and the University of Chicago's National Opinion Research Center and is an integral part of the National Children's Health Study, the largest longitudinal study of child health ever undertaken in the United States.

- The Valley Fever Vaccine Project (VFVP) is an academic consortium managed through California State University, Bakersfield. The VFVP originated as a response to a major epidemic of coccidioidomycosis that plagued California in the early 1990s and resurfaced in 2006 in areas of California and Arizona. The primary goal of this laboratory-based collaboration is to identify and produce a candidate vaccine that would undergo evaluation in human clinical trials. The VFVP recently received an award of $2 million from the State of California, Department of Public Health to continue research. Other partners in the VFVP include the County of Kern, the Valley Fever of the Americans Foundations, and local service clubs such as the Rotary and the Eagles.
- Dr. Paul Smith, Associate Professor of Biology at CSU Bakersfield, is externally funded by LI-COR Biosciences to conduct research in DNA sequencing and genotyping of diploid organisms for biodiversity, forensic mapping, and association analysis. LI-COR designs, manufactures and markets instruments for biological, biotechnical, environmental, and drug discovery research.

Chico

- CSU Chico produces approximately 75 percent of the public health nurses, master's prepared RNs and RNs who achieve bachelor's of science degrees in nursing in the region.

Dominguez Hills

- The Minority Biomedical Research Program at CSU Dominguez Hills offers students the opportunity to be integrated as research assistants in active research laboratories at the university, the Los Angeles Biomedical Research Institute at Harbor-UCLA and the Charles R. Drew University of Medicine and Science. The program is funded by the National Institutes of Health.
- The School of Nursing at CSU Dominguez Hills is a leader in innovative distance learning programs for registered nurses to earn bachelor's and master's degrees in nursing. The school also offers an accelerated full-time pre-licensure program for master's students seeking to become RNs.

East Bay

- CSU East Bay faculty in the life sciences are increasingly pursuing research in a range of topics that include endangered species, plant nutrients, heavy metals, toxicity and health issues such as dementia, HIV/hepatitis interactions and contaminated foods.
- The East Bay Biotechnology Education Program schools teachers in genetic engineering concepts and provides classroom activities in biotechnology, genetics and evolution by

using kits maintained and provided by a grant from Genentech Foundation. At least 150 teachers in two counties have been through the training, and more than 5,000 students at 60 high schools have been exposed to biotech basics in the past decade to help build a pipeline of students engaged in Science, Technology, Engineering and Math (STEM) disciplines.

Fresno

- Fresno State was awarded a five-year, $4.5 million federal (NIH) grant in 2007-08 to develop a state-of-the-art biomedical research facility in which researchers can take advantage of new technologies to research health issues impacting California. Instruments at the facility will support research in the areas of proteomics, functional genomics and bioinformatics.

Fullerton

- CSU Fullerton's Dr. Harold R. Rogers received $340,000 from the National Science Foundation in 2007 for the purchase of an Electron Paramagnetic Resonance (EPR) Spectrometer system. The EPR can be used in interdisciplinary projects that involve the development of polymers containing potentially environmentally stable, biocidal organometallic groups. With the new spectrometer, CSU Fullerton can provide students with hands-on training on state-of-the-art equipment used in many different fields, including forensics, geology and geochemistry, medicine, the petrochemical industry, molecular biology and biochemistry, and materials science.
- CSU Fullerton leads a three-campus consortium offering a Professional Science Master's degree with an emphasis in applied biotechnology, along with CSU Los Angeles and Cal Poly Pomona. This multicampus program offers students faculty expertise and educational resources at each of the member campuses. The two-year degree program prepares graduates for careers in the biomedical device, biocomputing and biopharmaceutical industry through training in the science skills fundamental to industry, as well as essential business skills. The CSU's Professional Science Master's degree programs were featured as the most advanced in the nation at the 2008 National Governor's Association Professional Science Master's Academy.
- The inaugural group of students enrolled in CSU Fullerton's entry-level nursing program in 2007 achieved an 89.5 percent first-time pass rate for the National Counsel Licensure Examination-RN.
- CSU Fullerton is the only university in California that offers the MSN with a concentration in School Nursing, the School Nurse Services Credential, and the Special Teaching Authorization in Health, as an online program.
- A $1.28 million Bridges to Stem Cell Research grant awarded to CSU Fullerton from the California Institute for Regenerative Medicine funds the specialized training of student stem-cell researchers. The program pairs each student with an internship mentor at UC Irvine, UC Riverside, USC, and Children's Hospital of Orange County.

- The Howard Hughes Medical Institute Undergraduate Research Scholars program offers CSU Fullerton students an intensive two-year immersion program of research, supportive studies and workshops for promising undergraduates majoring in biology, chemistry, biochemistry and mathematics.
- CSU Fullerton Professor of Chemistry and Biochemistry Dr. Maria Linder has garnered more than $3.6 million in grant funding from the National Institutes of Health in the past 13 years to continue her research of the structure, function, regulation and gene expression of proteins associated with the transport and storage of iron and copper in the body.

Humboldt

- Humboldt State is among the top 50 public universities in the nation for the proportion of students who go on to earn doctorates in science, math and engineering.
- Humboldt State University Professor Steve Sillett has conducted groundbreaking research on redwood forest canopies, and was featured in a 2009 cover story in *National Geographic*. He holds the Kenneth L. Fisher Chair in Redwood Forest Ecology, the only endowed chair in the world dedicated to a single tree species.
- Humboldt State has the nation's largest undergraduate botany program.
- Humboldt State offers the state's only undergraduate oceanography program, as well as an array of other programs focused on marine sciences. Students conduct research aboard the university's research vessel, the *Coral Sea*, and at its coastal marine lab.

Long Beach

- CSU Long Beach produces the highest number of master's of science in nursing (MSN) graduates in the CSU system.
- With a $330,000 grant from the National Science Foundation, Assistant Professor of Biological Sciences Simon Malcomber and his students are conducting research that could ultimately lead to increased agriculture production and new biofuels by collaborating with professors, students and researchers across the country.

Los Angeles

- Since his initial faculty appointment in 1994, Dr. Frank Gomez at CSU Los Angeles has received over $6 million in biotechnology research funding from the National Science Foundation, National Institutes of Health, Department of Defense, research corporations and the industry.
- IMPACT-LA graduate student fellows serve as visiting scientists and engineers, partnering with area high school and middle school teachers to foster students' interest in science, technology, engineering and math. Part of a National Science Foundation program, IMPACT stands for Improving Minority Partnerships and Access through Computer/Information Science/Engineering-related Teaching.

- The CSU Los Angeles Spinal Plasticity and Locomotor Training Lab, equipped with technology-advanced rehabilitation apparatus, investigates the effects of locomotor training after a spinal cord injury. Supported by federal and state funds, one current project uses rodent models to study the use of robotic technology in facilitating locomotor training, while another seeks to understand the neural mechanisms of training-enhanced locomotor recovery.
- CSU Los Angeles assistant professor, Dr. Howard Xu, focuses research in his biotechnology laboratory on drug discovery, employing approaches such as microbial genetics, bacterial physiology and genetics, molecular biology, and high throughput screening. Dr. Xu's laboratory pursues the discovery of novel antibiotics and has made significant progress in identifying the cellular targets of antibacterial compounds in bacteria, and in understanding the mechanisms of antibiotic drug resistance in clinical bacterial pathogens.
- CSU Los Angeles and Cal Poly Pomona represent the CSU interests in the Pasadena Bioscience Center, a collaborative development with the City of Pasadena, the California Institute of Technology and Pasadena City College. The Pasadena Bioscience Center promotes and supports new company formation by providing low-cost, high-quality wet lab space and access to shared-use equipment to start-ups.
- The Institute of Nursing at CSU Los Angeles is active in the recruitment and retention of nursing students, improving the quality of nursing practice, facilitating research and teaching.
- The Institute for Applied Gerontology at CSU Los Angeles focuses on the delivery of care to the elderly and works on best practices and enhanced services to promote the well-being of disadvantaged citizens.

Northridge

- According to the National Science Foundation, CSU Northridge consistently ranks among the top five comprehensive universities in the nation for preparing students to earn doctorates in research and the sciences.
- Recognizing the need for trained professionals to address the issues that arise from the burgeoning field of assistive technology, CSU Northridge has launched a Master of Science in Assistive Technology Studies and Human Services (ATHS).
- The CSU Northridge Language, Speech and Hearing Center has provided diagnostic and therapeutic services to children and adults with communication disorders since 1960. Today, the center averages 12,000 patient visits annually, training Northridge students to become professional speech/language or hearing specialists.

Sacramento

- With the second largest nursing program in the CSU, each year CSU Sacramento graduates nearly 800 highly skilled nurses--achieving a 95 percent pass rate on the National Council of State Boards of Nursing's Licensure Examination (NCLEX) over the past two years.

San Diego

- San Diego State's Center for Bio/Pharmaceutical and Biodevice Development addresses the continuing education and training needs of the pharmaceutical, biotechnology and medical device industries. Programs and courses are designed to give employees a foundation for the development, manufacture, and commercialization of FDA-regulated therapeutic and medical device products.
- San Diego State and San José State have received a combined total of nearly $10 million in U.S. Department of Labor grants for education, training, and placement services in partnership with the health care and biotechnology industries. In the San Diego region, the Biotechnology Readiness, Immersion, Certification and Degrees for Gainful Employment (BRIDGE) project's certificate and degree training focuses on fields of high need, including laboratory sciences/technology, regulatory affairs, quality assurance/control, computational sciences, medical physics, and informatics. At San José, training prepares participants for licensure and certification as Medical Laboratory Technicians (MLT), Clinical Laboratory Specialists (CLS), Clinical Genetic Molecular Biologist Scientists (CGMBS), and Cytogeneticists.
- The CSUPERB Microchemical Core Facility DNA Lab established at San Diego State in 1987 performs automated fluorescent sequencing services to support student and faculty research across all CSU campuses. The facility recently expanded its services to include genotyping, large-scale plasmid extraction, and Templiphi service, which can amplify DNA from glycerol.
- The School of Nursing is launching a baccalaureate degree program, which is partially taught through distance education, for second-degree candidates wishing to change careers and enter the field of nursing.

San Francisco

- San Francisco State's Student Enrichment Office assists 20 to 25 underrepresented students into doctoral programs each year. Founder Frank Bayliss' mentoring work has earned him a Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.
- The Conservation Genetics Laboratory at San Francisco State provides molecular genetics equipment, computer analysis facilities and software for DNA extraction and sequencing, PCR, cloning and microsatellite analysis for students and faculty at San Francisco State's and other CSU and University of California campuses.
- Technology Learning Classrooms at San Francisco State's School of Nursing offer computer-controlled patient simulators that allow faculty and students to experience a full spectrum of nursing care scenarios.
- Dr. Ursula Simonis at San Francisco State received a $1.2 million award from the National Institutes of Health for her project, Porphyrinic Sensitizers Aimed at Mitochondrial Targeting, which targets the development of minimally invasive alternatives to chemotherapy that would drastically reduce the side effects of current treatment regimens. Her work will open new avenues for the diagnosis and treatment of leukemia and prostate cancer.

- San Francisco State's Center for Computing in Life Sciences conducts research in such areas as bioinformatics, data modeling and computational drug discovery by integrating life sciences, computational science and mathematics. A recent study that mapped the genome of three parasitic wasps is providing the agricultural industry with a better understanding of how to use parasitic wasps as natural agents against agricultural pests and disease-carrying insects.

San José

- San José State's Professional Science Master's degree in medical product development management was developed in collaboration with Abbott Laboratories. It prepares graduates in advanced science, business management and regulatory affairs courses required to move into upper-level project management positions in one of the state's fastest growing industry sectors.

San Marcos

- A Master of Biotechnology degree has been developed under the auspices of the Professional Science Master's (PSM) program. Offered at CSU San Marcos and several other CSU campuses, this "21st century" MBA allows students to pursue advanced training and excel in science while simultaneously developing highly valued business skills.

Stanislaus

- CSU Stanislaus added its first Master of Science in Nursing program in 2009 for nurses seeking professional advancement at the management level.

Physical Sciences/Advanced Sciences Research

Channel Islands

- Dr. Cynthia Wyels, an Associate Professor of Mathematics at CSU Channel Islands, pursues research in combinatorial mathematics and linear algebra. She involves students in her research and has obtained funding to provide summer stipends for minority undergraduate mathematics students to work with her.

Dominguez Hills

- Dr. John Price, an Associate Professor of Physics at CSU Dominguez Hills, is engaged in research studying the properties of the XI hyperon, a particle related to the proton. This research is funded by an $85,000 grant from the U.S. Department of Energy and has been carried out with the assistance of CSU Dominguez Hills undergraduate students, three of whom have gone on to graduate work in physics.

Humboldt

- Humboldt State's fire lab researchers were recently awarded a grant to model the effects of moisture on smoldering forest floors, and have just completed a study on the effect of tree diseases on fires in tree crowns.

Engineering, Information Technology, and Technical Disciplines

Bakersfield

- CSU Bakersfield's petroleum geology program is the only one offered by a public university west of the Rockies. The program's Geotechnology Center is a state-of-the-art training resource for petroleum geology students and oil industry professionals. Its California Well Core Repository contains information from thousands of oil, gas, water, and core wells from California and is an irreplaceable resource for California's energy and water industries.
- The West Coast Geotechnology Training Center (GTTC) is located in the Geology Department and modeled after similar centers sponsored by the American Association of Petroleum Geologists in Houston, Midland and Dallas, Texas, and Golden, Colorado. The center provides training in UNIX and PC-based workstation skills necessary to succeed in today's petroleum exploration and production market. The West Coast GTTC provides a cost-effective alternative for local professionals and students to receive software training without incurring prohibitive travel expenses. ArcView GIS training also is available at the center.

Chico

- CSU Chico's College of Business manages a mega-hosting center for SAP, the world's largest enterprise software company, providing technical and curriculum support for hundreds of universities around the world.

Fullerton

- CSU Fullerton's Master of Science in software engineering program prepares individuals for careers as software engineers and software process managers in industry and government agencies. It also addresses the needs of professionals engaged in the rapidly changing arena of software development. Those enrolled in the online program come from such companies as Raytheon, ThalesRaytheonSystems, Northrop Grumman and Boeing.
- CSU Fullerton conducts research on web-based telecommunications link and orbital analysis, simulation and operation for NASA-JPL. Other research areas include GPS Local Area Augmentation, Global Navigation Satellite System, Intelligent Vehicle High System for automobile navigation with GPS and Inertial Navigation System.

Los Angeles

- The CSU Los Angeles Structures, Propulsion, and Control Engineering (SPACE) Center develops state-of-the-art computing tools and techniques for modeling, controlling and simulating aircraft of the future. The development and flight of a hydrogen fuel cell-driven unmanned aircraft is one of the first of its kind in the world. The center also trains engineering students in the areas of control systems, computer architecture design, digital signal processing, modeling, and animation. The center's work has been supported by $20 million in grants from NASA, the National Science Foundation, the U.S. Air Force, and the aerospace industry.

- CSU Los Angeles' Center for Technology Education assists students, faculty, teachers, public agencies, business, and industry by providing workshops, a communications network and other activities that advance technology education and technical training in robotics, computer-aided design (CAD), computer-aided manufacturing (CAM), desktop publishing, and fluid power.

Long Beach

- According to a National Science Foundation (NSF) study, CSU Long Beach produces more baccalaureate graduates who go on to earn a PhD in the sciences and engineering than any other master's university in the United States.
- CSU Long Beach was awarded a five-year, $5 million grant by the National Aeronautics and Space Administration (NASA) to create a center that will focus on technological advances in the air traffic management industry through study of human factors issues. The grant was awarded through the NASA Group 5 Research Center awards program, whose goal is to increase the number of underrepresented minorities who obtain advanced degrees in science, technology, engineering and mathematics by establishing multidisciplinary research centers at minority-serving universities.
- The CSU Long Beach Center for International Trade and Transportation (CITT) is working with its METRANS Federal Transportation Center partners at the University of Southern California on a three-year Transportation Workforce Development research project. The work is funded by a Federal Highway Administration grant. The multidisciplinary team is examining models for collaborative workforce development, bringing educational institutions together with local and regional industry organizations.
- A new rodder machine was designed, manufactured and tested entirely in the CSULB's College of Engineering laboratories and embodied numerous inventions. Through a partnership with a local entrepreneur, the new machine went into production with few changes from the original design.

Northridge

- CSU Northridge has two NASA grants totaling over $430,000: Exploring the Magnetic Connection and Associated Dynamics from the Photosphere through Chromosphere to the Corona; and a subcontract from Montana State University/NASA titled, Magnetic Origins of Solar Irradiance Variations.

Pomona

- The Cal Poly Pomona aerospace engineering program partnered with the Air Force to build supersonic and subsonic wind tunnels on campus, which allow faculty and students to research aerodynamics. The wind tunnels, as well as other aerospace projects such as unmanned aerial vehicles and spacecraft development, have received $5 million of support in the last six years.
- The Cal Poly Pomona Electrical & Computer Engineering Department has conducted applied research in the area of signal processing over the last five years, with grants from Rockwell International, Lockheed Martin, and Raytheon totaling more than $170,000. These research efforts are led by Professors Dr. H. K. Hwang and Dr. Zekeriya Aliyazicioglu who have involved undergraduate and graduate students in their work on radar antenna designs, antenna arrays, and specialized antenna systems.

San Diego

- San Diego State's Communication Systems and Signal Processing Institute is internationally recognized for leading innovations in technologies that support wireless communication. Telecommunications giants Qualcomm, SAIC, Cubic Corporation, and Northrop Grumman collaborate in this partnership and use the opportunity to employ San Diego State graduates.

San José

- San José State's Charles W. Davidson College of Engineering features campus laboratories sponsored by leading Silicon Valley firms including Applied Materials, Cisco and Hewlett-Packard. Faculty members collaborate with industry leaders to offer innovative programs for working professionals in emerging fields such as clean technology and cloud computing.
- San José State is part of a team conducting multiyear research on the solar system using a powerful telescope mounted on NASA's Kepler spacecraft.
- The NASA-Ames Research Center continues its research partnership with San José State to explore the role of human error in flight accidents and air transportation safety. With over $50 million invested in the Human Factors research, three current cooperative agreements provide $7.1 million in funding to enable the investigation of human automation integration, human information management, and safety system research, all focusing on safer air travel.

Sonoma

- The bachelor's and master's programs in Computer and Engineering Science prepare students to design and manufacture electronic systems, communications systems and networks, microprocessors and computers, microwave and lightwave communications, and integrated circuits.

Stanislaus

- Students in the Computer Information Systems (CIS) program at CSU Stanislaus receive training in the E & J Gallo Winery Laboratory to prepare them for jobs with major companies in the region such as Gallo and Foster Farms.

Media, Culture, and Design: California's Best-Known Export

Channel Islands

- In collaboration with prominent business leaders and community partnerships, CSU Channel Islands' Art Program provides off-campus galleries in Camarillo and Ventura that host art exhibitions and cultural events to benefit the campus and surrounding communities.

Chico

- CSU Chico's arts and media studies programs have produced a number of successful writers and artists, including Russ Woody, TV writer/producer (*Murphy Brown, Cybill, Mad About You, Becker, The Drew Carey Show*); Amanda Detmer, film actor (*Saving Silverman, The Majestic, Big Fat Liar*); and Matt Olmstead, TV writer/producer (*NYPD Blue, Blind Justice, Prison Break*).

Dominguez Hills

- The Digital Media Arts program at CSU Dominguez Hills focuses on careers in the television, motion picture, music recording, interactive, and digital media industries. Students have an option to major in Audio Recording, Music Technology or Television Arts, and alumni work as sound engineers, producers, writers, directors, editors, camera operators, and technicians in broadcast, entertainment, corporate, and educational venues.

Los Angeles

- In collaboration with the University's Office of Community Engagement, CSULA students in English 301 (An Introduction to Language) and English 430 (Children's' Literature) developed creative, hands-on activities to get east Los Angeles children interested in reading and to help improve their English grammar.
- CSU Los Angeles is home to the Center for Contemporary Poetry and Poetics, which each year hosts the acclaimed Jean Burden Poetry Readings, British Council Poet-in-Residence, and other programs.
- CSU Los Angeles' Luckman Fine Arts Complex, home of the renowned Luckman Jazz Orchestra, seats up to 1,152 and, with one of the largest stages in Los Angeles, has featured performers such as world-renowned violinist Itzak Perlman. The complex also hosts an array of well-received contemporary art exhibitions in the Luckman Gallery.

Northridge

- CSU Northridge's Department of Cinema and Television Arts offers frequent lectures from entertainment industry professionals who also teach in the program and hire Northridge graduates. Alumni of the program have written and directed feature films as well as created shows for television and other media.

  VISCOM, housed in CSU Northridge's College of Arts, Media, and Communications, develops educational and research opportunities for students, faculty, and staff interested in visual communications by providing creative services to regional businesses requiring graphic design support in multimedia platforms.

San Bernardino

- CSU San Bernardino's Coyote Radio was selected as the top Internet-only college radio station in America and the third-best of all college radio stations in the nation, as determined by students nationwide who voted for MTV's "Radio Woodie" Award. It is also one of only 50 select U.S. college radio stations carried by iTunes and is home to the nationally syndicated feature program "Isla Earth," with a weekly audience of 5 million listeners.
- CSU San Bernardino's Robert V. Fullerton Art Museum is a showcase for the fine arts and home to one of the finest privately held collections of Egyptian antiquities in the world.

San Diego

- SDSU's College of Extended Studies, in collaboration with the School of Journalism & Media Studies, now offers a certificate program targeted to working professionals within the fields of journalism, public relations, advertising, and multimedia content production. Participants hone their skills in multimedia and harness the interactive power of the internet to build an audience.

San Francisco

- San Francisco State has more than 13 Oscar wins among its alumni, including screenwriter/director Steve Zaillian (*Schindler's List*). San Francisco State-trained actors include Danny Glover, Annette Bening, Jeffrey Tambor, and Alex Borstein.
- The College of Creative Arts at San Francisco State hosts more than 300 events annually, serving more than 30,000 patrons. These events include concerts, plays, exhibits, film screenings, dances, lectures, broadcasts and telecasts.

Stanislaus

- Since 1986, all students in CSU Stanislaus' Music Education program have found jobs after graduation, and most have been hired by schools in the campus's service region.

Tourism: Packaging the California Experience

Dominguez Hills

- The Home Depot Center at CSU Dominguez Hills offers world-class competition and training facilities for amateur, Olympic, collegiate and professional athletes. The venue features an 8,000-seat tennis stadium; a 27,000-seat stadium for soccer, other athletic competitions and outdoor concerts; a 20,000-seat facility for track and field; an indoor velodrome for cycling; and facilities for softball, baseball, beach volleyball, basketball and other sports. Designated as an "Official U.S. Olympic Training Site," it is also home to Major League Soccer's Los Angeles Galaxy and Chivas USA.

East Bay

- The Department of Hospitality, Tourism, and Recreation at CSU East Bay places an emphasis on leadership, offers online courses in both bachelor's and master's programs, and provides internships for students.

Fullerton

- The Mihaylo College of Business and Economics at CSU Fullerton has the only undergraduate program in California that offers a concentration focused on the business/management side of entertainment and tourism.

San Diego

- The J. Willard and Alice S. Marriott Foundation Student Center for Professional Development in the School of Hospitality and Tourism Management has a 99 percent placement rate for graduates.

San Francisco

- Recreation studies at San Francisco State features the Fort Miley Adventure Challenge Course located in the Golden Gate National Recreation Area. The program fosters an environment for individuals and groups in the business, nonprofit and educational arenas to develop confidence, trust, support, communication, cooperation and leadership skills.

Educating Teachers: Building the Future Generation

Bakersfield

- CSU Bakersfield serves as the lead agency for the Central California Partnership for Teacher Quality Programs (CCP-TQP), one of only 28 awards in the nation to be given as part of the Teacher Quality Partnership aimed at improving instruction in struggling schools. CCP-TQP is an innovative collaboration between CSU Bakersfield, CSU Monterey Bay, and Cal Poly San Luis Obispo as well as the Kern County Superintendent of Schools and the Tulare County Office of Education to address the diverse needs of schools, teachers and students at 16 high-need schools in primarily rural areas. With a focus on science, math and special education, the program provides a two-year introductory experience and mentoring for new teachers in partner schools.

- Several departments at CSU Bakersfield are involved in the Single Subject Program in Social Science (History, Economics, Political Science, Philosophy/Religious Studies, and Sociology), preparing students to meet the needs for well-educated teachers of history, government, economics and the social and behavioral sciences.

Dominguez Hills

- The CSU Dominguez Hills Transition to Teaching program, funded by a five-year $3.2 million grant from the U.S. Department of Education, allows the program to expand into the Compton and Inglewood School Districts. The program, currently serving Lynwood and Los Angeles Unified School Districts, recruits and trains recent graduates who majored in math, science and English, as well as mid-career professionals, to become middle school and high school teachers for high-need schools.

East Bay

- Already among the state's largest provider of credentialed math and science teachers, CSU East Bay is expanding the pipeline of future teacher and students by partnering creatively with business and industry to encourage K-12 students to study science, technology, engineering and math (STEM). This includes a $1.5 million Chevron grant to triple capacity for the university's mathematics achievement academies, which help underserved students strengthen math skills and attain college readiness.

Fresno

- Fresno State's Kremen School of Education and Human Development was the first in the CSU to offer a doctorate in Educational Leadership as a joint program with UC Davis.
- Central Valley Educational Leadership Institute (CVELI) was formed in 2002 to support educational leaders in the San Joaquin Valley in their efforts to eliminate the achievement gap. CVELI delivers conferences, training, coaching and consulting activities in collaboration with the 150 school districts served by the Kremen School of Education and Human Development at Fresno State. Funding is provided by donations, grants and fees for service.

Fullerton

- With a five-year, $46.5 million grant from the National Science Foundation plus $2.1 million from the American Recovery and Reinvestment Act, Dr. David Pagni and Dr. Paul DeLand are directing Teachers Assisting Students to Excel in Learning Mathematics, in partnership with the Orange County Department of Education and 14 secondary schools. The program builds professional learning communities and provides professional development. Teachers collaborate on developing motivational classroom strategies to entice students to learn mathematics.

Long Beach

- CSU Long Beach's SERVE (Service Experiences for ReVitalizing Education) Program creates an opportunity for undergraduate students, particularly those considering careers in K-12 education, to learn about urban classrooms and the needs of the diverse K-12 student population. SERVE interns provide academic support and are able to focus on their career goals while providing direct service to K-12 students and teachers in their communities.

Northridge

- CSU Northridge continues to issue a significant portion of the state's teaching credentials; in fact in 2000-01 teaching credentials were issued to more CSU Northridge students than from any other public university.

San Bernardino

- CSU San Bernardino's nationally accredited College of Education developed a literacy center to improve the reading and comprehension skills of children from community public schools.
- CSU San Bernardino hosted community educators, administrators and leaders in education for the inaugural Latino Education and Advocacy Day summit, which drew nearly 200,000 viewers, listeners and attendees from around the U.S., as well as Mexico, El Salvador, Nicaragua and Panama, to discuss critical issues in Latino education.

San Diego

- The City Heights Educational Collaborative, begun in 1998, is a partnership between San Diego State, the San Diego Unified School District, the San Diego Education Association and Price Charities. The collaborative seeks to improve the academic achievement of students in three City Heights schools—Rosa Parks Elementary, Monroe Clark Middle and Hoover High—by improving the training and support of educational professionals working in the inner city.
- The Compact for Success is a partnership between San Diego State and the Sweetwater Union High School District and is supported by the Ellis Foundation and the Stensrud Foundation. The compact, which started with the class of 2006, guarantees admission to all Sweetwater graduates who meet the program's requirements. San Diego State also is supporting the district's efforts to strengthen its curriculum requirements and teacher development programs.
- The National Center for Urban School Transformation at San Diego State works to help urban school districts and their partners transform urban schools into places where students achieve academic proficiency and graduate prepared to succeed in post-secondary education, the workplace, and their communities. The center identifies the best practices of successful urban schools nationwide to support creating model high-performing schools.

Criminal Justice: Providing Leadership and Security

Dominguez Hills

- CSU Dominguez Hills Criminal Justice Administration program was one of the first to offer a course on terrorism and extremism as part of the criminal justice major. Criminal Justice Department Chair Dr. Clarence Martin is the author of several definitive texts on terrorism.
- With the award of grants totaling $1 million from the Department of Homeland Security, Dr. Antonia Boadi will develop programs that prepare undergraduate and graduate students who are majoring in science, technology, engineering or mathematics for homeland security related careers.

Los Angeles

- Working directly with local law enforcement agencies, CSU Los Angeles criminalistics master's students are playing important roles in reducing DNA forensic casework backlogs in sexual assault cases. The Smart Backlog Reduction Program, in partnership with the Los Angeles Police Department and the L.A. County Sheriff's Office, is funded through a $1 million federal appropriation to the California Forensic Science Institute at CSU Los Angeles.

San Bernardino

- CSU San Bernardino is the only campus in the CSU with a center for the Study of Hate and Extremism.

Public Administration: Leadership and Service

Bakersfield

- In addition to evaluating the effectiveness of mental health services in Kern County and educating the next generation of social workers in a variety of fields to meet the human needs of the community, CSU Bakersfield's Department of Social Work provides more than 72,000 hours a year of service learning through student internships. The department is working to create a national model to provide educational support for students who will work with Medicaid eligible elderly persons.
- CSU Bakersfield's Public Service Institute (PSI) makes available resources and expertise to public, nonprofit and health care agencies in the southern San Joaquin Valley. PSI provides: 1) technical, supervisory, managerial and leadership training; 2) policy analysis and program evaluation; and 3) international linkages that will benefit CSUB students and practitioners in the service region. Clients include California Compliance School, Bakersfield College, CSUB Center for Career Education and Community Engagement, Kern Medical Center, and CSUB Hawk Honors Program.

Dominguez Hills

- The California African American Political and Economic Institute at CSU Dominguez Hills is a training center that studies the dynamics of African American political and economic contributions and political leadership in California.

East Bay

- CSU East Bay's Department of Public Affairs and Administration participates in the federally funded Minority Training Program in Cancer Control and Research (MTPCCR). This joint program of the UCSF Comprehensive Cancer Center and the UCLA School of Public Health serves to increase ethnic diversity in the field of research and cancer control by encouraging minority students to pursue doctoral degrees and careers in research.
- CSU East Bay's Department of Public Affairs and Administration has built a strong network of community partnerships to offer internship and project opportunities for students in the field of public administration and health care administration. Members of the network include regional hospitals, county health offices, and nonprofit organizations.
- The Institute of Governmental Research and Training in CSU East Bay's Department of Public Affairs and Administration sponsors training workshops and conducts research in public policy and administration. Regionally, the institute provides training for public administrators and offers consulting and research services to government organizations.

Sacramento

- The Institute for the Study of Politics and Media at CSU Sacramento explores the impact of media and political processes on society. The institute is the go-to resource for political reporters throughout the state seeking expert analysis on candidates and issues as well as topics affecting elections and elected officials.
- Sacramento Semester, a program open to students throughout the state, offers undergraduate students unprecedented access to the largest state government in the country through legislative internships and a specially designed curriculum that features guest speakers from all levels of California government.

San Francisco

- The Willie L. Brown, Jr. Leadership Center at San Francisco State provides students the opportunity to gain professional experience working in the public sector, while preparing a diverse, qualified and well-educated workforce for Bay Area public agencies. The center also offers a speaker series and leadership programs for working professionals in the public sector.

Sustainability: Environmental Consciousness and Energy

Bakersfield

- Drs. Robert Horton and Robert Negrini, CSU Bakersfield professors of geology, have received grants from multiple agencies and foundations and published papers relating to climate and climate modeling.

Channel Islands

- The university is committed to environmental sustainability through research and education, environmentally conscious practices across campus, and leadership in the community. Some of these "green" efforts include:
  - Reduction of campus irrigation by 25 percent.
  - Converting irrigation to reclaimed water as the supply becomes available.
  - Waterless urinals only in men's restrooms, saving up to 40,000 gallons of water annually.
  - Replaced faucets and toilet valves with low-flow units throughout the campus.
  - Developed design standards that incorporate sustainable strategies for new buildings using recycled materials and rapidly renewable resources, and energy efficient heating, cooling and lighting systems.
  - Divert construction wastes from landfills by recycling metals, cardboard, asphalt and concrete.

Chico

- The Associated Students Chico Recycling Program diverts more than 1,200 tons of waste from landfills annually and has trained more than 150 future teachers and 2,000 elementary school students in waste reduction techniques.
- CSU Chico's University Printing Services was awarded the Forest Stewardship Council chain-of-custody certification by Scientific Certification Systems in 2008, supporting CSU Chico's campus-wide commitment to sustainability. CSU Chico is one of the first universities in the country to receive this certification. The certification means that products by CSU Chico's Printing Services bearing the FSC trademark meet strict tracking requirements ensuring that they come from responsibly-managed forests.
- CSU Chico was awarded the grand prize in the National Wildlife Federation's Campus Ecology Chill Out contest held in 2007. The competition recognizes colleges and universities around the country that are implementing innovative programs to reduce global warming pollution.

Dominguez Hills

- The Center for Urban Environmental Research (CUER) at CSU Dominguez Hills coordinates and supports urban environmental activities on campus, including an environmental science master's degree and interdisciplinary urban environmental research and policy.

- CSU Dominguez Hills is planning a native species urban forest on campus to serve as a resource/teaching center and also has plans for a Child Development Center Discovery Play Garden to be an educational tool for families.
- All showerheads on the CSU Dominguez Hills campus are being replaced with low-flow models. California Water Service Company (Cal Water) donated 132 showerheads and provided a grant to replace campus urinals with low-flow models.
- A grant from the Metropolitan Water District of Southern California provides a wireless irrigation system for the CSU Dominguez Hills campus that uses reclaimed water and includes a weather sensor that monitors flow.

Fullerton

- CSU Fullerton's annual Alternative Energy and Transportation Expo attracts business and industry, policymakers, government agencies, and the public. The 2009 AltExpo featured exhibits from major manufacturing and technology companies, entrepreneurs and government agencies, including BMW, Mercedes, Honda, Clean Energy, EBus, MTA and OCTA.
- Since 2006, CSU Fullerton has constructed four buildings that meet LEED standards, including the gold-rated Student Recreation Center, which also won the "Best Overall Sustainable Design" title as part of the 2007 Best Practice Awards for the University of California/California State University Energy Efficiency Partnership Program. Over the last 30 years, CSU Fullerton has implemented a variety of measures to assist in managing energy usage and utility costs. Despite incredible growth in the university's facilities and population, energy consumption per gross square foot (GSF) has been reduced by 62 percent from 1980 to 2008.

Humboldt

- Humboldt State's Marine Wildlife Care Center provides emergency care for seabirds following oil spills from Mendocino to the Oregon border. In addition, Humboldt State faculty and students are designated to respond when marine mammals are stranded on beaches along the North coast.
- Humboldt State's fire science program teaches modern techniques for managing wildfire, and an advanced training program is offered for Forest Service employees and similar professionals.
- Humboldt State's student-run eco-demonstration house on campus is one of the nation's oldest, and students recently voted for a new fee to fund student-led energy efficiency projects on campus.
- Humboldt State students developed the Graduation Pledge of Social and Environmental Responsibility, which has been adopted at hundreds of universities around the world.

Long Beach

- The CSU Long Beach Center for Energy and Environment Research and Services (CEERS) engages in basic and interdisciplinary research, development, testing and evaluation related to energy and environment, and provides educational outreach and professional development to local schools and industry. CEERS' areas of focus include air pollution, water pollution, diesel emissions control technology, assessment and mitigation processes, indoor and outdoor air quality, and renewable energy.
- Managed by the CSU Long Beach College of Engineering, the California Pavement Preservation Center works collaboratively with two other CSU campuses and CalTrans. Among other innovations, the center focuses on "green" construction, recycled materials and novel mix asphalt.
- The Center for Green Composites Technology at CSU Long Beach focuses on products and manufacturing processes for aerospace, automotive, defense, consumer products and alternative energy industries. Center activities include innovative manufacturing methods, nondestructive testing, composite repair and qualification, and workforce development.
- In partnership with the County of Los Angeles and the City of Long Beach, CSU Long Beach collaborated in the first and largest installation of energy efficient, state-of-the-art LED street lighting project in Southern California.

Los Angeles

- In 2009, CSU Los Angeles was awarded a $5 million, five-year grant from the National Science Foundation to establish the Center for Energy and Sustainability. The project will train students, support research and increase public awareness in the fields of biofuels, carbon sequestration, photovoltaics and fuel cells. CSU Los Angeles recently concluded a similar NSF program focus on environmental analysis.

Monterey Bay

- CSU Monterey Bay was honored with the Monterey County Business Council's Public/Private Partnership award in 2008 for implementing projects that have resulted in significant energy savings. Projects implemented in the previous three years included lighting retrofits, heating and ventilation retrofits, and controls upgrades. These projects resulted in an annual savings of 16 percent of the university's electricity consumption and 11 percent of natural gas consumption. The university also received a best practice award for a project to monitor—and reduce—energy consumption in nine campus buildings, which resulted in an 11 percent savings in electricity use and a 24 percent savings in natural gas consumption.

Northridge

- CSU Northridge's 1 megawatt fuel cell power plant, the single largest such power plant at a university in the world, is generating the base load electricity for the university's facilities and surplus heat for hot water. Designed with the help of CSU Northridge's engineering student team, the plant also powers a satellite chiller plant to help the campus handle its air conditioning and heating. During its lifetime, the fuel cell plant will effectively reduce CSU Northridge's carbon dioxide emissions into the environment by 60 million pounds.

- CSU Northridge's new "biotechnology" building, Chaparral Hall, conserves energy throughout its spaces, from its fluorescent lighting to low-flush toilets and waterless urinals, and uses energy from the campus's hydrogen fuel cell satellite plant.
- In 2003, CSU Northridge installed more than 3,000 solar panels on campus. It was one of the largest solar electric installations at a public university in California. In 2005, 2,832 more panels were installed. The panels save the campus more than $160,000 annually in energy costs and help reduce the campus's environmental impact in a significant way.
- Directed by Associate Professor of Geography Helen Cox, geography undergraduates are identifying, measuring and tagging each of the more than 3,600 trees on the CSU Northridge campus to determine whether the university can minimize its water usage—by choosing drought-tolerant trees—and reduce its greenhouse gas emissions by maximizing the trees' uptake of carbon dioxide.

Pomona

- Cal Poly Pomona Parking and Transportation Services has a GPS-based system that tracks the locations of the Bronco Express shuttles around campus and provides riders wait times at each stop. The Efficient Deployment of Advanced Public Transportation System (EDAPTS) includes marquee signs at four popular stops, an online map that pinpoints the shuttles routes and updates every 7 seconds, and a mobile phone option. The LED marquee signs are solar-powered and display the arrival time of the next bus. They are also ADA compliant, providing an audio announcement for visually impaired riders. The EDAPTS system assists Parking and Transportation Services in managing the bus routes and schedules more efficiently.

Sacramento

- CSU Sacramento is home to the California Smart Grid Center, which will oversee the installation of smart grid technology in buildings on campus and has developed curriculum to educate engineering and computer science students. CSU Sacramento and its smart grid partners, Sacramento Municipal Utility District (SMUD), Los Rios and the Department of General Services received $127 million in American Recovery and Reinvestment Act funding for the project. The grant will help make CSU Sacramento a "smart campus" by modernizing about 50 buildings. Additional grants of over $905,000 were awarded to CSU Sacramento in April 2010 to develop a new training program to enhance the region's growing smart grid system.

San Bernardino

- CSU San Bernardino has implemented conservation efforts to generate its own electricity through renewable solar power panels and produce fewer greenhouse gases, saving the university more than $1 million—or a 25 percent reduction—in utility costs.
- CSU San Bernardino has become the first college or university in California to convert human exercise into electricity with 20 elliptical fitness machines that generate energy from exercise.

San Diego

- In 2009 San Diego State launched the Center for Regional Sustainability to further sustainability on campus through academic engagement programs, faculty training, research, and community outreach. The center's initiatives include a faculty institute for course design and a service-learning project/community engagement project, "Public Conversations for a Sustainable Future," which engages students and faculty in intergenerational, community discussions.
- In 2009, San Diego State established a new sustainability major and implemented three additional courses on sustainability. Many faculty incorporate sustainability into courses in disciplines from biology to accounting to writing and rhetoric.
- San Diego State University's College of Extended Studies has developed three online professional certificates: Green Building Construction, Green Energy Management, and Sustainable Practices. The new Green Home Performance Contractor Certification will be the first green BPI certification course offered in Southern California to comply with the soon-to-be-signed legislation for Home Star tax incentives for homeowners and new jobs for BPI-certified green contractors.

San Francisco

- San Francisco State's College of Business requires graduate and undergraduate students to take a course on business and society and recently launched the MBA emphasis in sustainable business.
- University Housing at San Francisco State has furnished a model green apartment that showcases how students can live in a modern and comfortable setting while reducing their ecological impact.
- The MBA program at San Francisco State offers an emphasis in sustainable business that aims to transform mainstream businesses. The program provides students with an in-depth appreciation of the environmental and social dimensions of conducting business in a global market. Three aspects of sustainable business that improve a firm's long-term performance are emphasized: managing risks (regulatory, reputation, litigation, market), values-driven leadership, and recognizing market opportunities created by environmental and social challenges.

- The campus custodial service at San Francisco State has implemented a green cleaning program in all buildings that reduces the amount of harmful chemicals released into the environment and improves air quality.

San José

- In partnership with the San José Redevelopment Agency, the San José State University Research Foundation manages and operates the San José Bio Center, the U.S. Market Access Center, and the Environmental Business Cluster. All three business incubators provide high-potential, early-stage companies with facilities, business development services, and access to faculty experts and student interns.
- San José State won the $15,000 first prize at the 2007 "Idea-to-Product Competition" held at Purdue University for creation of the zero-emissions vehicle. SJSU Professor of Mechanical and Aerospace Engineering Tai-Ran Hsu was the senior project supervisor for an endeavor to create a new class of energy-efficient automobile: a student-designed zero-emissions vehicle, dubbed ZEM, which incorporates a pedaling system that initiates movement and generates storable power, as well as solar and electrical systems to back up the human element.

San Luis Obispo

- San Luis Obispo is conducting a campuswide energy audit, has $5.5 million contracted with Chevron Energy for energy and water conservation measures, and is performing feasibility studies for 1MW solar PV system, 1 MW wind power, and 1 MW biomass.

San Marcos

- CSU San Marcos Extended Learning is offering a new Certificate Program in Green Business Operations for those in local industry and organizations seeking to gain a deeper understanding of the problems and potential solutions for "Going Green," including how to reduce associated costs and comply with new legislation to preserve the environment.
- CSU San Marcos earned a statewide energy efficiency award in 2008 for cutting its peak-demand energy use in summer 2007 by 150 kilowatts, or 9 percent, compared to the previous year.

Sonoma

- Sonoma State earned a major "green" rating in a new category developed in 2008 by the Princeton Review in its annual "2009 Best 368 Colleges" issue. The institutional survey for the rating included questions on energy use, recycling, food, buildings, transportation, academic offerings (availability of environmental studies degrees and courses) and action plans and goals concerning greenhouse gas emission reductions.

Stanislaus

- CSU Stanislaus' Ecology and Sustainability Master's Degree in Science program trains students to help find solutions to resolve the conflicts between the region's growing population and the environment.

Environmental Research

Bakersfield

- Through an innovative partnership with Aera Energy LLC and other industry stakeholders, CSU Bakersfield's Environmental Resource Management program met regional needs for occupational safety and health managers through development of a new concentration within the Environmental Resource Management program.

Fresno

- Since 2005, a consortium comprising Fresno State, the U.S. Department of Agriculture, Red Rock Ranch, and the Panoche Drainage District, has been conducting research on the development of new resources from an otherwise known contaminant, selenium. Under the project, seed harvested from canola plants would be processed for bio-oil and blended with diesel fuel; investigators would then evaluate performance of the biofuels.

Fullerton

- CSU Fullerton's Dr. Steve Murray, Dr. Jayson Smith, and their students are conducting studies to determine whether, and to what extent, native rocky shore consumers feed on introduced marine plants. The impacts of invasive marine plants on coastal ecosystems is of increasing concern, and knowledge of how these species contribute to marine food webs is important to coastal managers. This applied research contributes to on-going state and federal efforts to improve management of invasive species and is funded by the National Oceanic and Atmospheric Administration's Sea Grant Program.

Humboldt

- Humboldt State's Marine Wildlife Care Center provides emergency care for seabirds following oil spills from Mendocino to the Oregon border. In addition, Humboldt State faculty and students are designated to respond when marine mammals are stranded on beaches along the North Coast.

Northridge

- The Energy Research Center in CSU Northridge's College of Engineering and Computer Science is set up to promote, coordinate, facilitate and implement research and development projects in new or alternative energy sources, conservation and sustainability practices, and to bridge the gap between the state-of-the-art and the state-of-practice in energy utilization.

San Bernardino

- CSU San Bernardino has reduced its carbon footprint by 15 percent. That translates to a reduction of nearly 2,000 metric tons of carbon dioxide emissions on campus--equivalent to taking 14,000 cars off the road or planting 2.9 million trees.
- The campus recycles more than 60 percent (by weight) of solid waste that would otherwise go to landfills. All construction projects on campus are required to recycle more than half of all the solid waste generated. All cleaning products at CSU San Bernardino have been converted to "green" products.
- A state-of-the-art wireless controlled irrigation system at CSU San Bernardino allows large irrigation lines to be turned off if breaks occur and large volumes of water are sensed. Irrigation is also switched off during inclement weather and self-adjusts watering times.
- The Palm Springs Institute for Environmental Sustainability works to improve the quality of life in the Coachella Valley through research, education and advocacy on issues pertaining to environmental sustainability. The institute is a community partnership for providing research data, consumer information and practical recommendations regarding environmental sustainability in the Coachella Valley.

San Diego

- Professor Richard Gersberg of the Graduate School of Public Health has been involved for many years in water quality studies involving San Diego Bay, the border areas between the United States and Mexico, and in Venice, Italy. His research includes water-based pathogens and chemical contamination.

San José

- The Center for Development of Recycling (CDR) located at San José State has worked on commercial recycling and water conservation projects for local government and established a beverage container-recycling program at SJSU. Since 1991, the center has operated with the financial support of more than 20 different government and agency contracts totaling $2 million.

San Luis Obispo

- Cal Poly San Luis Obispo's Dr. Jagjit Singh is conducting research that focuses on the use of Recycled Polyethylene Terephthalate, including the best use of these materials for non-food applications. Funded by the California Department of Conservation, the research is a collaboration among Cal Poly, the University of California, Santa Barbara, and Michigan State University to make systemwide improvements for sustainable use of beverage container materials.
- Cal Poly San Luis Obispo Professor of City and Regional Planning, Dr. Ken Topping, was the recipient of a sizeable grant in 2007-08 from the California Office of Emergency Services to prepare an updated version of the State of California's Multi-Hazard Mitigation Plan (MHMP) for the California Office of Emergency Services. The researchers have already

produced a new plan that has been recognized by the Federal Emergency Management Agency as a model for other states and has resulted in significantly enhanced federal funding for California for emergency preparedness and response.

Sonoma

- Assistant Professor of Biology Dr. Michael Cohen and graduate student Catherine Hare have partnered with the City of Santa Rosa to investigate the potential use of algae to remove excess nutrients and other contaminants from municipal wastewater at its treatment plant. The project has gained national attention and has garnered $200,000 in funding from a variety of sources, including the California Energy Commission, the Bay Area Air Quality Management District and the City of Santa Rosa.

Stanislaus

- CSU Stanislaus performs more than $6 million of government-funded research dealing with California's endangered species annually. The Endangered Species Program in the College of Natural Sciences focuses on rare and endangered animals and plant life, and helps resolve conservation conflicts with agriculture and urban growth.

Entrepreneurship and Innovation

Channel Islands

- The CSU Channel Islands California Institute for Social Business is an interdisciplinary, international and multicultural program that includes curriculum, research and an incubator/seed capital for business plans that build businesses on sound business practices and that have a social impact. The center's goal is to create a "triple bottom line" of financial, social and environmental results for businesses.
- CSU Channel Islands has partnered with the Smithsonian National Museum of American History on a national oral history project titled, *The Bracero History Project, Legacy of a Community*, in an effort to collect oral histories from those who participated in the bracero program, a guest worker program administered by the United States government from 1942 to 1964. To date, students in Chicana/o Studies, History, Library, and Spanish programs have collected 32 oral histories from former braceros and their families.

Chico

- The Accelerator Fund of CSU Chico's Entrepreneurship Program supports emerging businesses and intellectual properties. Fund assets are used to support student and faculty initiated entrepreneurial ventures, mobilize student teams, and acquire professionals to help entrepreneurs prepare their proposals for investor groups.

Dominguez Hills

- The Institute for Entrepreneurship, Small Business Development, and Global Logistics within the College of Business Administration and Public Policy at CSU Dominguez Hills focuses on minority and female entrepreneurs. The institute holds an annual business plan competition where student teams compete on abstracts, business plans, and oral presentations, evaluated by entrepreneurs and professionals.

East Bay

- The Center for Entrepreneurship at CSU East Bay promotes research and teaching of entrepreneurship in the university's academic curricula, supports student entrepreneurs and outreach activities, and connects with regional community economic agencies to explore and discuss business opportunities.

Long Beach

- The CSU Long Beach College of Engineering was instrumental in a technology incubation effort that resulted in the creation of TruePoint, a Long Beach-based company.

Northridge

- CSU Northridge's annual International Technology and Persons with Disabilities Conference is the largest conference in the world that explores new ways technology can help the disabled.
- Northridge's Ernie Schaeffer Center for Innovation and Entrepreneurship in its College of Engineering and Computer Science provides services, resources, and activities for CSU Northridge stakeholders and helps students, faculty members, alumni, and community members access educational programs, team building and networking events, facilities for making prototypes, technology transfer services, and funding organizations, and form technical and business partnerships.
- The Energy Research Center in CSU Northridge's College of Engineering and Computer Science is set up to promote, coordinate, facilitate and implement research and development projects in new or alternative energy sources and conservation and sustainability practices, and to bridge the gap between the state-of-the-art and the state-of-practice in energy utilization.
- CSU Northridge's San Fernando Valley Economic Research Center is widely recognized as the expert source for information and perspective on the economy and demographics of the San Fernando Valley.
- CSU Northridge's Language, Speech, and Hearing Center provides diagnostic and therapeutic services to children and adults with communication disorders and trains Northridge students to become professional speech/language or hearing specialists.
- CSU Northridge's Center for Supramolecular Studies—which includes faculty members and post-doctoral research associates from the Departments of Physics and Chemistry—is an

interdisciplinary program in experimental biophysics, bio-physical-chemistry, and biochemistry. Research is pursued within the center and in collaboration with scientists at other national and international institutions.

Pomona

- Cal Poly Pomona's Innovation Village Research Park has become a world-class research and development environment for public-private partnerships. With a large commitment from the Economic Development Agency, Innovation Village is home to the Southern California American Red Cross blood services unit, Southern California Edison's power distribution and engineering group, and the Center for Training, Technology, and Incubation, which includes two business incubators, the NASA Commercialization Center and the Pomona Technology Center.

Sacramento

- The Institute for Business Research and Consulting at CSU Sacramento offers research and consulting services for both the state and the public, including a biannual economic analysis of the Sacramento Region. The Sacramento Business Review offers the only independent study of the business climate of the region, exploring the economic impact of the area's real estate, energy, capital market and service industry sectors.
- CSU Sacramento's Center for Small Business offers small businesses in the Sacramento Region free personalized advice on topics from business plans to how to set up a website. Nearly 3,000 businesses have benefited.
- The College of Business Administration at CSU Sacramento has launched an Entrepreneurship Concentration to help students gain an understanding of entrepreneurial activities and strategies within organizations and to provide them with entrepreneurial skills that will enable them to be more effective in organizations that create new ventures, spin-offs, mergers and other entrepreneurial activities.

San Bernardino

- The Office of Technology Transfer and Commercialization (OTTC) at CSU San Bernardino provides business and research services to government agencies, private enterprise and academia to assist them in moving their technologies through the commercialization process. The OTTC helps new government and academic technologies transition to commercial applications.

San Diego

- Since the inception of the Technology Transfer Office, 10 start-ups have been initialized and remain in business today to generate new high-tech jobs and increase local, state and federal tax revenues.
- The College of Extended Studies Workforce Training and Education offers approved programs in collaboration with Workforce Partnership, Military Spouse projects, VA and

active military. The programs offer an industry-based certificate program for career transition, building new skill sets for a new environment and economy.

San Francisco

- San Francisco State Professor of Design and Industry Martin Linder designed an innovative line of chairs for health care waiting rooms that provide comfort and functionality.
- The Whirlwind Wheelchair International program at San Francisco State designs wheelchairs that can be manufactured in developing countries from locally available materials. Whirlwind technology has been taken to 45 countries to date, and the program has been awarded a $4.8 million grant from the U.S. Department of Education to develop a blueprint that will guide organizations that design, manufacture and distribute technology products in the Third World and American Indian tribal lands. Only five percent of disabled people in developing nations have the assistive devices they need.

Stanislaus

- CSU Stanislaus faculty and student researchers have the opportunity to work on biotechnology and environmental projects in conjunction with companies such as E&J Gallo Winery, Hilmar Cheese Co., Salida Wastewater, and California Animal Health & Food Safety. They also collaborate with colleagues at CSU Sacramento, UC Davis and UC San Francisco.

CSU Centers and Institutes – Additional Examples

- **Institute for Business Research and Consulting:** The Institute for Business Research and Consulting (IBRC) at CSU Sacramento offers research and consulting services for the state and the public, including a biannual economic analysis of the Sacramento Region. The Sacramento Business Review offers the only independent study of the business climate of the region, exploring the economic impact of the area's real estate, energy, capital market, and service industry sectors.
- **Center for Entrepreneurship:** The Center for Entrepreneurship is an outreach center and entrepreneurship support organization at the Mihaylo College of Business and Economics at CSU Fullerton that assists entrepreneurs throughout Southern California. Through a Small Business Development Center grant funded by the U. S. Small Business Administration, the center provides students and entrepreneurs with the knowledge and skills to create, launch and grow new ventures and supports entrepreneurial education, outreach programs such as the Small Business Institute, and research.
- **Center for Excellence in Early Intervention:** Housed in the Division of Special Education at CSU Los Angeles, the center provides a model program for training early-intervention professionals. It focuses on developing, demonstrating, and evaluating the best practices in serving young children with special needs and their families by providing training to professional, paraprofessionals, and parents; and by developing other resource materials and services.

- **The Bureau of Business and Economic Research:** The College of Business and Economics at CSU Los Angeles maintains a research bureau to encourage, facilitate and communicate faculty and student research. The bureau's primary objective is to relay information about research opportunities and ongoing research efforts to faculty members and students.

Appendix E: California State University Systemwide Initiatives for Underrepresented Communities

In 2004, Chancellor Charles B. Reed initiated a series of meetings with leaders from the African American, Latino, Asian Pacific Islander and tribal communities that resulted in a number of non-traditional partnerships with community, faith-based and educational groups. Their purpose was to bring community, civic, business and education leaders together to develop ways to educate students and parents about early preparation for college and to get the message out that a college degree was the minimum entry for a good job and stable future. The following is a summary of these initiatives

CSU African American Initiative

Key leaders developed an action plan with several initiatives to reach African American students and their parents/guardians. As a result, the following activities have been implemented and are ongoing:

- **CSU Breakfast with Church Partners:** Chancellor Reed, CSU campus presidents, select members from the CSU Board of Trustees and Board of Governors meet annually for breakfast at the CSU Los Angeles campus with CSU church partners/pastors in the Los Angeles basin. The goal is to further expand the partnerships with pastors/bishops and to demonstrate the level of commitment from the CSU.
- **CSU Super Sundays**: During the month of February--Black History Month--California State University leaders take to the pulpit in some of the largest African American churches throughout the state to deliver the message that college is possible and is the key to future success. This event is known as "Super Sunday."

  In February 2010, the CSU's fifth annual "Super Sunday" reached over 100,000 people (100 churches) in Northern and Southern California. Following church services, CSU outreach directors and volunteers disseminate information on the application and admissions process, scholarships, financial aid, and more. The CSU's partnership with the African American community has helped contribute to an 8 percent increase in African American freshmen enrollment.
- **Train-the-Trainer Workshop**: Developed by a group of CSU outreach directors based on recommendations from church partners, the workshop trains education advisors from partnering churches about the CSU admissions and application process, financial aid, working with parents, disabled student services, student resources and much more.
- **Super Saturday College Fair**: The purpose of this event is to provide students and parents with information and workshops on admissions, financial aid, Early Assessment Program (EAP), Free Application for Federal Student Aid (FAFSA), scholarship programs and housing. All 23 campuses are represented at the college fair.
- **CSU Counselor Conferences and Quarterly Meetings**: All Super Sunday church education advisors are invited to attend the Fall CSU Counselor Conferences, and designated church educational advisors attend quarterly meetings with CSU outreach directors and Chancellor's Office and CSU Los Angeles staff.

- **Summer Algebra Institutes**: Building on successful pilot projects, the California State University-based Summer Algebra Institute (CSU-SAI) is a California standards-based math course. The curriculum is designed to enhance the academic performance of underserved and vulnerable middle school students and accelerate math skills.

CSU Native American Initiative

In March 2006, the CSU held a summit with leaders representing 40 tribes in California to focus on college eligibility and how to build a college-going culture. This summit led to further discussion and legislation and the development of the American Indian Education Oversight Committee.

Recommendations from the March 2006 summit included:

- Review the status of American Indians as interpreted by the CSU Chancellor's Office under Proposition 209.
- Review the CSU policy on self-identification of American Indian students.
- Conduct regional meetings to discuss educational partnerships with and for tribal communities.
- Review teacher training programs to ensure truthful Indian history and culture is taught.

CSU campuses now hold regional meetings with tribal leaders from local districts. The CSU's goal is to increase the percentage of Native Americans eligible for college, which is among the lowest of any underserved community. To stay engaged, the CSU participates every year at several conferences including:

- The National Congress of American Indians
- The California Indian Education conference
- The National Conference on Racial Ethnicity
- Northern California Tribal Leaders Summit

CSU Asian Pacific Islander Initiative

The CSU held a town hall meeting with members of the Vietnamese community to develop ways to increase access to college, as well as to identify issues unique to Vietnamese students. The discussion centered on how to integrate cultural awareness into the CSU's curriculum. Individual campuses are conducting follow-up activities with the Vietnamese community to develop and sustain relationships. More recently, President Mildred Garcia at CSU Dominguez Hills initiated and brought to the forefront representatives from the Filipino and American Samoan communities in Carson.

The CSU supported AB37 (Furutani). This bill allows the CSU to confer an honorary degree upon each person, living or deceased, who was forced to leave his or her postsecondary studies as a result of federal Executive Order 9066, which caused the incarceration of individuals of Japanese ancestry during World War II.

In addition, the CSU's How to Get to College poster is available in Chinese, Korean, Tagalog, Hmong and Vietnamese so that native speakers can be informed and help their children prepare for the university.

CSU Latino Initiative

The CSU is actively involved with the following Latino organizations:

HACU

The Hispanic Association of Colleges and Universities is a national group with strong relationships in Washington, D.C. The CSU's engagement with HACU has produced federal dollars for several of its universities designated as Hispanic Serving Institutions (HSI). The CSU is by far the largest system in HACU with 12 HSI and 8 associate members.

The CSU participates at the annual conference in October and at the legislative conference in March (in Washington, D.C.). As a result of its presence five years ago, the CSU persuaded HACU to open a West Coast office in Sacramento. CSU Fullerton President Milton Gordon was named chair of the HACU Governing Board in October 2008.

PIQE

The CSU has partnered with the Parent Institute for Quality Education (PIQE), an organization that teaches parents how to help their children prepare for college. This is a nine-week parental involvement program that is intended to help parents create a home learning environment, navigate the school system, collaborate with teachers, counselors and principals, encourage college attendance; and support a child's emotional and social development. The program culminates with a graduation ceremony for parents who complete the course. The PIQE program works in partnership with all 23 CSU campuses and reaches over 120 middle schools where the parent training classes are conducted.

The course content is customizable for each parent and includes curriculum such as home/school collaboration, motivation and self-esteem, communication and discipline, drugs and gang awareness, and college and career election.

Déjà Huella: Educate

CSU Dominguez Hills hosted *Déjà Huella: Educate*, coordinated by Univision and over 60 community partners, to reach out to Latino parents to inform them on how they can help their children learn. The program was conducted in Spanish and attracted almost 20,000 parents and students in 2009. The success of the *Déjà Huella: Educate* program will be replicated in October 2010 at CSU Dominguez Hills in hopes of attracting 30,000 attendees. The CSU is a major sponsor along with Univision, Chivas USA, the Los Angeles Chamber of Commerce and most of the CSU's Latino partners.

Es el Momento

This is a three-year project conducted in collaboration with Univision that focuses on disseminating the message of academic preparation, high school graduation, and university education. The project, funded by the Bill and Melinda Gates Foundation, was developed after research and recommendations from a Univision Education Initiative Advisory Committee. The committee included a CSU representative and two Latino partners, PIQE and Alliance for a Better Community (ABC). The project will reach the Latino community via television, radio and social networks.

AAHHE

The American Association of Hispanics in Higher Education is in its third year and the CSU has been a partner since its inception. This organization is the largest meeting of Hispanic PhDs as they attract over 600 participants that include faculty, staff and administrators. CSU presidents, trustees and staff have historically attended.

The CSU Engineering Initiative

This initiative brings the Science, Technology, Engineering and Math (STEM) issue, as it relates to the underrepresented, to the engineering deans. This is accomplished by campus connections with underrepresented organizations including:

- The Mexican American Engineers in Science (MAES)
- The Society of Hispanic Professional Engineers (SHPE)
- The Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)

Appendix F: CSU Centers and Institutes

Table 4. Centers and Institutes—Agriculture

Campus	Entity Name
Chico	Agribusiness Institute
	Agricultural Teaching and Research Center (ATRC)
Fresno	The California Agricultural Technology Institute (CATI)
	Center for Agricultural Business (CAB)
	Viticulture and Enology Research Center
Pomona	AGRIscape
	Center for Turf, Landscape and Irrigation Technology (CTILT)
San Luis Obispo	Agricultural Safety Institute (INACTIVE)
	Brock Center for Agricultural Communication
	Dairy Products Technology Center
	Irrigation Training and Research Center

Table 5. Centers and Institutes—Biotechnology

Campus	Entity Name
Fullerton	Center for Applied Biotechnology Studies
	Institute for Molecular Biology & Nutrition
San Diego	California State University Program for Education and Research in Biotechnology (CSUPERB)
	Microchemical Core Facility (MCF)
San José	Biotechnology Education and Research Institute

Table 6. Centers and Institutes—Criminal Justice

Campus	Entity Name
Long Beach	Center for Criminal Justice Research and Training
Los Angeles	California Forensic Science Institute
San Bernardino	Center for Criminal Justice Research
	Center for the Study of Hate and Extremism
San José	Bureau of Administration of Justice

Table 7. Centers and Institutes—Engineering

Campus	Entity Name
Dominguez Hills	OSHA Training Institute
Humboldt	Schatz Energy Research Center
Long Beach	Center for Excellence in Construction
	Center for Advanced Logistics Management Systems (CALMS)
Los Angeles	Center for Spatial Analysis and Remote Sensing
Northridge	Interdisciplinary Materials Science Research Center (with Science and Mathematics)
Pomona	Center for Light Education and Applied Research
	Engineering Institute
	Maximizing Engineering Potential
San Diego	Concrete Research Institute
	Energy Engineering Institute
	San Diego Center for Materials Research
San Francisco	Engineering Design Center
	Industrial Assessment Center
	Center for Computing for Life Sciences
San José	Materials Characterization and Metrology Center
San Luis Obispo	Cal Poly National Pool Industry Research Center
	Center for Sustainability in Engineering
	Electric Power Institute
	Renewable Energy Institute

Table 8. Centers and Institutes—Education

Campus	Entity Name
Bakersfield	Center for Economic Education and Research
	Center for the Osher Lifelong Learning
Channel Islands	Osher Lifelong Learning Institute
Chico	Center for Bilingual/Multicultural Studies
	Center for Mathematics and Science Education
	Center for Regional and Continuing Education (RCE)
	Center for the Study of Computers in Education
	Northern California Local Government Leadership Institute (LGLI)
	Reading Center
	Religion and Public Education Resource Center (RPERC)

Campus	Entity Name
Dominguez Hills	Center for the Advancement of Diversity in Science and Mathematics
	Center for History and Social Science Education
	Center for Learning and Academic Support Services
	Center for Mathematics and Science Education
	Center for Teaching Careers
	Center for Training and Development
	Infant-Toddler Development Center
	Osher Lifelong Learning Institute
East Bay	Center for Economic Education (CEE)
	Walter J. McHugh Reading and Curriculum Resource Center
Fresno	Bonner Center for Character Education and Citizenship
	California Mini-Corps
	California Reading and Literature Project Fresno/Central Valley Region
	Center for Research, Evaluation, Assessment and Dissemination (CREAD)
	Central Valley Educational Leadership Institute (CVELI)
	Central Valley Science Project (CVSP)
	San Joaquin Valley Mathematics Project (SJVMP)
	San Joaquin Valley Writing Project (SJVWP)
	Science and Math Education Center
	Center for Economic Research and Education of Central California
	Institute for International Credentials Evaluation
Fullerton	Center for Children Who Stutter
	Community Learning and Literacy Center
	Center for Excellence in Science & Mathematics Education
	Center for the Advancement of Teaching and Learning in Mathematics
	Center for Economic Education
	Center for Research in Educational Access and Leadership
	Community Learning and Literacy Center
Humboldt	Center for Educational Excellence, Collaboration and Inquiry
	Humboldt Science and Mathematics Center
Long Beach	Center for the Advancement of Philosophy in the Schools
	Center for Collaboration in Education
	Center for Disability Studies and Scholarship
Los Angeles	Center for Language Minority Education and Research
	Center for Excellence in Early Intervention
	Center for Technology Education
Maritime Academy	Academic Enrichment Program

Campus	Entity Name
Northridge	Institute for the Advancement of Educational Studies and Programs (College Umbrella)
	Center for Partnerships for Educational Reform
	Center for Research and Innovation in Elementary Education
	Center for Professional Development and Educational Outreach
	Special Education Institute for Research, Innovation and Teaching (SPIRIT)
	Center for Achievement for Adaptive Physical Activity and Therapeutic Exercise
Pomona	Center for Education and Equity in Mathematics, Science & Technology
Sacramento	Cross-Cultural Resource Center
	Center for Mathematics and Science Education (MASE)
	Center for Higher Education Leadership and Policy Studies
	Center for Interdisciplinary Molecular Education, Research and Advancement
San Bernardino	Learning Research Institute
	California Council on Economic Education (CCEE)
	Center for Equity in Education
	Center for the Enhancement of Mathematics Education
San Bernardino	Center for the Study of Correctional Education
	Watson & Associates Literacy Center
	The Center for Teaching English Learners
San Diego	Center for International Business Education and Research (CIBER)
	National Center for the Study of Children's Literature (NCSCL)
	National Language Resource Center/Language Acquisition Resource Center (LARC)
	International Institute for the Commercialization of Biomedical Innovation (IICBI)
	International Technology and Trade Network (ITTN)
	Center for the Study of Personal Financial Planning (CSPFP)
	Center for Educational Leadership, Innovation, and Policy
	Center for Equity and Biliteracy Education Research (CEBER)
	Interwork Institute
	Center for Learning, Instruction, and Performance Technologies
	Pre-College Institute (PCI)
	Qualcomm Institute for Innovation and Educational Success
	Center for Social Equity Technical Assistance
	Center for the Study of International Education
	Center for Research in Mathematics and Science Education (CRMSE)

Campus	Entity Name
San Francisco	Center for Early Care and Education, Professional Development and Research (Children's Campus)
	California Research Institute on the Inclusion of Students with Significant Disabilities
	Center for Adult Education
	Center For Integration and Improvement of Journalism
	Center for Modern Greek Studies
	American Poetry Center/Archive
	Institute for Civic & Community Engagement
San José	Center for Educational Research on Dyslexia
San Luis Obispo	California Center for Construction Education
	Central Coast Center for Arts Education
	Collaborative-Agent Design (CAD) Research Center
	University Center for Excellence in Math and Science Education

Table 9. Centers and Institutes—Entertainment

Campus	Entity Name
Northridge	Entertainment Industry Institute (EII)

Table 10. Centers and Institutes—Energy

Campus	Entity Name
Humboldt	Schatz Energy Research Center
Northridge	Energy Research Center
Sacramento	California Smart Grid Center
San Diego	Energy Engineering Institute
	Center for Energy Studies
San Luis Obispo	Electric Power Institute
	Renewable Energy Institute

Table 11. Centers and Institutes—Environment

Campus	Entity Name
Bakersfield	Center for Environmental Studies (Facility for Animal Care and Treatment)
Chico	Center for Ecosystem Research (CER)
Dominguez Hills	Center for Urban Environmental Research (CUER)
Fresno	California Water Institute (CWI)
Fullerton	California Desert Studies Center
	Southern California Marine Institute
	Institute for Economics & Environmental Studies
	The South Central Coastal Information Center
	Tucker Wildlife Sanctuary
Humboldt	Institute for Redwood Ecology
	The Klamath Watershed Institute
	Northern California Institute of Marine Sciences
	Schatz Energy Research Center
	Institute for Spatial Analysis
Monterey Bay	Watershed Institute
	Institute for Global Learning
Northridge	Energy Research Center
	Center for the Study of Biodiversity
Pomona	John T. Lyle Center for Regenerative Studies
Sacramento	Center for Regional Environmental Science and Technology
San Bernardino	Palm Springs Institute for Environmental Sustainability
San Diego	Southwest Consortium for Environmental Research and Policy (SCERP)
	Coastal and Marine Institute
	Field Station Programs
	Center for Inland Waters
San José	Center for Development of Recycling
San Luis Obispo	Coastal Resource Institute
	Urban Forest Ecosystems Institute
	Center for Coastal Marine Sciences
Stanislaus	Endangered Species Recovery Program (ESRP)

Table 12. Centers and Institutes—Health

Campus	Entity Name
Bakersfield	Public Service Institute
	Nursing Center for the Advancement of Research/Evaluation
Chico	Center for Nutrition and Activity Promotion
Dominguez Hills	Center for Orthotics and Prosthetics
East Bay	Institute for Mental Health and Wellness
Fresno	Central California Center for Excellence in Nursing (CCEN)
	Central California Center for Health and Human Services (CCCHHS)
	Central California Children's Institute
	Central Valley Health Policy Institute
	Central California Institute for Healthy Aging
	Health Careers Opportunity Program (HCOP)
Fullerton	Center for the Study of Economics of Aging and Health
	Center for the Advancement of Responsible Youth Sport
	Sport and Movement Institute
	Center for Cancer Disparities Research
	Center for the Promotion of Healthy Lifestyles and Obesity Prevention
	Fibromyalgia Research and Education Center
	CSUF Institute of Gerontology
Long Beach	Center for Behavioral Research and Services
	Center for Career Studies
	Center for Health Care Innovation
	Center for Latino Community Health, Evaluation and Leadership Training
	Kinesiotherapy Center at Community Hospital of Long Beach
	Movement Science Laboratories
Los Angeles	Applied Gerontology Institute
	Institute of Nursing
Northridge	Valley Trauma Center
	Institute for Health and Human Development (College Umbrella)
	Marilyn Magaram Center for Food Science, Nutrition and Dietetics
	Center for Achievement for Adaptive Physical Activity and Therapeutic Exercise
	Center for the Study of Leisure and Play Behavior
	Center for Health Ethics and Policy
	Center for Health Research and Community Service
	Physical Therapy Center for Advanced Clinical Practice (PTCACP)
	Center for Cancer and Developmental Biology
Sacramento	Center for Health & Human Services Research
San Bernardino	Center for the Promotion of Health Disparities Research and Training

Campus	Entity Name
San Diego	International Institute for the Commercialization of Biomedical Innovation (IICBI)
	Center for Behavioral and Community Health Studies (BACH)
	Center for Behavioral Epidemiology and Community Health
	California Distance Learning Health Network (CDLHN)
	Communications Clinic for Speech, Language, Hearing Disorders and Deafness
	Heart Institute
	Institute for Nursing Research
	June Burnett Institute for Children, Youth and Families
	The California PARENT Center
	Institute for Public Health
	Center for Public Health Security
	Institute for Public Security and Health (IPSH)
	Center for Optimal Health and Performance (COHP)
	Center for Behavioral and Community Health Studies (BACH)
	Center for Behavioral Teratology (CBT)
	Heart Institute
San Francisco	Health, Mobility & Safety Lab
	Institute for Holistic Healing
	Health Equity Institute
	Institute on Disability
	Institute on Gerontology
San José	Center for Human Services Development
	Institute for Nursing Research & Practice

Table 13. Centers and Institutes—Marine

Campus	Entity Name
Fullerton	Southern California Marine Institute
Humboldt	Northern California Institute of Marine Sciences
Monterey Bay	Seafloor Mapping Lab
San Luis Obispo	Center for Coastal Marine Sciences

Table 14. Centers and Institutes—Security

Campus	Entity Name
Fullerton	Forum for Advanced Security Technologies (FAST)
Pomona	Center for Information Assurance
San Bernardino	Information Assurance and Security Management Center
San Diego	Institute for International Security and Conflict Resolution (IISCOR)
	Institute for Public Security and Health (IPSH)
	Visualization Center

Table 15. Centers and Institutes—Social Science

Campus	Entity Name
Dominguez Hills	African American Political and Economic Institute
	Center for History and Social Science
	Institute for the Study of Cultural Diversity and Internationalization
	Multicultural Center
	Urban Community Research Center
Fresno	Central California Social Welfare, Evaluation, Research and Training Center (SWERT)
	Social Science Research Laboratory
Fullerton	Center for Demographic Research
	Center for Ethnographic Cultural Analysis
	Center for Insurance Studies
	Center for Oral and Public History
	Center for Public Policy
	Center for Study of Emerging Markets
	Decision Research Center
	Developmental Research Center
	Gianneschi Center for Nonprofit Research
	Twin Studies Center
	Social Science Research Center
Humboldt	Center for Applied Social Analysis and Education California Center for Rural Policy Institute for Spatial Analysis
Long Beach	Institute for Integrated Research in Materials, Environments, and Society
Northridge	Valley Trauma Center
	Institute for Social and Behavioral Sciences (College Umbrella)

Campus	Entity Name
Sacramento	Institute for Social Research
San Bernardino	Institute for Child Development and Family Relations
	University Center for Developmental Disabilities
San Diego	Center for Qualitative Research
	Social Science Research Laboratory (SSRL)
	Center for Alcohol and other Drug Studies and Services
San Francisco	The Confucius Institute
	Center for Research on Gender and Sexuality
	National Sexuality Resource Center
	Center for U.S.-China Policy Studies
	Ohrenschall Center for Entrepreneurship
	Center for Electronic Business
	Cesar Chavez Institute
	Public Research Institute
	Pacific Leadership Institute

Table 16. Centers and Institutes—Transportation

Campus	Entity Name
Long Beach	James Ackerman Center for the Commercial Deployment of Transportation Technologies
	Center for International Trade and Transportation
San Bernardino	Leonard Transportation Center
San Francisco	Marian Wright Edelman Institute
San José	IISTPS—Norman Y. Mineta International Institute for Surface Transportation Studies

Table 17. Centers and Institutes—Water

Campus	Entity Name
Fresno	California Water Institute (CWI)
	International Center for Water Technology (ICWT)
	Center for Irrigation Technology (CIT)
Fullerton	Southern California Marine Institute
	National Center for Water Hazard Mitigation
Humboldt	The Klamath Watershed Institute
Monterey Bay	Watershed Institute
Sacramento	Office of Water Programs
San Bernardino	Water Resources Institute
San Diego	Center for Inland Waters
San Francisco	Romberg Tiburon Center for Environmental Studies
	San Francisco Bay National Estuarine Research Reserve
San Luis Obispo	Irrigation Training and Research Center

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CAPITAL PLANNING, DESIGN AND CONSTRUCTION
SECTION II - PHYSICAL MASTER PLAN AND OFF-CAMPUS CENTERS
SECTIONS 9007- 9014

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9007 DEVELOPMENT OF PHYSICAL MASTER PLAN

The Board of Trustees has long recognized the importance of each campus developing a Physical Master Plan, in concert with the campus consulting master plan architect and members of the community in which the campus is located. The Board requires that every campus have a master plan, showing existing and anticipated facilities necessary to accommodate a specified enrollment at an estimated target date, in accordance with approved educational policies and objectives. Each campus master plan reflects the ultimate physical requirements of academic programs and auxiliary activities.

In developing the Physical Master Plan, the campus and the consulting master plan architect are concerned with:

1. A schedule for the major goals of the Academic Master Plan.
2. A statement of the major goals of the Physical Master Plan.
3. A definition of the land including site title clearance (see Section III, 9017.03), physical facilities, landscaping, and other improvements required
4. The arrangement of all physical improvements on the land available and on proposed land acquisitions.
5. A schedule for implementing each major segment of the Physical Master Plan.
6. A definition of the architectural vocabulary as it relates to continuity or consistency of style, form, structure, and materials.
7. A cost estimate, by significant steps of development, for implementing the plan identifying state and nonstate funds.
8. An evaluation of alternate solutions.
9. Compliance with the California Environmental Quality Act (CEQA).

9008 PRESENTATION OF ORIGINAL PHYSICAL MASTER PLAN TO BOARD OF TRUSTEES FOR APPROVAL

After approval by the campus, the initial Physical Master Plan is submitted to CPDC in the chancellor's office for review and scheduling of its presentation to the Board of Trustees Committee on Campus Planning, Buildings and Grounds.

The presentation is made to the Board by the assistant vice chancellor of CPDC. Both the graphic and the oral components of the presentation must be clear and concise. Graphics must include slides of renderings or models. Other appropriate graphics are optional. The Boards Committee on Campus Planning, Buildings and Grounds recommendations are proposed for adoption by the full Board.

If the Physical Master Plan is not approved at the presentation, appropriate review, modifications, or changes must be made and it must be re-presented to CPDC and the Board until approval is obtained.

9009 SUBSEQUENT REVIEWS OF PHYSICAL MASTER PLAN

It is the policy of the Board of Trustees that master planning is a continuing process that does not end with approval of the original Physical Master Plan or with approval of any subsequent revisions to the plan. Modifications to the plan will be required to meet new conditions. Periodically, but not less than every three years, each campus shall re-evaluate the Physical Master Plan and shall submit a written summary report of the reevaluation to CPDC. Should the reevaluation result in major changes to the Physical Master Plan, the campus shall, in addition to submission to the summary report, prepare a statement of changes (written or graphic) and recommendations to be included in the printed agenda as an item for approval by the Board of Trustees. Authority has been delegated to the chancellor to approve minor revisions to the campus master plans, which were initially approved by the Board of Trustees. This delegation requires that the definition of minor revisions and the approval process for their implementation be disseminated through Executive Order. The purpose of the Executive Order is to comply with that directive.

All requests for minor or major master plan revisions should be addressed to the assistant vice chancellor, CPDC, and must include appropriate documentation as defined, required, and promulgated through coded memoranda and SUAM. Any approved master plan revision shall be subsequently incorporated in the campus physical master plan document maps.

9010 DEFINITION OF MINOR MASTER PLAN REVISION

Reference: Executive Order No. 630, February 1, 1995

A minor revision to the approved campus master plan is defined as follows:

1. A modification to the configuration of a future or existing building footprint (exterior building line at ground level).
2. A siting of a new capital outlay project provided the planned facility is consistent with the adopted campus architectural vocabulary and is not architecturally significant.
3. A siting of a relocatable and/or temporary facility.
4. A relocation of a maximum of three approved but yet to be constructed facilities to a more advantageous site, provided the overall utilization of the campus land area is not increased or the amount of open space decreased.
5. A vertical addition to an existing or yet to be constructed facility provided the addition is not determined to be architecturally significant; and
6. Other criteria and parameters as the Board of Trustees may from time to time adopt through its standing orders or by resolution.

9011 APPROVAL PROCEDURE FOR MINOR MASTER PLAN REVISION

Authority to approve minor master plan revisions as defined above has been delegated to the assistant vice chancellor, CPDC, to whom the request should be addressed. The following information should be included with the request:

1. A narrative description of the existing circumstance, the rationale for the proposed change, square footage of the proposal, and intended uses of the facility.
2. A discussion of any secondary effects the proposed change will have or require.
3. A need assessment, i.e., why it is necessary to implement the proposed minor revision at this time.
4. A fiscal analysis, i.e., what is the cost in terms of initial capital outlay and ongoing physical plant maintenance of the proposed minor revision, the intended preliminary planning (P) and working (W) drawings, construction (C), and equipment (E) build-out schedule, and proposed year for capital outlay program inclusion.
5. A master plan graphic that shows both the existing circumstance and the proposed minor revision. The area of facility proposed for changes should be identified clearly by a number inside a hexagon.
6. A statement by the campus proposing recommended action for compliance with the California Environmental Quality Act.
7. A summary of other minor master plan revisions that may have been approved previously by the chancellor's office, said summary to demonstrate that the current proposal, when added to its predecessor, does not accumulatively go over $15,000,000 in total value of minor master plan revisions for the campus.
8. A letter from the campus consulting master plan architect concurring with the proposed minor revision The assistant vice chancellor, CPDC will advise the campus president in writing when the item has been approved or denied, or if additional information is needed. Once approved, the revision will be incorporated into the approved master plan document maps.
9. Certification from the Land Use and Environmental Review section of CPDC that site title is clear, if applicable. (See Section III, 9017.03.)

9012 DEFINITION OF MAJOR MASTER PLAN REVISION

Reference: Executive Order No. 630, February 1, 1995

A major master plan revision is defined as:

- A project that is architecturally significant, as determined by the assistant vice chancellor, CPDC.
- A revision that changes more than three sites or land uses on the approved master plan.
- Other criteria and parameters as the Board of Trustees may from time to time adopt through its standing orders or by resolution.

9013 APPROVAL PROCEDURE FOR MAJOR MASTER PLAN REVISION

Each campus may request consideration by the Board of Trustees of one major master plan revision each calendar year. However, this request may include multiple revisions to the campus physical master plan. The Trustees, upon recommendation of the chancellor, may grant an exception to the single item per year limitation when warranted by emergency or when donor-sponsored capital projects require earlier consideration.

Requests for obtaining approval of a major master plan revision require the same level of documentation as for a minor revision (see 9011). The timing of submissions of master plan revisions to the Board of Trustees may depend upon the urgency of the project. If it involves a project for which schematic plan approval is pending, the approval of the master plan by the Trustees may precede the schematic plan presentation.

The Physical Master Plan to be reevaluated must be updated to include all existing (including temporary) and proposed facilities and submitted to CPDC. The facilities shall be numbered on the Physical Master Plan according to the numbers reported in the Space and Facilities Data Base. Special efforts must be made to reflect accurately the contemplated size of structures and FTE capacity included in the latest five-year program. In addition, the cost estimated for long-range development must be updated and include the difference in capital costs. A statement of the changes and recommendations, including the results of the consultative process between the campus and the community in the development and use of the area surrounding the campus, also must be prepared in advance by the campus and the consulting architect and submitted to CPDC. This statement will be included in the printed agenda for the Board of Trustees. CPDC also will review all proposed revisions for compliance with the California Environmental Quality Act.

9014 POLICIES AND CRITERIA FOR ESTABLISHMENT OF OFF-CAMPUS CENTERS

The establishment of a new off-campus center by a CSU campus shall be considered only when certain procedures are undertaken, as provided in Executive Order No. 720 at http://www.calstate.edu/EO/EO-720.pdf, issued January 11, 2000. The Executive Order defines the process for seeking approval of two different levels of off-campus centers; those up to 500 FTE, for which the Chancellor is delegated approval authority, and permanent centers that serve more than 500 FTE, which require the Board of Trustees approval.

The procedures require consideration of factors related to academic programs and resources, enrollment planning, as well as budgetary and physical planning issues.

Proposals must be presented to the Chancellor for evaluation prior to taking steps or making commitments for implementation of new centers or significant expansion of existing off-campus programs and facilities.

APPENDIX F3.2

F3.2

Air Quality Technical Memorandum
Scientific Resources Associated (January 10, 2011)

Scientific Resources Associated
1328 Kaimalino Lane
San Diego, CA 92109

To:	Michael Haberkorn Gatzke, Dillon, and Ballance	**From:**	Valorie Thompson
Re:	Plaza Linda Verde Air Quality Analysis	**Date:**	January 10, 2011

This technical memorandum addresses comments received on the Plaza Linda Verde Draft Environmental Impact Report.

One of the comments received addressed potential traffic impacts associated with the Existing Plus Project scenario. The Traffic Impact Analysis has included an additional scenario to address the potential impacts associated with the Existing plus Project scenario. The Existing plus Project scenario addresses traffic impacts from the existing conditions plus project-related traffic without considering cumulative traffic contributions.

Projects that involve traffic impacts may have the potential for CO "hot spots" to occur (i.e., high concentrations of CO at intersections). As discussed in the Air Quality Technical Report (SRA 2010), intersections that could operate at LOS E or worse would have to potential to experience CO "hot spots". The Traffic Impact Analysis for the Existing plus Project scenario identified four intersections that would operate at LOS E or worse. Those intersections are the following:

- College Avenue and Eastbound I-8 Ramps (am peak hour)
- College Avenue and Canyon Crest (pm peak hour)
- College Avenue and Zura Way (am hour)
- College Avenue/El Cajon Boulevard (pm peak hour)

All of the four intersections identified above were modeled to evaluate the potential for CO "hot spots" in the Air Quality Technical Report. The CO concentrations at these intersections were below the significance thresholds.

Because the traffic volumes modeled in the Existing plus Project scenario do not include cumulative projects, traffic volumes at these intersections are lower for the Existing plus Project scenario than for the Near Term with Project scenario that was evaluated in the Air Quality Technical Report. CO concentrations would therefore also be lower under the Existing plus Project scenario than under the Near Term with Project scenario. Impacts would therefore be lower than evaluated in the Air Quality Technical Report, and would be less than significant.

F3.2

Air Quality Technical Report for Plaza Linda Verde,
San Diego State University
Scientific Resources Associated (March 4, 2011)

Air Quality Technical Report

for

Plaza Linda Verde
San Diego State University

Submitted To:

Gatzke, Dillon and Balance LLP
1525 Faraday Avenue
Suite 150
Carlsbad, California 92008

Prepared By:

sra
Scientific Resources Associated
1328 Kaimalino Lane
San Diego, CA 92109

~~June 2, 2010~~March 4, 2011

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Glossary of Terms and Acronyms

APCD	Air Pollution Control District
AQIA	Air Quality Impact Assessment
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
BACM	Best Available Control Measure
BACT	Best Available Control Technology
BMPs	Best Management Practices
CAA	Clean Air Act (Federal)
CAAQS	California Ambient Air Quality Standard
CALINE4	California Line Source Dispersion Model (Version 4)
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CO	Carbon Monoxide
EPA	United States Environmental Protection Agency
H_2S	Hydrogen Sulfide
HARP	HotSpots Analysis and Reporting Program
HI	Hazard Index
ISCST	Industrial Source Complex Short Term Model
mg/m^3	Milligrams per Cubic Meter
$\mu g/m^3$	Micrograms per Cubic Meter
NAAQS	National Ambient Air Quality Standard
NOx	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
O_3	Ozone
$PM_{2.5}$	Fine Particulate Matter (particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10}	Respirable Particulate Matter (particulate matter with an aerodynamic diameter of 10 microns or less
ppm	Parts per million
PSD	Prevention of Significant Deterioration
RAQS	San Diego County Regional Air Quality Strategy
ROCs	Reactive Organic Compounds
ROG	Reactive Organic Gases
SANDAG	San Diego Association of Governments
SCAQMD	South Coast Air Quality Management District
SCAB	South Coast Air Basin
SDAB	San Diego Air Basin
SDAPCD	San Diego County Air Pollution Control District
SIP	State Implementation Plan
SOx	Oxides of Sulfur
SO_2	Sulfur Dioxide
TACs	Toxic Air Contaminants

T-BACT	Toxics Best Available Control Technology
VOCs	Volatile Organic Compounds

1.0 Introduction

This report presents an assessment of potential air quality impacts associated with the Plaza Linda Verde Project at San Diego State University. The evaluation addresses the potential for air quality impacts during construction and after full buildout of the project.

The SDSU Plaza Linda Verde Project (the Project) involves development of a mixed-use development that would provide additional student housing and retail uses south of the SDSU Transit Center and Aztec Walk in the San Diego College Area community. The Project would be developed in multiple phases, and at project buildout would include approximately 400 apartments to house approximately 1,600 students, with approximately 90,000 square feet of retail space. Two options are under consideration for development of the retail space: University/Community-Serving Retail, which would provide retail services focused primarily towards the university community but also would serve the surrounding residential community; and University-Service Retail, which would provide retail services focused exclusively on SDSU students, faculty, and staff. The Project will also include a five-story above grade parking structure to accommodate approximately 560 vehicles, a Campus Green that will feature both active and passive recreation areas for public use, and pedestrian malls in place of existing streets/alleys. The Project would require demolition of existing structures to allow for project construction and a revision to the SDSU Campus Master Plan boundary.

The Project will be designed as a pedestrian/bicycle friendly, open-air, sustainable urban village that will utilize "green" building practices, drought-tolerant landscaping, and other environmentally sustainable measures. CSU/SDSU will seek Leadership in Energy and Environmental Design (LEED) certification for the Project. To facilitate development of the Project, the existing southern boundary of the SDSU Campus Master Plan between 55th Street and one block east of College Avenue would be extended south to Montezuma Road to incorporate the proposed Project parcels within the Campus Master Plan boundaries. The Project includes five land use types: (1) Mixed-Use Retail/Student Housing; (2) Student Apartments; (3) Parking Structure; (4) Campus Green; and (5) Pedestrian Malls. Each of the developments is described in detail below.

Mixed-Use Retail/Student Housing. This Project component, which would be developed in two phases, consists of the construction of ground-floor retail and upper-floor residential buildings on sites located south of Hardy Avenue, north of Montezuma Road, and west and east of College Avenue immediately south of the main SDSU campus. Phase I would consist of the construction of two buildings west of College Avenue. Building 1 would include approximately 25,000 gross square feet (GSF) of ground-floor retail space and four floors of apartments consisting of approximately 90 student apartments for a total of 120,000 GSF. Building 2 would include approximately 20,000 GSF of retail space and four floors of apartments consisting of 60 student apartments for a total of 85,000 GSF.

Phase II would consist of the construction of two buildings east of College Avenue, directly across from Buildings 1 and 2. The development plan for Buildings 4 and 5 would be similar to that for Buildings 1 and 2. Building 4 would include approximately 20,000 GSF of retail space and 60 student apartments for a total of 120,000 GSF. Building 5 would include approximately 23,000 GSF of retail space and 90 student apartments for a total of 150,000 GSF.

Student Apartments. This Project component, which would be developed in Phase II, would consist of two buildings to be located north of Montezuma Road, west of Campanile Road, and south of Lindo Paseo, and one building to be located north of Montezuma Road west of Montezuma Place. The Student Apartments component would provide two 4-story buildings approximately 60,000 GSF in size with 50 student apartments each.

Parking Facilities. A parking structure which would be developed in Phase I, would be located north of Lindo Paseo and west of the Mixed-Use Retail/Student Housing Building 1 at the northwest corner of Lindo Paseo and Montezuma Place. The parking structure would be five stories above grade and would provide five levels of above ground parking and one level of below ground parking. The eastern portion of the parking structure would feature 2,000 GSF of ground-floor retail space.

In Phase II, an underground parking facility would be constructed below, and in conjunction with, Buildings 4 and 5 in the Mixed-Use Retail/Student Housing development.

Campus Green. This Project component, which would be developed in Phase I, would be located north of the proposed Mixed-Use Retail/Student Housing Building 1 and would be bisected by a public promenade. This "campus green" area would feature both active and passive recreation areas for public use.

Pedestrian Malls. This project component would be ancillary to the Mixed Use Retail/Student Housing and would not be essential to the development of the overall project site. The pedestrian malls would be developed primarily along portions of the existing Montezuma Place and the alley east of proposed Buildings 4 and 5 between Montezuma Road and College Avenue. The areas would be designed as pedestrian/bicycle-friendly, open-air spaces that would provide access to both existing uses, such as the transit center, and to the future buildings. The development of the pedestrian malls is contingent upon vacation of existing streets and alleys, and if not approved, the project would proceed without this element.

As discussed above, construction of the proposed Project would occur in multiple phases. Phase I demolition of existing structures is anticipated to begin in early 2011, with construction commencing in the summer of 2011. Occupancy of the buildings will occur some time in 2013. Phase II demolition and construction is anticipated to begin in 2013, with occupancy projected for 2015.

This Air Quality Technical Report includes an evaluation of existing conditions in the project vicinity, an assessment of potential impacts associated with project construction, and an evaluation of project operational impacts.

Methodology. The methodology for preparing the impact analysis involved identifying existing conditions, including background ambient air quality levels. To gauge the potential significance of air quality impacts associated with the proposed project, emissions associated with both construction and operation of the proposed project were estimated and compared with applicable air quality significance thresholds. Emissions attributable to both construction activities and project operation were calculated using the URBEMIS2007 model. To evaluate the potential for impacts associated with project-generated traffic, emissions associated with vehicles were estimated, and air dispersion modeling was conducted to estimate ground-level concentrations attributable to traffic. The concentrations, together with existing background air quality levels, were measured against applicable air quality standards.

2.0 Existing Conditions

The SDSU Campus is located in central San Diego, south of Interstate 8 at College Avenue. The campus is located in the San Diego Air Basin (SDAB). The following section provides information about the existing air quality regulatory framework, climate, air pollutants and sources, and sensitive receptors in the project area.

2.1 Regulatory Framework

2.1.1 Federal Regulations

Air quality is defined by ambient air concentrations of specific pollutants identified by the United States Environmental Protection Agency (EPA) to be of concern with respect to health and welfare of the general public. The EPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the EPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the EPA established both primary and secondary standards for seven pollutants (called "criteria" pollutants). The seven pollutants regulated under the NAAQS are as follows: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), respirable particulate matter (or particulate matter with an aerodynamic diameter of 10 microns or less, PM_{10}), fine particulate matter (or particulate matter with an aerodynamic diameter of 2.5 microns or less, $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect property and the public welfare from air pollutants in the atmosphere. Areas that do not meet the NAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant. On April 15, 2004, the San Diego Air Basin (SDAB) was designated a basic nonattainment area for the 8-hour NAAQS for O_3. The SDAB is in attainment for the NAAQS for all other criteria pollutants.

The following specific descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on EPA (EPA 2007a) and the California Air Resources Board (ARB) (ARB 2005).

Ozone. O_3 is considered a photochemical oxidant, which is a chemical that is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NOx), both by-products of combustion, react in the presence of ultraviolet light. O_3 is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to O_3.

Carbon Monoxide. CO is a product of combustion, and the main source of CO in the SDAB is from motor vehicle exhaust. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease, and can also affect mental alertness and vision.

Nitrogen Dioxide. NO_2 is also a by-product of fuel combustion, and is formed both directly as a product of combustion and in the atmosphere through the reaction of nitrogen oxide (NO) with oxygen. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, refers to particulate matter with an aerodynamic diameter of

2.5 microns or less. Particulate matter in this size range has been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM_{10} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, combustion, tire and brake wear, construction operations and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. $PM_{2.5}$ is considered to have the potential to lodge deeper in the lungs.

Sulfur dioxide. SO_2 is a colorless, reactive gas that is produced from the burning of sulfur-containing fuels such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Pb in the atmosphere occurs as particulate matter. Pb has historically been emitted from vehicles combusting leaded gasoline, as well as from industrial sources. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Pb has the potential to cause gastrointestinal, central nervous system, kidney and blood diseases upon prolonged exposure. Pb is also classified as a probable human carcinogen.

Volatile Organic Compounds. While the EPA has not set ambient air quality standards for volatile organic compounds (VOCs), VOCs are considered ozone precursors as they react in the atmosphere to form O_3. Accordingly, VOCs are regulated through limitations on VOC emissions from solvents, paints, processes, and other sources.

Hazardous Air Pollutants. Also referred to as toxic air contaminants (TACs), HAPs are pollutants that are known or suspected to result in adverse health effects upon exposure through inhalation or other exposure routes. HAPs from stationary sources are regulated through the federal National Emission Standards for Hazardous Air Pollutants (NESHAPS) program. HAPs from mobile sources such as vehicles and off-road equipment are regulated through emission standards implemented by the EPA and/or state regulatory agencies.

2.1.2 State and Local Regulations

California Clean Air Act. The California Clean Air Act was signed into law on September 30, 1988, and became effective on January 1, 1989. The Act requires that local air districts implement regulations to reduce emissions from mobile sources through the adoption and enforcement of transportation control measures. The California Clean Air Act required the SDAB to achieve a five percent annual reduction in ozone precursor emissions from 1987 until the standards are attained. If this reduction cannot be achieved, all feasible control measures must be implemented. Furthermore, the California Clean Air Act required local air districts to implement a Best Available Control Technology rule and to require emission offsets for nonattainment pollutants.

The ARB is the state regulatory agency with authority to enforce regulations to both achieve and maintain air quality in the state. The ARB is responsible for the development, adoption, and enforcement of the state's motor vehicle emissions program, as well as the adoption of the California Ambient Air Quality Standards (CAAQS). The ARB also reviews operations and programs of the local air districts, and requires each air district with jurisdiction over a nonattainment area to develop its own strategy for achieving the NAAQS and CAAQS. The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The ARB has established the more stringent CAAQS for the six criteria pollutants through the California Clean Air Act of 1988, and also has established CAAQS for additional pollutants, including sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. The SDAB is currently classified as a nonattainment area under the CAAQS for O_3, PM_{10}, and $PM_{2.5}$. It should be noted that the ARB does not differentiate between attainment of the 1-hour and 8-hour CAAQS for O_3; therefore, if an air basin records exceedances of either standard the area is considered a nonattainment area for the CAAQS for O_3. The SDAB has recorded exceedances of both the

1-hour and 8-hour CAAQS for O_3. The following specific descriptions of health effects for the additional California criteria air pollutants are based on the ARB (ARB 2001).

Sulfates. Sulfates are the fully oxidized ionic form of sulfur. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide. H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard would result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

Vinyl Chloride. Vinyl chloride, a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants and hazardous waste sites, due to microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer, in humans.

Visibility Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The CAAQS is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

Table 1 presents a summary of the ambient air quality standards adopted by the federal and California Clean Air Acts.

Table 1
Ambient Air Quality Standards

POLLUTANT	AVERAGE TIME	CALIFORNIA STANDARDS		NATIONAL STANDARDS		
		Concentration	Measurement Method	Primary	Secondary	Measurement Method
Ozone (O_3)	1 hour	0.09 ppm (180 μg/m³)	Ultraviolet Photometry	0.12 ppm (235 μg/m³)	0.12 ppm (235 μg/m³)	Ethylene Chemiluminescence
	8 hour	0.070 ppm (137 μg/m³)		0.075 ppm (147 μg/m³)	0.075 ppm (147 μg/m³)	
Carbon Monoxide (CO)	8 hours	9.0 ppm (10 mg/m³)	Non-Dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m³)	None	Non-Dispersive Infrared Spectroscopy (NDIR)
	1 hour	20 ppm (23 mg/m³)		35 ppm (40 mg/m³)		
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm (56 μg/m³)	Gas Phase Chemiluminescence	0.053 ppm (100 μg/m³)	0.053 ppm (100 μg/m³)	Gas Phase Chemiluminescence
	1 hour	0.18 ppm (338 μg/m³)		**0.100 ppm (188 μg/m³)**~~--~~	--	
Sulfur Dioxide (SO_2)	**24 hours**~~Annual Average~~	**0.04 ppm (105 μg/m³)**~~--~~	Ultraviolet Fluorescence	~~0.03 ppm (80 μg/m³)--~~	--	Pararosaniline
	3 hours	--		--	0.5 ppm (1300 μg/m³)	
	1 hour	0.25 ppm (655 μg/m³)		~~--~~**0.075 ppm (196 μg/m³)**	--	
Respirable Particulate Matter (PM_{10})	24 hours	50 μg/m³	Gravimetric or Beta Attenuation	150 μg/m³	150 μg/m³	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 μg/m³		--	--	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m³	Gravimetric or Beta Attenuation	15 μg/m³	15 μg/m³	Inertial Separation and Gravimetric Analysis
	24 hours	--		35 μg/m³	35 μg/m³	
Sulfates	24 hours	25 μg/m³	Ion Chromatography	--	--	--
Lead (Pb)	30-day Average	1.5 μg/m³	Atomic Absorption	--	--	Atomic Absorption
	Calendar Quarter	--		1.5 μg/m³	1.5 μg/m³	
	3-month Rolling Average	--		0.15 μg/m³	0.15 μg/m³	
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (42 μg/m³)	Ultraviolet Fluorescence	--	--	--
Vinyl Chloride	24 hours	0.010 ppm (26 μg/m³)	Gas Chromatography	--	--	--

ppm= parts per million
μg/m³ = micrograms per cubic meter
mg/m³= milligrams per cubic meter
Source: California Air Resources Board 20~~09~~11

Toxic Air Contaminants. In 1983, the California Legislature enacted a program to identify the health effects of Toxic Air Contaminants (TACs) and to reduce exposure to these contaminants to protect the public health (AB 1807: Health and Safety Code sections 39650-39674). The Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

The State of California has identified diesel particulate matter as a TAC. Diesel particulate matter is emitted from on- and off-road vehicles that utilize diesel as fuel. Following identification of diesel particulate matter as a TAC in 1998, the ARB has worked on developing strategies and regulations aimed at reducing the emissions and associated risk from diesel particulate matter. The overall strategy for achieving these reductions is found in the *Risk Reduction Plan to Reduce Particulate Matter from Diesel-Fueled Engines and Vehicles* (State of California 2000). A stated goal of the plan is to reduce the cancer risk statewide arising from exposure to diesel particulate matter by 75 percent by 2010 and by 85 percent by 2020. The *Risk Reduction Plan* contains the following three components:

- New regulatory standards for all new on-road, off-road and stationary diesel-fueled engines and vehicles to reduce diesel particulate matter emissions by about 90 percent overall from current levels;
- New retrofit requirements for existing on-road, off-road and stationary diesel-fueled engines and vehicles where determined to be technically feasible and cost-effective; and
- New Phase 2 diesel fuel regulations to reduce the sulfur content levels of diesel fuel to no more than 15 ppm to provide the quality of diesel fuel needed by the advanced diesel particulate matter emission controls.

A number of programs and strategies to reduce diesel particulate matter are in place or are in the process of being developed as part of the ARB's Diesel Risk Reduction Program. Some of these programs and strategies include those that would apply to construction and operation of the Plaza Linda Verde Project, including the following:

- In 2001, the ARB adopted new particulate matter and NOx emission standards to clean up large diesel engines that power big-rig trucks, trash trucks, delivery vans and other large vehicles. The new standard for particulate matter takes effect in 2007 and reduces emissions to 0.01 gram of particulate matter per brake horsepower-hour (g/bhp-hr.) This is a 90 percent reduction from the existing particulate matter standard. New engines will meet the 0.01 g/bhp-hr particulate matter standard with the aid of diesel particulate filters that trap the particulate matter before exhaust leaves the vehicle.

- ARB has worked closely with the United States Environmental Protection Agency (U.S. EPA) on developing new particulate matter and NOx standards for engines used in offroad equipment such as backhoes, graders, and farm equipment. U.S EPA has proposed new standards that would reduce the emission from off-road engines to similar levels to the on-road engines discussed above by 2010 – 2012. These new engine standards were adopted as part of the Clean Air Nonroad Diesel Final Rule in 2004. Once approved by U.S. EPA, ARB will adopt these as the applicable state standards for new off-road engines. These standards will reduce diesel particulate matter emission by over 90 percent from new off-road engines currently sold in California.

- The ARB has adopted several regulations that will reduce diesel emissions from in-use vehicles and engines throughout California. In some cases, the particulate matter reduction strategies also reduce smog-forming emissions such as NOx.

As an ongoing process, the ARB reviews air contaminants and identifies those that are classified as TACs. The ARB also continues to establish new programs and regulations for the control of TACs, including diesel particulate matter, as appropriate.

The local air pollution control district (APCD) has the primary responsibility for the development and implementation of rules and regulations designed to attain the NAAQS and CAAQS, as well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations. The San Diego APCD is the local agency responsible for the administration and enforcement of air quality regulations in San Diego County.

The APCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The San Diego County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004 and most recently in 2009 (APCD 2009). The RAQS outlines APCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS does not address the state air quality standards for PM_{10} or $PM_{2.5}$. The APCD has also developed the air basin's input to the State Implementation Plan (SIP), which is required under the Federal Clean Air Act for areas that are out of attainment of air quality standards. The SIP includes the APCD's plans and control measures for attaining the O_3 NAAQS. The SIP is also updated on a triennial basis. The latest SIP update was submitted by the ARB to the EPA in 1998, and the APCD is in the process of updating its SIP to reflect the new 8-hour O_3 NAAQS. To that end, the APCD has developed its *Eight-Hour Ozone Attainment Plan for San Diego County* (hereinafter referred to as the Attainment Plan) (APCD 2007). The Attainment Plan forms the basis for the SIP update, as it contains documentation on emission inventories and trends, the APCD's emission control strategy, and an attainment demonstration that shows that the SDAB will meet the NAAQS for O_3. Emission inventories, projections, and trends in the Attainment Plan are based on the latest O_3 SIP planning emission projections compiled and maintained by ARB. Supporting data were developed jointly by stakeholder agencies, including ARB, the APCD, the South Coast Air Quality Management District (SCAQMD), the Southern California Association of Governments (SCAG), and SANDAG. Each agency plays a role in collecting and reviewing data as necessary to generate comprehensive emission inventories. The supporting data include socio-economic projections, industrial and travel activity levels, emission factors, and emission speciation profiles.

The ARB compiles annual statewide emission inventories in its emission-related information database, the California Emission Inventory Development and Reporting System (CEIDARS). Emission projections for past and future years were generated using the California Emission Forecasting System (CEFS), developed by ARB to project emission trends and track progress towards meeting emission reduction goals and mandates. CEFS utilizes the most current growth and emissions control data available and agreed upon by the stakeholder agencies to provide comprehensive projections of anthropogenic (human activity-related) emissions for any year from 1975 through 2030. Local air districts are responsible for compiling emissions data for all point sources and many stationary area-wide sources. For mobile sources, CEFS integrates emission estimates from ARB's EMFAC2007 and OFFROAD models. SCAG and SANDAG incorporate data regarding highway and transit projects into their Travel Demand Models for estimating and projecting vehicle miles traveled (VMT) and speed. The ARB's on-road emissions inventory in EMFAC2007 relies on these VMT and speed estimates. To complete the inventory, estimates of biogenic (naturally occurring) emissions are developed by ARB using the Biogenic Emissions Inventory Geographic Information System (BEIGIS) model.

Because the ARB mobile source emission projections and SANDAG growth projections are based on population and vehicle trends and land use plans developed by the cities and by the County as part of the development of General Plans, projects that propose development that is consistent with the growth anticipated by the general plans would be consistent with the RAQS and the Attainment Plan. In the event that a project would propose development which is less dense than anticipated within the general plan, the project would likewise be consistent with the RAQS and the Attainment Plan. If a project proposes development that is greater than that anticipated in the general plan and SANDAG's growth projections, the project might be in conflict with the RAQS and SIP, and might have a potentially significant impact on air quality.

2.2 Climate and Meteorology

The SDSU Campus is located in central San Diego, south of Interstate 8 at College Avenue. The campus is located in the San Diego Air Basin (SDAB). The climate of the SDAB is dominated by a semi-permanent high pressure cell located over the Pacific Ocean. This cell influences the direction of prevailing winds (westerly to northwesterly) and maintains clear skies for much of the year. Figure 1 provides a graphic representation of the prevailing winds in the project vicinity, as measured at the San Diego Air Pollution Control District's

(APCD's) Miramar Monitoring Station (the closest meteorological monitoring station to the site). The high pressure cell also creates two types of temperature inversions that may act to degrade local air quality.

The climate of the SDSU area of San Diego is characterized by a repetitive pattern of frequent early morning cloudiness, hazy afternoon sunshine, clean daytime onshore breezes and little temperature change throughout the year. Limited rainfall occurs in the winter while summers are often completely dry. An average of 10 inches of rain falls each year from mid-November to early April. Unfortunately, the same atmospheric conditions that create a desirable living climate combine to limit the ability of the atmosphere to disperse the air pollution generated by the large population attracted by the climate. The onshore winds across the coastline diminish quickly when they reach the foothill communities east of San Diego, and the sinking air within the offshore high pressure system forms a massive temperature inversion that traps all air pollutants near the ground. The resulting horizontal and vertical stagnation, in conjunction with ample sunshine, cause a number of reactive pollutants to undergo photochemical reactions and form smog that degrades visibility and irritates tear ducts and nasal membranes. High smog levels in coastal communities occasionally occur when polluted air from the South Coast (Los Angeles) Air Basin drifts seaward and southward at night, and then blows onshore the next day. Such weather patterns are particularly frustrating because no matter what San Diego County does to achieve clean air, such interbasin transport will cause occasionally unhealthy air over much of the County despite its best air pollution control efforts.

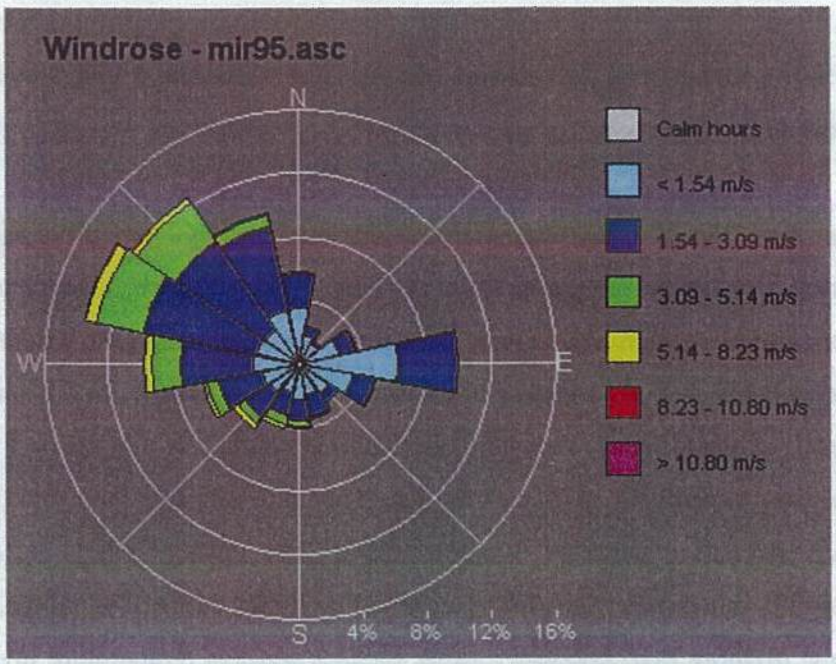

Figure 1. Wind Rose – Miramar Monitoring Station

2.3 Background Air Quality

The APCD operates a network of ambient air monitoring stations throughout San Diego County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The nearest ambient monitoring stations to the SDSU campus that measures all pollutants are the San Diego Overland Avenue and El Cajon monitoring stations. The Overland Avenue monitoring station also measures O_3, PM_{10}, $PM_{2.5}$, and NO_2. The other monitoring stations in the project vicinity are the downtown San Diego monitoring station, which measures CO and SO_2. The Overland Avenue monitoring station is more representative of the San Diego State area because the El Cajon monitoring station is located farther inland is and is subject to higher ambient concentrations due to pollutants being trapped in the valley. Ambient concentrations of pollutants over the last three years are presented in Table 2.

The federal 8-hour ozone standard was exceeded at the Overland Avenue monitoring station once in 2006, twice in 2007, and five times in 2008. The Overland Avenue monitoring station measured an exceedance of the state PM_{10} standard in 2007 during the southern California fire events. The data from the monitoring stations indicate that air quality is in attainment of all other ambient air quality standards.

Table 2
Ambient Background Concentrations
(ppm unless otherwise indicated)

Pollutant	Averaging Time	2006	2007	2008	Most Stringent Ambient Air Quality Standard	Monitoring Station
Ozone	8 hour	0.091	0.076	0.093	0.070	Overland Ave.
	1 hour	0.108	0.088	0.100	0.09	Overland Ave.
PM_{10}	Annual	22.6	23.6	23.9	20 μg/m³	Overland Ave.
	24 hour	42	65	41	50 μg/m³	Overland Ave.
$PM_{2.5}$	Annual	11.0	10.4	11.8	12 μg/m³	Overland Ave.
	24 hour	26.3	30.6	27.2	35 μg/m³	Overland Ave.
NO_2	Annual	0.017	0.015	0.014	0.030	Overland Ave.
	1 hour	0.091	0.087	0.077	0.18	Overland Ave.
CO	8 hour	3.27	3.01	2.60	9.0	San Diego
	1 hour	5.3	4.4	4.1	20	San Diego
SO_2	Annual	0.004	0.003	0.003	0.03	San Diego
	24 hour	0.009	0.006	0.007	0.04	San Diego
	3 hour	0.030	0.014	0.019	0.5[1]	San Diego
	1 hour	0.034	0.018	0.019	0.25	San Diego

N/A = Not Available
[1]New CAAQS proposed by ARB
[2]Secondary NAAQS
Source: www.arb.ca.gov/aqd/aqd.htm (Measurements of all pollutants at Overland station, except CO and SO_2 from San Diego station)
www.epa.gov/air/data/monvals.html (1-hour and 3-hour SO_2 and 1-hour CO)

3.0 Thresholds of Significance

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the State CEQA Guidelines which provides guidance that a project would have a significant environmental impact if it would:

1. Conflict or obstruct the implementation of the San Diego Regional Air Quality Strategy (RAQS) or applicable portions of the State Implementation Plan (SIP);
2. Result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs);
4. Expose sensitive receptors (including, but not limited to, schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

To determine whether a project would (a) result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation; or (b) result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs), project emissions may be evaluated based on the quantitative emission thresholds established by the San Diego APCD. As part of its air quality permitting process, the APCD has established thresholds in Rule 20.2 for the preparation of Air Quality Impact Assessments (AQIA).

For CEQA purposes, these screening criteria can be used as numeric methods to demonstrate that a project's total emissions would not result in a significant impact to air quality. Since APCD does not have AQIA thresholds for emissions of VOCs, the use of the threshold for

VOCs from the City of San Diego's Significance Thresholds (City of San Diego 2007) is appropriate. The screening thresholds are included in the table below.

Table 3
SCREENING-LEVEL CRITERIA FOR AIR QUALITY IMPACTS

Pollutant	Total Emissions		
Construction Emissions			
	Lb. per Day		
Respirable Particulate Matter (PM_{10})	100		
Fine Particulate Matter ($PM_{2.5}$)	100		
Oxides of Nitrogen (NOx)	250		
Oxides of Sulfur (SOx)	250		
Carbon Monoxide (CO)	550		
Volatile Organic Compounds (VOCs)[1]	137		
Operational Emissions			
	Lb. Per Hour	Lb. per Day	Tons per Year
Respirable Particulate Matter (PM_{10})	---	100	15
Fine Particulate Matter ($PM_{2.5}$)	---	100	15
Oxides of Nitrogen (NOx)	25	250	40
Oxides of Sulfur (SOx)	25	250	40
Carbon Monoxide (CO)	100	550	100
Lead and Lead Compounds	---	3.2	0.6
Volatile Organic Compounds (VOC)[2]	---	137	15

The thresholds listed in Table 3 represent screening-level thresholds that can be used to evaluate whether project-related emissions could cause a significant impact on air quality. Emissions below the screening-level thresholds would not cause a significant impact. In the event that emissions exceed these thresholds, modeling would be required to demonstrate that the project's total air quality impacts result in ground-level concentrations that are below the State and Federal Ambient Air Quality Standards, including appropriate background levels. For nonattainment pollutants (ozone, with ozone precursors NOx and VOCs, and PM_{10}), if emissions exceed the thresholds shown in Table 3, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality.

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as toxic air contaminants (TACs) or Hazardous Air Pollutants (HAPs). In San Diego County, APCD Regulation XII establishes acceptable risk levels and emission control requirements for new and modified facilities that may emit additional TACs. Under Rule 1210, emissions of TACs that result in a cancer risk of 10 in 1 million or less and a health hazard index of one or less would not be required to notify the public of potential health risks. If a project has the potential to result in emissions of any TAC or HAP which result in a cancer risk of greater than 10 in 1 million, the project would be deemed to have a potentially significant impact.

With regard to evaluating whether a project would have a significant impact on sensitive receptors, air quality regulators typically define sensitive receptors as schools (Preschool-12th Grade), hospitals, resident care facilities, or day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality. Any project which has the potential to directly impact a sensitive receptor located within 1 mile and results in a health risk greater than 10 in 1 million would be deemed to have a potentially significant impact.

APCD Rule 51 (Public Nuisance) also prohibits emission of any material which causes nuisance to a considerable number of persons or endangers the comfort, health or safety of any person. A project that proposes a use which would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of offsite receptors.

The impacts associated with construction and operation of the project were evaluated for significance based on these significance criteria.

4.0 Impacts

This section presents an evaluation of impacts associated with construction and operations for the Plaza Linda Verde Project.

4.1 Construction Activity Impacts

Construction activities, including soil disturbance dust emissions and combustion pollutants from on-site construction equipment and from off-site trucks hauling dirt, cement or building materials, will create a temporary addition of pollutants to the local airshed. These emissions are quite variable in both time and space and differ considerably among various construction projects. Such emission levels can, therefore, only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Because of their temporary nature, construction activity impacts have often been considered as having a less-than-significant air quality impact. However, the cumulative impact from all simultaneous construction in the basin is a contributor to the overall pollution burden. A number of current APCD strategies thus focus on dust control and on using cleaner off-road equipment to reduce the contribution from construction projects.

Three types of dust emissions may be associated with construction. Large particulates are generated that settle out again rapidly in close proximity to the source. A fraction of the material is small enough to remain suspended in the air semi-indefinitely. The size cut-off for these total suspended particulates (TSP) is around 30 microns in diameter. An even lesser fraction of TSP is small enough to enter deep lung tissue. The size cut-off for particulate matter that is deeply respirable is 10 microns or less and is called PM_{10}. The ambient air quality standard is for PM_{10}. The PM_{10} fraction of TSP is assumed to be around 50 percent. Fine particulate matter, which is considered particulate matter that is 2.5 microns or less, is called $PM_{2.5}$. Depending on the type of source, $PM_{2.5}$ is a fraction of the PM_{10} emissions ranging from 21 percent to 99 percent (SCAQMD 2006).

As discussed in Section 1.0, the Plaza Linda Verde Project will be constructed in two phases. Phase I involves the following construction phases:

- Demolition of existing structures at 5178 and 5168 College Avenue, demolition of existing parking lots at 5164 and 5140 College Avenue and parking lot south of Lindo Paseo, and demolition of additional structures in preparation for construction of Student Apartments.
- **Excavation of parking garage and export of 6,200 cubic yards of soil.**
- Construction of Mixed-Use Retail/Student Housing Buildings 1 and 2
- Construction of five-story parking structure with 2,000 GSF of retail and 340 parking spaces.

Phase II involves the following construction phases:

- Demolition of additional structures in preparation for construction of Student Apartments.
- **Excavation of parking garage and export of 21,000 cubic yards of soil.**
- Construction of Mixed-Use Retail/Student Housing Buildings 4 and 5
- Construction of Student Apartments
- Construction of additional underground parking facilities below Buildings 4 and 5

Tables 4a and 4b present the URBEMIS2007 model results for Phase I and Phase II construction. Construction projects at SDSU would be required to implement fugitive dust control measures during grading, which would include watering the site a minimum of twice daily to control dust, as well as reducing speeds on unpaved surfaces to 15 mph or less, replacing ground cover in disturbed areas quickly, and reducing dust during loading/unloading of dirt and other materials. Also, SDSU would utilize low-VOC paints that would not exceed 100 grams of VOC per liter for interior surface and 150 grams of VOC per liter for exterior surfaces, in accordance with the requirements of APCD Rule 67.0 for architectural coatings. The tables present an estimate of the maximum daily construction emissions, assuming that these construction project design features will be employed.

Table 4a
Phase I Construction Emissions - Plaza Linda Verde Project

Construction Project/Phase	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition						
Fugitive Dust	-	-	-	-	11.76	2.45
Off-Road Diesel	1.65	11.52	7.24	0.00	0.85	0.78
On-Road Diesel	0.68	10.20	3.48	0.01	0.44	0.37
Worker Trips	0.05	0.08	1.53	0.00	0.01	0.01
Total	**2.38**	**21.80**	**12.25**	**0.02**	**13.06**	**3.61**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Site Grading						
Fugitive Dust	-	-	-	-	2.13	0.45
Off-Road Diesel	4.61	36.41	20.11	0.00	2.04	1.87
Worker Trips	0.06	0.10	1.78	0.00	0.01	0.01
Total	**4.67**	**36.51**	**21.89**	**0.00**	**4.18**	**2.33**
Significance Threshold	**137**	**250**	**550**	**250**	**100**	**100**
Above Threshold?	No	No	No	No	No	No
Soil Export						
Fugitive Dust	-	-	-	-	**16.54**	3.45
Off-Road Diesel	**0.99**	**14.78**	**5.04**	**0.02**	**0.64**	**0.54**
Total	**0.99**	**14.78**	**5.04**	**0.02**	**17.18**	**3.99**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Building Construction						
Building Construction Off-Road Diesel	6.59	37.88	23.28	0.00	2.76	2.54
Building Construction Vendor Trips	0.24	3.02	2.46	0.01	0.14	0.12
Building Construction Worker Trips	0.45	0.76	14.08	0.01	0.11	0.06
Total	**7.28**	**41.66**	**39.82**	**0.02**	**3.01**	**2.71**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Paving – Parking Structure						
Asphalt Offgassing	0.04	-	-	-	-	-
Paving Off-Road Diesel	4.18	30.11	15.54	0.00	2.00	1.84
Paving On-Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00
Paving Worker Trips	0.09	0.15	2.83	0.00	0.02	0.01
Total	**4.32**	**30.37**	**18.41**	**0.00**	**2.02**	**1.85**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Paving - General						
Asphalt Offgassing	0.03	-	-	-	-	-
Paving Off-Road Diesel	2.34	14.35	8.99	0.00	1.24	1.14
Paving On-Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00
Paving Worker Trips	0.06	0.10	1.89	0.00	0.02	0.01
Total	**2.44**	**14.53**	**10.91**	**0.00**	**1.26**	**1.15**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Architectural Coatings Use						
Architectural Coating Offgassing	32.29	-	-	-	-	-
Architectural Coatings Worker Trips	0.02	0.04	0.78	0.00	0.01	0.00
Total	**32.31**	**0.04**	**0.78**	**0.00**	**0.01**	**0.00**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Maximum Simultaneous Construction Emissions[1]	**45.82**	**83.88**	**68.15**	**0.03**	**~~13.06~~21.36**	**~~3.61~~6.32**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

[1]Maximum simultaneous emissions for all pollutants except PM_{10} and $PM_{2.5}$ occur during simultaneous building construction, parking structure construction, parking area construction, and architectural coatings application. Maximum simultaneous emissions of PM_{10} and $PM_{2.5}$ occur during ~~demolition activities~~**grading and soil export**.

Table 4b
Phase II Construction Emissions
Plaza Linda Verde Project

Construction Project/Phase	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition						
Fugitive Dust	-	-	-	-	48.38	10.06
Off-Road Diesel	1.96	13.52	9.24	0.00	0.91	0.84
On-Road Diesel	2.37	33.10	11.65	0.06	1.46	1.21
Worker Trips	0.07	0.11	2.18	0.00	0.02	0.01
Total	**4.39**	**46.72**	**23.07**	**0.06**	**50.78**	**12.12**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Site Grading						
Fugitive Dust	-	-	-	-	2.98	0.62
Off-Road Diesel	5.63	43.99	26.16	0.00	2.30	2.12
Worker Trips	0.06	0.10	1.97	0.00	0.01	0.01
Total	**5.69**	**44.10**	**28.12**	**0.00**	**5.30**	**2.75**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Soil Export						
Fugitive Dust	**-**	**-**	**-**	**-**	**21.03**	**4.39**
Off-Road Diesel	**0.61**	**8.52**	**3.00**	**0.02**	**0.38**	**0.31**
Total	**0.61**	**8.52**	**3.00**	**0.02**	**21.41**	**4.70**
Significance Threshold	**137**	**250**	**550**	**250**	**100**	**100**
Above Threshold?	No	No	No	No	No	No
Building Construction						
Building Construction Off-Road Diesel	4.36	25.13	16.84	0.00	1.61	1.48
Building Construction Vendor Trips	0.32	3.78	3.34	0.01	0.18	0.15
Building Construction Worker Trips	0.56	0.95	18.13	0.02	0.16	0.05
Total	**5.24**	**29.87**	**38.30**	**0.03**	**1.74**	**1.52**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Paving - General						
Asphalt Offgassing	0.04	-	-	-	-	-
Paving Off-Road Diesel	2.06	12.89	8.85	0.00	1.06	0.98
Paving On-Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00
Paving Worker Trips	0.05	0.08	1.62	0.00	0.02	0.01
Total	**2.16**	**13.06**	**10.50**	**0.00**	**1.08**	**0.99**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Architectural Coatings Use						
Architectural Coating Offgassing	48.61	-	-	-	-	-
Architectural Coatings Worker Trips	0.03	0.05	1.01	0.00	0.01	0.01
Total	**48.64**	**0.05**	**1.01**	**0.00**	**0.01**	**0.01**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Maximum Simultaneous Construction Emissions[1]	**55.60**	**47.62**	**47.76**	**0.06**	**50.78**	**12.12**
Significance Threshold	137	250	550	250	100	100
Above Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

[1]Maximum simultaneous emissions for VOC and CO occur during simultaneous building construction, paving, and architectural coatings use. Maximum simultaneous emissions for NOx, SOx, PM_{10} and $PM_{2.5}$ occur during demolition activities.

As shown in the Tables 4a and 4b, emissions of all criteria pollutants would be below the significance thresholds, and no mitigation measures would be required. Emissions during construction would be less than significant.

Under the University-Serving Retail Alternative, neither the parking structure nor the underground parking under Buildings 4 and 5 would be constructed. Construction emissions for this alternative would therefore be lower than for the University/Community-Serving Retail Alternative that are presented in Tables 4a and 4b. Emissions would therefore be lower than emissions presented in Tables 4a and 4b, and would also be less than significant for the University-Serving Retail Alternative.

4.2 Operational Impacts

Operational impacts associated with the Plaza Linda Verde Project would include impacts associated with vehicular traffic, as well as area sources such as energy use, landscaping, consumer products use, and architectural coatings use for maintenance purposes.

The following subsections present an analysis of operational impacts associated with the project, which would include University/Community-Serving Retail uses, and the alternative to the project, which would include University-Serving Retail uses.

University/Community-Serving Retail. The Plaza Linda Verde Traffic Impact Analysis (Linscott, Law and Greenspan 2010) calculated project trip generation rates based on the proposed development with University/Community-Serving Retail, minus decreases in average daily trips (ADT) that would occur based on removal of existing residences and retail land uses. As discussed in Section 1.0, two options for the retail development were considered in the Traffic Impact Analysis. According to the Traffic Impact Analysis, the Project would generate a net traffic increase of 2,396 ADT under this option. These trip generation rates were accounted for within the URBEMIS Model runs for vehicular emissions.

Operational impacts associated with vehicular traffic and area sources including energy use, landscaping, consumer products use, and architectural coatings use for maintenance purposes were estimated using the URBEMIS model, Version 9.2.4. It should be noted that the URBEMIS model does not contain San Diego-specific emission factors; therefore, emissions were based on California statewide averages. The URBEMIS Model calculates vehicle emissions based on emission factors from the EMFAC2007 model. It was assumed that the first year of full occupancy would be 2013 for Phase I, and 2015 for Phase II. Based on the results of the EMFAC2007 model for subsequent years, emissions would decrease on an annual basis from 2013 onward due to phase-out of higher polluting vehicles and implementation of more stringent emission standards that are taken into account in the EMFAC2007 model. The project will incorporate Project Design Features that will reduce emissions associated with area sources. These Project Design Features that were considered in the analysis include the following:

- Building will exceed Title 24 standards by 20%
- Low-VOC architectural coatings

Table 5 presents the results of the emission calculations, in lbs/day, considering the above-listed emission reduction measures, along with a comparison with the significance criteria.

Table 5
Operational Emissions – University/Community-Serving Retail

	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Summer Day, Lbs/day						
Natural Gas Combustion	0.24	3.11	1.61	0.00	0.01	0.01
Landscaping	0.25	0.04	3.09	0.00	0.01	0.01
Consumer Products	19.57	-	-	-	-	-
Architectural Coatings	1.46	-	-	-	-	-
Vehicular Emissions	18.05	20.30	188.29	0.19	33.89	6.57
TOTAL	**39.57**	**23.45**	**192.99**	**0.19**	**33.91**	**6.59**
Significance Screening Criteria	137	250	550	250	100	55
Above Screening Criteria?	*No*	*No*	*No*	*No*	*No*	*No*
Winter Day, Lbs/day						
Natural Gas Combustion	0.24	3.11	1.61	0.00	0.01	0.01
Consumer Products	19.57	-	-	-	-	-
Architectural Coatings	1.46	-	-	-	-	-
Vehicular Emissions	17.00	29.63	202.84	0.17	33.89	6.57
TOTAL	**38.27**	**32.74**	**204.45**	**0.17**	**33.9**	**6.58**
Significance Screening Criteria	137	250	550	250	100	55
Above Screening Criteria?	*No*	*No*	*No*	*No*	*No*	*No*

Projects that involve traffic impacts may have the potential for CO "hot spots" to occur (i.e., high concentrations of CO at intersections). To evaluate the potential for CO "hot spots," the procedures in the Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol were used.

The Traffic Impact Analysis identified intersections for the Near Term and Long Term scenarios for which project-related traffic, in combination with projected future traffic considering cumulative projects, would cause or contribute to a significant impact. CO "hot spots" may occur for intersections that operate at LOS E or F. Intersections that were predicted to operate at LOS E or worse in the Near Term are as follows:

- College Avenue and Eastbound I-8 Ramps (am peak hour)
- College Avenue and Canyon Crest (am and pm peak hours)
- College Avenue and Zura Way (am and pm peak hours)
- College Avenue and Montezuma Road (am and pm peak hour)

- College Avenue/El Cajon Boulevard (pm peak hour)
- Montezuma Road and Campanile Avenue (pm peak hour)

Intersections that were predicted to operate at LOS E or worse in the Long Term are as follows:

- College Avenue and Eastbound I-8 Ramps (pm peak hour)
- College Avenue and Canyon Crest (am and pm peak hours)
- College Avenue and Zura Way (am and pm peak hours)
- College Avenue and Montezuma Road (am and pm peak hour)
- Montezuma Road and 55th Street (am and pm peak hours)
- Montezuma Road and Campanile Avenue (am and pm peak hours)

As recommended in the Protocol, CALINE4 modeling was conducted for the intersections identified above for the Project plus cumulative traffic scenario. Modeling was conducted based on the guidance in Appendix B of the Protocol to calculate maximum predicted 1-hour CO concentrations. Predicted 1-hour CO concentrations were then scaled to evaluate maximum predicted 8-hour CO concentrations using the recommended scaling factor of 0.7 for urban locations.

Inputs to the CALINE4 model were obtained from the Traffic Impact Analysis. As recommended in the Protocol, receptors were located at locations that were approximately 3 meters from the mixing zone, and at a height of 1.8 meters. For conservative purposes, average approach and departure speeds were assumed to be 1 mph, which results in higher CO emission rates and a conservative estimate of potential impacts. For conservative purposes, emission factors from the EMFAC2007 model for the year 2013 (opening year) were used in the CALINE4 model.

In accordance with the Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol, it is also necessary to estimate future background CO concentrations in the project vicinity to determine the potential impact plus background and evaluate the potential for CO "hot spots" due to the project. The existing maximum 1-hour and 8-hour background concentrations of CO that was measured at the San Diego monitoring station for the period 2006 – 2008 of 5.3 and 3.27 ppm were used to represent future maximum background 1-hour and 8-hour CO concentrations. CO concentrations in the future may be lower as inspection and maintenance programs and more stringent emission controls are placed on vehicles.

The CALINE4 model outputs are provided in Appendix A of this report. Table 6 presents a summary of the predicted CO concentrations (impact plus background) for the intersections evaluated for the Near Term and Long Term scenarios. As shown in Table 6, the predicted CO concentrations would be substantially below the 1-hour and 8-hour NAAQS and CAAQS for CO shown in Table 1 of this report. Therefore, no exceedances of the CO standard are predicted, and the project would not cause or contribute to a violation of the air quality standard.

Table 6
CO "Hot Spots" Modeling Results (ppm)

Intersection	Near Term	
Near Term Conditions		
Maximum 1-hour Concentration Plus Background, ppm CAAQS = 20 ppm; NAAQS = 35 ppm; Background 5.3 ppm		
	am	***pm***
College Avenue and EB I-8 Ramps	6.9	N/A
College Avenue and Canyon Crest Drive	6.5	6.6
College Avenue and Zura Way	6.7	6.8
College Avenue and Montezuma Road	6.5	7.0
College Avenue and El Cajon Boulevard	N/A	6.6
Montezuma Road and Campanile Way	N/A	6.3
Maximum 8-hour Concentration Plus Background, ppm CAAQS = 9.0 ppm; NAAQS = 9 ppm; Background 3.27 ppm		
College Avenue and EB I-8 Ramps	4.39	
College Avenue and Canyon Crest Drive	4.18	
College Avenue and Zura Way	4.32	
College Avenue and Montezuma Road	4.46	
College Avenue and El Cajon Boulevard	4.18	
Montezuma Road and Campanile Way	3.97	
Long Term Conditions		
Maximum 1-hour Concentration Plus Background, ppm CAAQS = 20 ppm; NAAQS = 35 ppm; Background 5.3 ppm		
	am	***pm***
College Avenue and EB I-8 Ramps	N/A	6.0
College Avenue and Canyon Crest Drive	6.0	5.9
College Avenue and Zura Way	5.9	6.0
College Avenue and Montezuma Road	5.8	6.0
Montezuma Road and 55th Street	5.7	5.8
Montezuma Road and Campanile Way	5.6	5.8
Maximum 8-hour Concentration Plus Background, ppm CAAQS = 9.0 ppm; NAAQS = 9 ppm; Background 3.27 ppm		
College Avenue and EB I-8 Ramps	3.76	
College Avenue and Canyon Crest Drive	3.76	
College Avenue and Zura Way	3.76	
College Avenue and Montezuma Road	3.76	
Montezuma Road and 55th Street	3.62	
Montezuma Road and Campanile Way	3.62	

As shown in Table 6, all impacts, when added to background CO concentrations, would be below the CAAQS for both the 1-hour and 8-hour averaging periods; therefore, the project would not result in a significant impact for CO.

University-Serving Retail. The Plaza Linda Verde Traffic Impact Analysis (Linscott, Law and Greenspan 2010) calculated project trip generation rates based on the proposed development with University-Serving Retail, minus decreases in average daily trips (ADT) that would occur based on removal of existing residences and retail land uses. As discussed in Section 1.0, two options for the retail development were considered in the Traffic Impact Analysis. According to the Traffic Impact Analysis, the Project would generate a net traffic increase of 529 ADT under this option.

Operational impacts associated with area sources including energy use, landscaping, consumer products use, and architectural coatings use for maintenance purposes would be the same as estimated for the project with University/Community-Serving Retail. Table 7 presents the operational emissions for the University-Serving Retail option.

Table 7
Operational Emissions – University-Serving Retail

	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Summer Day, Lbs/day						
Natural Gas Combustion	0.24	3.11	1.61	0.00	0.01	0.01
Landscaping	0.25	0.04	3.09	0.00	0.01	0.01
Consumer Products	19.57	-	-	-	-	-
Architectural Coatings	1.46	-	-	-	-	-
Vehicular Emissions	6.94	5.96	60.31	0.06	10.07	1.96
TOTAL	**28.46**	**9.11**	**65.01**	**0.06**	**10.09**	**1.98**
Significance Screening Criteria	137	250	550	250	100	55
Above Screening Criteria?	*No*	*No*	*No*	*No*	*No*	*No*
Winter Day, Lbs/day						
Natural Gas Combustion	0.24	3.11	1.61	0.00	0.01	0.01
Consumer Products	19.57	-	-	-	-	-
Architectural Coatings	1.46	-	-	-	-	-
Vehicular Emissions	5.01	8.74	63.17	0.05	10.08	1.97
TOTAL	**26.28**	**11.85**	**64.78**	**0.05**	**10.09**	**1.98**
Significance Screening Criteria	137	250	550	250	100	55
Above Screening Criteria?	*No*	*No*	*No*	*No*	*No*	*No*

Emissions of all criteria pollutants would be below the significance thresholds, and no significant air quality impacts would result from the University-Serving Retail Alternative.

As discussed under the University/Community-Serving Retail option, projects that involve traffic impacts may have the potential for CO "hot spots" to occur. Because traffic impacts would be lower for the University-Serving Retail than for the University/Community-Serving Retail, the potential for CO "hot spots" would also be lower. As shown in Table 6, all impacts for the University/Community-Serving Retail option would be below the CAAQS for both the 1-hour and 8-hour averaging periods. The University-Serving Retail option impacts would be lower, and would not result in a significant impact for CO.

4.3 Toxic Air Contaminant Impacts

The threshold concerns whether the project could expose sensitive receptors to substantial pollutant concentrations of TACs. If a project has the potential to result in emissions of any

TAC which result in a cancer risk of greater than 10 in 1 million or substantial non-cancer risk, the project would be deemed to have a potentially significant impact.

Air quality regulators typically define sensitive receptors as schools (Preschool-12th Grade), hospitals, resident care facilities, or day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality. Residential land uses may also be considered sensitive receptors. The project is located within the SDSU Campus area, which includes students and residences.

Retail and residential dwelling are not land uses that would emit substantial amounts of toxic air contaminants. Minor amounts of truck traffic would be associated with deliveries to the retail land uses, but truck traffic would be minimal and would not result in substantial emissions of diesel particulate matter that would affect sensitive receptors. Toxic air contaminant impacts would be less than significant.

4.4 Objectionable Odors

Project construction could result in minor amounts of odor compounds associated with diesel heavy equipment exhaust. These compounds would be emitted in various amounts and at various locations during construction. Odors are highest near the source and would quickly dissipate offsite; any odors associated with construction would be temporary. Due to the temporary nature of construction odors and the anticipated dissipation of odors offsite, impacts during construction would be less than significant.

The Project is a residential and retail development and would not include land uses that would be sources of nuisance odors. Thus the potential for odor impacts associated with the project is less than significant.

5.0 Cumulative Impacts

To evaluate the potential for cumulative impacts to air quality, past, present, and planned projects must be included in the evaluation. Past and present project impacts are accounted for in the background ambient air quality data that are presented in Section 2.0, Existing Conditions. The Traffic Impact Analysis identified 33 future cumulative development projects in the vicinity of the Plaza Linda Verde Project.

While several projects listed in the Traffic Impact Analysis are located in the immediate vicinity of the Plaza Linda Verde Project, it is unlikely that major construction on multiple cumulative projects would be occurring simultaneously. Furthermore, the emissions associated with the Plaza Linda Verde Project construction are substantially below the City of San Diego's significance thresholds. Projections of basin-wide emissions from the ARB (ARB 2009) indicate that construction equipment accounts for 3.24 tons per day of ROG, 21.86 tons per day of NOx, and 1.34 tons per day of PM_{10}. Architectural coatings use accounts for 8.94 tons per day of ROG. Emissions of nonattainment pollutants (ozone precursors NOx and ROG, and PM_{10}) are a small percentage of the overall construction emissions within the SDAB; ROG emissions would be 0.23 percent of the basin-wide emissions, NOx emissions would be 0.19 percent of the basin-wide emissions, and PM_{10} would be 1.9 percent of the basin-wide emissions. These emissions would be short-term and temporary and would not result in cumulatively considerable impacts to the ambient air quality.

The purpose of the Plaza Linda Verde Project is to provide housing for students that might otherwise live elsewhere, or commute to SDSU. The University/Community-Serving Retail would provide local retail services in the area; the University-Serving Retail would provide services for the University community. Regardless, the project is consistent with current SANDAG growth forecasts for the area and would not result in an increase in student enrollment. Because the project would not result in growth, emissions are consistent with the attainment demonstration included in the SIP and would not therefore be cumulatively considerable.

6.0 Summary and Conclusions

In summary, the proposed project would result in emissions of air pollutants for both the construction phase and operational phase of the project. The air quality impact analysis evaluated the potential for adverse impacts to the ambient air quality due to construction and operational emissions. Construction emissions would include emissions associated with fugitive dust, heavy construction equipment and construction worker commuting to and from the site. The project would employ dust control measures such as watering to control emissions during construction and use of low-VOC paints. Emissions are less than the significance thresholds for all pollutants.

Operational emissions would include emissions associated with retail operations, including energy use and landscaping, and with vehicle traffic. As discussed in Section 4.0, the impacts would be less than significant.

7.0 References

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Appendix A

URBEMIS Model Output

Appendix A

CALINE4 Model Outputs

URBEMIS Model Outputs

CALINE4 Model Outputs

```
CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   1

    JOB: College and I8 EB NTam
    RUN: Hour 1            (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I.  SITE VARIABLES

     U=   1.0 M/S              Z0= 100. CM          ALT=      0. (M)
   BRG= WORST CASE             VD=    .0 CM/S
  CLAS=     7 (G)              VS=    .0 CM/S
  MIXH= 1000. M               AMB=    .0 PPM
 SIGTH=   10. DEGREES        TEMP= 37.0 DEGREE (C)

II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)    *                EF      H     W
  DESCRIPTION   *   X1     Y1     X2     Y2  * TYPE  VPH  (G/MI)  (M)   (M)
----------------*--------------------------*-----------------------------
A. I8 EBRA1     *  -126    -24    -63    -39 *  AG   2175   5.5     .0  10.0
B. I8 EBRA2     *   -63    -39      0     -4 *  AG   2175   5.5     .0  10.0
C. I8 EBD       *     0     -4     83    110 *  AG    222   5.5     .0  10.0
D. I8 EBLA1     *  -126    -20    -63    -36 *  AG    309   5.5     .0  10.0
E. I8 EBLA2     *   -63    -36      0      0 *  AG    309   5.5     .0  10.0
F. Coll NBA     *     4   -150      4      0 *  AG   1210   5.5     .0  10.0
G. Coll SBA     *    -4    150     -4      0 *  AG   1307   5.5     .0  10.0
H. Coll NBD     *     4      0      4    150 *  AG   1315   5.5     .0  10.0
I. Coll SBD     *    -4      0     -4   -150 *  AG   3260   5.5     .0  10.0
```

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and I8 EB NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-20	1.8
2. Recpt 2	-34	-32	1.8
3. Recpt 3	-54	-44	1.8
4. Recpt 4	-14	-40	1.8
5. Recpt 5	-14	-60	1.8
6. Recpt 6	-14	5	1.8
7. Recpt 7	-34	-7	1.8
8. Recpt 8	-54	-19	1.8
9. Recpt 9	-14	25	1.8
10. Recpt 10	-14	45	1.8
11. Recpt 11	14	0	1.8
12. Recpt 12	34	25	1.8
13. Recpt 13	54	50	1.8
14. Recpt 14	14	-20	1.8
15. Recpt 15	14	-40	1.8
16. Recpt 16	14	30	1.8
17. Recpt 17	34	56	1.8
18. Recpt 18	54	82	1.8
19. Recpt 19	14	50	1.8
20. Recpt 20	14	70	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and I8 EB NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	31.	1.6	.0	.5	.0	.0	.0	.0	.1	.2
2. Recpt 2	40.	1.2	.0	.7	.0	.0	.0	.0	.1	.1
3. Recpt 3	290.	1.1	.8	.2	.0	.1	.0	.0	.0	.0
4. Recpt 4	17.	1.3	.0	.2	.0	.0	.0	.0	.1	.2
5. Recpt 5	16.	1.2	.0	.0	.0	.0	.0	.1	.0	.1
6. Recpt 6	164.	1.5	.0	.3	.0	.0	.0	.3	.0	.0
7. Recpt 7	154.	.9	.0	.3	.0	.0	.0	.2	.0	.0
8. Recpt 8	87.	.8	.0	.5	.0	.0	.0	.0	.0	.0
9. Recpt 9	168.	1.3	.0	.2	.0	.0	.0	.3	.0	.0
10. Recpt 10	170.	1.1	.0	.1	.0	.0	.0	.2	.2	.0
11. Recpt 11	247.	1.6	.1	.7	.0	.0	.1	.2	.0	.0
12. Recpt 12	234.	.8	.0	.3	.0	.0	.0	.0	.0	.1
13. Recpt 13	229.	.6	.0	.2	.0	.0	.0	.0	.0	.0
14. Recpt 14	265.	1.2	.2	.3	.0	.0	.0	.2	.0	.0
15. Recpt 15	328.	1.0	.0	.2	.0	.0	.0	.3	.0	.0
16. Recpt 16	200.	1.1	.0	.1	.0	.0	.0	.2	.0	.2
17. Recpt 17	211.	.7	.0	.1	.0	.0	.0	.0	.0	.1
18. Recpt 18	211.	.5	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	195.	1.1	.0	.1	.0	.0	.0	.1	.0	.3
20. Recpt 20	193.	1.0	.0	.1	.0	.0	.0	.0	.1	.3

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   4

     JOB: College and I8 EB NTam
     RUN: Hour 1           (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
```

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	(PPM) I
1. Recpt 1	.6
2. Recpt 2	.1
3. Recpt 3	.0
4. Recpt 4	.6
5. Recpt 5	.8
6. Recpt 6	.9
7. Recpt 7	.4
8. Recpt 8	.2
9. Recpt 9	.7
10. Recpt 10	.5
11. Recpt 11	.4
12. Recpt 12	.2
13. Recpt 13	.1
14. Recpt 14	.4
15. Recpt 15	.5
16. Recpt 16	.5
17. Recpt 17	.2
18. Recpt 18	.2
19. Recpt 19	.4
20. Recpt 20	.3

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Cyn Crest NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	10. DEGREES	TEMP=	37.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. CC EBTA1	-150	-4	-75	-19	AG	114	5.5	.0	10.0
B. CC EBLA2	-75	-16	0	0	AG	49	5.5	.0	10.0
C. CC EBTA2	-75	-19	0	-4	AG	19	5.5	.0	10.0
D. CC EBRA2	-75	-23	0	-7	AG	46	5.5	.0	10.0
E. CC EBD1	0	-4	55	12	AG	634	5.5	.0	10.0
F. CC EBD2	55	12	123	-63	AG	634	5.5	.0	10.0
G. CC WBTA1	130	-63	55	15	AG	385	5.5	.0	10.0
H. CC WBLA2	55	12	0	0	AG	89	5.5	.0	10.0
I. CC WBTA2	55	15	0	4	AG	144	5.5	.0	10.0
J. CC WBRA2	55	19	0	7	AG	152	5.5	.0	10.0
K. CC WBD1	0	4	-75	-12	AG	1002	5.5	.0	10.0
L. CC WBD2	-75	-12	-150	4	AG	1002	5.5	.0	10.0
M. Coll NBLA	59	-142	0	0	AG	152	5.5	.0	10.0
N. Coll NBTA	63	-142	4	0	AG	935	5.5	.0	10.0
O. Coll NBRA	66	-142	7	0	AG	93	5.5	.0	10.0
P. Coll NBD	4	0	4	150	AG	1136	5.5	.0	10.0
Q. Coll SBLA	0	150	0	0	AG	706	5.5	.0	10.0
R. Coll SBTA	-4	150	-4	0	AG	1265	5.5	.0	10.0
S. Coll SBRA	-7	150	-7	0	AG	522	5.5	.0	10.0
T. Coll SBD	-4	0	56	-142	AG	1400	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Cyn Crest NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-20	1.8
2. Recpt 2	-34	-25	1.8
3. Recpt 3	-54	-30	1.8
4. Recpt 4	-6	-40	1.8
5. Recpt 5	3	-60	1.8
6. Recpt 6	22	-12	1.8
7. Recpt 7	30	-32	1.8
8. Recpt 8	38	-52	1.8
9. Recpt 9	42	-5	1.8
10. Recpt 10	-17	13	1.8
11. Recpt 11	-37	8	1.8
12. Recpt 12	-57	3	1.8
13. Recpt 13	-17	33	1.8
14. Recpt 14	-17	53	1.8
15. Recpt 15	14	20	1.8
16. Recpt 16	34	23	1.8
17. Recpt 17	54	26	1.8
18. Recpt 18	14	40	1.8
19. Recpt 19	14	60	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Cyn Crest NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	12.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	23.	.7	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	29.	.6	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	4.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	360.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	340.	.8	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	315.	.7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	317.	.7	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	275.	.6	.0	.0	.0	.0	.1	.0	.0	.0
10. Recpt 10	144.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	101.	.8	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	95.	.7	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	153.	1.2	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	157.	1.2	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	343.	.9	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	246.	.6	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	247.	.6	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	340.	.9	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	206.	.9	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Cyn Crest NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR		CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Recpt 1	*	.0	.0	.1	.0	.0	.0	.0	.2	.2	.4	.2	.0
2. Recpt 2	*	.0	.0	.1	.0	.0	.0	.0	.1	.1	.2	.0	.0
3. Recpt 3	*	.0	.0	.1	.0	.0	.0	.0	.1	.0	.1	.0	.0
4. Recpt 4	*	.0	.0	.0	.0	.0	.0	.0	.2	.2	.3	.1	.2
5. Recpt 5	*	.0	.0	.0	.0	.0	.0	.0	.2	.1	.2	.0	.2
6. Recpt 6	*	.0	.0	.0	.0	.0	.0	.0	.2	.1	.2	.0	.0
7. Recpt 7	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
8. Recpt 8	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
9. Recpt 9	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	*	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0	.0	.4
11. Recpt 11	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.2	.1	.3
14. Recpt 14	*	.0	.0	.0	.0	.0	.2	.0	.1	.1	.3	.2	.2
15. Recpt 15	*	.0	.0	.0	.0	.0	.0	.0	.4	.2	.3	.1	.0
16. Recpt 16	*	.0	.0	.2	.0	.0	.0	.0	.1	.0	.1	.0	.0
17. Recpt 17	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	*	.0	.0	.0	.0	.0	.0	.0	.4	.2	.3	.0	.0
19. Recpt 19	*	.0	.0	.0	.0	.0	.0	.0	.3	.2	.2	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   1

     JOB: College and Cyn Crest NTpm
     RUN: Hour 1             (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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I. SITE VARIABLES

```
    U=   1.0 M/S           Z0= 100. CM          ALT=     0. (M)
  BRG= WORST CASE          VD=    .0 CM/S
 CLAS=      7 (G)          VS=    .0 CM/S
 MIXH= 1000. M            AMB=    .0 PPM
SIGTH=   10. DEGREES     TEMP= 37.0 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. CC EBTA1	*	-150	-4	-75	-19	*	AG	646	5.5	.0	10.0
B. CC EBLA2	*	-75	-16	0	0	*	AG	502	5.5	.0	10.0
C. CC EBTA2	*	-75	-19	0	-4	*	AG	56	5.5	.0	10.0
D. CC EBRA2	*	-75	-23	0	-7	*	AG	88	5.5	.0	10.0
E. CC EBD1	*	0	-4	55	12	*	AG	493	5.5	.0	10.0
F. CC EBD2	*	55	12	123	-63	*	AG	493	5.5	.0	10.0
G. CC WBTA1	*	130	-63	55	15	*	AG	402	5.5	.0	10.0
H. CC WBLA2	*	55	12	0	0	*	AG	108	5.5	.0	10.0
I. CC WBTA2	*	55	15	0	4	*	AG	13	5.5	.0	10.0
J. CC WBRA2	*	55	19	0	7	*	AG	281	5.5	.0	10.0
K. CC WBD1	*	0	4	-75	-12	*	AG	194	5.5	.0	10.0
L. CC WBD2	*	-75	-12	-150	4	*	AG	194	5.5	.0	10.0
M. Coll NBLA	*	59	-142	0	0	*	AG	66	5.5	.0	10.0
N. Coll NBTA	*	63	-142	4	0	*	AG	1725	5.5	.0	10.0
O. Coll NBRA	*	66	-142	7	0	*	AG	153	5.5	.0	10.0
P. Coll NBD	*	4	0	4	150	*	AG	2508	5.5	.0	10.0
Q. Coll SBLA	*	0	150	0	0	*	AG	115	5.5	.0	10.0
R. Coll SBTA	*	-4	150	-4	0	*	AG	1447	5.5	.0	10.0
S. Coll SBRA	*	-7	150	-7	0	*	AG	284	5.5	.0	10.0
T. Coll SBD	*	-4	0	56	-142	*	AG	1643	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Cyn Crest NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-20	1.8
2. Recpt 2	-34	-25	1.8
3. Recpt 3	-54	-30	1.8
4. Recpt 4	-6	-40	1.8
5. Recpt 5	3	-60	1.8
6. Recpt 6	22	-12	1.8
7. Recpt 7	30	-32	1.8
8. Recpt 8	38	-52	1.8
9. Recpt 9	42	-5	1.8
10. Recpt 10	-17	13	1.8
11. Recpt 11	-37	8	1.8
12. Recpt 12	-57	3	1.8
13. Recpt 13	-17	33	1.8
14. Recpt 14	-17	53	1.8
15. Recpt 15	14	20	1.8
16. Recpt 16	34	23	1.8
17. Recpt 17	54	26	1.8
18. Recpt 18	14	40	1.8
19. Recpt 19	14	60	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Cyn Crest NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	14.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	25.	.7	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	30.	.5	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	6.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	1.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	339.	.9	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	310.	.8	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	316.	.9	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	272.	.6	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	144.	1.2	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	102.	.7	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	100.	.6	.0	.1	.0	.0	.0	.0	.0	.0
13. Recpt 13	153.	1.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	157.	1.2	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	341.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	242.	.7	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	245.	.6	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	340.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	204.	1.1	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Cyn Crest NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.4	.0	.4	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.3	.0	.2	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.2	.0	.1	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.4	.0	.3	.0	.2
5. Recpt 5	.0	.0	.0	.0	.0	.1	.0	.3	.0	.2	.0	.3
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.4	.0	.2	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.2
8. Recpt 8	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.2
9. Recpt 9	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.5
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.1
13. Recpt 13	.0	.0	.0	.0	.0	.4	.0	.1	.0	.2	.0	.3
14. Recpt 14	.0	.0	.0	.0	.0	.3	.0	.2	.0	.3	.0	.2
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.7	.0	.3	.0	.0
16. Recpt 16	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
17. Recpt 17	.0	.1	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.7	.0	.3	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.7	.0	.2	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Zura Way NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	10. DEGREES	TEMP=	37.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Zura Way	74	-16	0	0	AG	100	5.5	.0	10.0
B. Coll NBTA	4	-150	4	0	AG	1374	5.5	.0	10.0
C. Coll NBRA	6	-150	6	0	AG	171	5.5	.0	10.0
D. Coll SBLA1	-20	71	0	0	AG	556	5.5	.0	10.0
E. Coll SBTA1	-23	71	-4	0	AG	1228	5.5	.0	10.0
F. Coll SBLA2	-71	126	-20	71	AG	556	5.5	.0	10.0
G. Coll SBTA2	-75	126	-23	71	AG	1228	5.5	.0	10.0
H. Coll NBD1	4	0	-16	71	AG	1474	5.5	.0	10.0
I. Coll NBD2	-16	71	-67	129	AG	1474	5.5	.0	10.0
J. Coll SBD	-4	0	-4	-150	AG	1228	5.5	.0	10.0
K. Zura WayD	0	-4	74	-20	AG	727	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Zura Way NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-60	1.8
2. Recpt 2	-14	-40	1.8
3. Recpt 3	-14	-20	1.8
4. Recpt 4	-14	0	1.8
5. Recpt 5	-19	20	1.8
6. Recpt 6	-24	40	1.8
7. Recpt 7	-29	60	1.8
8. Recpt 8	14	-60	1.8
9. Recpt 9	14	-40	1.8
10. Recpt 10	14	-20	1.8
11. Recpt 11	6	20	1.8
12. Recpt 12	1	40	1.8
13. Recpt 13	-4	60	1.8
14. Recpt 14	34	-22	1.8
15. Recpt 15	54	-24	1.8
16. Recpt 16	14	5	1.8
17. Recpt 17	34	2	1.8
18. Recpt 18	54	-1	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Zura Way NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	22.	.7	.0	.2	.0	.0	.0	.0	.0	.0
2. Recpt 2	160.	.7	.0	.3	.0	.0	.0	.0	.0	.0
3. Recpt 3	163.	.7	.0	.3	.0	.0	.0	.0	.0	.0
4. Recpt 4	102.	.8	.0	.2	.0	.0	.0	.0	.0	.0
5. Recpt 5	124.	.8	.0	.0	.0	.1	.3	.0	.0	.2
6. Recpt 6	139.	.9	.0	.0	.0	.1	.4	.0	.0	.2
7. Recpt 7	145.	1.0	.0	.0	.0	.2	.4	.0	.0	.3
8. Recpt 8	343.	1.1	.0	.4	.0	.0	.1	.0	.0	.1
9. Recpt 9	339.	1.2	.0	.3	.0	.0	.2	.0	.0	.2
10. Recpt 10	334.	1.4	.0	.2	.0	.1	.3	.0	.0	.3
11. Recpt 11	186.	1.3	.0	.4	.0	.0	.0	.0	.0	.3
12. Recpt 12	182.	1.2	.0	.3	.0	.0	.0	.0	.0	.4
13. Recpt 13	311.	1.3	.0	.0	.0	.0	.0	.2	.3	.3
14. Recpt 14	324.	.8	.0	.0	.0	.0	.1	.0	.0	.2
15. Recpt 15	317.	.7	.0	.0	.0	.0	.0	.0	.0	.1
16. Recpt 16	195.	.9	.0	.4	.0	.0	.0	.0	.0	.0
17. Recpt 17	206.	.5	.0	.2	.0	.0	.0	.0	.0	.0
18. Recpt 18	214.	.4	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Zura Way NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K
1. Recpt 1	.0	.4	.0
2. Recpt 2	.0	.4	.0
3. Recpt 3	.0	.4	.0
4. Recpt 4	.0	.2	.3
5. Recpt 5	.0	.0	.1
6. Recpt 6	.0	.0	.0
7. Recpt 7	.0	.0	.0
8. Recpt 8	.0	.1	.0
9. Recpt 9	.0	.0	.0
10. Recpt 10	.1	.0	.1
11. Recpt 11	.0	.3	.0
12. Recpt 12	.0	.3	.0
13. Recpt 13	.4	.0	.0
14. Recpt 14	.0	.0	.2
15. Recpt 15	.0	.0	.2
16. Recpt 16	.0	.3	.1
17. Recpt 17	.0	.2	.1
18. Recpt 18	.0	.1	.1

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Zura Way NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	10. DEGREES	TEMP=	37.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Zura Way	74	-16	0	0	AG	444	5.5	.0	10.0
B. Coll NBTA	4	-150	4	0	AG	1623	5.5	.0	10.0
C. Coll NBRA	6	-150	6	0	AG	138	5.5	.0	10.0
D. Coll SBLA1	-20	71	0	0	AG	188	5.5	.0	10.0
E. Coll SBTA1	-23	71	-4	0	AG	1463	5.5	.0	10.0
F. Coll SBLA2	-71	126	-20	71	AG	188	5.5	.0	10.0
G. Coll SBTA2	-75	126	-23	71	AG	1463	5.5	.0	10.0
H. Coll NBD1	4	0	-16	71	AG	2067	5.5	.0	10.0
I. Coll NBD2	-16	71	-67	129	AG	2067	5.5	.0	10.0
J. Coll SBD	-4	0	-4	-150	AG	1463	5.5	.0	10.0
K. Zura WayD	0	-4	74	-20	AG	326	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Zura Way NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-60	1.8
2. Recpt 2	-14	-40	1.8
3. Recpt 3	-14	-20	1.8
4. Recpt 4	-14	0	1.8
5. Recpt 5	-19	20	1.8
6. Recpt 6	-24	40	1.8
7. Recpt 7	-29	60	1.8
8. Recpt 8	14	-60	1.8
9. Recpt 9	14	-40	1.8
10. Recpt 10	14	-20	1.8
11. Recpt 11	6	20	1.8
12. Recpt 12	1	40	1.8
13. Recpt 13	-4	60	1.8
14. Recpt 14	34	-22	1.8
15. Recpt 15	54	-24	1.8
16. Recpt 16	14	5	1.8
17. Recpt 17	34	2	1.8
18. Recpt 18	54	-1	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Zura Way NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	22.	.8	.0	.2	.0	.0	.0	.0	.0	.0
2. Recpt 2	160.	.8	.0	.3	.0	.0	.0	.0	.0	.0
3. Recpt 3	163.	.8	.0	.3	.0	.0	.0	.0	.0	.0
4. Recpt 4	100.	.8	.2	.2	.0	.0	.0	.0	.0	.0
5. Recpt 5	123.	.9	.0	.0	.0	.0	.4	.0	.0	.3
6. Recpt 6	138.	1.0	.0	.0	.0	.0	.4	.0	.0	.3
7. Recpt 7	145.	1.1	.0	.0	.0	.0	.5	.0	.0	.4
8. Recpt 8	342.	1.2	.0	.4	.0	.0	.1	.0	.0	.1
9. Recpt 9	339.	1.3	.0	.4	.0	.0	.2	.0	.0	.2
10. Recpt 10	335.	1.5	.0	.2	.0	.0	.3	.0	.1	.5
11. Recpt 11	186.	1.5	.0	.5	.0	.0	.0	.0	.0	.4
12. Recpt 12	182.	1.4	.0	.3	.0	.0	.1	.0	.0	.6
13. Recpt 13	311.	1.4	.0	.0	.0	.0	.0	.0	.4	.3
14. Recpt 14	324.	.8	.0	.0	.0	.0	.2	.0	.0	.3
15. Recpt 15	317.	.7	.1	.0	.0	.0	.1	.0	.0	.2
16. Recpt 16	196.	1.0	.0	.5	.0	.0	.0	.0	.0	.0
17. Recpt 17	206.	.6	.0	.2	.0	.0	.0	.0	.0	.0
18. Recpt 18	214.	.5	.0	.2	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Zura Way NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K
1. Recpt 1	.0	.4	.0
2. Recpt 2	.0	.4	.0
3. Recpt 3	.0	.5	.0
4. Recpt 4	.0	.2	.1
5. Recpt 5	.0	.0	.0
6. Recpt 6	.0	.0	.0
7. Recpt 7	.0	.0	.0
8. Recpt 8	.1	.2	.0
9. Recpt 9	.1	.1	.0
10. Recpt 10	.1	.0	.0
11. Recpt 11	.0	.4	.0
12. Recpt 12	.0	.3	.0
13. Recpt 13	.6	.0	.0
14. Recpt 14	.0	.0	.0
15. Recpt 15	.0	.0	.0
16. Recpt 16	.0	.3	.0
17. Recpt 17	.0	.2	.0
18. Recpt 18	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College & Montezuma NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	10. DEGREES	TEMP=	37.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	150	0	0	0	AG	336	5.5	.0	10.0
B. Mont EBTA	150	-4	0	-4	AG	413	5.5	.0	10.0
C. Mont EBRA	150	-6	0	-6	AG	139	5.5	.0	10.0
D. Mont EBD	0	-4	-150	-4	AG	787	5.5	.0	10.0
E. Mont WBLA	-150	0	0	0	AG	55	5.5	.0	10.0
F. Mont WBTA	-150	4	0	4	AG	781	5.5	.0	10.0
G. Mont WBRA	-150	6	0	6	AG	332	5.5	.0	10.0
H. Mont WBD	0	4	150	4	AG	1523	5.5	.0	10.0
I. Coll NBLA	63	-138	0	0	AG	564	5.5	.0	10.0
J. Coll NBTA	67	-138	4	0	AG	935	5.5	.0	10.0
K. Coll NBRA	69	-138	6	0	AG	161	5.5	.0	10.0
L. Coll NBD	4	0	-4	150	AG	1603	5.5	.0	10.0
M. Coll SBLA	-8	150	0	0	AG	213	5.5	.0	10.0
N. Coll SBTA	-12	150	-4	0	AG	474	5.5	.0	10.0
O. Coll SBRA	-13	150	-6	0	AG	178	5.5	.0	10.0
P. Coll SBD	-4	0	60	-138	AG	668	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College & Montezuma NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-16	-16	1.8
2. Recpt 2	-36	-16	1.8
3. Recpt 3	-56	-16	1.8
4. Recpt 4	-9	-36	1.8
5. Recpt 5	-2	-56	1.8
6. Recpt 6	-16	16	1.8
7. Recpt 7	-36	16	1.8
8. Recpt 8	-56	16	1.8
9. Recpt 9	-17	36	1.8
10. Recpt 10	-18	56	1.8
11. Recpt 11	14	14	1.8
12. Recpt 12	13	34	1.8
13. Recpt 13	12	54	1.8
14. Recpt 14	34	14	1.8
15. Recpt 15	54	14	1.8
16. Recpt 16	20	-16	1.8
17. Recpt 17	30	-36	1.8
18. Recpt 18	40	-56	1.8
19. Recpt 19	40	-16	1.8
20. Recpt 20	60	-16	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College & Montezuma NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	74.	.9	.0	.1	.0	.0	.0	.0	.0	.3
2. Recpt 2	74.	.8	.0	.0	.0	.0	.0	.0	.0	.3
3. Recpt 3	77.	.7	.0	.0	.0	.1	.0	.0	.0	.2
4. Recpt 4	7.	.8	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	3.	.8	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	146.	1.2	.0	.0	.0	.0	.0	.1	.0	.0
7. Recpt 7	105.	.9	.0	.0	.0	.0	.0	.0	.0	.3
8. Recpt 8	103.	.8	.0	.0	.0	.0	.0	.1	.0	.2
9. Recpt 9	153.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	156.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	255.	1.0	.0	.0	.0	.2	.0	.3	.1	.0
12. Recpt 12	202.	.8	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	200.	.8	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	254.	.9	.0	.0	.0	.2	.0	.1	.0	.2
15. Recpt 15	254.	.9	.0	.0	.0	.1	.0	.0	.0	.4
16. Recpt 16	291.	1.0	.0	.0	.0	.2	.0	.2	.0	.0
17. Recpt 17	312.	.9	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	316.	.8	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	286.	.8	.0	.0	.0	.1	.0	.1	.0	.0
20. Recpt 20	286.	.8	.0	.0	.0	.0	.0	.1	.0	.1

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College & Montezuma NTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	.0	.1	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.3	.0	.1	.0	.0
5. Recpt 5	.0	.0	.0	.2	.0	.0	.0	.0
6. Recpt 6	.2	.3	.0	.0	.0	.0	.0	.2
7. Recpt 7	.0	.0	.0	.1	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.1	.2	.0	.1	.0	.1	.0	.1
10. Recpt 10	.0	.2	.0	.2	.0	.1	.0	.0
11. Recpt 11	.0	.0	.0	.3	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.3	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.4	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.1	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.1	.2	.0	.0	.0	.0	.0	.1
17. Recpt 17	.1	.3	.0	.0	.0	.0	.0	.1
18. Recpt 18	.1	.3	.0	.0	.0	.0	.0	.1
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College & Montezuma NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	*	150	0	0	0	*	AG	778	5.5	.0	10.0
B. Mont EBTA	*	150	-4	0	-4	*	AG	1010	5.5	.0	10.0
C. Mont EBRA	*	150	-6	0	-6	*	AG	572	5.5	.0	10.0
D. Mont EBD	*	0	-4	-150	-4	*	AG	1508	5.5	.0	10.0
E. Mont WBLA	*	-150	0	0	0	*	AG	276	5.5	.0	10.0
F. Mont WBTA	*	-150	4	0	4	*	AG	788	5.5	.0	10.0
G. Mont WBRA	*	-150	6	0	6	*	AG	395	5.5	.0	10.0
H. Mont WBD	*	0	4	150	4	*	AG	1522	5.5	.0	10.0
I. Coll NBLA	*	63	-138	0	0	*	AG	525	5.5	.0	10.0
J. Coll NBTA	*	67	-138	4	0	*	AG	709	5.5	.0	10.0
K. Coll NBRA	*	69	-138	6	0	*	AG	101	5.5	.0	10.0
L. Coll NBD	*	4	0	-4	150	*	AG	1882	5.5	.0	10.0
M. Coll SBLA	*	-8	150	0	0	*	AG	397	5.5	.0	10.0
N. Coll SBTA	*	-12	150	-4	0	*	AG	932	5.5	.0	10.0
O. Coll SBRA	*	-13	150	-6	0	*	AG	209	5.5	.0	10.0
P. Coll SBD	*	-4	0	60	-138	*	AG	1780	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
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PAGE 2

JOB: College & Montezuma NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-16	-16	1.8
2. Recpt 2	-36	-16	1.8
3. Recpt 3	-56	-16	1.8
4. Recpt 4	-9	-36	1.8
5. Recpt 5	-2	-56	1.8
6. Recpt 6	-16	16	1.8
7. Recpt 7	-36	16	1.8
8. Recpt 8	-56	16	1.8
9. Recpt 9	-17	36	1.8
10. Recpt 10	-18	56	1.8
11. Recpt 11	14	14	1.8
12. Recpt 12	13	34	1.8
13. Recpt 13	12	54	1.8
14. Recpt 14	34	14	1.8
15. Recpt 15	54	14	1.8
16. Recpt 16	20	-16	1.8
17. Recpt 17	30	-36	1.8
18. Recpt 18	40	-56	1.8
19. Recpt 19	40	-16	1.8
20. Recpt 20	60	-16	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
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JOB: College & Montezuma NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	75.	1.4	.2	.3	.2	.0	.0	.0	.0	.3
2. Recpt 2	76.	1.2	.2	.2	.1	.1	.0	.0	.0	.3
3. Recpt 3	78.	1.1	.1	.1	.0	.2	.0	.0	.0	.2
4. Recpt 4	7.	1.2	.0	.0	.0	.1	.0	.0	.0	.0
5. Recpt 5	3.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	147.	1.7	.0	.0	.0	.2	.0	.1	.0	.0
7. Recpt 7	105.	1.3	.2	.2	.1	.0	.0	.0	.0	.3
8. Recpt 8	104.	1.2	.1	.2	.0	.0	.0	.1	.1	.2
9. Recpt 9	153.	1.5	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	157.	1.4	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	255.	1.4	.0	.0	.0	.3	.0	.3	.1	.0
12. Recpt 12	202.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	200.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	254.	1.2	.0	.0	.0	.3	.0	.1	.0	.2
15. Recpt 15	253.	1.2	.1	.1	.0	.2	.0	.0	.0	.4
16. Recpt 16	291.	1.4	.0	.0	.0	.3	.0	.2	.0	.0
17. Recpt 17	312.	1.1	.0	.0	.0	.1	.0	.0	.0	.0
18. Recpt 18	315.	1.0	.0	.0	.0	.1	.0	.0	.0	.0
19. Recpt 19	288.	1.2	.0	.2	.1	.2	.0	.1	.0	.0
20. Recpt 20	287.	1.2	.1	.2	.2	.0	.0	.0	.0	.1

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
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JOB: College & Montezuma NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	*	.0	.0	.0	.0	.0	.0	.0	.2
2. Recpt 2	*	.0	.0	.0	.0	.0	.0	.0	.1
3. Recpt 3	*	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	*	.0	.0	.0	.4	.1	.2	.0	.1
5. Recpt 5	*	.0	.0	.0	.3	.0	.1	.0	.2
6. Recpt 6	*	.2	.2	.0	.0	.0	.0	.0	.6
7. Recpt 7	*	.0	.0	.0	.1	.0	.0	.0	.0
8. Recpt 8	*	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	*	.1	.2	.0	.1	.0	.2	.0	.3
10. Recpt 10	*	.0	.1	.0	.2	.0	.2	.0	.2
11. Recpt 11	*	.0	.0	.0	.3	.0	.1	.0	.0
12. Recpt 12	*	.0	.0	.0	.4	.0	.0	.0	.1
13. Recpt 13	*	.0	.0	.0	.5	.0	.1	.0	.0
14. Recpt 14	*	.0	.0	.0	.2	.0	.0	.0	.0
15. Recpt 15	*	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	*	.1	.2	.0	.0	.0	.0	.0	.3
17. Recpt 17	*	.1	.2	.0	.0	.0	.0	.0	.3
18. Recpt 18	*	.1	.2	.0	.0	.0	.0	.0	.3
19. Recpt 19	*	.0	.0	.0	.0	.0	.0	.0	.1
20. Recpt 20	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College & El Cajon NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	0. (M)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	10. DEGREES	TEMP=	37.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. EC EBLA	-121	-76	0	0	AG	252	5.5	.0	10.0
B. EC EBTA	-121	-80	0	-4	AG	694	5.5	.0	10.0
C. EC EBRA	-121	-81	0	-6	AG	183	5.5	.0	10.0
D. EC EBD	0	-4	121	72	AG	1304	5.5	.0	10.0
E. EC WBLA	121	76	0	0	AG	331	5.5	.0	10.0
F. EC WBTA	121	80	0	4	AG	543	5.5	.0	10.0
G. EC WBRA	121	81	0	6	AG	298	5.5	.0	10.0
H. EC WBD	0	4	-121	-72	AG	1013	5.5	.0	10.0
I. Coll NBLA1	28	-141	0	-131	AG	237	5.5	.0	10.0
J. Coll NBLA2	0	-131	0	0	AG	237	5.5	.0	10.0
K. Coll NBTA1	31	-141	4	-131	AG	785	5.5	.0	10.0
L. Coll NBTA2	4	-131	4	0	AG	785	5.5	.0	10.0
M. Coll NBRA1	33	-141	6	-131	AG	174	5.5	.0	10.0
N. Coll NBRA2	6	-131	6	0	AG	174	5.5	.0	10.0
O. Coll NBD	4	0	4	150	AG	1335	5.5	.0	10.0
P. Coll SBLA	0	150	0	0	AG	436	5.5	.0	10.0
Q. Coll SBTA	-4	150	-4	0	AG	1065	5.5	.0	10.0
R. Coll SBRA	-6	150	-6	0	AG	233	5.5	.0	10.0
S. Coll SBD1	-4	0	-4	-131	AG	1579	5.5	.0	10.0
T. Coll SBD2	-4	-131	24	-141	AG	1579	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College & El Cajon NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-25	1.8
2. Recpt 2	-34	-38	1.8
3. Recpt 3	-54	-51	1.8
4. Recpt 4	-14	-45	1.8
5. Recpt 5	-14	-65	1.8
6. Recpt 6	-16	5	1.8
7. Recpt 7	-36	-8	1.8
8. Recpt 8	-56	-21	1.8
9. Recpt 9	-16	25	1.8
10. Recpt 10	-16	45	1.8
11. Recpt 11	16	-5	1.8
12. Recpt 12	36	8	1.8
13. Recpt 13	56	21	1.8
14. Recpt 14	16	-25	1.8
15. Recpt 15	16	-45	1.8
16. Recpt 16	14	25	1.8
17. Recpt 17	34	38	1.8
18. Recpt 18	54	51	1.8
19. Recpt 19	14	45	1.8
20. Recpt 20	14	65	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College & El Cajon NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. Recpt 1	16.	1.3	.0	.2	.0	.0	.0	.0	.0	.2
2. Recpt 2	43.	1.0	.0	.1	.0	.2	.0	.0	.0	.0
3. Recpt 3	45.	.9	.0	.2	.0	.1	.0	.0	.0	.1
4. Recpt 4	15.	1.2	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	13.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	72.	1.2	.0	.0	.0	.3	.1	.2	.1	.0
7. Recpt 7	71.	1.0	.0	.0	.0	.3	.0	.1	.0	.2
8. Recpt 8	69.	1.0	.0	.0	.0	.2	.0	.0	.0	.3
9. Recpt 9	165.	1.0	.0	.0	.0	.0	.0	.0	.0	.1
10. Recpt 10	165.	1.0	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	344.	1.2	.0	.0	.0	.3	.0	.0	.0	.0
12. Recpt 12	254.	1.0	.0	.0	.0	.3	.0	.0	.0	.2
13. Recpt 13	252.	1.0	.0	.0	.0	.4	.0	.0	.0	.1
14. Recpt 14	345.	1.0	.0	.0	.0	.1	.0	.0	.0	.0
15. Recpt 15	347.	.9	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	200.	1.3	.0	.0	.0	.2	.0	.1	.0	.0
17. Recpt 17	223.	1.0	.0	.1	.0	.0	.0	.1	.0	.1
18. Recpt 18	225.	.9	.0	.0	.0	.1	.0	.1	.0	.0
19. Recpt 19	196.	1.1	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	195.	1.1	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College & El Cajon NTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	I	J	K	L	M	N	O	P	Q	R	S	T
		CONC/LINK (PPM)											
1. Recpt 1	*	.0	.0	.0	.0	.0	.0	.3	.1	.2	.0	.2	.0
2. Recpt 2	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
3. Recpt 3	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	*	.0	.0	.0	.0	.0	.0	.2	.0	.1	.0	.3	.0
5. Recpt 5	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.4	.0
6. Recpt 6	*	.0	.0	.0	.0	.0	.0	.2	.0	.2	.0	.0	.0
7. Recpt 7	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	*	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.3	.0
10. Recpt 10	*	.0	.0	.0	.1	.0	.0	.0	.0	.2	.0	.2	.0
11. Recpt 11	*	.0	.0	.0	.0	.0	.0	.4	.1	.2	.0	.0	.0
12. Recpt 12	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	*	.0	.0	.0	.0	.0	.0	.3	.1	.2	.0	.0	.0
15. Recpt 15	*	.0	.0	.0	.1	.0	.0	.2	.0	.2	.0	.0	.0
16. Recpt 16	*	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0	.3	.0
17. Recpt 17	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
18. Recpt 18	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	*	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.2	.0
20. Recpt 20	*	.0	.0	.0	.0	.0	.0	.4	.0	.1	.0	.2	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Campanile and Montezuma NT pm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	*	-150	0	0	0	*	AG	182	5.5	.0	10.0
B. Mont EBTA	*	-150	-4	0	-4	*	AG	1384	5.5	.0	10.0
C. Mont EBRA	*	-150	-6	0	-6	*	AG	28	5.5	.0	10.0
D. Mont EBD	*	0	-4	150	-4	*	AG	1909	5.5	.0	10.0
E. Mont WBLA	*	150	0	0	0	*	AG	196	5.5	.0	10.0
F. Mont WBTA	*	150	4	0	4	*	AG	880	5.5	.0	10.0
G. Mont WBRA	*	150	6	0	6	*	AG	236	5.5	.0	10.0
H. Mont WBD	*	0	4	-150	4	*	AG	1075	5.5	.0	10.0
I. Camp NBLA	*	0	-150	0	0	*	AG	25	5.5	.0	10.0
J. Camp NBTA	*	4	-150	4	0	*	AG	39	5.5	.0	10.0
K. Camp NBRA	*	6	-150	6	0	*	AG	155	5.5	.0	10.0
L. Camp NBD	*	4	0	4	150	*	AG	457	5.5	.0	10.0
M. Camp SBLA	*	0	150	0	0	*	AG	370	5.5	.0	10.0
N. Camp SBTA	*	-4	150	-4	0	*	AG	38	5.5	.0	10.0
O. Camp SBRA	*	-6	150	-6	0	*	AG	170	5.5	.0	10.0
P. Camp SBD	*	-4	0	-4	-150	*	AG	262	5.5	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Campanile and Montezuma NT pm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. Recpt 1	*	-14	-16	1.8
2. Recpt 2	*	-34	-16	1.8
3. Recpt 3	*	-54	-16	1.8
4. Recpt 4	*	-14	-36	1.8
5. Recpt 5	*	-14	-56	1.8
6. Recpt 6	*	-16	14	1.8
7. Recpt 7	*	-16	34	1.8
8. Recpt 8	*	-16	54	1.8
9. Recpt 9	*	-36	14	1.8
10. Recpt 10	*	-56	14	1.8
11. Recpt 11	*	16	-14	1.8
12. Recpt 12	*	16	-34	1.8
13. Recpt 13	*	16	-54	1.8
14. Recpt 14	*	36	-14	1.8
15. Recpt 15	*	56	-14	1.8
16. Recpt 16	*	14	16	1.8
17. Recpt 17	*	34	16	1.8
18. Recpt 18	*	54	16	1.8
19. Recpt 19	*	14	36	1.8
20. Recpt 20	*	14	56	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: Campanile and Montezuma NT pm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. Recpt 1	74.	.9	.0	.0	.0	.5	.0	.2	.0	.0
2. Recpt 2	75.	.8	.0	.1	.0	.3	.0	.2	.0	.0
3. Recpt 3	76.	.8	.0	.2	.0	.2	.0	.1	.0	.0
4. Recpt 4	12.	.6	.0	.1	.0	.0	.0	.0	.0	.0
5. Recpt 5	11.	.5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	105.	1.0	.0	.0	.0	.4	.0	.3	.0	.0
7. Recpt 7	116.	.6	.0	.0	.0	.2	.0	.1	.0	.0
8. Recpt 8	124.	.5	.0	.0	.0	.2	.0	.0	.0	.0
9. Recpt 9	104.	.9	.0	.0	.0	.3	.0	.2	.0	.2
10. Recpt 10	102.	.9	.0	.0	.0	.3	.0	.1	.0	.2
11. Recpt 11	73.	.9	.0	.0	.0	.6	.0	.2	.0	.0
12. Recpt 12	348.	.6	.0	.0	.0	.2	.0	.0	.0	.0
13. Recpt 13	350.	.5	.0	.0	.0	.1	.0	.0	.0	.0
14. Recpt 14	290.	.9	.0	.1	.0	.4	.0	.0	.0	.2
15. Recpt 15	286.	.9	.0	.0	.0	.5	.0	.0	.0	.1
16. Recpt 16	253.	.8	.0	.3	.0	.0	.0	.0	.0	.3
17. Recpt 17	254.	.8	.0	.3	.0	.0	.0	.0	.0	.2
18. Recpt 18	255.	.8	.0	.2	.0	.1	.0	.2	.0	.1
19. Recpt 19	244.	.5	.0	.2	.0	.0	.0	.0	.0	.2
20. Recpt 20	201.	.5	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: Campanile and Montezuma NT pm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.1	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.1	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.1	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and I8 EB LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
     U=    1.0 M/S            Z0= 100. CM           ALT=      0. (M)
   BRG= WORST CASE            VD=    .0 CM/S
  CLAS=      7 (G)            VS=    .0 CM/S
  MIXH= 1000. M              AMB=    .0 PPM
 SIGTH=    10. DEGREES      TEMP= 37.0 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. I8 EBRA1	-126	-24	-63	-39	AG	1158	2.1	.0	10.0
B. I8 EBRA2	-63	-39	0	-4	AG	1158	2.1	.0	10.0
C. I8 EBD	0	-4	83	110	AG	1080	2.1	.0	10.0
D. I8 EBLA1	-126	-20	-63	-36	AG	834	2.1	.0	10.0
E. I8 EBLA2	-63	-36	0	0	AG	834	2.1	.0	10.0
F. Coll NBA	4	-150	4	0	AG	3528	2.1	.0	10.0
G. Coll SBA	-4	150	-4	0	AG	1700	2.1	.0	10.0
H. Coll NBD	4	0	4	150	AG	2448	2.1	.0	10.0
I. Coll SBD	-4	0	-4	-150	AG	1225	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and I8 EB LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-20	1.8
2. Recpt 2	-34	-32	1.8
3. Recpt 3	-54	-44	1.8
4. Recpt 4	-14	-40	1.8
5. Recpt 5	-14	-60	1.8
6. Recpt 6	-14	5	1.8
7. Recpt 7	-34	-7	1.8
8. Recpt 8	-54	-19	1.8
9. Recpt 9	-14	25	1.8
10. Recpt 10	-14	45	1.8
11. Recpt 11	14	0	1.8
12. Recpt 12	34	25	1.8
13. Recpt 13	54	50	1.8
14. Recpt 14	14	-20	1.8
15. Recpt 15	14	-40	1.8
16. Recpt 16	14	30	1.8
17. Recpt 17	34	56	1.8
18. Recpt 18	54	82	1.8
19. Recpt 19	14	50	1.8
20. Recpt 20	14	70	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and I8 EB LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	A	B	C	D	E	F	G	H
			CONC/LINK (PPM)							
1. Recpt 1	34.	.6	.0	.1	.1	.0	.0	.0	.0	.1
2. Recpt 2	40.	.5	.0	.1	.0	.0	.0	.0	.0	.0
3. Recpt 3	44.	.4	.0	.1	.0	.0	.0	.0	.0	.0
4. Recpt 4	22.	.5	.0	.0	.0	.0	.0	.1	.0	.0
5. Recpt 5	15.	.4	.0	.0	.0	.0	.0	.1	.0	.0
6. Recpt 6	164.	.5	.0	.0	.0	.0	.0	.2	.0	.0
7. Recpt 7	149.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. Recpt 8	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	164.	.5	.0	.0	.0	.0	.0	.2	.0	.0
10. Recpt 10	165.	.5	.0	.0	.0	.0	.0	.2	.1	.0
11. Recpt 11	249.	.7	.0	.2	.0	.0	.1	.2	.0	.0
12. Recpt 12	237.	.4	.0	.0	.1	.0	.0	.0	.0	.0
13. Recpt 13	233.	.3	.0	.0	.1	.0	.0	.0	.0	.0
14. Recpt 14	337.	.5	.0	.0	.0	.0	.0	.2	.1	.1
15. Recpt 15	340.	.5	.0	.0	.0	.0	.0	.3	.0	.0
16. Recpt 16	195.	.6	.0	.0	.1	.0	.0	.2	.0	.1
17. Recpt 17	201.	.4	.0	.0	.1	.0	.0	.1	.0	.0
18. Recpt 18	204.	.3	.0	.0	.2	.0	.0	.0	.0	.0
19. Recpt 19	194.	.5	.0	.0	.0	.0	.0	.1	.0	.2
20. Recpt 20	195.	.5	.0	.0	.0	.0	.0	.0	.0	.2

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and I8 EB LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	* (PPM) I
1. Recpt 1	.0
2. Recpt 2	.0
3. Recpt 3	.0
4. Recpt 4	.1
5. Recpt 5	.1
6. Recpt 6	.2
7. Recpt 7	.0
8. Recpt 8	.0
9. Recpt 9	.1
10. Recpt 10	.0
11. Recpt 11	.0
12. Recpt 12	.0
13. Recpt 13	.0
14. Recpt 14	.0
15. Recpt 15	.0
16. Recpt 16	.0
17. Recpt 17	.0
18. Recpt 18	.0
19. Recpt 19	.0
20. Recpt 20	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Cyn Crest LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. CC EBTA1	*	-150	-4	-75	-19	*	AG	214	2.1	.0	10.0
B. CC EBLA2	*	-75	-16	0	0	*	AG	103	2.1	.0	10.0
C. CC EBTA2	*	-75	-19	0	-4	*	AG	41	2.1	.0	10.0
D. CC EBRA2	*	-75	-23	0	-7	*	AG	70	2.1	.0	10.0
E. CC EBD1	*	0	-4	55	12	*	AG	1002	2.1	.0	10.0
F. CC EBD2	*	55	12	123	-63	*	AG	1002	2.1	.0	10.0
G. CC WBTA1	*	130	-63	55	15	*	AG	499	2.1	.0	10.0
H. CC WBLA2	*	55	12	0	0	*	AG	130	2.1	.0	10.0
I. CC WBTA2	*	55	15	0	4	*	AG	149	2.1	.0	10.0
J. CC WBRA2	*	55	19	0	7	*	AG	220	2.1	.0	10.0
K. CC WBD1	*	0	4	-75	-12	*	AG	1674	2.1	.0	10.0
L. CC WBD2	*	-75	-12	-150	4	*	AG	1674	2.1	.0	10.0
M. Coll NBLA	*	59	-142	0	0	*	AG	228	2.1	.0	10.0
N. Coll NBTA	*	63	-142	4	0	*	AG	1294	2.1	.0	10.0
O. Coll NBRA	*	66	-142	7	0	*	AG	186	2.1	.0	10.0
P. Coll NBD	*	4	0	4	150	*	AG	1617	2.1	.0	10.0
Q. Coll SBLA	*	0	150	0	0	*	AG	747	2.1	.0	10.0
R. Coll SBTA	*	-4	150	-4	0	*	AG	1848	2.1	.0	10.0
S. Coll SBRA	*	-7	150	-7	0	*	AG	1297	2.1	.0	10.0
T. Coll SBD	*	-4	0	56	-142	*	AG	2048	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Cyn Crest LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-20	1.8
2. Recpt 2	-34	-25	1.8
3. Recpt 3	-54	-30	1.8
4. Recpt 4	-6	-40	1.8
5. Recpt 5	3	-60	1.8
6. Recpt 6	22	-12	1.8
7. Recpt 7	30	-32	1.8
8. Recpt 8	38	-52	1.8
9. Recpt 9	42	-5	1.8
10. Recpt 10	-17	13	1.8
11. Recpt 11	-37	8	1.8
12. Recpt 12	-57	3	1.8
13. Recpt 13	-17	33	1.8
14. Recpt 14	-17	53	1.8
15. Recpt 15	14	20	1.8
16. Recpt 16	34	23	1.8
17. Recpt 17	54	26	1.8
18. Recpt 18	14	40	1.8
19. Recpt 19	14	60	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Cyn Crest LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	11.	.6	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	24.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	29.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	4.	.6	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	360.	.5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	339.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	315.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	317.	.4	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	275.	.4	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	143.	.6	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	101.	.4	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	96.	.4	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	153.	.7	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	157.	.6	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	238.	.5	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	247.	.3	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	250.	.3	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	340.	.5	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	208.	.5	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Cyn Crest LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P	Q	R	S	T
	CONC/LINK (PPM)											
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.1	.0	.2	.1	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.1	.0	.1	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.1	.0	.1	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.1
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0	.0	.2
11. Recpt 11	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.1	.1
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0
15. Recpt 15	.0	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0
16. Recpt 16	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.2	.0	.1	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.2	.0	.1	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   1

     JOB: College and Cyn Crest LTpm
     RUN: Hour 1              (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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I. SITE VARIABLES

```
   U=    1.0 M/S            Z0= 100. CM          ALT=      0. (M)
 BRG= WORST CASE            VD=    .0 CM/S
CLAS=      7 (G)            VS=    .0 CM/S
MIXH= 1000. M              AMB=    .0 PPM
SIGTH=   10. DEGREES       TEMP= 37.0 DEGREE (C)
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II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. CC EBTA1	-150	-4	-75	-19	AG	833	2.1	.0	10.0
B. CC EBLA2	-75	-16	0	0	AG	642	2.1	.0	10.0
C. CC EBTA2	-75	-19	0	-4	AG	70	2.1	.0	10.0
D. CC EBRA2	-75	-23	0	-7	AG	121	2.1	.0	10.0
E. CC EBD1	0	-4	55	12	AG	630	2.1	.0	10.0
F. CC EBD2	55	12	123	-63	AG	630	2.1	.0	10.0
G. CC WBTA1	130	-63	55	15	AG	774	2.1	.0	10.0
H. CC WBLA2	55	12	0	0	AG	207	2.1	.0	10.0
I. CC WBTA2	55	15	0	4	AG	24	2.1	.0	10.0
J. CC WBRA2	55	19	0	7	AG	543	2.1	.0	10.0
K. CC WBD1	0	4	-75	-12	AG	319	2.1	.0	10.0
L. CC WBD2	-75	-12	-150	4	AG	319	2.1	.0	10.0
M. Coll NBLA	59	-142	0	0	AG	106	2.1	.0	10.0
N. Coll NBTA	63	-142	4	0	AG	2345	2.1	.0	10.0
O. Coll NBRA	66	-142	7	0	AG	187	2.1	.0	10.0
P. Coll NBD	4	0	4	150	AG	2668	2.1	.0	10.0
Q. Coll SBLA	0	150	0	0	AG	373	2.1	.0	10.0
R. Coll SBTA	-4	150	-4	0	AG	1821	2.1	.0	10.0
S. Coll SBRA	-7	150	-7	0	AG	189	2.1	.0	10.0
T. Coll SBD	-4	0	56	-142	AG	2149	2.1	.0	10.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   2

     JOB: College and Cyn Crest LTpm
     RUN: Hour 1            (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
```

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. Recpt 1	*	-14	-20	1.8
2. Recpt 2	*	-34	-25	1.8
3. Recpt 3	*	-54	-30	1.8
4. Recpt 4	*	-6	-40	1.8
5. Recpt 5	*	3	-60	1.8
6. Recpt 6	*	22	-12	1.8
7. Recpt 7	*	30	-32	1.8
8. Recpt 8	*	38	-52	1.8
9. Recpt 9	*	42	-5	1.8
10. Recpt 10	*	-17	13	1.8
11. Recpt 11	*	-37	8	1.8
12. Recpt 12	*	-57	3	1.8
13. Recpt 13	*	-17	33	1.8
14. Recpt 14	*	-17	53	1.8
15. Recpt 15	*	14	20	1.8
16. Recpt 16	*	34	23	1.8
17. Recpt 17	*	54	26	1.8
18. Recpt 18	*	14	40	1.8
19. Recpt 19	*	14	60	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Cyn Crest LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	14.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	26.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	30.	.2	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	6.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	1.	.5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	276.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	308.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	314.	.4	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	271.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	144.	.6	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	105.	.3	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	100.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	152.	.6	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	157.	.6	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	341.	.5	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	241.	.3	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	244.	.3	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	340.	.5	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	203.	.5	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Cyn Crest LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.2	.0	.2	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.2	.0	.1	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1
6. Recpt 6	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.1
7. Recpt 7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
8. Recpt 8	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.2	.0	.0	.0	.1	.0	.1
14. Recpt 14	.0	.0	.0	.0	.0	.1	.0	.0	.0	.1	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.3	.0	.1	.0	.0
16. Recpt 16	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.3	.0	.1	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.3	.0	.1	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Zura Way LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Zura Way	*	74	-16	0	0	*	AG	128	2.1	.0	10.0
B. Coll NBTA	*	4	-150	4	0	*	AG	1564	2.1	.0	10.0
C. Coll NBRA	*	6	-150	6	0	*	AG	200	2.1	.0	10.0
D. Coll SBLA1	*	-20	71	0	0	*	AG	580	2.1	.0	10.0
E. Coll SBTA1	*	-23	71	-4	0	*	AG	1475	2.1	.0	10.0
F. Coll SBLA2	*	-71	126	-20	71	*	AG	580	2.1	.0	10.0
G. Coll SBTA2	*	-75	126	-23	71	*	AG	1475	2.1	.0	10.0
H. Coll NBD1	*	4	0	-16	71	*	AG	1692	2.1	.0	10.0
I. Coll NBD2	*	-16	71	-67	129	*	AG	1692	2.1	.0	10.0
J. Coll SBD	*	-4	0	-4	-150	*	AG	1475	2.1	.0	10.0
K. Zura WayD	*	0	-4	74	-20	*	AG	780	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College and Zura Way LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-60	1.8
2. Recpt 2	-14	-40	1.8
3. Recpt 3	-14	-20	1.8
4. Recpt 4	-14	0	1.8
5. Recpt 5	-19	20	1.8
6. Recpt 6	-24	40	1.8
7. Recpt 7	-29	60	1.8
8. Recpt 8	14	-60	1.8
9. Recpt 9	14	-40	1.8
10. Recpt 10	14	-20	1.8
11. Recpt 11	6	20	1.8
12. Recpt 12	1	40	1.8
13. Recpt 13	-4	60	1.8
14. Recpt 14	34	-22	1.8
15. Recpt 15	54	-24	1.8
16. Recpt 16	14	5	1.8
17. Recpt 17	34	2	1.8
18. Recpt 18	54	-1	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Zura Way LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	22.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	160.	.3	.0	.1	.0	.0	.0	.0	.0	.0
3. Recpt 3	163.	.3	.0	.1	.0	.0	.0	.0	.0	.0
4. Recpt 4	102.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	124.	.4	.0	.0	.0	.0	.1	.0	.0	.0
6. Recpt 6	139.	.4	.0	.0	.0	.0	.2	.0	.0	.1
7. Recpt 7	145.	.4	.0	.0	.0	.0	.2	.0	.0	.1
8. Recpt 8	342.	.5	.0	.2	.0	.0	.0	.0	.0	.0
9. Recpt 9	339.	.5	.0	.1	.0	.0	.0	.0	.0	.0
10. Recpt 10	334.	.6	.0	.0	.0	.0	.1	.0	.0	.1
11. Recpt 11	186.	.6	.0	.2	.0	.0	.0	.0	.0	.1
12. Recpt 12	183.	.5	.0	.0	.0	.0	.0	.0	.0	.2
13. Recpt 13	311.	.5	.0	.0	.0	.0	.0	.0	.1	.1
14. Recpt 14	324.	.3	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	317.	.3	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	196.	.4	.0	.2	.0	.0	.0	.0	.0	.0
17. Recpt 17	206.	.2	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	214.	.2	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Zura Way LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K
1. Recpt 1	.0	.2	.0
2. Recpt 2	.0	.2	.0
3. Recpt 3	.0	.2	.0
4. Recpt 4	.0	.0	.1
5. Recpt 5	.0	.0	.0
6. Recpt 6	.0	.0	.0
7. Recpt 7	.0	.0	.0
8. Recpt 8	.0	.0	.0
9. Recpt 9	.0	.0	.0
10. Recpt 10	.0	.0	.0
11. Recpt 11	.0	.1	.0
12. Recpt 12	.0	.1	.0
13. Recpt 13	.2	.0	.0
14. Recpt 14	.0	.0	.0
15. Recpt 15	.0	.0	.0
16. Recpt 16	.0	.1	.0
17. Recpt 17	.0	.0	.0
18. Recpt 18	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College and Zura Way LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Zura Way	74	-16	0	0	AG	664	2.1	.0	10.0
B. Coll NBTA	4	-150	4	0	AG	1974	2.1	.0	10.0
C. Coll NBRA	6	-150	6	0	AG	204	2.1	.0	10.0
D. Coll SBLA1	-20	71	0	0	AG	315	2.1	.0	10.0
E. Coll SBTA1	-23	71	-4	0	AG	1834	2.1	.0	10.0
F. Coll SBLA2	-71	126	-20	71	AG	315	2.1	.0	10.0
G. Coll SBTA2	-75	126	-23	71	AG	1834	2.1	.0	10.0
H. Coll NBD1	4	0	-16	71	AG	2638	2.1	.0	10.0
I. Coll NBD2	-16	71	-67	129	AG	2638	2.1	.0	10.0
J. Coll SBD	-4	0	-4	-150	AG	1834	2.1	.0	10.0
K. Zura WayD	0	-4	74	-20	AG	519	2.1	.0	10.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   2

     JOB: College and Zura Way LTpm
     RUN: Hour 1           (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-60	1.8
2. Recpt 2	-14	-40	1.8
3. Recpt 3	-14	-20	1.8
4. Recpt 4	-14	0	1.8
5. Recpt 5	-19	20	1.8
6. Recpt 6	-24	40	1.8
7. Recpt 7	-29	60	1.8
8. Recpt 8	14	-60	1.8
9. Recpt 9	14	-40	1.8
10. Recpt 10	14	-20	1.8
11. Recpt 11	6	20	1.8
12. Recpt 12	1	40	1.8
13. Recpt 13	-4	60	1.8
14. Recpt 14	34	-22	1.8
15. Recpt 15	54	-24	1.8
16. Recpt 16	14	5	1.8
17. Recpt 17	34	2	1.8
18. Recpt 18	54	-1	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College and Zura Way LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	22.	.4	.0	.1	.0	.0	.0	.0	.0	.0
2. Recpt 2	160.	.4	.0	.1	.0	.0	.0	.0	.0	.0
3. Recpt 3	160.	.4	.0	.1	.0	.0	.0	.0	.0	.0
4. Recpt 4	100.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	123.	.4	.0	.0	.0	.0	.2	.0	.0	.1
6. Recpt 6	137.	.5	.0	.0	.0	.0	.2	.0	.0	.2
7. Recpt 7	143.	.5	.0	.0	.0	.0	.2	.0	.0	.2
8. Recpt 8	342.	.5	.0	.2	.0	.0	.0	.0	.0	.0
9. Recpt 9	340.	.6	.0	.2	.0	.0	.0	.0	.0	.1
10. Recpt 10	335.	.7	.0	.1	.0	.0	.1	.0	.0	.2
11. Recpt 11	186.	.7	.0	.2	.0	.0	.0	.0	.0	.2
12. Recpt 12	183.	.7	.0	.1	.0	.0	.0	.0	.0	.3
13. Recpt 13	311.	.7	.0	.0	.0	.0	.0	.0	.2	.2
14. Recpt 14	324.	.4	.0	.0	.0	.0	.0	.0	.0	.1
15. Recpt 15	317.	.3	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	196.	.5	.0	.2	.0	.0	.0	.0	.0	.0
17. Recpt 17	206.	.3	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	256.	.2	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College and Zura Way LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K
1. Recpt 1	.0	.2	.0
2. Recpt 2	.0	.2	.0
3. Recpt 3	.0	.2	.0
4. Recpt 4	.0	.1	.0
5. Recpt 5	.0	.0	.0
6. Recpt 6	.0	.0	.0
7. Recpt 7	.0	.0	.0
8. Recpt 8	.0	.0	.0
9. Recpt 9	.0	.0	.0
10. Recpt 10	.0	.0	.0
11. Recpt 11	.0	.2	.0
12. Recpt 12	.0	.1	.0
13. Recpt 13	.3	.0	.0
14. Recpt 14	.0	.0	.0
15. Recpt 15	.0	.0	.0
16. Recpt 16	.0	.1	.0
17. Recpt 17	.0	.0	.0
18. Recpt 18	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: College & Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	*	150	0	0	0	*	AG	451	2.1	.0	10.0
B. Mont EBTA	*	150	-4	0	-4	*	AG	406	2.1	.0	10.0
C. Mont EBRA	*	150	-6	0	-6	*	AG	158	2.1	.0	10.0
D. Mont EBD	*	0	-4	-150	-4	*	AG	816	2.1	.0	10.0
E. Mont WBLA	*	-150	0	0	0	*	AG	58	2.1	.0	10.0
F. Mont WBTA	*	-150	4	0	4	*	AG	740	2.1	.0	10.0
G. Mont WBRA	*	-150	6	0	6	*	AG	310	2.1	.0	10.0
H. Mont WBD	*	0	4	150	4	*	AG	1391	2.1	.0	10.0
I. Coll NBLA	*	63	-138	0	0	*	AG	679	2.1	.0	10.0
J. Coll NBTA	*	67	-138	4	0	*	AG	1099	2.1	.0	10.0
K. Coll NBRA	*	69	-138	6	0	*	AG	170	2.1	.0	10.0
L. Coll NBD	*	4	0	-4	150	*	AG	1860	2.1	.0	10.0
M. Coll SBLA	*	-8	150	0	0	*	AG	240	2.1	.0	10.0
N. Coll SBTA	*	-12	150	-4	0	*	AG	550	2.1	.0	10.0
O. Coll SBRA	*	-13	150	-6	0	*	AG	272	2.1	.0	10.0
P. Coll SBD	*	-4	0	60	-138	*	AG	766	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: College & Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-16	-16	1.8
2. Recpt 2	-36	-16	1.8
3. Recpt 3	-56	-16	1.8
4. Recpt 4	-9	-36	1.8
5. Recpt 5	-2	-56	1.8
6. Recpt 6	-16	16	1.8
7. Recpt 7	-36	16	1.8
8. Recpt 8	-56	16	1.8
9. Recpt 9	-17	36	1.8
10. Recpt 10	-18	56	1.8
11. Recpt 11	14	14	1.8
12. Recpt 12	13	34	1.8
13. Recpt 13	12	54	1.8
14. Recpt 14	34	14	1.8
15. Recpt 15	54	14	1.8
16. Recpt 16	20	-16	1.8
17. Recpt 17	30	-36	1.8
18. Recpt 18	40	-56	1.8
19. Recpt 19	40	-16	1.8
20. Recpt 20	60	-16	1.8

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   3

     JOB: College & Montezuma LTam
     RUN: Hour 1          (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	74.	.4	.0	.0	.0	.0	.0	.0	.0	.1
2. Recpt 2	75.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	77.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	7.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	3.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	146.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	105.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	103.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	153.	.5	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	156.	.4	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	255.	.4	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	202.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	201.	.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	254.	.4	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	254.	.3	.0	.0	.0	.0	.0	.0	.0	.1
16. Recpt 16	291.	.4	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	312.	.4	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	316.	.4	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	286.	.3	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	286.	.3	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College & Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P
				CONC/LINK (PPM)				
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.1	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.1	.0	.0	.0	.0
6. Recpt 6	.0	.1	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.1	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.1	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.2	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.1	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.1	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.1	.0	.0	.0	.0	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   1

     JOB: College & Montezuma LTpm
     RUN: Hour 1            (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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I. SITE VARIABLES

```
   U=   1.0 M/S             Z0= 100. CM          ALT=     0. (M)
 BRG= WORST CASE            VD=    .0 CM/S
CLAS=      7 (G)            VS=    .0 CM/S
MIXH= 1000. M              AMB=    .0 PPM
SIGTH=   10. DEGREES       TEMP= 37.0 DEGREE (C)
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II. LINK VARIABLES

LINK DESCRIPTION	*	X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	*	150	0	0	0	*	AG	1302	2.1	.0	10.0
B. Mont EBTA	*	150	-4	0	-4	*	AG	967	2.1	.0	10.0
C. Mont EBRA	*	150	-6	0	-6	*	AG	657	2.1	.0	10.0
D. Mont EBD	*	0	-4	-150	-4	*	AG	1469	2.1	.0	10.0
E. Mont WBLA	*	-150	0	0	0	*	AG	290	2.1	.0	10.0
F. Mont WBTA	*	-150	4	0	4	*	AG	776	2.1	.0	10.0
G. Mont WBRA	*	-150	6	0	6	*	AG	384	2.1	.0	10.0
H. Mont WBD	*	0	4	150	4	*	AG	1789	2.1	.0	10.0
I. Coll NBLA	*	63	-138	0	0	*	AG	707	2.1	.0	10.0
J. Coll NBTA	*	67	-138	4	0	*	AG	782	2.1	.0	10.0
K. Coll NBRA	*	69	-138	6	0	*	AG	63	2.1	.0	10.0
L. Coll NBD	*	4	0	-4	150	*	AG	2468	2.1	.0	10.0
M. Coll SBLA	*	-8	150	0	0	*	AG	439	2.1	.0	10.0
N. Coll SBTA	*	-12	150	-4	0	*	AG	1084	2.1	.0	10.0
O. Coll SBRA	*	-13	150	-6	0	*	AG	306	2.1	.0	10.0
P. Coll SBD	*	-4	0	60	-138	*	AG	2031	2.1	.0	10.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   2

     JOB: College & Montezuma LTpm
     RUN: Hour 1            (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-16	-16	1.8
2. Recpt 2	-36	-16	1.8
3. Recpt 3	-56	-16	1.8
4. Recpt 4	-9	-36	1.8
5. Recpt 5	-2	-56	1.8
6. Recpt 6	-16	16	1.8
7. Recpt 7	-36	16	1.8
8. Recpt 8	-56	16	1.8
9. Recpt 9	-17	36	1.8
10. Recpt 10	-18	56	1.8
11. Recpt 11	14	14	1.8
12. Recpt 12	13	34	1.8
13. Recpt 13	12	54	1.8
14. Recpt 14	34	14	1.8
15. Recpt 15	54	14	1.8
16. Recpt 16	20	-16	1.8
17. Recpt 17	30	-36	1.8
18. Recpt 18	40	-56	1.8
19. Recpt 19	40	-16	1.8
20. Recpt 20	60	-16	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: College & Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	75.	.6	.1	.1	.0	.0	.0	.0	.0	.1
2. Recpt 2	76.	.5	.0	.0	.0	.0	.0	.0	.0	.1
3. Recpt 3	78.	.5	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	8.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	3.	.5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	147.	.7	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	104.	.6	.0	.0	.0	.0	.0	.0	.0	.1
8. Recpt 8	103.	.5	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	153.	.6	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	156.	.6	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	224.	.6	.0	.0	.0	.0	.0	.0	.0	.1
12. Recpt 12	202.	.5	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	200.	.5	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	245.	.5	.0	.0	.0	.0	.0	.0	.0	.2
15. Recpt 15	249.	.5	.0	.0	.0	.0	.0	.0	.0	.2
16. Recpt 16	338.	.6	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	315.	.5	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	315.	.4	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	298.	.5	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	292.	.5	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: College & Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.1
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.2	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.1	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.2
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.1
10. Recpt 10	.0	.0	.0	.1	.0	.1	.0	.0
11. Recpt 11	.0	.0	.0	.2	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.2	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.2	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.0	.0	.2	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.1
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: 55th and Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	-150	0	0	0	AG	1114	2.1	.0	10.0
B. Mont EBTA	-150	-4	0	-4	AG	625	2.1	.0	10.0
C. Mont EBRA	-150	-6	0	-6	AG	26	2.1	.0	10.0
D. Mont EBD	0	-4	150	-4	AG	778	2.1	.0	10.0
E. Mont WBLA	150	0	0	0	AG	20	2.1	.0	10.0
F. Mont WBTA	150	4	0	4	AG	1194	2.1	.0	10.0
G. Mont WBRA	150	6	0	6	AG	375	2.1	.0	10.0
H. Mont WBD	0	4	-150	4	AG	1446	2.1	.0	10.0
I. 55th NBLA	0	-150	0	0	AG	50	2.1	.0	10.0
J. 55th NBTA	4	-150	4	0	AG	15	2.1	.0	10.0
K. 55th NBRA	6	-150	6	0	AG	10	2.1	.0	10.0
L. 55th NBD	4	0	4	150	AG	1504	2.1	.0	10.0
M. 55th SBLA	0	150	0	0	AG	143	2.1	.0	10.0
N. 55th SBTA	-4	150	-4	0	AG	10	2.1	.0	10.0
O. 55th SBRA	-6	150	-6	0	AG	202	2.1	.0	10.0
P. 55th SBD	-4	0	-4	-150	AG	56	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: 55th and Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-16	1.8
2. Recpt 2	-34	-16	1.8
3. Recpt 3	-54	-16	1.8
4. Recpt 4	-14	-36	1.8
5. Recpt 5	-14	-56	1.8
6. Recpt 6	-16	14	1.8
7. Recpt 7	-16	34	1.8
8. Recpt 8	-16	54	1.8
9. Recpt 9	-36	14	1.8
10. Recpt 10	-56	14	1.8
11. Recpt 11	16	-14	1.8
12. Recpt 12	16	-34	1.8
13. Recpt 13	16	-54	1.8
14. Recpt 14	36	-14	1.8
15. Recpt 15	56	-14	1.8
16. Recpt 16	14	16	1.8
17. Recpt 17	34	16	1.8
18. Recpt 18	54	16	1.8
19. Recpt 19	14	36	1.8
20. Recpt 20	14	56	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 55th and Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	15.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	50.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	66.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	12.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	10.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	104.	.4	.0	.0	.0	.0	.0	.1	.0	.0
7. Recpt 7	115.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	135.	.2	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	104.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	104.	.3	.0	.0	.0	.0	.0	.0	.0	.1
11. Recpt 11	345.	.3	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	349.	.2	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	351.	.2	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	284.	.3	.0	.0	.0	.0	.0	.0	.0	.1
15. Recpt 15	284.	.3	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	252.	.4	.0	.0	.0	.0	.0	.0	.0	.1
17. Recpt 17	256.	.4	.0	.0	.0	.0	.0	.0	.0	.1
18. Recpt 18	259.	.3	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	244.	.3	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	205.	.3	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: 55th and Montezuma LTam
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	.0	.0	.0	.1	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.1	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.2	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.1	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.0	.0	.1	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	.0	.0	.0	.1	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.2	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: 55th and Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	*	-150	0	0	0	*	AG	571	2.1	.0	10.0
B. Mont EBTA	*	-150	-4	0	-4	*	AG	1395	2.1	.0	10.0
C. Mont EBRA	*	-150	-6	0	-6	*	AG	117	2.1	.0	10.0
D. Mont EBD	*	0	-4	150	-4	*	AG	1990	2.1	.0	10.0
E. Mont WBLA	*	150	0	0	0	*	AG	30	2.1	.0	10.0
F. Mont WBTA	*	150	4	0	4	*	AG	1613	2.1	.0	10.0
G. Mont WBRA	*	150	6	0	6	*	AG	217	2.1	.0	10.0
H. Mont WBD	*	0	4	-150	4	*	AG	2236	2.1	.0	10.0
I. 55th NBLA	*	0	-150	0	0	*	AG	60	2.1	.0	10.0
J. 55th NBTA	*	4	-150	4	0	*	AG	15	2.1	.0	10.0
K. 55th NBRA	*	6	-150	6	0	*	AG	20	2.1	.0	10.0
L. 55th NBD	*	4	0	4	150	*	AG	803	2.1	.0	10.0
M. 55th SBLA	*	0	150	0	0	*	AG	575	2.1	.0	10.0
N. 55th SBTA	*	-4	150	-4	0	*	AG	20	2.1	.0	10.0
O. 55th SBRA	*	-6	150	-6	0	*	AG	563	2.1	.0	10.0
P. 55th SBD	*	-4	0	-4	-150	*	AG	167	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: 55th and Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-16	1.8
2. Recpt 2	-34	-16	1.8
3. Recpt 3	-54	-16	1.8
4. Recpt 4	-14	-36	1.8
5. Recpt 5	-14	-56	1.8
6. Recpt 6	-16	14	1.8
7. Recpt 7	-16	34	1.8
8. Recpt 8	-16	54	1.8
9. Recpt 9	-36	14	1.8
10. Recpt 10	-56	14	1.8
11. Recpt 11	16	-14	1.8
12. Recpt 12	16	-34	1.8
13. Recpt 13	16	-54	1.8
14. Recpt 14	36	-14	1.8
15. Recpt 15	56	-14	1.8
16. Recpt 16	14	16	1.8
17. Recpt 17	34	16	1.8
18. Recpt 18	54	16	1.8
19. Recpt 19	14	36	1.8
20. Recpt 20	14	56	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: 55th and Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	14.	.4	.0	.0	.0	.0	.0	.0	.0	.1
2. Recpt 2	45.	.4	.0	.1	.0	.0	.0	.0	.0	.1
3. Recpt 3	66.	.4	.0	.1	.0	.0	.0	.0	.0	.1
4. Recpt 4	10.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	9.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	106.	.5	.0	.0	.0	.1	.0	.2	.0	.0
7. Recpt 7	116.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	149.	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	105.	.5	.0	.0	.0	.1	.0	.0	.0	.1
10. Recpt 10	105.	.5	.0	.0	.0	.0	.0	.0	.0	.2
11. Recpt 11	286.	.4	.0	.2	.0	.0	.0	.0	.0	.2
12. Recpt 12	348.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	350.	.2	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	286.	.4	.0	.0	.0	.1	.0	.0	.0	.1
15. Recpt 15	285.	.4	.0	.0	.0	.2	.0	.0	.0	.0
16. Recpt 16	253.	.5	.0	.1	.0	.0	.0	.0	.0	.2
17. Recpt 17	256.	.5	.0	.0	.0	.0	.0	.0	.0	.1
18. Recpt 18	257.	.4	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	244.	.3	.0	.0	.0	.0	.0	.0	.0	.1
20. Recpt 20	209.	.3	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: 55th and Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Campanile and Montezuma LT am
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 0. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 37.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	X1	Y1	X2	Y2	*	TYPE	VPH	EF (G/MI)	H (M)	W (M)
		LINK COORDINATES (M)									
A. Mont EBLA	*	-150	0	0	0	*	AG	191	2.1	.0	10.0
B. Mont EBTA	*	-150	-4	0	-4	*	AG	784	2.1	.0	10.0
C. Mont EBRA	*	-150	-6	0	-6	*	AG	38	2.1	.0	10.0
D. Mont EBD	*	0	-4	150	-4	*	AG	1015	2.1	.0	10.0
E. Mont WBLA	*	150	0	0	0	*	AG	99	2.1	.0	10.0
F. Mont WBTA	*	150	4	0	4	*	AG	1321	2.1	.0	10.0
G. Mont WBRA	*	150	6	0	6	*	AG	271	2.1	.0	10.0
H. Mont WBD	*	0	4	-150	4	*	AG	1550	2.1	.0	10.0
I. Camp NBLA	*	0	-150	0	0	*	AG	34	2.1	.0	10.0
J. Camp NBTA	*	4	-150	4	0	*	AG	30	2.1	.0	10.0
K. Camp NBRA	*	6	-150	6	0	*	AG	105	2.1	.0	10.0
L. Camp NBD	*	4	0	4	150	*	AG	492	2.1	.0	10.0
M. Camp SBLA	*	0	150	0	0	*	AG	126	2.1	.0	10.0
N. Camp SBTA	*	-4	150	-4	0	*	AG	25	2.1	.0	10.0
O. Camp SBRA	*	-6	150	-6	0	*	AG	195	2.1	.0	10.0
P. Camp SBD	*	-4	0	-4	-150	*	AG	162	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Campanile and Montezuma LT am
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-14	-16	1.8
2. Recpt 2	-34	-16	1.8
3. Recpt 3	-54	-16	1.8
4. Recpt 4	-14	-36	1.8
5. Recpt 5	-14	-56	1.8
6. Recpt 6	-16	14	1.8
7. Recpt 7	-16	34	1.8
8. Recpt 8	-16	54	1.8
9. Recpt 9	-36	14	1.8
10. Recpt 10	-56	14	1.8
11. Recpt 11	16	-14	1.8
12. Recpt 12	16	-34	1.8
13. Recpt 13	16	-54	1.8
14. Recpt 14	36	-14	1.8
15. Recpt 15	56	-14	1.8
16. Recpt 16	14	16	1.8
17. Recpt 17	34	16	1.8
18. Recpt 18	54	16	1.8
19. Recpt 19	14	36	1.8
20. Recpt 20	14	56	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: Campanile and Montezuma LT am
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	74.	.3	.0	.0	.0	.1	.0	.0	.0	.0
2. Recpt 2	74.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	75.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	12.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	10.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	105.	.4	.0	.0	.0	.0	.0	.1	.0	.0
7. Recpt 7	113.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	120.	.2	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	102.	.3	.0	.0	.0	.0	.0	.1	.0	.0
10. Recpt 10	102.	.3	.0	.0	.0	.0	.0	.0	.0	.1
11. Recpt 11	285.	.3	.0	.0	.0	.0	.0	.0	.0	.1
12. Recpt 12	348.	.2	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	350.	.2	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	286.	.3	.0	.0	.0	.0	.0	.0	.0	.1
15. Recpt 15	285.	.3	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	253.	.3	.0	.0	.0	.0	.0	.0	.0	.2
17. Recpt 17	254.	.3	.0	.0	.0	.0	.0	.0	.0	.1
18. Recpt 18	255.	.3	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	244.	.2	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	203.	.2	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: Campanile and Montezuma LT am
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. Recpt 1	*	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	*	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	*	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	*	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	*	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	*	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	*	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	*	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	*	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	*	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	*	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	*	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	*	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	*	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	*	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	*	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	*	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	*	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	*	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	*	.0	.0	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   1

     JOB: Campanile & Montezuma LTpm
     RUN: Hour 1              (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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I. SITE VARIABLES

```
     U=    1.0 M/S            Z0= 100. CM          ALT=      0. (M)
   BRG= WORST CASE            VD=    .0 CM/S
  CLAS=      7 (G)            VS=    .0 CM/S
  MIXH= 1000. M              AMB=    .0 PPM
 SIGTH=    10. DEGREES      TEMP= 37.0 DEGREE (C)
```

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Mont EBLA	150	0	0	0	AG	263	2.1	.0	10.0
B. Mont EBTA	150	-4	0	-4	AG	1744	2.1	.0	10.0
C. Mont EBRA	150	-6	0	-6	AG	35	2.1	.0	10.0
D. Mont EBD	0	-4	-150	-4	AG	2277	2.1	.0	10.0
E. Mont WBLA	-150	0	0	0	AG	250	2.1	.0	10.0
F. Mont WBTA	-150	4	0	4	AG	1202	2.1	.0	10.0
G. Mont WBRA	-150	6	0	6	AG	337	2.1	.0	10.0
H. Mont WBD	0	4	150	4	AG	1860	2.1	.0	10.0
I. Coll NBLA	63	-138	0	0	AG	32	2.1	.0	10.0
J. Coll NBTA	67	-138	4	0	AG	41	2.1	.0	10.0
K. Coll NBRA	69	-138	6	0	AG	155	2.1	.0	10.0
L. Coll NBD	4	0	-4	150	AG	641	2.1	.0	10.0
M. Coll SBLA	-8	150	0	0	AG	378	2.1	.0	10.0
N. Coll SBTA	-12	150	-4	0	AG	76	2.1	.0	10.0
O. Coll SBRA	-13	150	-6	0	AG	626	2.1	.0	10.0
P. Coll SBD	-4	0	60	-138	AG	361	2.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Campanile & Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Recpt 1	-16	-16	1.8
2. Recpt 2	-36	-16	1.8
3. Recpt 3	-56	-16	1.8
4. Recpt 4	-9	-36	1.8
5. Recpt 5	-2	-56	1.8
6. Recpt 6	-16	16	1.8
7. Recpt 7	-36	16	1.8
8. Recpt 8	-56	16	1.8
9. Recpt 9	-17	36	1.8
10. Recpt 10	-18	56	1.8
11. Recpt 11	14	14	1.8
12. Recpt 12	13	34	1.8
13. Recpt 13	12	54	1.8
14. Recpt 14	34	14	1.8
15. Recpt 15	54	14	1.8
16. Recpt 16	20	-16	1.8
17. Recpt 17	30	-36	1.8
18. Recpt 18	40	-56	1.8
19. Recpt 19	40	-16	1.8
20. Recpt 20	60	-16	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: Campanile & Montezuma LTpm
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Recpt 1	13.	.4	.0	.0	.0	.1	.0	.0	.0	.0
2. Recpt 2	68.	.4	.0	.0	.0	.1	.0	.0	.0	.0
3. Recpt 3	73.	.4	.0	.0	.0	.2	.0	.0	.0	.0
4. Recpt 4	5.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	1.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	107.	.5	.0	.1	.0	.0	.0	.0	.0	.2
7. Recpt 7	106.	.4	.0	.1	.0	.0	.0	.0	.0	.1
8. Recpt 8	105.	.4	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	151.	.3	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	155.	.3	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	255.	.5	.0	.0	.0	.2	.0	.1	.0	.0
12. Recpt 12	244.	.3	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	236.	.3	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	256.	.5	.0	.0	.0	.1	.0	.0	.0	.0
15. Recpt 15	257.	.4	.0	.0	.0	.1	.0	.0	.0	.1
16. Recpt 16	287.	.4	.0	.0	.0	.2	.0	.0	.0	.0
17. Recpt 17	332.	.3	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	330.	.2	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	286.	.4	.0	.0	.0	.1	.0	.0	.0	.0
20. Recpt 20	286.	.4	.0	.1	.0	.0	.0	.0	.0	.0

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CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
         JUNE 1989 VERSION
         PAGE   4

     JOB: Campanile & Montezuma LTpm
     RUN: Hour 1            (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide
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IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	I	J	K	L	M	N	O	P
	CONC/LINK (PPM)							
1. Recpt 1	.0	.0	.0	.0	.0	.0	.0	.0
2. Recpt 2	.0	.0	.0	.0	.0	.0	.0	.0
3. Recpt 3	.0	.0	.0	.0	.0	.0	.0	.0
4. Recpt 4	.0	.0	.0	.0	.0	.0	.0	.0
5. Recpt 5	.0	.0	.0	.0	.0	.0	.0	.0
6. Recpt 6	.0	.0	.0	.0	.0	.0	.0	.0
7. Recpt 7	.0	.0	.0	.0	.0	.0	.0	.0
8. Recpt 8	.0	.0	.0	.0	.0	.0	.0	.0
9. Recpt 9	.0	.0	.0	.0	.0	.0	.0	.0
10. Recpt 10	.0	.0	.0	.0	.0	.0	.0	.0
11. Recpt 11	.0	.0	.0	.0	.0	.0	.0	.0
12. Recpt 12	.0	.0	.0	.0	.0	.0	.0	.0
13. Recpt 13	.0	.0	.0	.0	.0	.0	.0	.0
14. Recpt 14	.0	.0	.0	.0	.0	.0	.0	.0
15. Recpt 15	.0	.0	.0	.0	.0	.0	.0	.0
16. Recpt 16	.0	.0	.0	.0	.0	.0	.0	.0
17. Recpt 17	.0	.0	.0	.0	.0	.0	.0	.0
18. Recpt 18	.0	.0	.0	.0	.0	.0	.0	.0
19. Recpt 19	.0	.0	.0	.0	.0	.0	.0	.0
20. Recpt 20	.0	.0	.0	.0	.0	.0	.0	.0

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Urbemis\Urbemis 9.2.2\Projects\Plaza Linda Verde Phase I Construction Excavation.urb924

Project Name: SDSU Plaza Linda Verde

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	7.28	51.28	39.82	0.02	79.42	2.91	82.02	16.60	2.68	18.99	6,015.68
2011 TOTALS (lbs/day mitigated)	7.28	51.28	39.82	0.02	18.76	2.91	21.36	3.93	2.68	6.32	6,015.68
2012 TOTALS (lbs/day unmitigated)	84.65	83.88	68.15	0.03	0.12	5.94	6.06	0.04	5.46	5.50	10,728.57
2012 TOTALS (lbs/day mitigated)	45.82	83.88	68.15	0.03	0.12	5.94	6.06	0.04	5.46	5.50	10,728.57

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/3/2011-3/31/2011 Active Days: 64	2.38	21.80	12.25	0.02	11.82	1.24	13.06	2.47	1.14	3.61	2,820.55
Demolition 01/01/2011-03/31/2011	2.38	21.80	12.25	0.02	11.82	1.24	13.06	2.47	1.14	3.61	2,820.55
Fugitive Dust	0.00	0.00	0.00	0.00	11.76	0.00	11.76	2.45	0.00	2.45	0.00
Demo Off Road Diesel	1.65	11.52	7.24	0.00	0.00	0.85	0.85	0.00	0.78	0.78	1,101.59
Demo On Road Diesel	0.68	10.20	3.48	0.01	0.05	0.39	0.44	0.02	0.35	0.37	1,565.67
Demo Worker Trips	0.05	0.08	1.53	0.00	0.01	0.00	0.01	0.00	0.00	0.01	153.29
Time Slice 4/1/2011-4/15/2011 Active Days: 11	5.65	51.28	26.93	0.02	**79.42**	2.60	**82.02**	**16.60**	2.39	**18.99**	6,015.68
Mass Grading 04/01/2011-04/15/2011	0.99	14.78	5.04	0.02	48.81	0.56	49.37	10.20	0.51	10.72	2,269.20
Mass Grading Dust	0.00	0.00	0.00	0.00	48.73	0.00	48.73	10.18	0.00	10.18	0.00
Mass Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading On Road Diesel	0.99	14.78	5.04	0.02	0.08	0.56	0.64	0.03	0.51	0.54	2,269.20
Mass Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 04/01/2011-06/30/2011	4.66	36.50	21.89	0.00	30.61	2.04	32.65	6.39	1.88	8.27	3,746.48
Mass Grading Dust	0.00	0.00	0.00	0.00	30.60	0.00	30.60	6.39	0.00	6.39	0.00
Mass Grading Off Road Diesel	4.61	36.41	20.11	0.00	0.00	2.04	2.04	0.00	1.87	1.87	3,567.64
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.78	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.84

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Time Slice 4/18/2011-6/30/2011 Active Days: 54	4.66	36.50	21.89	0.00	30.61	2.04	32.65	6.39	1.88	8.27	3,746.48
Mass Grading 04/01/2011-06/30/2011	4.66	36.50	21.89	0.00	30.61	2.04	32.65	6.39	1.88	8.27	3,746.48
Mass Grading Dust	0.00	0.00	0.00	0.00	30.60	0.00	30.60	6.39	0.00	6.39	0.00
Mass Grading Off Road Diesel	4.61	36.41	20.11	0.00	0.00	2.04	2.04	0.00	1.87	1.87	3,567.64
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.78	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.84
Time Slice 7/1/2011-12/30/2011 Active Days: 131	7.28	41.66	39.82	0.02	0.09	2.91	3.01	0.03	2.68	2.71	5,803.39
Building 07/01/2011-12/31/2012	7.28	41.66	39.82	0.02	0.09	2.91	3.01	0.03	2.68	2.71	5,803.39
Building Off Road Diesel	6.59	37.88	23.28	0.00	0.00	2.76	2.76	0.00	2.54	2.54	3,760.90
Building Vendor Trips	0.24	3.02	2.46	0.01	0.02	0.12	0.14	0.01	0.11	0.12	631.42
Building Worker Trips	0.45	0.76	14.08	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.07
Time Slice 1/2/2012-6/29/2012 Active Days: 130	11.07	69.31	56.46	0.02	0.11	4.69	4.79	0.04	4.31	4.34	9,153.40
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53

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Time Slice 7/2/2012-9/28/2012 Active Days: 65	13.50	83.84	67.37	0.02	0.12	5.94	6.05	0.04	5.45	5.50	10,643.72
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Asphalt 07/01/2012-12/31/2012	2.44	14.53	10.91	0.00	0.01	1.25	1.26	0.00	1.15	1.15	1,490.32
Paving Off-Gas	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.34	14.35	8.99	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,272.04
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.83
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.45
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53

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Time Slice 10/1/2012-12/31/2012 Active Days: 66	**84.65**	83.88	**68.15**	0.03	0.12	**5.94**	6.06	0.04	**5.46**	5.50	10,728.57
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Asphalt 07/01/2012-12/31/2012	2.44	14.53	10.91	0.00	0.01	1.25	1.26	0.00	1.15	1.15	1,490.32
Paving Off-Gas	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.34	14.35	8.99	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,272.04
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.83
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.45
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53
Coating 10/01/2012-12/31/2012	71.15	0.04	0.78	0.00	0.00	0.00	0.01	0.00	0.00	0.00	84.85
Architectural Coating	71.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.78	0.00	0.00	0.00	0.01	0.00	0.00	0.00	84.85

Phase Assumptions

Phase: Demolition 1/1/2011 - 3/31/2011 - Phase I Demolition

Building Volume Total (cubic feet): 280000

Building Volume Daily (cubic feet): 28000

On Road Truck Travel (VMT): 388.89

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Mass Grading 4/1/2011 - 6/30/2011 - Phase I Site Grading

Total Acres Disturbed: 6.11

Maximum Daily Acreage Disturbed: 1.53

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2011 - 4/15/2011 - Excavation

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 413 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 563.64

Off-Road Equipment:

Phase: Paving 1/1/2012 - 12/31/2012 - Phase I Parking Structure Construction

Acres to be Paved: 4

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

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2 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Paving 7/1/2012 - 12/31/2012 - Phase I Paving

Acres to be Paved: 1.53

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 7/1/2011 - 12/31/2012 - Phase I Building Construction

Off-Road Equipment:

4 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

2 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

4 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 10/1/2012 - 12/31/2012 - Phase I Painting

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/3/2011-3/31/2011 Active Days: 64	2.38	21.80	12.25	0.02	11.82	1.24	13.06	2.47	1.14	3.61	2,820.55
Demolition 01/01/2011-03/31/2011	2.38	21.80	12.25	0.02	11.82	1.24	13.06	2.47	1.14	3.61	2,820.55
Fugitive Dust	0.00	0.00	0.00	0.00	11.76	0.00	11.76	2.45	0.00	2.45	0.00
Demo Off Road Diesel	1.65	11.52	7.24	0.00	0.00	0.85	0.85	0.00	0.78	0.78	1,101.59
Demo On Road Diesel	0.68	10.20	3.48	0.01	0.05	0.39	0.44	0.02	0.35	0.37	1,565.67
Demo Worker Trips	0.05	0.08	1.53	0.00	0.01	0.00	0.01	0.00	0.00	0.01	153.29
Time Slice 4/1/2011-4/15/2011 Active Days: 11	5.65	51.28	26.93	0.02	18.76	2.60	21.36	3.93	2.39	6.32	6,015.68
Mass Grading 04/01/2011-04/15/2011	0.99	14.78	5.04	0.02	16.62	0.56	17.18	3.48	0.51	3.99	2,269.20
Mass Grading Dust	0.00	0.00	0.00	0.00	16.54	0.00	16.54	3.45	0.00	3.45	0.00
Mass Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading On Road Diesel	0.99	14.78	5.04	0.02	0.08	0.56	0.64	0.03	0.51	0.54	2,269.20
Mass Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 04/01/2011-06/30/2011	4.66	36.50	21.89	0.00	2.14	2.04	4.18	0.45	1.88	2.33	3,746.48
Mass Grading Dust	0.00	0.00	0.00	0.00	2.13	0.00	2.13	0.45	0.00	0.45	0.00
Mass Grading Off Road Diesel	4.61	36.41	20.11	0.00	0.00	2.04	2.04	0.00	1.87	1.87	3,567.64
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.78	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.84

Time Slice 4/18/2011-6/30/2011 Active Days: 54	4.66	36.50	21.89	0.00	2.14	2.04	4.18	0.45	1.88	2.33	3,746.48
Mass Grading 04/01/2011-06/30/2011	4.66	36.50	21.89	0.00	2.14	2.04	4.18	0.45	1.88	2.33	3,746.48
Mass Grading Dust	0.00	0.00	0.00	0.00	2.13	0.00	2.13	0.45	0.00	0.45	0.00
Mass Grading Off Road Diesel	4.61	36.41	20.11	0.00	0.00	2.04	2.04	0.00	1.87	1.87	3,567.64
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.78	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.84
Time Slice 7/1/2011-12/30/2011 Active Days: 131	7.28	41.66	39.82	0.02	0.09	2.91	3.01	0.03	2.68	2.71	5,803.39
Building 07/01/2011-12/31/2012	7.28	41.66	39.82	0.02	0.09	2.91	3.01	0.03	2.68	2.71	5,803.39
Building Off Road Diesel	6.59	37.88	23.28	0.00	0.00	2.76	2.76	0.00	2.54	2.54	3,760.90
Building Vendor Trips	0.24	3.02	2.46	0.01	0.02	0.12	0.14	0.01	0.11	0.12	631.42
Building Worker Trips	0.45	0.76	14.08	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.07
Time Slice 1/2/2012-6/29/2012 Active Days: 130	11.07	69.31	56.46	0.02	0.11	4.69	4.79	0.04	4.31	4.34	9,153.40
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53

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Time Slice 7/2/2012-9/28/2012 Active Days: 65	13.50	83.84	67.37	0.02	0.12	5.94	6.05	0.04	5.45	5.50	10,643.72
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Asphalt 07/01/2012-12/31/2012	2.44	14.53	10.91	0.00	0.01	1.25	1.26	0.00	1.15	1.15	1,490.32
Paving Off-Gas	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.34	14.35	8.99	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,272.04
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.83
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.45
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53

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Time Slice 10/1/2012-12/31/2012 Active Days: 66	45.82	83.88	**68.15**	0.03	0.12	**5.94**	6.06	0.04	**5.46**	5.50	10,728.57
Asphalt 01/01/2012-12/31/2012	4.32	30.37	18.41	0.00	0.02	2.01	2.02	0.01	1.85	1.85	3,349.51
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	4.18	30.11	15.54	0.00	0.00	2.00	2.00	0.00	1.84	1.84	3,024.61
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.22
Paving Worker Trips	0.09	0.15	2.83	0.00	0.01	0.01	0.02	0.01	0.01	0.01	306.68
Asphalt 07/01/2012-12/31/2012	2.44	14.53	10.91	0.00	0.01	1.25	1.26	0.00	1.15	1.15	1,490.32
Paving Off-Gas	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.34	14.35	8.99	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,272.04
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.83
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.45
Building 07/01/2011-12/31/2012	6.75	38.94	38.05	0.02	0.09	2.68	2.77	0.03	2.46	2.49	5,803.89
Building Off Road Diesel	6.12	35.55	22.72	0.00	0.00	2.54	2.54	0.00	2.33	2.33	3,760.90
Building Vendor Trips	0.22	2.70	2.29	0.01	0.02	0.10	0.13	0.01	0.10	0.10	631.46
Building Worker Trips	0.41	0.70	13.04	0.01	0.07	0.04	0.11	0.02	0.03	0.06	1,411.53
Coating 10/01/2012-12/31/2012	32.32	0.04	0.78	0.00	0.00	0.00	0.01	0.00	0.00	0.00	84.85
Architectural Coating	32.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.78	0.00	0.00	0.00	0.01	0.00	0.00	0.00	84.85

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 4/1/2011 - 6/30/2011 - Phase I Site Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

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For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Mass Grading 4/1/2011 - 4/15/2011 - Excavation

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Architectural Coating 10/1/2012 - 12/31/2012 - Phase I Painting

For Residential Architectural Coating Measures, the Residential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 40%

For Residential Architectural Coating Measures, the Residential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 60%

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 40%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 60%

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Urbemis\Urbemis 9.2.2\Projects\Plaza Linda Verde Phase II Construction Excavation.urb924

Project Name: SDSU Plaza Linda Verde

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (lbs/day unmitigated)	6.30	52.61	38.30	0.06	104.82	2.63	107.45	21.90	2.42	24.31	8,204.69
2013 TOTALS (lbs/day mitigated)	6.30	52.61	38.30	0.06	48.62	2.63	50.78	10.14	2.42	12.12	8,204.69
2014 TOTALS (lbs/day unmitigated)	114.06	40.65	47.76	0.03	0.16	2.67	2.83	0.06	2.45	2.51	7,696.05
2014 TOTALS (lbs/day mitigated)	55.60	40.65	47.76	0.03	0.16	2.67	2.83	0.06	2.45	2.51	7,696.05

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/1/2013-3/29/2013 Active Days: 64	4.39	46.72	23.07	**0.06**	48.62	2.15	50.78	10.14	1.98	12.12	**8,204.69**
Demolition 01/01/2013-03/31/2013	4.39	46.72	23.07	0.06	48.62	2.15	50.78	10.14	1.98	12.12	8,204.69
Fugitive Dust	0.00	0.00	0.00	0.00	48.38	0.00	48.38	10.06	0.00	10.06	0.00
Demo Off Road Diesel	1.96	13.51	9.24	0.00	0.00	0.91	0.91	0.00	0.84	0.84	1,507.43
Demo On Road Diesel	2.37	33.10	11.65	0.06	0.23	1.23	1.46	0.07	1.13	1.21	6,441.61
Demo Worker Trips	0.07	0.11	2.18	0.00	0.01	0.01	0.02	0.00	0.01	0.01	255.65
Time Slice 4/1/2013-6/10/2013 Active Days: 51	6.30	**52.61**	31.12	0.02	**104.82**	2.63	**107.45**	**21.90**	2.42	**24.31**	6,676.21
Mass Grading 04/01/2013-06/10/2013	0.61	8.52	3.00	0.02	62.01	0.32	62.33	12.96	0.29	13.25	1,657.77
Mass Grading Dust	0.00	0.00	0.00	0.00	61.95	0.00	61.95	12.94	0.00	12.94	0.00
Mass Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading On Road Diesel	0.61	8.52	3.00	0.02	0.06	0.32	0.38	0.02	0.29	0.31	1,657.77
Mass Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 04/01/2013-06/30/2013	5.69	44.10	28.12	0.00	42.81	2.31	45.12	8.94	2.12	11.07	5,018.44
Mass Grading Dust	0.00	0.00	0.00	0.00	42.80	0.00	42.80	8.94	0.00	8.94	0.00
Mass Grading Off Road Diesel	5.63	43.99	26.16	0.00	0.00	2.30	2.30	0.00	2.12	2.12	4,788.36
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	230.08

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Time Slice 6/11/2013-6/28/2013 Active Days: 14	5.69	44.10	28.12	0.00	42.81	2.31	45.12	8.94	2.12	11.07	5,018.44
Mass Grading 04/01/2013-06/30/2013	5.69	44.10	28.12	0.00	42.81	2.31	45.12	8.94	2.12	11.07	5,018.44
Mass Grading Dust	0.00	0.00	0.00	0.00	42.80	0.00	42.80	8.94	0.00	8.94	0.00
Mass Grading Off Road Diesel	5.63	43.99	26.16	0.00	0.00	2.30	2.30	0.00	2.12	2.12	4,788.36
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	230.08
Time Slice 7/1/2013-12/31/2013 Active Days: 132	5.24	29.87	38.30	0.03	0.14	1.81	1.95	0.05	1.66	1.71	6,071.51
Building 07/01/2013-12/31/2014	5.24	29.87	38.30	0.03	0.14	1.81	1.95	0.05	1.66	1.71	6,071.51
Building Off Road Diesel	4.36	25.13	16.84	0.00	0.00	1.61	1.61	0.00	1.48	1.48	2,953.95
Building Vendor Trips	0.32	3.78	3.34	0.01	0.04	0.15	0.18	0.01	0.13	0.15	995.47
Building Worker Trips	0.56	0.95	18.13	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.09
Time Slice 1/1/2014-6/30/2014 Active Days: 129	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76

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Time Slice 7/1/2014-9/30/2014 Active Days: 66	6.96	40.60	46.75	0.03	0.15	2.67	2.82	0.05	2.45	2.50	7,568.24
Asphalt 07/01/2014-12/31/2014	2.16	13.06	10.50	0.00	0.01	1.07	1.08	0.00	0.98	0.99	1,495.97
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.06	12.89	8.85	0.00	0.00	1.06	1.06	0.00	0.98	0.98	1,272.04
Paving On Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.35
Paving Worker Trips	0.05	0.08	1.62	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.58
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76
Time Slice 10/1/2014-12/31/2014 Active Days: 66	**114.06**	40.65	47.76	0.03	0.16	**2.67**	2.83	0.06	**2.45**	2.51	7,696.05
Asphalt 07/01/2014-12/31/2014	2.16	13.06	10.50	0.00	0.01	1.07	1.08	0.00	0.98	0.99	1,495.97
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.06	12.89	8.85	0.00	0.00	1.06	1.06	0.00	0.98	0.98	1,272.04
Paving On Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.35
Paving Worker Trips	0.05	0.08	1.62	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.58
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76
Coating 10/01/2014-12/31/2014	107.10	0.05	1.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.82
Architectural Coating	107.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.03	0.05	1.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.82

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Phase Assumptions

Phase: Demolition 1/1/2013 - 3/31/2013 - Phase II Demolition

Building Volume Total (cubic feet): 1152000

Building Volume Daily (cubic feet): 115200

On Road Truck Travel (VMT): 1600

Off-Road Equipment:

4 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

4 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Mass Grading 4/1/2013 - 6/30/2013 - Phase II Site Grading

Total Acres Disturbed: 8.55

Maximum Daily Acreage Disturbed: 2.14

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2013 - 6/10/2013 - Excavation - Export

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 525 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 411.76

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Off-Road Equipment:

Phase: Paving 7/1/2014 - 12/31/2014 - Phase II Paving

Acres to be Paved: 2.14

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 7/1/2013 - 12/31/2014 - Phase II Building Construction

Off-Road Equipment:

2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

4 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 10/1/2014 - 12/31/2014 - Phase II Painting

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

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	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2013-3/29/2013 Active Days: 64	4.39	46.72	23.07	**0.06**	48.62	2.15	50.78	10.14	1.98	12.12	**8,204.69**
Demolition 01/01/2013-03/31/2013	4.39	46.72	23.07	0.06	48.62	2.15	50.78	10.14	1.98	12.12	8,204.69
Fugitive Dust	0.00	0.00	0.00	0.00	48.38	0.00	48.38	10.06	0.00	10.06	0.00
Demo Off Road Diesel	1.96	13.51	9.24	0.00	0.00	0.91	0.91	0.00	0.84	0.84	1,507.43
Demo On Road Diesel	2.37	33.10	11.65	0.06	0.23	1.23	1.46	0.07	1.13	1.21	6,441.61
Demo Worker Trips	0.07	0.11	2.18	0.00	0.01	0.01	0.02	0.00	0.01	0.01	255.65
Time Slice 4/1/2013-6/10/2013 Active Days: 51	6.30	**52.61**	31.12	0.02	24.08	2.63	26.70	5.04	2.42	7.45	6,676.21
Mass Grading 04/01/2013-06/10/2013	0.61	8.52	3.00	0.02	21.08	0.32	21.40	4.41	0.29	4.70	1,657.77
Mass Grading Dust	0.00	0.00	0.00	0.00	21.03	0.00	21.03	4.39	0.00	4.39	0.00
Mass Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading On Road Diesel	0.61	8.52	3.00	0.02	0.06	0.32	0.38	0.02	0.29	0.31	1,657.77
Mass Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 04/01/2013-06/30/2013	5.69	44.10	28.12	0.00	2.99	2.31	5.30	0.63	2.12	2.75	5,018.44
Mass Grading Dust	0.00	0.00	0.00	0.00	2.98	0.00	2.98	0.62	0.00	0.62	0.00
Mass Grading Off Road Diesel	5.63	43.99	26.16	0.00	0.00	2.30	2.30	0.00	2.12	2.12	4,788.36
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	230.08

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Time Slice 6/11/2013-6/28/2013 Active Days: 14	5.69	44.10	28.12	0.00	2.99	2.31	5.30	0.63	2.12	2.75	5,018.44
Mass Grading 04/01/2013-06/30/2013	5.69	44.10	28.12	0.00	2.99	2.31	5.30	0.63	2.12	2.75	5,018.44
Mass Grading Dust	0.00	0.00	0.00	0.00	2.98	0.00	2.98	0.62	0.00	0.62	0.00
Mass Grading Off Road Diesel	5.63	43.99	26.16	0.00	0.00	2.30	2.30	0.00	2.12	2.12	4,788.36
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.06	0.10	1.97	0.00	0.01	0.01	0.02	0.00	0.00	0.01	230.08
Time Slice 7/1/2013-12/31/2013 Active Days: 132	5.24	29.87	38.30	0.03	0.14	1.81	1.95	0.05	1.66	1.71	6,071.51
Building 07/01/2013-12/31/2014	5.24	29.87	38.30	0.03	0.14	1.81	1.95	0.05	1.66	1.71	6,071.51
Building Off Road Diesel	4.36	25.13	16.84	0.00	0.00	1.61	1.61	0.00	1.48	1.48	2,953.95
Building Vendor Trips	0.32	3.78	3.34	0.01	0.04	0.15	0.18	0.01	0.13	0.15	995.47
Building Worker Trips	0.56	0.95	18.13	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.09
Time Slice 1/1/2014-6/30/2014 Active Days: 129	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76

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Time Slice 7/1/2014-9/30/2014 Active Days: 66	6.96	40.60	46.75	0.03	0.15	2.67	2.82	0.05	2.45	2.50	7,568.24
Asphalt 07/01/2014-12/31/2014	2.16	13.06	10.50	0.00	0.01	1.07	1.08	0.00	0.98	0.99	1,495.97
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.06	12.89	8.85	0.00	0.00	1.06	1.06	0.00	0.98	0.98	1,272.04
Paving On Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.35
Paving Worker Trips	0.05	0.08	1.62	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.58
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76
Time Slice 10/1/2014-12/31/2014 Active Days: 66	55.60	40.65	**47.76**	0.03	0.16	**2.67**	2.83	0.06	**2.45**	2.51	7,696.05
Asphalt 07/01/2014-12/31/2014	2.16	13.06	10.50	0.00	0.01	1.07	1.08	0.00	0.98	0.99	1,495.97
Paving Off-Gas	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.06	12.89	8.85	0.00	0.00	1.06	1.06	0.00	0.98	0.98	1,272.04
Paving On Road Diesel	0.01	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.35
Paving Worker Trips	0.05	0.08	1.62	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.58
Building 07/01/2013-12/31/2014	4.80	27.54	36.25	0.03	0.14	1.60	1.74	0.05	1.47	1.52	6,072.27
Building Off Road Diesel	4.00	23.33	16.39	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,953.95
Building Vendor Trips	0.29	3.33	3.09	0.01	0.04	0.13	0.17	0.01	0.12	0.13	995.55
Building Worker Trips	0.51	0.87	16.77	0.02	0.10	0.06	0.16	0.04	0.05	0.08	2,122.76
Coating 10/01/2014-12/31/2014	48.64	0.05	1.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.82
Architectural Coating	48.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.03	0.05	1.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.82

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Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 4/1/2013 - 6/30/2013 - Phase II Site Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Mass Grading 4/1/2013 - 6/10/2013 - Excavation - Export

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Architectural Coating 10/1/2014 - 12/31/2014 - Phase II Painting

For Residential Architectural Coating Measures, the Residential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 40%

For Residential Architectural Coating Measures, the Residential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 60%

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 40%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 60%

F3.2

Global Climate Change Technical Report for Plaza Linda Verde,
San Diego State University
Scientific Resources Associated (January 11, 2011)

Global Climate Change Technical Report

for

Plaza Linda Verde San Diego State University

Submitted To:

Gatzke, Dillon and Balance LLP
1525 Faraday Avenue
Suite 150
Carlsbad, California 92008

Prepared By:

sra
Scientific Resources Associated
1328 Kaimalino Lane
San Diego, CA 92109

~~June 1, 2010~~
January 11, 2011

Table of Contents

List of Acronyms

APCD	Air Pollution Control District
AB	Assembly Bill
AB 32	Assembly Bill 32, Global Warming Solutions Act of 2006
ARB	Air Resources Board
ASTM	American Society of Testing and Materials
CAPCOA	California Air Pollution Control Officers Association
CAT	Climate Action Team
CCAP	Center for Clean Air Policy
CCAR	California Climate Action Registry
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CIWMB	California Integrated Waste Management Board
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DWR	Department of Water Resources
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
EPIC	University of San Diego School of Law Energy Policy Initiative Center
EV	Electric Vehicles
GCC	Global Climate Change
GHG	Greenhouse Gas
GGEP	Greenhouse Gas Emissions Policy
GGRP	Greenhouse Gas Reduction Plan
GP	General Plan
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
LEED	Leadership in Energy and Environmental Design
MMT	Million Metric Tons
MW	Megawatts
N_2O	Nitrous Oxide
NOx	Oxides of Nitrogen
OPR	State Office of Planning and Research
PFCs	Perfluorocarbons
PM	Particulate Matter
ROG	Reactive Organic Gas
RPS	Renewable Portfolio Standards
S-3-05	Executive Order S-3-05
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SDCGHGI	San Diego County Greenhouse Gas Inventory
SRI	Solar Reflective Index

THC	Total Hydrocarbon
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS	Urban Emissions Model
USBGC	U.S. Green Building Council
VMT	Vehicle Miles Traveled
WARM	Waste Reduction Model

1.0 INTRODUCTION

This report presents an assessment of potential global climate change-related impacts associated with the Plaza Linda Verde Project (the Proposed Project) at San Diego State University.

The Proposed Project includes five land use types: (1) Mixed-Use Retail/Student Housing; (2) Student Apartments; (3) Parking Structure; (4) Campus Green; and (5) Pedestrian Malls. As a mixed-use development, the Project would provide additional student housing and retail uses south of the SDSU Transit Center and Aztec Walk in the San Diego College Area community. The Project would be developed in two phases and, at buildout, would include approximately ~~400 apartments~~390 units to house approximately 1,600 students, with approximately 90,000 gross square feet of retail space. The Project will also include parking to accommodate up to 560 vehicles, a Campus Green that will feature both active and passive recreation areas for public use, and pedestrian malls in place of existing streets/alleys. The Project would require demolition of existing structures on the Project site and a revision to the SDSU Campus Master Plan boundary.

The Proposed Project will be designed as a pedestrian/bicycle friendly, open-air, sustainable urban village that will utilize "green" building practices, drought-tolerant landscaping, and other environmentally sustainable measures. CSU/SDSU will seek Leadership in Energy and Environmental Design (LEED) Silver certification for the Project.

Methodology. To gauge the potential significance of global climate change impacts associated with the Proposed Project, emissions associated with construction and operation of the Project were estimated. With respect to operational-related activities, the emissions inventory considered electricity use, natural gas use, water use, and vehicles. Emissions were evaluated based on their consistency with the goals of Assembly Bill (AB) 32.

1.1 General Principles and Existing Conditions

Global Climate Change (GCC) refers to changes in average climatic conditions on Earth as a whole, including temperature, wind patterns, precipitation and storms. GCC may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere and alter the surface and features of land. Historical records indicate that global climate changes have occurred in the past due to natural phenomena (such as during previous ice ages). Some data indicate that the current global conditions differ from past climate changes in rate and magnitude.

Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), which are known as greenhouse gases (GHGs). These gases allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere, much like a greenhouse. GHGs are emitted by both natural processes and human activities. Without these natural GHGs, the Earth's temperature would be about 61° Fahrenheit cooler (California Environmental Protection Agency 2006). Emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere. For example, data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years; however, concentrations of CO_2 have increased in the atmosphere since the industrial revolution.

GCC and GHGs have been at the center of a widely contested political, economic, and scientific debate. Although the conceptual existence of GCC is generally accepted, the extent to which GHGs generally and anthropogenic-induced GHGs (mainly CO_2, CH_4 and N_2O) contribute to it remains a source of debate. The State of California has been at the forefront of developing solutions to address GCC.

The United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The IPCC concluded that a stabilization of GHGs at 400 to 450 ppm CO_2 equivalent concentration is required to keep global mean warming below ~~35~~3.6° Fahrenheit (2° Celsius), which is assumed to be necessary to avoid dangerous climate change (Association of Environmental Professionals 2007).

State law defines greenhouse gases as any of the following compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) (California Health and Safety Code Section 38505(g).) CO_2, followed by CH_4 and N_2O, are the most common GHGs that result from human activity.

1.2 Sources and Global Warming Potentials of GHG

Anthropogenic sources of CO_2 include combustion of fossil fuels (coal, oil, natural gas, gasoline and wood). CH_4 is the main component of natural gas and also arises naturally from anaerobic decay of organic matter. Accordingly, anthropogenic sources of CH_4 include landfills, fermentation of manure and cattle farming. Anthropogenic sources of N_2O include combustion of fossil fuels and industrial processes such as nylon production and production of nitric acid. Other GHGs are present in trace amounts in the atmosphere and are generated from various industrial or other uses.

GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (USEPA 2006). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main greenhouse gases that have been attributed to human activity include CH_4, which has a GWP of 21, and N_2O, which has a GWP of 310. Table 1 presents the GWP and atmospheric lifetimes of common GHGs. In order to account for each GHG's respective GWP, all types of GHG emissions are expressed in terms of CO_2 equivalents (CO_2e) and are typically quantified in metric tons (MT) or millions of metric tons (MMT).

Table 1

Global Warming Potentials and Atmospheric Lifetimes of GHGs

GHG	Formula	100-Year Global Warming Potential	Atmospheric Lifetime (Years)
Carbon Dioxide	CO_2	1	Variable
Methane	CH_4	21	12 ± 3
Nitrous Oxide	N_2O	310	120
Sulfur Hexafluoride	SF_6	23,900	3,200
Hydrofluorocarbons	HFCs	140 to 11,700	3.7 to 264
Perfluorocarbons	PFCs	6,500 to 9,200	2,600 to 50,000
Nitrogen Trifluoride	NF_3	17,200	740
Source: UNFCCC Global Warming Potentials, http://unfccc.int/ghg_data/items/3825.php			

The California Air Resources Board (ARB) compiled a statewide inventory of anthropogenic GHG emissions and sinks that includes estimates for CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs. The current inventory covers the years 1990 to ~~2004~~2008, and is summarized in Table 2. Data sources used to calculate this GHG inventory include California and federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the IPCC. The 1990 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. The inventory is divided into ~~seven~~nine broad sectors and categories in the inventory. These sectors include: Agriculture; Commercial; Electricity Generation; Forestry; Industrial; Residential; Recycling and Waste; High GWP Gases; and Transportation.

Table 2
State of California GHG Emissions by Sector

Sector	Total 1990 Emissions ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total ~~2004~~2008 Emissions ($MMTCO_2e$)	Percent of Total ~~2004~~2008 Emissions
Agriculture	23.4	5%	~~27.9~~28.06	6%
Commercial	14.4	3%	~~12.8~~14.68	3%
Electricity Generation	110.6	26%	~~119.8~~116.35	25%
Forestry (excluding sinks)	0.2	<1%	0.~~2~~19	<1%
Industrial	103.0	24%	~~96.2~~92.66	20%
Residential	29.7	7%	~~29.1~~28.45	6%
Transportation	150.7	35%	~~182.4~~174.99	~~38~~37%
Recycling and Waste			6.71	1%
High GWP Gases			15.65	3%
Forestry Sinks	(6.7)		(~~4.7~~3.98)	

Source: California Air Resources Board, see ~~http://www.arb.ca.gov/cc/inventory/archive/archive.htm.~~http://www.arb.ca.gov/cc/inventory/data/data.htm.

In addition to the statewide GHG inventory prepared by the ARB, a GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center (EPIC) for the San Diego region (University of San Diego 2008). The San Diego County Greenhouse Gas Inventory (SDCGHGI) takes into account the unique characteristics of the region when estimating emissions, and estimated emissions for years 1990, 2006, and 2020. Based on this inventory and the emission projections for the region, EPIC found that GHG emissions must be reduced by 33 percent below business as usual conditions for year 2020 in order for San Diego County to return to 1990 emission levels. "Business as usual" is defined as the emissions that would occur without any greenhouse gas reduction measures[1]. For example, construction of buildings using 2005 Title 24 building standards, and not subsequently enacted more rigorous standards, would create "business as usual" emissions.

Areas where feasible reductions could occur and the strategies for achieving those reductions are outlined in the SDCGHGI. A summary of the various sectors that contribute GHG emissions in San Diego County for year 2006 is provided in Table 3. Total GHGs in San Diego County are estimated at 34 $MMTCO_2e$.

Table 3
San Diego County 2006 GHG Emissions by Category

Sector	Total Emissions ($MMTCO_2e$)	Percent of Total Emissions
On-Road Transportation	16	46%
Electricity	9	25%
Natural Gas Consumption	3	9%
Civil Aviation	1.7	5%
Industrial Processes & Products	1.6	5%
Other Fuels/Other	1.1	4%
Off-Road Equipment & Vehicles	1.3	4%
Waste	0.7	2%
Agriculture/Forestry/Land Use	0.7	2%
Rail	0.3	1%
Water-Born Navigation	0.13	0.4%
Source: EPIC's SDCGHGI, 2008.		

According to the SDCGHGI, a majority of the region's emissions are attributable to on-road transportation, with the next largest source of GHG emissions attributable to electricity generation. The SDCGHGI states that emission reductions from on-road transportation will be achieved in a variety of ways, including through regulations aimed at increasing fuel efficiency standards and decreasing vehicle emissions. These regulations are outside the control of project applicants for land use development. The SDCGHGI also indicates that emission reductions

[1] As defined in the California Air Resources Board's *Climate Change Proposed Scoping Plan*, October 2008, page 11.

from electricity generation will be achieved in a variety of ways, including through a 10 percent reduction in electricity consumption, implementation of the renewable portfolio standard (RPS), cleaner electricity purchases by San Diego Gas & Electric, replacement of the Boardman Contract (which allows the purchase of electricity from coal-fired power plants), and implementation of 400 MW of photovoltaics. Many of these measures are also outside the control of project applicants.

1.3 Regulatory Framework

All levels of government have some responsibility for the protection of air quality, and each level (Federal, State, and regional/local) has specific responsibilities relating to air quality regulation. GHG emissions and the regulation of GHGs is a relatively new component of this air quality regulatory framework.

1.3.1 National and International Efforts

In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis for human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of GCC.

Fairly recently, the United States Supreme Court decided, in the case of *Massachusetts et al. v. Environmental Protection Agency et al.* (2007) that the U.S. Environmental Protection Agency

(EPA) does have the ability to regulate GHG emissions. This ruling, arguably, has triggered a number of regulatory developments at the federal level, as summarized below.

Endangerment Finding. On April 17, 2009, EPA issued its proposed endangerment finding for GHG emissions. On December 7, 2009, the EPA Administrator signed and finalized two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

> **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases--carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)--in the atmosphere threaten the public health and welfare of current and future generations.
>
> **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite to finalizing the EPA's proposed greenhouse gas emission standards for light-duty vehicles, which were jointly proposed by EPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009 and adopted on April 1, 2010. As finalized in April 2010, the emissions standards rule for vehicles will improve average fuel economy standards to 35.5 miles per gallon by 2016. In addition, the rule will require model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of carbon dioxide per mile.

Mandatory GHG Reporting Rule. On March 10, 2009, in response to the FY2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), the EPA proposed a rule that requires mandatory reporting of greenhouse gas (GHG) emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of Greenhouse Gases Rule was signed, and was published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. The rule will collect accurate and comprehensive emissions data to inform future policy decisions.

The EPA is requiring suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to EPA. The gases covered by the proposed rule are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and other fluorinated gases, including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFE).

1.3.2 State Regulations and Standards

The following subsections describe regulations and standards that have been adopted by the State of California to address GCC issues.

Assembly Bill 32, the California Global Warming Solutions Act of 2006. In September 2006, Governor Schwarzenegger signed AB 32 into law. AB 32 directs the ARB to do the following:

- Make publicly available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the statewide GHG limit and the measures required to achieve compliance with the statewide limit.
- Make publicly available a GHG inventory for the year 1990 and determine target levels for 2020.
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures.
- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources that ARB finds necessary to achieve the statewide GHG emissions limit.

- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

AB 32 required that, by January 1, 2008, the ARB determine what the statewide GHG emissions level was in 1990, and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020. The ARB adopted its Scoping Plan in December 2008, which provided estimates of the 1990 GHG emissions level and identified sectors for the reduction of GHG emissions. The ARB has estimated that the 1990 GHG emissions level was 427 MMT net CO_2e (ARB 2007b). The ARB estimates that a reduction of 173 MMT net CO_2e emissions below business-as-usual would be required by 2020 to meet the 1990 levels (ARB 2007b). This amounts to roughly a 30 percent reduction from projected business-as-usual levels in 2020 (ARB 2008a).

Senate Bill 97. Senate Bill (SB) 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. SB 97 directed the Governor's Office of Planning and Research (OPR) to develop draft CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" by July 1, 2009, and directed the California Natural Resources Agency (CNRA) to certify and adopt the CEQA guidelines by January 1, 2010.

OPR published a technical advisory on CEQA and climate change on June 19, 2008. The guidance did not include a suggested threshold, but stated that the OPR had asked the ARB to "recommend a method for setting thresholds which will encourage consistency and uniformity in the CEQA analysis of greenhouse gas emissions throughout the state." The OPR technical advisory does recommend that CEQA analyses include the following components:

- Identification of greenhouse gas emissions;
- Determination of significance; and
- Mitigation of impacts, as needed and as feasible.

On December 31, 2009, the CNRA adopted the proposed amendments to the State CEQA Guidelines. These amendments became effective on March 18, 2010.

Executive Order S-3-05. Executive Order S-3-05, signed by Governor Schwarzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020 and for an 80 percent reduction in GHG emissions below 1990 levels by 2050. Executive Order S-3-05 also calls for the California EPA (CalEPA) to prepare biennial science reports on the potential impact of continued GCC on certain sectors of the California economy. The first of these reports, "Our Changing Climate: Assessing Risks to California", and its supporting document "Scenarios of Climate Change in California: An Overview" were published by the California Climate Change Center in 2006.

Executive Order S-21-09. Executive Order S-21-09 was enacted by the Governor on September 15, 2009. Executive Order S-21-09 requires that the ARB, under its AB 32 authority, adopt a regulation by July 31, 2010 that sets a 33 percent renewable energy target. In September 2010, the ARB adopted a 33 percent renewable energy target that must be achieved by calendar year 2020.

Under Executive Order S-21-09, the ARB will work with the Public Utilities Commission and California Energy Commission to encourage the creation and use of renewable energy sources, and will regulate all California utilities. The ARB will also consult with the Independent System Operator and other load balancing authorities on the impacts on reliability, renewable integration requirements, and interactions with wholesale power markets in carrying out the provisions of the Executive Order. The order requires the ARB to establish highest priority for those resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health.

California Code of Regulations Title 24. Although not originally intended to reduce greenhouse gas emissions, Title 24 of the California Code of Regulations, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow for the consideration and possible incorporation of new energy efficiency technologies and methods. Energy efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in greenhouse gas emissions. Therefore, increased energy efficiency results in decreased greenhouse gas emissions.

The GHG emission ~~inventory was~~inventories for the existing, on-site conditions, as well as the project's business-as-usual emissions were based on Title 24 standards as of October 2005; however, Title 24 has been updated as of 2008 and the 2008 standards became effective on January 1, 2010. Therefore, as discussed further below in Section 5.0, the project's emissions inventory accounts for the energy efficiency improvements associated with the 2008 standards, as compared to the 2005 standards.

Relatedly, Title 24's Green Building Standards Code (CALGREEN) takes effect on January 1, 2011. The CALGREEN standards will require every new building constructed in California to reduce water consumption by 20 percent; divert 50 percent of construction waste from landfills; install low pollutant-emitting materials; install separate water meters for nonresidential-related indoor and outdoor water use; install moisture-sensing irrigation systems; and conduct mandatory inspections of energy systems. (Emission reductions attributable to CALGREEN were not incorporated into the emission inventories presented in this report, which is a conservative approach in that post-project emissions likely are ~~currently being phased in.~~overstated.)

State Standards Addressing Vehicular Emissions. California Assembly Bill 1493 (Pavley) enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by ARB would apply to 2009 and later model year vehicles. ARB estimated that the regulation would reduce climate change emissions from light duty passenger vehicle fleet by an estimated

18% in 2020 and by 27% in 2030 (AEP 2007). Once implemented, emissions from new light-duty vehicles are expected to be reduced in San Diego County by up to 21 percent by 2020[2].

The ARB has adopted amendments to the Pavley regulations that reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments, approved by the ARB Board on September 24, 2009, are part of California's commitment toward a nation-wide program to reduce new passenger vehicle GHGs from 2012 through 2016, and prepare California to harmonize its rules with the federal rules for passenger vehicles.

Executive Order S-01-07. Executive Order S-01-07 was enacted by the Governor on January 18, 2007, and mandates that: 1) a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California. According to the SDCGHGI, the effects of the LCFS would be a 10% reduction in GHG emissions from fuel use by 2020[3]. On April 23, 2009, the ARB adopted regulations to implement the LCFS.

Senate Bill 375. SB 375 finds that GHG from autos and light trucks can be substantially reduced by new vehicle technology, but even so "it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." Therefore, SB 375 requires that regions with metropolitan planning organizations adopt sustainable communities strategies, as part of their regional transportation plans, which are designed to achieve certain goals for the reduction of GHG emissions from mobile sources.

SB 375 also includes CEQA streamlining provisions for "transit priority projects" that are consistent with an adopted sustainable communities strategy. As defined in SB 375, a "transit priority project" shall: (1) contain at least 50 percent residential use, based on total building

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[2] SDCGHGI, An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets, On-Road Transportation Report. Sean Tanaka, Tanaka Research and Consulting, September 2008, Page 7.

[3] SDCGHGI, An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets, On-Road Transportation Report. Sean Tanaka, Tanaka Research and Consulting, September 2008, Page 7.

square footage and, if the project contains between 26 and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (2) provide a maximum net density of at least 20 dwelling units per acre; and (3) be within 0.5 mile of a major transit stop or high quality transit corridor.

2.0 POTENTIAL CLIMATE CHANGE IMPACTS TO PROJECT SITE

2.1 Existing Conditions

The site is currently developed with individual residences and retail buildings. Specific information on the existing land uses was obtained from the *Traffic Impact Study – Plaza Linda Verde* (Linscott, Law and Greenspan 2010). The site as currently developed is a source of GHG emissions due to emissions from energy use and vehicles.

2.2 Typical Adverse Effects

The Climate Scenarios Report (CCCC 2006) uses a range of emissions scenarios developed by the IPCC to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century. Three warming ranges were identified: lower warming range (3.0 to 5.5 degrees Fahrenheit (°F)); medium warming range (5.5 to 8.0 °F); and higher warming range (8.0 to 10.5 °F). The Climate Scenarios Report then presents an analysis of the future projected climate changes in California under each warming range scenario.

According to the report, substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California. These impacts would result from a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. These impacts are described below.

Public Health. Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to O_3 formation are projected to increase by 25 to 35 percent under the lower warming range and 75 to 85 percent under the medium warming range. In addition, if global background O_3 levels increase as is predicted in some scenarios, it may become impossible to meet local air quality standards. An increase in wildfires could also occur, and the corresponding increase in the release of pollutants including $PM_{2.5}$ could further compromise air quality. The Climate Scenarios Report indicates that large wildfires could become up to 55 percent more frequent of GHG emissions are not significantly reduced.

Potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (e.g., heat rash and heat stroke). In addition, climate sensitive diseases (such as malaria, dengue fever, yellow fever, and encephalitis) may increase, such as those spread by mosquitoes and other disease-carrying insects.

Water Resources. A vast network of reservoirs and aqueducts capture and transport water throughout the State from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages. In addition, if temperatures continue to rise more precipitation would fall as rain instead of snow, further reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. The State's water resources are also at risk from rising sea levels. An influx of seawater would degrade California's estuaries, wetlands, and groundwater aquifers.

Agriculture. Increased GHG and associated increases in temperature are expected to cause widespread changes to the agricultural industry, reducing the quantity and quality of agricultural products statewide. Significant reductions in available water supply to support agriculture would also impact production. Crop growth and development will change as will the intensity and frequency of pests and diseases.

Ecosystems/Habitats. Continued global warming will likely shift the ranges of existing invasive plants and weeds, thus alternating competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Continued global warming is also likely to increase the populations of and types of pests. Continued global warming would also affect natural ecosystems and biological habitats throughout the State.

Wildland Fires. Global warming is expected to increase the risk of wildfire and alter the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the State.

Rising Sea Levels. Rising sea levels, more intense coastal storms, and warmer water temperatures will increasing threaten the State's coastal regions. Under the high warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. A sea level risk of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten levees and inland water systems, and disrupt wetlands and natural habitats.

2.3 California Climate Adaptation Strategy

As part of its climate change planning process, the CNRA prepared its California Climate Adaptation Strategy (CNRA 2009) to summarize the best known science on climate change impacts in California, with the goal of assessing vulnerability to climate change impacts. The Climate Adaptation Strategy also outlines possible solutions that can be implemented within and across state agencies to promote resiliency.

The California Climate Adaptation Strategy takes into account the long-term, complex, and uncertain nature of climate change and establishes a proactive foundation for an ongoing adaptation process. The strategy made preliminary recommendations as a first step in addressing responses to impacts of global climate change within the state. Key recommendations include:

1. A Climate Adaptation Advisory Panel (CAAP) will be appointed to assess the greatest risks to California from climate change and recommend strategies to reduce those risks building on California's Climate Adaptation Strategy.
2. Identify necessary changes to California's water management and uses.

3. Consider project alternatives that avoid significant new development in areas that cannot be adequately protected (planning, permitting, development, and building) from flooding, wildfire and erosion due to climate change.
4. All state agencies responsible for the management and regulation of public health, infrastructure or habitat subject to significant climate change should prepare as appropriate agency-specific adaptation plans, guidance, or criteria by September 2010.
5. To the extent required by CEQA Guidelines Section 15126.2, all significant state projects, including infrastructure projects, must consider the potential impacts of locating such projects in areas susceptible to hazards resulting from climate change.
6. The California Emergency Management Agency (Cal EMA) will collaborate with the California Natural Resources Agency, the Climate Action Team, the Energy Commission, and the CAAP to assess California's vulnerability to climate change, identify impacts to state assets, and promote climate adaptation/mitigation awareness through the Hazard Mitigation Web Portal and My Hazards Website as well as other appropriate sites.
7. Using existing research the state should identify key California land and aquatic habitats that could change significantly during this century due to climate change. Based on this identification, the state should develop a plan for expanding existing protected areas or altering land and water management practices to minimize adverse effects from climate change induced phenomena.
8. The best long-term strategy to avoid increased health impacts associated with climate change is to ensure communities are healthy to build resilience to increased spread of disease and temperature increases.
9. Communities with General Plans and Local Coastal Plans should begin, when possible, to amend their plans to assess climate change impacts, identify areas most vulnerable to these impacts, and develop reasonable and rational risk reduction strategies using the CAS as guidance.
10. State fire fighting agencies should begin immediately to include climate change impact information into fire program planning to inform future planning efforts.
11. State agencies should meet projected population growth and increased energy demand with greater energy conservation and an increased use of renewable energy.

12. Existing and planned climate change research can and should be used for state planning and public outreach purposes; new climate change impact research should be broadened and funded.

3.0 CLIMATE CHANGE SIGNIFICANCE CRITERIA

According to the California Natural Resources Agency[4], "due to the global nature of GHG emissions and their potential effects, GHG emissions will typically be addressed in a cumulative impacts analysis~~."~~. According to Appendix G of the CEQA Guidelines, the following criteria may be considered to establish the significance of GCC emissions:

Would the project:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As discussed in Section 15064.4 of the CEQA Guidelines, the determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency, consistent with the provisions in Section 15064. Section 15064.4 further provides that a lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

(1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or

(2) Rely on a qualitative analysis or performance based standards.

Section 15064.4 also advises a lead agency to consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

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[4] California Natural Resources Agency, Initial Statement of Reasons for Regulatory Action, Proposed Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gases Pursuant to SB 97. July 2009.

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions.

Based on the ARB's analysis that statewide 2020 business as usual GHG emissions would be 596 $MMTCO_2e$ and that 1990 emissions were 427 $MMTCO_2e$, some local lead agencies have estimated that a reduction of 28.35% below business as usual is required to achieve the AB 32 reduction mandate (ARB 2010). (The San Joaquin Valley Air Pollution Control District and Sacramento Metropolitan Air Quality Management District are two examples of regional agencies that have issued guidance to CEQA lead agencies recommending that project significance be assessed by considering whether a project's business-as-usual reduction is consistent with the AB 32 reduction mandate.)

Recently, other lead agencies such as the South Coast Air Quality Management District (SCAQMD) and the Bay Area Air Quality Management District (BAAQMD) have proposed significance thresholds based on specific GHG emission levels. The SCAQMD (SCAQMD 2009) is proposing a significance threshold of 3,000 metric tons of CO_2e emissions for mixed use projects like the Plaza Linda Verde Project, based on a 90% capture rate (i.e., 90% of projects would be subject to evaluation, further analysis, and potential mitigation measures based on a GHG emission threshold). The BAAQMD ~~is proposing~~has adopted a significance threshold of 1,100 metric tons of CO_2e, or a threshold of 4.6 MT CO_2e/service population/yr (residents + employees), for projects other than stationary sources.

According to the ARB (ARB 2010), "ARB staff estimated 2020 business-as-usual GHG emissions, which represent the emissions that would be expected to occur in the absence of any GHG reductions actions. ARB staff estimates the statewide 2020 business-as-usual greenhouse gas emissions will be 596 $MMTCO_2E$. Emission reductions from the recommended measures in the Scoping Plan total 169 $MMTCO_2E$, allowing California to attain the 2020 emissions limit of 427 $MMTCO_2E$.

The 2020 BAU emissions estimate was derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors. For the purposes of the Scoping Plan, ARB used three-year average emissions, by sector, for 2002-2004 to forecast emissions to 2020. At the time the Scoping Plan process was initiated, 2004 was the most recent year for which actual data were available."

According to the ARB (ARB 2010), "Growth factors are sector-specific and are derived from several sources, including the energy demand models generated by California Energy Commission (CEC) for their 2007 Integrated Energy Policy Report (IEPR), business economic growth data developed for ARB's criteria pollutant forecast system (CEFS), population growth data from the California Department of Finance, and projections of vehicle miles traveled from ARB's on-road mobile source emissions model, EMFAC2007. For the electricity and other energy sectors, ARB consulted with CEC to select the most appropriate growth factor."

Given that the ARB's growth projections were based on 2007 data, prior to implementation of the 2008 Title 24 energy efficiency standards but after adoption of the 2005 Title 24 energy efficiency standards, the projections for BAU GHG emissions are based on Title 24 as of 2005. For energy efficiency, therefore, "business as usual" is considered to be the equivalent of Title 24 as of 2005.

4.0 GREENHOUSE GAS IMPACTS

GHG emissions associated with the Plaza Linda Verde Project were estimated for ~~four~~five categories of emissions: (1) construction; (2) energy use, including electricity and natural gas usage; (3) water consumption; (4) solid waste handling; and (~~4~~5) transportation. The analysis also includes a baseline estimate that assumes Title 24-compliant buildings, which is considered business as usual for the Project. Emissions were estimated based on emission factors from the California Climate Action Registry General Reporting Protocol (CCAP 2008). The complete emissions inventory is summarized below and included in the Appendix.

4.1 Existing Conditions

The site is currently developed with 31 residential dwelling units and approximately ~~30,000~~44,200 square feet of retail uses. The Traffic Impact Analysis (Linscott, Law, and Greenspan 2010) indicates that existing average daily trips generated from current uses average 3,113 ADT. In addition to GHGs generated by vehicles, indirect GHG emissions are generated from electricity, natural gas, and water use.

Baseline energy use was calculated as a function of kWh per square foot based on average performance for southern California residences and commercial buildings, according to the *California Statewide Residential Appliance Saturation Survey* (CEC 2004) and the *California Commercial End-Use Survey* (CEC 2006). The energy use figures in these reports represent current state-wide average uses for all land uses, including those that are compliant with 2005 Title 24 standards. Because the Historic Resource Inventory (ASM Affiliates 2009) indicated that the existing buildings were constructed from 1937 through 1991, with most structures constructed in the period from 1940 through 1960, it is likely that energy efficiency is lower and that average energy use figures underestimate energy use for these buildings. Thus the baseline energy use provides a conservative estimate of current energy requirements relative to future energy requirements.

The *California Statewide Residential Appliance Saturation Survey* provided estimated energy use for older homes versus newer homes, which indicated that newer homes used more electricity (7,035 kWh annually versus 5,846 kWh annually for older homes) due to their larger size (2,061 square feet for newer homes, on average, versus 1,448 square feet for older homes). On a per square foot basis, however, older homes used more electricity than newer homes, with a rate of 4.037 kWh/square foot versus 3.413 kWh/square foot for newer homes. For the purpose of estimating electricity use for the existing residential dwellings, the average size of 1,448 square feet was used with an average electricity use of 4.037 kWh/square foot. Natural gas usage rates were reported as 370 therms per year for newer homes and 355 therms per year for older homes, which equates to an average natural gas usage rate of 0.18 therms/square foot for newer homes and 0.25 therms/square foot for older homes. For the purpose of estimating natural gas use for the existing residential dwellings, the average size of 1,448 square feet was used with an average natural gas usage of 0.25 therms/square foot.

Electricity usage rates for the retail space were calculated based on estimated annual rates of 14.06 kilowatt-hours (kWh) per square foot from the *California Commercial End-Use Survey* (CEC 2006) for retail space. Emissions associated with natural gas usage were calculated based on the CEC's estimated natural gas usage per square foot of 0.5 therms per square foot of retail space per month. Emissions were calculated based on emission factors in the California Climate Action Registry General Reporting Protocol, Version 3.1 (CCAR 2009).

Water use and energy use are often closely linked. The provision of potable water to commercial users consumes large amounts of energy associated with five stages: source and conveyance, treatment, distribution, end use, and wastewater treatment. This inventory estimated that delivered water for the project will have an embodied energy of 3,519 kWh/acre foot or 0.0108 kWh/gallon (Wilkinson and Wolfe 2005). Water usage was estimated from the existing land uses to be 9,494 gallons per day. Total existing water usage would therefore be 3,463,310 gallons per year.

Solid waste generation also contributes to the emission of GHGs, through waste collection and management activities and emissions of GHGs from landfilling. Solid waste generation rates were estimated based on the public services evaluation conducted for the project. The existing uses were estimated to generate a total of 123.8 tons/year of solid waste. GHG emissions from solid waste management were estimated using the EPA's Waste Reduction Model (WARM) (EPA 2009). Because the Miramar Landfill recovers landfill gas and utilizes it to generate power, the WARM model was run assuming landfilling of solid waste with landfill gas recovery for energy.

The disposal of solid waste produces greenhouse gas emissions in a number of ways. First, the anaerobic decomposition of waste in landfills produces methane, a greenhouse gas 21 times more potent than carbon dioxide. Second, the incineration of waste produces carbon dioxide as a by-product. In addition, the transportation of waste to disposal sites produces greenhouse gas emissions from the combustion of the fuel used in the transport equipment. Finally, the disposal of materials results in the generation of new products; this production often requires the use of fossil fuels to obtain raw materials and manufacture the items. The EPA's WARM model relies on a life-cycle analysis of solid waste landfilling, which includes landfill carbon storage, landfill gas generation, GHG emissions associated with transport of waste to the landfill, and avoided electric utility emissions from the use of landfill gas for energy (USEPA 2010a).

Because the WARM model assumes that the landfill gas will be recovered and used for energy, the EPA estimates that there will be a net GHG emission reduction, rather than an emissions increase, associated with solid waste handling at Miramar Landfill (USEPA 2010b). This is based on the EPA's calculation of net emissions associated with landfilling of municipal solid waste, which accounts for the reduction in landfill methane emissions due to use of the generated landfill gas for energy production, and the avoidance of emissions from the electric utility. These emission reductions offset the emission increases associated with transport of waste materials to the Miramar Landfill and CO_2 emissions from combustion of landfill gas. The WARM model therefore predicted a net decrease in GHG emissions with these assumptions of 6 metric tons of CO_2-equivalent emissions annually.

Emissions from vehicles were estimated using the EMFAC2007 model (ARB 2007a) emission factors, assuming an average trip length of 5.8 miles based on data for average trip lengths within

San Diego County estimated by the San Diego Association of Governments (SANDAG). Estimated GHG emissions from vehicles associated with existing uses are presented in Table 4.

Table 4
SUMMARY OF ESTIMATED EXISTING OPERATIONAL GREENHOUSE GAS EMISSIONS

Emission Source	Annual Emissions (Metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
Operational Emissions				
Electricity Use	~~241~~320	0.~~0018~~0024	0.~~0010~~0013	~~241~~320
Natural Gas Use	~~138~~176	0.~~0154~~0195	0.0003	~~138~~176
Water Use	15	0.0001	0.0001	15
Solid Waste Handling	(6)	-	-	(6)
Vehicle Emissions	3,575	0.20	0.28	3,666
Global Warming Potential Factor	**1**	**21**	**310**	
CO_2 Equivalent Emissions	~~3,969~~4,080	5	87	4,~~060~~171
TOTAL CO_2 Equivalent Emissions	**4,~~060~~171**			

4.2 Construction Greenhouse Gas Emissions

Construction GHG emissions include emissions from heavy construction equipment, truck traffic, and worker trips. Emissions were calculated using the URBEMIS Model, Version 9.2.4, for completed and proposed construction. The URBEMIS Model contains emission factors from the OFFROAD2007 model for heavy construction equipment (ARB 2007), and from the EMFAC2007 model for on-road vehicles. Table 5 presents the construction-related emissions associated with Phase I and Phase II of the Proposed Project.

Table 5
Construction GHG Emissions
Metric tons/year

Construction Phase	CO_2 Emissions, metric tons
Phase I Construction	1,712
Phase II Construction	1,864
TOTAL	3,576

Under the University-Serving Retail Alternative (an alternative to the Proposed Project), considered below, neither the parking structure nor the underground parking under Buildings 4 and 5 would be constructed. Construction emissions for this alternative would therefore be lower than for the University/Community-Serving Retail Alternative (i.e., the Proposed Project) that are presented in Table 5.

The ARB issued a 7,000 MT draft threshold for industrial projects, such that projects with emissions below that level could be allowed to proceed without mitigation under CEQA (ARB 2008b). Of note, the Proposed Project's total emissions from construction would be less than the draft significance threshold for industrial projects proposed by the ARB. Because the 7,000 metric ton threshold is proposed for application to industrial projects with continuing emissions, and because the construction emissions associated with the Proposed Project would be temporary and below 7,000 MT, it is reasonable to conclude that the construction-related emissions would not be significant under the ARB's draft significance threshold.

Recent guidance from the SCAQMD[5] suggests amortizing construction emissions over a 30-year period to account for the contribution of construction emissions over the lifetime of the project. Amortizing the emissions from construction of the Proposed Project over a 30-year period would result in an annual contribution of 119 metric tons of CO_2e. Of note, if the construction emissions are amortized, the emissions are below the 900 metric tons of CO_2e threshold identified by CAPCOA as one potential threshold for use by lead agencies when considering whether further analysis is required.

In summary, because the construction emissions are temporary and would be below both the ARB's proposed and CAPCOA's recommended thresholds, emissions from construction would be less than significant.

[5] South Coast Air Quality Management District, Interim GHG Significance Threshold, as adopted December 5, 2008. http://www.aqmd.gov/hb/2008/December/081231a.htm

4.3 Operational Greenhouse Gas Emissions

Two options are under consideration for development of the retail space: (1) University/Community-Serving Retail, which would provide services to both the SDSU community and the surrounding community; and (2) University-Serving Retail, which would focus services on primarily serving the SDSU students, faculty, and staff. The following subsections present an analysis of operational impacts associated with the Proposed Project, which would include University/Community-Serving Retail uses, and an alternative to the Proposed Project, which would include University-Serving Retail uses.

4.3.1 University/Community-Serving Retail Option

This subsection presents an evaluation of emissions and impacts associated with the University/Community-Serving Retail option.

Energy Use Emissions. As discussed above, energy use generates GHG through emissions from power plants that generate electricity as well as emissions from natural gas usage at the facility itself.

As discussed above, under existing conditions, baseline energy use was calculated as a function of kWh per square foot based on average performance for southern California residences and commercial buildings compliant with 2005 Title 24 standards. Energy use was calculated based on usage rates from the *California Statewide Residential Appliance Saturation Survey* (CEC 2004) and the *California Commercial End-Use Survey* (CEC 2006). The *California Statewide Residential Appliance Saturation Survey* provided estimated electricity use for newer homes of 7,035 kWh annually, for an average sized home of 2,061 square feet. The student housing proposed for the Plaza Linda Verde Project will average 1,025 square feet. On a per square foot basis, electricity use is estimated at 3.413 kWh/square foot for newer homes based on the *Survey*. On a per square foot basis, natural gas usage rates are 0.18 therms/square foot for newer homes. These values were used to calculate "business as usual" electricity and natural gas usage, based on average residential square footage for the Project of 1,025 square feet; annual electricity use was therefore estimated at 3,498 kWh and annual natural gas usage was estimated at 184.5 therms under "business as usual" conditions.

Electricity usage rates for the retail space were calculated based on estimated annual rates of 14.06 kilowatt-hours (kWh) per square foot from the *California Commercial End-Use Survey* (CEC 2006) for retail space. Emissions associated with natural gas usage were calculated based on the CEC's estimated natural gas usage per square foot of 0.5 therms per square foot of retail space per month. Emissions were calculated based on emission factors in the California Climate Action Registry General Reporting Protocol, Version 3.1 (CCAR 2009).

Water. As discussed above, water use results in indirect energy use, which results in GHG emissions. This inventory estimated that delivered water for the project will have an embodied energy of 3,519 kWh/acre foot or 0.0108 kWh/gallon (Wilkinson and Wolfe 2005). Water usage was estimated from the Project to be 68,050 gallons per day. Total existing water usage would therefore be 24,838,250 gallons per year.

Solid Waste. Solid waste generation rates were estimated based on the public services evaluation conducted for the project. The proposed uses were estimated to generate a total of 216.9 tons/year of solid waste. GHG emissions from solid waste management were estimated using the EPA's WARM (EPA 2009). As discussed above, because the Miramar Landfill recovers landfill gas and utilizes it to generate power, the WARM model was run assuming landfilling of solid waste with landfill gas recovery for energy. The WARM model predicted a net decrease in GHG emissions with these assumptions of 11 metric tons of CO_2-equivalent emissions annually.

Based on the public services and utilities evaluation, the Miramar Landfill will likely close in 2018, and wastes will be diverted to the Sycamore Canyon Landfill. The Sycamore Canyon Landfill is located 12 miles from the Plaza Linda Verde project, as opposed to 9.6 miles for the Miramar Landfill. The WARM model predicted a net decrease in GHG emissions for transport to the Sycamore Landfill of 6 metric tons of CO_2-equivalent emissions annually. For conservative purposes, this reduction was assumed for the project.

Transportation. As discussed in Section 1.2, on-road vehicle emissions account for 46% of existing GHG emissions in San Diego County. The Traffic Impact Analysis (Linscott, Law, and Greenspan 2010) indicated that the total gross projected ADT generated by the Proposed Project would be 5,508. Emissions from vehicles under "business as usual" conditions were calculated using the EMFAC2007 model. The EMFAC2007 model does not take into account any of the GHG reduction measures proposed by the state or federal government. Emissions from vehicles were estimated using the EMFAC2007 model emission factors, assuming an average trip length of 5.8 miles based on data for average trip lengths within San Diego County estimated by the San Diego Association of Governments (SANDAG). Estimated GHG emissions from vehicles associated with existing uses are presented in Table 6.

The results of the inventory for operational emissions for business as usual are presented in Table 6. These include GHG emissions associated with buildings (natural gas, purchased electricity) and water consumption (energy embodied in potable water). Table 6 summarizes projected emissions using the methodologies noted above.

Table 6
SUMMARY OF ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS
BUSINESS AS USUAL SCENARIO
UNIVERSITY/COMMUNITY-SERVING RETAIL

Emission Source	Annual Emissions (Metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
Operational Emissions				
Electricity Use	1,062	0.0081	0.0045	1,064
Natural Gas Use	630	0.0701	0.0012	632
Water Use	107	0.0008	0.0005	107
Solid Waste Handling	(6)	-	-	(6)
Vehicle Emissions	6,326	0.36	0.49	6,485
Global Warming Potential Factor	**1**	**21**	**310**	
CO_2 Equivalent Emissions	8,~~125~~119	9	154	8,~~288~~282
TOTAL CO_2 Equivalent Emissions	**8,~~288~~282**			

4.3.2 University-Serving Retail Option

This subsection presents an evaluation of emissions and impacts associated with the University-Serving Retail option.

Energy Use Emissions. Energy use emissions (electricity and natural gas) would be the same for the University-Serving Retail and University/Community-Serving Retail options.

Water. Water usage would be the same for the University-Serving Retail and University/Community-Serving Retail options.

Solid Waste. Emissions relating to solid waste handling would be the same for the University-Serving Retail and University/Community-Serving Retail options.

Transportation. The Traffic Impact Analysis (Linscott, Law, and Greenspan 2010) indicated that the total gross projected ADT generated by the University-Serving Retail option would be 3,642. Emissions from vehicles under "business as usual" conditions were calculated using the EMFAC2007 model. The EMFAC2007 model does not take into account any of the GHG reduction measures proposed by the state or federal government. Emissions from vehicles were estimated using the EMFAC2007 model emission factors, assuming an average trip length of 5.8 miles based on data for average trip lengths within San Diego County estimated by the San Diego Association of Governments (SANDAG).

The results of the inventory for operational emissions for business as usual are presented in Table 7. These include GHG emissions associated with buildings (natural gas, purchased electricity) and water consumption (energy embodied in potable water). Table 7 summarizes projected emissions using the methodologies noted above.

Table 7 SUMMARY OF ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS BUSINESS AS USUAL SCENARIO UNIVERSITY-SERVING RETAIL				
Emission Source	**Annual Emissions (Metric tons/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Electricity Use	1,062	0.0081	0.0045	1,064
Natural Gas Use	630	0.0701	0.0012	632
Water Use	107	0.0008	0.0005	107
Solid Waste Handling	(6)	-	-	(6)
Vehicle Emissions	4,182	0.24	0.32	4,286
Global Warming Potential Factor	**1**	**21**	**310**	
CO_2 Equivalent Emissions	5,~~981~~975	7	101	6,~~089~~083
TOTAL CO_2 Equivalent Emissions	**6,~~089~~083**			

5.0 SUMMARY OF PROJECT DESIGN FEATURES, IMPACTS, AND MITIGATION MEASURES

As discussed in Section 3.0, a significance threshold of 28.35% below "business as usual" levels is considered to demonstrate that a project would be consistent with the goals of AB 32.

The Plaza Linda Verde Project will meet the requirements of the California State University's Sustainability and Energy Efficiency Goals. These goals include SDSU's commitment to achieve LEED Silver certification for the Proposed Project's buildings. As such, the buildings that would be constructed would be more energy-efficient than existing buildings located on the Project site. In addition, Energy Star appliances would be used in the project. According to the EPA and U.S. Department of Energy (USEPA ~~2010~~2010c), Energy Star appliances are 10 to 30 percent more energy efficient than the minimum federal standard for appliances. To account for energy efficiency of Energy Star appliances, as well as accounting for energy efficiency associated with non-plug loads that will be achieved through meeting the California State

University's Sustainability and Energy Efficiency Goals, it was assumed that 20% less energy (electricity and natural gas) would be used than under "business as usual" conditions. This reduction accounts for the 15% improvement over Title 24 standards as of 2005 that is attributable to Title 24 standards as of 2008, with an additional 5% reduction attributable to meeting LEED Silver Certification.

As shown in Tables 6 and 7, and as discussed in the ARB's *Staff Report, California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit* (ARB 2007b), vehicular emissions are the greatest contributor to GHG emissions. Because CSU/SDSU does not have direct control over the types of vehicles or emission/fuel standards, the effect of California programs to reduce GHG emissions from vehicles was evaluated. Based on the SDCGHGI, the percent reductions in GHG emissions anticipated through implementation of the Federal CAFE standards, LCFS, and Pavley fuel efficiency standard (analogous to the Federal CAFE standard), as well as the effect of light/heavy vehicle efficiency/hybridization programs can be estimated. Based on that study, emissions from vehicles would be reduced by 20 percent through implementation of the Federal CAFE standard/Pavley standard, 10 percent through LCFS, and 3 percent by the light/heavy vehicle efficiency/hybridization standard. Emissions from vehicles would therefore be reduced by as much as 33 percent from state and federal programs by the year 2020. In this analysis, it was assumed that emissions from vehicles would be reduced by 30 percent to account for reductions in GHG emissions from the Federal CAFE/Pavley standard and the LCFS.

In addition to the energy efficiency and mobile source emissions reductions discussed above, reductions attributable to California's RPS (SB 1078; 2002) were included in the emission calculations for electricity use. SB 1078 initially set a target of 20% of energy to be sold from renewable sources by the year 2017. The schedule for implementation of the RPS was accelerated in 2006 with the Governor's signing of SB 107, which accelerated the 20% RPS goal from 2017 to 2010. On November 17, 2008, the Governor signed Executive Order S-14-08, which requires all retail sellers of electricity to serve 33 percent of their load with renewable energy by 2020. The Governor signed Executive Order S-21-09 on September 15, 2009, which directs ARB to implement a regulation consistent with the 2020 33% renewable energy target by July 31, 2010.

According to the SDCGHGI, implementation of the 20% RPS goal by 2010 would reduce GHG emissions by a further 14% from 2006 levels; the inventory estimated that San Diego Gas and Electric was providing 6% of its electricity from renewable resource in 2006. To account for the implementation of the 20% RPS, a 14% reduction in GHG emissions was assumed.

While implementation of Executive Order S-21-09 (i.e., the 33% RPS) will result in additional GHG reductions of 27% below 2006 levels, no additional credit was taken for these reductions because they ~~have not yet been promulgated or adopted by the ARB.~~ were not promulgated or adopted by the ARB at the time this report was prepared for use in the Draft EIR. Implementation of the 33% RPS will result in an addition reduction in GHG emissions of 119 metric tons of CO_2 equivalent GHGs; however, no credit was taken for this additional reduction in the project's emissions inventory.

While water conservation measures, Energy Star appliances, and the RPS will reduce GHG emissions associated with water usage, for conservative purposes no credit was taken for these measures in the calculation of GHG from water consumption.

As discussed in Section 4.1, existing conditions associated with the current development at the Project site have 4,~~060~~171 metric tons of GHG emissions. These emissions will be eliminated upon development of the Plaza Linda Verde Project, accounting for some reduction in GHG emissions.

Further reductions will be achieved through the energy efficiency measures associated with the LEED Silver rating and the CSU Sustainability Programs that are designed to reduce energy needs and thereby reduce GHG emissions. The purpose of the Plaza Linda Verde Project is to provide housing for students that might otherwise live elsewhere, or commute to SDSU. The University/Community-Serving Retail would provide local retail services in the area; the University-Serving Retail would provide services for the University community.

Regardless, the Project is consistent with current growth forecasts and would not result in an increase in student enrollment.

Table 8 presents the estimated GHG emissions for the University/Community-Serving Retail option, with implementation of the GHG reduction measures summarized above (i.e., LEED Silver rating; federal and state mobile source regulatory framework; 20% RPS).

Table 8
SUMMARY OF ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS WITH GHG REDUCTION MEASURES
UNIVERSITY/COMMUNITY-SERVING RETAIL

Emission Source	Annual Emissions (Metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
Operational Emissions				
Electricity Use	731	0.0056	0.0031	732
Natural Gas Use	504	0.0561	0.0010	506
Water Use	107	0.0008	0.0005	107
Solid Waste Handling	(6)	-	-	(6)
Vehicle Emissions	4,428	0.25	0.34	4,539
Global Warming Potential Factor	**1**	**21**	**310**	
CO_2 Equivalent Emissions	5,~~770~~764	7	107	5,~~884~~878
TOTAL CO_2 Equivalent Emissions, with GHG Reductions	**5,~~884~~878**			
Business As Usual CO_2 Equivalent Emissions	**8,~~288~~282**			
Percent Below Business As Usual	**~~29.0~~29.0%**			
Existing CO_2 Equivalent Emissions	**4,~~060~~171**			
Net CO_2 Equivalent Emissions	**1,~~824~~707**			

Table 9 presents the estimated GHG emissions for the University-Serving Retail option, with implementation of GHG reduction measures summarized above (i.e., LEED Silver rating; federal and state mobile source regulatory framework; 20% RPS).

Table 9 SUMMARY OF ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS WITH GHG REDUCTION MEASURES UNIVERSITY-SERVING RETAIL				
Emission Source	**Annual Emissions (Metric tons/year)**			
	CO_2	**CH_4**	**N_2O**	**CO_2e**
Operational Emissions				
Electricity Use	731	0.0056	0.0031	732
Natural Gas Use	504	0.0561	0.0010	506
Water Use	107	0.0008	0.0005	107
Solid Waste Handling	(6)	-	-	(6)
Vehicle Emissions	2,927	0.17	0.22	3,000
Global Warming Potential Factor	**1**	**21**	**310**	
CO_2 Equivalent Emissions	4,~~269~~263	5	70	4,~~345~~339
TOTAL CO_2 Equivalent Emissions, with GHG Reductions	**4,~~345~~339**			
Business As Usual CO_2 Equivalent Emissions	**6,~~089~~083**			
Percent Below Business As Usual	**28.~~6~~7%**			
Existing CO_2 Equivalent Emissions	**4,~~060~~171**			
Net CO_2 Equivalent Emissions	**~~285~~168**			

As shown in Tables 8 and 9, emissions for both the University/Community-Serving Retail Alternative and the University-Serving Retail Alternative would be both below "business as usual" emission levels with implementation of the GHG emission reduction measures summarized above (i.e., LEED Silver rating; federal and state mobile source regulatory framework; 20% RPS) by more than 28.35~~%, -~~.%. Additionally, net emissions for the University/Community-Serving Retail Alternative would be 1,~~824~~707 metric tons of CO_2e, which is above the screening-level threshold of 900 metric tons of CO_2e identified by CAPCOA as one potential threshold for use by lead agencies when considering whether further analysis is required, but below the SCAQMD's draft significance threshold for mixed-use projects of 3,000 metric tons of CO_2e. Net emissions for the University-Serving Retail Alternative would be both below the screening-level threshold of 900 metric tons of CO_2e, and below the SCAQMD's SCAQMD's draft significance threshold for mixed-use projects of 3,000 metric tons of CO_2e.

Accordingly, the Plaza Linda Verde Project will meet the goals of AB 32 and would not result in significant global climate impacts.

6.0 CONCLUSIONS

Emissions of GHGs were quantified for both construction and operation of the Plaza Linda Verde Project. Operational emissions were calculated for existing conditions, and for both the University/Community-Serving Retail scenario and the University-Serving Retail scenario. Through the CSU Sustainability Program, and the mobile source emission regulatory framework and RPS, emissions will be reduced for the Proposed Project to a level that is consistent with the goals of AB 32. Therefore, the Proposed Project would not result in a significant global climate change impact.

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Appendix A

Greenhouse Gas Emission Calculations

Table A-1
Electricity Greenhouse Gas Emissions - Existing Conditions
Plaza Linda Verde Project

Electricity

Land Use	1,000 Sqft	Usage Rate [a] (kWh\sq.ft\yr)	(KWh\year)	MWh\year
Project			0	0.00
Retail	44.2	14.06	621,452	621.45
Residential (SF and MF, Dwelling Unit	31.0	5,846	181,226	181.23
Total Project			**802,678**	**802.68**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	lbs/MWh[b]	lbs	metric tons	CO_2E
Project				
CO_2	878.71	705321.1854	319.9280471	319.9280471
CH_4	0.0067	5.3779426	0.002439392	0.051227227
N_2O	0.0037	2.9699086	0.001347127	0.417609302
				320.40

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-2
Natural Gas Greenhouse Gas Emissions - Existing Conditions
Plaza Linda Verde Project

Natural Gas

Land Use	1,000 Sqft	Usage Rate per SF or unit Therms/Year	Total Natural Gas Usage Therms/Year	Total Natural Gas Usage (MMBTU\year)
Project				
Retail	44.2	0.5	22,100	2,210
Residential (SF and MF, Dwelling Units)	31.0	355	11,005	1,101
Total Project			33,105	**3,311**

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	Kg/MMBtu[b]	Kg	metric tons	CO_2E (Metric Tons)
Project				
CO_2	53.06	175,655.13	175.66	175.66
CH_4	0.0059	19.53	0.0195	0.41
N_2O	0.0001	0.33	0.0003	0.10
				176.17

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-3
Water Use Greenhouse Gas Emissions - Existing Conditions
Plaza Linda Verde Project

Water Usage

Land Use	GPY	Usage Rate (kWh\MMgal)	(KWh\year)	MWh\year
Project	3465310	10800	37,425	37.43
Total Project			**37,425**	**37.43**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	lbs/MWh[b]	lbs	metric tons	CO_2E
Project				
CO_2	878.71	32886.02754	14.916839	14.916839
CH_4	0.0067	0.250749832	0.000113738	0.0023885
N_2O	0.0037	0.138473788	6.28106E-05	0.019471287
				14.94

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-4
Solid Waste Management - Existing Conditions
Plaza Linda Verde Project

Solid Waste

Land Use	1,000 Sqft or number of units	Solid Waste generation, tons/unit or sf	Solid Waste Tons/year
Project			
Retail	44.2	0.0108	477.36
Residential (SF and MF,	31.0	2.0400	63.24
Total Project			**540.60**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

Table A-5
On-Road Mobile Source Greenhouse Gas Emissions - Existing Conditions
Plaza Linda Verde Project

On Road Mobile Source

Land Use	Daily VMT	Annual VMT[a]
Total Project	18,055	6,590,221.00

[a] Multiplied Daily VMT by 365 to get Annual VMT
[b] Factors dervied from URBEMIS2002

San Diego County CO_2 2012 AVG Gram/Mile[c]	542.4161429
San Diego County CH_4 2012 AVG Gram/Mile[c]	0.0305
N_2O Gram/Mile	0.042

GHG	Gram/Mile	Gram	metric tons	CO_2E (Metric Tons)
Project				
CO_2	542.41614	3,574,642,255.40	3,574.64	3,574.64
CH_4	0.0305	201,001.74	0.20	4.22
N_2O	0.042	276,789.28	0.28	85.80
				3664.67

[c] Averaged EMFAC2007 fleet values for 0-65mph
[d] Emission Factor for N_2O based on EPA Tier 0 emission factoı

Table A-6
Electricity Greenhouse Gas Emissions - Business As Usual
Plaza Linda Verde Project

Electricity

Land Use	1,000 Sqft or units	Usage Rate [a] (kWh\sq.ft\yr)	(KWh\year)	MWh\year
Project			0	0.00
Retail	90.0	14.06	1,265,400	1265.40
Residential (DU)	400.0	3,498	1,399,200	1399.20
Total Project			**2,664,600**	**2664.60**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	lbs/MWh [b]	lbs	metric tons	CO_2E
Project				
CO_2	878.71	2341410.666	1062.045147	1062.045147
CH_4	0.0067	17.85282	0.008097896	0.170055823
N_2O	0.0037	9.85902	0.004471973	1.386311506
				1063.60

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-7
Natural Gas Greenhouse Gas Emissions - Business As Usual
Plaza Linda Verde Project

Natural Gas

Land Use	1,000 Sqft	Usage Rate per SF or unit Therms/Year	Total Natural Gas Usage Therms/Year	Total Natural Gas Usage (MMBTU\year)
Project				
Retail	90.0	0.1	4,500	450
Residential (DU)	400.0	185	73,800	7,380
Total Project			78,300	**7,830**

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	Kg/MMBtu[b]	Kg	metric tons	CO_2E (Metric Tons)
Project				
CO_2	53.06	415,459.80	415.46	415.46
CH_4	0.0059	46.20	0.0462	0.97
N_2O	0.0001	0.78	0.0008	0.24
				416.67

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-8
Water Use Greenhouse Gas Emissions - Business As Usual
Plaza Linda Verde Project

Water Usage

Land Use	GPY	Usage Rate (kWh\MMgal)	(KWh\year)	MWh\year
Project	24838250	10800	268,253	268.25
Total Project			**268,253**	**268.25**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	lbs/MWh[b]	lbs	metric tons	CO_2E
Project				
CO_2	878.71	235716.6815	106.919201	106.919201
CH_4	0.0067	1.79729577	0.000815239	0.017120019
N_2O	0.0037	0.99253647	0.000450207	0.139564047
				107.08

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-9
Solid Waste Management Emissions
Plaza Linda Verde Project

Solid Waste

Land Use	1,000 Sqft or number of units	Solid Waste generation, tons/unit or sf	Solid Waste Tons/year
Project			
Retail	90.0	0.0108	972.00
Residential (SF and MF,	400.0	1.1700	468.00
Total Project			**1440.00**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	Metric Tons/ton	lbs	metric tons	CO_2E
Project				
CO_2e	1.51		0	15
				15.00

Table A-10
On-Road Mobile Source Greenhouse Gas Emissions - Business As Usual
Plaza Linda Verde Project

On Road Mobile Source - Community-Serving Retail

Land Use	Daily VMT	Annual VMT[a]
Total Project	31,952	11,662,553.00

[a] Multiplied Daily VMT by 365 to get Annual VMT
[b] Factors dervied from URBEMIS2002

San Diego County CO_2 2012 AVG Gram/Mile[c]	542.4161429
San Diego County CH_4 2012 AVG Gram/Mile[c]	0.0305
N_2O Gram/Mile	0.042

GHG	Gram/Mile	Gram	metric tons	CO_2E (Metric Tons)
Project				
CO_2	542.41614	6,325,957,014.13	6,325.96	6,325.96
CH_4	0.0305	355,707.87	0.36	7.47
N_2O	0.042	489,827.23	0.49	151.85
				6485.27

[c] Averaged EMFAC2007 fleet values for 0-65mph
[d] Emission Factor for N_2O based on EPA Tier 0 emission factoı

Table A-11
On-Road Mobile Source Greenhouse Gas Emissions - Business As Usual
Plaza Linda Verde Project

On Road Mobile Source - University-Serving Retail

Land Use	Daily VMT	Annual VMT[a]
Total Project	**21,124**	**7,710,114.00**

[a] Multiplied Daily VMT by 365 to get Annual VMT
[b] Factors dervied from URBEMIS2002

San Diego County CO_2 2012 AVG Gram/Mile[c]	**542.4161429**
San Diego County CH_4 2012 AVG Gram/Mile[c]	**0.0305**
N_2O Gram/Mile	**0.042**

GHG	Gram/Mile	Gram	metric tons	CO_2E (Metric Tons)
Project				
CO_2	542.41614	4,182,090,296.87	4,182.09	4,182.09
CH_4	0.0305	235,158.48	0.24	4.94
N_2O	0.042	323,824.79	0.32	100.39
				4287.41

[c] Averaged EMFAC2007 fleet values for 0-65mph
[d] Emission Factor for N_2O based on EPA Tier 0 emission factoı

Table A-12
Electricity Greenhouse Gas Emissions - with GHG Reductions
Plaza Linda Verde Project

Electricity

Land Use	1,000 Sqft	Usage Rate [a] (kWh\sq.ft\yr)	(KWh\year)	MWh\year
Project			0	0.00
Retail	90.0	11.25	1,012,320	1012.32
Residential (DU)	400.0	2,798	1,119,360	1119.36
Total Project			**2,131,680**	**2131.68**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	lbs/MWh[b]	lbs	metric tons	CO_2E
Project				
CO_2	755.6906	1610890.538	730.687061	730.687061
CH_4	0.005762	12.28274016	0.005571353	0.116998406
N_2O	0.003182	6.78300576	0.003076717	0.953782316
				731.76

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

Table A-13
Natural Gas Greenhouse Gas Emissions - with GHG Reductions
Plaza Linda Verde Project

Natural Gas

Land Use	1,000 Sqft	Usage Rate per SF or unit Therms/Year	Total Natural Gas Usage Therms/Year	Total Natural Gas Usage (MMBTU\year)
Project				
Retail	90.0	0.0	3,600	360
Residential (DU)	400.0	148	59,040	5,904
Total Project			62,640	6,264

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

GHG	Kg/MMBtu[b]	Kg	metric tons	CO_2E (Metric Tons)
Project				
CO_2	53.06	332,367.84	332.37	332.37
CH_4	0.0059	36.96	0.0370	0.78
N_2O	0.0001	0.63	0.0006	0.19
				333.34

[b] Emission factors for CO_2, CH_4, and N_2O were derived from the California Climate Action Registry General Reporting Protocol; Version 3.1, January 2009

APPENDIX F3.3

F3.3

Historical Resources Supplemental Memoranda

ASM affiliates
archaeology
history
architectural history
ethnography

March 23, 2011

Sarah Lozano, AICP
Environmental Project Manager
DUDEK
605 Third Street
Encinitas, CA 92024

Re: Supplemental Historic Research 5157 College Avenue

Dear Ms. Lozano,

Thank you for the opportunity to respond to comments provided on ASM Affiliates' report entitled *Historic Resource Inventory and Evaluation for the San Diego State University Plaza Linda Verde Project, San Diego, California.* The reviewer questions the construction date of the building at 5157 College Avenue:

> *Based on water and sewer permit records, the date of construction for the property 5157 College Avenue is incorrect. The building was constructed in 1946, not 1958. The report should be corrected.*

Prior to ASM's survey we conducted archival research in an effort to determine the date of construction of buildings within the project area. Our research included accessing County of San Diego Assessor records for the parcels. The date of construction provided by the County Assessor records was 1958. According to the reviewer's comment the water and sewer records indicate a date of construction of 1946 for this building. Sewer and water connection dates are generally used to determine when water services were first provided to a lot. They can be a good source of information regarding dates of construction for buildings on the lot. However, they are not 100 percent accurate, as buildings present at the time of the first water connection can be moved, demolished and replaced. County Assessor records are generally thought to be more accurate as they reflect either the original date of construction, or the date when substantial alterations to the building were completed, thereby requiring a re-assessment of the building's value for taxation purposes.

2034 Corte Del Nogal, Carlsbad, California 92011 • (760) 804-5757 • Fax: (760) 804-5755
260 S. Los Robles Ave., Suite 106, Pasadena, California 91101 • (626) 793-7395 • Fax: (626) 793-2008
121 California Ave., Reno, Nevada 89509 • (775) 324-6789 • Fax: (775) 324-9666
453 Vandehei Avenue, Suite 140, Cheyenne, Wyoming 82009 • (307) 772-9317 • Fax: (307) 772-9350
2319 Foothill Drive, Suite 140C, Salt Lake City, Utah 84109 • (801) 485-1464 • (801) 485-2908
20912 Frank Waters Rd., Stanwood, WA 98292 • (760) 845-0284
www.asmaffiliates.com

It is possible that the building at 5157 College Avenue was constructed as early as 1946, however it is not possible, given the sources available, to state that categorically. The earlier date of construction does not change the recommendation that this building is not eligible for listing in the National Register of Historic Places, the California Register of Historic Resources, or the City of San Diego Historical Resources Register.

Respectfully submitted,

Sinéad Ní Ghabhláin, Ph.D.
Principal

ASM affiliates
archaeology
history
architectural history
ethnography

March 23, 2011

Sarah Lozano, AICP
Environmental Project Manager
DUDEK
605 Third Street
Encinitas, CA 92024

Re: Supplemental Historic Research 5178 College Avenue

Dear Ms. Lozano,

Thank you for the opportunity to respond to comments provided on ASM Affiliates' report entitled *Historic Resource Inventory and Evaluation for the San Diego State University Plaza Linda Verde Project, San Diego, California*. The reviewer questions the construction date and use of the building at 5178 College Avenue:

> *The property at 5178 College Avenue does not have the correct date of construction or historic use. According to water and sewer permits, the building was constructed in 1958 (not 1980s) for St. Dunstan's Episcopal Church. The construction date and use should be corrected, the building re-evaluated within that context, and DPR forms should be prepared.*

Prior to ASM's survey we conducted archival research in an effort to determine the date of construction of buildings within the project area. Our research included accessing County of San Diego Assessor records for the parcels. No information was available for the building at 5178 College Ave. Our assessment of the date of construction was therefore based on the structural and stylistic characteristics of the building. The building is currently a modern commercial space and is reflective of this throughout its entire design and use. Specifically, the siding, modern windows and doors, steel girder based concrete side staircase amongst other features suggested a date of construction in the early 1970s, if not later.

Following receipt of this comment we conducted additional research on the history of St. Dunstan's Episcopal Church in San Diego. The history of St. Dunstan's church is detailed in *The Parish of St. Dunstan, San Diego, California, The First Twenty-Five Years* (History Book Committee, 1973), and is excerpted on the St. Dunstan Episcopal Church website (http://stdunstans.org/history.html).

St. Dunstan's Episcopal Church was moved to two parcels at 5198-5178 College Avenue in the spring of 1948 from its original location at 8th and C Streets in San Diego, where it had served as the parish church of St. Paul's Episcopal Parish since 1887. According to an article in the *San Diego Union* on May 13, 1948, the "entire cost of moving, re-assembling and remodeling the church was estimated at $40,000". Photographs of the church taken before and after its move to College Avenue indicate that it was a large Neo-Gothic structure with nave, chancel, apse and a tall spire (Figure 1). The church was cut into ten pieces to facilitate the move to its new location.

By 1965, enrollment at San Diego State University (then San Diego State College) had increased to more than 16,000, and plans were being made to initiate an extensive building program to increase the size of the campus. A lack of parking space for parishioners, and lack of space for expansion of parish facilities, prompted the congregation to sell the property on College Avenue and to move to Lemon Grove. The church building was again moved to a new location in Lemon Grove where it became St. Philip's Parish Church (Figure 2). Stained glass windows from the original chapel also made the transition to the new church building. The first service in the new location was held on Dec 24, 1969.

In conclusion, a church was present at 5178-5198 College Avenue between 1948 and 1967. This church was subsequently moved to Lemon Grove. The current commercial building was constructed sometime after 1967, a date consistent with the structural and stylistic features of the building. Given the date of construction, this building does not meet the age threshold for eligibility to the California Register of Historic Resources, City of San Diego Historic Resources Register or the National Register of Historic Places.

Respectfully submitted,

Sinéad Ní Ghabhláin, Ph.D.
Principal

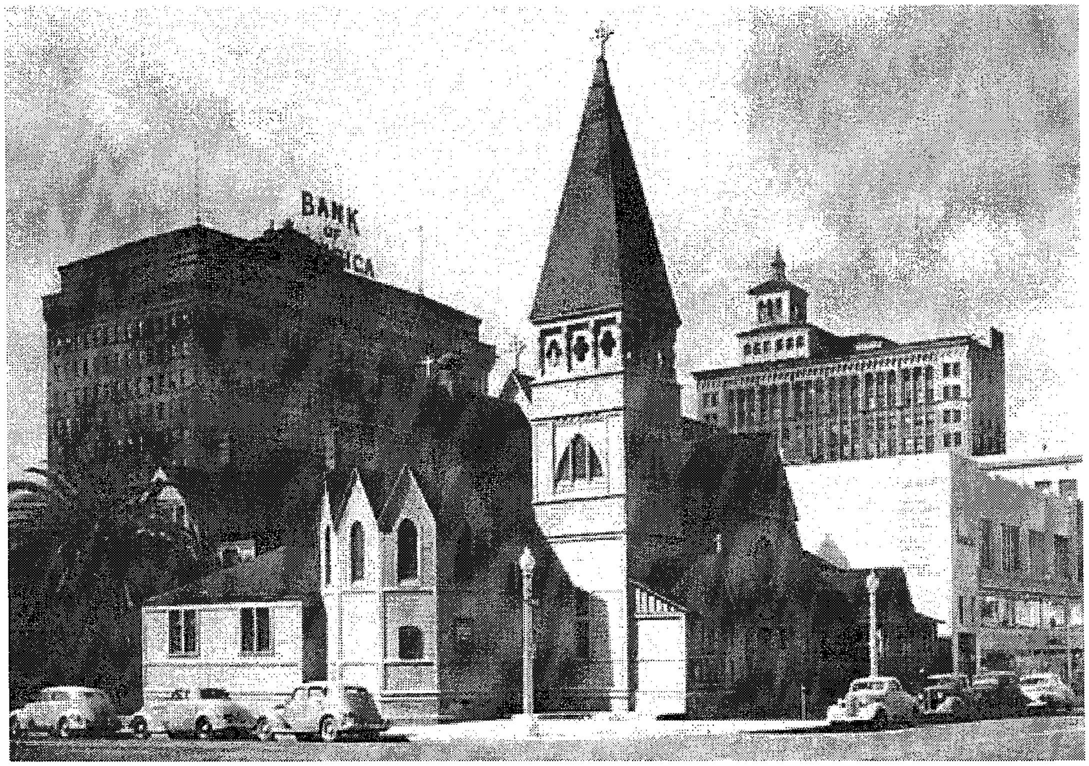

Figure 1. St. Paul's Episcopal Church, San Diego at its original location

Figure 2 St. Dunstan's Church being moved to Lemon Grove in 1967

APPENDIX F3.5

F3.5

Closure Letters

County of San Diego

J. WILLIAM COX, M.D., Ph.D
DIRECTOR
(619) 236-2237

DEPARTMENT OF HEALTH SERVICES

1700 PACIFIC HIGHWAY, SAN DIEGO, CALIFORNIA 92101-2417

ENVIRONMENTAL HEALTH SERVICES
HAZARDOUS MATERIALS MANAGEMENT DIVISION
P.O. BOX 85261
SAN DIEGO, CA 92138-5261
(619) 236-2222

May 12, 1988

Cindy Hughes
Chevron USA, Inc.
LaHabra, CA 90631

RE: UNAUTHORIZED RELEASE #T0812/H12638,
5111 COLLEGE AVENUE, SAN DIEGO (SS# 8565)

Dear Ms. Hughes:

The written report dated May 2, 1988, regarding a failed precision test of an underground storage tank system at the above referenced site has been reviewed by the Hazardous Materials Management Division (HMMD). Based on the information provided, the situation has been resolved to the satisfaction of the HMMD and no further action regarding the suspected unauthorized release is required at this time. The underground storage tank system has been re-tested and certified tight by C.R.J. Inc., on July 3, 1987, after only minor adjustments to the system.

Should any information come to light in the future to indicate that an unauthorized release (leak) has occured at this site, please be advised that the unauthorized release must be reported to the HMMD within 24 hours in accordance with Section 25295 of the California Health and Safety Code.

Please call me at (619) 236-2222, if you have any questions regarding this matter.

Sincerely,

MIKE VERNETTI, Hazardous Materials Specialist
Hazardous Materials Management Division

MV/tjl

cc: Scott Hugenberger, RWQCB

M. Porter

County of San Diego

J. WILLIAM COX. M.D., Ph.D
DIRECTOR
STEVEN A. ESCOBOZA
ASSISTANT DIRECTOR

DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL HEALTH SERVICES

OFFICE OF THE DEPUTY DIRECTOR
P.O. BOX 85261
SAN DIEGO, CA 92186-5261
(619) 338-2211
Fax #: 338-2174

July 2, 1991

Sheila Fooshe
Chevron U.S.A., Inc.
P.O. Box 2833
La Habra, CA 90632-2833

Dear Ms. Fooshe:

RE: UNAUTHORIZED RELEASE #T01788/H12636-001
CHEVRON SERVICE STATION 9-8565-WASTE OIL RELEASE
5111 COLLEGE AVENUE, SAN DIEGO, CA 92115-2411

The site remediation information submitted to this agency by Groundwater Technology, Inc. summarizing the site characterization and mitigation activities at the above referenced location has been reviewed. With the provision that the information provided to this agency was accurate and representative of existing conditions, it is the position of this office that no further action is required at this time.

This information has also been discussed with staff of the Regional Water Quality Control Board (RWQCB). Based on the information submitted and current requirements, the RWQCB concurs with the determination of this agency that no further action is required at this time.

Please be advised that this letter does not relieve you of any liability under the California Health and Safety Code or Water Code for past, present, or future operations at the site. Nor does it relieve you of the responsibility to clean up existing, additional or previously unidentified conditions at the site which cause or threaten to cause pollution or nuisance or otherwise pose a threat to water quality or public health.

Additionally, be advised that changes in the present or proposed use of the site may require further site characterization and mitigation activity. It is the property owner's responsibility to notify this agency of any changes in report content, future contamination findings, or site usage.

Thank you for your efforts in resolving this matter. Please contact the Hazardous Materials Management Division, Michael G. Porter, at (619) 338-2245, if you require additional assistance.

Sincerely,

GARY R. STEPHANY, Deputy Director
Environmental Health Services

GRS:cmc

cc: James Munch-RWQCB
Babette L. Lithgow-Groundwater Technology, Inc.
Jane Fruin-Chevron U.S.A., Inc.

WP\T01788

SW

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
(619) 338-2222 FAX (619) 338-2377
1-800-253-9933

RICHARD HAAS
ASSISTANT DIRECTOR

December 24, 2001

Mr. Jerry Bogaczyk
Chevron Products Company
SAR Project Manager
P.O. Box 2292
Brea, CA 92822-2292

Dear Mr. Bogaczyk:

UNDERGROUND STORAGE TANK CASE #H12636-004
CHEVRON STATION #9-8565
5111 COLLEGE AVENUE, SAN DIEGO, CA

This letter confirms the completion of a site investigation and corrective action for the underground storage tanks both formerly and currently located at the above-described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former and current underground storage tanks is greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, this agency finds that the site investigation and corrective action carried out at your underground storage tanks site is in compliance with the requirements of subdivisions (a) and (b) of Section 25299.37 of the Health and Safety Code and with corrective action regulations adopted pursuant to Section 25299.77 of the Health and Safety Code. No further action related to the petroleum releases at the site is required.

This notice is issued pursuant to subdivision (h) of Section 25299.37 of the Health and Safety Code. Please contact Scott Weldon at (619) 338-2539 if you have questions regarding this matter.

Sincerely,

GARY W. ERBECK, Director
Department of Environmental Health
Site Assessment and Mitigation Program

GWE:SW:kd

Enclosure

cc: Regional Water Quality Control Board
Allan Patton, SWRCB, UST Cleanup Fund Program
Ted Cramer, Cramer Management Company
Rudy Reyes, SECOR

DAL

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
(619) 338-2222 FAX (619) 338-2377
1-800-253-9933

RICHARD HAAS
ASSISTANT DIRECTOR

July 6, 2000

Mr. Brad Ledesma
Project Engineer
Mobil Oil Corporation
3700 W. 190th Street
T.P.T. 2
Torrance, CA 90509

Ms. Mary V. Arnold
4266 Ridgeway
San Diego, CA 92116

Ms. Susan A. Machado,
Mr. Mark E. Arnold, and
Mr. Matthew C. Arnold
13792 Hwy 8 Business
Space #37
El Cajon, CA 92021

Mr. Lou Haberkern
SDSU Foundation
5250 Campanile Dr.
San Diego, CA 92182

Ms. Lynda C. Ogle
1012 W. Deer Trail
Kingsville, TX 78363

Ms. Patricia S. Chapman
5243 S. E. 66th
Portland, OR 97206

Mr. Lyle L. Arnold
10782 B Riderwood Terrace
Santee, CA 92071

Dear Mr. Ledesma, Mr. Haberkern, Mr. Arnold, Ms. Ogle, Ms. Arnold, Ms. Machado and Ms. Chapman:

UNDERGROUND STORAGE TANK (UST) CASE #H12486-001 & 002
FORMER MOBIL STATION 18-EHB
5130 COLLEGE AVE., SAN DIEGO, CA

This letter confirms the completion of a site investigation and corrective action for the underground storage tanks formerly located at the above-described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tanks is greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, this agency finds that the site investigation and corrective action carried out at your underground storage tanks site is in compliance with the requirements of subdivisions (a) and (b) of Section 25299.37 of the Health and Safety Code and with corrective action regulations adopted pursuant to Section 25299.77 of the Health and Safety Code and that no further action related to the petroleum release(s) at the site is required.

This notice is issued pursuant to subdivision (h) of Section 25299.37 of the Health and Safety Code.

DAL

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
(619) 338-2222 FAX (619) 338-2377
1-800-253-9933

RICHARD HAAS
ASSISTANT DIRECTOR

March 7, 2002

Lee Hanley
Project Engineer
Mobil Oil Corporation
1464 Madera Road
Suite N-265
Simi Valley, CA 93065

Mary V. Arnold
4266 Ridgeway
San Diego, CA 92116

Susan A. Machado
Mark E. Arnold
Matthew C. Arnold
13792 Hwy 8 Business
Space #37
El Cajon, CA 92021

Lou Haberkern
SDSU Foundation
5250 Campanile Dr.
San Diego, CA 92182

Lynda C. Ogle
1012 W. Deer Trail
Kingsville, TX 78363

Patricia S. Chapman
5243 S. E. 66th
Portland, OR 97206

Lyle L. Arnold
10782 B Riderwood Terrace
Santee, CA 92071

Dear Mr. Hanley, Mr. Haberkern, Mr. Arnold; Ms. Ogle, Ms. Arnold, Ms. Machado and Ms. Chapman:

UNDERGROUND STORAGE TANK (UST) CASE #H12486-003

This letter confirms the completion of a site investigation and corrective action for the underground storage tanks formerly located at the above-described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tanks is greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, this agency finds that the site investigation and corrective action carried out at your underground storage tank(s) site is in compliance with the requirements of subdivisions (a) and (b) of Section 25299.37 of the Health and Safety Code and with corrective action regulations adopted pursuant to Section 25299.77 of the Health and Safety Code and that no further action related to the petroleum release(s) at the site is required.

This notice is issued pursuant to subdivision (h) of Section 25299.37 of the Health and Safety Code. Please contact Donn LiPera at (619) 338-2244 if you have questions regarding this matter.

Sincerely,

GARY W. ERBECK, Director
Department of Environmental Health
Site Assessment and Mitigation Program

GWE:DAL:kd

Enclosure

cc: Regional Water Quality Control Board
Allan Patton, SWRCB, UST Cleanup Fund Program

WP/H12486-003CLO

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
619-338-2222/FAX 619-338-2315/1-800-253-9933
www.sdcounty.ca.gov/deh/lwq

RICHARD HAAS
ASSISTANT DIRECTOR

September 16, 2005

Mr. John Frary
Unocal Corporation
P.O. Box 1069
San Luis Obispo, CA 93406

Mr. Lou Haberkern, Director
SDSU Foundation – Facilities Management
5250 Campanile Drive
San Diego, CA 92182

Dear Mr. Frary and Mr. Haberkern:

UNDERGROUND STORAGE TANK (UST) PROGRAM – DEH FILE NO. H12309-003
FORMER UNOCAL STATION NO. 3991
5140 COLLEGE AVENUE, SAN DIEGO, CA

This letter confirms completion of corrective actions associated with the underground storage tanks formerly located at the above-referenced site.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, this agency finds that the corrective actions were carried out in compliance with the requirements of subdivisions (a) and (b) of Section 25299.37 of the Health and Safety Code and with corrective action regulations adopted pursuant to Section 25299.77 of the Health and Safety Code and that no further action related to the petroleum release at the site is required.

This notice is issued pursuant to subdivision (h) of Section 25299.37 of the Health and Safety Code. Please contact Jim Schuck at (619) 338-2908 if you have questions regarding this matter.

Sincerely,

GARY W. ERBECK, Director
Department of Environmental Health
Site Assessment and Mitigation Program

GWE:JCS:kd

Enclosure (Case Closure Summary)

cc: Mr. John Odermatt, Regional Water Quality Control Board
Mr. Dominic DiCarlo, ENSR International

WP/H12309-003-905POPCLO

APPENDIX F3.7

F3.7

Settlement Agreement and Mutual Releases; SDSU Foundation, Redevelopment Agency of San Diego, City of San Diego, Board of Trustees of the California State University

DUPLICATE ORIGINAL

SETTLEMENT AGREEMENT AND MUTUAL RELEASES

This SETTLEMENT AGREEMENT AND MUTUAL RELEASES ("Agreement") is made and entered into effective October 12, 2009 ("Effective Date"), by and among **SAN DIEGO STATE UNIVERSITY FOUNDATION** ("Foundation"), **REDEVELOPMENT AGENCY OF SAN DIEGO** ("Agency"), **CITY OF SAN DIEGO** ("City") and **BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY** ("CSU") all of which parties collectively shall be described as the "Parties" and individually as a "Party."

RECITALS:

A. On or about December 3, 1991, Foundation and Agency made and entered into that certain written Agreement for Processing a Redevelopment Plan and Land Use Entitlements ("1991 Agreement") pertaining to the proposed redevelopment of the area in the City of San Diego designated as the "Site" on the map attached to the 1991 Agreement as Exhibit "A" ("Project Area"). Among other things, the 1991 Agreement provided for certain deposits and other payments to be made by the Foundation in connection with the proposed redevelopment plan and, under the circumstances specified therein, reimbursement by Agency to Foundation of such amounts ("Foundation Reimbursement").

B. On or about March 3, 2005, Foundation and Agency entered into a Cash Depository Agreement ("CDA") with reference to that certain parcel of property located at 5840-5846 Hardy Avenue in the City of San Diego, California ("Property"). Pursuant to the CDA, the 1991 Agreement and the Redevelopment Plan, the Foundation and Agency were in the process of negotiating the "Paseo Disposition and Development Agreement" ("Paseo DDA"). In addition, pursuant to the CDA, the Foundation provided funds to cover the costs associated with the acquisition of the Property. Furthermore, the CDA provided that, in the event the Paseo DDA was not signed by Foundation and Agency on or before January 1, 2006, and Agency, on or before September 1, 2007, had not disposed of the property to a third party, Foundation had the right of first offer to purchase the Property at a cost equal to the fair market value of the Property less the portion of the amounts advanced by Foundation for the purchase by Agency of the Property which was allocated towards the purchase price ("Foundation Right of First Offer").

C. On or about March 10, 2008, Foundation provided to Agency written notice of exercise of the Foundation Right of First Offer.

D. On or about July 1, 2008, Agency provided written notice to Foundation alleging that Foundation was in breach of both the 1991 Agreement and the CDA and that, therefore, Agency had no obligation: (i) to Foundation with respect to the Foundation Right of First Offer; or (ii) to pay to Foundation any Foundation Reimbursement pursuant to the 1991 Agreement.

E. On or about September 5, 2008, Foundation caused to be filed against Agency a complaint ("Complaint") in San Diego County Superior Court, Case No. 37-2008-00091165-CU-BC-CTL in which Foundation alleged causes of action against Agency for specific performance with respect to the Foundation Right of First Offer and declaratory relief ("Action"). Thereafter, on or about February 26, 2009, Agency and City filed a cross-complaint, which, as subsequently amended, alleges several causes of action against both Foundation and CSU ("Second Amended Cross-Complaint"). The Second Amended Cross-Complaint contains numerous factual allegations, including the "General Allegations" referenced in paragraphs 1-42 therein. All such factual allegations are made by Agency and City to support the First through Tenth Causes of Action. Said causes of action assert, among other things: (a) that both Foundation and CSU breached the 1991 Agreement and the CDA; (b) that CSU interfered with the contracts and economic relations between Foundation and Agency relating to these agreements; and (c) various claims for declaratory relief relative to these agreements and the rights and responsibilities of the Parties to each other. CSU has pending a demurrer to the Second Amended Cross-Complaint.

F. On or about June 24, 2009, Foundation filed an administrative claim against Agency for the Foundation Reimbursement in an amount estimated to be, including principal and interest, in excess of $3,400,000 ("Reimbursement Claim"). On or about August 13, 2009, Agency rejected the Reimbursement Claim. Foundation has not, to date, initiated litigation with respect to the Reimbursement Claim.

G. The Parties and their counsel met on October 12, 2009 to resolve all claims relating to the Complaint, Action, and Second Amended Cross-Complaint. At that time, the Parties and their counsel negotiated and signed a written Memorandum of Principal Terms of Settlement ("Memorandum of Settlement") which, subject to the approval of the Parties' governing bodies, sets forth the principal terms of settlement of the Action. Such Memorandum of Settlement also contemplates the preparation and signature by the Parties of this Agreement. All required approvals of the governing bodies of the Parties were obtained. Therefore, the Parties, by this Agreement, hereby enter into the contemplated Agreement, which supersedes and replaces the Memorandum of Settlement.

THEREFORE, the Parties hereby agree as follows:

1. **SETTLEMENT TERMS**

1.1 **Conveyance by Agency to Foundation of Property; Waiver of Monetary Claims under CDA; Mutual Termination of CDA.**

(a) On or before December 11, 2009, Agency shall convey good and marketable title to the Property to Foundation by delivery of a grant deed and recordable assignment of leases. Agency and Foundation shall each pay one-half (1/2) of all costs associated with the conveyance including but not limited to escrow fees, document recording costs and the premium for an ALTA owners policy of title insurance with Western regional exceptions with liability in the amount of $5 million. .

(b) Foundation waives any Claims against Agency with respect to any difference between the fair market value of the Property and the "Acquisition Costs" as defined in the CDA.

(c) Foundation and Agency hereby mutually terminate both the CDA and the 1991 Agreement, effective upon conveyance of the Property, and shall thereafter have no further rights or obligations under either agreement.

1.2 **Payment**. Agency shall pay to Foundation the total principal sum of $750,000 in settlement of the Reimbursement Claim by Foundation against Agency pursuant to the 1991 Agreement. The foregoing payment shall be made pursuant to the following terms:

(a) The principal amount may be paid without interest before June 30, 2010;

(b) From and after June 30, 2010, any unpaid principal amount shall accrue simple interest in the amount as determined pursuant to Section 108 of the 1991 Agreement, which is hereby incorporated herein by this reference;

(c) All payments shall be applied first to accrued interest and then to principal; and

(d) All principal and accrued interest shall be due and payable in full on or before June 30, 2012.

1.3 **Attorneys' Fees and Costs**. Each Party to this Agreement shall bear all attorneys' fees and costs incurred by such Party in connection with the Action, including both the Complaint and Second Amended Cross-Complaint, and the negotiation and preparation of this Agreement.

1.4 **Dismissal of Lawsuit with Prejudice**. Foundation shall cause to be filed a dismissal with prejudice of the entire Complaint, and Agency and City shall cause to be filed a dismissal with prejudice of the entire Second Amended Cross-Complaint. In addition, Foundation shall cause to be recorded a withdrawal of lis pendens with respect to the Complaint.

2. MUTUAL RELEASE

2.1 **Release by Agency and City**. Agency and City, individually and collectively, hereby forever release and discharge Foundation and CSU, individually and collectively, as well as their respective boards, trustees, parents, subsidiaries, affiliated university, companies, shareholders, officers, directors, managers, members, agents, licensees, brokers, servants, partners, principals, affiliates, presidents, employees, attorneys, insurers, predecessors and assigns and assignors, jointly and severally, from any and all claims, allegations, demands, controversies, causes of action, damages, rights, liabilities, and obligations ("Claims"), of whatsoever character, nature and kind, in law or in equity, known or unknown, past, present or future: (a) alleged in the Action, including both the Complaint and Second Amended Cross-Complaint, and all causes of action alleged therein; (b) which are substantively the same as those claims alleged by City and/or Agency in the Ninth Cause of Action of the Second Amended Cross-Complaint and which also are asserted in the briefing by the Agency and City in the *Del Cerro Action Council* Lawsuit (as defined below); or (c) arising from or related in any way to the 1991 Agreement, the CDA, or the Property. As used in this Section 2.1, the term "*Del Cerro Action Council* Lawsuit" means the consolidated action entitled, *Del Cerro Action Council v. CSU*, and related actions, San Diego County Superior Court, consolidated under Case No. GIC855643. The "briefing" in the *Del Cerro Action Council* Lawsuit shall mean the Petitioners City of San Diego and Redevelopment Agency of the City of San Diego's Opening Brief, dated June 10, 2009, Section F, beginning with page 22, line 20, through page 26, line 2; Section G, page 27, lines 4-5; Section H, page 27, lines 8-22; and Section J, page 28, lines 23-26. Notwithstanding any other provision herein to the contrary, this release shall not apply to the rights and obligations of the Parties expressly created or preserved pursuant to this Agreement. Nothing herein shall be construed as a waiver, release, or discharge of any such Claims of Agency and City with respect to (i) any redevelopment plan project area other than the College Community Redevelopment Plan ("CCRP") Project Area, (ii) any Foundation obligation, to the extent the Foundation does not enjoy sovereign immunity, to comply with the CCRP and City land use regulations for any building or development undertaken by Foundation within the CCRP Project Area, and (iii) any third party claims against Agency or City arising from Foundation's management of the Property before the conveyance of the Property by Agency to Foundation pursuant to Section 1.1(a), above.

2.2 **Release by Foundation and CSU**. Foundation and CSU, individually and collectively, hereby forever release and discharge Agency and City, individually and collectively, as well as their respective boards, parents, subsidiaries, companies, shareholders, officers, directors, managers, members, agents, licensees, brokers, servants, partners, principals, affiliates, employees, attorneys, insurers, predecessors and assigns and assignors, jointly and severally, from any and all Claims (as that term is defined in Section 2.1, above), of whatsoever character, nature and kind, in law or in equity, known or unknown, past present or future: (a) alleged in the Action, including the Complaint and Second Amended Cross-Complaint, and all causes of action alleged therein; or (b) arising from or related in any way to the 1991 Agreement, the CDA, or the Property. Notwithstanding any other provision herein to the contrary, this release shall not apply to the rights and obligations of the Parties expressly created or preserved pursuant to this Agreement. Nothing herein shall be construed as a waiver, release, or discharge of CSU's sovereign immunity or any of its immunities arising under the Tort Claims Act.

2.3 **Waiver of CIVIL CODE Section 1542**. It is the intention of the Parties that the foregoing releases shall be effective as a bar to all Claims of whatsoever character, nature and kind, known or unknown, suspected or unsuspected, with respect to the Claims waived pursuant to Sections 2.1 and 2.2, above. In furtherance of this intention, each of the Parties expressly waives any and all rights and benefits conferred upon such Parties by the provisions of §1542 of the California CIVIL CODE, which are as follows:

> *A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor.*

Each of the Parties hereby acknowledges that the foregoing waiver of the provisions of §1542 of the California CIVIL CODE was separately bargained for and is given with the benefit of advice from counsel; each of the Parties expressly consents that this release shall be given full force and effect in accordance with each and all of its express terms and provisions, including those terms and provisions relating to unknown and unsuspected claims, demands and causes of action, if any, to the same effect as those terms and provisions relating to any other claims, demands and causes of action herein above specified.

3. **MISCELLANEOUS**

3.1 **Disputed Claims**. This Agreement represents the settlement of disputed claims and does not constitute any admission of liability by any Party to any other Party; each Party to this Agreement hereby expressly denies any liability to any other Party.

3.2 **Counterparts**. This Agreement may be executed in two or more counterparts, each of which shall be an original, but all of which shall constitute one and the same instrument.

3.3 **Jurisdiction of Court to Enforce Agreement**. The court in which the Action is pending shall retain jurisdiction to enforce this Agreement pursuant to California Code of Civil Procedure § 664.6.

3.4 **Further Assurances**. The Parties hereto hereby agree to execute such other documents and to take such other action as may reasonably be necessary to further the purposes of this Agreement.

3.5 **Time of Essence**. Time is expressly declared to be of the essence of this Agreement and of every provision hereof in which time is an element.

3.6 **Governing Law**. This Agreement has been negotiated and entered into in the State of California, and shall be governed by, construed and enforced in accordance with the internal laws of the State of California.

3.7 **Benefit and Burden**. This Agreement shall be binding upon and inure to the benefit of the Parties.

3.8 **Severability**. If any material covenant, condition or provision herein contained is held to be invalid, void or unenforceable by a final judgment of any court of competent jurisdiction, the invalid, void, or unenforceable provision shall become void.

3.9 **Waiver and Amendment**. No breach of any provision hereof can be waived unless in writing, signed by the waiving Party. Waiver of any one such breach shall not be deemed to be a waiver of any other breach of the same or any other provision hereof.

3.10 **Captions**. Paragraph titles or captions contained herein are inserted as a matter of convenience and for reference, and in no way define, limit, extend or describe the scope of this Agreement or any provision hereof.

3.11 **Negotiated Agreement Interpretations**. The Parties acknowledge that this Agreement is the result of good faith negotiations between the Parties through their respective counsel and representatives. Any statute or rule of construction that ambiguities are to be resolved against the Party who caused such ambiguity to exist shall not be employed in the interpretation or enforcement of this Agreement.

3.12 **Integration; Entire Agreement; Amendments**. Neither Party has made any warranty or representation to the other, as an inducement to enter into this Agreement or otherwise, which is not set forth in this Agreement. This Agreement constitutes the entire agreement between the Parties hereto pertaining to the subject matter hereof, fully supersedes any and all prior understandings, representations, warranties and agreements between the Parties hereto, or any of them, pertaining to the subject matter hereof (including but not limited to the Memorandum of Settlement). The Parties have not relied upon any promises, warranties or undertakings other than those expressly set forth in this Agreement. This Agreement may be modified only by written agreement signed by all of the Parties hereto.

3.13 **Independent Advice of Counsel**. The Parties hereto, and each of them, represent and declare that in executing this Agreement they rely solely upon their own judgment, belief and knowledge, and the advice and recommendations of their own independently selected counsel, concerning the nature, extent and duration of their rights and claims, and that they have not been influenced to any extent whatsoever in executing the same by any of the Parties hereto or by any person representing them, or any of them.

3.14 **Voluntary Agreement**. The Parties hereto, and each of them, further represent and declare that they have carefully read this Agreement and know the contents thereof, and that they sign the same freely and voluntarily.

IN WITNESS WHEREOF, the Parties hereto have signed this Agreement as of the Effective Date.

SAN DIEGO STATE UNIVERSITY FOUNDATION

By: [signature]
Its: Executive Director

REDEVELOPMENT AGENCY OF SAN DIEGO

By: [signature]
Its: Deputy Executive Director

CITY OF SAN DIEGO

By: [signature]
Its: Jerry Sanders
Mayor

R- 305467

BOARD OF TRUSTEES OF CALIFORNIA STATE UNIVERSITY

By: [signature]

Its: VICE PRESIDENT SDSU

R - 305467

APPROVED AS TO FORM:

HECHT SOLBERG ROBINSON GOLDBERG & BAGLEY LLP

By: ______________________ 12/9/09
Jerold H. Goldberg, Esq. Dated
Attorneys for San Diego State
University Foundation

OFFICE OF CITY ATTORNEY, CITY OF SAN DIEGO

By: ______________________ 12/11/09
Donald R. Worley, Esq. Dated
Attorneys for Redevelopment Agency
of San Diego and City of San Diego

GATZKE DILLON & BALLANCE LLP

By: ______________________ ______________________
Mark J. Dillon, Esq. Dated
Attorneys for the Board of
Trustees of California State
University

APPROVED AS TO FORM:

HECHT SOLBERG ROBINSON GOLDBERG & BAGLEY LLP

By:______________________________ ______________________________

Jerold H. Goldberg, Esq.
Attorneys for San Diego State
University Foundation

Dated

OFFICE OF CITY ATTORNEY, CITY OF SAN DIEGO

By:______________________________ ______________________________

Donald R. Worley, Esq.
Attorneys for Redevelopment Agency
of San Diego and City of San Diego

Dated

GATZKE DILLON & BALLANCE LLP

By: [signature] 12/10/09

Mark J. Dillon, Esq.
Attorneys for the Board of
Trustees of California State
University

Dated

(RA-2010-43)

SDRA 12/7/09 RA Item # 54D

REDEVELOPMENT AGENCY OF

THE CITY OF SAN DIEGO

RESOLUTION NUMBER R- 04475

DATE OF FINAL PASSAGE DEC 09 2009

A RESOLUTION OF THE REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO APPROVING THE SETTLEMENT AGREEMENT AND MUTUAL RELEASES AND ASSOCIATED ACTIONS IN CONNECTION WITH CLAIMS ASSERTED RELATING TO THE AGREEMENT FOR PROCESSING A REDEVELOPMENT PLAN AND LAND USE ENTITLEMENTS AND THE CASH DEPOSITORY AGREEMENT ENTERED INTO BY AND BETWEEN THE REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO AND THE SAN DIEGO STATE UNIVERSITY FOUNDATION.

WHEREAS, on or about December 3, 1991, San Diego State University Foundation [Foundation] and the Redevelopment Agency of the City of San Diego [Agency] entered into an Agreement for Processing a Redevelopment Plan and Land Use Entitlements [1991 Agreement] pertaining to the proposed redevelopment of the area in the City of San Diego [City] designated as the "Site" on the map attached to the 1991 Agreement as Exhibit "A" [Project Area], which Agreement provided for certain deposits and other payments to be made by the Foundation in connection with the proposed redevelopment plan, and, under the circumstances specified therein, reimbursement by the Agency to the Foundation of such amounts [Foundation Reimbursement]; and

WHEREAS, on or about March 3, 2005, the Foundation and the Agency entered into a Cash Depository Agreement [CDA] with reference to that certain parcel of property located at 5840-5846 Hardy Avenue in the City of San Diego, California [Property] and, pursuant to the CDA, the Foundation provided funds to cover the costs associated with the acquisition of the Property; and principal and interest, in excess of $3,400,000 [Reimbursement Claim] and, on or about August 13, 2009, the Agency rejected the Reimbursement Claim; and

WHEREAS, representatives of the Agency, City, Foundation and CSU each agree that it is in each party's best interest to settle certain claims made in the Complaint, Action, and Second Amended Cross-Complaint in connection with the 1991 Agreement and the CDA and that the Agency and Foundation terminate the 1991 Agreement and the CDA; and

WHEREAS, as proposed in the Settlement Agreement and Mutual Release and subject to releases and waivers of claims by the Agency, City, Foundation and CSU, the Agency and Foundation each agree to voluntarily terminate the 1991 Agreement and the CDA upon the transfer of Property, and the Agency further agrees to transfer fee title of the Property to the Foundation by Grant Deed, to assign all leases of the Property to the Foundation pursuant to a recordable Assignment of Leases, to pay half (1/2) of all costs and fees associated with the closing on the transfer of fee title of the Property to the Foundation, and to pay a total amount of Seven Hundred Fifty Thousand Dollars ($750,000) to the Foundation as settlement of claims before June 30, 2010, or alternatively to pay a total amount of $750,000 plus simple interest as calculated in the Settlement Agreement to the Foundation as settlement of claims from and after June 30, 2010 but before June 30, 2012; and

WHEREAS, in accordance with the California Community Redevelopment Law, including California Health and Safety Code Section 33431, the Agency duly conducted a public hearing on March 1, 2005, for the purpose of considering the approval of the CDA and the proposed transfer of the Property to the Foundation; NOW, THEREFORE,

BE IT RESOLVED, by the Redevelopment Agency of the City of San Diego [Agency] as follows:

amount of $750,000 plus simple interest as calculated in the Settlement Agreement to the Foundation as settlement of claims from and after June 30, 2010 but before June 30, 2012.

7. That the Agency authorizes the Agency Executive Director or designee, on behalf of the Agency, to sign all documents necessary and appropriate to carry out and implement the Settlement Agreement and this Resolution and to administer the Agency's obligations, responsibilities and duties to be performed thereunder.

APPROVED: JAN I. GOLDSMITH, General Counsel

By ______________________
Kendall D. Berkey
Deputy General Counsel

KDB:nda
11/20/09
Or.Dept: Redev.Agency
RA-2010-43
MMS#7230
Comp. R-2010-391

I hereby certify that the foregoing Resolution was passed by the Redevelopment Agency of the City of San Diego, at this meeting of DEC 0 7 2009

REDEVELOPMENT AGENCY

By ______________________
Jeannette Santos, Deputy Secretary

Approved: 12-9-09
(date)

____
JERRY SANDERS, Executive Director

Vetoed: ______________
(date)

____
JERRY SANDERS, Executive Director

Passed by the Redevelopment Agency of The City of San Diego on DEC 07 2009, by the following vote:

Agency Members	Yeas	Nays	Not Present	Recused
Sherri Lightner	☑	☐	☐	☐
Kevin Faulconer	☑	☐	☐	☐
Todd Gloria	☑	☐	☐	☐
Anthony Young	☑	☐	☐	☐
Carl DeMaio	☑	☐	☐	☐
Donna Frye	☑	☐	☐	☐
Marti Emerald	☑	☐	☐	☐
Ben Hueso	☑	☐	☐	☐

Date of final passage DEC 09 2009.

AUTHENTICATED BY:

JERRY SANDERS
Executive Director of The City of San Diego, California.

(Seal)

ELIZABETH S. MALAND
Secretary of The City of San Diego, California.

By [signature], Deputy

Office of the Redevelopment Agency, San Diego, California

Resolution Number R- 04475

(R-2010-391) S400 12/7

RESOLUTION NUMBER R-305467

DATE OF FINAL PASSAGE DEC 08 2009

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN DIEGO APPROVING THE SETTLEMENT AGREEMENT AND MUTUAL RELEASES AND ASSOCIATED ACTIONS IN CONNECTION WITH CLAIMS ASSERTED RELATING TO THE AGREEMENT FOR PROCESSING A REDEVELOPMENT PLAN AND LAND USE ENTITLEMENTS AND THE CASH DEPOSITORY AGREEMENT ENTERED INTO BY AND BETWEEN THE REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO AND THE SAN DIEGO STATE UNIVERSITY FOUNDATION.

WHEREAS, on or about December 3, 1991, San Diego State University Foundation [Foundation] and the Redevelopment Agency of the City of San Diego [Agency] entered into an Agreement for Processing a Redevelopment Plan and Land Use Entitlements [1991 Agreement] pertaining to the proposed redevelopment of the area in the City of San Diego [City] designated as the "Site" on the map attached to the 1991 Agreement as Exhibit "A" [Project Area], which Agreement provided for certain deposits and other payments to be made by the Foundation in connection with the proposed redevelopment plan, and, under the circumstances specified therein, reimbursement by the Agency to the Foundation of such amounts [Foundation Reimbursement]; and

WHEREAS, on or about March 3, 2005, the Foundation and the Agency entered into a Cash Depository Agreement [CDA] with reference to that certain parcel of property located at 5840-5846 Hardy Avenue in the City of San Diego, California [Property] and, pursuant to the CDA, the Foundation provided funds to cover the costs associated with the acquisition of the Property; and

WHEREAS, the CDA provided that, in the event a Paseo Project Disposition and Development Agreement was not signed by the Foundation and the Agency on or before January

1, 2006, and that Agency, on or before September 1, 2007, had not disposed of the Property to a third party, the Foundation had the right of first offer to purchase the Property at a cost equal to the fair market value of the Property less the amounts advanced by the Foundation for the Agency's purchase of the Property [Foundation Right of First Offer]; and

WHEREAS, on or about March 10, 2008, the Foundation provided to the Agency written notice of exercise of the Foundation Right of First Offer; and

WHEREAS, on or about July 1, 2008, the Agency provided written notice to the Foundation alleging that the Foundation was in breach of both the 1991 Agreement and the CDA and that the Agency had no obligation: (i) to the Foundation with respect to the Foundation Right of First Offer; or (ii) to pay to the Foundation any Foundation Reimbursement pursuant to the 1991 Agreement; and

WHEREAS, on or about September 5, 2008, the Foundation caused to be filed against the Agency a complaint [Complaint] in San Diego County Superior Court, Case No. 37-2008-00091165-CU-BC-CTL wherein the Foundation alleged causes of action against the Agency for specific performance with respect to the Foundation Right of First Offer and declaratory relief [Action], and, thereafter, on or about February 26, 2009, the Agency and the City filed a cross-complaint which, as subsequently amended [Second Amended Cross-Complaint], alleges several causes of action against both the Foundation and the Board of Trustees of California State University [CSU]; and

WHEREAS, on or about June 24, 2009, the Foundation filed an administrative claim against the Agency for the Foundation Reimbursement in an amount estimated to be, including principal and interest, in excess of $3,400,000 [Reimbursement Claim] and, on or about August 13, 2009, the Agency rejected the Reimbursement Claim; and

WHEREAS, representatives of the Agency, City, Foundation and CSU each agree that it is in each party's best interest to settle certain claims made in the Complaint, Action, and Second Amended Cross-Complaint in connection with the 1991 Agreement and the CDA and that the Agency and Foundation terminate the 1991 Agreement and the CDA; and

WHEREAS, as proposed in the Settlement Agreement and Mutual Release and subject to releases and waivers of claims by the Agency, City, Foundation and CSU, the Agency and Foundation each agree to voluntarily terminate the 1991 Agreement and the CDA upon the transfer of Property, and the Agency further agrees to transfer fee title of the Property to the Foundation by Grant Deed, to assign all leases of the Property to the Foundation pursuant to a recordable Assignment of Leases, to pay half (1/2) of all costs and fees associated with the closing on the transfer of fee title of the Property to the Foundation, and to pay a total amount of Seven Hundred Fifty Thousand Dollars ($750,000) to the Foundation as settlement of claims before June 30, 2010, or alternatively to pay a total amount of $750,000 plus simple interest as calculated in the Settlement Agreement to the Foundation as settlement of claims from and after June 30, 2010 but before June 30, 2012; and

WHEREAS, in accordance with the California Community Redevelopment Law, including California Health and Safety Code Section 33431, the Agency duly conducted a public hearing on March 1, 2005, for the purpose of considering the approval of the CDA and the proposed transfer of the Property to the Foundation; NOW, THEREFORE,

BE IT RESOLVED, by the Council of the City of San Diego [Council], as follows:

1. That the Council approves the Settlement Agreement and Mutual Releases [Settlement Agreement] effective October 12, 2009 by and among San Diego State University Foundation [Foundation], Redevelopment Agency of the City of San Diego [Agency], City of

San Diego [City], and Board of Trustees of the California State University [CSU], thereby terminating the Cash Depository Agreement [CDA] and the Agreement for Processing a Redevelopment Plan and Land Use Entitlements [1991 Agreement], previously entered into by and between the Agency and the Foundation, upon the Agency's transfer of the Property to the Foundation.

2. That the Council authorizes the Mayor or designee to execute the Settlement Agreement; a copy of which, when executed by the City, shall be placed on file in the office of the City Clerk as Document No. R-305467.

3. That the Council authorizes the Mayor or designee, on behalf of the City, to sign all documents necessary and appropriate to carry out and implement the Settlement Agreement and this Resolution and to administer the City's obligations, responsibilities and duties to be performed thereunder.

APPROVED: JAN I. GOLDSMITH, City Attorney

By __________________________
Donald R. Worley
Assistant City Attorney

DRW:nda
11/20/09
Or.Dept:Redev.Agency
R-2010-391
MMS#7230
Comp. RA-2010-43

I hereby certify that the foregoing Resolution was passed by the Council of the City of San Diego, at this meeting of DEC 07 2009.

ELIZABETH S. MALAND
City Clerk

By [signature]
Deputy City Clerk

Approved: 12-8-09
(date)

[signature]
JERRY SANDERS, Mayor

Vetoed: ________________
(date)

____
JERRY SANDERS, Mayor

JAN I. GOLDSMITH, City Attorney
ANDREW JONES, Assistant City Attorney
CHRISTINE M. LEONE, Chief Deputy City Attorney
California State Bar No. 208803

Office of the City Attorney
1200 Third Avenue, Suite 1100
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Attorneys for Petitioners City of San Diego
and Redevelopment Agency of the City of San Diego

EXEMPT FROM FILING FEES
PURSUAN TO GOV'T CODE § 6103

SUPERIOR COURT OF CALIFORNIA, COUNTY OF SAN DIEGO

DEL CERRO ACTION COUNCIL,

Petitioner,

v.

BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY and DOES 1 to 20, inclusive,

Respondents,

SAN DIEGO STATE UNIVERSITY and DOES 21 through 40, inclusive,

Real Parties-in-Interest.

CITY OF SAN DIEGO; REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO,

Petitioners

v.

BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY and DOES 1 to 20, inclusive,

Respondents,

SAN DIEGO STATE UNIVERSITY FOUNDATION and DOES 21 through 50, inclusive,

Real Parties-in-Interest

Case Nos. GIC855643 (Lead Case)
[consolidated with Case Nos. GIC 855701; 37-2007-00083692-CU-WM-CTL; 37-2007-00083768-CU-TT-CTL; 37-2007-00083773-CU-MC-CTL]

PETITIONERS CITY OF SAN DIEGO AND REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO'S OPENING BRIEF

Hearing Date:	September 25, 2009
Time:	1:30 a.m.
Judge:	Hon. Thomas P. Nugent
Dept.:	NC-30
Trial Date:	Not Set
Action Filed:	Dec. 14, 2007

SAN DIEGO METROPOLITAN TRANSIT SYSTEM, a California public agency,

Petitioner,

v.

BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY and ROES 1 to 20, inclusive,

Respondents,

SAN DIEGO ASSOCIATION OF GOVERNMENTS, a Regional Transportation Agency and Council of Governments for the San Diego County Region,

Petitioner,

v.

BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY and ROES 1 to 20, inclusive,

Respondents.

CITY OF SAN DIEGO; REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO,

Petitioners/Plaintiffs,

v.

BOARD OF TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY and DOES 1 to 20, inclusive,

Respondents/Defendants,

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Vineyard, supra, 40 Cal.4th at 431. Instead of analyzing the potential impacts of future water needs, Respondent improperly deferred this analysis to the City to undertake at some unspecified point in the future. AR 18:264:17267-17268.

The water analysis glosses over the significant and unavoidable impacts which new water demands will create under current circumstances. Given the state wide water shortage, the FEIR was required to provide a more detailed analysis of water supply to address theses issues. AR 18:264:17267.

E. The FEIR Fails to Identify and Adequately Address Parks and Recreation Issues

The faculty family residential community proposed in North Adobe Falls will generate impacts to the City's parks system that are unmitigated. AR 27:591:S22571-22573, 18:264:17273-17277. Petitioners advised Respondent that the development was inconsistent with the Community Plan and City's park system requirements. *Id.* Specifically, the campus expansion and Adobe falls development would create an increase in the population surrounding the area, which would create increased demand for park and recreation facilities and services. *Id.* The FEIR fails to provide an adequate analysis to address these additional needs as well as indicate fees or monies it will provide to the City for additional services which will be required. Respondent's position that there will not be impacts to parks or services is not supported by substantial evidence.

F. The FEIR Fails to Identify and Adequately Address Inconsistencies Between the Campus Expansion Project and Adopted Land Use Plans Governing the Project Area

An EIR must discuss any inconsistencies between the proposed project and applicable land use plans. Guidelines § 15125(d). An applicable plan is a plan which has been adopted and applies to a project. *Chaparral Greens v. City of Chula Vista* (1996) 50 Cal.App.4th 1134, 1145, fn. 7. Although the requirement that EIRs analyze any inconsistencies with plans is set forth in Section 15125, which generally governs the EIR's description of a project's environmental setting, this analysis also relates to an EIR's evaluation of environmental impacts. CEQA Guidelines § 15126 [all phases of the project must discuss the growth-inducing impact of the proposed project]. The purpose of the required analysis is to identify inconsistencies that the lead agency should address and modify to avoid inconsistencies. CEQA Guidelines § 15125; see also *Orinda Ass'n v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1169. Respondent's position that it does not need to be consistent with the redevelopment plan documents and San Diego general and community plans is a blatant usurpation of the City and Agency's duty and authority to monitor and control development in the SDSU area.

1. The Campus Expansion Project must be consistent with the College Community Area Redevelopment Plan.

The FEIR states that "SDSU, as a state entity, is not subject to local government planning directives, ..., and is subject only to state planning laws" (AR 15:232:14608) and thus, any "conflicts or inconsistencies between the proposed project and these regulations would not constitute a significant impact under CEQA because these regulations are not applicable to SDSU." AR 15:232:14623. This position ignores the contractual and legal obligations Respondent has regarding the College Community Redevelopment Plan and the related plan documents. And failure to adhere to the Redevelopment Plan and its related documents will result in piecemeal development which will impede the objectives of the Redevelopment Plan which are to be reached through coordinated planning efforts.

The authority under which the Agency operates is conferred to the Redevelopment Agency though the State of California's Health and Safety Code (Section 33000-et. seq.), also known as the California Community Redevelopment Law. Redevelopment agencies are governmental entities that exist by state law and are administrative agents of the state. These agencies carry out state policy and do not function as local entities. *Andrews v. City of San Bernardino* (1959) 175 Cal.App.2d 459, 462; *Walker v. Salinas* (1976) 56 Cal.App.3d 711, 718; *Kehoe v. City of Berkeley* (1977) 67 Cal.App.3d 666. Therefore, the Campus Expansion Project is subject to the requirements set forth in the Redevelopment Plan documents as executed by the Agency. Moreover, as will be discussed below, Respondent has contractual obligations to develop consistent with the Redevelopment Plan and subject to City's discretionary permit approval process.

In 1988, the San Diego State Foundation, an auxiliary organization acting on behalf of SDSU, approached the Agency regarding the potential for establishing a Redevelopment Project Area in the area adjacent and in close proximity to SDSU. In December 1991, an agreement was executed entitled the Agreement for Processing a Redevelopment Plan and Land Use Entitlements, dated December 3, 1991 [1991 Agreement], representing the formal request to the Agency to commence the process of preparing and processing a redevelopment plan. AR 30:671:S23488-S23501. The 1991 Agreement stated that any project within the Redevelopment Project Area would be subject to the City of San Diego permit approval process. AR 30:671:S23495.

The San Diego City Council adopted the College Community Redevelopment Plan for the Project Area in November 1993 [Redevelopment Plan]. AR 6:53:05071-05108, 5:52:05022-05070. The Project Area encompasses 131 acres and is generally located adjacent to or within close proximity to the SDSU campus. AR 30:675:S23646. The main goals of the Redevelopment Plan are to redevelop the area in a manner which eradicates the existing blighting conditions through the Project Area; mitigate the problems with traffic, parking congestion, and mini-dorms in the surrounding community as a result of SDSU's growth; and enhance the utilization of scarce land resources through parcel condition, relocation, and the intensification of land use. AR 6:53:05071-05108.

In 2005, Real Party in Interest SDSU took control of the Paseo Project which was a redevelopment project for a high-density, mixed-use project adjacent to the SDSU campus. AR 21:327:20675-20677. In late 2007, at the same time it was approving the current FEIR, SDSU implied that it would not go forward with the Paseo Project but would pursue a project of its own design. AR 18:264:17254-17255. Indeed, SDSU designed a new project and in January 2009 issued a Notice of Preparation of a draft EIR for the project Plaza Linda Verde, and notified the Agency that it would build a project on parcels owned by the Foundation within the footprint of the Paseo Project. Per the NOP, the project would be carried out without Agency involvement, without City entitlements, limited parking and a commercial component determined to not present any competition to commercial interests within campus boundaries. The City and Agency and Respondent and Real Party in Interest are involving in pending litigation involving these issues. RJN, Exhibit 4, Exhibit 5. The FEIR does not acknowledge or address the pending Plaza Linda Verde project and only acknowledges the Paseo Project in passing stating that the project is "on hold." AR 18:264:17254. The Plaza Linda Verde project is in direct conflict with the Redevelopment Plan and its goals.

While Respondent claims that it is consistent with various community and redevelopment plans (AR 15:232:14628-14631), this statement is untrue. The following are some examples of the inconsistencies which were raised but were ignored in the FEIR:

- Based upon the incomplete and misleading Traffic Analysis discussed above, the Campus Expansion Project is not and cannot be consistent with the Transportation Goals of the Redevelopment Plan. AR 15:232:14628-14631.
- The Redevelopment Plan did not anticipate and does not allow for the construction of a hotel in the Alvarado Sub-Area of the College Community Redevelopment Project Area. A hotel is permitted in the Lot A Sub-Area of the College Community Redevelopment Project Area, but that is not what is being proposed by the project. AR 12:221:14158.
- The growth projections and placement of new students into the single – family residential neighbors surrounding SDSU also conflicts with the goals and objectives of the College Area Community Plan. While the DEIR acknowledges the goal of the College Area Community Plan, it ignores the goal by failing to provide any mitigation measures. AR 15:236:14725-14726.
- Several of the short and long term projects have commercial and/or retail elements involved. Respondent and Real Party in Interest do not have immunity for projects proprietary in nature but only those for educational or research purposes. *City of Marina*, at 355, fn. 10.

Respondent is obligated to adhere to the requirements of the Redevelopment Plan and as shown from above has failed to adequately acknowledge and address the inconsistencies.

G. The FEIR Fails as an Informational Document

"The failure to provide enough information to permit informed decision-making is fatal." *Napa Citizens for Honest Gov't v. County of Napa*, *supra*, 91 Cal.App.4th at 361. "When the informational requirements of CEQA are not complied with, an agency has failed to proceed in a manner required by law and has therefore abused its discretion." *Id.*, quoting *Save Our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 118. Failure to comply with procedures that result in the omission of relevant information from the environmental review constitutes a prejudicial abuse of discretion "regardless of whether a different outcome would have resulted" had the agency complied with CEQA's requirements. *Neighbors of Cavitt Ranch v. County of Placer* (*Bayside Covenant Church*) (2003) 106 Cal.App.4th 1092, 1100; *Bakersfield Citizens for Local Control v. City of Bakersfield* (*Panama 99 Properties*) (2004) 124 Cal.App.4th 1184, 1198, 1208; *Rural Landowners Assn. v. City Council* (1983) 143 Cal.App.3d 1013, 1023 [where "failure to comply with the law results in a subversion of the purposes of CEQA by omitting information from the environmental review process, the error is prejudicial."] The critical question is whether an alleged procedural violation "deprived the public or local agencies of information relevant to" the project. *Neighbors of Cavitt Ranch*, *supra*, 106 Cal.App.4th at 1102; *Sierra Club v. State Bd. of Forestry* (1994) 7 Cal.4th 1215, 1236-1237 [prejudice is presumed where the absence of information "frustrated the purpose of the public comment provisions of the Forest Practice Act" and made "meaningful assessment of potentially significant environmental impacts" impossible.]

The FEIR fails as an informational document for three reasons. First, the defective traffic analysis discussed in Section F above resulting in a failure to provide accurate information regarding traffic impacts and necessary mitigation. Second, Respondent's improper reliance on *City of Marina* to ignore its mitigation obligations resulted in a failure to provide information regarding other funding mechanisms available or a discussion of project alterations which could have reduced the off campus impacts. *City of Marina* at 356 [An EIR that incorrectly disclaims the power and duty to mitigate identified environmental effects based on erroneous legal assumptions is not sufficient as an informative documents.]. Finally, the FEIR failed to adequately discuss the Paseo Project, the Plaza Linda Verde Project and Respondent's legal obligations under the Redevelopment Plan. For these reasons, the FEIR did not provide all information required for informed decision-making and public participation.

H. EIR Misuse and Misapplication of the Environmental Impact Report Process

While CEQA allows multi-level review of development projects in certain cases, a lead agency must still adequately analyze reasonably foreseeable significant environmental impacts, and is not justified in deferring this analysis to a later CEQA document. Guidelines § 15152. The FEIR mixes in some of the proposed Paseo project but not the entire redevelopment project. Respondent claims the Paseo project is not discussed because it is "on hold" but fails to address the Plaza Linda Verde Project which will be developed in its place. Because a part of the proposed Paseo project is included in this Project at the same site and would be expected to have traffic impacts on the same locations, the entire proposed Paseo project as part of this proposed Project should be analyzed. AR 18:264:17269. Respondent's claim that this project is "on hold" does not sufficiently address the potential cumulative impacts nor provide sufficient information for analysis of the project. By not including an analysis of the Plaza Linda Verde and Paseo projects, Respondent is misleading the public regarding the extent of the cumulative environmental impacts to the area.

I. Improper Reliance on a Statement of Overriding Consideration.

EIR requirements are clear: The public agency should not approve a project so proposed if there are feasible alternative or mitigating measures available that would lessen the project's environmental impact. Pub. Res. Code § 21002.1; Cal. Code Regs, titl. 14, § 15021(a)(2). Alternatively, a project with significant, unavoidable or unmitigatable impacts may only be approved upon substantial evidence that the project's benefits outweigh its impacts. CEQA Guidelines § 15093, subds. (a), (b). By certifying and approving the FEIR for the Project, Respondent has failed to meet both of the foregoing requirements.

The Statement of Overriding Consideration Respondent did not properly accomplish the appropriate balancing between economic, legal, social, technological or other benefits of the proposed Project versus the adverse environmental effects of the Project. The overrides can be found at AR 19:297:18522-18525. The statement of overriding considerations is flawed in two respects. First, the Statement of Overriding Considerations adopted by Respondent has as its foundation the legally flawed environmental analysis as to the traffic impacts set forth above. Accordingly, the findings are not supported by substantial evidence. Second, the findings regarding mitigation of acknowledged traffic impacts are erroneous because they presume that the obligation to mitigate or avoid the impacts is limited to making a request for funds from the legislature. The findings fail to consider what other feasible means of funding mitigation might be available, what means of reducing the cost of mitigation measures might be available, and feasible ways the mitigation measures could be avoided. As such, Respondent could not have accomplished the appropriate balancing because the statement of overriding considerations, as stated above, relies on determinations and conclusions that were unsupported by substantial evidence. Guidelines § 15093.

J. The FEIR Fails to Address Cumulative Impacts

When considering a project, CEQA guidelines require that a lead agency review the whole of the action. Guidelines § 15378. The Adobe Falls, Alvarado Hotel and Alvarado Campus Park components of the Campus Expansion Project together cause significant, irreversible environmental impacts to the same geographic area, specifically the I-8/College Avenue/Alvarado Road interchange. Also the failure to analyze the Paseo Project or new Plaza Linda Verde project improperly segments the environmental review ignoring the cumulative effect. The impacts, when considered cumulatively, are more significant than when considered individually.

An EIR must discuss the impacts of the project over time in conjunction with past, present and reasonably foreseeable future projects. Pub. Res. Code § 21083; Guidelines, §

15130. Guidelines section 15130, subdivision (b) provides that "[t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided of the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness." Thus, an EIR which completely ignores cumulative impacts of the project is inadequate. *Citizens to Preserve the Ojai v. County of Ventura* (1985) 176 Cal.App.3d 421, 430-431.

Respondent must address the cumulative impact of the project on the area, when two or more sub-areas will compound or increase environmental impacts. Guidelines § 15355. This requirement is especially necessary in multi-phase development plans, such as the proposed Campus Expansion Project. Respondent fails to adequately set forth and to independently analyze the incremental development occurring in each of the sub-areas against one other. This is a significant legal deficiency in the FEIR. This factor alone warrants judicial review of Respondent's approval and certification of the FEIR.

IV.

CONCLUSION

For reasons set forth above, Respondent failed to proceed in a manner required by law in certifying and approving the 2007 Campus Master Plan Revision FEIR in compliance with CEQA and the Public Resources Code. Moreover, this decision, and the statement of overriding considerations justifying the decision was unsupported by substantial evidence. Accordingly, the decision to certify and adopt the FEIR should be set aside, and Respondent ordered to prepare and certify a new Environmental Impact Report which meets the standards set forth under CEQA.

Dated: June 10, 2009

JAN I. GOLDSMITH, City Attorney

By Christine Leone

Christine M. Leone
Chief Deputy City Attorney
Attorneys for Petitioners/Plaintiffs City of San Diego and Redevelopment Agency of the City of San Diego

APPENDIX F3.8

F3.8

Plaza Linda Verde Project Existing + Project Traffic Noise Level Addendum

DUDEK

CORPORATE OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

January 13, 2011 P.N. 6243

Ms. Lauren Cooper
SDSU Office of Planning Design and Construction
5500 Campanile Drive
San Diego, CA 92182

SUBJECT: ***Plaza Linda Verde Project***
Existing + Project Traffic Noise Level Addendum

Dear Ms. Cooper:

Dudek has reviewed the Existing + Project traffic noise scenario impacts for the Plaza Linda Verde project. The traffic volumes for the Existing + Project traffic scenario have been provided by LLG, January 4, 2011. The majority of the project-generated traffic would be along College Avenue and Montezuma Road. The additional traffic would increase the noise along the adjacent roads by less than 1 dB CNEL. The additional project-generated traffic volume along the roads would not substantially increase the ambient noise level and, therefore, the proposed project would not result in a significant impact attributable to vehicle noise under this analysis scenario. The Existing + Project noise level increase is depicted in Table 1.

If you have any questions, please call me at 760.942.5147

Very truly yours,

DUDEK

Mike Komula
Senior Acoustician

Table 1
Off-Site Traffic Noise Level Increase

Street Segment	Existing ADT	Existing + Project ADT	CNEL Increase (dB)
College Avenue			
Canyon Crest Dr. to Zura Way	44,000	44,880	0.1
Zura Way to Montezuma Rd	30,000	30,880	0.1
Montezuma Rd. to El Cajon Blvd.	29,100	29,500	0.1
Montezuma Road			
Collwood Blvd. to 55th Street	30,600	31,285	0.1
55th Street to College Ave	26,100	25,785	0.1
College Ave. to Catoctin Dr.	14,800	15,125	0.1

APPENDIX F3.11

F3.11

City of San Diego, Report to the City Council, Engine Company Brownout and Lifeguard Reductions Monthly Report (January 26, 2011)

THE CITY OF SAN DIEGO

REPORT TO THE CITY COUNCIL

DATE ISSUED: January 26, 2011 REPORT NO:

ATTENTION: Public Safety and Neighborhood Services Committee

SUBJECT: Engine Company Brownout and Lifeguard Reductions Monthly Report

REFERENCE: None

REQUESTED ACTION

This is an informational item only. No action is required by the Committee or the City Council.

STAFF RECOMMENDATION

Accept the Report.

INTRODUCTION

This is the tenth monthly report to the PS&NS Committee on the status of the Engine Company Brownouts and Lifeguard reductions being administered to achieve budgetary savings in the Fire-Rescue Department. Brownouts are defined as the temporary closures of up to eight fire engines per day in those fire stations housing more than one emergency response apparatus.

This month's report will update workload, brownout frequency, and response time statistics since the inception of the Brownout Plan on February 6, 2010 through January 14, 2011. It will also address an increase in the number of overdue inspections performed by Engine and Truck Companies, an increase in the time necessary to assemble an Effective Fire Force (EFF), and impacts to Fire and Lifeguard Training.

SUMMARY

During this reporting period (February 6 to January 14, 2011), the thirteen engines subject to brownout were out-of-service from 33% to 99% of the time. As a result, compliance with the 5 minute 90% of the time national response standard for the first due unit has declined to 24% to 80% within these districts and 54% city-wide as compared to 28% to 87% in these districts and 56% city-wide for the same period last year. Average response times increased by 6 seconds within these districts and by 7 seconds city-wide when compared to the same period last year.

Response times for the assembly of an Effective Fire Force of 14-15 firefighters (3 engines, 1 truck and 1 battalion chief) within the 9 minutes 90% of the time national response standard was 0% to 100% within these districts and 69% city-wide as compared to 43% to 100% respectively and 73% city-wide for the same period last year. It should be noted that this is the first time this standard has fallen below our performance target since the brownouts began. Average response times for an Effective Fire Force also increased within these districts and city-wide when compared to the same period last year.

STATISTICAL DATA

Following is cumulative statistical data for the emergency response districts subject to fire engine brownouts and the response time impacts city-wide for the period indicated.

Brownout Frequency

Data in the table below reflects the percentage of total operational hours in the reporting period (days in period x 24 hours) that the indicated engine company was out of service due to placement in brownout status.

Percent of Time Units Browned Out
02/06/2010 – 1/14/2011

Community	Engine	Pct.
College	E10	98.66%
Downtown	E201	49.56%
East Village	E4	33.32%
Golden Hills	E11	47.70%
Kearny Mesa	E28	42.62%
Lincoln Park	E12	36.62%
Midway	E20	50.09%
Mira Mesa	E44	99.24%
North Park	E14	49.23%
Pacific Beach	E21	49.76%
Rancho Penasquitos	E40	99.24%
San Ysidro	E29	47.72%
University City	E35	41.91%

Number of Emergency Responses

Data in the table below reflects the total number and type of emergency incidents that occurred within the City during the reporting period.

Overall System Wide
02/06/2010 – 1/14/2011

	Fire	Medical	Other	Total
2/6/09-1/14/10	3,303	86,961	11,963	102,227
2/6/10–1/14/11	3,333	94,449	11,856	109,638
Percent Change	0.91	8.61	-0.89	7.24

City-wide Response Time Performance

This following data reflects City-wide response time performance expressed in two formats. The first table shows the percentage of incidents where no more than 5 minutes elapsed from the time an engine or truck company was notified of an emergency response and their arrival at the scene of the emergency. The nationally accepted standard is 90% and the Department's current performance target is 55%. The second table uses the same notification and arrival time stamps, but reports response times as an average (mean).

5 Minutes or Less Response Time Percentage (1st Arriving Engine or Truck)

2009-2010 Pct	2010-2011 Pct	Percent Change
55.53%	53.55%	-3.57

Average Response Time (1st Arriving Engine or Truck)

2009-2010 Avg	2009-2010 Avg	Percent Change
0:05:02	0:05:09	2.14

Data Reported by Brownout Community

The data in the following tables uses the same criteria as described above, but breaks the data down by individual community.

Browned Out Districts
Incident Counts
02/06/10 – 1/14/11

	2009-2010			2009-2010			Percent Change		
	Fire	Medical	Other	Fire	Medical	Other	Fire	Medical	Other
College (Sta. 10)	74	2,275	264	76	2,580	263	2.70	13.41	-0.38
Downtown (Sta. 201)	46	1,951	346	62	2,115	368	34.78	8.41	6.36
East Village (Sta. 4)	68	3,614	461	82	4,067	418	20.59	12.53	-9.33
Golden Hills (Sta. 11)	90	1,883	195	95	1,994	176	5.56	5.89	-9.74
Kearny Mesa (Sta. 28)	107	2,177	576	121	2,423	545	13.08	11.30	-5.38
Lincoln Park (Sta. 12)	179	4,134	349	169	4,354	314	-5.59	5.32	-10.03
Midway (Sta. 20)	72	2,777	364	78	3,162	338	8.33	13.86	-7.14
Mira Mesa (Sta. 44)	71	1,434	274	54	1,424	237	-23.94	-0.70	-13.50
North Park (Sta. 14)	122	2,624	263	102	2,889	252	-16.39	10.10	-4.18
Pacific Beach (Sta. 21)	77	2,834	362	88	3,059	391	14.29	7.94	8.01
Rancho Penasquitos (Sta. 40)	49	1,130	162	42	1,209	162	-14.29	6.99	0.00
San Ysidro (Sta. 29)	56	3,037	159	80	3,453	144	42.86	13.70	-9.43
University City (Sta. 35)	157	2,715	834	131	2,927	854	-16.56	7.81	2.40

5 Minutes or Less Response Time Percentage First Arriving Engine or Truck	2009-2010 Pct	2009-2010 Pct	Pct Change
College (Sta. 10)	54.07%	46.18%	-14.60
Downtown (Sta. 201)	80.84%	80.14%	-0.86
East Village (Sta. 4)	86.72%	79.73%	-8.06
Golden Hills (Sta. 11)	73.88%	66.40%	-10.12
Kearny Mesa (Sta. 28)	39.24%	35.54%	-9.41
Lincoln Park (Sta. 12)	49.49%	45.43%	-8.20
Midway (Sta. 20)	52.07%	51.47%	-1.16
Mira Mesa (Sta. 44)	40.44%	32.62%	-19.35
North Park (Sta. 14)	75.82%	68.28%	-9.95
Pacific Beach (Sta. 21)	60.37%	48.55%	-19.59
Rancho Penasquitos (Sta. 40)	28.08%	23.66%	-15.76
San Ysidro (Sta. 29)	60.11%	57.05%	-5.10
University City (Sta. 35)	34.80%	27.90%	-19.83

Average Response Time (First Arriving Engine or Truck)	2009-2010 Avg	2009-2010 Avg	Pct Change
College (Sta. 10)	0:05:01	0:05:17	5.37
Downtown (Sta. 201)	0:03:47	0:03:50	1.25
East Village (Sta. 4)	0:03:47	0:04:04	7.71
Golden Hills (Sta. 11)	0:04:14	0:04:36	8.70
Kearny Mesa (Sta. 28)	0:05:41	0:05:55	3.98
Lincoln Park (Sta. 12)	0:05:11	0:05:23	3.93
Midway (Sta. 20)	0:05:10	0:05:16	1.95
Mira Mesa (Sta. 44)	0:05:51	0:06:08	4.89
North Park (Sta. 14)	0:04:07	0:04:31	9.79
Pacific Beach (Sta. 21)	0:04:41	0:05:14	11.90
Rancho Penasquitos (Sta. 40)	0:06:13	0:06:43	8.25
San Ysidro (Sta. 29)	0:04:58	0:05:07	3.10
University City (Sta. 35)	0:06:11	0:06:34	6.27

Effective Fire Force

This following data reflects response time performance for the assembly of the 14-15 firefighters needed to complete the tasks necessary to combat a typical residential structure fire. In our City, this is achieved by the response of 3 engines, 1 truck, and 1 battalion chief. The table shows both City-wide and brownout district performance. The nationally accepted standard is 9 minutes 90% of the time and the Department's current performance target is 9 minutes 72% of the time.

Effective Fire Force*
2/6 /10-01/14/11

Community	Engine	2009-2010 Percent 9 Min	2009-2010 Average (Minutes)	2009-2010 Count	2010-2011 Percent 9 Min	2010-2011 Average (Minutes)	2010-2011 Count
College	10	88.89%	7.79	18	70.59%	7.82	17
Downtown	201	93.33%	5.38	15	93.33%	5.46	15
East Village	04	100.00%	4.84	31	80.65%	6.46	31
Golden Hills	11	100.00%	5.61	21	100.00%	6.23	26
Kearny Mesa	28	66.67%	7.87	9	73.91%	8.29	23
Lincoln Park	12	81.25%	7.21	32	80.65%	7.45	31
Midway	20	70.00%	8.04	10	76.92%	11.40	13
Mira Mesa	44	62.50%	8.63	8	9.09%	11.54	11
North Park	14	100.00%	6.04	28	100.00%	6.16	22
Pacific Beach	21	66.67%	8.68	18	55.56%	9.04	9
RanchoPenasquitos	40	50.00%	9.28	6	0.00%	11.62	7
San Ysidro	29	66.67%	9.17	6	71.43%	8.83	7
University City	35	43.33%	10.05	30	37.84%	10.70	37
City Wide		72.83%	7.67	622	69.16%	8.14	629

* 28 incidents originally dispatched as single engine responses and later upgraded were not included in this EFF calculation

SERVICE DELIVERY IMPACTS

There is ample scientific data to support that the more quickly the right type and number of resources can be brought to bear on an emergency incident, generally speaking, the better the outcome. Under the best of circumstances, multiple concurrent calls for service, routine maintenance, training, community educational outreach events, administrative activities, and unit location at the time of an incident dispatch can all impact incident response times.

Because many variables can influence incident outcomes, it is very difficult to isolate changes in incident outcomes resulting solely from brownouts. However, it can be safely assumed that any emergency receiving a delayed response for any reason will result in undesired impacts. In the case of fires, the most likely impact is increased fire spread and damage and the increased possibility of injury or death. In the case of a medical emergency, the impact may be prolonged pain from an injury, distress from a medical condition, or greater risk of permanent injury or death.

Service delivery impacts are felt by all requestors for emergency response whenever a response is delayed due to brownouts or other reasons. However, accurately isolating the specific impacts of the brownouts on victim survival probability proves to be extremely difficult and it is important to note that over the past five years an average of four persons per year have died as a result of fires in our City.

Non-emergency brownout impacts include a noticeable increase in the number of fire inspections performed by our engine and truck companies that are late in being completed and increased difficulty in conducting manipulative training due to the number of units committed to incidents or out-of-service status.

To address the late inspections impacts, light duty personnel have been assigned to assist in completing these inspections when they are available. In April of last year, 12% of the inspections performed by companies were more than 90 days overdue. Currently, 31% are overdue, an increase from 27% at the last report. These overdue inspections increase risk associated with not identifying and correcting fire code violations and slow the collection of inspection fee revenues. Per the Committee's request, the IBA has prepared a report on the fiscal impact of the delayed inspection fee collection.

To address the challenges in freeing units from emergency response status to conduct required training, the number of units permitted to be temporarily out-of-service at one time was increased from 12 to 14. In addition, the number of units removed from service to attend manipulative training sessions for 4 hours in the morning and afternoon at the Regional Public Safety Training Institute has been reduced from 5 (or 4) to 3 (or 2) units. When possible, these training sessions have been reduced by sending an instructor to the fire station or delivering the training in an online format to increase unit availability.

Significant Emergency Response Impacts during this Reporting Period

On November 29, 2010, at 0950 hours a residential structure fire was reported at 3535 Mt. Burnham Court, in the community of Clairemont. The fire originated in the garage, and before it was extinguished had penetrated the kitchen and attic of the dwelling, causing approximately $600,000 in damage. There were no injuries. The fire was the result of an electrical malfunction in plant growing equipment in the garage.

Engine Availability Analysis

Engine 36, the first due engine for this address, was out of service due to a mechanical issue and was enroute to the repair facility. Engine 28, the second due unit, was browned out. Engine 27, the third due unit, was out of service and enroute to the repair facility for a mechanical inspection. Engine 23 was also out of service mechanical and enroute to the repair facility for a "regeneration" of its smog system. Engine 5, from the community of Hillcrest was enroute to in-service training. As a result, the first due engine was Engine 25 from Bay Park. It took 9 minutes and 48 seconds for that engine to arrive, four minutes and 48 seconds longer than our goal. An effective fire force did not assemble until 13 minutes and 5 seconds after dispatch, four minutes and five seconds longer than our goal.

Conclusion

Due to a number of apparatus in the same area needing immediate mechanical attention, the brownout of Engine 28, and a unit's travel to scheduled training, response was delayed to this address. An increased loss to this dwelling was the result of the delay.

LIFEGUARD DIVISION

The Lifeguard Division contributed to budgetary savings via a number of reductions. Impacts from reductions taken have been felt in several areas of lifeguard operations: lifeguard coverage, training activities, increased workloads for supervisors, personnel schedules and Reductions in Force (RIF). These impacts are discussed below.

Budget Reduction Impacts on Lifeguard Training

Prior to the mid-year budget reductions implemented in January 2010, all permanent Lifeguards, other than those assigned to the night crew, were scheduled to be on-duty on Wednesdays. With the Lifeguard Division split into two shifts, on Wednesdays, one shift would be assigned to training while the other would be assigned to operations. Thus, the two shifts would rotate between operations and training allowing for ten hours of training on alternate Wednesdays during the six months of the year when beach attendance was at its lowest levels.

To achieve budgetary savings for Fiscal Years 2010-2011, dedicated training on Wednesdays was eliminated and employee schedules were altered to create additional relief shifts. These relief shifts allow the Lifeguard Division to cover open operational shifts on straight time rather than with overtime. Additionally, the River Rescue Team had its annual training reduced by half. Both of these changes resulted in a reduction in the overtime budget. The Lifeguard Division also eliminated one Lifeguard II position dedicated to developing, organizing, and conducting training. Budgetary savings achieved by these reductions are $236,000 in overtime and $68,912 for the LGII FTE.

These budget impacts have reduced training opportunities. Refresher training for essential skills is being provided, albeit in a manner that is overall less effective than in years past. Additionally, other training important to ensure long term effectiveness and succession planning of Lifeguard Services is difficult to achieve. A modified training plan was developed and implemented beginning October 2, 2010. This plan will continue to be evaluated and revised throughout the winter months.

Contract Discussion with UCSD for Lifeguard Coverage at Torrey Pines

The department continues to pursue an agreement with the University of California, San Diego in regard to lifeguard coverage in the Torrey Pines area. The proposed contract is now being reviewed by UCSD.

Update on Torrey Pines Incidents

The following incidents have been recorded for Torrey Pines City Beach. Responses came from lifeguards assigned at La Jolla stations or from other districts.

Torrey Pines City Beach Responses 11/01/2010 to 01/18/2011	**Total**
Medical Aids (via 911 or Call Box)	2
Water Rescues	0
Cliff Rescues/Recoveries	0
Preventative Actions (cliff & water warnings/non-rescue calls)	14
Enforcement	2
Other Calls for Service	1
Total Incidents	19

The following incidents have been recorded for the non-City sections of Torrey Pines Beach:

Torrey Pines Beach Response (non-City sections) 11/01/2010 to 01/18/2011	**Total**
Medical Aids (via 911 or Call Box)	1
Water Rescues	0
Cliff Rescues/Recoveries	0
Preventative Actions (cliff & water warnings/non-rescue calls)	12
Enforcement	1
Other Calls for Service	2
Total Incidents	16

FISCAL CONSIDERATIONS

The brownouts are projected to achieve an FY2011 budgetary savings of $11.5M.

The Lifeguard Division reductions to overtime, Torrey Pines operations, Wind 'n' Sea operations and operational relief hours are projected to achieve an FY2011 budgetary savings of $721,915.

PREVIOUS COUNCIL and/or COMMITTEE ACTIONS

N/A

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS

Ongoing

KEY STAKEHOLDERS AND PROJECTED IMPACTS

Community and Citizens

J. Mainar

Javier Mainar, Fire Chief

F3.11

Citygate Associates, LLC, *Fire Service Standards of Response Coverage Deployment Study for the City of San Diego Fire-Rescue Department, Volume 1 of 2 - Main Report* (February 14, 2011)

CITYGATE ASSOCIATES, LLC

FOLSOM (SACRAMENTO), CA — MANAGEMENT CONSULTANTS

FIRE SERVICE STANDARDS OF RESPONSE COVERAGE DEPLOYMENT STUDY FOR THE

CITY OF SAN DIEGO FIRE-RESCUE DEPARTMENT

VOLUME 1 OF 2 – MAIN REPORT

February 14, 2011

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CITYGATE ASSOCIATES, LLC

FIRE & EMERGENCY SERVICES

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EXECUTIVE SUMMARY

The City of San Diego retained Citygate Associates, LLC to conduct a Fire Services deployment planning study to:

- Further refine the findings of the Regional Fire Service Deployment Study Citygate conducted for the County of San Diego that pertained to Fire-Rescue deployment within the City of San Diego;
- Analyze whether the San Diego Fire-Rescue Department's performance measures are appropriate and achievable given the risks, topography and special hazards to be protected in the City of San Diego;
- Review existing Fire-Rescue Department deployment and staffing models for efficiency and effectiveness and determine how and where alternative deployment and staffing models could be beneficial to address current and projected needs.

The commissioned study was to include:

- A Standard of Response Cover planning analysis (fire station and crew deployment) to examine the levels of firefighting personnel, stations and equipment;
- Fire station and staffing infrastructure triggers for additional resources, if needed;
- Order of magnitude costs and possible financing strategies for changes to the Fire-Rescue Department.

This comprehensive study is presented in several sections including: this Executive Summary summarizing the most important findings and recommendations; the fire station/crew deployment analysis supported by maps and response statistics; and the fiscal costs associated with the proposed recommendations.

It needs to be stated at the front of this study that the Citygate Associates team member who spent time in the City of San Diego found the fire staff at all levels very cooperative and helpful. They are committed to their city, agency, and mission. Given the struggle to keep service levels strong while coping with tight revenues, there is pride and ongoing effort to deliver the best customer service with the currently available resources. Fires are being suppressed and medical calls are being answered with excellent patient care.

We find that even with the suggested improvements identified in this report that can be accomplished over time, at present the City of San Diego Fire-Rescue Department is one of the best metropolitan agencies we have had the pleasure of working with. This study needs to be taken in the context of a "best practices tune-up" for a good agency that does very well with the limited resources given to it.

CITY LEADERSHIP POLICY CHOICES FRAMEWORK

As a starting point, San Diego City leadership needs to remember that there are no mandatory federal or state regulations directing the level of fire service staffing, response times and outcomes. Thus, communities have the level of fire services that they *can afford*, which is not always what they would desire. However, the body of regulations on the fire service provides that *if fire services are provided at all, they must be done so with the safety of the firefighters and citizens in mind* (see regulatory discussion on page 18). Given this situation, the overall challenge for the City is to design fire services within the fiscal constraints that limit the City's ability to staff, train and equip a safe and effective fire/medical response force.

Moreover, it must be acknowledged that the deep and prolonged recession has negatively impacted local government finances and a projected slow recovery will likely constrain the City's ability to fund and fully implement the added resource recommendations of this study.

STUDY PHILOSOPHY FRAMEWORK

In technical studies such as this one, it is all too easy to initially assess isolated data and make quick, non-comprehensive conclusions. The reason this result is so natural is that it follows the familiar thought patterns to which all fire-related parties are accustomed. In contrast with this limited way of thinking, as the Citygate and San Diego Fire-Rescue senior staff worked on this project, Citygate suggested an approach that focused on the "big picture" and desired outcomes at a more comprehensive level. We chose to start with and keep this larger framework in mind to ensure that the final analytical results met the specific, long-term needs of the City of San Diego, including:

- Why – Does San Diego Fire-Rescue exist?

  To provide neighborhood response to mitigate and terminate emergencies while small. To lessen the human and economic impacts of threatening situations.

- How – Does San Diego Fire-Rescue lessen emergency severity?

  With a layered multi-hazard service approach, sensitive to risks, population densities and demands for service.

- What – Does San Diego Fire-Rescue do to control emergencies?

  Deploy the appropriate type of unit for quick first response, followed up as needed with multiple diverse units for complex emergencies.

OVERALL CITYGATE PERSPECTIVE ON THE STATE OF SAN DIEGO CITY'S FIRE SERVICES

In brief, Citygate finds that the challenge of providing fire services in San Diego City is similar to that found in many California cities: providing an adequate level of fire services within the context of limited fiscal resources, competing needs, growing populations and the uncertainty that surrounds the exact timing and location of future development.

The City has recognized the value of fire prevention and the need to prevent or limit the severity of fires, given the type of housing stock, commercial buildings, younger and elderly residents and the threat of wildland fires on the City's edges. To meet these challenges, the City has adopted safety codes more strenuous than those mandated by state minimums. One example is the wildland fuel management programs.

The City of San Diego does *not* have adequate fire station coverage in all areas, due to the inability to fund fire service expansion as the City developed. Due to recent economic conditions, the City has struggled to even maintain the pre-recession level of daily firefighter staffing as the population and calls for service demands continue.

Citygate's deployment study findings *do recommend* that the City of San Diego needs additional fire stations over time as fiscal conditions allow. The improvements can be phased and some alternative approaches can be tried for smaller areas. However, given the number of additional fire stations necessary, alternative measures alone will not mitigate the entire need for more fire stations and/or units, *if the City wants to deliver fire service to the level of its current performance standards*.

Citygate evaluated all aspects of the Department's deployment system during the preparation of this study. We met extensively with the Command and Field Operations staffs and built comprehensive geographic mapping coverage models. To supplement what the geographic map models predict coverage will be, we also deeply analyzed three years of incident response data. We then met several times with staff to match the analysis results with their real world experience. Finally, we worked together to align Citygate's findings with fire deployment master plans already in place in the Department.

It should be noted that the data measures in this report were for three years before the economic-crisis-driven "brownout" reductions of eight engine companies per day that began on February 6, 2010. Thus, the response time performance in this study is the best that the system delivers with all previously budgeted resources available. This study did not analyze performance after the brownouts were operating.

In this report, Citygate makes observations, key findings and, where appropriate, specific action item recommendations that deserve specific and particular consideration. Overall, there are 15 key findings and 8 specific action item recommendations.

THE MAIN CHALLENGE

One can summarize the fire service deployment challenge that faces the City by stating that at the City's desired firefighting response time performance measures, there are just not enough fire crews and stations in all areas. The deployment system was challenged to grow as the City extended beyond the urban core into areas bisected by canyons and hills in the coastal areas of San Diego County. The topography and resultant non-grid road network makes efficient fire station spacing very difficult, thus raising the number of needed stations, which even in good economic times were a challenge to provide.

Over the years, the City spaced fire stations in the center of new growth areas, but did not backfill with other stations and fully interconnect the fire station system to provide equitable response time performance to all substantially developed neighborhoods. Thus, response time gaps occurred and have accumulated over the last several decades of growth. This issue did not occur quickly and, given the size of what will be needed to improve the deployment system, improvements will take years.

Field Operations Deployment (Fire Stations and Staffing)

Fire department deployment, simply stated, is about the *speed* and *weight* of the attack. Speed calls for first-due, multi-hazard intervention units (engines, ladder trucks and specialty companies) strategically located across a department. These units are tasked with controlling everyday, average emergencies without the incident escalating to second alarm or greater size, which then unnecessarily depletes the department's resources as multiple requests for service occur. Weight is about multiple-unit response for significant emergencies like a "room and contents structure fire," a multiple-patient incident, a vehicle accident with extrication required, or a complex rescue or wildland fire incident. In these situations, departments must assemble enough firefighters in a reasonable period in order to control the emergency safely without it escalating to greater alarms.

In Section 2 of this study, Standards of Response Cover (Station/Staffing) Analysis, Citygate's analysis of prior response statistics and use of geographic mapping tools reveals that the City has ***a significant fire station location and staffing issue to rectify as fiscal resources allow***.

While no one city (even a metropolitan one) can stand by itself and handle everything and any possibility without help, a desirable goal is to field enough of a response force to handle a community's day-to-day responses for primary single-unit response needs equitably to all neighborhoods, as well as be able to provide an effective initial response force (first alarm) to moderately serious building fires.

In summary, the 2009 total citywide total response times are presented below.

For priority serious medical incidents, the following fractile results for total response time (fire dispatch receipt of call to first unit arrived) were:

Measure	90% Minute Goal	Goal Source	Actual Performance
Fire Receipt to Arrival	<= 06:00	Current City of SD	49.7%
Fire Receipt to Arrival	<= 07:30	Citygate Recommendation	77.2%
Fire Receipt to Arrival	<= 08:50	City of SD Actual Compliance	90.2%

The current City goal point is equivalent to 6 minutes total response time from fire dispatch receiving the call.

Travel time – Here are the citywide travel time measures for 2009 to serious medical incidents. While not inclusive of fires, given the high number of EMS incidents, this measure is the most descriptive of citywide fire crew response time performance:

Measure	90% Minute Goal	Goal Source	Actual Performance
Travel	<= 04:00	Desired San Diego City Performance Minute	55.2%
Travel	<= 06:20	Actual Performance Minute	90.9%

Effective Response Force – Where 3 engines, 1 ladder truck and 1 battalion chief all arrived:

Measure	90% Minute Goal	Goal Source	Actual Performance
Fire Receipt to Arrival	<= 10:00	Current City of SD	49.8%
Fire Receipt to Arrival	<= 10:30	Citygate Recommendation	55.4%
Fire Receipt to Arrival	<= 15:00	City of SD Actual Compliance	89.7%

Geographic Coverage Challenges

A natural question becomes, at what minute of travel does the existing station network reach 90 percent coverage of the current public street network? The table below shows the public (not military or private) road miles covered for each minute of fire crew travel time:

Public Road Miles Covered per Minute of Fire Crew Travel Time

	Existing Station Coverage	
Travel Time	**Miles**	**Percent Covered**
4 Minute	2,329	60.32%
5 Minute	3,146	81.50%
6 Minute	3,544	91.80%
Total	**3,860**	**100.00%**

While it may appear to be easy to add fire stations to increase coverage per minute of travel, this study will explain in detail that given the topography and road network in the City of San Diego, it is difficult and expensive to extend coverage out to the distal ends of the road network. This is because past a certain point, each new station adds very little new coverage as the remaining gaps become smaller and smaller.

FINDINGS AND RECOMMENDATIONS

Citygate's deployment findings and recommendations are listed below. For reference purposes, the findings and recommendation numbers refer to the sequential numbers in the main body of the report.

Finding #1: While the City has developed fire deployment goals, they can be improved to include a beginning time measure starting from the point of fire dispatch receiving the 911-phone call, and a goal statement tied to risks and outcome expectations. The deployment measure should have a second measurement statement to define multiple-unit response coverage (Effective Response Force) for serious emergencies. Making these deployment goal changes will strengthen the measures and meet the best practice recommendations of the Commission on Fire Accreditation International and the NFPA.

Finding #2: The City of San Diego is very difficult to cover efficiently with a cost-effective quantity of fire stations due to the non-grid street network and very difficult coastal topography with canyons, mesas and other natural barriers.

Finding #3: Much of the City is substantially developed and is of urban and suburban population densities. Given the populations and diverse risks in the developed areas, the City should have fire service deployment goals to deliver an urban level of first-due fire unit coverage, which would be 4 minutes of travel time for the best possible outcomes in the most populated areas and 5 minutes travel in the less populated and lighter risk zones.

Finding #4: Increasing coverage at the 4th minute of travel would require 27 additional fire stations increasing total station coverage to 72 percent of the public road network.

Finding #5: If the policy choice were to implement a deployment model balanced to provide the entire City 5 minutes of travel time coverage from a neighborhood response resource, then 19 additional stations would extend coverage to 90 percent of the public road network. While adding one minute to the travel time places it one minute above the NFPA 1710 national best practice recommendation, it is a reasonable adjustment given the City's complex road network and difficulty in achieving 4-minute travel time coverage, even with an extraordinary expense in fire stations that would only cover just a few miles of roads past the 4th minute.

Finding #6: In addition to the need for multiple neighborhood based first-response units, based on the first alarm concentration gap analysis of ladder truck and battalion chief coverage, improving citywide first alarm effectiveness at 8 minutes travel to 90 percent of the public road network will also require the addition of 4 ladder trucks and 2 battalion chief units.

Finding #7: Emergency incident requests are evenly distributed over the months, week of the year and day of week. This means that the deployment model should not have widely different staffing patterns. The Department needs a constant baseline of response resources.

Finding #8: There is tapering off of emergency incident demand from midnight to 7 AM. As the day becomes busy the hourly demand for service is fairly high and constant from 10 AM to 7 PM. Peak activity units on partial day staffing such as the paramedic ambulances are already deployed on assist areas at peak hours experiencing high simultaneous calls for service.

Finding #9: San Diego Fire-Rescue's ambulance call processing times are consistent with national call sorting practices. The Department needs to place greater emphasis on procedures to get the first-due engine dispatched in less time, closer to the ambulance performance point.

Finding #10: For crew turnout time performance, San Diego Fire-Rescue excels in this area and is the largest department Citygate has seen to perform this well at the 90-second point for structure fire turnout time.

Finding #11: The citywide and individual fire station area *travel* times correlate with the geographic model travel time predictions, in that there are not enough fire stations in some areas to achieve the City's 4-minute *travel* time to 90 percent of the

incidents in urban areas. This is due to a combination of not enough fire stations combined with the effects of a non-grid street network in other areas.

Finding #12: **The incident response measures for a Full Effective Response Force show that outside of three fire station areas in the downtown core, <u>none</u> of the other 44 fire station areas can deliver 3 engines and 1 ladder truck to 90 percent of building fires within a desired goal point of 10:30 minutes total response time, of which 8 minutes is travel time. The fire station areas are too large, there are not enough stations, and some units are busy and unavailable at peak hours of the day.**

Finding #13: **The message from the deficient response time analysis tables is that within the 24.46 percent or 25,834 Priority 1 calls with response times exceeding City goals, there are 8,203 that exceed 9 minutes and *<u>this occurs every hour somewhere, every day</u>*. In the nine peak hours where performance is the most deficient, every hour period for all 365 days, has at least one Priority 1 incident with the first due unit arriving *2 minutes later* than the desired goal point.**

Finding #14: Due to very high call for service volumes in the downtown core, and the vertical (high-rise) building populations, multiple units and stations will be always be needed to cover not just geographic travel time, but to provide enough units at peak demand hours to maintain adequate customer service to all incidents.

Finding #15: The current technology to alert fire stations crews of what and where to respond is 21 years old, technically obsolete and, in many cases, inserts unnecessary time delays into the crew dispatching process.

Based on the above findings, Citygate's recommendations are:

Recommendation #1: **<u>Adopt Revised Deployment Measures:</u>** The City should adopt revised performance measures to direct fire crew planning and to monitor the operation of the Department. The measures should take into account a realistic company turnout time of 1:30 minutes and be designed to deliver outcomes that will save patients medically salvageable upon arrival; and to keep small, but serious fires from becoming greater alarm fires. Citygate recommends these measures be:

1.1 **<u>Distribution of Fire Stations:</u>** To treat medical patients and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 911 call in fire dispatch. This equates to 1-minute dispatch time, 1:30 minutes/seconds company turnout time and <u>5</u> minutes drive time in the most populated areas.

1.2 **Multiple-Unit Effective Response Force for Serious Emergencies:** To confine fires near the room of origin, to stop wildland fires to under 3 acres when noticed promptly and to treat up to 5 medical patients at once, a multiple-unit response of at least 17 personnel should arrive within 10:30 minutes/seconds from the time of 911-call receipt in fire dispatch, 90 percent of the time. This equates to 1-minute dispatch time, 1:30 minutes/seconds company turnout time and 8 minutes drive time spacing for multiple units in the most populated areas.

Recommendation #2: **Adopt Fire Station Location Measures:** To direct fire station location timing and crew size planning as the community grows, adopt fire unit deployment performance measures based on population density zones in the table below. The more specific, measurable and consistent the policy is, the more it can be applied fairly to all uses and easily understood by a non-fire service user.

Proposed Deployment Measures for San Diego City Growth

By Population Density Per Square Mile

	Structure Fire Urban Area	Structure Fire Rural Area	Structure Fire Remote Area	Wildfires Populated Areas
	>1,000-people/sq. mi.	**1,000 to 500 people/sq. mi.**	**500 to 50 people/sq. mi. ***	**Permanent open space areas**
1st Due Travel Time	5	12	20	10
Total Reflex Time	7.5	14.5	22.5	12.5
1st Alarm Travel Time	8	16	24	15
1st Alarm Total Reflex	10.5	18.5	26.5	17.5

* Less than 50 people per square mile there is acknowledgment that fire and EMS services are going to be substandard.

Recommendation #3: **Aggregate Population Definitions:** Where more than one square mile is not populated at similar densities, and/or a contiguous area with different zoning types aggregates into a population "cluster," these measures can guide the determination of response time measures and the need for fire stations:

Area	Aggregate Population	First-Due Unit Travel Time Goal
Metropolitan	> 200,000 people	4 minutes
Urban-Suburban	< 200,000 people	5 minutes
Rural	500 - 1,000 people	12 minutes
Remote	< 500	> 15 minutes

Recommendation #4: Near Term Deployment Options: As the City struggles with the economic downturn, it should consider this phasing of deployment changes:

- Do nothing
- Add back the 8 brownout engines
- Add back some of the 4-firefighter brownout engines as peak hour demand units*
- Implement gap area engines and/or Fast Response Squads.*

* *Meet and confer on impacts, work schedules, position compensation.*

Recommendation #5: Adopt the Priority Criteria of this Study for Where to Add Resources: Use of the tools and methods in this study would result over time as resources allow the addition of:

- 10 additional 4-firefighter staffed engine companies
- 9 new "Fast Response Squads"
- 4 additional aerial ladder trucks
- 2 additional field battalion chiefs.

Recommendation #6: Fire Engine Dispatch Process: The Department has to improve the procedures to achieve a decrease of the dispatch queue time for the first responding engine company.

Recommendation #7: Fast Response Squads: The Department should immediately begin detailed planning to fully design and cost a pilot program of two-firefighter Fast Response Squads to assist in smaller deployment gaps where there are high simultaneous incident workloads. Unit type and capabilities are defined in Section 2.7.9.

Recommendation #8: <u>**Replace In-Station Alerting System:**</u> **The City should make it a priority to replace the 21-year-old fire crew in-station alerting system at an approximate cost of $3.4 million. This will improve response times via a one-time capital expense without adding any more response crews.**

<u>Additional Resources:</u> **If the City can provide the revenue to improve response times, these are Citygate's recommended sites in Citygate's priority order to improve service in the identified gap areas:**

Citygate Priority	FRS Eligible	Sites @ 5-min to 90%	Additive Population Per Gap 5-min	Additive Calls Per Gap 5-min
1	NO	Home Ave	10,271	683
2	NO	Paradise Hills	11,486	787
3	NO	College	6,729	403
4	NO	Skyline	19,803	1,384
5	YES	Encanto	9,715	710
6	NO	Stresemann / Governor	8,670	597
7	NO	Mission Bay / Pacific Beach	19,011	1,935
8	NO	UCSD	10,248	1,283
9	YES	Liberty Station	2,117	1,127
10	YES	University City	4,753	456
11	NO	Torrey	11,946	567
12	NO	Serra Mesa	15,646	1,553
13	NO	Mira Mesa	1,437	393
14	YES	East Otay	634	140
15	YES	Scripps Miramar	4,867	160
16	YES	San Pasqual	21	130
17	YES	Linda Vista	6,371	501
18	YES	Black Mountain Ranch	1,384	51
19	YES	Mission Valley	16,174	1,517
	9 FRS's	Total:	161,283	14,377

Improving response capability to all 19 gaps using a 5-minute travel time model achieves the following:

- 161,283 residents receive improved coverage by at least 1-minute travel time;
- 14,377 incidents receive improved service;
- A mix of 19 resources also adds weight of attack to first alarm coverage as well as depth of capacity in high workload areas;
- Sites 11 through 19 only add 10 miles of new coverage each;
- Of these 19 sites, Citygate believes 6 are the most critical, taking into consideration all the factors. Just these 6 sites would improve service to 66,674 residents and 4,564 delayed response time incidents. They are:
  - Home Avenue
  - Paradise Hills
  - College
  - Skyline
  - Encanto
  - Stresemann/Governor.
- For improved ladder truck and battalion chief coverage, the geographic and workload analysis concluded that the system needs:
  - Four (4) additional ladder trucks
  - Two (2) additional field battalion chief units.

COSTS AND SUGGESTED PHASING

If the City decides to add these enhancements as recommended by Citygate, the table below provides the associated annual estimated cost in FY 10-11 dollars:

Operating Macro Costs

Resource – Staff & Operating	Cost in $ Millions	Quantity for 5-Minute Coverage @ 90%	Totals
2-FF Fast Response Squads	1.0	9	9.0
Single engine staffed station	2.2	6	13.2
Double staffed station	4.4	4	17.6
Batt Chief	0.53	2	1.1
Total			**$40.9**

Capital Macro Costs

Resource	Cost in $ Millions	Quantity for 5-Minute Coverage @ 90%	Totals
Engine	0.78	10	7.8
Ladder	1.1	4	4.4
Fast Response Squad	0.4	9	3.6
Single station	7	6	42.0
Double station	8	4	32.0
Fast Response Squad Station	.5	9	4.5
Replace Fire Station Crew Alert System	3.4	-	3.4
Total			**$97.7**

PRIORITIES AND TIMING

Some of the recommendations in this planning effort requiring minimal additional resources can be worked on in parallel. Others will take several fiscal years, both in time and funding. Given these two realities, Citygate recommends two short-term priorities and one long-term priority:

Short-Term Priority One

- Absorb the policy recommendations of this fire services study and adopt revised Fire Department performance measures to drive the deployment of firefighting and emergency medical resources.
- Create a task force to fully study the Fast Response Squad concept. Bring forward an implementation pilot project and costs.

Short-Term Priority Two

- Add back brownout engines per the priority methodology used in this study.
- Identify revenues to replace the failing fire station alerting system to ensure timely incident notification to emergency responders.
- Identify revenue sources to increase the Department's deployment system.
- Add additional primary engine and Fast Response Squads as revenues allow.

Long-Term Priority

- Monitor the performance of the deployment system using adopted deployment measures and the methods in this study.

SECTION 1—INTRODUCTION AND BACKGROUND

1.1 REPORT ORGANIZATION

This report is structured into the following sections that group appropriate information together for the reader.

This Volume (**Volume 1**) includes:

Section 1 Introduction and Background: Background facts about the City of San Diego's current Fire Services.

Section 2 Standards of Response Cover (Staffing/Station) Analysis: An in-depth examination of the Fire Department's deployment ability to meet the community's risks, expectations and emergency needs.

Section 3 Fiscal Impacts: An outline of the costs to implement this study's recommendations.

Separately attached:

Volume 2 Map Atlas

1.1.1 Goals of Report

As each of the sections mentioned above imparts information, this report will cite findings and make recommendations, if appropriate, that relate to each finding. There is a sequential numbering of all of the findings and recommendations throughout Section 2 of this report. To provide a comprehensive summary, a complete listing of all these same findings and recommendations in order is shown in the Executive Summary. Finally, the report brings attention to the highest priority needs and possible timing in Section 3.

This document provides technical information about how the City's fire services are currently deployed and, if deficiencies exist, what the options are to address them. This information is presented in the form of recommendations and policy choices for the City of San Diego leadership and community to discuss.

The result is a solid technical foundation upon which to understand the advantages and disadvantages of the choices facing the City of San Diego leadership and community on how best to provide fire services, and more specifically, at what level of desired outcome and expense as the City deals with the results of the negative national and local economy.

1.1.2 Limitations of Report

In the United States, there are no federal or state regulations on what a minimum level of fire services has to be. Each community, through the public policy process, is expected to understand the local fire risks, their ability to pay, and then to choose their level of fire services. If fire services are provided at all, the federal and state regulations specify how to do it safely for the personnel providing the service and the public.

While this report and technical explanation can provide a framework for the discussion of fire services for the City of San Diego, neither this report nor the Citygate consulting team can make the final decisions or cost out in detail every possible alternative. Once policy choices are given approval, City staff can conduct any final costing and fiscal analysis as normally done in the operating and capital budget preparation cycle.

It should be noted that the data measures in this report were for three years before the economic-crisis-driven "brownout" reductions of eight engine companies per day that began on February 6, 2010. Thus, the response time performance in this study is the best that the system delivers with all previously budgeted resources available. This study did not analyze performance after the brownouts were operating.

1.2 BACKGROUND

This project involved the development of a Fire Services deployment analysis. This effort involved the study of the fire services risk within the City of San Diego. In this report, the term "Department" will be used when referring to San Diego Fire-Rescue itself, and the term "City" will be used when referring to the City of San Diego.

The Mayor's Office commissioned this study and resultant planning recommendations to evaluate the current capacity of the Department to respond to emergency fire, rescue, and medical incidents within its area. The study was to:

- Further refine the findings of the Regional Fire Service Deployment Study Citygate conducted for the County of San Diego that pertained to Fire-Rescue deployment within the City of San Diego;
- Analyze whether the San Diego Fire-Rescue Department's performance measures are appropriate and achievable given the risks, topography and special hazards to be protected in the City of San Diego;
- Review existing Fire-Rescue Department deployment and staffing models for efficiency and effectiveness and determine how and where alternative deployment and staffing models could be beneficial to address current and projected needs;
- Provide an in-depth Standard of Response Cover planning analysis (fire station and crew deployment) to examine the levels of firefighting personnel, stations and equipment;
- Identify fire station and staffing infrastructure triggers for additional resources, if needed;

- Present order of magnitude costs and possible financing strategies for changes to the Fire-Rescue Department.

In its entirety, this analysis and corresponding findings and recommendations will allow the City to make informed policy decisions about the level of fire services desired and the best method to deliver and fund them.

The challenges facing the City are not unique. At the start of this project in the fall of 2010, the City faced the challenges that all California communities did with revenue not matching needs in an atmosphere made worse by a state budget deficit. This Fire Service deployment study has to acknowledge that the City may desire improved fire services, but in the near term cannot afford any improvements. Thus, the plan will have to suggest how to prioritize existing services to revenues, while laying out a road map for future improvements that can be followed as revenue growth occurs.

1.3 City of San Diego Project Approach and Research Methods

Citygate used several tools to gather, understand, and model information about the City and Department for this study. We started by making a large document request to the Department to gain background information on costs, current and prior service levels, the history of service level decisions and what other prior studies, if any, had to say.

In subsequent site visits, the Citygate team member followed up on this information by conducting focused interviews of fire management team members and other appropriate City staff. We reviewed demographic information about the City, proposed developments, and managed growth projections. As we collected and understood information about the City and Department, Citygate obtained electronic map and response data from which to model current and projected fire services deployment. The goal was to identify the location(s) of stations and crew quantities required to serve the City as it develops.

Once Citygate gained an understanding of the Department service area with its fire, rescue, and EMS risks, the Citygate team developed a model of fire services that was tested against the mapping and prior response data to ensure an appropriate fit. This resulted in Citygate being able to propose an approach to deploying fire services that would also meet reasonable expectations and fiscal abilities.

1.4 City of San Diego Fire-Rescue Department Background Information

The City of San Diego is the second largest city by population in California and the eighth largest in the nation. It is a vibrant, thriving city vitally important to the state and national economy. The City is very diverse in the types of risks to be protected by San Diego's Fire-Rescue Department. The City has most every type of firefighting and technical rescue risk found in the United States today, except for a major oil refinery. Most hazardous chemicals and commodities can be found in San Diego's businesses, the port and shipping transportation community.

The physical building structures also are very diverse from the international airport terminal to 205 high-rise buildings to cruise ships and suburban single-family homes. According to the State of California Finance Department, in January 2010, the City's resident population was 1,376,173. This figure does not include the daily workforce that comes in from other communities, tourism, military personnel, the airports, the port and what is on the road network passing through the county.

Over an operational area approximately 342 square miles, San Diego Fire-Rescue has to be deployed to handle anything from a single-patient medical emergency in an easy-to-access situation such as a home, to emerging serious fires in complex buildings. Just the international airport handles over 30,000 passengers per day, which is larger than the entire population of Coronado or Lemon Grove.

Then there are the special industrial risks, including the oceanfront beaches, Mission Bay, the sports venues, and the extreme wildland fire risk.

For disasters, the City has to be prepared to handle most of what any place in the world might experience. Serious storms, earthquakes, major airplane crashes and two historic wildland fires have brought serious damage to the City over its lifetime.

The challenge faced by the City is to protect these risks, which occur in very different quantities and locations. Just the resident population density alone varies greatly from the highest in the downtown high-rise core to suburban Rancho Bernardo for example. Thus, San Diego is a collection of diverse communities, not a singular entity with few and homogenous risks to protect.

1.4.1 Deployment Challenge Questions

Such a spread of risks across a very diverse topography creates several challenging questions: Should there be a baseline, somewhat equal, protective effort to all neighborhoods and then a larger, more technical response, to key risks that are above the baseline amount? Should the baseline deployment system be staffed higher where high call for service counts occur or spread out thinly to cover the vast geography? The details in this study will address all of these issues.

1.5 REGULATION AFFECTING THE FIRE SERVICE

In addition to restrictions on local government finance, there have been a number of newer state and federal laws, regulations, and court cases over the last decade that limit the flexibility of cities in determining their staffing levels, training, and methods of operation. These are given an abbreviated overview below:

- 1999 OSHA Staffing Policies – Federal OSHA applied the confined space safety regulations for work inside tanks and underground spaces to America's firefighters. This requires in atmospheres that are "IDLH" (Immediately Dangerous to Life and Health) that there be teams of two inside and two outside in constant communication, and with the outside pair equipped and ready to rescue the inside pair. This situation occurs in building fires where the fire and smoke conditions are serious enough to require the wearing of self-contained breathing apparatus (SCBA). This is commonly called the "2-in/2-out" policy. This policy requires that firefighters enter serious building fires in teams of two, while two more firefighters are outside and immediately ready to rescue them should trouble arise.
- While under OSHA policy one of the outside "two-out" personnel can also be the incident commander (typically a chief officer) or fire apparatus operator, this person must be fully suited-up in protective clothing, have a breathing apparatus donned except for the face piece, meet all physical requirements to enter IDLH atmospheres and thus be ready to immediately help with the rescue of interior firefighters in trouble.
- May 2001 National Staffing Guidelines (NFPA 1710) – The National Fire Protection Association (NFPA) Standard on Career Fire Service Deployment was issued ten years ago. While *advisory* to local governments, as it starts to become locally adopted and used, it develops momentum, forcing adoption by neighboring communities. NFPA 1710 calls for four-person fire crew staffing, arriving on one or two apparatus as a "company." The initial attack crew should arrive at the emergency within four minutes travel time, 90 percent of the time, and the total effective response force (first alarm assignment) shall arrive within eight minutes travel time, 90 percent of the time. These guidelines will be explained and compared to the City of San Diego in the deployment measures section of this document.
- The on-scene incident commanders (battalion chiefs) at hazardous materials incidents must have certification compliant with NFPA 472, *Standard for Emergency Response to Hazardous Materials Incidents*. This is also now an OSHA requirement.
- CAL OSHA Requirements – Among the elements required is a safety orientation for new employees, a hazard communications system for employees to communicate hazards to supervisors, the CAL-OSHA process for post-injury reviews, the required annual report of injuries, and a standard for safety work plans. Employers have many different responsibilities under the Occupational Safety and Health Act of 1970 and the Code of Federal Regulations (CFR). Initially OSHA focused its efforts on the private sector; more recently, it has

turned its attention to the public sector and specifically the fire service. All of this raises (appropriately for safety) fire agency training and equipment costs.

1.6 NEGATIVE PRESSURES ON VOLUNTEER-BASED FIRE SERVICES

While the City of San Diego does not operate a volunteer firefighter system, wholly or in part, a common question is why not solve some of a city's fire staffing problems with volunteers? To pre-address this question, here is a brief overview of the state of depending on volunteer firefighters:

All volunteer-based fire departments are under great pressure today to maintain an adequate roster. The reasons for this are not unique to any one type of community and are placing pressure on small community volunteer systems across the state and nation:

- Economic pressures result in more two-income families and less time to volunteer.
- In a commuter economy, more jobs are clustered in metropolitan and dense suburban areas. Communities throughout the City of San Diego increasingly have residents who work elsewhere, and many of the younger age people who would consider volunteering are just too busy.
- Due to the growth in society of complex systems and technology, the fire service was given more missions, like emergency medical services, hazardous materials response, and technical rescue. This dramatically increased the legally mandated training hours for volunteers, causing many to drop out as the time commitments became unbearable.

This change, coupled with all the other factors, means that volunteer firefighter programs dry up due to lack of members. Additional training and additional responses mean a significant time commitment for "true" volunteers, who are serving for love of the community and to give something back. Most departments feel that it takes 100-120 hours of training per year to meet safety minimums, and this time is expended before a volunteer goes on a single incident.

As this report will explain in detail, City of San Diego fire services are already spread thin. Even if a small volunteer cadre could be found to assist with non-emergency work, volunteer programs take design, supervision, and some fiscal support. In Citygate's opinion, the needs of the City of San Diego Fire-Rescue Department far outweigh what a small volunteer or per diem apprentice firefighter program could solve. More importantly, just creating and operating such a program would drain the already thin administrative staffing from managing critical day-to-day operations.

SECTION 2—STANDARDS OF RESPONSE COVER (STATION/STAFFING) ANALYSIS

Section Intent: This section serves as an in-depth analysis of the San Diego Fire-Rescue Department's current ability to deploy and meet the emergency risks presented in the City. The response analysis will use prior response statistics and geographic mapping to help elected officials and the community visualize what the current response system can and cannot deliver.

2.1 GENERAL FIRE DEPLOYMENT BACKGROUND INFORMATION

The Commission on Fire Accreditation International recommends a systems approach known as "Standards of Response Coverage" to evaluate deployment as part of the self-assessment process of a fire agency. This approach uses risk and community expectations on outcomes to assist elected officials in making informed decisions on fire and EMS deployment levels. Citygate has adopted this methodology as a comprehensive tool to evaluate fire station location. Depending on the needs of the study, the depth of the components can vary.

This study will also reference and use as benchmarks the best practice recommendations of other organizations, specifically the National Fire Protection Association (NFPA) and the Insurance Service Office (ISO).

The Standard of Response Coverage systems approach to deployment, rather than a one-size-fits-all prescriptive formula, allows for local determination of the level of deployment to meet the risks presented in each community. In this comprehensive approach, each agency can match local need (risks and expectations) with the costs of various levels of service. In an informed public policy debate, a city council "purchases" the fire, rescue, and EMS service levels (insurance) the community needs and can afford.

While working with multiple components to conduct a deployment analysis is admittedly more work, it yields a much better result than any singular component can. If we only look to travel time, for instance, and do not look at the frequency of multiple and overlapping calls, the analysis could miss over-worked companies. If we do not use risk assessment for deployment, and merely base deployment on travel time, a community could under-deploy to incidents.

The Standard of Response Cover process consists of eight parts:

1. Existing Deployment – each agency has something in place today.
2. Community Outcome Expectations – what does the community expect out of the response agency?
3. Community Risk Assessment – what assets are at risk in the community?
4. Critical Task Time Study – how long does it take firefighters to complete tasks to achieve the expected outcomes?

5. Distribution Study – the locating of first-due resources (typically engines).

6. Concentration Study – first alarm assignment or the effective response force.

7. Reliability and Historical Response Effectiveness Studies – using prior response statistics to determine what percent of compliance the existing system delivers.

8. Overall Evaluation – proposed standard of cover statements by risk type.

Fire department deployment, simply stated, is about the ***speed*** and ***weight*** of the attack. Speed calls for first-due, multi-hazard intervention units (engines, ladder trucks and specialty companies) strategically located across a department. These units are tasked with controlling everyday, average emergencies without the incident escalating to second alarm or greater size, which then unnecessarily depletes the department resources as multiple requests for service occur. Weight is about multiple-unit response for significant emergencies like a room and contents structure fire, a multiple-patient incident, a vehicle accident with extrication required, or a heavy rescue incident. In these situations, departments must assemble enough firefighters in a reasonable period in order to control the emergency safely without it escalating to greater alarms.

Thus, small fires and medical emergencies require a single- or two-unit response (engine and ambulance) with a quick response time. Larger incidents require more companies. In either case, if the companies arrive too late or the total personnel sent to the emergency are too few for the emergency type, they are drawn into a losing and more dangerous battle. The art of fire company deployment is to spread companies out across a community for quick response to keep emergencies small with positive outcomes, without spreading the stations so far apart that they cannot quickly amass enough companies to be effective in major emergencies.

Given the need for companies to be stationed throughout a community for prompt response instead of all companies responding from a central fire station, communities such as San Diego are faced with neighborhood equity of response issues. When one or more areas grow beyond the reasonable travel distance of the nearest fire station, the choices available to the elected officials are limited: add more neighborhood fire stations, or tell certain segments of the community that they have longer response times, even if the type of fire risk found is the same as other areas.

For the purposes of this fire services study, Citygate used all eight components of the Standards of Response Cover process (at varying levels of detail) to understand the risks in the City, how the City is staffed and deployed today, and then modeled those parameters using geographic mapping and response statistical analysis tools. The models were then compared to the proposed growth in the City so that the study can recommend changes, if any, in fire services to the City's service area.

Thus, Citygate tailored the deployment recommendations in this report to the City's unique needs, and did not only use one-size-fits-all national recommendations.

The next few subsections in this section will cover the City area factors and make findings about each component of the deployment system. From these findings of fact about the City's fire deployment system, the study is then able to make deployment change recommendations.

2.2 CITY OF SAN DIEGO COMMUNITY OUTCOME EXPECTATIONS – WHAT IS EXPECTED OF THE FIRE-RESCUE DEPARTMENT?

The next step in the Standards of Response Cover process is to review existing fire and emergency medical outcome expectations. This can be restated as follows: for what purpose does the current response system exist? Has the governing body adopted any response time performance measures? If so, the time measures used by the City need to be understood and good data collected.

The community, if asked, would probably expect that fires be confined to the room or nearby area of fire origin, and that medical patients have their injuries stabilized and be transported to the appropriate care location. Thus, the challenge faced by the City is maintaining an equitable level of fire service deployment across the entire City service area without adding significantly more resources as demand for services grows and traffic congestion increases, slowing response times.

The Insurance Services Office (ISO) Fire Department Grading Schedule would like to see first-due fire engines stations spaced 1.5 miles apart and ladder trucks spaced 2.5 miles apart, which, given travel speeds on surface streets, is a 3- to 4-minute travel time for first-due engines and a 7- to 8-minute travel time for first-due ladder trucks. The National Fire Protection Association (NFPA) guideline 1710 on fire services deployment suggests a 4-minute travel time for the initial fire apparatus response and 8 minutes travel time maximum for the follow-on units. This recommendation is for departments that are substantially staffed by career firefighters, as the City is.

The ISO grades community fire defenses on a 10-point scale, with Class 1 being the best. Historically, the City has been evaluated as a Class 3 department in its urban areas meaning the fire engine and ladder truck coverage is similar to many lighter suburban density fire departments. For many reasons, it is not necessary for an agency to only deploy to meet the ISO measures. The ISO criteria are designed to evaluate the fire protection system for the purposes of underwriting a department's ability to stop a building fire *conflagration*. The ISO system does not address small fires, auto fires, outdoor fires and emergency medical incidents. In addition, underwriters today can issue fire premiums in Grading Schedule "bands" such as 3-5 and give safer buildings a single rating of Class 1, for example.

Thus, if an agency only tries to meet the ISO or NFPA station placement criteria, they do not necessarily deliver better outcomes, given the diversity of risk across American communities. Importantly within the Standards of Response Coverage process, positive outcomes are the goal, and from that company size and response time can be calculated to allow efficient fire station spacing. Emergency medical incidents have situations with the most severe time constraints. In a heart attack that stops the heart, a trauma that causes severe blood loss, or in a respiratory emergency, the brain can only live 8 to 10 minutes maximum without oxygen. Not only heart attacks, but also other emergencies can cause oxygen deprivation to the brain. Heart attacks make up a small percentage; drowning, choking, trauma, constrictions, or other similar events have the same effect on the brain and the same time constraints. In a building fire, a small incipient fire can grow to involve the entire room in a 4- to 5-minute time frame. The point in time where the entire room becomes involved in fire is called "flashover," when everything is burning, life is no longer possible, and the fire will shortly spread beyond the room of origin.

If fire service response is to achieve positive outcomes in severe EMS situations and incipient fire situations, ***all*** the companies must arrive, size up the situation and deploy effective measures before brain damage or death occurs or the fire spreads beyond the room of origin.

Given that the emergency started before or as it was noticed and continues to escalate through the steps of calling 911, dispatch notification of the companies, their response, and equipment set-up once on scene, there are three "clocks" that fire and emergency medical companies must work against to achieve successful outcomes:

- The time it takes an incipient room fire to fully engulf a room in 4 to 5 minutes, thus substantially damaging the building and most probably injuring or killing occupants.
- When the heart stops, the brain starts to die from lack of oxygen in 4 to 6 minutes and brain damage becomes irreversible at about the 10-minute point.
- In a trauma patient, severe blood loss and organ damage becomes so great after the first hour that survival is difficult if not impossible. The goal of trauma medicine is to stabilize the patient in the field as soon as possible after the injury, and to transport them to a trauma center where appropriate medical intervention can be initiated within one hour of the injury.

Somewhat coincidently, in all three situations above, the first responder emergency company must arrive on-scene within 5 to 7 minutes of the 911-phone call to have a chance at a successful resolution. Further, the follow-on (additional) companies for serious emergencies must arrive within the 8- to 11-minute point. These response times need to include the time steps for the dispatcher to process the caller's information, alert the stations needed, and the companies to then don OSHA-mandated safety clothing and drive safely to the emergency. The sum of these three time steps – dispatch, company turnout and drive time – comprises "total reflex," or total response time. Thus, to get the first firefighters on-scene within only 5 to 7 minutes of the 911-call being answered is very challenging to all parts of the system, as this study will describe later in detail.

The three event timelines above start with the emergency happening. It is important to note the fire or medical emergency continues to deteriorate from the time of inception, not the time the fire engine actually starts to drive the response route. It is hoped that the emergency is noticed immediately and the 911 system is activated. This step of awareness – calling 911 and giving the dispatcher accurate information – takes, in the best of circumstances, 1 minute. Then company notification and travel take additional minutes. Once arrived, the company must walk to the patient or emergency, size up the problem and deploy their skills and tools. Even in easy-to-access situations, this step can take 2 or more minutes. It is considerably longer up long driveways, apartment buildings with limited access, multi-storied office buildings or shopping center buildings such as those found in parts of the City.

2.2.1 City of San Diego Existing Policy

The City's General Plan Safety element, last updated in 2008, states for the fire services goal in the Safety Element Section: "Protection of life, property, and environment by delivering the highest level of emergency and fire-rescue services, hazard prevention, and safety education"

This service level goal is further defined by these key policies for fire service *deployment* measures in Section PF-D.1:

- **PF-D.1**. Locate, staff, and equip fire stations to meet established response times. Response time objectives are based on national standards. Add one minute for turnout time to all response time objectives on all incidents.
  - Total response time for deployment and arrival of the first-in engine company for fire suppression incidents should be within four minutes 90 percent of the time.
  - Total response time for deployment and arrival of the full first alarm assignment for fire suppression incidents should be within eight minutes 90 percent of the time.
  - Total response time for the deployment and arrival of first responder or higher-level capability at emergency medical incidents should be within four minutes 90 percent of the time.
  - Total response time for deployment and arrival of a unit with advanced life support (ALS) capability at emergency medical incidents, where this service is provided by the City, should be within eight minutes 90 percent of the time.
- **PF-D.2.** Deploy to advance life support emergency responses EMS personnel including a minimum of two members trained at the emergency medical technician-paramedic level and two members trained at the emergency medical technician-basic level arriving on scene within the established response time as follows:

- Total response time for deployment and arrival of EMS first responder with Automatic External Defibrillator (AED) should be within four minutes to 90 percent of the incidents; and
- Total response time for deployment and arrival of EMS for providing advanced life support should be within eight minutes to 90 percent of the incidents.

- **PF-D.3.** Adopt, monitor, and maintain service delivery objectives based on time standards for all fire, rescue, emergency response, and lifeguard services.
- **PF-D.5.** Maintain service levels to meet the demands of continued growth and development, tourism, and other events requiring fire-rescue services.
  a. Provide additional response units, and related capital improvements as necessary, whenever the yearly emergency incident volume of a single unit providing coverage for an area increases to the extent that availability of that unit for additional emergency responses and/or non-emergency training and maintenance activities is compromised. An excess of 2,500 responses annually requires analysis to determine the need for additional services or facilities.
- **PF-D.6.** Provide public safety related facilities and services to assure that adequate levels of service are provided to existing and future development.
- **PF-D.7.** Evaluate fire-rescue infrastructure for adherence to public safety standards and sustainable development policies (see also Conservation Element, Section A).
- **PF-D.8.** Invest in technological advances that enhance the City's ability to deliver emergency and fire-rescue services more efficiently and cost-effectively.

The Fire-Rescue Department further defined these General Plan policies in its 2005 Standards of Response Cover Study and its budget performance measures as:

- A first responding four-person engine company shall arrive at the scene of an emergency within an average of five minutes or less from the time of page received.
- A unit with advanced life support capability will arrive at emergency medical incidents within five minutes 90 percent of the time, from point of dispatch.
- Truck companies will arrive at the scene of an emergency within an average of nine minutes from the time of page received.
- An effective response force will arrive at the scene of an emergency within 9 minutes or less 95 percent of the time from the time of page received.

- **The Hazardous Incident Response Team will arrive at scene within 60 minutes from point of dispatch 90 percent of the time to the contract provided service area.**
- **The Aviation Rescue and Firefighting units at the San Diego International Airport will arrive at the mid-point of the runway within three minutes of alarm received.**
- **The Urban Search and Rescue Task Force will be capable of mobilizing within a four-hour timeframe for an over-the-road response and six hour timeframe for an air response.**
- The first-in engine company will place one line in-service at 150 gallons per minute (GPM) and initiate mitigation efforts within one minute of arrival.
- An effective response force for a low risk occupancy will place a water supply in service at a minimum 400 GPM for 30 minutes and include: one attack line in service with two firefighters at 150 GPM, a second attack line with two firefighters at a minimum of 150 GPM, one ventilation team consisting of two firefighters, one search and rescue team consisting of two firefighters, establish command outside the hazard area with a dedicated position and the capability of flowing 400 GPM without interruption
- An effective response force for medium risk occupancy will provide in addition to resources for low risk the capability to flow 1,000 GPM without interruption, two ventilation teams, two search and rescue teams, and a rapid intervention crew of four firefighters.
- An effective response force for a high risk occupancy will provide in addition to resources for low and medium, two, 2 ½ inch attack lines in-service, one on the fire floor and one on the floor above, one additional ventilation team, one additional search and rescue team, establish lobby control as well as overall command, and supplement the fire protection systems as needed.

2.2.2 Critique of San Diego City Response Measures

Current best practice nationally is to measure percent completion of a goal (i.e., 90 percent of responses) instead of an average measure, as many fire departments did in the past. Response goal measures should start with the time of fire dispatch receiving the 911-call to the arrival of the first unit at the emergency, and the measure should state what is delivered and what the expected outcome is desired to be.

Percent of completed goal measures are better than the measure of average, because average just identifies the central or middle point of response time performance for all calls for service in the data set. From an average statement, it is impossible to know how many incidents had response times that were considerably over the average or just over. For example, if a department had an average response time of 5 minutes for 5,000 calls for service, it cannot be determined how many calls past the average point of 5 minutes were answered slightly past the 5th minute, in the 6th minute or way beyond at 10 minutes. This is a significant issue if hundreds or thousands of calls are answered much beyond the average point.

The City of San Diego General Plan Goal and policy statements are generally consistent with best practices, but in key parts are too vague to be measurable. For example, "national standards" are not defined and on other occurrences, the specific begin and end point of "total response time" are not stated to allow for measures that can use existing dispatch time records. Some goal statements include total response time, but the minutes cited are actually *travel* time from national recommendations.

Some of the Fire-Rescue Department's measures use "average" instead of percent of goal statements; others use percent of goal and the begin and end time terminology in some vary.

> **Finding #1:** While the City has developed fire deployment goals, they can be improved to include a beginning time measure starting from the point of fire dispatch receiving the 911-phone call, and a goal statement tied to risks and outcome expectations. The deployment measure should have a second measurement statement to define multiple-unit response coverage (Effective Response Force) for serious emergencies. Making these deployment goal changes will strengthen the measures and meet the best practice recommendations of the Commission on Fire Accreditation International and the NFPA.

In earlier national recommendations, it was thought to take 1 minute for the company to receive the dispatch alert message and get the apparatus moving. However, as will be discussed later, even 1 minute for company turnout is unrealistic, given the need to don mandated protective safety clothing and to be seated and belted in before the apparatus begins to move. Other recommendations were that the 911 dispatch center processing should take no more than 1 minute for 90 percent of the incidents.

If up to 2.5 minutes for dispatch processing and crew "turnout" time is added to 4 minutes travel time over the streets, from the time of fire dispatch *receiving the call*, an effective deployment system is ***beginning*** to manage the problem within 6.5 minutes total response time. Even this only occurs when a "grid" type street system and close fire station spacing can support 4 minutes travel time. If the first unit can arrive from 6.5 to no more than 7.5 minutes, that is right before the point that brain death is becoming irreversible and the fire has grown to the point to leave the room of origin and become very serious. Yes, sometimes the emergency is too severe even before the Fire Department is called in for the responding company to reverse the outcome; however, given an appropriate response time policy and a system that is well designed, then only issues like bad weather, poor traffic conditions or a significant number of multiple emergencies will slow the response system. Consequently, a properly designed system will give the citizens hope of a positive outcome for their tax dollar expenditure.

2.3 City of San Diego Fire Risk Assessment

Both newcomers to the community, as well as long-term residents, may not realize the community assets that are at risk today in such a vibrant and diverse community. San Diego Fire-Rescue is charged with responding to a variety of emergencies, from fires to medical calls to special hazards and cargo transportation emergencies on the highway.

SANDAG estimates employment in the City is approximately 800,000. In addition to the resident population and risk types listed earlier in section 1.4, the Department also has to deploy to emergencies for:

- 17 miles of coastline
- 4,600 acres around Mission Bay Park
- Major shifts in the City's population twice per workday
- Wide variance in population densities per square mile, which contribute to very different call for service occurrences
- Universities and colleges
- Health care centers of all sizes and types
- Sports and tourism venues
- An international border
- Aviation and shipping hazards
- Railroads, pipelines and trucking systems that transport hazardous materials
- High-tech semi-conductor and biotech research and manufacturing.

In addition to the above risks, the City contains a mix of single- and multi-family dwellings, small and larger businesses, and light or "high-tech" industrial park businesses. In addition, there are smaller warehouse and light manufacturing facilities, regional shopping malls, hotels, 205 high-rise business and residential buildings, the Sea World theme park, the San Diego Zoo, Balboa Park and the list of attractions and amenities becomes quite lengthy.

The significance of the above information is that the Department must be staffed, equipped and trained to deal with most any type of emergency faced by a United States fire department.

In order to understand the importance of response time in achieving satisfactory outcomes, the deployment of resources must be based upon assessment of the risks and the emergency outcome desired if something goes wrong. There are actually many different types of risks depending upon the nature of the emergency. At a very basic level, a fire in a single-family, detached home is among the most frequent events with a measurable outcome. A *single*-patient medical emergency is a different event, and while it is the most frequent, it is normally not as threatening to life and property as the structure fire since the structure fire can spread from building to building and eventually become a conflagration.

The fire incident reporting system indicates a wide variety of events that can result in a call for service, but it is a reported fire in a building that is the essence of a fire department's deployment plan that drive the need for a "distribution" system of fire stations, apparatus and firefighters.

2.3.1 Building Fire Risk

In addition to risk types and community demographics cited above, in a Standards of Response Coverage study, building fire risk could be understood by looking at larger classes of buildings as well as the wildfire potential that surrounds the City.

In Map Set #2 in the mapping appendix to this study (found in Volume 2, separately bound), are displayed the locations of the larger *commercial* buildings that the Insurance Service Office (ISO) has sent an evaluation engineer into for underwriting purposes.

The ISO sends underwriters into commercial buildings to evaluate and collect demographic data for fire insurance underwriting purposes. This study obtained the current ISO data set for the City of San Diego, and it contains approximately 11,590 location records that range in size from a few hundred square feet up to 1.1 million square feet under one roof. There are 104 locations with buildings greater than 100,000 square feet.

One of the measures the ISO collects is called fire flow, or the amount of water that would need to be applied if the building were seriously involved in fire. The measure of fire flow is expressed in gallons per minute (gpm). In San Diego the ISO records list 1,813 buildings with a required fire flow of more than 3,000 gpm. These locations are shown on Map Set #2 in the attached map atlas. The table below breaks out the fire flow categories:

Fire Flow Categories

ISO Location Quantity	Required Fire Flow	% Of Whole
235	≥ 5,000	2%
316	4,000 – 4,999	3%
1,262	3,000 – 3,999	11%
9,776	< 3,000	84%

Fire flows above 3,000 gpm are a significant amount of firefighting water to deploy, and a major fire at any one of these buildings would result in a greater alarm fire. Using the generally accepted figure of fifty gallons per minute per firefighter on large building fires, a fire in a building requiring 3,000 gallons per minute would require 60 firefighters, or a *four alarm* fire deployment effort given the Department's current staffing of a minimum of 17 firefighters on a first alarm structure fire response.

An effective response force is the deployment of multiple units (pumpers, ladder trucks and incident commander) so they can arrive close enough together to combat serious fires and keep them to less than greater alarm size. This refers back to the earlier points in this report on speed and weight of attack. The massing of units in a timely manner (weight) must be such that serious fires do not typically become larger. Since City zoning has placed these buildings throughout the City, this places additional pressure to have a multiple-unit effective response force of pumpers, and, also importantly, ladder trucks throughout the more built-up areas of the City.

2.3.2 Special Hazard Risks

The City has several hundred businesses that use or resell hazardous materials. Examples are gasoline stations and dry cleaners. These businesses are highly regulated by the building, fire and environmental codes. Other businesses in the industrial parks use chemicals in the fabrication of electronic and circuit board devices. The largest businesses using larger quantities of hazardous materials are called "target hazards" in that they receive a higher level of inspection activities and the responding firefighters have plans for their business and technical inventories.

San Diego Fire-Rescue and the County of San Diego are the lead agencies in a countywide Joint Powers Authority (JPA) regional hazardous materials response team for serious incidents. All San Diego Fire-Rescue firefighters are trained to the level of "first responder" for hazardous materials emergencies.

2.3.3 Wildland Fire Risk

The wildfire threat in the City of San Diego is significant, as the community is all too painfully aware. Many of the City's edge neighborhoods are exposed to wildland fuels and upslope terrain, all of which combine to pose a real danger. To combat this risk, the City works closely with its mutual aid partner fire departments while training and equipping its firefighters for wildland firefighting in San Diego County conditions.

The Department has extensively mapped and identified high hazard wildfire areas resulting in 90 plus percent of the City being in the Very High Fire Hazard Severity Zone for wildfire threat. This includes over 900 linear miles of canyon rim that traverse behind homes and businesses.

The City has adopted new, best practice codes for fuel reduction safety zones and fire resistant construction standards. Even so, given the risks and quantity of exposed homes, the City has to field an extensive and layered wildfire response system, including state of the art helicopters.

To provide ground-based firefighting resources for wildfires, the Department operates 12 brush fire apparatus and 2 water tenders capable of off-road travel. During normal fire weather conditions, these units are "cross staffed" by crews assigned to structure fire engines.

Occasionally, during extreme fire weather conditions the brush apparatus receive dedicated staffing with personnel on overtime.

2.3.4 Desired Outcomes

A response system can be designed with staffing and station locations to accomplish desired outcomes. An outcome example is, "confine a residential fire to the room of origin." That outcome requires a more aggressive response time and staffing plan than "confine the fire to the building of origin, to keep it from spreading to adjoining structures." As such, fire deployment planning takes direction from policy makers as to the outcomes desired by the community.

Given the Fire-Rescue Department's current response time goals revolving around the first-due unit having a travel time of 4 minutes and the first alarm having a travel time of 8 minutes and its Class 3 fire insurance classification rating, the City has, in effect, adopted a structure fire goal of deploying a significant force to building fires to contain the fire near the room, or compartment, of origin, if the fire is small to modest when first reported. By delivering paramedics via fire engines and ambulances, the City has committed to a higher level of emergency medical care that is typical in urban areas in California.

2.4 STAFFING – WHAT MUST BE DONE OVER WHAT TIMEFRAME TO ACHIEVE THE STATED OUTCOME EXPECTATION?

The next step in the Standards of Response Cover process is to take the risk information above and review what the firefighting staffing is, and what it is capable of, over what timeframe.

Fires and complex medical emergencies require a timely, coordinated effort in order to stop the escalation of the emergency. Once the tasks and time to accomplish them to deliver a desired outcome are set, travel time, and thus station spacing, can be calculated to deliver the requisite number of firefighters over an appropriate timeframe.

2.4.1 Offensive vs. Defensive Strategies in Structure Fires Based on Risk Presented

Most fire departments use a strategy that places emphasis upon the distinction between offensive or defensive methods. These strategies can be summarized:

> It is important to have an understanding of the duties and tasks required at a structural fire to meet the strategic goals and tactical objectives of the Fire Department response. Firefighting operations fall in one of two strategies – **offensive or defensive.**
>
> Offensive strategy is characterized primarily by firefighters working **inside** the structure on fire. This strategy is riskier to firefighters but much more effective for performing rescues and attacking the fire at its seat.

Defensive strategy is characterized by firefighters working **outside** the structure on fire. This strategy is generally safer for firefighters; however, it also means no rescues can be performed and the building on fire is a total loss. Risks to firefighters take into account:

We may risk our lives a lot to protect savable lives.

We may risk our lives a little to protect savable property.

We will not risk our lives at all to save what is already lost.

Considering the level of risk, the Incident Commander will choose the proper strategy to be used at the fire scene. The Incident Commander must take into consideration the available resources (including firefighters) when determining the appropriate strategy to address any incident. The strategy can also change with conditions or because certain benchmarks are achieved or not achieved. For example, an important benchmark is "all clear," which means that all persons who can be saved have been removed from danger or placed in a safe refuge area.

Once it has been determined that the structure is safe to enter, an **offensive** fire attack is centered on life safety of the occupants. When it is safe to do so, departments will initiate offensive operations at the scene of a structure fire. Initial attack efforts will be directed at supporting a primary search – the first attack line will go between the victims and the fire to protect avenues of rescue and escape.

The decision to operate in a **defensive** strategy indicates that the offensive attack strategy, or the potential for one, has been abandoned for reasons of personnel safety, and the involved structure has been conceded as lost (the Incident Commander makes a conscious decision to write the structure off). The announcement of a change to a defensive strategy means all personnel will withdraw from the structure and maintain a safe distance from the building. Officers will account for their crews. Interior lines will be withdrawn and repositioned. Exposed properties will be identified and protected.

For safety, federal and state Occupational Health and Safety Regulations (OSHA) mandate that firefighters cannot enter a burning structure past the incipient or small fire stage without doing so in teams of 2, one team inside and one team outside, ready to rescue them. This totals a minimum of 4 firefighters on the fireground to initiate an interior attack. The only exception is when there is a known life inside to be rescued. This reason, along with the fact that a four-person company can perform more tasks simultaneously and 25 percent more efficiently than a three-person company, is why NFPA Deployment Standard 1710 for career fire departments recommends four-person company staffing on engines (pumpers) as well as on ladder trucks. For these reasons, this is also the staffing policy of San Diego Fire-Rescue.

Many fire department deployment studies using the Standards of Response Coverage process, as well as NFPA guidelines, arrive at the same fact – that an average (typically defined by the NFPA as a modest single-family dwelling) risk structure fire needs a minimum of 16 firefighters, *plus* one on-scene incident commander.

The NFPA 1710 recommendation is that the first unit should arrive on-scene within 6:20 minutes/seconds of call receipt (1-minute dispatch, 80-seconds company turnout, and 4-minute travel), 90 percent of the time. The balance of the units should arrive within 10:20 minutes/seconds of call receipt (8-minute travel), 90 percent of the time, if they hope to keep the fire from substantially destroying the building. (The NFPA recommendation of 1-minute dispatch time is generally attainable; the 80-second company turnout time is generally unattainable considering the time it takes firefighters to don the required full personal protective equipment.)

For an extreme example, to confine a fire to one room in a multi-story building requires many more firefighters than in a single-story family home in a suburban zone. The amount of staffing needed can be derived from the desired outcome and risk class. If the community desires to confine a one-room fire in a residence to the room or area of origin, that effort will require a minimum of 16 personnel plus incident commander. This number of firefighters is the minimum needed to safely conduct the ***simultaneous*** operational tasks of rescue, fire attack, and ventilation plus providing for firefighter accountability and incident command ***in a modest, one fire hose line house fire***.

A significant fire in a two-story residential building or a one-story commercial or multi-story building would require, at a minimum, an additional two to three engines and an additional truck and chief officer, for upwards of 17 plus additional personnel. As the required fire flow water gallonage increases, concurrently the required number of firefighters increases. Simultaneously, the travel distance for additional personnel increases creating an exponential impact on the fire problem. A typical auto accident requiring multiple-patient extrication or other specialty rescue incidents will require a minimum of 10 firefighters plus the incident commander for accountability and control.

2.4.2 Daily Unit Staffing in the City

Below is the current and typical <u>minimum</u> daily unit firefighter staffing assignment in the City:

<u>Units and Daily Firefighter Staffing Plan</u>

<u>Minimum</u> Per Unit			Extended
47 Engines @	4	Firefighters/day	188*
12 Ladder Trucks @	4	Firefighters/day	48
1 Medium Rescue Unit @	4	Firefighters/day	4
3 Aircraft Fire Rescue @	3/2	Firefighters/day	8
1 Med. Lift Helicopter @	3	Firefighters/day	3
0 24-hr Ambulances @	0	Firefighter/paramedics	0
1 Shift Commander @	1	Per day for command	1
7 Battalion Chiefs @	1	Per day for command	7
		Total 24/hr Personnel:	259

** In February 2010 the Department had to close or brownout 8 engines per day due to economic challenges. This results in a reduction of up to 32 primary firefighters per day.*

To compliment the above "baseline" staffing for primary firefighting and rescue, the Department also staffs these specialty units 24/7/365 with dedicated staffing, or "cross-staffed" where the engine crew switches to the specialty unit when it is needed.

- Metro Arson Strike Team (MAST)
  - 1 Captain and 1 Engineer – dedicated 24/7/365
- Explosive Device Team (EDT)
  - 1 40-hour Technician, 10 other technicians from crossed-staffed units
- 24-hour ambulances
  - All non-Firefighter personnel
- 12-hour ambulances
  - All non-Firefighter personnel
- Hazardous Incident Response Team
  - Cross-staffed with 1 Engine crew
- STAR (Special Tactical and Response) Tactical Medic Team
  - Cross-staffed with 2 Firefighter-Paramedics
- Heavy Rescue
  - US&R 41 cross-staffed with E41 crew

- Swiftwater Team (OES/Cal EMA)
  - Life Guard and Firefighter cross-staffed.

In addition to the Department's daily staffing listed above, San Diego Fire-Rescue and the surrounding fire departments operate under an automatic aid and boundary drop "closest unit" agreement managed by five fire dispatch centers via a Regional computer interface beginning in Spring 2011. This policy means that edge area building fires receive a mix of City and automatic aid partner agencies. For modest fires in the edges areas of the City, this system not only helps by providing the units in the least amount of time without regard to jurisdiction, but also leaves other City units available for back-to-back or simultaneous calls for service in other areas.

2.4.3 Staffing Discussion

If the City provides fire services at all, safety of the public and firefighters must be the first consideration. Additionally, the chief officers, as on-scene incident commanders, must be well trained and competent, since they are liable for mistakes that violate the law. An under-staffed, poorly led, token force will not only be unable to stop a fire, it also opens the City up for real liability should the Fire Department fail.

As stated earlier in this section, national norms indicate that 16 or so firefighters, including an incident commander, are needed at significant building fires if the expected outcome is to contain the fire to the room of origin and to be able to simultaneously and safely perform all the critical tasks needed. The reason for this is that the clock is still running on the problem after arrival, and too few firefighters on-scene will mean the fire can still grow faster than the efforts to contain it. Chief officers also need to arrive at the scene in a timely manner in order to intervene and provide the necessary incident command leadership and critical decision making to the organization.

To meet its goal of sending an Effective Response Force of a minimum of 3 engines, 1 ladder truck and 1 battalion chief to modest building fires, the City has to send 17 personnel or 7 percent of its on-duty force. Then, to augment its staffing above 16, it has to send additional units via greater alarms and/or mutual aid. Given the occurrence of building fires in the City at approximately 421 per year, or about 35 per month, the City can typically field enough firefighters at a modest building fire. However, as the mapping portion of this study will show, delivering an effective first alarm in the northern City is very difficult as compared to the downtown core where the station spacing is tighter.

2.4.4 Company Critical Task Time Measures

In order to understand the time it takes to complete all the needed tasks on a moderate residential fire and a modest emergency medical rescue, the Department staff provided information using their standard operating procedures to demonstrate how much time the entire operations take.

The following tables start with the time of fire dispatch notification and finish with the outcome achieved. There are several important themes contained in these tables:

- These results were obtained under best conditions, in that the day was sunny and moderate in temperature. The structure fire response times are from actual incident records, showing how units arrive at staggered intervals in the core of the City. The actual drills were conducted in real buildings at the Department's Fire Training Center.
- It is noticeable how much time it takes after arrival or after the event is ordered by command to actually accomplish key tasks to arrive at the actual outcome. This is because it requires firefighters to carry out the ordered tasks. The fewer the firefighters, the longer some task completion times will be. *Critical steps* are highlighted in ***grey*** in the tables.
- The time for task completion is usually a function of how many personnel are ***simultaneously*** available so that firefighters can complete some tasks simultaneously.
- Some tasks have to be assigned to a minimum of two firefighters to comply with safety regulations. An example is that two firefighters would be required for searching a smoke filled room for a victim.

The following tables of unit and individual duties are required at a first alarm fire scene at a typical single-family dwelling fire. This set of duties is taken from Department operational procedures. This set of needed duties is entirely consistent with the usual and customary findings of other agencies using the Standards of Response Cover process and that found in NFPA 1710 or in CAL-OSHA regulations on firefighter safety. No conditions existed to override the OSHA 2-in/2-out safety policy.

Shown below are the critical tasks for a typical single-family house fire with a room burning on the second floor. The response force is three engines, one ladder truck, and one battalion chief responding for a total of 17 personnel:

Critical Tasks – Structure Fires

Structure Fire Incident Tasks	Time From Arrival 1st Engine	Total Reflex Time
Pre-arrival time of dispatch, turnout and travel time at desired goal point		07:00
1st engine on-scene	00:00	
Conditions report	02:37	
Supply line charged	03:00	
Charged line to 2nd Floor	03:48	
Rapid Intervention Team Established	04:40	11:40
Forced Entry	06:09	
Second engine arrival	03:38	
Third engine arrival	05:45	
Back-up attack line at door, charged	06:15	
Water on Fire	07:04	14:04
Ladder Truck arrival	07:56	
Primary Search for victims	08:10	15:10
Ladders positioned	11:05	
Utilities secured	12:45	
Positive pressure ventilation	12:32	
Secondary search complete	15:53	22:00
Check for fire extension in hidden spaces	15:58	
Fire out / incident under control	**16:45**	**23:45**

The above duties grouped together to form an *effective response force or first alarm assignment*. Remember that the above discrete tasks must be performed simultaneously and effectively to achieve the desired outcome. Just arriving on-scene does not stop the escalation of the emergency. Firefighters accomplishing the above tasks do, but as they are being performed, the clock is still running, and it has been since the emergency first started.

Fire spread in a structure can double in size during its free burn period. Many studies have shown that a small fire can spread to engulf the entire room in less than 4 to 8 minutes after open burning has started. Once the room is completely superheated and involved in fire (known as flashover), the fire will spread quickly throughout the structure and into the attic and walls. For this reason, it is imperative that fire attack and search commence before the flashover point occurs, if the outcome goal is to keep the fire damage in or near the room of origin. In addition, flashover presents a serious danger to both firefighters and any occupants of the building.

For comparison purposes, the critical task table below reviews the tasks needed on a typical auto accident rescue. The situation modeled was a one-car collision with one patient. The driver required moderate extrication with power tools and the vehicle was upright with no fuel hazards. One engine, one ladder truck, one ambulance and one battalion chief responded with a total of eleven (11) personnel.

Critical Tasks – Auto Incident – 1 Vehicle, 1 Patient

Vehicle Extrication Critical Tasks	Time From Arrival 1st Engine	Total Reflex Time
Pre-arrival time of dispatch, turnout and travel time at desired goal point		07:00
Engine on scene	00:00	
Size up and upgrade to rescue response	00:15	
Initial report	02:00	
Vehicle stabilization initiated	02:00	09:00
Protection firefighting line in place	02:25	
Ladder Truck arrival	02:00	
Patient assessed, vital signs obtained	03:48	10:48
Door forcibly opened and secured	04:48	
Patient on backboard and removed	05:40	13:40
Patient on gurney	06:00	
Patient under ambulance crew care and depart scene	07:00	14:00

The table above shows typical task times for good patient care outcomes. These patient care times and steps are consistent with San Diego County EMS Agency patient care protocols and would provide positive outcomes where medically possible.

2.4.5 Critical Task Measures Evaluation

What does a deployment study derive from a response time and company task time analysis? The total completion times above to stop the escalation of the emergency have to be compared to outcomes. We know from nationally published fire service "time vs. temperature" tables that after about 4 to 8 minutes of free burning a room fire will grow to the point of flashover where the entire room is engulfed, the structure becomes threatened and human survival near or in the fire room becomes impossible. We know that brain death begins to occur within 4 to 6 minutes of the heart having stopped. Thus, the effective response force must arrive in time to stop these catastrophic events from occurring.

The response and task completion times discussed above show that the residents of the City are able to expect positive outcomes and have a better than not chance of survival in a *modest* fire or medical emergency, when the first responding units *are* available in 7 minutes or less total response time.

The point of the tables above is that mitigating an emergency event is a team effort once the units have arrived. This refers back to the "weight" of response analogy. If too few personnel arrive too slowly, then the emergency will get worse, not better. Control of the structure fire incident still took 16:45 minutes/seconds after the time of the first unit's arrival, or 23:45 minutes/seconds from fire dispatch notification. The outcome times, of course, will be longer, with less desirable results, if the arriving force is later or smaller.

The quantity of staffing and the time frame it arrives in can be critical in a serious fire. As the risk assessment portion of this study identified, the City's building stock is diverse and includes large and multi-story buildings, any of which can slow the firefighting times as personnel and tools have to be walked to upper floors. Fires in these buildings could well require the initial firefighters needing to rescue trapped or immobile (the very young or elderly) occupants. If a lightly staffed force arrives, they cannot simultaneously conduct rescue and firefighting operations.

In EMS trauma incidents, the patient is initially being assessed within 10:48 minutes/seconds total reflex time and is able to be transported within 14 minutes. These times are good for trauma patients, when all the needed units can arrive by minute 7, which is not always possible at the outer perimeter areas of the City, or when multiple calls for service occur.

Fires and complex medical incidents require that the other needed units arrive in time to complete an effective intervention. Time is one factor that comes from ***proper station placement***. Good performance also comes from ***adequate staffing***. On the fire and rescue time measures above, the City can do a good job, in terms of time, on one or two moderate building fires and several routine medical calls at once. This is typical for metropolitan departments that staff 4-person companies for average, routine emergencies. However, major fires and medical emergencies where the closest unit is not available to respond ***will*** challenge the City response system to deliver good outcomes, so the City is co-dependent for severe emergency coverage with its neighbors. This factor **must** be taken into account when we look at fire station locations. Operating as a "single" regional system is a great, cost-effective idea, as long as all of the partners maintain their levels of service.

Previous critical task studies conducted by Citygate, the Standard of Response Cover documents reviewed from accredited fire departments, and NFPA recommendations all arrive at the need for 16+ firefighters plus a command chief arriving within 11 minutes (from the time of call) at a room and contents structure fire to be able to ***simultaneously and effectively*** perform the tasks of rescue, fire attack and ventilation.

If fewer firefighters arrive, what from the list of tasks mentioned would not be done? Most likely, the search team will be delayed, as will ventilation. The attack lines only have two firefighters, which does not allow for rapid movement above the first floor deployment. Rescue is done with only two-person teams; thus, when rescue is essential, other tasks are not done in a simultaneous, timely manner. Remember what this report stated in the beginning: effective deployment is about the **speed** *(travel time)* and the **weight** *(firefighters)* of the attack.

Yes, 17 initial firefighters (3 engines, 1 ladder truck, 1 battalion chief) can handle a moderate risk house fire (especially on the first floor). An effective response force of even 17 will be seriously slowed if the fire is above the first floor in a low-rise apartment building or commercial/industrial building.

When the on-duty staffing is stretched thin, the City can bring in greater alarms or automatic or mutual aid equipment, but from a distance and under the assumption that the aiding department is not already busy.

2.5 CURRENT STATION LOCATION CONFIGURATIONS

The City is served today by 47 fire stations.[1] As part of this fire services study, it is appropriate to understand what the existing stations do and do not cover, <u>if</u> there are any coverage gaps needing one or more stations, and what, if anything, to do about them as the City continues to evolve. In brief, there are two geographic perspectives to fire station deployment:

- Distribution – the spreading out or spacing of first-due fire units to stop routine emergencies.
- Concentration – the clustering of fire stations close enough together so that building fires can receive enough resources from multiple fire stations quickly enough. This is known as the Effective Response Force or commonly the "first alarm assignment" – the collection of a sufficient number of firefighters on-scene, delivered within the concentration time goal to stop the escalation of the problem.

To analyze first-due and first alarm fire unit travel time coverage for this study, Citygate used a geographic mapping tool called *FireView* that can measure travel time distance over the street network. Citygate ran several deployment map studies and measured their impact on various parts of the City.

The maps (found in Volume 2 of this study) display travel time using prior Department incident data to adjust the normal posted speed limits per type of street to those more reflective of slower fire truck travel times. The travel time measures used in this analysis are reflective of current City goals and national best practice recommendations. These are 4 minutes travel time for first-

[1] Does not include Lindberg Field, the helicopter base and assumes normal staffing for the eight stations without a fire engine crew due to brownouts.

due units for good suburban outcomes. For the first alarm, multiple-unit coverage, travel time is based on 8 minutes. When one minute is added for dispatch reflex time and two minutes for company notification times, the maps then effectively show the area covered within 7 minutes for first-due units and 10:30 minutes for a first alarm assignment from the time the 911-call is received in the fire dispatch center.

An additional measure used was the Insurance Service Office 1.5-mile recommendation for first-due fire companies and 2.5-mile service for second-due companies and ladder trucks. 1.5 miles driving distance equates to 3.5 to 4 minutes travel time over the road network.

The map set in this study does not show the coverage from the closest, nearby automatic aid fire stations from the career-staffed departments around the City of San Diego. The first goal is to determine if the City can substantially cover itself with its fire stations in appropriate response times. If so, then the automatic aid coverage is useful to fill in edge area gaps and be able to provide back-up unit response when City units are on other incidents. As Citygate's study for the County of San Diego determined, aid from other fire departments only replaces the need for initial San Diego City based coverage in very few, small locations on the City limits.

Note – given the size of the City, and to allow for greater local area detail, each map theme is done twice, once in a northern and once in a southern view.

Map Sets #1 through #16 are a view of the baseline or "as is" situation. These provide a basis for Map Sets #17 through #19 that show response coverage gaps. Finally, geographic measures of road miles covered will be reviewed in data table to understand mathematically in addition to the visual maps, what is and is not covered at different response time measures.

Map #1 – Existing Fire Station Locations

This first map shows the City and its current fire stations. This map view, then, is important to remember as later maps in the set display the fire station coverage areas. The different station symbols show the type of primary apparatus assigned to each station.

Map #2 – Risk Assessment

Map Set #2A displays the locations of the higher fire flow buildings as calculated by the Insurance Service Office (ISO) over a broad measure of population density. Most of these buildings are along the major road corridors in commercial and industrial areas due to zoning. Many, but not all of the commercial areas are also in the urban population density zone. There are two exceptions to this in the north City where large business parks are in suburban population density areas. These higher fire flow sites are the buildings that must receive a timely effective first alarm force to serious fires.

Map Set #2B is a different measure of risk – wildland fire hazards severity zones. This map again shows the higher fire flow building sites along with the very high wildfire risk zones as determined by San Diego Fire-Rescue and CAL FIRE staffs. This view demonstrates that the wildfire threat to be protected against is not just a danger to homes, but also businesses and business parks in several areas throughout the entire City.

Map #3 – First-Due Unit Distribution – Existing Stations (4-Minute Travel)

These maps show in green colored street segments the *distribution* or first-due response time for each current City fire station per a desirable response goal of 4 minutes travel time. Thus, the computer shows how far each company can reach within 7 minutes Fire Department *total* response time from the time of the fire communications center receiving the call. Therefore, the limit of color per station area is the time an engine could reach the 4-minute travel time limit, ***assuming*** they are in-station and encounter no unusual traffic delays. In addition, the computer uses speed limits per roadway type that are slowed by actual fire unit travel times. Thus, the projection is a very close modeling of the real world.

A goal for a city as developed as the City of San Diego could be to cover 90 percent of the geography containing the highest population densities with a first-due unit coverage plan based on a goal measure statement to deliver acceptable outcomes. This would only leave the very hard-to-serve outer edge areas with longer coverage times, and depending on the emergency, with less effective outcomes. There should be some overlap between station areas so that a second-due unit can have a chance of an adequate response time when it covers a call for another station. The outer perimeter areas are hard to serve, and in many cases, cost-prohibitive to serve for a small number of calls for service.

As can be seen in this measure, the shape of the City is very hard to serve; especially since a grid type road network does not exist. However, due to very challenging topography and the resultant non-grid street network in much of the City, many of the station areas only have partial coverage at 4 minutes of travel. This is especially true outside of the downtown core.

The message to be taken from this map is that it would be very challenging for the City to improve travel time coverage without adding fire stations. At the end of this set of map descriptions, the actual miles covered and the size of the response gaps will be discussed with a data table.

Map #4 – ISO Engine Coverage Areas – Existing City Stations

These map exhibits display the ISO requirement that stations cover a 1.5-mile distance response area. Depending on the road network in a department, the 1.5-mile measure usually equates to a 3- to 4-minute travel time. However, a 1.5-mile measure is a reasonable indicator of station spacing and overlap. As with the 4-minute drive time map, many, but not all of the developed road areas of the City are served within a 1.5-mile distance from the existing fire stations. As the 4-minute map projected, the areas in the difficult to serve street network/topography areas and newer growth areas are not.

Stated this way, the two models of 4-minute and 1.5-mile travel represent the best and least coverages likely and both state that some of the developed areas are just beyond these measures.

Map #5 – Concentration (Effective Response Force)

These map exhibits show the *concentration* or massing of fire companies for serious fire or rescue calls. Building fires, in particular, require 16+ firefighters arriving within a reasonable time frame to work together and effectively to stop the escalation of the emergency. Otherwise, if too few firefighters arrive, or arrive too late in the fire's progress, the result is a greater alarm fire, which is more dangerous to the public and the firefighters.

The concentration map exhibits look at the Department's ability to deploy a minimum of three of its engines, one ladder truck and one battalion chief to building fires within 8 minutes travel time (10:30 minutes/seconds total Fire Department response time from the 911-call receipt). This measure ensures that a minimum of 16 firefighters and one battalion chief can be deployed at the incident to work ***simultaneously*** and effectively to stop the spread of a modest fire in a house or small commercial building.

The green color in the map shows the area where the City's current fire deployment system should deliver the initial effective response force. Streets without the green highlights do not have three engines, one ladder truck or the battalion chief in 8 minutes travel time.

As can be seen, due to the spacing of the City fire stations, an effective response force can be gathered in much of the City core. This coverage is not possible in northern and southern areas unless a cluster of stations exists.

The next few maps will "take apart" the full first alarm Map #5 and show the coverages of the different types of units, which makes up an effective response force.

Map #6 – Multiple Engine Coverage

In Map Set #6, the coverage for the three needed engines is displayed at 8 minutes travel. As can be seen, this coverage is a little better than in Map Set #5. This occurs because the City has more primary fire engines than ladder trucks and chief officers. The lack of these specialty units in some areas limits the coverage area of the first alarm team as seen in Map Set #5.

Map #7 – Ladder Truck Coverage

Map Set #7a measures the ladder truck coverage at an 8-minute travel time goal. As can be seen in both northern and southern views, there are several pockets and in some cases, almost entire station areas that do not receive a ladder trick within 8 minutes.

Map Set #7b measures the ISO 2.5-mile driving *distance* measure for ladder trucks. The result is similar and correlates with the 8-minute time map in that not all of the developed road segments are covered within 2.5 miles of a ladder truck location.

Completing the coverage of ladder trucks at 8 minutes travel will require the addition of four (4) more trucks.

Map #8 – Battalion Chief Coverage

Measured here is the battalion chief coverage for the first alarm at 8 minutes travel. As with ladder trucks, outside of the urban core, battalion chief coverage is incomplete in several developed areas.

Completing the coverage of incident command battalion chiefs at 8 minutes travel will require the addition of two (2) more chief units.

Map #9 – All Incident Locations

This is an overlay of the exact location for all Fire Department incident types for two years from January 2008 through December 2009. It is apparent that there is a need for Fire Department services in all of the station areas of the City. It also should be noted that call for service volumes are higher where the population densities and human activity are the highest. This is normal, as people drive calls for service more than do open space areas. Also shown on this map are incidents on freeways and to neighboring fire departments. Wildfire responses are plotted to the nearest paved road address location.

Map #10 – EMS Incident Locations

This map further breaks out only the emergency medical and rescue call locations. Again, with the majority of the calls for service being emergency medical, almost all streets need Fire Department services in one year's time.

Map #11 – All Fire Type Locations

This map identifies the location of all fires in the City. All fires include any type of fire call from auto to rubbish to building. There are obviously fewer fires than medical or rescue calls. Even given few fires, it is evident that all first-due station areas experience fires with areas having the greatest population density, having the most fires.

Map #12 – Structure Fire Locations

This map is similar to the previous map, but only displays structure fires for one year. While the structure fire count is a smaller subset of the total fire count, there are two meaningful findings to this map. There are still structure fires in every first-due fire company area. The location of many of the building fires parallels the higher risk and older building type commercial areas in the more built-up areas of the City. Fires in the more complicated building types must be controlled quickly or the losses will be very large.

Map #13 – All Incident Location Hot Spots

This map set examines, by mathematical density, where clusters of incident activity occurred. In this set, all incidents are plotted by high-density workload. For each density measure, the darker the color, the greater the quantity of incidents in a small area. This type of map makes the location of frequent workload more meaningful than just mapping the dots of all locations as done in Map Set #9.

Why is this perspective important? Overlap of units and ensuring the delivery of a good concentration for the effective response force. When we compare this type of map with the concentration map, we want the best concentration of unit coverage (first alarm) to be where the greatest density of calls for service occurs. For the City, this mostly occurs in the highest population density areas.

Map #14 – EMS Incident Location Densities

This map set is similar to Map Set #11, but only the medical and rescue hot spots of activity are plotted. The clusters of activity look very similar to the all-incident set in Map #13 because medical calls are such a large part of the total.

Map #15 – All Fire Location Densities

This map set shows the hot spot activity for all types of fires. While again the call-for-service density is highest where there is more population density, there are also fire incidents of some type in every populated area and on the roads connecting clusters of population activity. Even auto fires at the side of a freeway need to be suppressed quickly or the risk of the fire spreading to and causing a serious wildfire is very real.

Map #16 – Structure Fire Densities

This map only shows the structure fire workload by density. Here, the activity clusters are smaller given the lower number of incidents, but are still spread across many areas of the City.

2.5.1 Deployment Improvement Needs Analysis

As these baseline coverage maps were understood, Citygate worked with the Department staff to identify and test the impacts of possible deployment improvement scenarios. The next series of maps and data tables will explain the best-fit choices identified.

Citygate started by understanding the Department's existing fire station master plan for new or re-built sites. A few are already in the capital improvement budget pipeline. Given the very good fire station site identification work already done by fire management staff, we compared Citygate's response gap model to possible fire station locations. In some cases where more than one site per gap area was possible, Citygate choose the best-fit site that provided the most road miles of coverage in the fewest minutes of travel. In some cases, we did not use a fire-identified site as we determined the area was just too small for a fire station when compared to other options. This will be explained in detail below.

Map #17 – 4 and 5-minute First-Due Unit Gap Analysis – Existing Stations

This map set changes the streets color to red to better contrast against response time areas. The green streets are the current 4-minute travel time coverage. The blue street segments extend the travel time coverage into the gaps by one additional minute, or the 5th minute of travel. As can be seen, even by a 5th travel minute not all the streets are covered. Smaller gaps are backfilled by the 5th minute.

A natural question becomes, at what minute of travel does the existing station network reach 90 percent coverage? The table below shows the public (not military or private) road miles covered for each measure:

Public Road Miles Covered for Each Measure

	Existing Station Coverage	
Travel Time	**Miles**	**Percent Covered**
4 Minute	2,329	60.32%
5 Minute	3,146	81.50%
6 Minute	3,544	91.80%
Total	**3,860**	**100.00%**

As can be seen, the 5th minute of travel does increase coverage 21.5 percent which is significant. Stated this way, if an area is outside the green coverage on the map, is the gap a 1-minute or 5- or 10-minute gap? The answer is that many areas are just beyond the 5th minute of coverage.

More complete 90 percent coverage is not attained until the 6th minute of travel. The road network outside of the urban core with a traditional, "right angle" grid street network is very hard to efficiently serve. In addition to many newer, post-war areas being designed with curvilinear streets, and dead end one-way in/out subdivisions, there are many natural barriers in the City due to the mesa and canyon topography in coastal southern California.

Map #18 – Prioritization of Filling the Gaps Identified

This pair of maps displays the gaps beyond the 4th and 5th minute, with priority to improve numbers placed in black on the top 15 gaps. The **added** station coverage is shown as dark and light blue. A number of factors went into this prioritization and they will be discussed in several sections of this report, including the prior incident response statistics analysis.

Using just geographic coverage measures, this table displays how much more road mile coverage each future fire station site adds cumulatively to the citywide coverage measure. The priority numbers take the data from this table into consideration, but <u>later</u> in the report will be further refined and re-sorted with response statistics insights.

Added Road Mile Coverage Per Additive Station

Station Site	Added Miles @ 4 Minutes	% Covered Increase
Skyline	31.62	61.16%
Serra Mesa	34.09	62.04%
Mission Bay / Pacific Beach	37.63	63.01%
Paradise Hills	31.79	63.84%
Home Ave	24.79	64.48%
Navajo	23.64	65.09%
Encanto	18.93	65.58%
Mission Valley	13.04	65.92%
Torrey	31.24	66.73%
USCD	23.51	67.34%
Liberty Station	24.41	67.97%
West Mission Vly	18.76	68.46%
College	16.07	68.87%
Stresemann / Governor	23.81	69.49%
Tierrasanta	14.03	69.85%
Scripps Miramar	21.35	70.41%
Linda Vista	8.56	70.63%
Research Park	10.58	70.90%
Mira Mesa	13.55	71.25%
University City	10.33	71.52%
South Park	8.75	71.75%
Kensington	3.68	71.84%
Black Mountain Ranch	3.75	71.94%
San Pasqual	7.68	72.14%
East Village	0.84	72.16%
East Otay	6.28	72.32%
Rancho Encantada	3.00	72.40%
Bayside	0.00	72.40%

The road miles covered per added fire station in the table above shows a very difficult situation facing the City. After about 17 or so stations are added, each remaining site only adds 10 miles of coverage or less at the 4th minute. This occurs as the added stations also overlap coverage of existing stations and do not add more coverage to "gap" miles. The best example of this is the

Bayside station downtown west of the railroad tracks, which improves response time due to traffic disruption and availability for simultaneous calls, but it is not needed to cover miles beyond the 4th minute of coverage from other stations.

In fact, even if 27 more stations were added to increase coverage at the 4th minute of travel, only 72 percent of the road network is covered. The reason for this is that serving all of the curvilinear, dead end neighborhood street system outside of the urban core, is too expensive, as the last added stations produce almost no increase in coverage.

An analogy would be that if the coverage problem was the shape of a human hand or blood vessels in the body, a few stations could easily cover the palm or core areas. Pushing into the fingers or legs covers more, but only partway out. To cover to the finger tips or toes requires many more stations to cover increasingly small areas.

As in the previous table, how does the coverage look if more stations are added **and** the travel time goal is increased one-minute to five travel minutes, reflecting the topography challenge in the San Diego region?

The table below shows the marked difference in additive coverage. First, the existing stations cover more in the 5th minute of travel, as do the added stations. By pushing out the existing coverage one minute and then filling in the largest remaining gaps, coverage to near 90 percent is possible for a more effective number of stations.

Additive Coverage Measures Using 5 Minutes Travel Time

GIS Priority	Locations	5-Minute Travel Added Miles	Coverage % Increase	5-min Gap Population	5-min Gap Incidents	Gap Avg Pop Density
1	Mission Bay/Pacific Beach	38.77	83.87%	19,011	1,935	5-25,000
2	Torrey	31.40	84.69%	11,946	567	5-10,000
3	Serra Mesa	31.11	85.49%	15,646	1,553	5-10,000
4	Stresemann/Governor	24.07	86.12%	8,670	597	5-10,000
5	Encanto	17.35	86.57%	9,715	710	0-10,000
6	Skyline	16.22	86.99%	19,803	1,384	**10-20,000**
7	UCSD	15.45	87.39%	10,248	1,283	10-15,000
8	Paradise Hills	12.78	87.72%	11,486	787	**10-20,000**
9	Mira Mesa	11.13	88.01%	1,437	393	5-10,000
10	Liberty Station	9.90	88.26%	2,117	1,127	10-20,000
11	University City	9.84	88.52%	4,753	456	0-10,000
12	San Pasqual	9.51	88.76%	21	130	0-5,000
13	Home Ave	8.45	88.98%	10,271	683	**5-20,000**
14	College	8.08	89.19%	6,729	403	**5-25,000**
15	Scripps Miramar	7.01	89.37%	4,867	160	0-5,000
16	East Otay	6.80	89.55%	634	140	0-5,000
17	Linda Vista	3.53	89.64%	6,371	501	5-10,000
18	Black Mountain Ranch	3.35	89.73%	1,384	51	0-10,000
19	Mission Valley	3.04	89.81%	16,174	1,517	**5-25,000**
	Totals:	**267.79**		**161,283**	**14,377**	

However, even with this 5-minute travel model, the additive miles covered per station drops quickly after the first nine stations are added.

More analysis measures were added to this model, to better understand what besides road miles were to be covered by each added station. The geographic model allowed the measurement of how many prior year incidents from the data set were in the gap area, <u>beyond</u> the 4th travel minute from the existing stations. Also measured were the total population in the gap area and what each area's population density per square mile was. These allow different comparative rankings to determine site weighting priority and the additive impacts of several sites. For example, if all 19 gaps were filled:

- Coverage at the 5th minute increases to 90 percent, a gain of 1-minute over the existing system 6th minute coverage;

- Another 161,283 residents are covered within 5 minutes of a neighborhood resource, which is the equivalent of adding into coverage more than the population of Escondido.
- Another 14,377 calls for service are reached in the 5th minute, not the 6th or longer. This is more incidents than found in some suburban cities.

As can also be seen, five gap areas have urban to metropolitan population densities per square mile with high call for service counts. If only the first nine geographically largest gaps were filled with a station, the results would be:

- Coverage at the 5th minute increases to 88 percent.
- Another 107,962 residents are covered within 5 minutes of a neighborhood resource, which is the equivalent of adding into coverage more than the population of Carlsbad.
- Another 9,209 calls for service are reached in the 5th minute. This is more incidents than found in smaller suburban cities and, when averaged daily, increases service 25 times per day, or once per hour.

The addition of nine well-placed resources, along with a model balanced to deliver 5 minutes of travel time coverage, significantly increases public service.

After the review of response statistics in the next section of this report, these geographic coverage facts will be considered with current workload issues to determine the final site priorities as shown on Map Set #18.

Map 19 – Gaps to Population Density Analysis

This set of maps allowed the Citygate and Department management team to review the population densities within each 4+ minute response gap. As the data table discussed above measured, there is quite a divergence of population densities across the gap areas. When these are compared to the incidents not covered in the 5th minute of travel in the same table, the relationship of population density to calls for service is shown. For the most part, people, not things, generate the need for emergency services.

2.6 MAPPING MEASURES EVALUATION

Based on the above mapping evaluation, Citygate offers the following findings:

Finding #2:	The City of San Diego is very difficult to cover efficiently with a cost-effective quantity number of fire stations due to the non-grid street network and very difficult coastal topography with canyons, mesas and other natural barriers.

Finding #3:	Much of the City is substantially developed and is of urban and suburban population densities. Given the populations and diverse risks in the developed areas, the City should have fire service deployment goals to deliver an urban level of first-due fire unit coverage, which would be 4 minutes of travel time for the best possible outcomes in the most populated areas and 5 minutes travel in the less populated and lighter risk zones.
Finding #4:	Increasing coverage at the 4^{th} minute of travel would require 27 additional fire stations increasing total station coverage to 72 percent of the public road network.
Finding #5:	If the policy choice were to implement a deployment model balanced to provide the entire City 5 minutes of travel time coverage from a neighborhood response resource, then 19 additional stations would extend coverage to 90 percent of the public road network. While adding one minute to the travel time places it one minute above the NFPA 1710 national best practice recommendation, it is a reasonable adjustment given the City's complex road network and difficulty in achieving 4-minute travel time coverage, even with an extraordinary expense in fire stations that would only cover just a few miles of roads past the 4^{th} minute.
Finding #6:	In addition to the need for multiple neighborhood based first-response units, based on the first alarm concentration gap analysis of ladder truck and battalion chief coverage, improving citywide first alarm effectiveness at 8 minutes travel to 90 percent of the public road network will also require the addition of 4 ladder trucks and 2 battalion chief units.

After the historical response statistics are analyzed in the next section of this report, then an integrated set of deployment recommendations will be made to further prioritize the filling of response gaps and what alternative deployment strategies may be considered.

2.7 CURRENT WORKLOAD STATISTICS SUMMARY

In this section of the Standards of Response Cover process, prior response statistics are used to determine what percent of compliance the existing system delivers. In other words, if the geographic map measures say the system will respond with a given travel time, does it actually deliver up to expectations? A detailed analysis of in-depth statistics was separately provided to the Department senior staff. What follows is a summary of those comprehensive measures and findings.

The sections of this report that focused on mapping the distribution and concentration of fire stations used geographic mapping tools to estimate travel time over the street network. Thus, the maps show what ***should*** occur from the station placements. However, in the real world, traffic, weather, and units being out of quarters on other business such as training or fire prevention duties affect response times. Further, if a station area has simultaneous calls for service, referred to as "call-stacking," the cover unit to the second or third call in the same area must travel much farther. Thus, a complete Standards of Response Coverage study looks at the actual response time performance of the system from incident records. Only when combined with map measures can the system fully be understood and configured.

As a review of actual performance occurs, there are two perspectives to keep in mind. First, the recommendations of NFPA 1710 only require that a *department-wide* performance measure of 90 percent of the historical incidents (not geography) be maintained. This allows the possibility that a few stations in the core of a city with great response time performance can "mask" the performance of stations with poorer travel times.

In the Accreditation philosophy for the Standards of Response Coverage approach, and in Citygate's opinion, it is recommended that the performance of each *station area* also be determined to ensure a balance or **equity** of coverage to the degree economically possible. However, even this approach is not perfect – a station area may well have less than 90 percent performance, but serves lower-risk open space areas with limited buildings thereby not having an economic justification for better performance. In addition, the study must discuss just what is measured within the under-performing statistic. For example, a station area with a first-due performance of 88 percent with only 50 calls in the 88th to 90th percentile is far different from an area with 500 calls for service in that 88th to 90th percentile.

All measures, then, must be understood in the complete context of geography, risk, and actual numbers of calls for service that exceed the City's performance measure. A balanced system will avoid such extremes and strive for equity of service within each category of risk.

Fire departments are required to report response statistics in a format published by the U.S. Fire Administration called the National Fire Incident Reporting System (NFIRS). The private sector develops software to do this reporting according to state and federal specifications.

Data sets for this section of the study were extracted from the San Diego Fire-Rescue Communications center that provides dispatching and NFIRS records services for the Department and other contracting area fire departments.

Total response time in this study is measured from the time of receiving the call at the Fire Communications center to the unit being on-scene. This time does not include the time it takes to receive a 911-call at the City's Police Dispatch Center and transfer the call to the regional fire communications center. While the computer systems are not linked to track this data, the call answer and transfer process typically takes less than 30 seconds.

For suburban and urban population density areas, NFPA 1710 recommends a 4-minute fire unit travel time, which when a more realistic 1.5 minutes is added for turnout time and 1 minute for dispatch processing, aggregates to a 6.5-minute total reflex (customer) measure. For multiple-unit calls, the outer NFPA 1710 recommended measurement is 8 travel minutes, plus 1.5 for turnout and 1 minute for dispatch, which is a 10.5-minute total reflex measure. These measures are also consistent with good outcomes for urban/suburban risks as identified in the Standards of Response Cover Process.

The primary 4- and 8-minute travel time measures are also consistent with current City of San Diego General Plan and Fire Department measures.

Data sets in this study were "cleaned" to eliminate records without enough time stamp records or records with impossible times, such as a 23-hour response. The data sets were modeled in the "*NFIRS 5 Alive*" fire service analysis tool for fire service deployment statistics. Later, this study will integrate all the Standards of Cover study elements to propose refined deployment measures that best meet the risk and expectations found in the City.

The San Diego Fire-Rescue Department furnished NFIRS 5 data for 274,325 incidents dated for the 36-month period from 7/1/2007 through 12/31/2009. This NFIRS 5 incident data included 609,114 Apparatus records and 1,642,009 fire fighter responder records for the same period. This quantity of records provides a statistically significant and robust measure of response times in the City.

2.7.1 Incident Types and Distribution Over Time

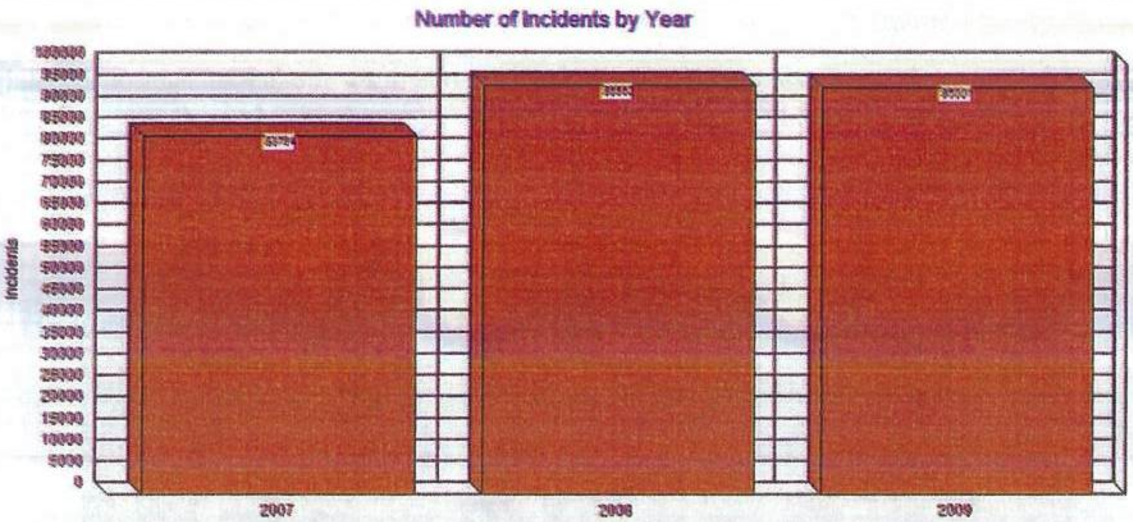
Below is a list of "Nature of Call" counts for **2009**. These counts are based on first apparatus arrivals so they represent incidents as opposed to apparatus responses. Only call categories of 200 or more were included.

Incident Type	Count
321 EMS call, excluding vehicle accident with injury	67,206
322 Vehicle accident with injuries	7,320
611 Dispatched & canceled en route	2,929
700 False alarm or false call, other	2,005
743 Smoke detector activation, no fire - unintentional	805
745 Alarm system sounded, no fire - unintentional	801
740 Unintentional transmission of alarm, other	791
735 Alarm system sounded due to malfunction	707
651 Smoke scare, odor of smoke	695
300 Rescue, emergency medical call (EMS) call, other	502
131 Passenger vehicle fire	469
730 System malfunction, other	458
600 Good intent call, other	444
331 Lock-in (if lock out , use 511)	412
113 Cooking fire, confined to container	409
353 Removal of victim(s) from stalled elevator	392
733 Smoke detector activation due to malfunction	362
111 Building fire	346
744 Detector activation, no fire - unintentional	308
118 Trash or rubbish fire, contained	299
151 Outside rubbish, trash or waste fire	297
150 Outside rubbish fire, other	237
622 No incident found on arrival of incident address	213

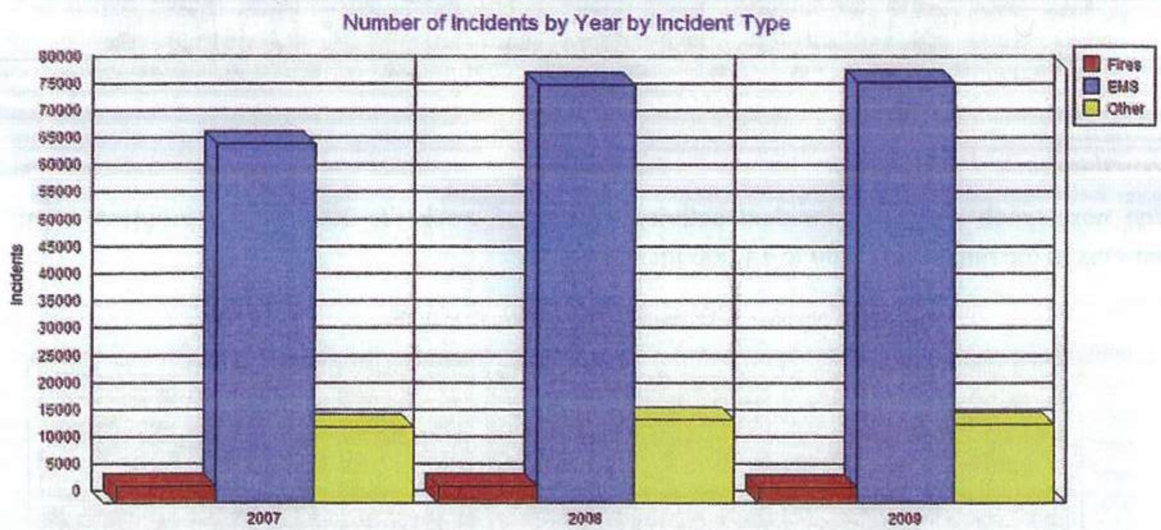
This chart shows the top types of property receiving services from the Department 2009. Property types with fewer than 200 responses were eliminated from the list.

Property Type		Count
419	1 or 2 family dwelling	27,042
429	Multifamily dwellings	15,025
963	Street or road in commercial area	9,647
962	Residential street, road or residential driveway	4,343
960	Street, other	3,594
961	Highway or divided highway	3,111
311	24-hour care Nursing homes, 4 or more persons	2,319
599	Business office	2,056
340	Clinics, Doctors offices, hemodialysis centers	1,978
449	Hotel/motel, commercial	1,937
439	Boarding/rooming house, residential hotels	1,596
965	Vehicle parking area	1,209
150	Public or government, other	951
931	Open land or field	815
519	Food and beverage sales, grocery store	619
882	Parking garage, general vehicle	597
322	Alcohol or substance abuse recovery center	596
161	Restaurant or cafeteria	590
171	Airport passenger terminal	581
215	High school/junior high school/middle school	545
400	Residential, other	512
937	Beach	492
341	Clinic, clinic-type infirmary	488
331	Hospital - medical or psychiatric	473
500	Mercantile, business, other	415
888	Fire station	392
241	Adult education center, college classroom	380
213	Elementary school, including kindergarten	375
900	Outside or special property, other	322
131	Church, mosque, synagogue, temple, chapel	290
361	Jail, prison (not juvenile)	267
160	Eating, drinking places	250
936	Vacant lot	211
300	Health care, detention, & correction, other	209

The above information describes where the bulk of the demand for service occurs – emergency medical issues and in the predominant building type – homes. There was a significant rise in incidents between 2007 (83,764) and 2008 (95,560). There was a very slight decrease in incidents between 2008 (95,560) and 2009 (95,001):



Here is the same 3-year incident set broken down by incident type:

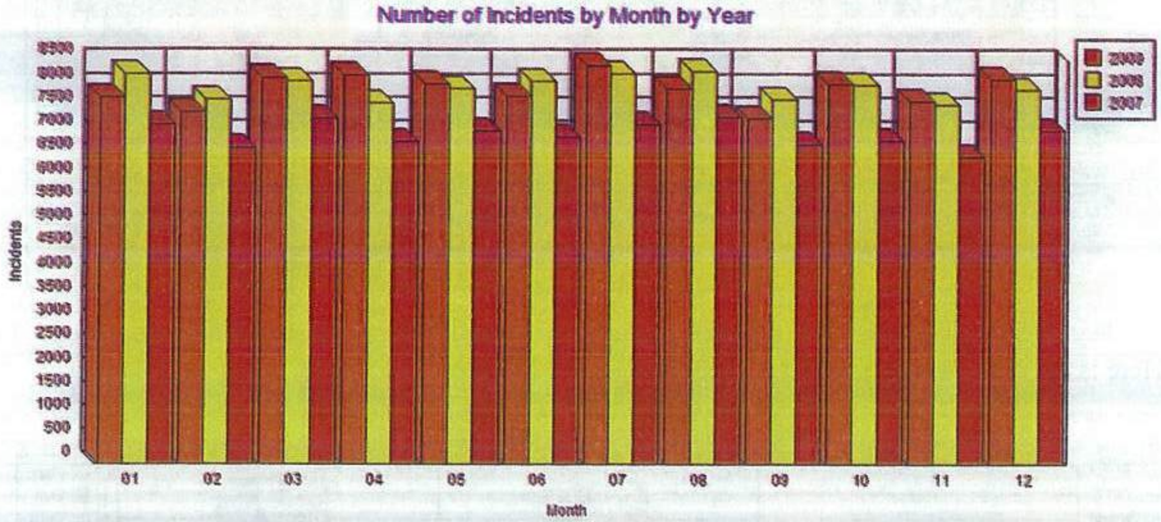


Here are the numbers for the graph above:

	2007	2008	2009
Fire	3,364	3,194	3,084
EMS	66,218	76,986	77,444
Other	14,182	15,380	14,472

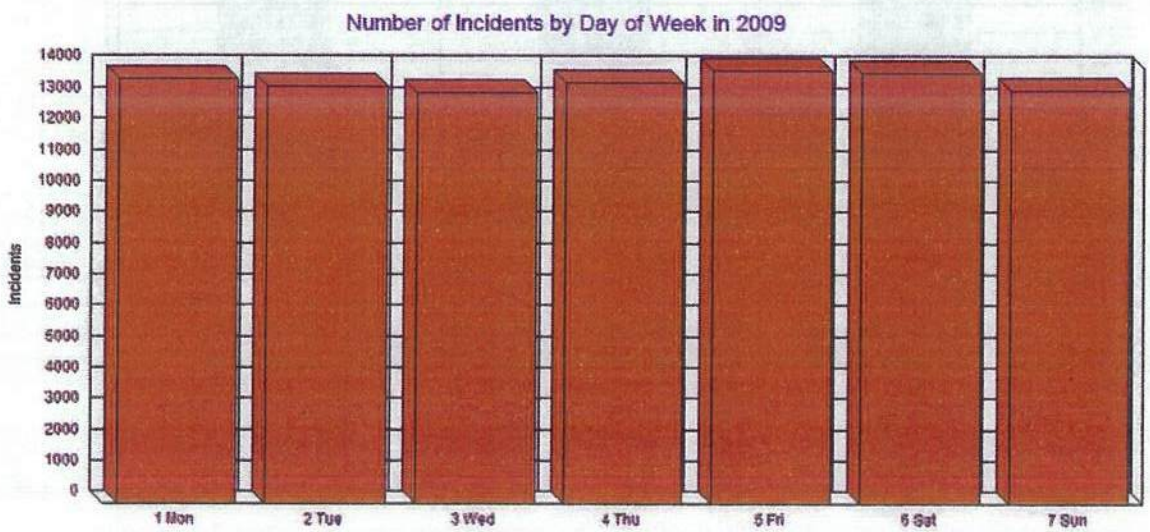
Distribution by Month

The graph below illustrates the number of incidents by month for the 3-year dataset. Monthly incident numbers are not highly volatile remaining within a range from 6,500 – 8,500 over a 36-month period:



Distribution by Day of Week

The next graph illustrates incident activity by day of week for 2009. Daily incident count remains in the range of 13,000 to 14,000 incidents:



Finding #7:	Emergency incident requests are evenly distributed over the months, week of the year and day of week. This means that the deployment model should not have widely different staffing patterns. The Department needs a constant baseline of response resources.

2.7.2 Peak Demand for Service Patterns

Unlike the monthly and day of week patterns, there <u>is</u> a slight variance of workload by hour of day. The following temporal activity graph measures activity by hour of day and day of week in 2009. High activity hours are shown in red with low activity hours shown in green:

	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Total
00:00-00:59	371	375	319	336	362	492	570	2,825
01:00-01:59	347	332	291	326	357	566	597	2,816
02:00-02:59	241	268	269	257	320	495	552	2,402
03:00-03:59	239	263	245	239	252	320	361	1,919
04:00-04:59	211	208	198	217	187	269	253	1,543
05:00-05:59	227	236	209	244	277	238	284	1,715
06:00-06:59	348	306	316	324	333	320	279	2,226
07:00-07:59	499	503	494	504	450	392	323	3,165
08:00-08:59	587	594	577	613	552	463	463	3,849
09:00-09:59	726	721	700	683	679	590	500	4,599
10:00-10:59	779	772	758	747	746	659	647	5,108
11:00-11:59	798	813	768	774	729	669	644	5,195
12:00-12:59	852	749	787	766	838	688	711	5,391
13:00-13:59	777	809	760	772	776	761	685	5,340
14:00-14:59	768	811	766	782	829	759	657	5,372
15:00-15:59	828	815	770	782	746	729	638	5,308
16:00-16:59	792	759	764	788	773	653	728	5,257
17:00-17:59	831	701	802	781	858	723	723	5,419
18:00-18:59	708	733	692	740	702	713	723	5,011
19:00-19:59	720	657	696	723	685	724	658	4,863
20:00-20:59	620	630	649	622	676	705	659	4,561
21:00-21:59	548	539	576	595	670	700	638	4,266
22:00-22:59	486	456	468	510	590	646	530	3,686
23:00-23:59	381	394	367	408	536	603	476	3,165
Total	13,684	13,444	13,241	13,533	13,923	13,877	13,299	95,001

Finding #8: There is tapering off of emergency incident demand from midnight to 7 AM. As the day becomes busy the hourly demand for service is fairly high and constant from 10 AM to 7 PM. Peak activity units on partial day staffing such as the paramedic ambulances are already deployed on assist areas at peak hours experiencing high simultaneous calls for service.

Simultaneous Incident Loading

Simultaneous incidents are incidents that occur when other incidents are underway. As a metropolitan fire department San Diego rarely has a break from simultaneous activity. The table below shows the number of incidents underway when new incidents occur:

# of Incidents	Percent
2 or more incidents underway	98.69%
3 or more incidents underway	96.41%
4 or more incidents underway	92.78%
5 or more incidents underway	87.87%
6 or more incidents underway	81.98%
7 or more incidents underway	74.95%
8 or more incidents underway	66.93%
9 or more incidents underway	58.20%
10 or more incidents underway	49.05%
11 or more incidents underway	39.88%
12 or more incidents underway	31.26%
13 or more incidents underway	23.60%
14 or more incidents underway	17.11%
15 or more incidents underway	11.94%
16 or more incidents underway	08.00%
17 or more incidents underway	05.15%
18 or more incidents underway	03.23%
19 or more incidents underway	01.97%
20 or more incidents underway	01.18%

We see by this chart San Diego's median simultaneous incident activity is 10 incidents.

2.7.3 San Diego Fire-Rescue Response Times

While many fire departments track *average* response time, it is not highly regarded as a performance measurement. One of the most commonly used criteria to measure response effectiveness is fractile analysis of response time. A fractile analysis splits responses into time segments and provides a count and percentage for each progressive time segment.

Here is a fractile response time breakdown for *citywide* fire department first arriving unit for 2009:

For Priority 1 incidents, the following fractile results for total response time are:

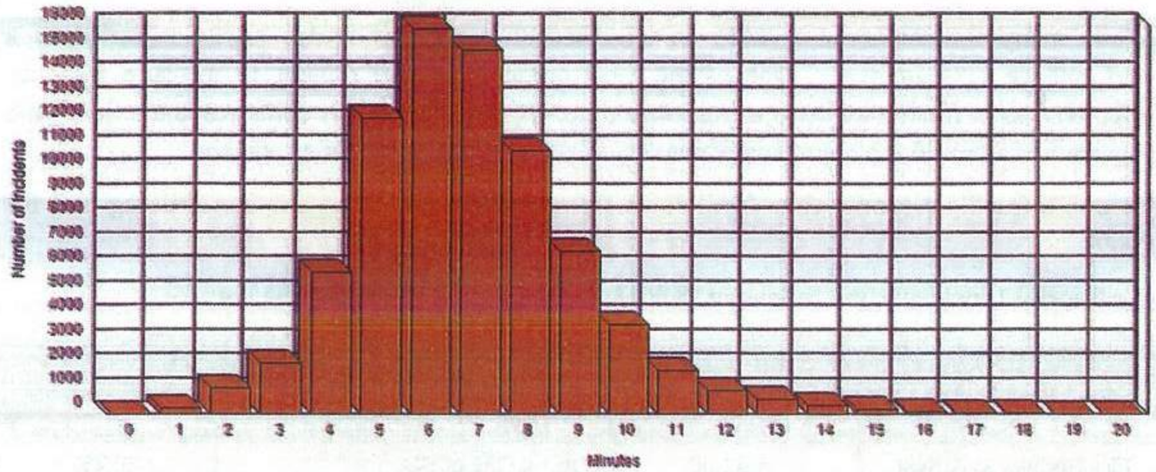
Measure	90% Minute Goal	Goal Source	Actual Performance
Fire Receipt to Arrival	<= 06:00	Current City of SD	49.7%
Fire Receipt to Arrival	<= 07:30	Citygate Recommendation	77.2%
Fire Receipt to Arrival	<= 08:50	City of SD Actual Compliance	90.2%

The current City goal is 6 minutes total response time. This is 1-minute dispatch, 1-minute crew turnout and 4 minutes travel time.

Once on-scene, the crew must identify the emergency, in a medical call gain access to the patient, and then begin emergency intervention procedures. In the best of situations, this takes 2-3 more minutes after arrival. Therefore, for good outcomes in urban/suburban areas, Citygate typically recommends to our clients that they plan for a 90 percent arrival near the 7th minute of total response. The additional minute past the City goal of 6 minutes reflects a more realistic crew turnout time of 1.5 minutes and allows for some set-up time prior to actual intervention.

The graph below illustrates **Call to Arrival** performance using the same dataset of all Priority 1 incidents in 2009.

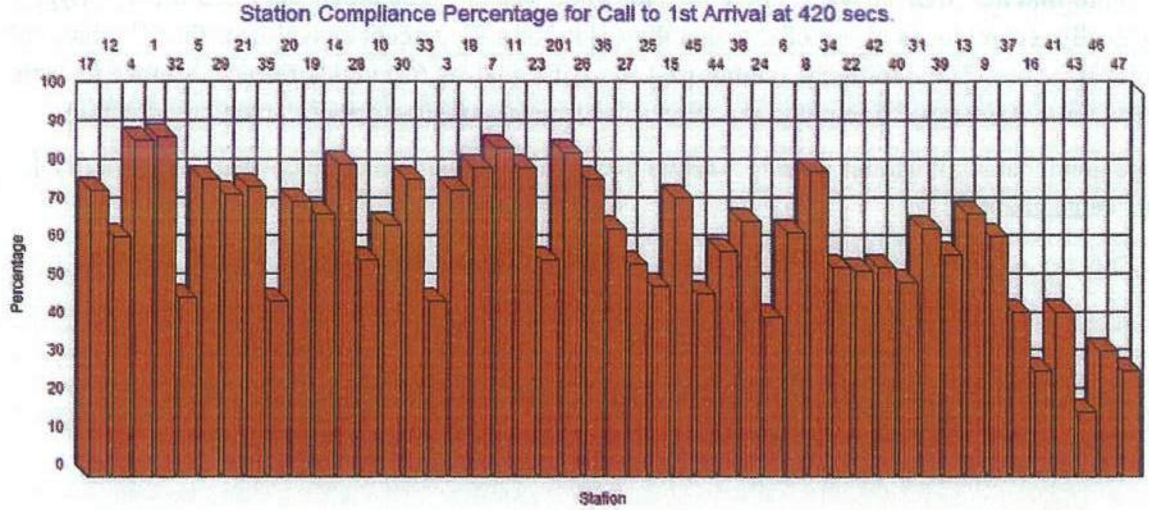
Fractile for Incidents Call to 1st Arrival - 78,500 Responses



In the above graph having a maximum incident count at 6 minutes is normal. However, having a very slow drop-off at 7, 8 and 9 minutes is not normal for a well-deployed metropolitan fire department. As the data by station district will show, many of the station areas are too large and have lengthy response times.

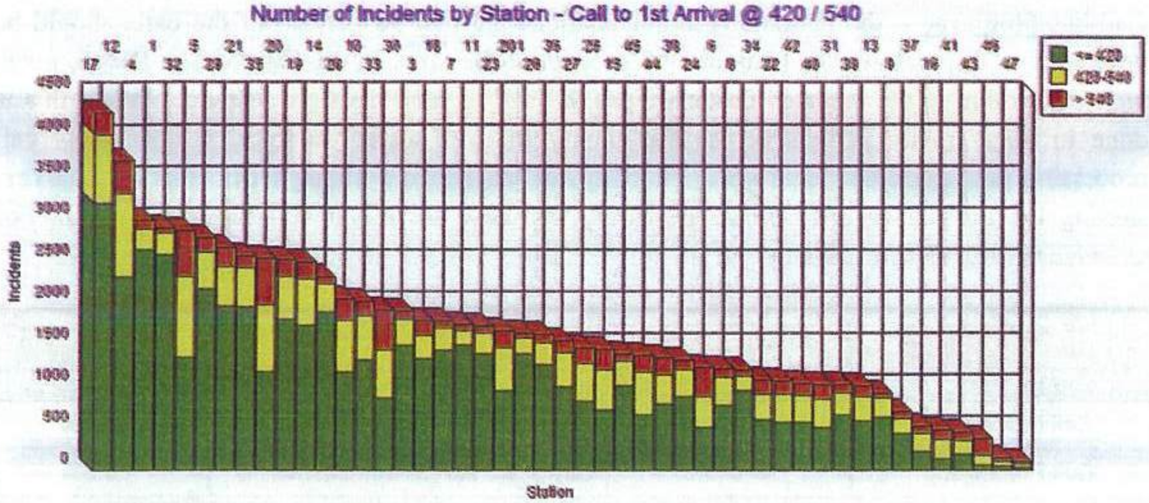
The next graph shows how total response time performance varies significantly by fire station area due to size and not enough fire stations in some areas. In the graph 420 seconds equals 7 minutes:

Station Compliance Percentage for Call to 1st Arrival at 420 secs.



While overall total response time performance does not achieve 90 percent to all incidents, incidents closer to fire stations *do* receive service within the City's adopted goal.

This **next graph** measures the length of call to arrival delays. Here green incidents are less than or equal 420 seconds (Citygate goal point of 7 minutes), yellow incidents are greater than 420 and less than or equal to 540 seconds (9 minutes) and finally red incidents are greater than 540 seconds. Stations 32, 35 and 33 show a high number of incidents with delayed first arrivals beyond 9 minutes.



Structure Fires Alone

The following fractile breaks down responses to **structure fires** that occurred during **<u>2009</u>**.

Measure	90% Minute Goal	Goal Source	Actual Performance
Fire Receipt to Arrival	<= 06:00	Current City of SD	49.7%
Fire Receipt to Arrival	<= 07:30	Citygate Recommendation	71.2%
Fire Receipt to Arrival	<= 08:50	City of SD Actual Compliance	90.2%

2.7.4 Response Time Component Measurements

The next step is to evaluate all response time components by breaking down "Total Reflex Time" into its three component parts of:

- <u>Call-handling time</u> – time of call until time of dispatch. Only dispatch records showing a call-handling time greater than 0 seconds and less than 3 minutes were used in this analysis.

- <u>Turnout time</u> – time of dispatch until time unit is responding. Only dispatch records showing a turnout time greater than 0 seconds and less than 4 minutes were used in this analysis.

- Travel time – time unit is responding until time the unit arrives on the scene. Only dispatch records showing a travel time greater than 0 seconds and less than 10 minutes were used in this analysis.

Call-handling time – the national recommendations are that 90 percent of the calls should be processed to dispatch within 1 minute, 90 percent of the time. In the City of San Diego, given high call volumes, the dispatch center triages the call to send the right resource. While this is done in many metro centers across the county to save scare resources, it does slow call processing past the older ideal goal. The City of San Diego system places emphasis on first alerting the ambulance crew where necessary, as these are the fewest resources of all. For ambulance dispatches in 2009:

Measure	90% Minute Goal	Goal Source	Actual Performance
Call Processing	<= 01:00	Desired NFPA Goal Point	66.5%
Call Processing	<= 01:40	City of SD Actual Compliance	89.9%

For the first-due fire engine:

Measure	90% Minute Goal	Goal Source	Actual Performance
Call Processing	<= 01:00	Desired NFPA Goal Point	10.5%
Call Processing	<= 02:50	City of SD Actual Compliance	89.0%

Finding #9: San Diego Fire-Rescue's ambulance call processing times are consistent with national call sorting practices. The Department needs to place greater emphasis on procedures to get the first-due engine dispatched in less time, closer to the ambulance performance point.

Company turnout time – the time from company notification to donning protective clothing to getting underway.

Measure	90% Minute Goal	Goal Source	Actual Performance
Turnout	<= 00:80	Desired Goal Point in NFPA 1710	86.1%
Turnout	<= 00:90	City of SD Actual Performance	90.3%
Turnout	<= 02:00	Citygate Recommendation	96.6%

Older national recommendations were for turnout time to take 1 minute. Over the last five plus years of increasing protective clothing regulations by OSHA and the NFPA, complete data studies have shown this to be a near impossible goal to accomplish safely. The NFPA for structure fires now recommends 80 seconds, but Citygate finds a more realistic goal is to complete the company notification and turnout process in 1:30 minutes or less, 90 percent of the time. Attention to this critical time element can help reduce the time.

> **Finding #10:** For crew turnout time performance, San Diego Fire-Rescue excels in this area and is the largest department Citygate has seen to perform this well at the 90-second point for structure fire turnout time.

Travel time – here are the citywide travel time measures for 2009 to Priority 1 EMS incidents. While not inclusive of fires, given the high number of EMS incidents, this measure is the most descriptive of citywide performance:

Measure	90% Minute Goal	Goal Source	Actual Performance
Travel	<= 04:00	Desired Goal Point in NFPA 1710 & SDFD Goal	55.2%
Travel	<= 06:20	City of SD Actual Compliance	90.9%

This table shows the travel time performance as a percent of the City's 4-minute travel time goal:

Travel Time Performance (At City's 4-Minute Travel Time Goal)

Station	4-Minute % Travel Compliance	Station	4-Minute % Travel Compliance
17	64.40%	25	31.90%
12	46.10%	27	35.30%
4	83.50%	44	43.90%
35	32.80%	45	28.30%
1	81.60%	24	29.10%
5	65.10%	15	60.20%
32	30.50%	38	49.80%
21	62.10%	8	63.80%
20	55.90%	6	46.60%
29	61.30%	34	39.60%
19	55.40%	22	44.00%
14	67.70%	39	34.20%
28	37.70%	42	43.40%
10	50.60%	40	32.80%
33	37.70%	31	45.70%
3	58.30%	13	55.60%
201	81.70%	9	46.80%
30	61.60%	41	26.60%
18	66.20%	37	26.30%
11	68.50%	16	16.40%
23	42.20%	43	13.10%
7	74.30%	46	20.50%
26	63.60%	47	23.40%
36	43.40%		

Finding #11: The citywide and individual fire station area *travel* times correlate with the geographic model travel time predictions, in that there are not enough fire stations in some areas to achieve the City's 4-minute *travel* time to 90 percent of the incidents in urban areas. This is due to a combination of not enough fire stations combined with the effects of a non-grid street network in other areas.

2.7.5 First Alarm Fractile Compliance

This report section focuses on concentration or massing of units for the first alarm arrival units.

Most Standards of Response Cover studies along with NFPA 1710 recommend that for urban/suburban areas that all of the necessary fire units for an effective response force (first alarm) arrive on-scene within 8 minutes travel time, and when 2.5 minutes are added for dispatch and turnout time, this equals 10:30 minutes, 90 percent of the time. A normal first alarm response for San Diego Fire-Rescue is 4 engines, 1 ladder truck and 1 battalion chief. However, given the mapping coverage result that the Department does not have enough engine companies, this study looked at the performance with 3 engines, as the minimum staffing necessary, which is that considered typical for medium density populations in NFPA 1710.

In the 2009 data set, there were 2,257 occurrences (6 times per day on average) where 3 engines and 1 ladder truck had to arrive. The performance citywide was:

Measure	90% Minute Goal	Goal Source	Actual Performance
Fire Receipt to Arrival	<= 10:00	Current City of SD	49.8%
Fire Receipt to Arrival	<= 10:30	Citygate Recommendation	55.4%
Fire Receipt to Arrival	<= 15:00	City of SD Actual Compliance	89.7%

As with other measures of deployment, there is a wide diversity of first alarm compliance across the different station areas as the next table describes. Some areas had *no* events with a complete 4-unit response even when rounded up to minute 11:

Station	Percent by 11 Minutes	Station	Percent by 11 Minutes
4	95.34%	22	45.94%
11	91.66%	44	44.44%
7	90.90%	25	43.58%
15	88.00%	16	40.00%
14	86.36%	6	39.13%
201	86.15%	39	35.00%
1	85.91%	32	31.03%
17	85.38%	37	29.41%
19	84.52%	35	29.23%
5	82.35%	42	25.00%
3	80.85%	38	22.72%
10	80.70%	40	22.22%
18	78.57%	13	21.42%
8	74.57%	27	16.66%
30	74.19%	31	10.52%
26	73.52%	43	8.33%
12	71.29%	41	5.88%
23	62.79%	34	0.00%
28	59.72%	9	0.00%
20	56.86%	24	0.00%
21	55.00%	33	0.00%
45	53.48%	46	0.00%
29	50.00%		
36	46.42%		

As the next table shows, many of the station areas had the complete first alarm firefighting force arrive from 1 to 11 minutes past the City's desired goal point:

First Alarm Total Response Time Measures by Station Area

Station	Minutes at 90%	Station	Minutes at 90%
4	9.50	39	14.42
11	10.33	12	14.67
7	10.50	28	14.92
14	11.17	33	15.00
15	11.25	24	15.08
8	11.58	32	15.17
1	11.75	25	15.42
19	11.83	22	15.42
18	12.08	40	15.92
201	12.17	16	16.33
5	12.25	41	17.58
17	12.42	35	17.67
26	13.00	13	17.75
30	13.17	38	18.00
20	13.25	34	18.42
10	13.33	6	18.83
45	13.33	43	18.92
23	13.67	9	19.58
44	14.08	42	19.58
3	14.17	27	20.58
21	14.25	29	21.83
31	14.33	37	21.92
36	14.42	46	22.92

Finding #12: The incident response measures for a Full Effective Response Force show that outside of three fire station areas in the downtown core, none of the other 44 fire station areas can deliver 3 engines and 1 ladder truck to 90 percent of building fires within a desired goal point of 10:30 minutes total response time, of which 8 minutes is travel time. The fire station areas are too large, there are not enough stations, and some units are busy and unavailable at peak hours of the day.

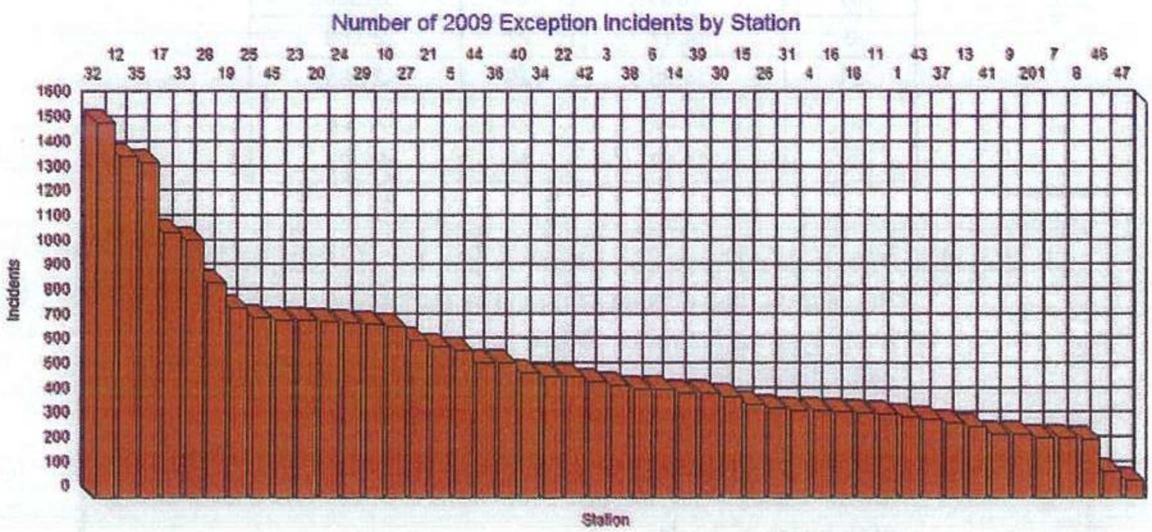
2.7.6 Gap Analysis of Response Time Deficiencies

While many of the measures discussed above review percent of performance against a desired goal point, the ***quantity*** of calls in the gap between current performance and the desired goal need to be understood and what factors other than geography might create delayed response time performance. The table below shows the number of calls in 2009 that were not reached by a first unit within 7 minutes total response time:

Response Time Deficiencies

	Incident Count	Percentage of Incidents Inside City
2009 Incident NFIRS Records	95,001	
Incidents Inside City Limits	94,065	
Call to Arrival > 7 minutes	33,107	35.1%
Deficiencies to any Priority 1 Incident	**25,834**	**24.46%**
Deficiencies to All Types of Fires	1,261	1.34%
Deficiencies to All EMS Types	24,573	26.12%

Thus, 24.46 percent of the priority calls inside the City limits received the first-due San Diego Fire-Rescue unit in greater than the desired goal point of 7 minutes. This next graph shows the deficiencies or exceptions to policy by station area:



As the geographic mapping and simultaneous incident statistics showed, there are *both* response gap and high workload reasons for the diversity of deficient response times across a 47-station system.

By hour of the day, the deficient response times exist every hour, but peak from 10 AM through 6 PM, at a constant rate across all seven days of the week:

2009 Exception Incidents > 7 Minutes Total Response Time

	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Total
00:00-00:59	121	117	106	102	100	152	139	837
01:00-01:59	123	116	107	102	132	210	205	995
02:00-02:59	80	105	89	95	116	183	200	868
03:00-03:59	90	106	86	87	86	108	151	714
04:00-04:59	87	80	89	81	77	115	93	622
05:00-05:59	81	91	94	106	106	106	115	699
06:00-06:59	119	102	113	137	118	113	99	801
07:00-07:59	174	175	159	177	161	115	108	1,069
08:00-08:59	151	176	158	162	137	112	98	994
09:00-09:59	198	191	190	164	169	152	115	1,179
10:00-10:59	246	248	229	212	228	193	178	1,534
11:00-11:59	234	243	206	199	176	178	146	1,382
12:00-12:59	196	174	193	135	200	153	162	1,213
13:00-13:59	193	212	193	189	174	185	148	1,294
14:00-14:59	198	209	163	183	196	187	143	1,279
15:00-15:59	237	247	220	206	190	174	142	1,416
16:00-16:59	222	210	194	227	195	147	156	1,351
17:00-17:59	216	174	222	219	207	176	149	1,363
18:00-18:59	167	163	166	174	149	156	151	1,126
19:00-19:59	153	150	161	159	150	180	148	1,101
20:00-20:59	115	143	159	153	161	166	138	1,035
21:00-21:59	135	124	148	144	156	182	153	1,042
22:00-22:59	124	122	121	118	165	174	150	974
23:00-23:59	113	117	117	108	186	173	132	946
Total	3,773	3,795	3,683	3,639	3,735	3,790	3,419	**25,834**

Next is the same table by hour of the day, but only for the deficiencies that exceed 9 minutes:

Exceptions > 9 Minutes Call to Arrival

	1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	Total
00:00-00:59	38	43	29	34	30	55	49	278
01:00-01:59	36	42	36	33	41	80	61	329
02:00-02:59	27	39	22	35	46	55	66	290
03:00-03:59	31	35	32	29	24	42	48	241
04:00-04:59	26	31	30	31	31	38	37	224
05:00-05:59	26	35	29	33	41	28	35	227
06:00-06:59	38	33	36	44	40	28	26	245
07:00-07:59	43	50	52	53	46	29	24	297
08:00-08:59	39	59	55	49	43	26	29	300
09:00-09:59	58	51	60	47	52	48	40	356
10:00-10:59	93	96	74	73	78	58	63	535
11:00-11:59	82	82	63	79	61	55	51	473
12:00-12:59	64	45	51	39	62	43	49	353
13:00-13:59	58	67	58	60	59	59	50	411
14:00-14:59	74	61	60	58	62	72	38	425
15:00-15:59	84	83	82	74	66	59	39	487
16:00-16:59	81	78	68	85	52	39	36	439
17:00-17:59	82	58	73	65	72	41	43	434
18:00-18:59	45	47	51	48	46	48	48	333
19:00-19:59	41	41	47	59	44	56	58	346
20:00-20:59	36	45	50	59	52	52	37	331
21:00-21:59	35	31	51	35	39	53	43	287
22:00-22:59	27	36	37	31	55	53	49	288
23:00-23:59	31	39	34	23	58	53	36	274
Total	1,195	1,227	1,180	1,176	1,200	1,170	1,055	8,203

Finding #13: The message from the deficient response time analysis tables is that within the 24.46 percent or 25,834 Priority 1 calls with response times exceeding City goals, there are 8,203 that exceed 9 minutes and *this occurs every hour somewhere, every day*. In the nine peak hours where performance is the most deficient, every hour period for all 365 days, has at least one Priority 1 incident with the first due unit arriving *2 minutes later* than the desired goal point.

Finding #14: Due to very high call for service volumes in the downtown core, and the vertical (high-rise) building populations, multiple units and stations will be always be needed to cover not just geographic travel time, but to provide enough units at peak demand hours to maintain adequate customer service to all incidents.

Finding #15: The current technology to alert fire stations crews of what and where to respond is 21 years old, technically obsolete and, in many cases, inserts unnecessary time delays into the crew dispatching process.

2.7.7 Integrated Fire Station Deployment Recommendations

Discussion

While no one city (even a metropolitan one) can stand by itself and handle everything and any possibility without help, a desirable goal is to field enough of a response force to handle a community's day-to-day responses for primary single-unit response needs equitably to all neighborhoods, as well as be able to provide an effective initial response force (first alarm) to moderately serious building fires.

The City of San Diego has adopted fire deployment measures consistent with its risks, outcome expectations and national best practice recommendations for urban-suburban areas.

As the mapping coverage and response statistics analysis in this study have shown, deploying a best practice mix of fire crews across the challenging topography of the City of San Diego cost-effectively is *very difficult* to achieve. This is likely why over many decades; the fire station spacing did not keep pace with City growth.

When the deployment gaps are also understood in the context of the current and foreseeable economic challenges, the question becomes how best to deploy any new resources as the City can afford to make changes.

Citygate used the comprehensive data sets built for this study to identify patterns in the deployment system of:

- Overuse of resources;
- High density call for service areas;
- Identifying where response time gaps are as large or larger than an entire typical fire station area;
- Trying to balance the push-pull of improving neighborhood equity of service availability versus the need to handle multiple incidents per hour in smaller areas.

2.7.8 Integrated Analysis to Determine Priorities and Alternative Approaches

The study team reviewed detailed data on the quantity of calls per hour on some units, the locations of high demand areas which generate simultaneous calls, and then in combination, where did high workloads combine with response time gaps (missing stations) to create small, perfect storms of weak response time performance.

By using a multiple measures approach, instead of just road miles covered by a new fire station, or just fixing a simultaneous incident issue in an existing fire station area, the team could make integrated and prioritized recommendations.

Further as this analysis showed the need for more than a fixed fire station deployment model, alternative deployment approaches were considered.

The results described in this section are the result of this integrated work.

The first step in the priority analysis was to compare in-depth data on three factors summarized in the following table. The factors are:

- Station areas with the highest rate of simultaneous incident rates;
- Individual engines that had the highest workload rates, known as Unit Hour Utilization;
- Locating station areas that had the most responses to other station areas (helpers);
- Cross-identifying where an impacted for workload station area meet two or three of these criteria to be known as a workload impacted area.

Dist's Giving Most Outside Aid >300/yr	Engines w/ highest UHU >12%	Stations with highest Simoul >20%
E201	E17	17
E14	E12	12
E11	E32	32
E1	E5	4
E26	E35	29
E5		35
E7		1
E4		19
E12		5
E19		20
E8		21
E17		14
E18		33
E27		28
		10

As can be seen in the summary table above, several engines are in more than one category. Three engines – 5, 12 and 17 – are in all three categories.

Next the analysis considered the geographic mapping results that adding stations to meet a 4-minute travel time goal was not feasible given San Diego City's unique topography. However, a 5-minute travel time model to achieve 90 percent coverage equitably across the developed city was more feasible and that with some additional in-fill stations, much of the long response time issues could be improved. While adding one minute to the travel time places it one minute above the NFPA 1710 national best practice recommendation, it is a reasonable adjustment given the City's complex road network and difficulty in achieving 4-minute travel time coverage, even with an extraordinary expense in fire stations that would only cover just a few miles of roads past the 4th minute.

The geographic data model was used to rank order the 5-minute fire station gaps by how under-covered road miles could be improved with each station addition. For each station addition, the current incident loads and population densities were also measured:

Ranking of Future Station Sites by Road Miles of Additive Coverage

GIS Priority	Sites @ 5-min to 90%	Additive Per Gap 5-min Population	Additive Per Gap 5-min Incidents	Avg Pop Density
1	Mission Bay / Pacific Beach	19,011	1,935	5-25,000
2	Torrey	11,946	567	5-10,000
3	Serra Mesa	15,646	1,553	5-10,000
4	Stresemann/Governor	8,670	597	5-10,000
5	Encanto	9,715	710	0-10,000
6	Skyline	19,803	1,384	10-20,000
7	UCSD	10,248	1,283	10-15,000
8	Paradise Hills	11,486	787	10-20,000
9	Mira Mesa	1,437	393	5-10,000
10	Liberty Station	2,117	1,127	10-20,000
11	University City	4,753	456	0-10,000
12	San Pasqual	21	130	0-5,000
13	Home Ave	10,271	683	5-20,000
14	College	6,729	403	5-25,000
15	Scripps Miramar	4,867	160	0-5,000
16	East Otay	634	140	0-5,000
17	Linda Vista	6,371	501	5-10,000
18	Black Mountain Ranch	1,384	51	0-10,000
19	Mission Valley	16,174	1,517	5-25,000
	Total:	**161,283**	**14,377**	

Understanding that the station gap areas were very different when reviewed for long response time workloads and populations, and that gaps #10-19 all only added more than 10 new road miles of coverage each, the high workload areas were added to the priority analysis table. Then Citygate placed priorities on adding service to an area based on these "weighting" factors:

- New station areas (gaps) that are next to high workload areas. These are the areas in the table on page 75 having the most to least yellow, orange and red negative workload impacts. A number in a color cell in the following table on page 77 means that more than one station area had this measure in the gap area under consideration;
- Serving the highest under-served population densities;
- Serving areas with most 5-minute population and long response times;

- Additive road miles the gap station covered.

As the priorities became clearer, it was apparent that the smallest gaps were not next to high workload areas and were not of enough priority in the immediate future to need a 24-hour, fixed location engine company. Thus, the gaps were also sorted for consideration for alternative deployment units, or Fast Response Squads (FRS) to be explained below. The weighted priorities became:

Final Citygate Integrated Ranking of Additional Fire Station Sites

Citygate Priority	FRS Eligible	Stats Weight			GIS Priority	Sites @ 5-min to 90%	Additive Per Gap 5-min population	Additive 5-min calls	Avg Pop Density
7	NO				1	Mission Bay / Pacific Beach	19,011	1,935	5-25,000
11	NO				2	Torrey	11,946	567	5-10,000
12	NO				3	Serra Mesa	15,646	1,553	5-10,000
6	NO				4	Stresemann / Governor	8,670	597	5-10,000
5	YES				5	Encanto	9,715	710	0-10,000
4	NO	2			6	Skyline	19,803	1,384	10-20,000
8	NO				7	UCSD	10,248	1,283	10-15,000
2	NO			2	8	Paradise Hills	11,486	787	10-20,000
13	NO				9	Mira Mesa	1,437	393	5-10,000
9	YES				10	Liberty Station	2,117	1,127	10-20,000
10	YES				11	University City	4,753	456	0-10,000
16	YES				12	San Pasqual	21	130	0-5,000
1	NO	3	2	2	13	Home Ave	10,271	683	5-20,000
3	NO			2	14	College	6,729	403	5-25,000
15	YES				15	Scripps Miramar	4,867	160	0-5,000
14	YES				16	East Otay	634	140	0-5,000
17	YES				17	Linda Vista	6,371	501	5-10,000
18	YES				18	Black Mountain Ranch	1,384	51	0-10,000
19	YES				19	Mission Valley	16,174	1,517	5-25,000
	9 FRS's					Total:	161,283	14,377	

Thus, the sites in Citygate's priority order to improve service in the identified gap areas are:

Citygate Priority Order of Additional Fire Station Sites

Citygate Priority	FRS Eligible	Sites @ 5-min to 90%	Additive Per Gap 5-min Population	Additive 5-min Calls
1	NO	Home Ave	10,271	683
2	NO	Paradise Hills	11,486	787
3	NO	College	6,729	403
4	NO	Skyline	19,803	1,384
5	YES	Encanto	9,715	710
6	NO	Stresemann/Governor	8,670	597
7	NO	Mission Bay / Pacific Beach	19,011	1,935
8	NO	UCSD	10,248	1,283
9	YES	Liberty Station	2,117	1,127
10	YES	University City	4,753	456
11	NO	Torrey	11,946	567
12	NO	Serra Mesa	15,646	1,553
13	NO	Mira Mesa	1,437	393
14	YES	East Otay	634	140
15	YES	Scripps Miramar	4,867	160
16	YES	San Pasqual	21	130
17	YES	Linda Vista	6,371	501
18	YES	Black Mountain Ranch	1,384	51
19	YES	Mission Valley	16,174	1,517
	9 FRS's	**Total:**	**161,283**	**14,377**

Improving response capability to all 19 gaps using a 5-minute travel time model achieves the following:

- 161,283 residents receive improved coverage by at least 1-minute travel time;
- 14,377 incidents receive improved service;
- A mix of 19 resources also adds weight of attack to first alarm coverage as well as depth of capacity in high workload areas;
- Sites 11 through 19 only add 10 miles of new coverage each;

- Of these 19 sites, Citygate believes 6 are the most critical, taking into consideration all the factors. Just these 6 sites would improve service to 66,674 residents and 4,564 delayed response time incidents. They are:
  - Home Avenue
  - Paradise Hills
  - College
  - Skyline
  - Encanto
  - Stresemann/Governor.
- For improved ladder truck and battalion chief coverage, the geographic and workload analysis concluded that the system needs:
  - Four (4) additional ladder trucks
  - Two (2) additional field battalion chief units.

2.7.9 Fast Response Squads and Engine Staffing Discussion

Given the competing needs of a cost-effective deployment increase, the fact that some response time gaps are actually very small and near other units, and that incident demands move during the day between the urban core and the suburbs, Citygate believes a cost-to-service effective solution is to implement 2 firefighter "Fast Response Squads" that would have these capabilities, which are more than adding just an ambulance:

- 2 firefighter crews, one of which is a paramedic
- Smaller, more agile unit, capable of:
  - EMS assessment
  - 1-patient transport when no ambulance is available
  - Providing "recon" at serious emergencies to tell dispatch what is really needed and what is not, which saves valuable resources at peak demand hours
  - Carrying a small quantity of water/foam for small fires – "knock down" capability pending the arrival of an engine company
  - Increasing first alarm staffing, multiple FRS's can be assigned to a first alarm feeing up at least one engine company
  - Can be part- or full-time staffed (12-hour or 24-hour schedule)

- **If 24-hour staffed, placed in smaller buildings, like converted homes and commercial suites**
- **Can be moved to areas of need, following the population and call trends per hour of day. A 24-hour FRS could have two "posts," one in a high workload urban core in the daytime, and in the evening and weekends, in a suburban area response time gap.**

Discussion

The Citygate team and Fire-Rescue senior staff discussed this option at length. It is not thrown out lightly. The joint team agrees there are solid needs driving this issue. There is no reason that serious emergencies cannot *also* be responded to with more, lesser-staffed units as part of a complete mix of units. A good analogy would be a deployment system that can "swarm" a resource mix to the emergency.

However, these units, for the most part, do not exist in the fire service. As such, this recommendation is experimental and not an off-the-shelf solution where the apparatus can be purchased immediately. This would need to be a pilot project that will take the combined talent of San Diego Fire-Rescue managers, labor representatives and apparatus manufacturers to accomplish. There are issues to be met and conferred on with the Fire Union. As the study team and apparatus builders determine what can be cost-effectively built, not all of the mission goals listed above may end up being feasible. But at the outset, the pilot program needs to consider all options.

As with any pilot program as it is implemented, data has to be collected and the Department has to be willing and be given the flexibility to make incremental adjustments. Even with all this to be done, Citygate and the Fire Chief believe this option needs to be strongly considered as part of the solution set.

The joint study team then considered the 3- versus 4-firefighter-per-unit issue. There is no question from Citygate, the Department, or City elected official leadership, that a 4-firefighter unit is more effective and safer for the firefighter and the public. However, if an agency has light workload on some or all of its units and cannot afford 4 firefighters, many agencies from suburban communities to the Los Angeles County Fire Department, operate 3-firefighter engines.

Citygate used the analysis tools in this study to answer this question, "Given the deployment gaps in the City of San Diego, how many engines, if any, could have staffing reduced from 4 to 3?"

The reality is that very few engines can have staffing reduced. With 19 or more fire station gaps in the system, in many areas the second-due unit is not close-by so a 3-firefighter crew cannot start interior fire attack if the 2-in/2-out rule has to be complied with. We also had to take into account where call for service demands are high which creates delays for a second- or third-due unit to be available. Thus, we identified these criteria and results to the question:

- Areas that are under-deployed, with little to no overlap from an adjoining unit at 4 minutes travel.
- Areas that are very busy and drop calls to other units.
- Either of the above means a 3-firefighter unit is less effective than a 4-firefighter unit, as the first arriver, ***if*** the second-due unit is farther away.
- Analysis finds only 12 engines that have significant overlap from adjoining units with modest workloads, and that are <u>not</u> next to one or more major gap areas, that could allow their staffing to be at 3-firefighters/unit, which is a 25 percent efficiency loss per unit.
- Thus, 12 re-deployed firefighters per day would equal:
  - 3 more engines at 4-firefighters each, or
  - 4 more engines at 3-firefighters each, or
  - 6 new FRS units.

Given the efficiency and safety advantages of 4-firefighter units, San Diego's leadership preference for 4-firefighter units, and the number of deployment gaps in the system, Citygate and the Fire Chief prefer to see the Fast Response Squads units tried before unit staffing is reduced.

2.7.10 Integrated Deployment Recommendations

Given the complete analysis of the data elements in this study, combined with the knowledge of the <u>very good</u> San Diego Fire-Rescue senior staff, and of Citygate's extensive knowledge of the conditions in the City of San Diego, Citygate makes the following recommendations to deal with the findings of this study:

Recommendation #1: **<u>Adopt Revised Deployment Measures:</u>** The City should adopt revised performance measures to direct fire crew planning and to monitor the operation of the Department. The measures should take into account a realistic company turnout time of 1:30 minutes and be designed to deliver outcomes that will save patients medically salvageable upon arrival; and to keep small, but serious fires from becoming greater alarm fires. Citygate recommends these measures be:

1.1 **<u>Distribution of Fire Stations:</u>** To treat medical patients and control small fires, the first-due unit should arrive within 7:30 minutes, 90 percent of the time from the receipt of the 911 call in fire dispatch. This equates to 1-minute dispatch time, 1:30

minutes/seconds company turnout time and 5 minutes drive time in the most populated areas.

1.2 **Multiple-Unit Effective Response Force for Serious Emergencies:** To confine fires near the room of origin, to stop wildland fires to under 3 acres when noticed promptly and to treat up to 5 medical patients at once, a multiple-unit response of at least 17 personnel should arrive within 10:30 minutes/seconds from the time of 911-call receipt in fire dispatch, 90 percent of the time. This equates to 1-minute dispatch time, 1:30 minutes/seconds company turnout time and 8 minutes drive time spacing for multiple units in the most populated areas.

Recommendation #2: **Adopt Fire Station Location Measures:** To direct fire station location timing and crew size planning as the community grows, adopt fire unit deployment performance measures based on population density zones in the table below. The more specific, measurable and consistent the policy is, the more it can be applied fairly to all uses and easily understood by a non-fire service user.

Proposed Deployment Measures for San Diego City Growth

By Population Density Per Square Mile

	Structure Fire Urban Area	Structure Fire Rural Area	Structure Fire Remote Area	Wildfires Populated Areas
	>1,000-people/sq. mi.	**1,000 to 500 people/sq. mi.**	**500 to 50 people/sq. mi. ***	**Permanent open space areas**
1st Due Travel Time	5	12	20	10
Total Reflex Time	7.5	14.5	22.5	12.5
1st Alarm Travel Time	8	16	24	15
1st Alarm Total Reflex	10.5	18.5	26.5	17.5

* Less than 50 people per square mile there is acknowledgment that fire and EMS services are going to be substandard.

Recommendation #3: **Aggregate Population Definitions:** Where more than one square mile is not populated at similar densities, and/or a contiguous area with different zoning types aggregates into a population "cluster," these measures can guide the determination of response time measures and the need for fire stations:

Area	Aggregate Population	First-Due Unit Travel Time Goal
Metropolitan	> 200,000 people	4 minutes
Urban-Suburban	< 200,000 people	5 minutes
Rural	500 - 1,000 people	12 minutes
Remote	< 500	> 15 minutes

Recommendation #4: **Near Term Deployment Options:** As the City struggles with the economic downturn, it should consider this phasing of deployment changes:

- Do nothing
- Add back the 8 brownout engines
- Add back some of the 4-firefighter brownout engines as peak hour demand units*
- Implement gap area engines and/or Fast Response Squads.*

* *Meet and confer on impacts, work schedules, position compensation.*

Recommendation #5: **Adopt the Priority Criteria of this Study for Where to Add Resources:** Use of the tools and methods in this study would result over time as resources allow the addition of:

- 10 additional 4-firefighter staffed engine companies
- 9 new "Fast Response Squads"
- 4 additional aerial ladder trucks
- 2 additional field battalion chiefs.

Recommendation #6: **Fire Engine Dispatch Process:** The Department has to improve the procedures to achieve a decrease of the dispatch queue time for the first responding engine company.

Recommendation #7: **Fast Response Squads:** The Department should immediately begin detailed planning to fully design and cost a pilot program of two-firefighter Fast Response Squads to assist in smaller deployment gaps where there are high simultaneous incident workloads. Unit type and capabilities are defined in Section 2.7.9.

Recommendation #8: **<u>Replace In-Station Alerting System:</u>** The City should make it a priority to replace the 21-year-old fire crew in-station alerting system at an approximate cost of $3.4 million. This will improve response times via a one-time capital expense without adding any more response crews.

SECTION 3—FISCAL IMPACTS

Section Intent: This chapter presents order-of-magnitude costs identified for the recommendations contained in this study. These are sufficient to permit the understanding of costs in current dollars so future long-range fiscal planning for fire and other City needs can occur when the economy recovers. Then, illustrative general timelines for implementing improvements are demonstrated.

Detailed costing is not possible until City leadership approves fire service deployment measures with Standards of Response Cover recommendations and sees enough of an economic recovery to plan for fire service enhancements. Even when the economy recovers, the City will likely have sustained damage to its existing service levels and fiscal reserves. As such, Fire Department needs may or may not be of sufficient priority to receive funding early in a recovery. The Mayor and Council will have to understand the entire City's under-met needs and make the appropriate fiscal allocation decisions. Additionally, the facility needs mentioned need more detailed planning and cost estimation based on City fire station standards and specific site costs.

If the City decides to add these enhancements as recommended by Citygate, the table below provides an *illustration* or sample of how this might be phased in over several years and the associated annual estimated cost in FY 10-11 dollars:

Operating Macro Costs

Resource – Staff & Operating	Cost in $ Millions	Quantity for 5-Minute Coverage @ 90%	Totals
2-FF Fast Response Squads	1.0	9	9.0
Single engine staffed station	2.2	6	13.2
Double staffed station	4.4	4	17.6
Batt Chief	0.53	2	1.1
Total			**$40.9**

Capital Macro Costs

Resource	Cost in $ Millions	Quantity for 5-Minute Coverage @ 90%	Totals
Engine	0.78	10	7.8
Ladder	1.1	4	4.4
Fast Response Squad	0.4	9	3.6
Single station	7	6	42.0
Double station	8	4	32.0
Fast Response Squad Station	.5	9	4.5
Replace Fire Station Crew Alert System	3.4	-	3.4
Total			**$97.7**

3.1 PRIORITIES AND TIMING

Some of the recommendations in this planning effort requiring minimal additional resources can be worked on in parallel. Others will take several fiscal years, both in time and funding. Given these two realities, Citygate recommends two short-term priorities and one long-term priority:

3.1.1 Short-Term Priority One

- Absorb the policy recommendations of this fire services study and adopt revised Department performance measures to drive the deployment of firefighting and emergency medical resources.
- Create a task force to fully study the Fast Response Squad concept. Bring forward an implementation pilot project and costs.

3.1.2 Short-Term Priority Two

- Add back brownout engines per the priority methodology used in this study.
- Identify revenues to replace the failing fire station alerting system to ensure timely incident notification to emergency responders.
- Identify revenue sources to increase the Department's deployment system.
- Add additional primary engine and Fast Response Squads as revenues allow.

3.1.3 Long-Term Priority

- Monitor the performance of the deployment system using adopted deployment measures and the methods in this study.

F3.11

Citygate Associates, LLC, ***Fire Service Standards of Response Coverage Deployment Study for the City of San Diego Fire-Rescue Department, Volume 2 of 2 - Map Atlas*** **(February 14, 2011)**

CITYGATE ASSOCIATES, LLC

FOLSOM (SACRAMENTO), CA MANAGEMENT CONSULTANTS

FIRE SERVICE STANDARDS OF RESPONSE COVERAGE DEPLOYMENT STUDY FOR THE

CITY OF SAN DIEGO FIRE-RESCUE DEPARTMENT

VOLUME 2 OF 2 – MAP ATLAS

February 14, 2011

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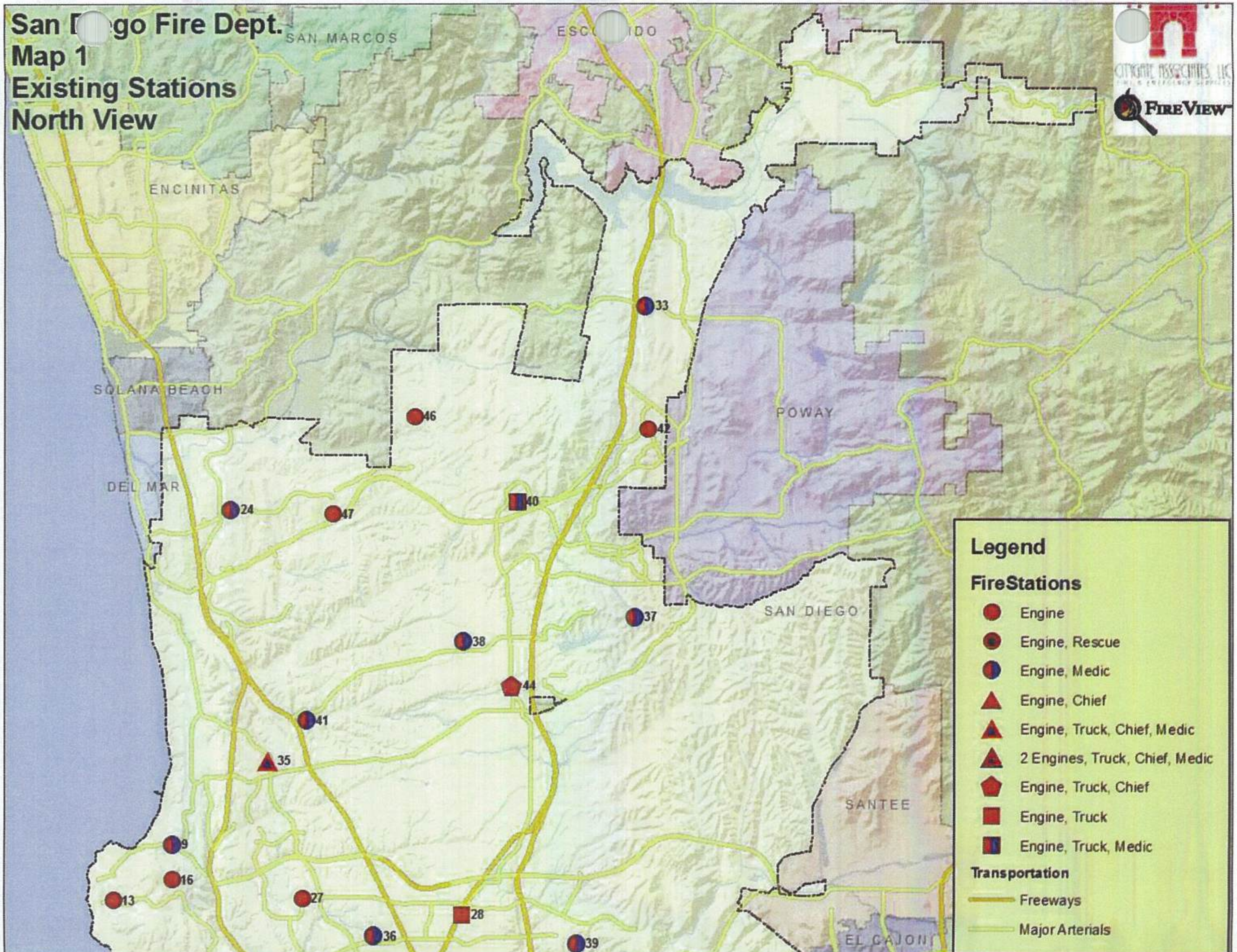
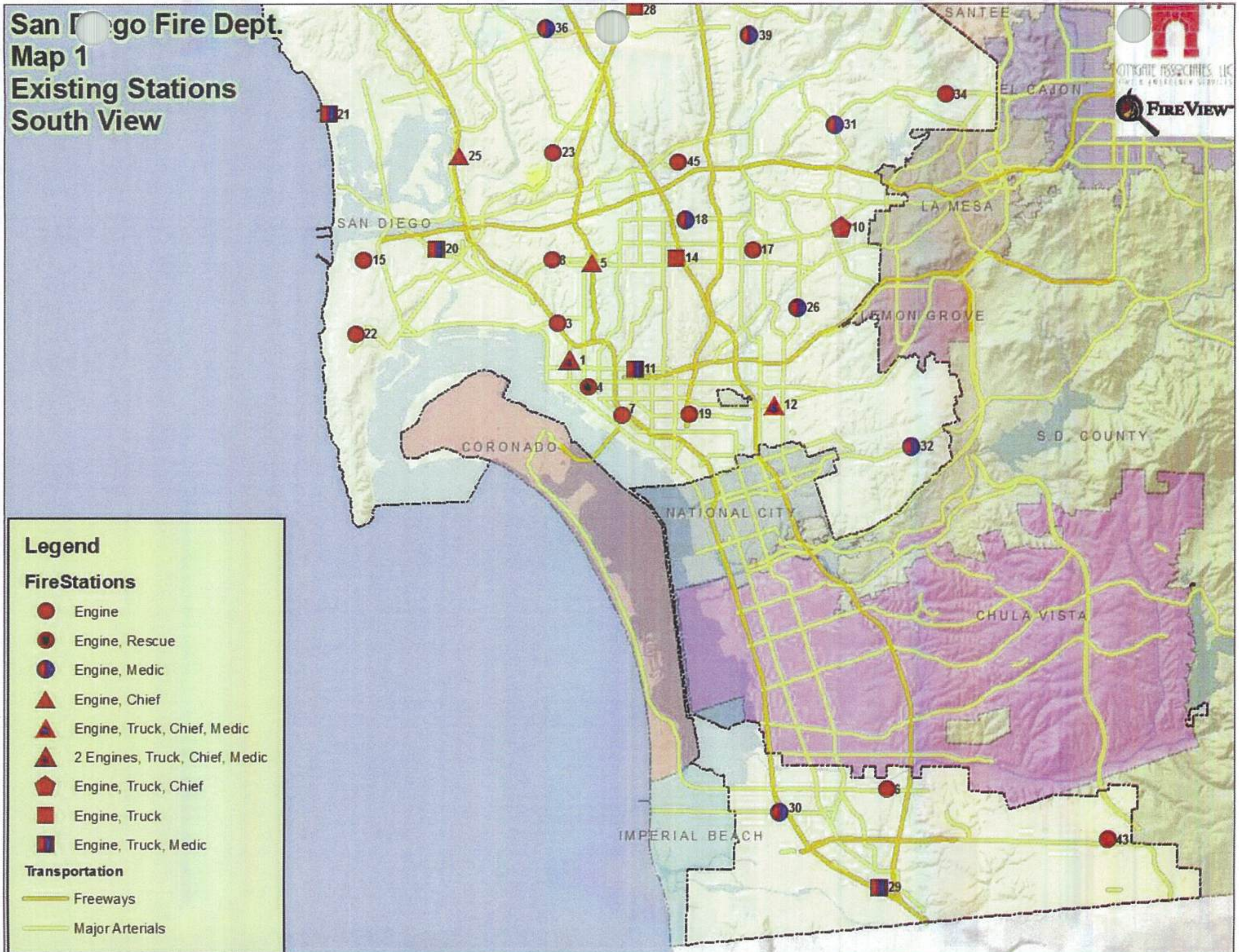
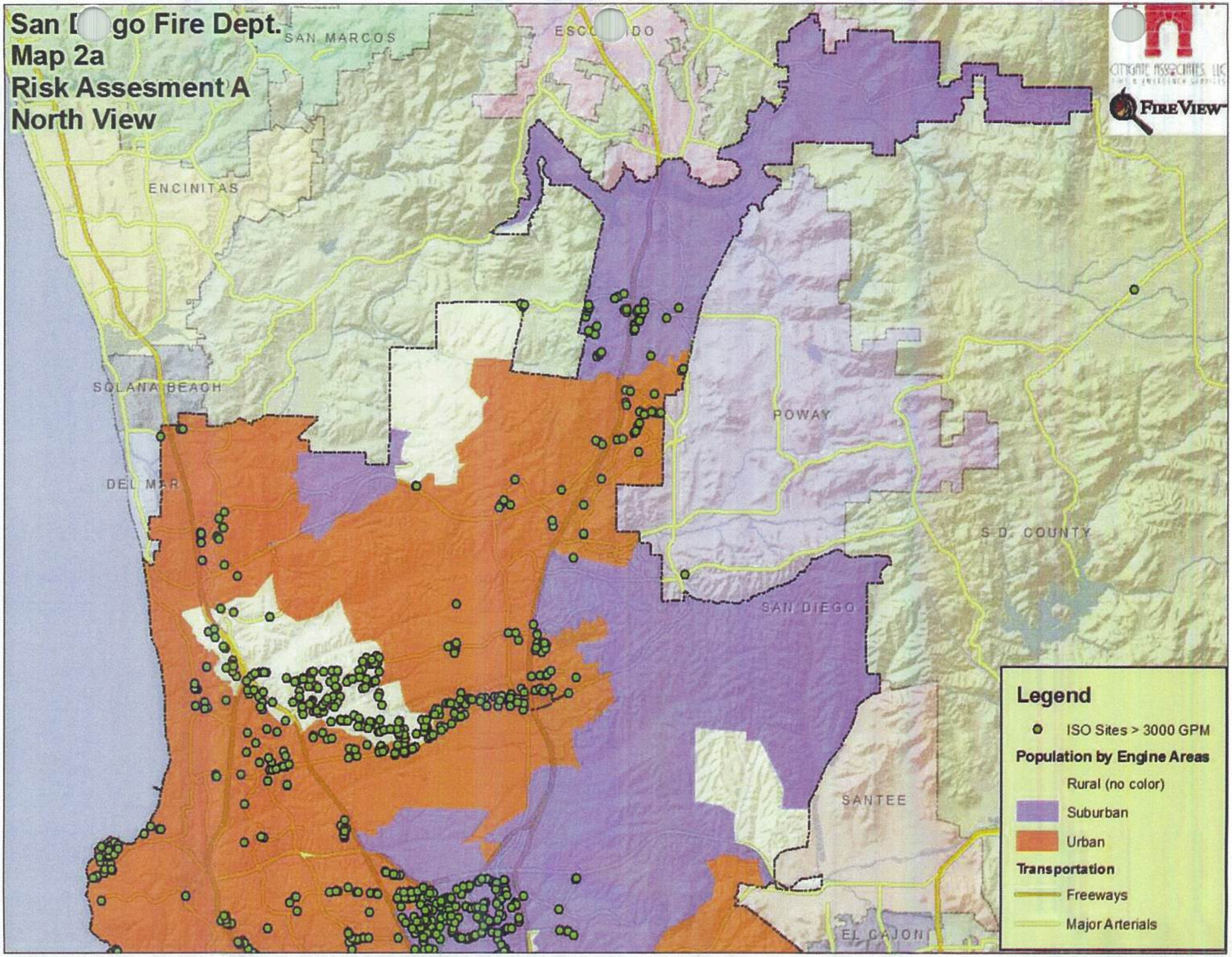
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES

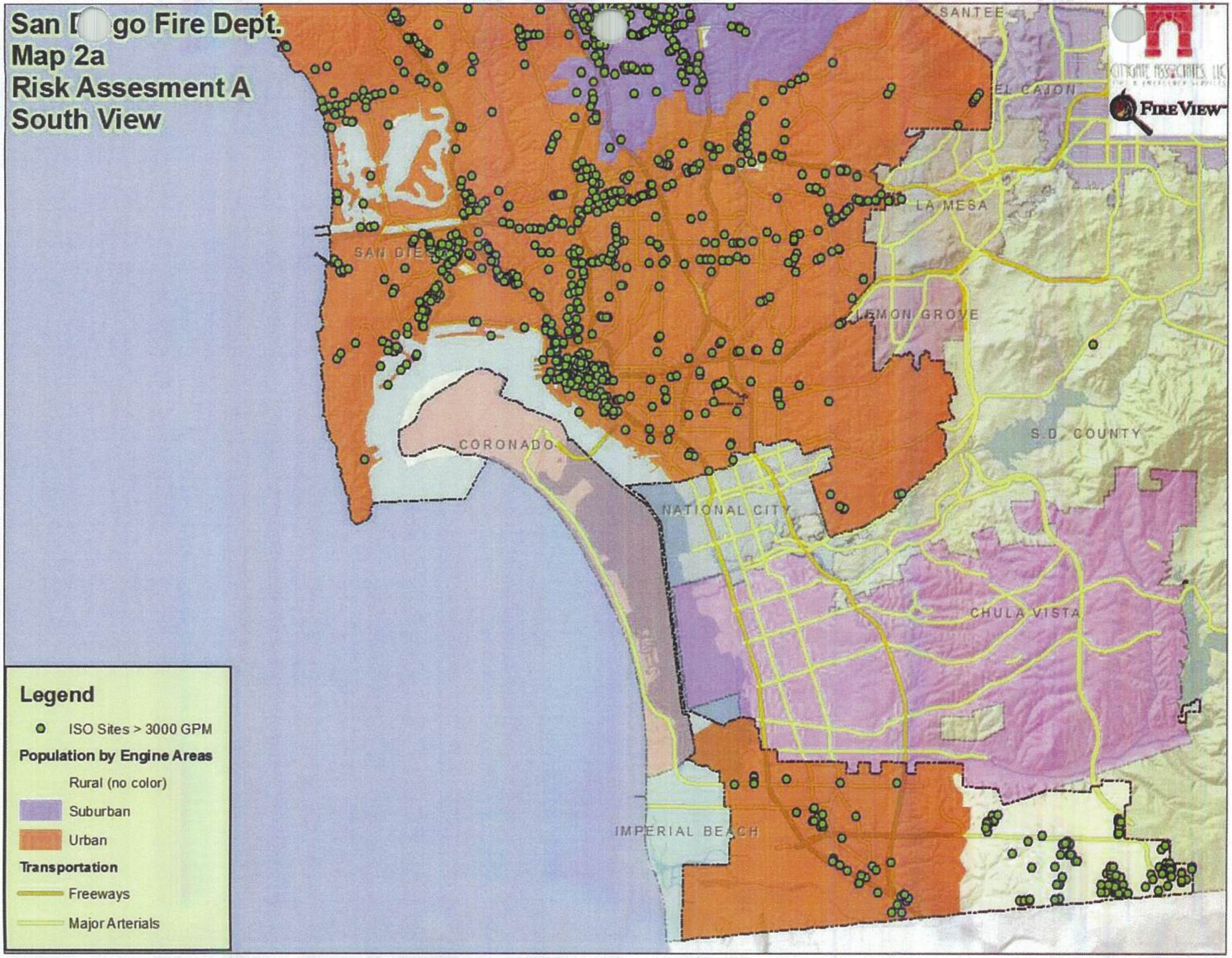

San D go Fire Dept.
Map 1
Existing Stations
North View
SAN MARCOS
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIREVIEW
33
46
42
24
47
40
37
38
44
41
35
9
16
13
27
28
36
39
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways
Major Arterials

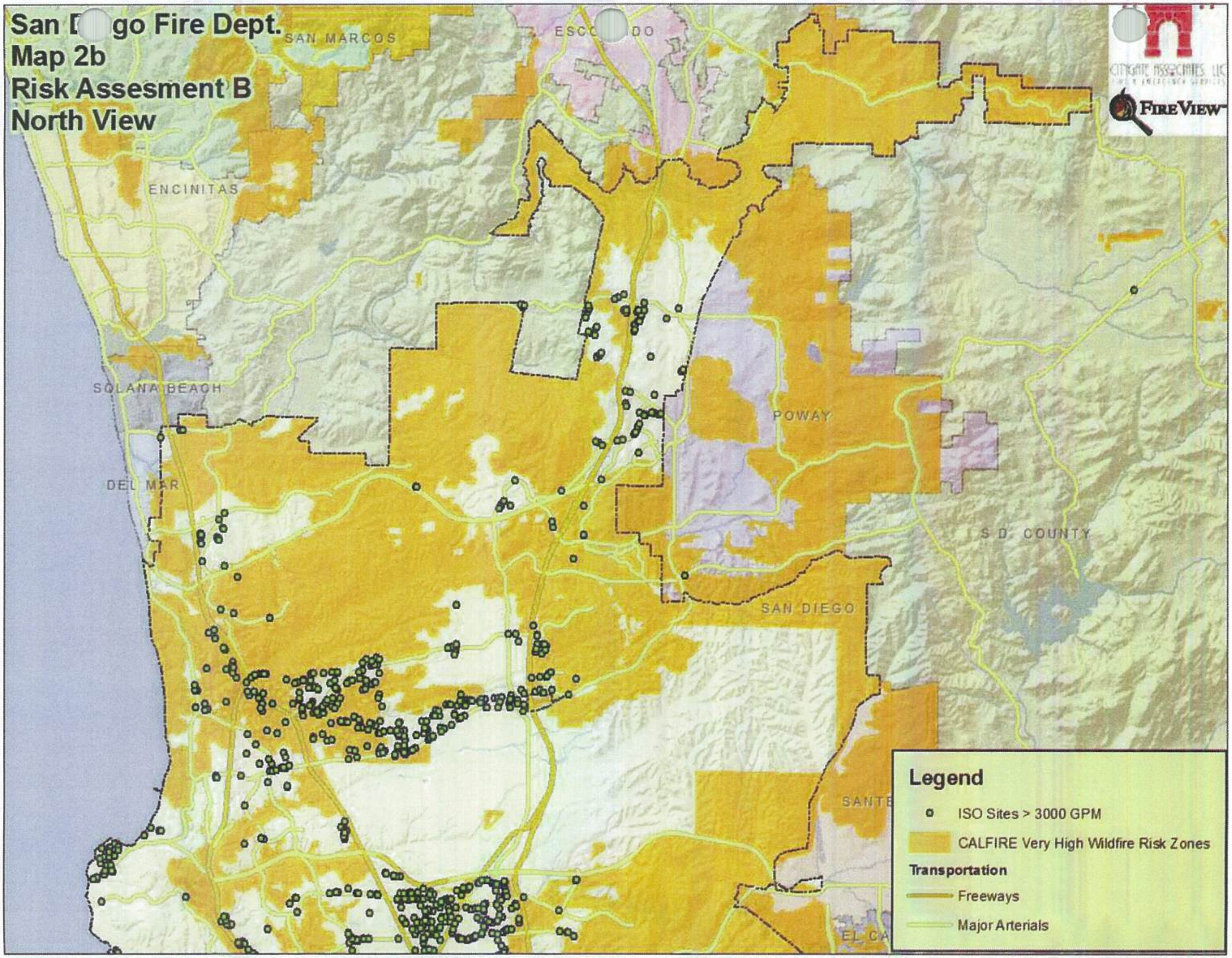


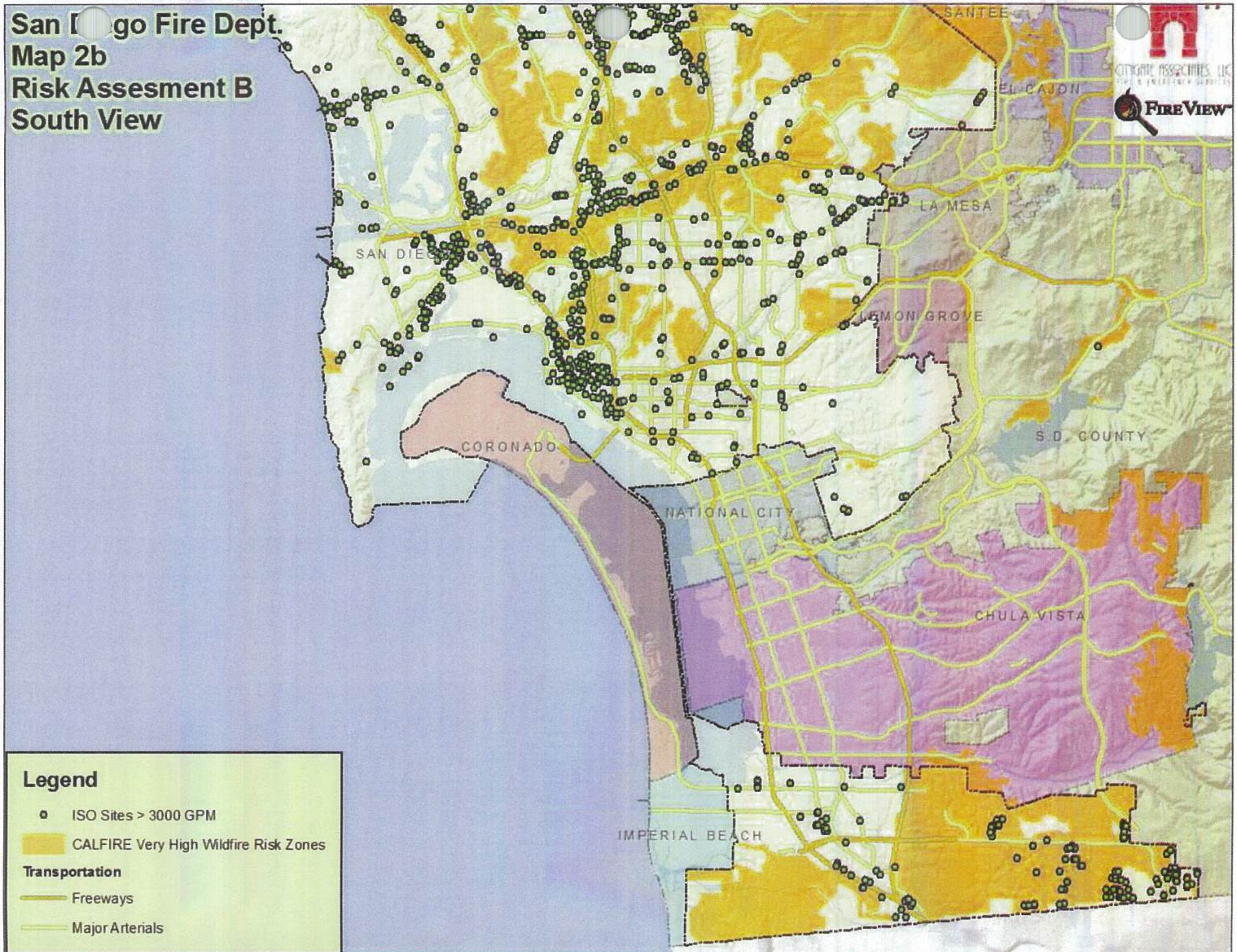
San Diego Fire Dept.
Map 1
Existing Stations
South View
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
CORONADO
S.D. COUNTY
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways
Major Arterials



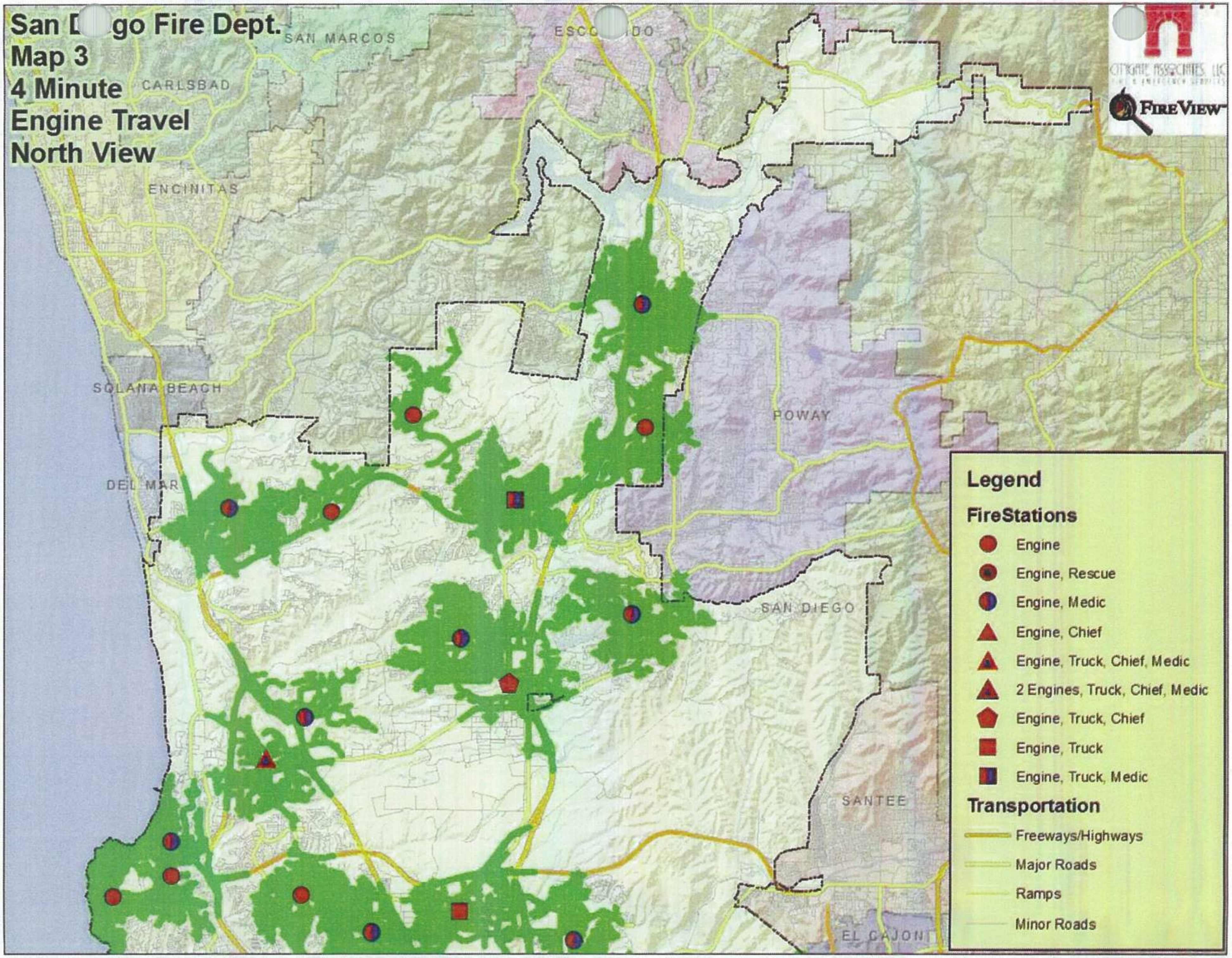
San Diego Fire Dept.
Map 2a
Risk Assesment A
North View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SAN MARCOS
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SAN DIEGO
SANTEE
EL CAJON
Legend
ISO Sites > 3000 GPM
Population by Engine Areas
Rural (no color)
Suburban
Urban
Transportation
Freeways
Major Arterials


San D go Fire Dept.
Map 2a
Risk Assesment A
South View
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
FireView
Legend
ISO Sites > 3000 GPM
Population by Engine Areas
Rural (no color)
Suburban
Urban
Transportation
Freeways
Major Arterials

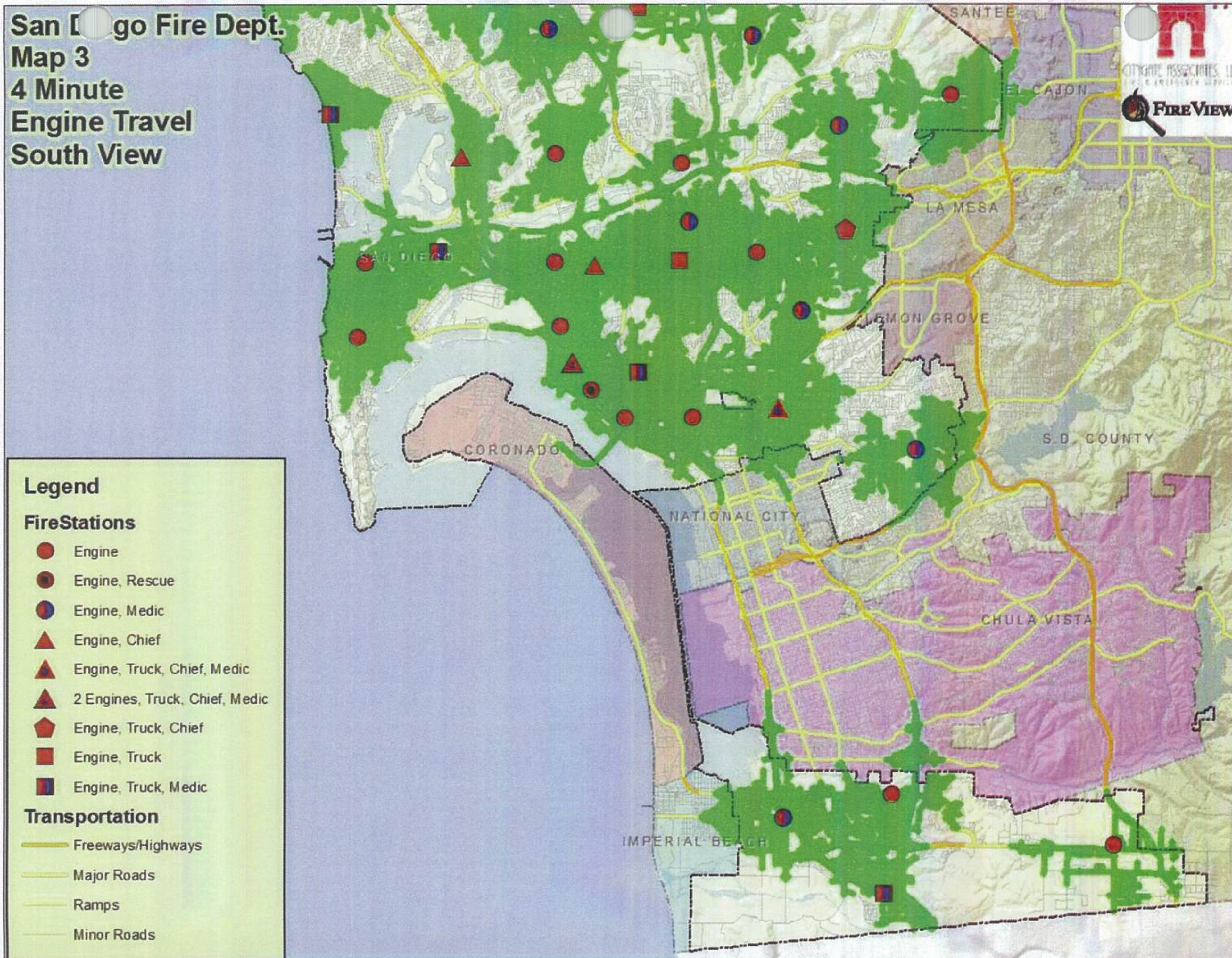

San D go Fire Dept.
Map 2b
Risk Assesment B
North View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SAN DIEGO
SANTE
EL CA
Legend
ISO Sites > 3000 GPM
CALFIRE Very High Wildfire Risk Zones
Transportation
Freeways
Major Arterials

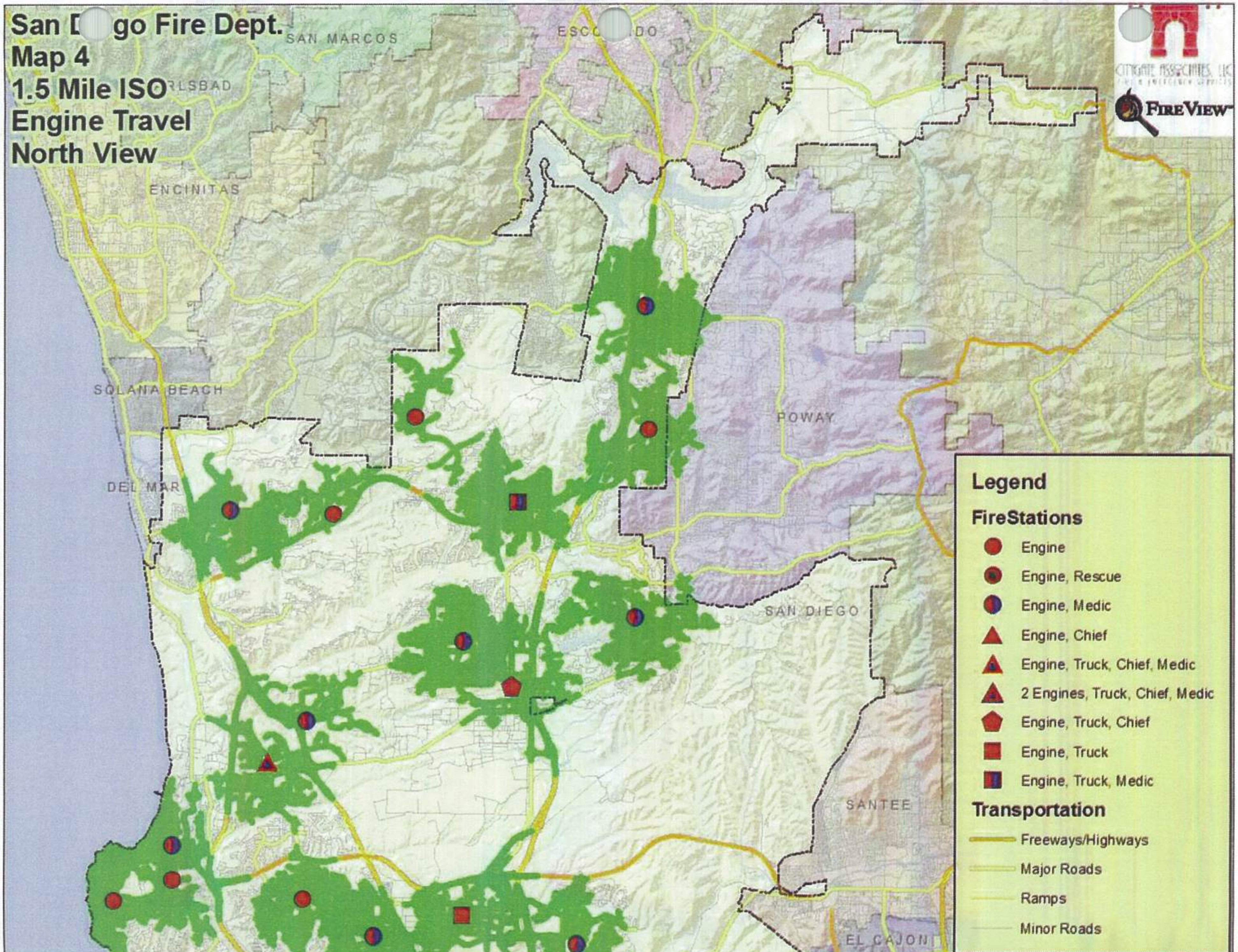


San D go Fire Dept.
Map 2b
Risk Assesment B
South View
SANTEE
EL CAJON
FIREVIEW
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
ISO Sites > 3000 GPM
CALFIRE Very High Wildfire Risk Zones
Transportation
Freeways
Major Arterials

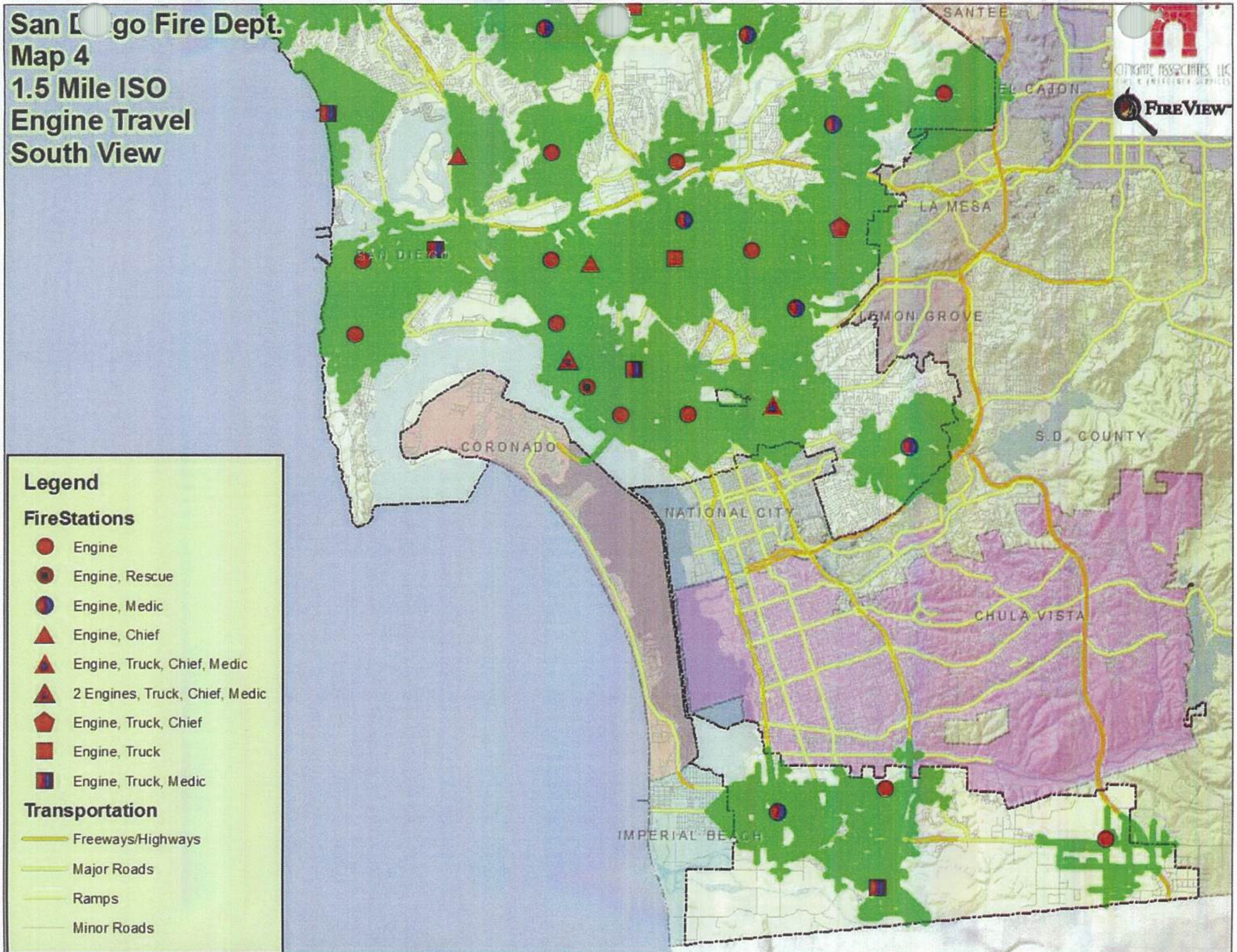


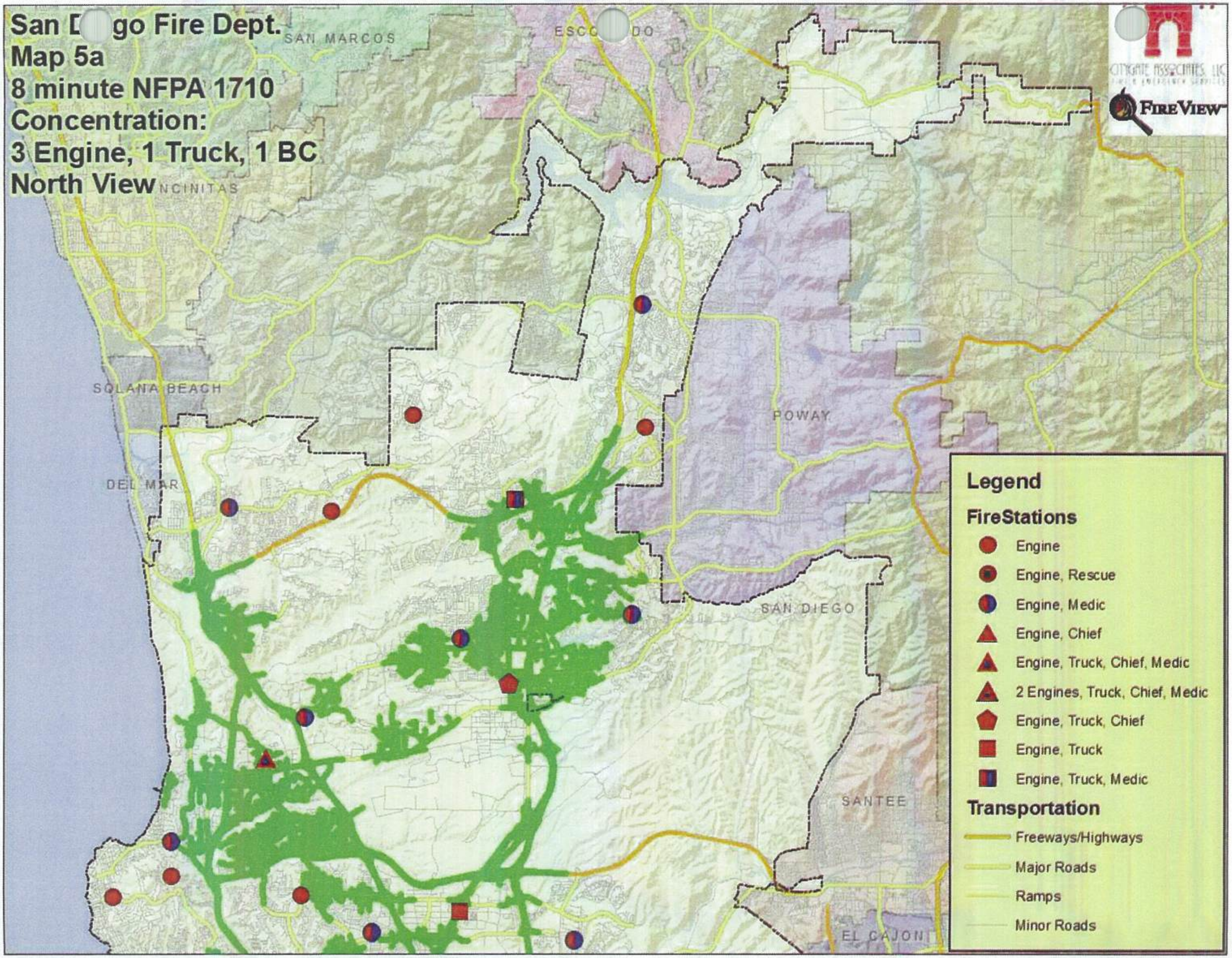
San D go Fire Dept.
Map 3
4 Minute
Engine Travel
North View
SAN MARCOS
ESCO DO
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San D go Fire Dept.
Map 3
4 Minute
Engine Travel
South View
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
FIRE VIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

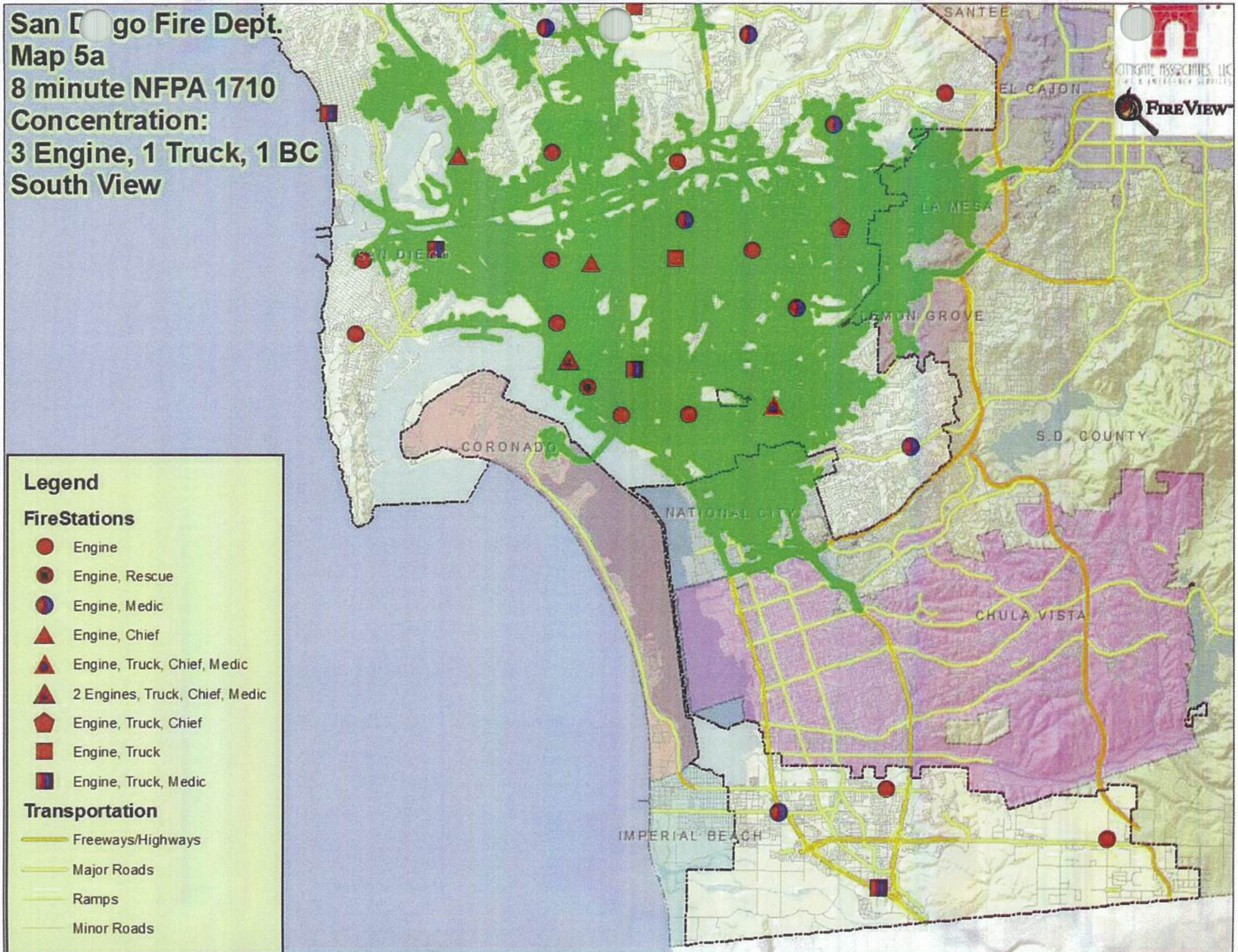


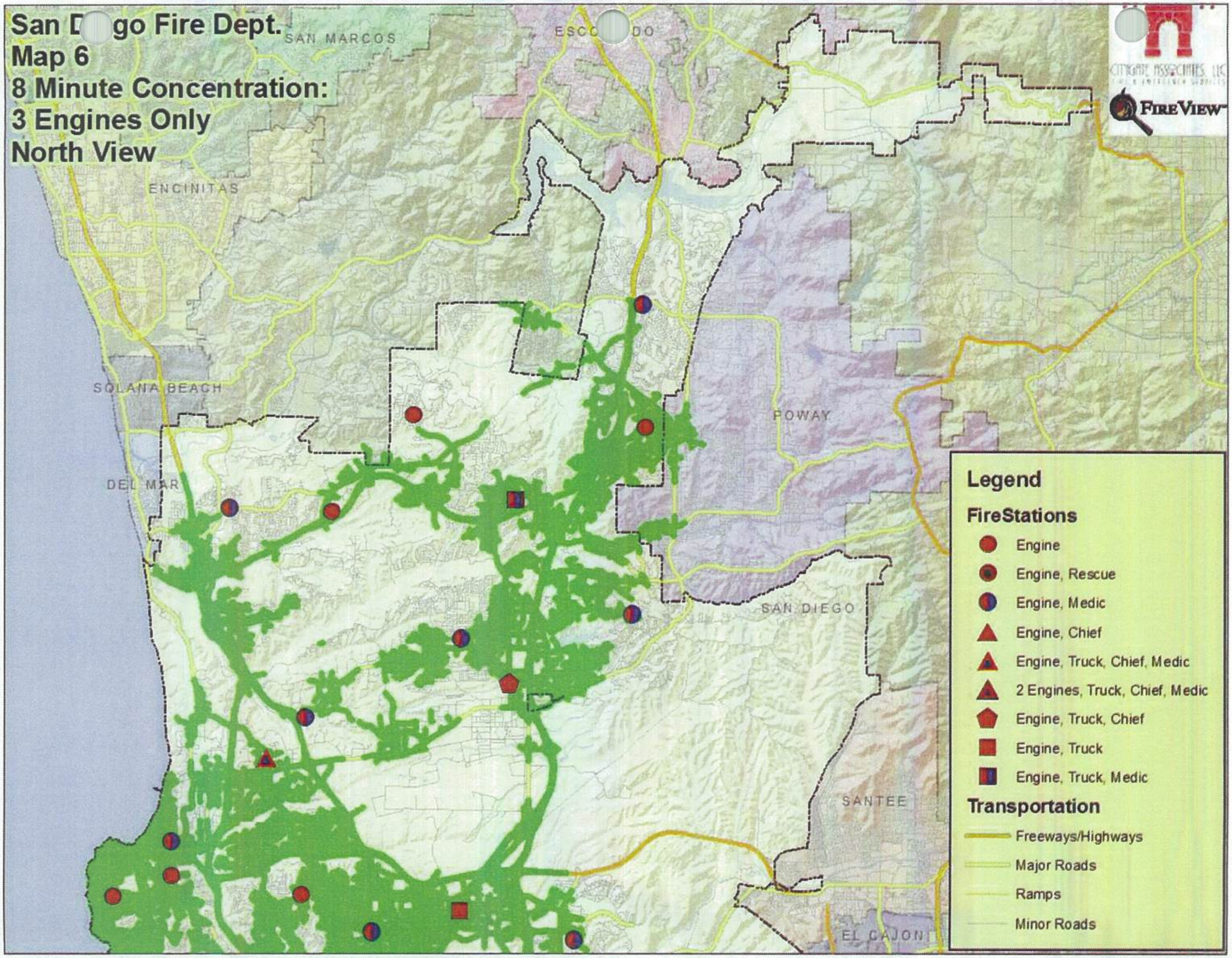
San D go Fire Dept.
Map 4
1.5 Mile ISO
Engine Travel
North View
SAN MARCOS
ESCO DO
RLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

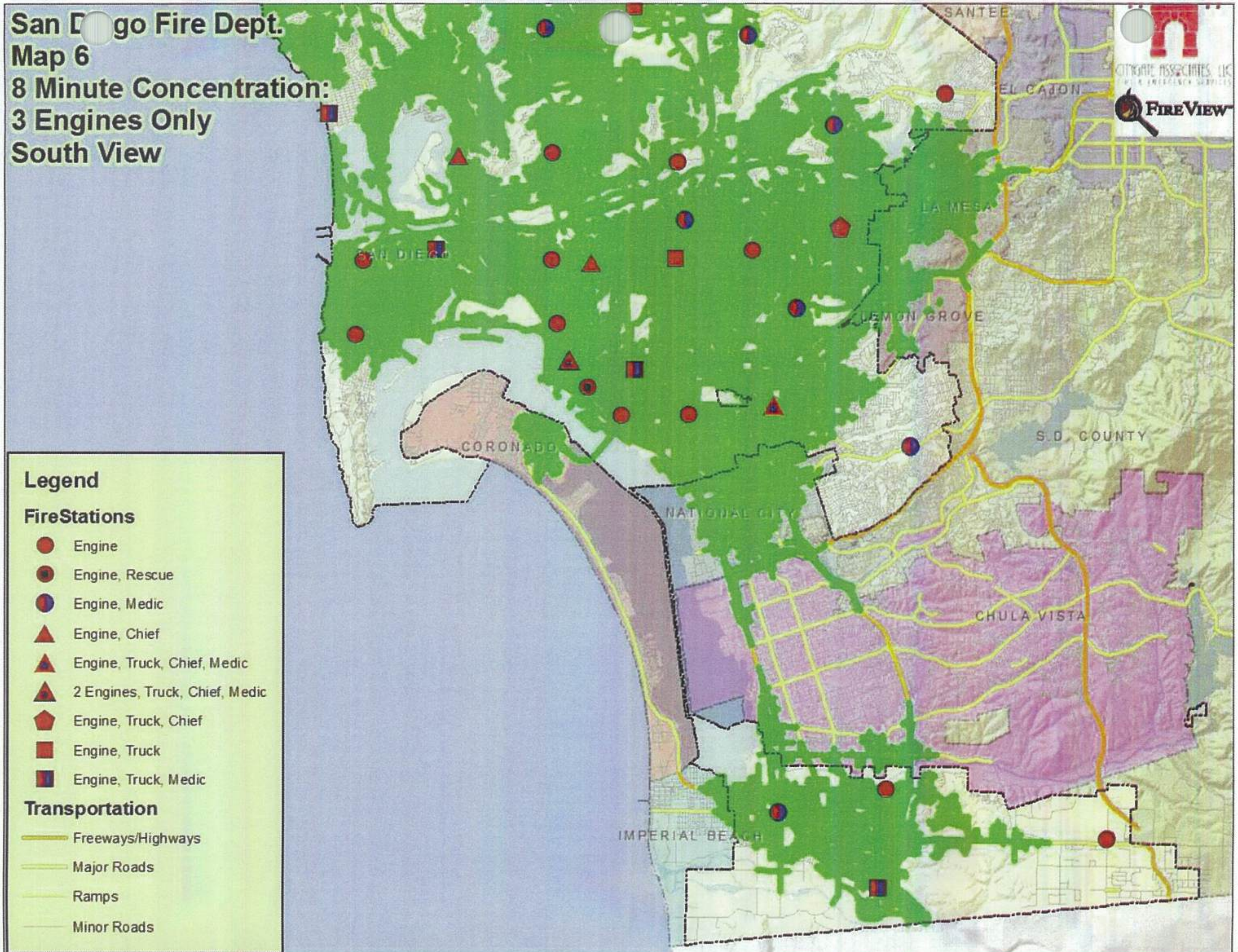

San Diego Fire Dept.
Map 4
1.5 Mile ISO
Engine Travel
South View
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
FireView
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads



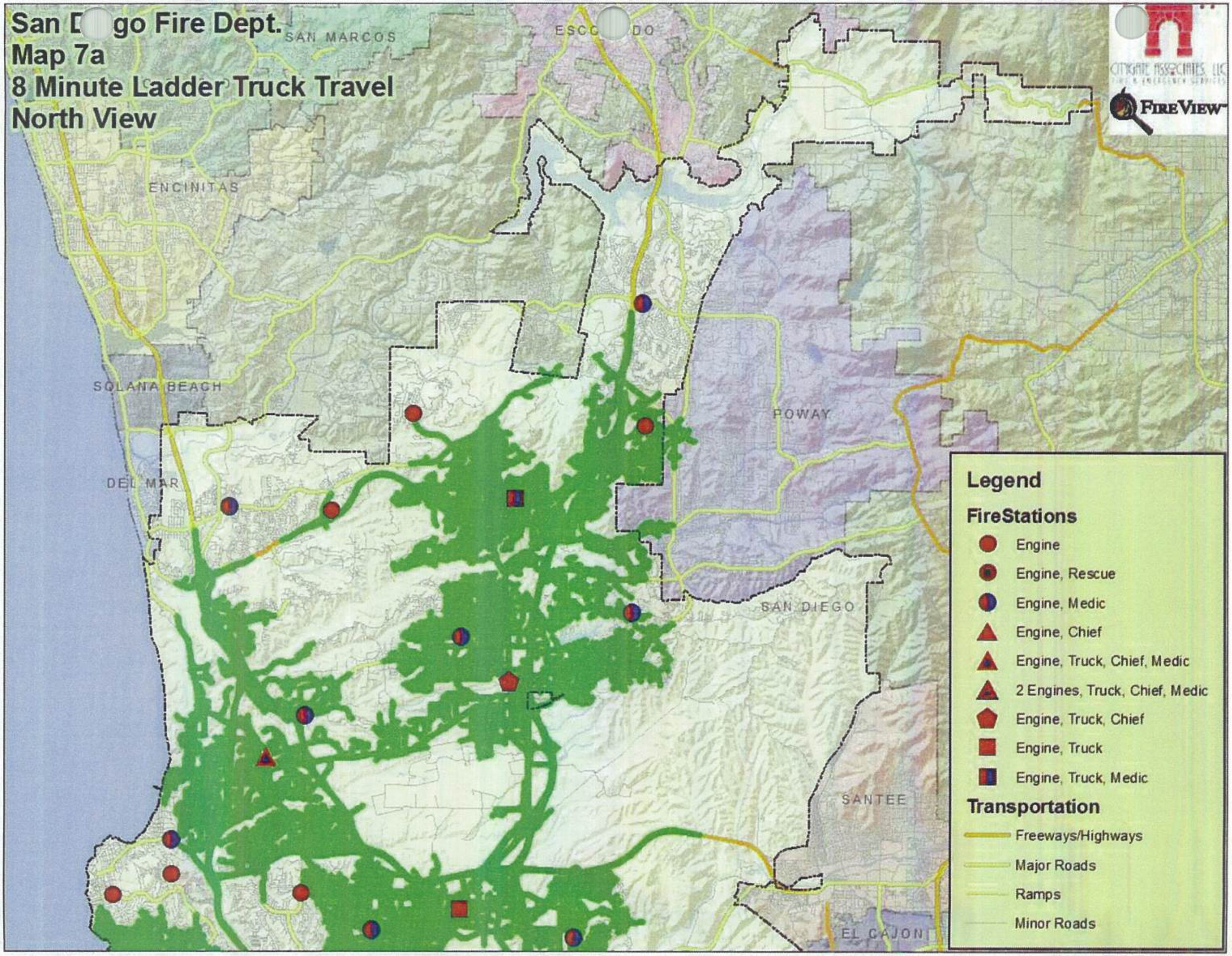
San D go Fire Dept.
Map 5a
8 minute NFPA 1710
Concentration:
3 Engine, 1 Truck, 1 BC
North View
SAN MARCOS
ESCO DO
NCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
Citygate Associates, LLC
FireView
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

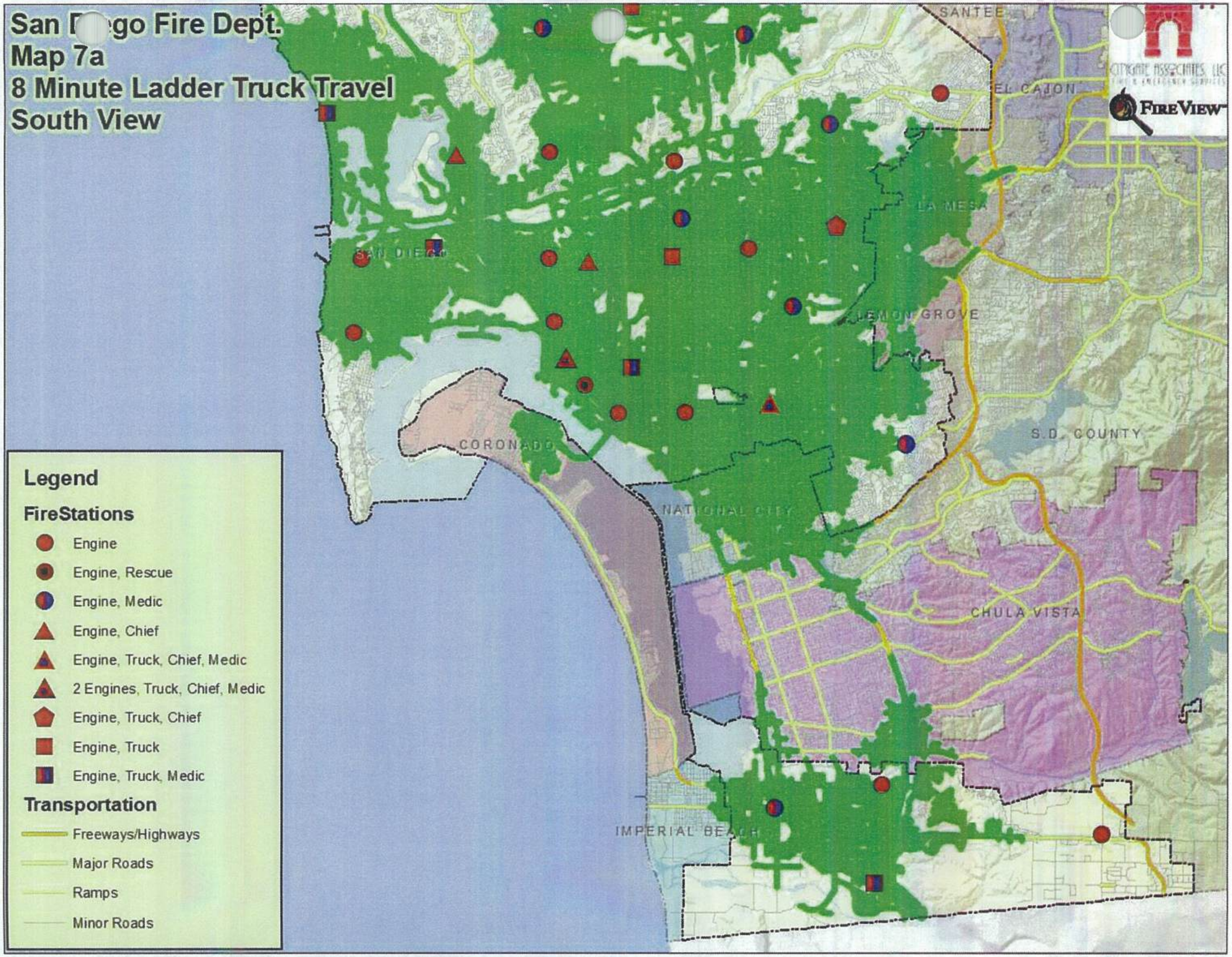

San D go Fire Dept.
Map 5a
8 minute NFPA 1710
Concentration:
3 Engine, 1 Truck, 1 BC
South View
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIREVIEW
LA MESA
SAN DIEGO
LEMON GROVE
CORONADO
S.D. COUNTY
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San D go Fire Dept.
Map 6
8 Minute Concentration:
3 Engines Only
North View
SAN MARCOS
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

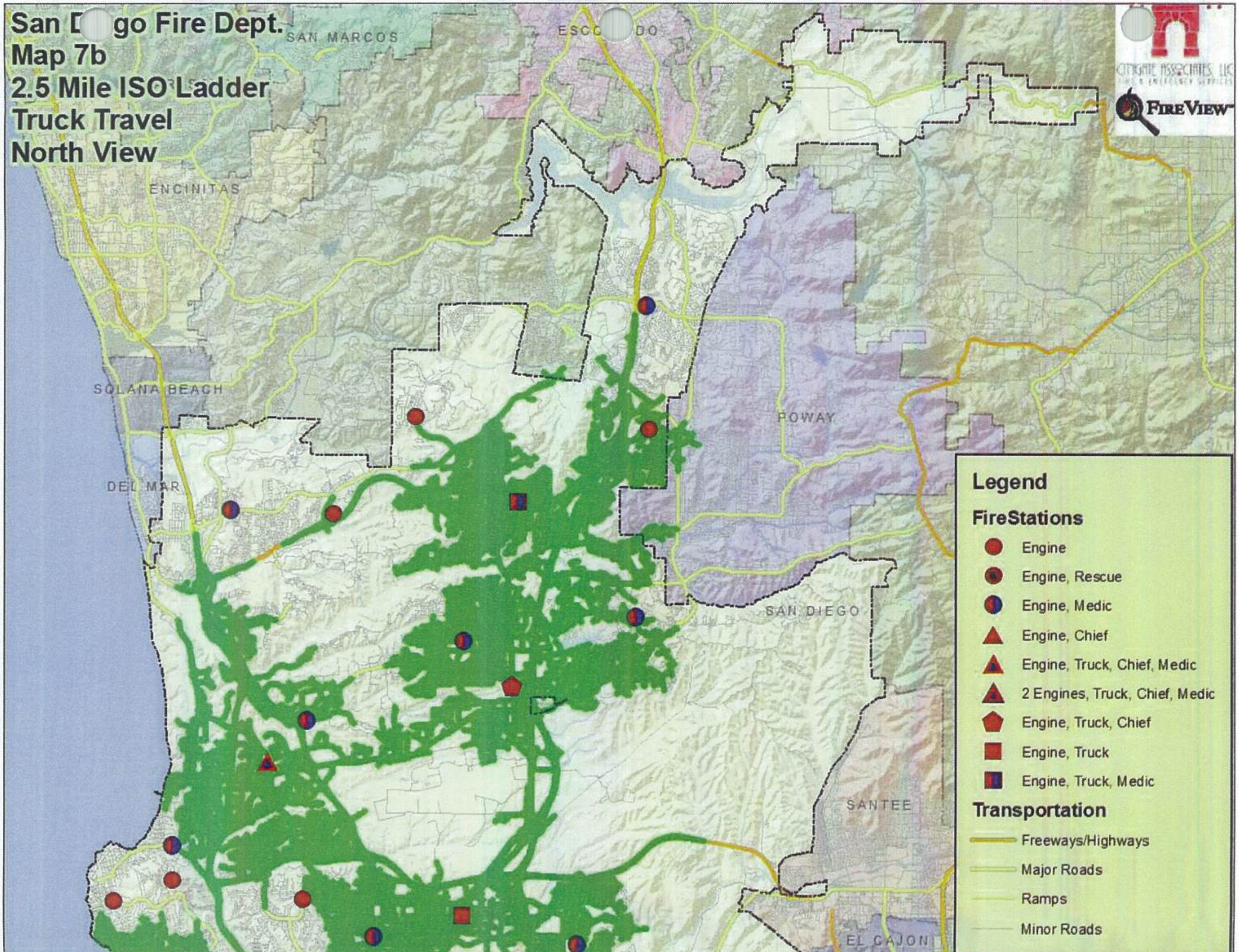


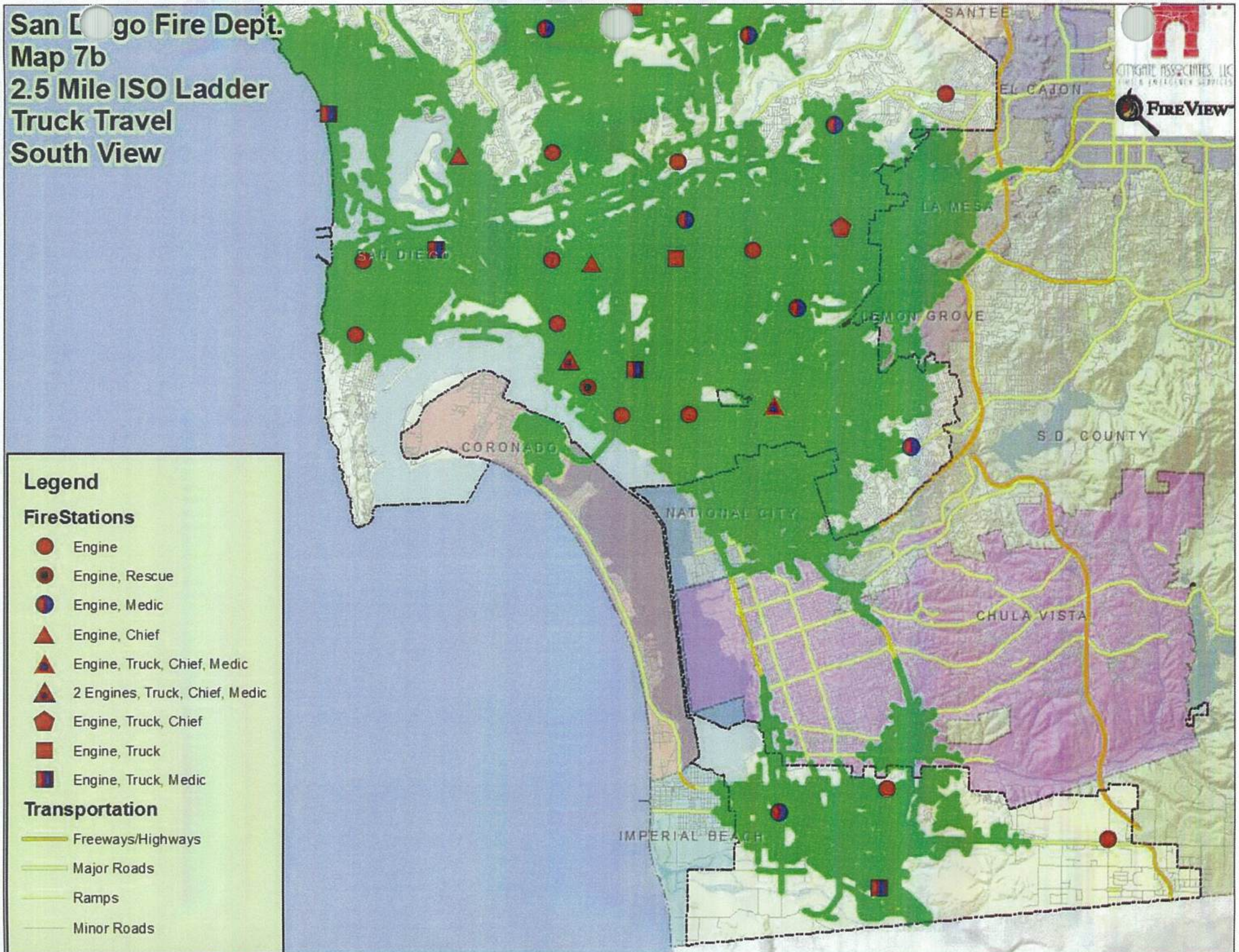
San D go Fire Dept.
Map 6
8 Minute Concentration:
3 Engines Only
South View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

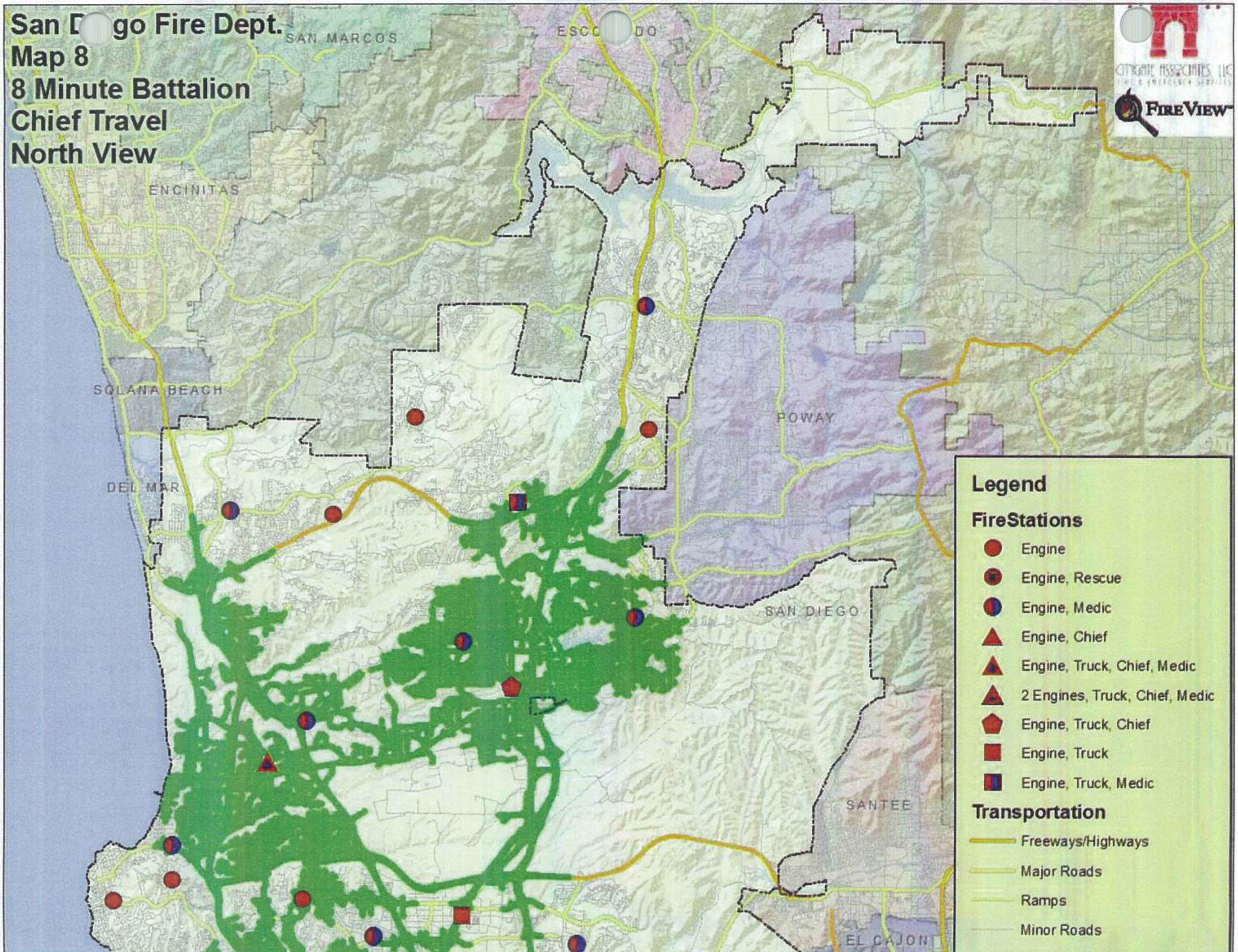

San D go Fire Dept.
Map 7a
8 Minute Ladder Truck Travel
North View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SAN MARCOS
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

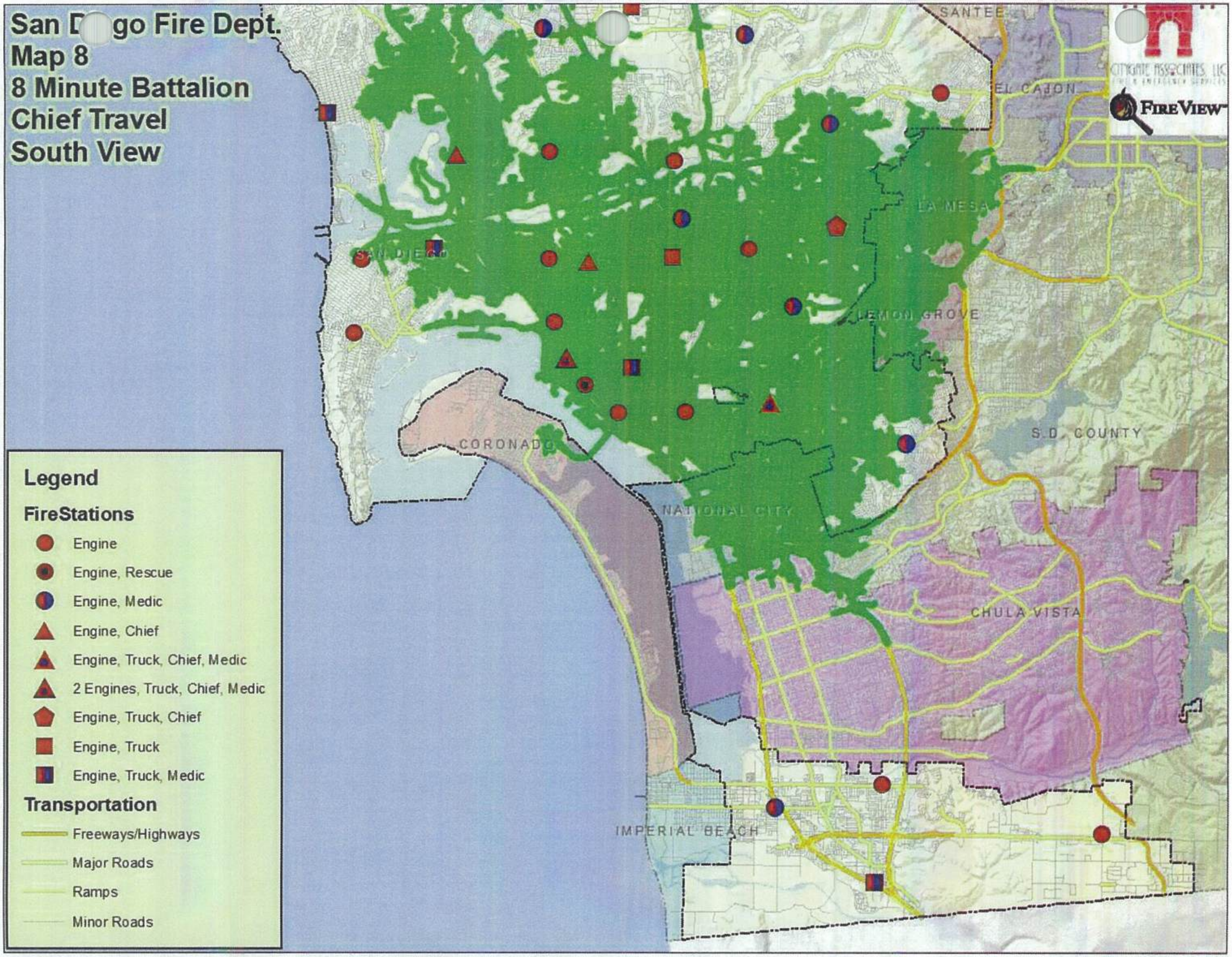


San D ego Fire Dept.
Map 7a
8 Minute Ladder Truck Travel
South View
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
CORONADO
S.D. COUNTY
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

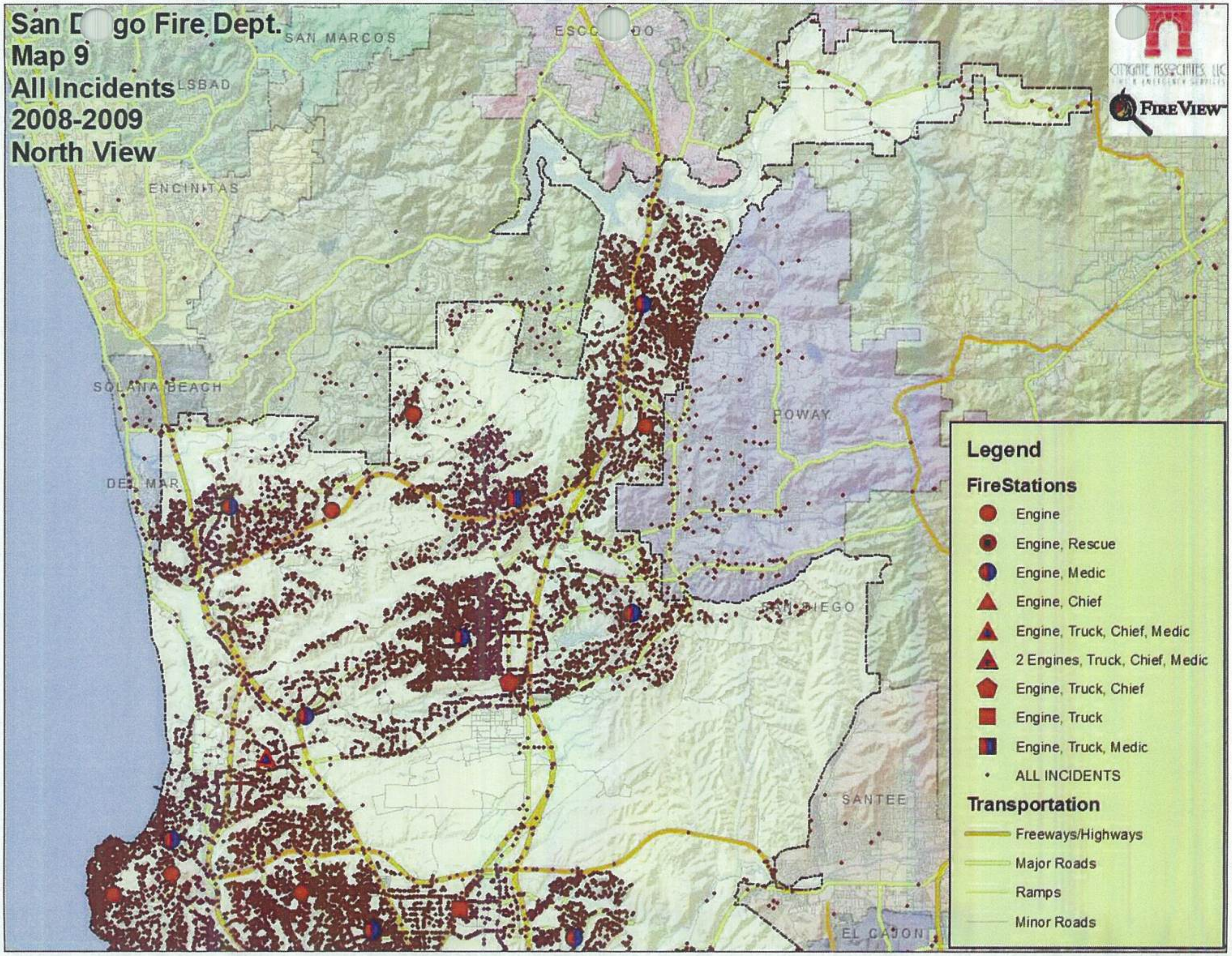

San D go Fire Dept.
Map 7b
2.5 Mile ISO Ladder
Truck Travel
North View
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FireView
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San Di go Fire Dept.
Map 7b
2.5 Mile ISO Ladder
Truck Travel
South View
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
CITYGATE ASSOCIATES, LLC
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

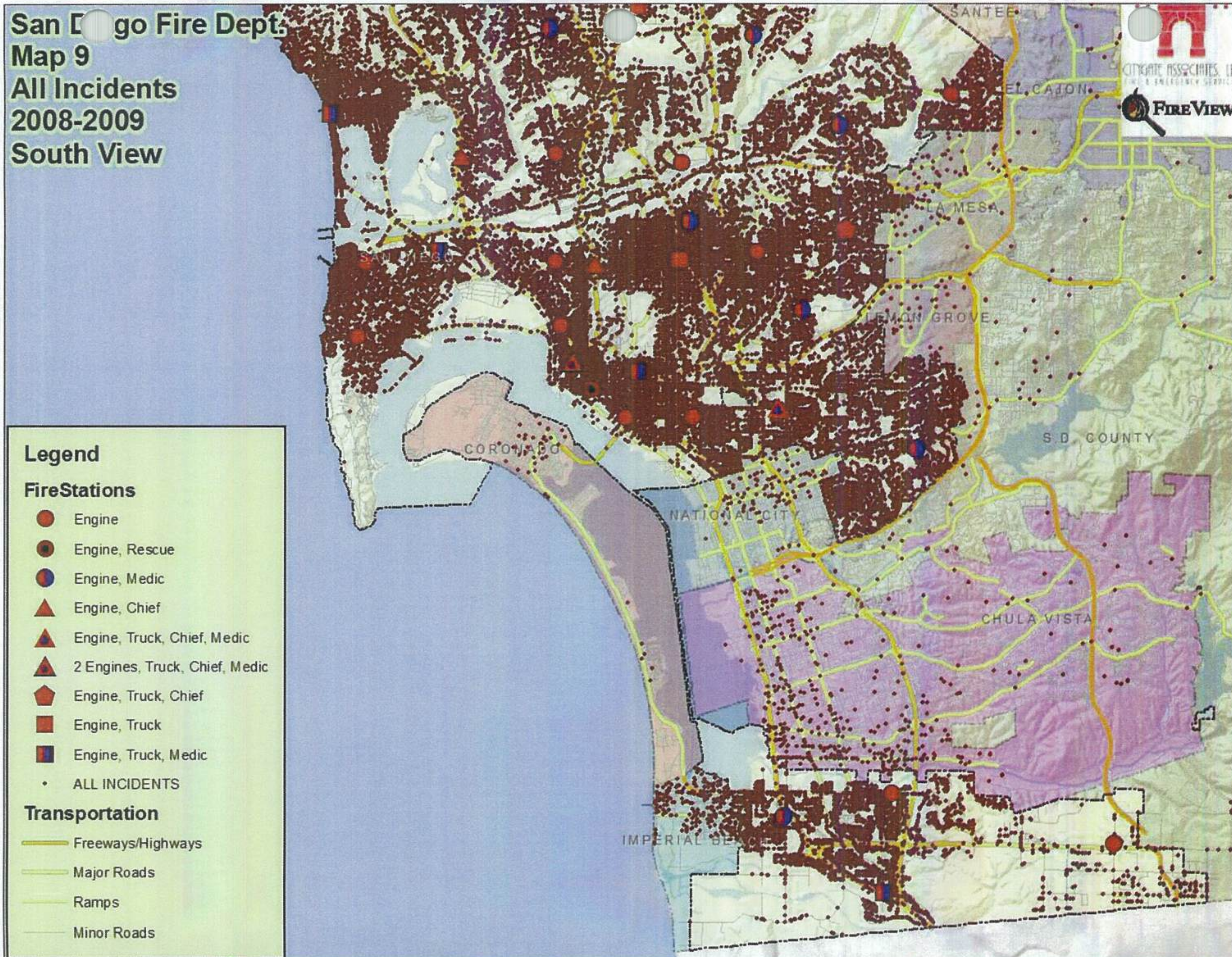

San D go Fire Dept.
Map 8
8 Minute Battalion
Chief Travel
North View
SAN MARCOS
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

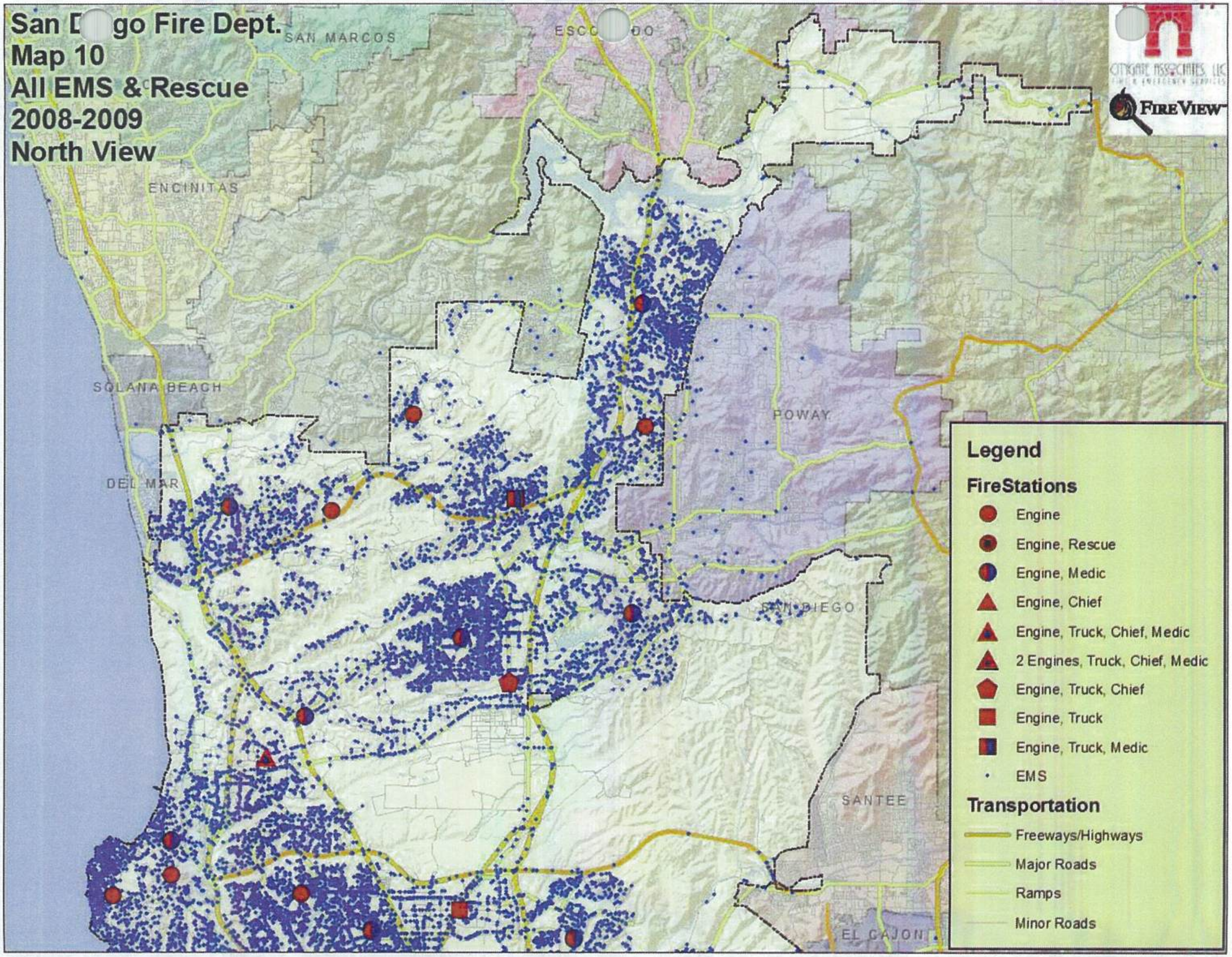


San D go Fire Dept.
Map 8
8 Minute Battalion
Chief Travel
South View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

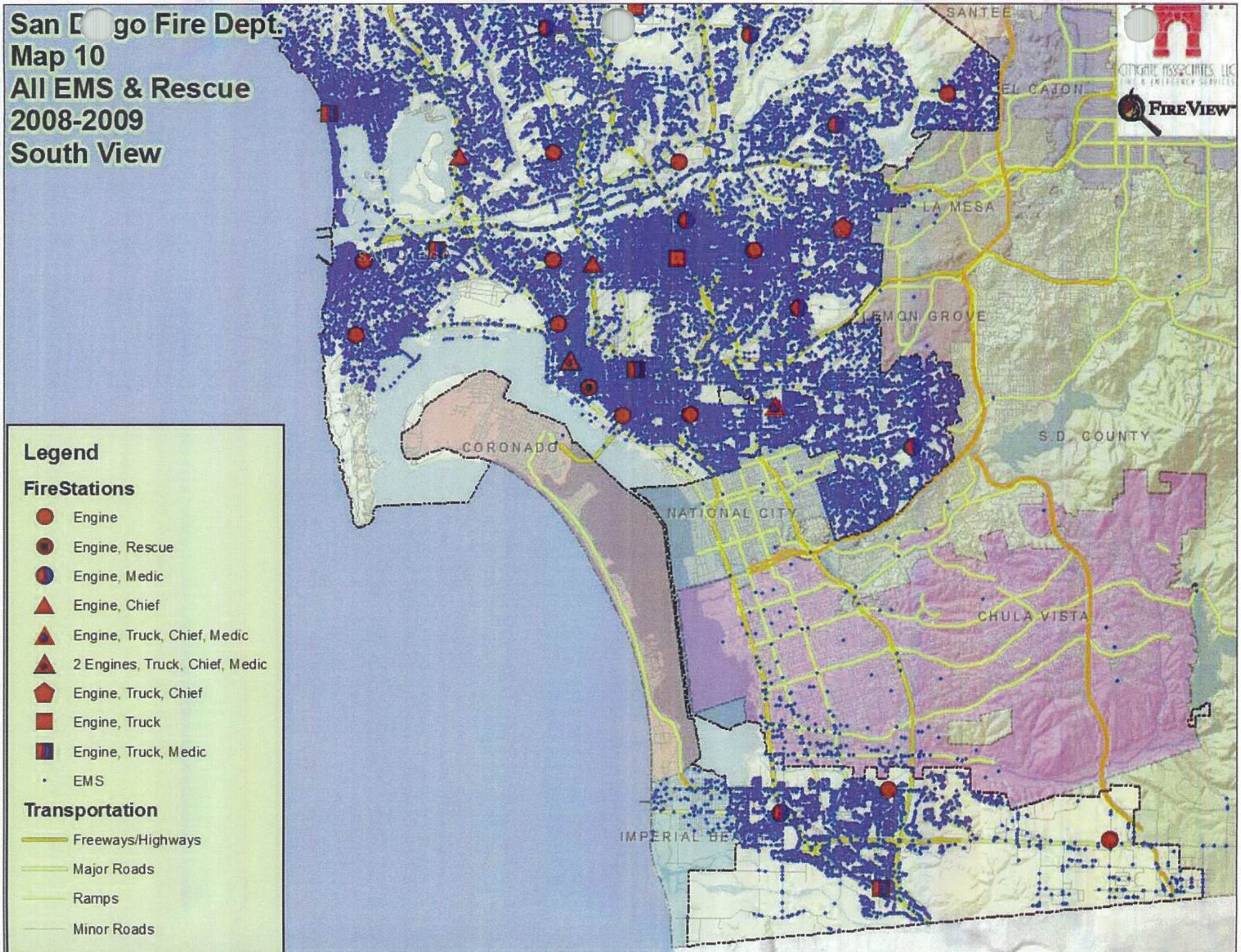


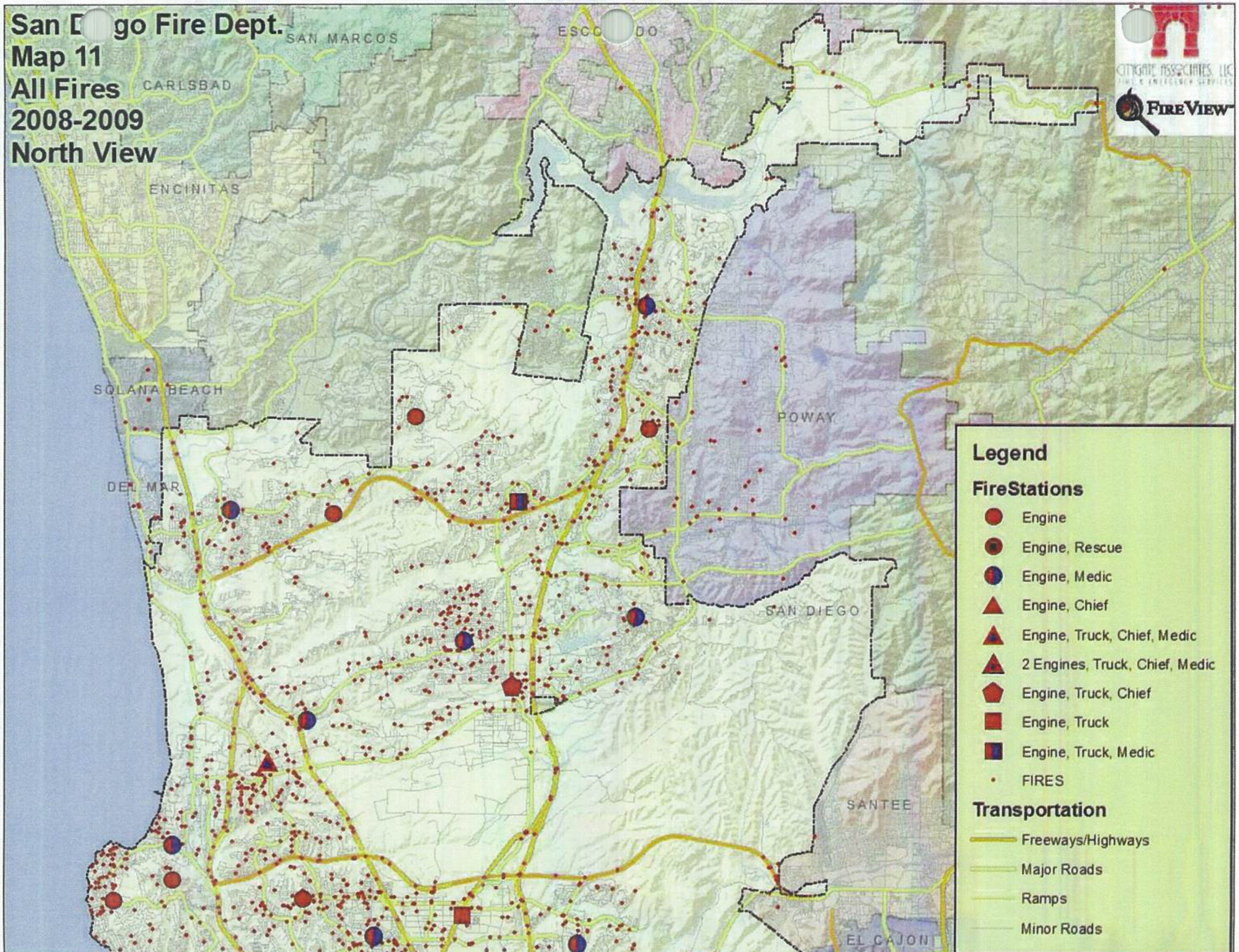
San D go Fire Dept.
Map 9
All Incidents
2008-2009
North View
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
ALL INCIDENTS
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San D go Fire Dept.
Map 9
All Incidents
2008-2009
South View
Citigate Associates, LLC
FireView
SANTEE
EL CAJON
LA MESA
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BE
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
ALL INCIDENTS
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

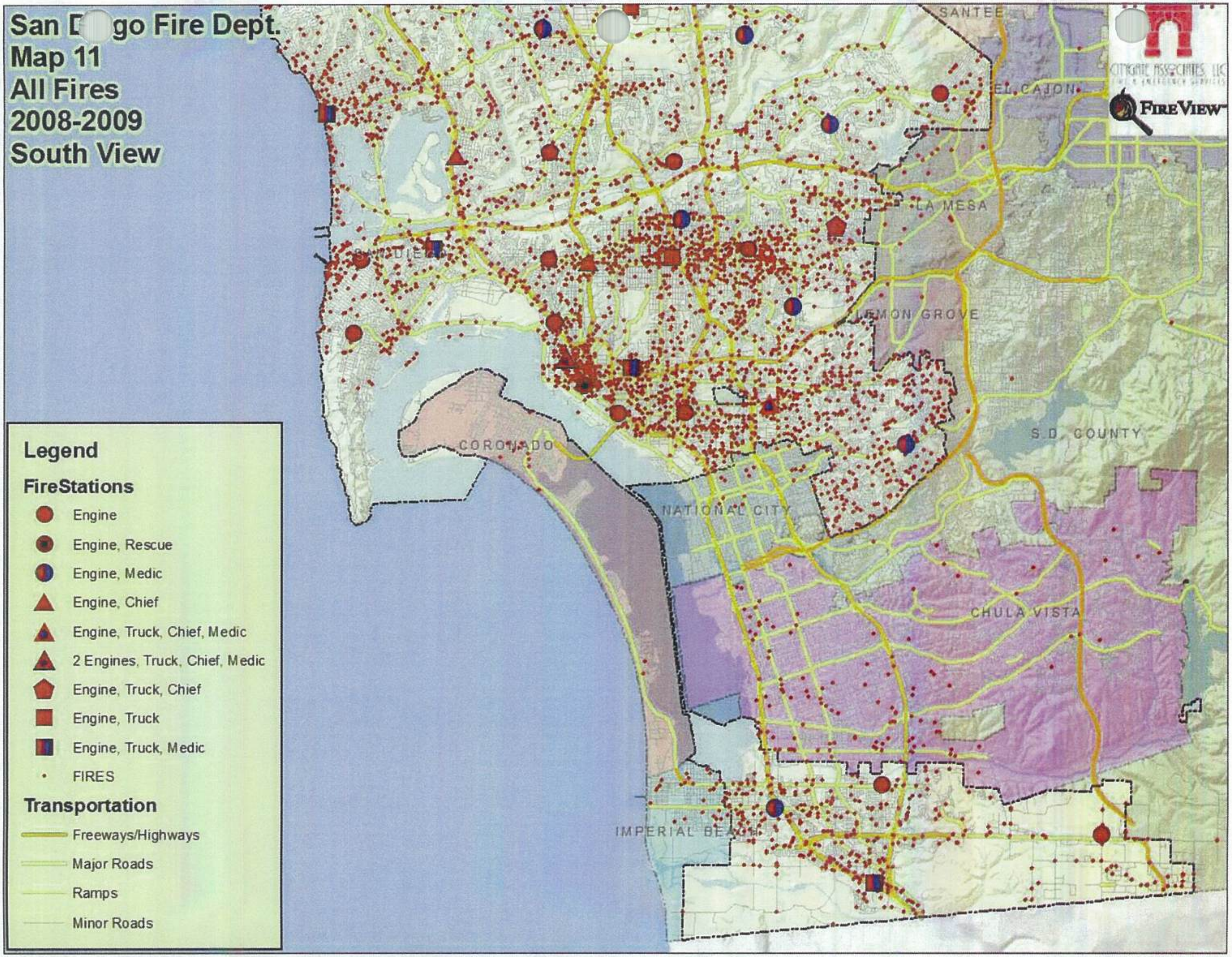


San D go Fire Dept.
Map 10
All EMS & Rescue
2008-2009
North View
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
EMS
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

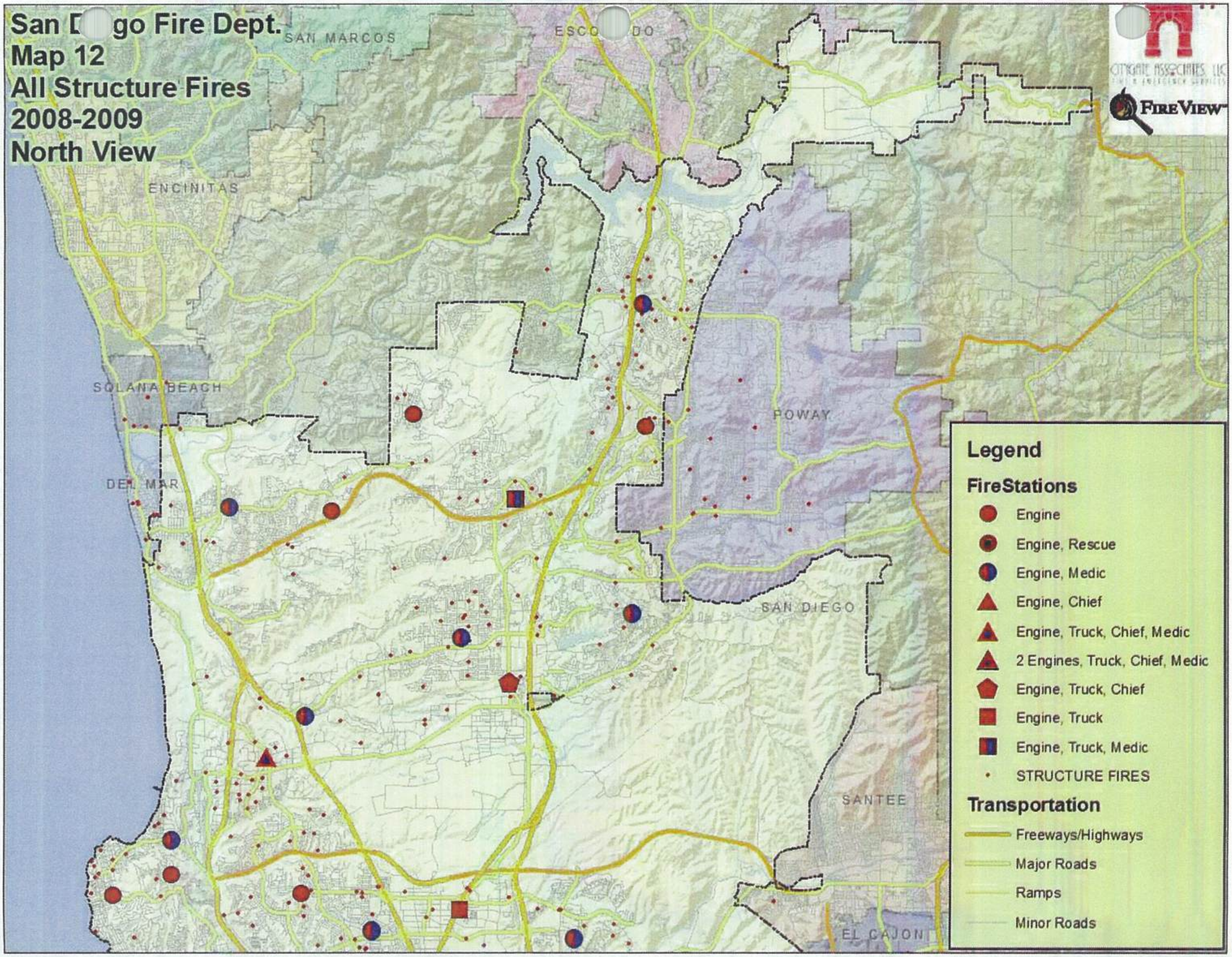

San D go Fire Dept.
Map 10
All EMS & Rescue
2008-2009
South View
SANTEE
EL CAJON
LA MESA
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEA
CITYGATE ASSOCIATES, LLC
FIRE VIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
EMS
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads



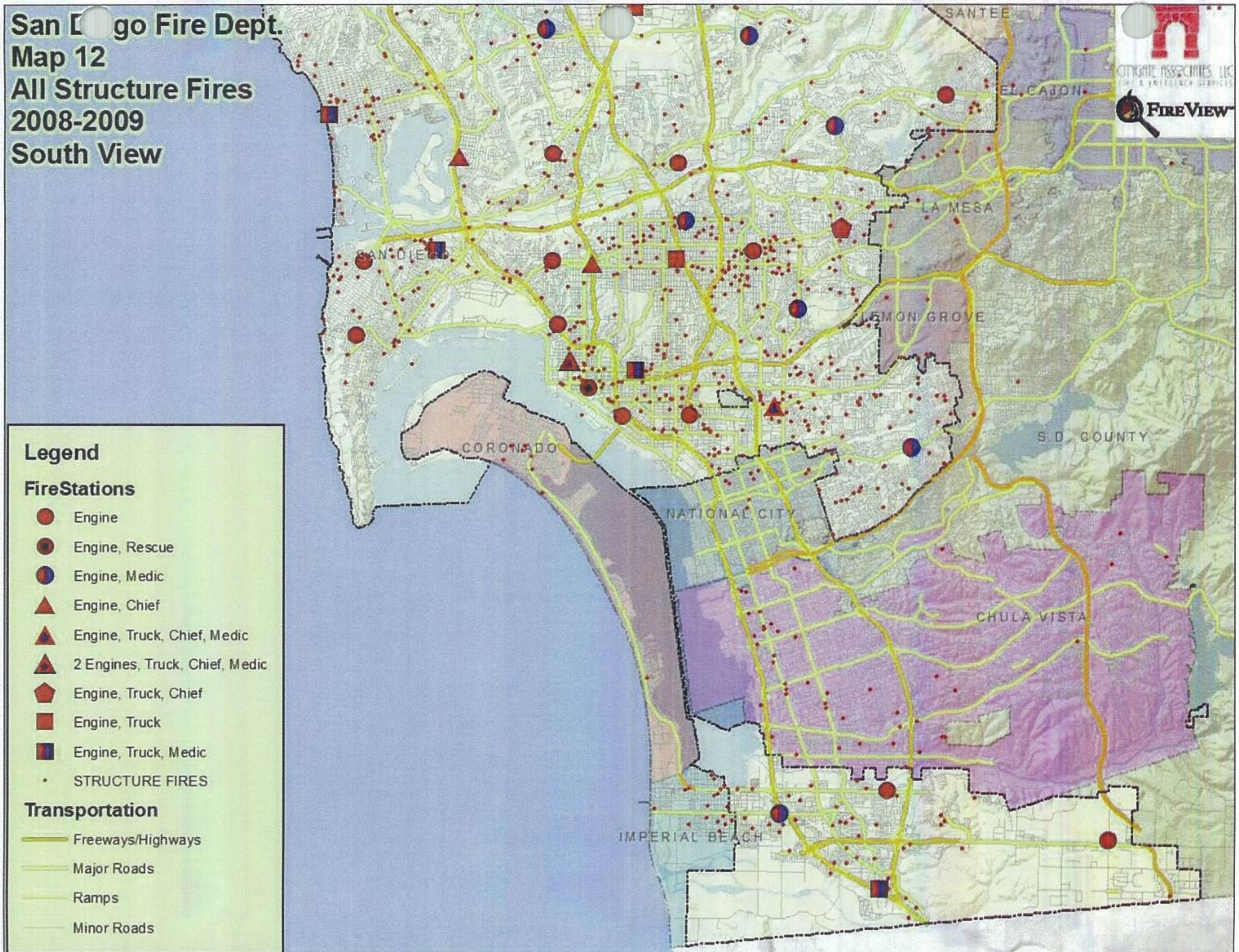
San D go Fire Dept.
Map 11
All Fires
2008-2009
North View
SAN MARCOS
CARLSBAD
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
FIRES
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

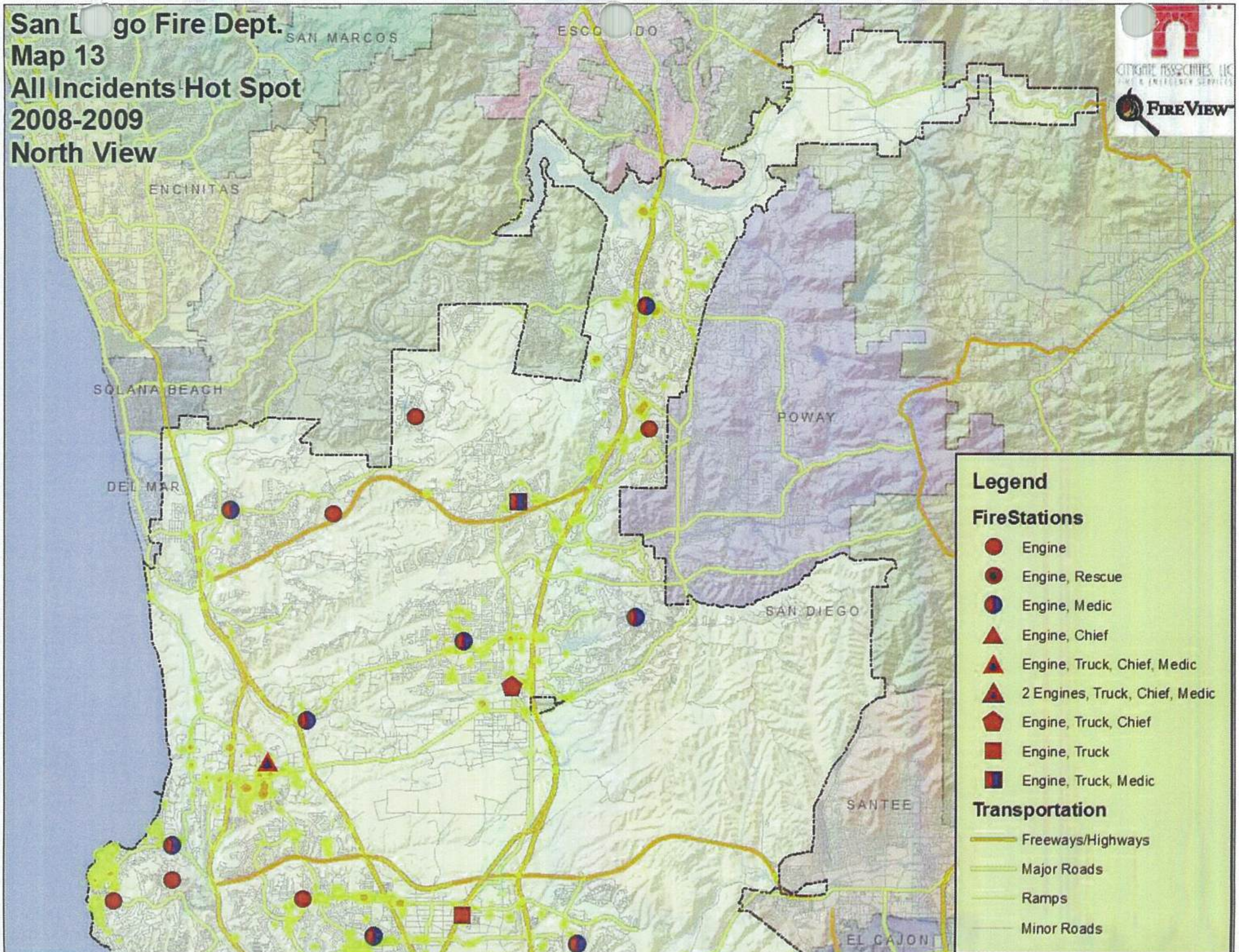


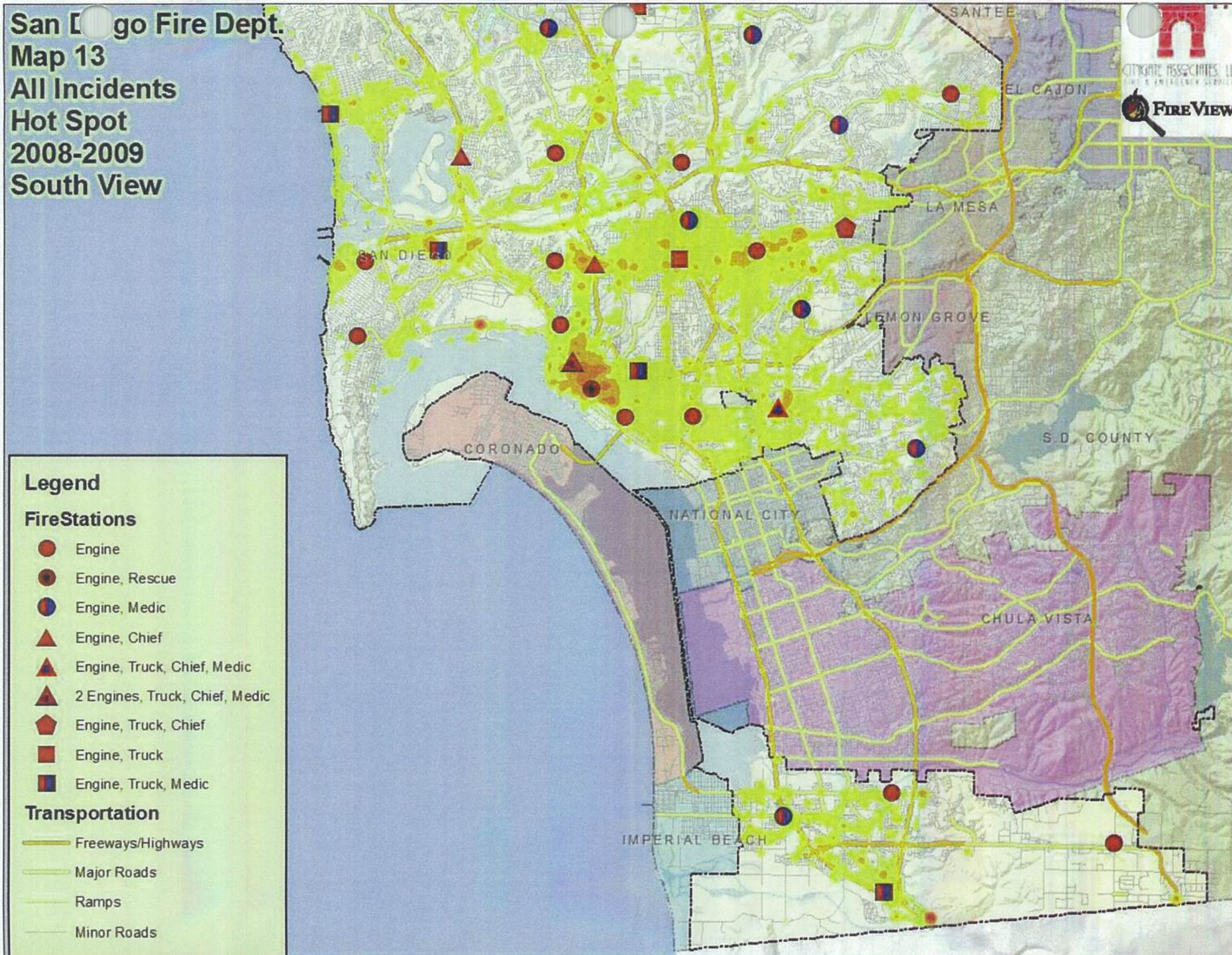
San D go Fire Dept.
Map 11
All Fires
2008-2009
South View
SANTEE
EL CAJON
FireView
LA MESA
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
FIRES
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

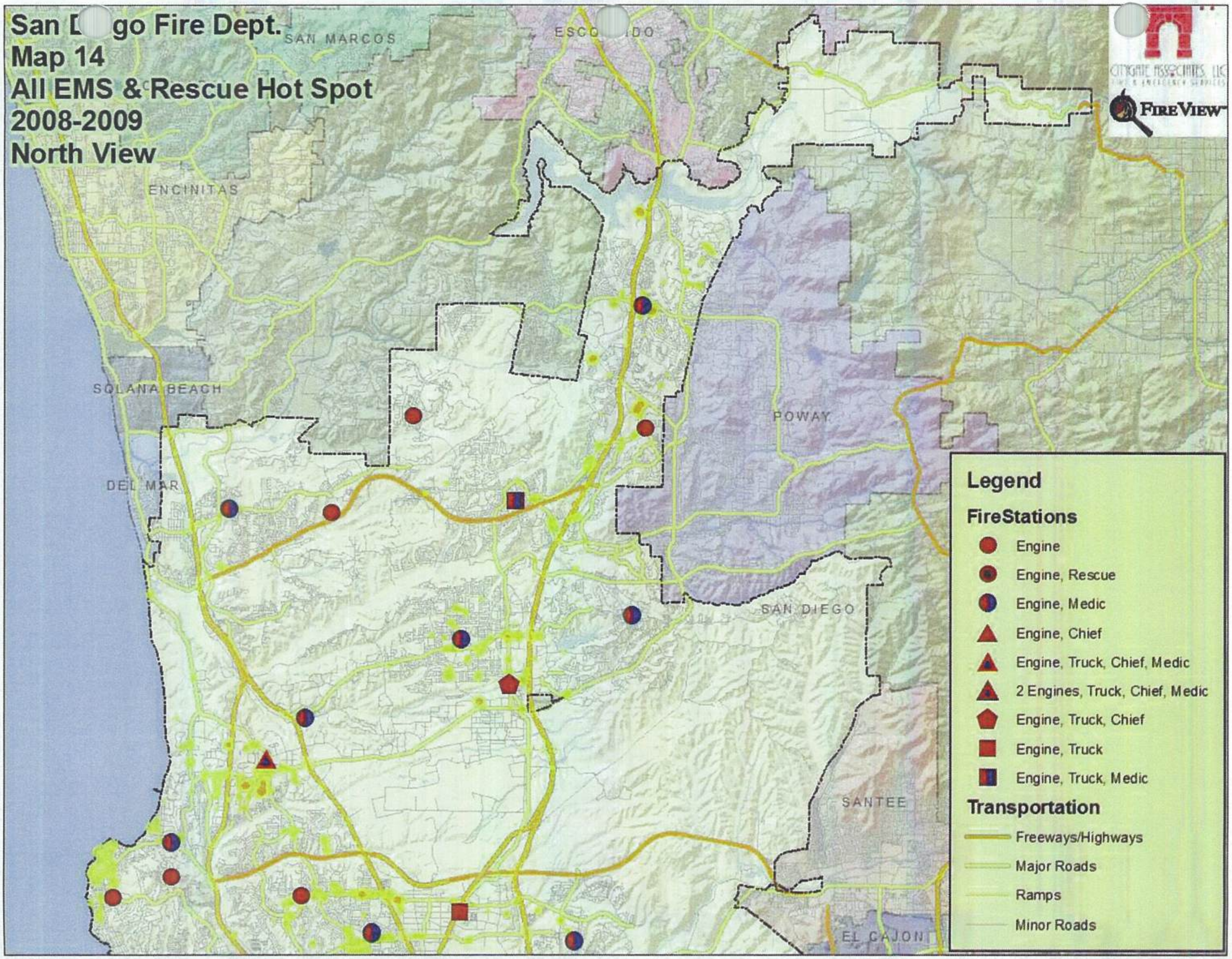


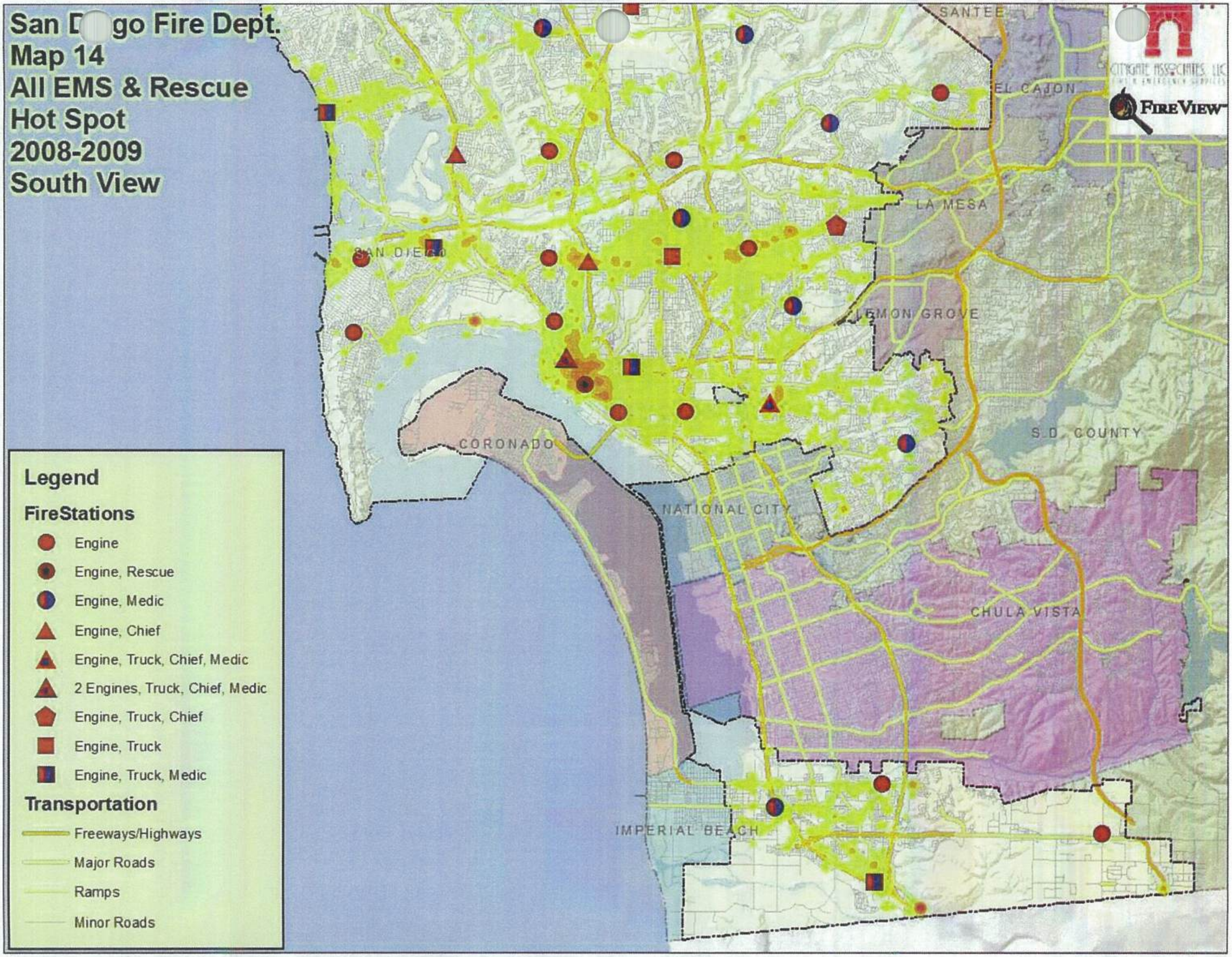
San Diego Fire Dept.
Map 12
All Structure Fires
2008-2009
North View
SAN MARCOS
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
STRUCTURE FIRES
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

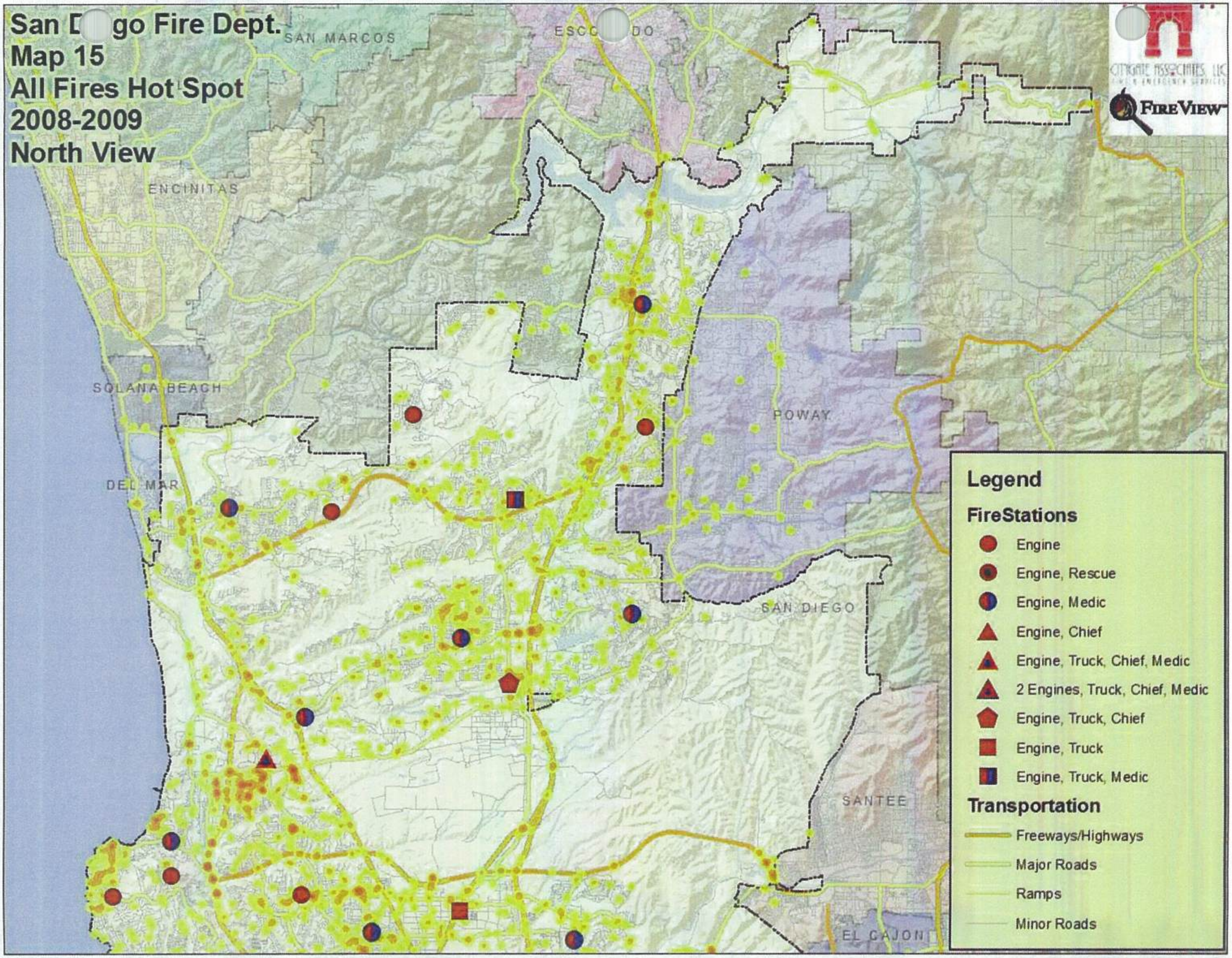

San D go Fire Dept.
Map 12
All Structure Fires
2008-2009
South View
SANTEE
EL CAJON
FIREVIEW
LA MESA
SAN DIEGO
LEMON GROVE
CORONADO
S.D. COUNTY
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
STRUCTURE FIRES
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San D go Fire Dept.
Map 13
All Incidents Hot Spot
2008-2009
North View
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

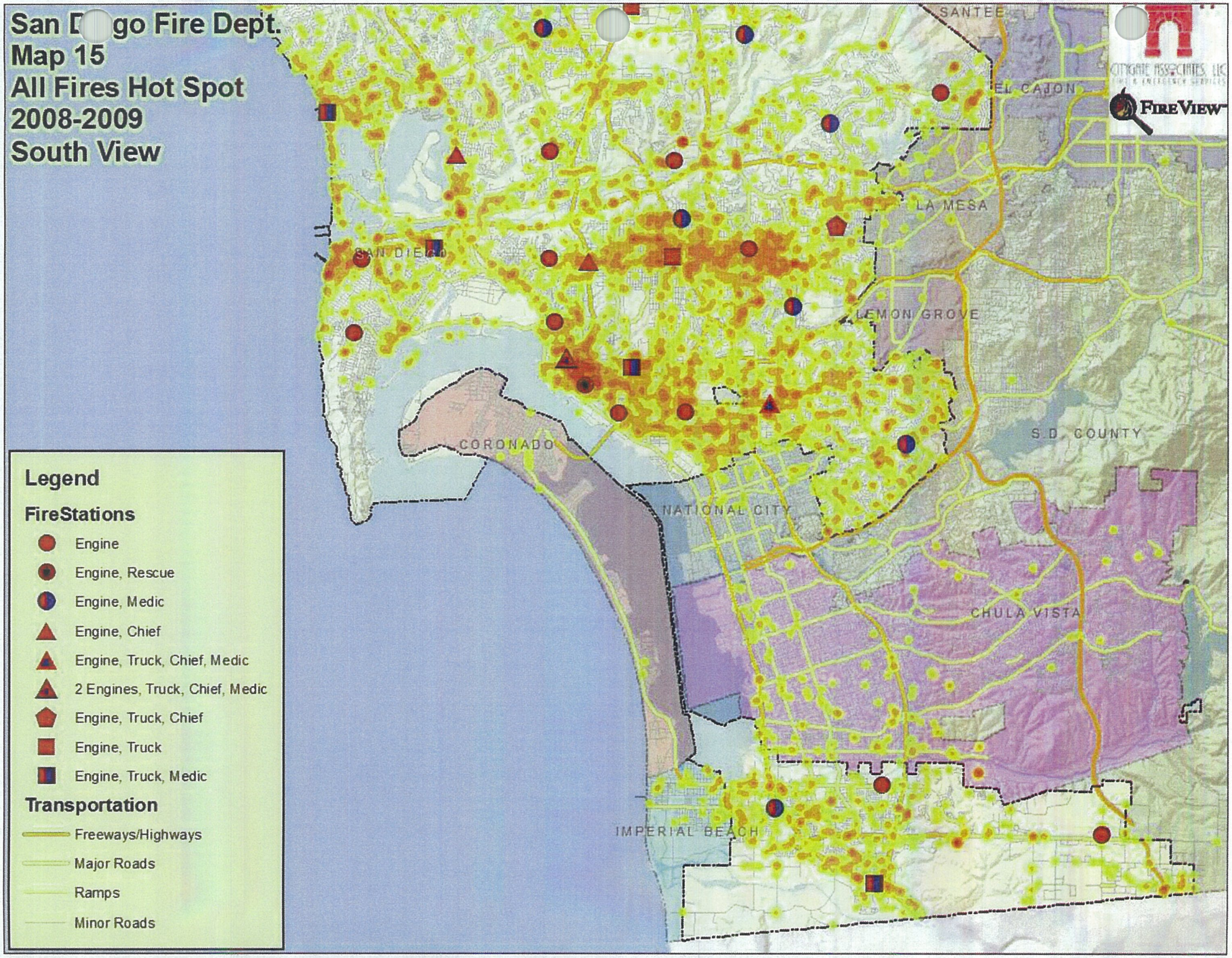

San D go Fire Dept.
Map 13
All Incidents
Hot Spot
2008-2009
South View
CITIGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

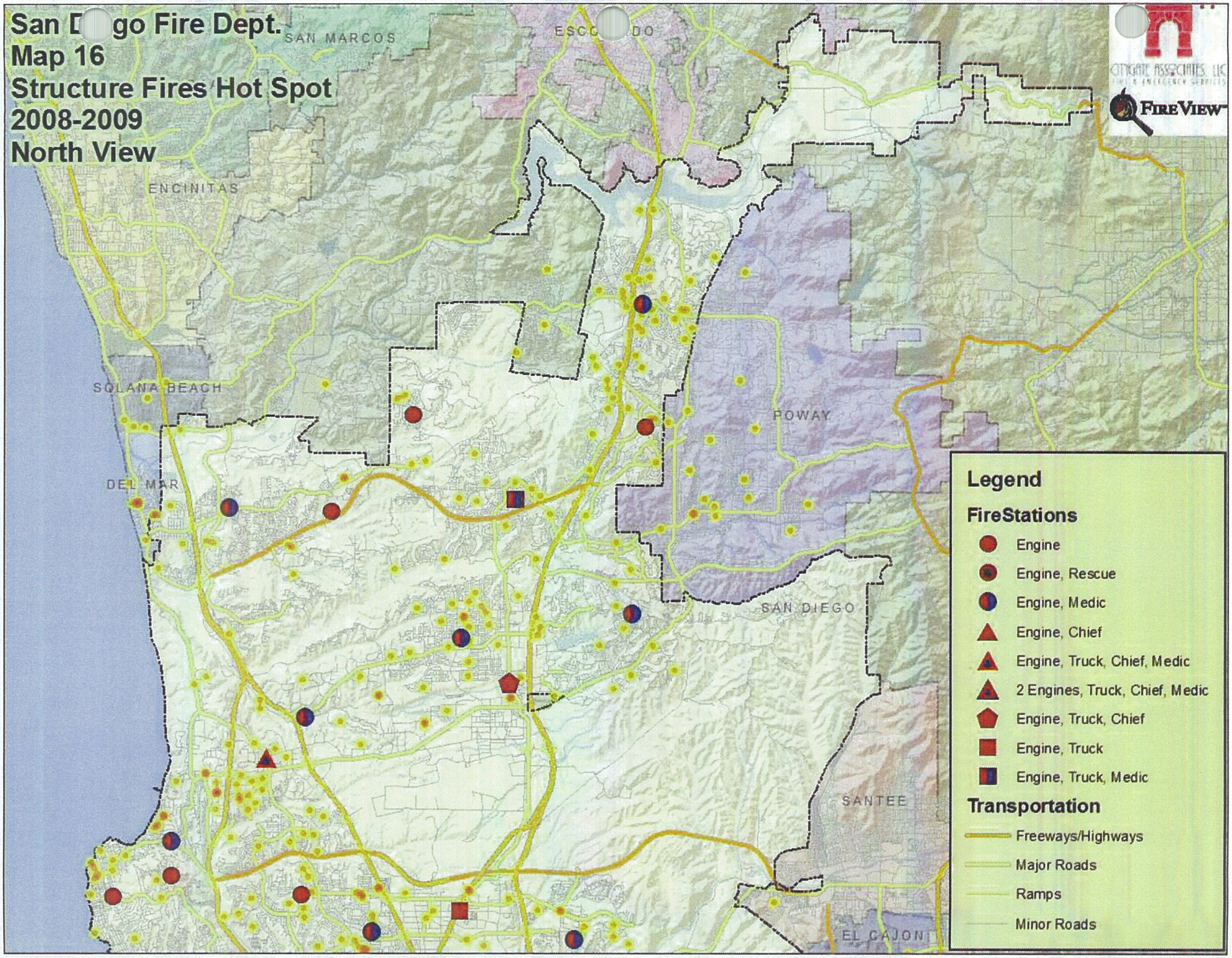

San D go Fire Dept.
Map 14
All EMS & Rescue Hot Spot
2008-2009
North View
SAN MARCOS
ESCO DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

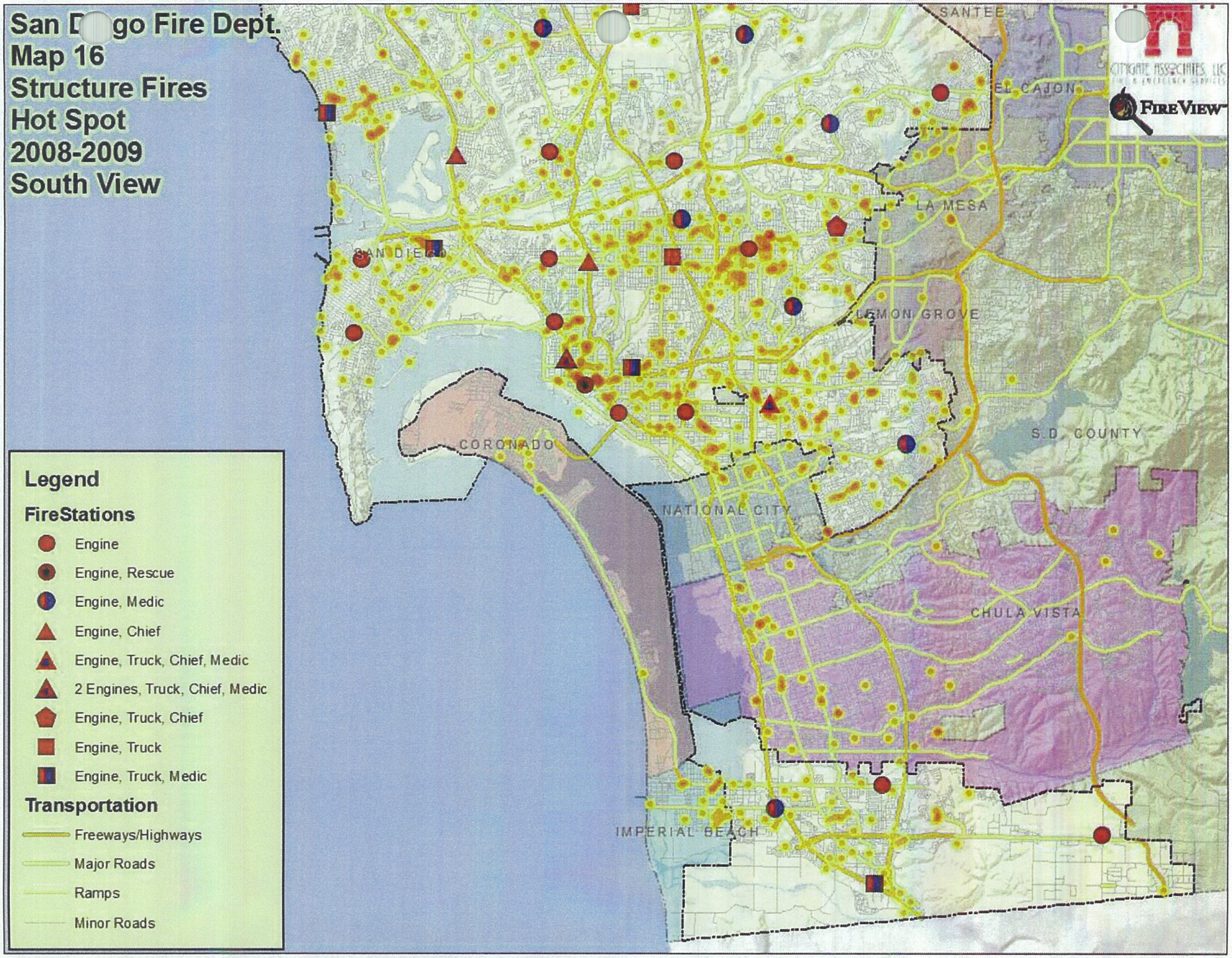

San Diego Fire Dept.
Map 14
All EMS & Rescue
Hot Spot
2008-2009
South View
CITYGATE ASSOCIATES, LLC
FIREVIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

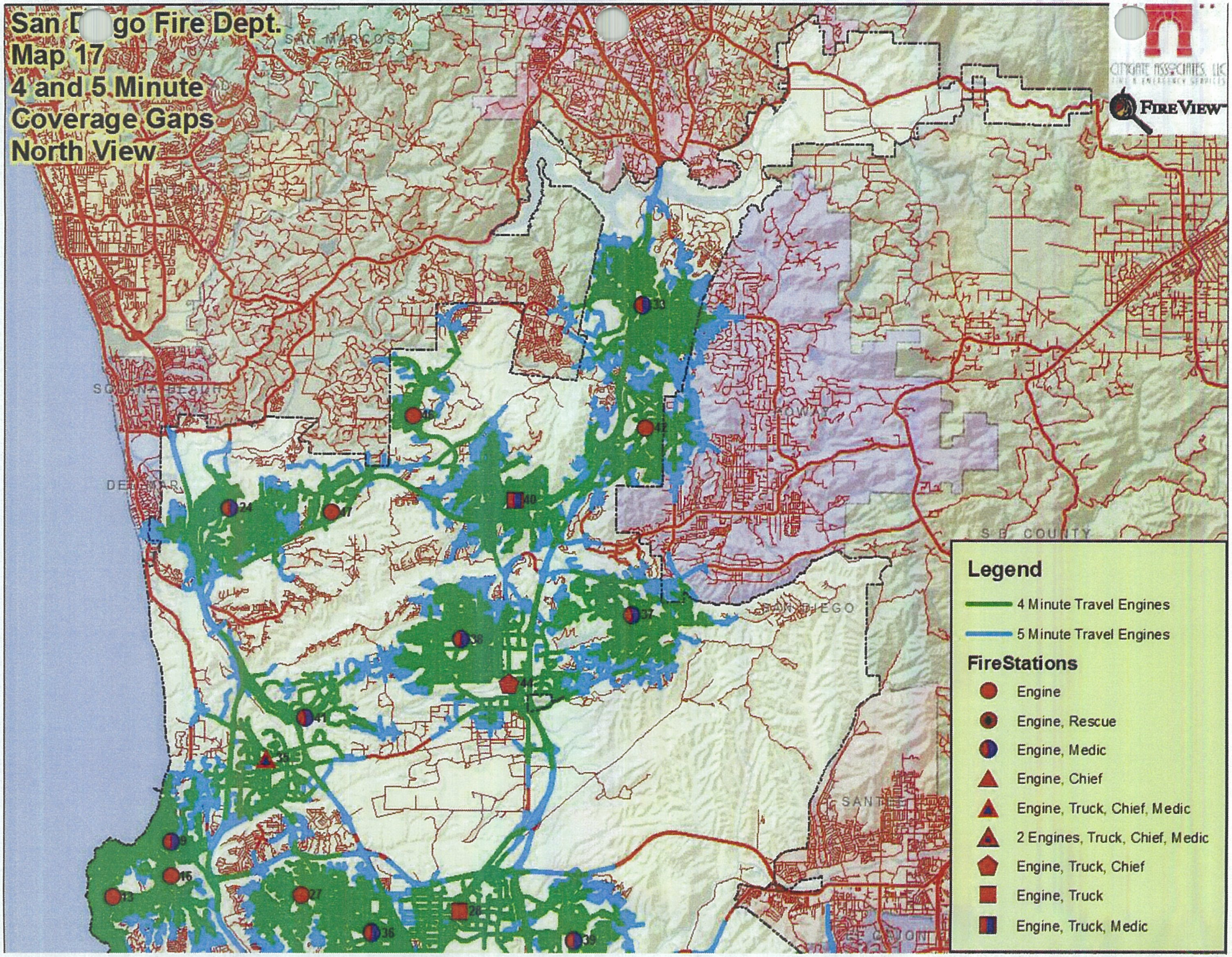


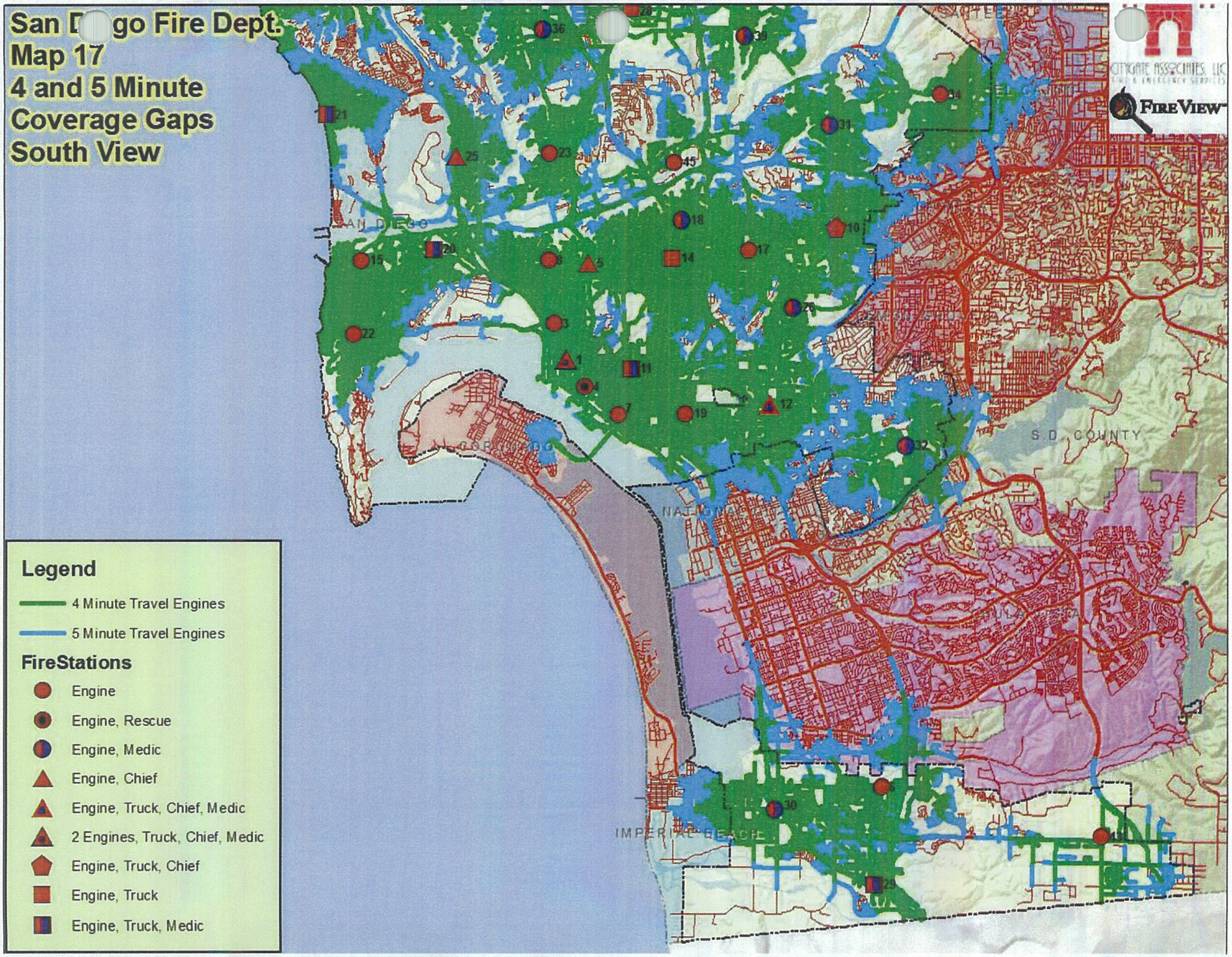
San D go Fire Dept.
Map 15
All Fires Hot Spot
2008-2009
North View
SAN MARCOS
ESC DO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads


San Diego Fire Dept.
Map 15
All Fires Hot Spot
2008-2009
South View
SANTEE
EL CAJON
FIRE VIEW
LA MESA
SAN DIEGO
LEMON GROVE
CORONADO
S.D. COUNTY
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

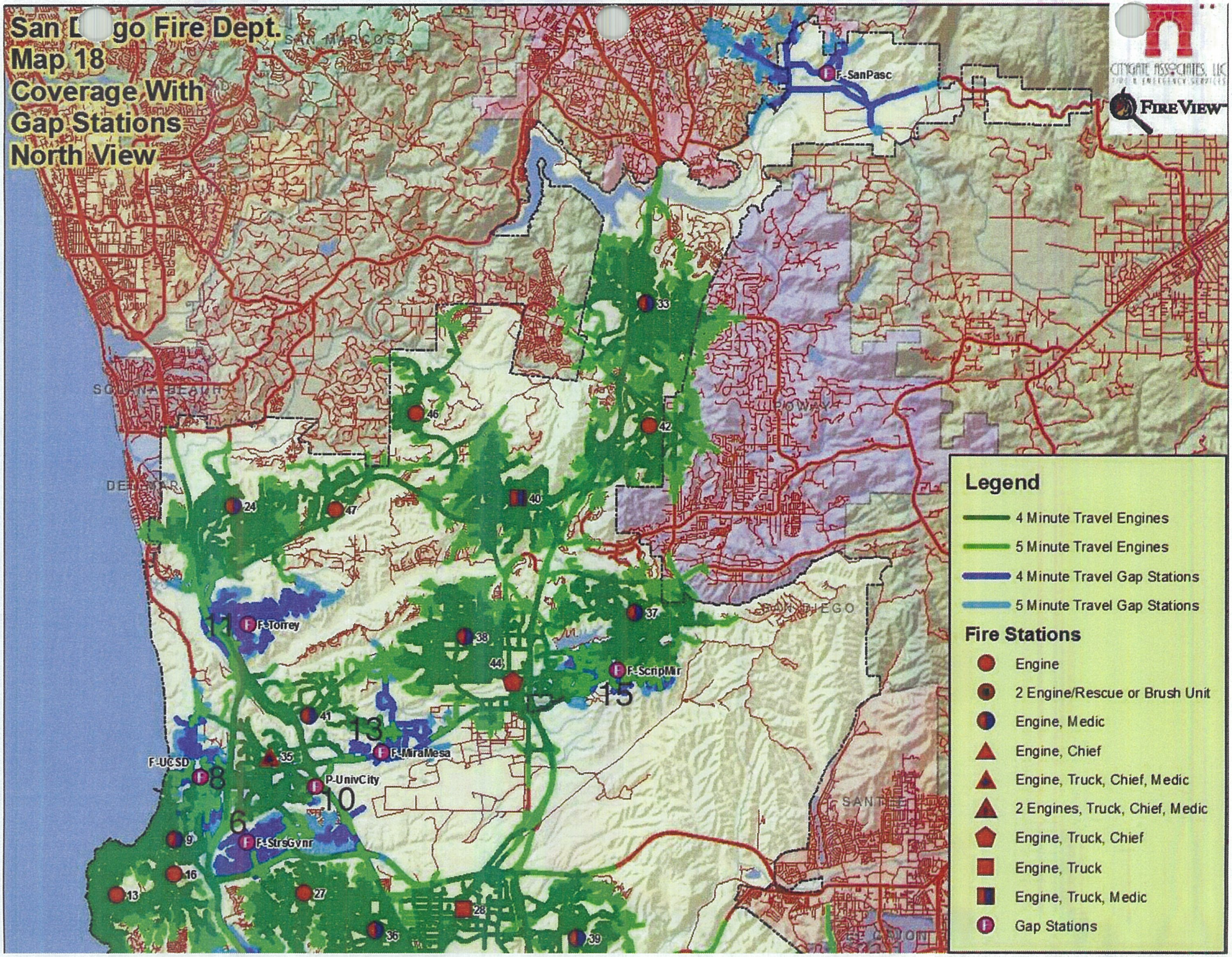

San Diego Fire Dept.
Map 16
Structure Fires Hot Spot
2008-2009
North View
SAN MARCOS
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
SAN DIEGO
SANTEE
EL CAJON
CITYGATE ASSOCIATES, LLC
FIREVIEW
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

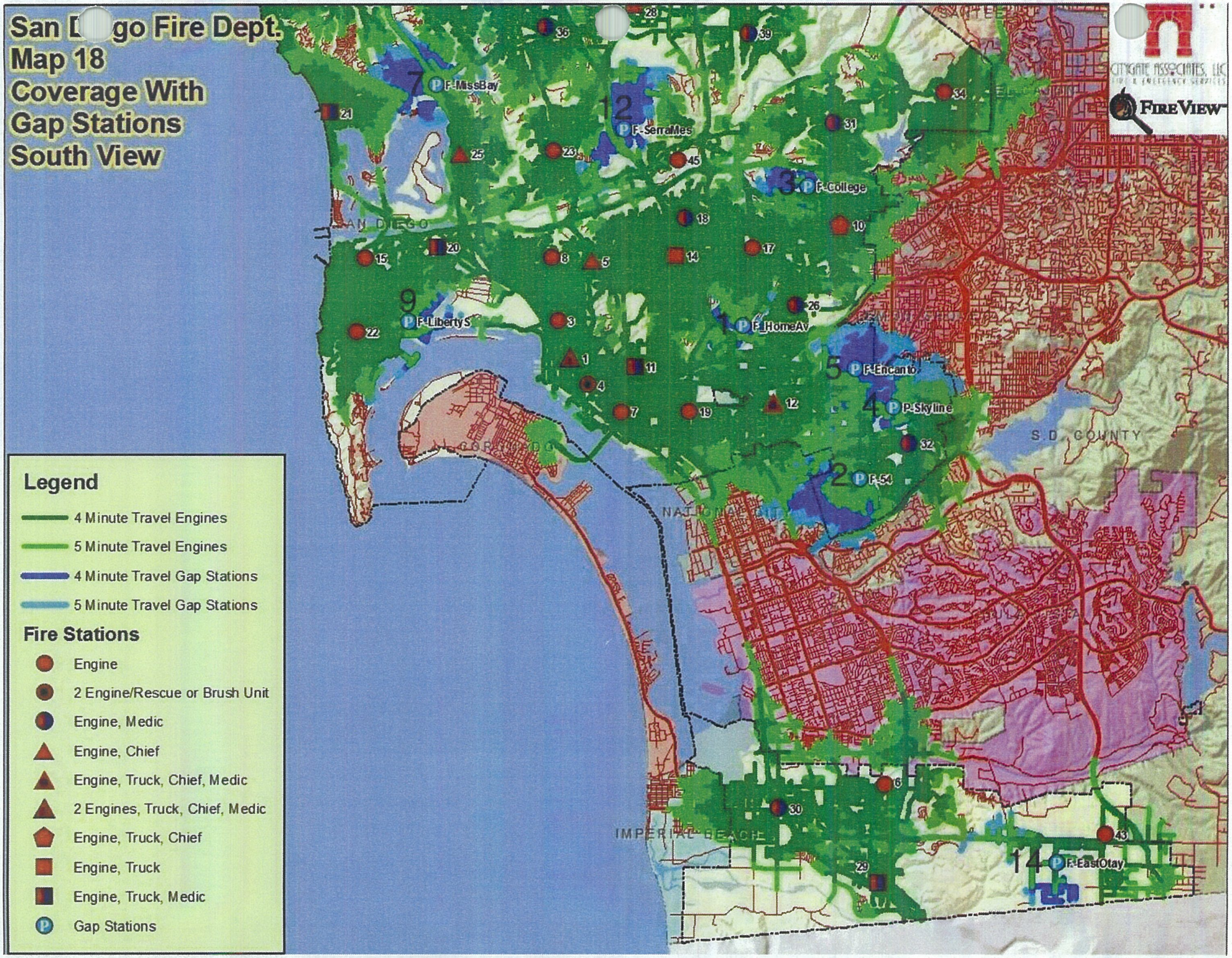

San D go Fire Dept.
Map 16
Structure Fires
Hot Spot
2008-2009
South View
CITIGATE ASSOCIATES, LLC
FIRE VIEW
SANTEE
EL CAJON
LA MESA
SAN DIEGO
LEMON GROVE
S.D. COUNTY
CORONADO
NATIONAL CITY
CHULA VISTA
IMPERIAL BEACH
Legend
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Transportation
Freeways/Highways
Major Roads
Ramps
Minor Roads

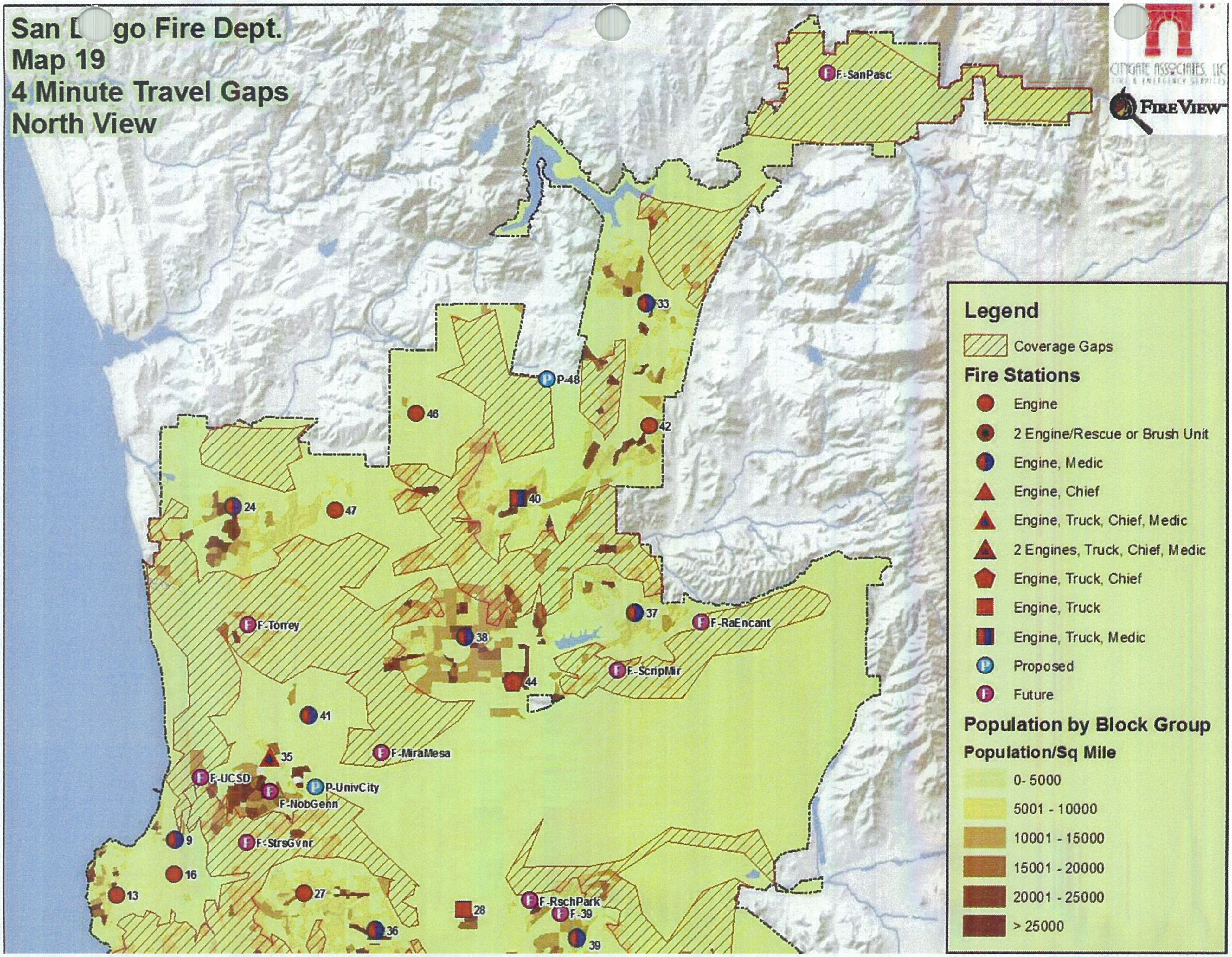

San D go Fire Dept.
Map 17
4 and 5 Minute
Coverage Gaps
North View
CITYGATE ASSOCIATES, LLC
FIREVIEW
POWAY
S D COUNTY
Legend
4 Minute Travel Engines
5 Minute Travel Engines
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic



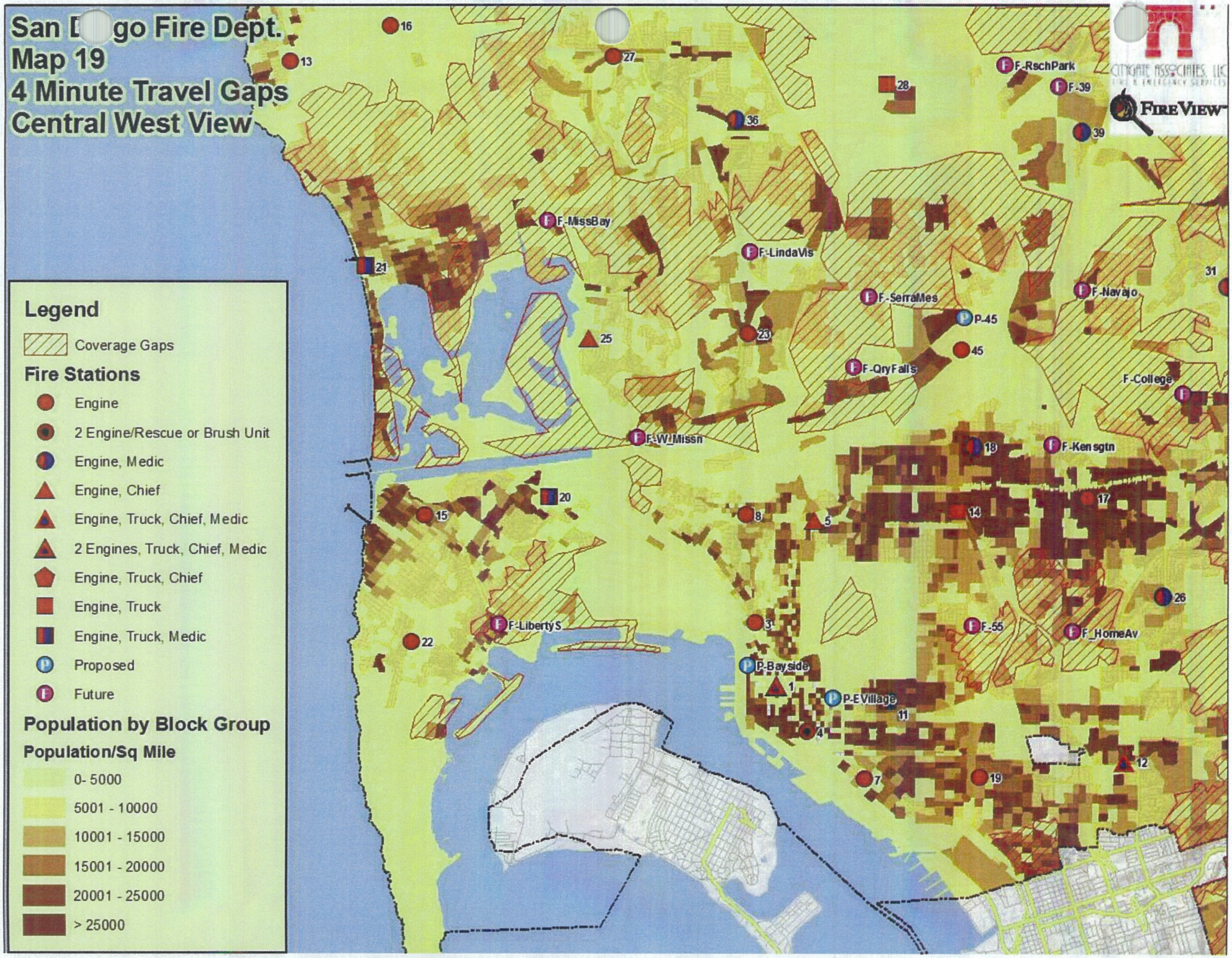
San Diego Fire Dept.
Map 17
4 and 5 Minute
Coverage Gaps
South View
FireView
Legend
4 Minute Travel Engines
5 Minute Travel Engines
FireStations
Engine
Engine, Rescue
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
SAN DIEGO
S.D. COUNTY
IMPERIAL BEACH


San D go Fire Dept.
Map 18
Coverage With
Gap Stations
North View
CITYGATE ASSOCIATES, LLC
FIRE & EMERGENCY SERVICES
FIREVIEW
SAN MARCOS
F-SanPasc
POWAY
SAN DIEGO
SANTEE
EL CAJON
DEL MAR
33
46
42
40
24
47
37
38
44
F-Torrey
F-ScripMir
11
15
13
41
F-MiraMesa
35
F-UCSD
8
P-UnivCity
10
6
F-StrsGvnr
9
16
13
27
28
36
39
Legend
4 Minute Travel Engines
5 Minute Travel Engines
4 Minute Travel Gap Stations
5 Minute Travel Gap Stations
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Gap Stations


San D go Fire Dept.
Map 18
Coverage With
Gap Stations
South View
CITYGATE ASSOCIATES, LLC
FIREVIEW
F-MissBay
F-SerraMes
F-College
F-LibertyS
F_HomeAv
F-Encanto
F-Skyline
F-54
F-EastOtay
SAN DIEGO
CORONADO
NATIONAL CITY
S.D. COUNTY
IMPERIAL BEACH
Legend
4 Minute Travel Engines
5 Minute Travel Engines
4 Minute Travel Gap Stations
5 Minute Travel Gap Stations
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Gap Stations



San Diego Fire Dept.
Map 19
4 Minute Travel Gaps
North View
CITYGATE ASSOCIATES, LLC
FIREVIEW
F-SanPasc
P-48
46
33
42
40
24
47
37
F-RaEncant
F-Torrey
38
F-ScripMir
44
41
35
F-MiraMesa
F-UCSD
P-UnivCity
F-NobGenn
9
F-StrsGvnr
16
13
27
28
F-RschPark
F-39
36
39
Legend
Coverage Gaps
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Proposed
Future
Population by Block Group
Population/Sq Mile
0- 5000
5001 - 10000
10001 - 15000
15001 - 20000
20001 - 25000
> 25000



San D go Fire Dept.
Map 19
4 Minute Travel Gaps
Central West View
Citygate Associates, LLC
FireView
Legend
Coverage Gaps
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Proposed
Future
Population by Block Group
Population/Sq Mile
0- 5000
5001 - 10000
10001 - 15000
15001 - 20000
20001 - 25000
> 25000
16
13
27
28
36
39
F-RschPark
F-39
F-MissBay
F-LindaVis
21
31
F-SerraMes
F-Navajo
P-45
25
23
45
F-QryFalls
F-College
F-W_Missn
18
F-Kensgtn
20
17
15
8
5
14
26
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F-LibertyS
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11
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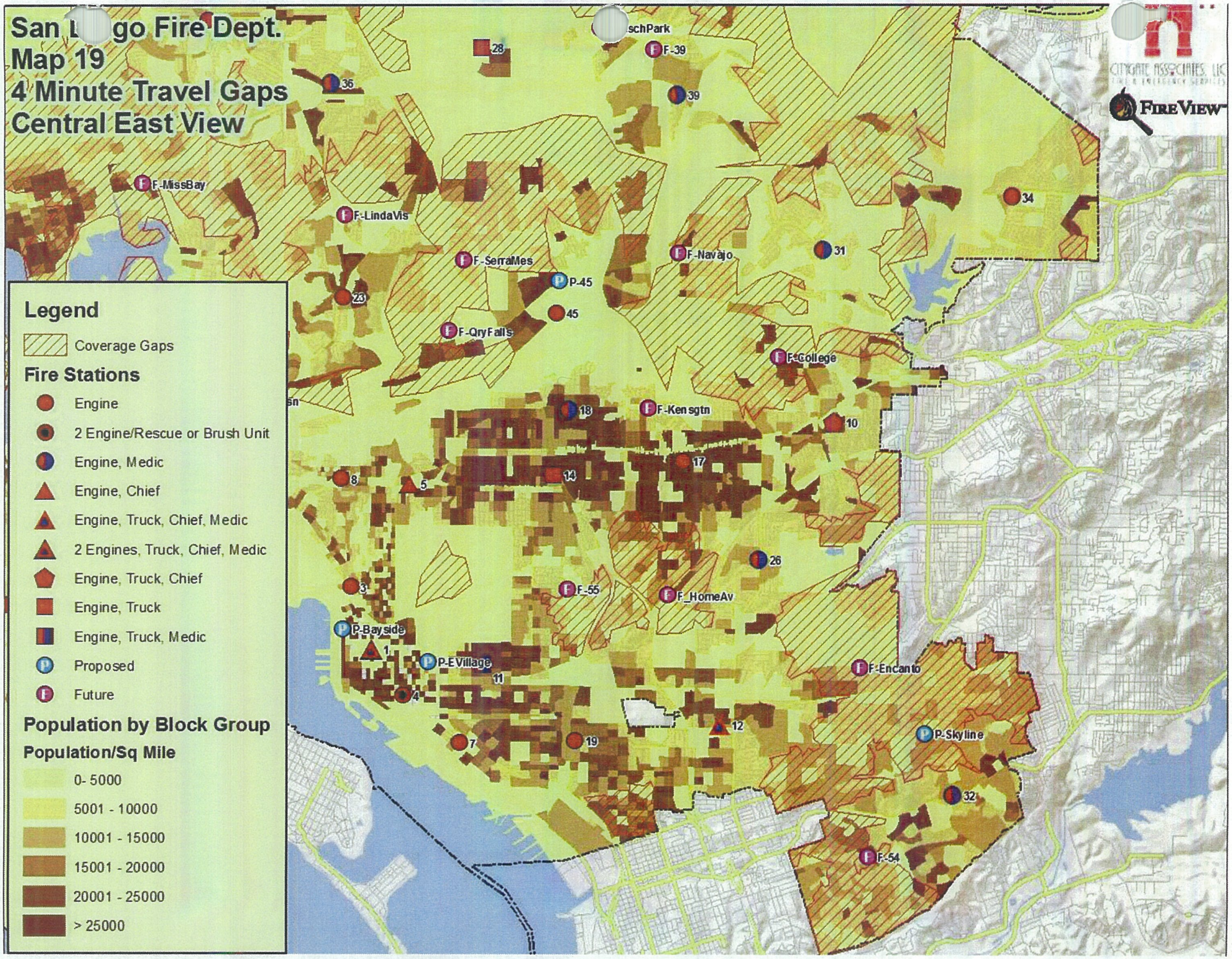
12
7
19



San go Fire Dept.
Map 19
4 Minute Travel Gaps
Central East View
Legend
Coverage Gaps
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Proposed
Future
Population by Block Group
Population/Sq Mile
0- 5000
5001 - 10000
10001 - 15000
15001 - 20000
20001 - 25000
> 25000
CITYGATE ASSOCIATES, LLC
FIREVIEW
F-39
28
36
39
34
31
F-MissBay
F-LindaVis
F-SerraMes
F-Navajo
P-45
23
45
F-QryFalls
F-College
18
F-Kensgtn
10
17
8
5
14
26
3
F-55
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P-EVillage
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F-Encanto
4
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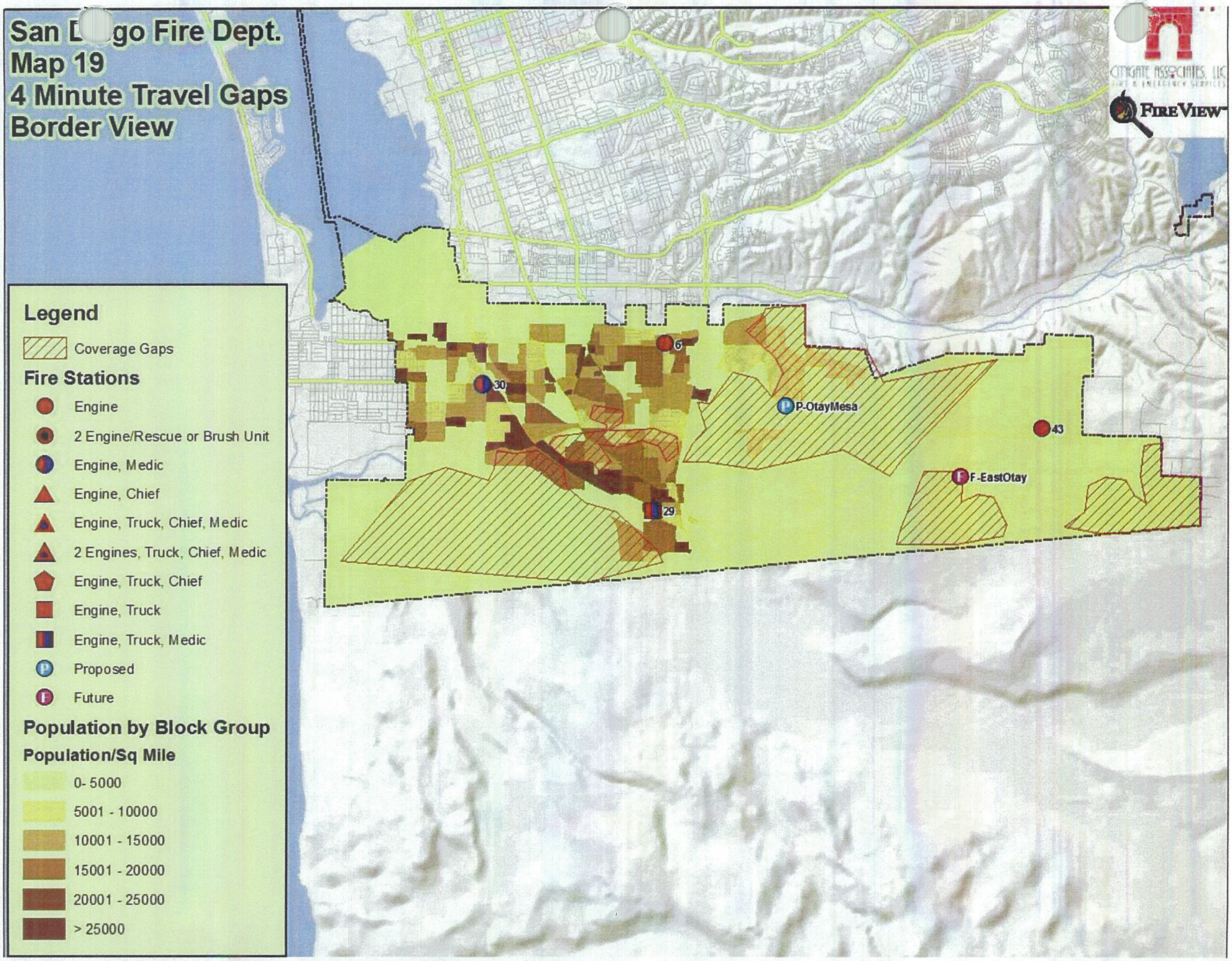
P-Skyline
7
19
32
F-54



San D go Fire Dept.
Map 19
4 Minute Travel Gaps
Border View
CITIGATE ASSOCIATES, LLC
FIREVIEW
Legend
Coverage Gaps
Fire Stations
Engine
2 Engine/Rescue or Brush Unit
Engine, Medic
Engine, Chief
Engine, Truck, Chief, Medic
2 Engines, Truck, Chief, Medic
Engine, Truck, Chief
Engine, Truck
Engine, Truck, Medic
Proposed
Future
Population by Block Group
Population/Sq Mile
0- 5000
5001 - 10000
10001 - 15000
15001 - 20000
20001 - 25000
> 25000
6
30
P-OtayMesa
43
F-EastOtay
29

APPENDIX F3.12

F3.12

Linscott Law & Greenspan, *Traffic Impact Analysis, Plaza Linda Verde* (Revised) (January 11, 2011)

LINSCOTT LAW & GREENSPAN engineers

TRAFFIC IMPACT ANALYSIS

PLAZA LINDA VERDE

San Diego, California

~~August 6, 2010~~January 11, 2011

LLG Ref. 3-08-1857

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SDSU PLAZA LINDA VERDE

San Diego, California

~~August 6, 2010~~January 11, 2011

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers ("LLG") has been retained to prepare a traffic study for the San Diego State University ("SDSU") Plaza Linda Verde project ("Proposed Project"). The purpose of this study is to assess the traffic impacts to the local circulation system as a result of the Proposed Project in both the near- and long-term scenarios.

The mixed-use Proposed Project is located north of Montezuma Road and both east and west of College Avenue in the City of San Diego.

The Proposed Project would be developed in multiple phases, and a detailed project description is presented in Section 2.0 of this report.

The traffic analysis presented in this report includes the following:

- Project Description
- Analysis Approach and Methodology
- Existing Conditions Description
- Analysis Approach and Methodology
- Significance Criteria
- Analysis of Existing Conditions
- Cumulative Projects Traffic
- Project Traffic Generation, Distribution & Assignment
- Analysis of Near-Term Scenarios
- Analysis of Long-Term Scenarios
- Congestion Management Program Compliance (CMP)
- Construction Traffic
- College Avenue/Lindo Paseo Driveway Access
- Parking Assessment
- Transit Assessment
- Pedestrian/Bicycle Circulation
- Roadway Closures/Street Vacations
- Emergency Vehicle Access
- Alternative Mitigation Measure Diversion Analysis Significant Impacts and Mitigation Measures
- Post Mitigation Operations
- Reduced Project Alternative – Qualitative Impact Comparison

2.0 PROJECT DESCRIPTION

2.1 Project Description

The proposed San Diego State University Plaza Linda Verde project consists of the development of additional on-campus student housing and retail services to support SDSU and the surrounding community. The Proposed Project is a mixed-use development featuring ground-floor commercial and upper-floor student housing, student apartments, additional parking facilities to accommodate increased parking demand within the area, a Campus Green featuring a public promenade, and pedestrian malls in place of existing streets/alleys linking the proposed mixed-use buildings to the main campus.

The Proposed Project would be located adjacent to the main SDSU campus, which is located approximately 8 miles east of downtown San Diego. The existing boundaries of the SDSU campus generally are Hardy Avenue on the south, East Campus Drive on the east, 55th Street/Remington Road on the west, and Adobe Falls Road/Del Cerro Boulevard (north of Interstate 8 [I-8]) on the north. The Proposed Project would be developed on property located south of the existing Campus Master Plan boundary, generally between Aztec Walk and Montezuma Road. The land on which the Proposed Project would be developed is currently owned by SDSU, the SDSU Foundation, and private entities. Lands currently owned by private entities would be purchased by SDSU prior to development.

The project consists of the demolition of existing structures and parking lots and is on an approximately 18-acre site located immediately south of the SDSU main campus. The development of certain portions of the Proposed Project, primarily including the pedestrian malls, would be contingent upon the vacation of certain existing vehicular rights-of-way; if the subject vacations are not approved, the Proposed Project would proceed on a modified basis.

In conjunction with the Proposed Project, SDSU also is proposing to amend the SDSU Campus Master Plan boundary such that the southern campus boundary between 55th Street and one block east of College Avenue would extend south generally from Aztec Walk to Montezuma Road.

The Proposed Project would consist of development of the following five project components:

I. Mixed-Use Retail/Student Housing. This project component consists of the development of four ground-floor retail and upper-floor residential buildings located south of Hardy Avenue, north of Montezuma Road, and west and east of College Avenue. Collectively, the four buildings would contain approximately 294 apartments to house approximately 1,216 students, and also would contain approximately 90,000 gross square feet of university/ community-serving retail uses.

II. Student Apartments. This project component would consist of two four-story buildings located west of Campanile Drive, north of Montezuma Road, and south of Lindo Paseo. Collectively, the two buildings would contain approximately 96 apartments to house 416 students.

III. Parking Facilities. A freestanding parking structure would be constructed at the northwest corner of Lindo Paseo and Montezuma Place. The structure would consist of five levels—one underground parking deck and four aboveground decks—and would provide approximately 342 parking spaces. The parking structure also would support approximately 1,815 net square feet of ground-floor retail space. The Mixed-Use Retail/Student Housing buildings to be developed east of College Avenue would contain underground parking for an additional 160 to 220 vehicles, depending on the ultimate configuration. **The project will redevelop the east leg of the College Avenue/Lindo Paseo intersection (westbound approach) with the following westbound geometry: 1 shared left-thru lane and 1 dedicated right-turn lane. This project design feature will ensure adequate egress from the parking located under buildings 4 & 5.**

IV. Campus Green. A Campus Green is planned for development south of the existing SDSU Transit Center and would consist of active and passive recreational areas for public use.

V. Pedestrian Malls. The Proposed Project also would include two pedestrian malls, in place of existing streets/alleys, to be located along the western and eastern flanks of the main mixed-use building area. These corridors would facilitate non-motorized movement between the proposed buildings and main campus and would support meeting/resting space and outdoor eating facilities associated with the adjacent retail shops. This project component would be ancillary to the Mixed-Use Retail/Student Housing component and would not be essential to development of the overall project site.

This traffic analysis assesses 90,000 total gross square feet of retail and 400 student housing units. These are the number of student housing units is slightly higher than what is currently proposed. Thus, the results of this traffic study are slightly conservative.

Figure 2–1 shows the project vicinity and ***Figure 2–2*** shows the project area map. ***Figure 2–3*** shows the proposed site plan.

3.0 EXISTING CONDITIONS

The project study area was determined based on a Select Zone Assignment. The Select Zone assignment was prepared by SANDAG and predicts the project trip assignments on the street network using a computer model. The assignment of project traffic is described later in this report. ***Figure 3–1*** illustrates the existing street network.

The specific study area includes the following intersections and street segments which were determined using the 50 peak hour trip thresholds as a guideline.

Intersections

- College Avenue / I–8 WB Ramps
- College Avenue / I–8 EB Ramps
- College Avenue / Canyon Crest Drive
- College Avenue / Zura Way
- College Avenue / Lindo Paseo
- College Avenue / Montezuma Road
- College Avenue / El Cajon Boulevard
- Montezuma Road / Collwood Boulevard
- Montezuma Road / 55th Street
- Montezuma Road / Campanile Drive
- Montezuma Road / Catoctin Drive
- Montezuma Road / El Cajon Boulevard

Street Segments

- College Avenue: Canyon Crest Drive to Zura Way
- College Avenue: Zura Way to Montezuma Road
- College Avenue: Montezuma Road to El Cajon Boulevard
- Montezuma Road: Collwood Boulevard to 55th Street
- Montezuma Road: 55th Street to College Avenue
- Montezuma Road: College Avenue to Catoctin Drive

Since the project adds less than 50 peak hour trips to Interstate 8 and adds less than 20 peak hour trips on any individual ramp meter, it was not necessary to conduct a freeway or ramp meter analysis as part of the Congestion Management Program requirements (see Section 11.0 for more details).

3.1 Existing Street Network

The current *City of San Diego Street Design Manual* (November 2002) generally applies to new roadways only. The majority of roadways within the study area were built under the previous standards, which may vary from the current standards described below.

Six-Lane Primary Arterials should be 98 feet wide in 142 feet of Right-of-Way (R/W), providing six through lanes, bike lanes, and a raised median/left-turn lane. Six-Lane Major Streets should be 112 feet wide in 140 to 152 feet of R/W, providing six through lanes, bike lanes, and a raised median/left-turn lane. Four-Lane Major Streets should be 76 feet wide in 120 feet of R/W, providing four through lanes, bike lanes, and a raised median/left-turn lane. Four-Lane Collectors with a Two-Way Left-Turn Lane should be 82 feet wide in 110 to 122 feet of R/W, providing four through lanes, bike lanes, left-turn lanes, and curbside parking. Two-Lane Collectors with a Two-Way Left-Turn Lane should be 54 feet wide in 78 to 94 feet of R/W and provide two through lanes, bike lanes, and curbside parking. Two-Lane Collectors with Bike Lanes should be 46 feet wide in 70 to 96 feet of R/W, providing two through lanes, bike lanes, and curbside parking. Two-Lane Collectors should be 36 feet wide in 60 to 86 feet of R/W and provide two through lanes and curbside parking.

The principal roadways in the project study area are described briefly below. Roadway classifications were determined from a review of the College Area and Navajo Community Plans, field observations, and information obtained from Caltrans. This information is provided in ***Appendix A***.

Interstate 8 (I-8) is an interstate freeway operated by CALTRANS. I-8 is an east-west facility spanning San Diego and Imperial Counties. This facility provides access to the Fairmount Avenue, Waring Road, College Avenue and Lake Murray / 70th Street interchanges within the project vicinity.

Campanile Drive is classified as a Collector road according to the College Area Community Plan. Campanile Drive is a two-lane, divided roadway with a northerly termination at the SDSU trolley station. The speed limit is not posted and parking is intermittently limited.

College Avenue is classified as a Major Arterial according to the College Area Community Plan. College Avenue is a four-lane intermittently divided roadway within the project vicinity. The speed limit is generally 35 mph, parking is prohibited and infrequent bus stops are provided.

Montezuma Road is classified as a Major Arterial according to the College Area Community Plan. Montezuma Road is a four-lane, divided roadway south of the SDSU Campus. The posted speed limit is 35mph, bus stops are provided, and curbside parking is permitted along the roadway.

55th Street is classified as a Collector road according to the College Area Community Plan. 55th Street is a north-south, four-lane undivided roadway located to the west of the SDSU Campus. Parking is not permitted north of Montezuma Road in the vicinity of the Campus and the posted speed limit is 25mph.

Collwood Boulevard is classified as a Major Arterial according to the College Area Community Plan. Collwood Boulevard is a three lane undivided roadway south of Montezuma Road with two northbound lanes and one southbound lane. Parking is permitted and bike lanes are provided at frequent locations.

Lindo Paseo is an unclassified roadway according to the College Area Community Plan. Lindo Paseo is a one lane undivided (one-way) eastbound roadway between 55th Street and Campanile Drive. Parking is allowed along the roadway.

Zura Way is an unclassified roadway according to the College Area Community Plan. Zura Way provides one lane of undivided travel in a generally east-west direction. This roadway connects College Avenue with East Campus Drive via a series of parking lots. The Zura Way / College Avenue intersection is an unsignalized two-way stop controlled intersection; Left turns onto College Avenue are prohibited.

El Cajon Boulevard is classified as a Major Arterial according to the College Area Community Plan. El Cajon Boulevard is a four lane divided roadway. Parking is permitted intermittently and bike lanes are provided.

3.2 Existing Traffic Volumes

3.2.1 *Peak Hour Intersection Turing Movement Volumes*

Weekday manual peak hour intersection counts were conducted in December 2008 while all local schools were in session. Weekday counts were conducted during both the AM (7:00-9:00) and PM (4:00-6:00) peak periods. ***Figure 3–2*** shows the existing peak hour and daily traffic volumes in the study area.

3.2.2 *Daily Segment Volumes*

Bi-directional daily traffic counts were conducted on the study area street segments in December 2008, while the college was in session. Traffic counts at two study area segments along Montezuma Road where obtained in February 2008. *Figure 3–2* depicts the 24-hour segment volumes along the study area segments.

Table 3–1 summarizes the ADT counts. ***Appendix B*** contains the manual intersection and street segment count sheets.

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Street Segment	ADT [a]	Date	Source
College Avenue			
Canyon Crest Drive to Zura Way	44,000	December 2008	LLG
Zura Way to Lindo Paseo	30,000	December 2008	LLG
Montezuma Road to El Cajon Boulevard	29,100	December 2008	LLG
Montezuma Road			
Collwood Road to 55th Street	30,600	February 2008	LLG
55th Street to Campanile Drive	26,100	February 2008	LLG
College Avenue to Catoctin Drive	14,800	December 2008	LLG

Footnotes:

a. Average Daily Traffic Volumes.

4.0 ANALYSIS APPROACH AND METHODOLOGY

4.1 Analysis Overview

This traffic study is organized into the several sections, pursuant to standards of practice in the San Diego region. Generally, the LOS analyses summarize Near-term and Long-term (2030) traffic operations in the study area, and compares Proposed Project impacts to a no-build baseline.

In addition to the LOS analyses, the report includes assessments of potential traffic impacts to regional Congestion Management Program roadways, impacts related to project construction, driveway access, parking, transit, pedestrian and bicycle circulation, and proposed street vacations and roadway closures.

Table 4–1 provides an overview of the various analyses completed in this traffic impact report, lists their respective sections, and briefly describes each analysis.

TABLE 4–1
ANALYSIS OVERVIEW

Scenario/ Element		Report Section	Description
Near-Term	Existing	6.0	Summarizes the existing intersection and street segment LOS in the study area.
Near-Term	Existing + Near-Term Cumulative	9.0	Includes the effects of 33 near-term cumulative projects in the study area. The results of this analysis form the baseline against which near-term net project impacts are measured.
Near-Term	Existing + Near-Term Cumulative + University-Serving Retail	9.0	This analysis measures the near-term net project impacts of only the university-serving retail scenario. This is for reference only.
Near-Term	Existing + Near-Term Cumulative + University/Community-Serving Retail	9.0	This analysis measures the near-term net project impacts of only the university/community-serving retail scenario. This is for reference only.
Near-Term	Existing + Near-Term Cumulative + University -Serving Retail + Student Housing	9.0	This analysis measures the near-term net project impacts of both the university-serving retail scenario and the student housing. These results are measured against *Existing + Near-Term Cumulative* results to determine impacts based on the significance criteria in Section 5.0.
Near-Term	Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing	9.0	This analysis measures the near-term net project impacts of both the university/community-serving retail scenario and the student housing. These results are measured against *Existing + Near-Term Cumulative* results to determine impacts based on the significance criteria in Section 5.0.
Continued			

TABLE 4–1 *continued*
ANALYSIS OVERVIEW

	Scenario/ Element	Report Section	Description
Long-Term (2030)	Long-Term (2030) Without Project	10.0	Includes the effects of buildout of the study area land uses and network. The results of this analysis form the baseline against which long-term net project impacts are measured.
	Long-Term (2030) + University - Serving Retail	10.0	This analysis measures the long-term net project impacts of only the university-serving retail scenario. This is for reference only.
	Long-Term (2030) + University/Community-Serving Retail	10.0	This analysis measures the long-term net project impacts of only the university/community-serving retail scenario. This is for reference only.
	Long-Term (2030) + University - Serving Retail + Student Housing	10.0	This analysis measures the long-term net project impacts of both the university-serving retail scenario and the student housing. These results are measured against *Long-Term (2030) Without Project* results to determine impacts based on the significance criteria in Section 5.0.
	Long-Term (2030) + University/Community-Serving Retail + Student Housing	10.0	This analysis measures the long-term net project impacts of both the university/community-serving retail scenario and the student housing. These results are measured against *Long-Term (2030) Without Project* results to determine impacts based on the significance criteria in Section 5.0.
Other	Congestion Management Compliance	11.0	This section discusses the study's compliance with respect to the regional Congestion Management Program (CMP)
	Construction Traffic Impacts	12.0	This section discusses the potential traffic impacts associated with construction of the project.
	College Avenue/ Lindo Paseo Driveway Access	13.0	This section discusses the potential traffic impacts associated with the parking garage access proposed at College Avenue/ Lindo Paseo.
	Parking	14.0	This section discusses the potential impacts associated with parking for the proposed project.
	Transit	15.0	This section discusses the potential impacts of the project on local transit.
	Pedestrian/ Bicycle Circulation	16.0	This section discusses the potential impacts of the project on pedestrian and bicycle circulation.
	Roadway Closures/ Street Vacations	17.0	This section discusses the potential impacts of the proposed road closures and street vacations in the study area.
	Emergency Vehicle Access	18.0	This section discusses the emergency vehicle access/circulation in the study area.

For the purposes of segregating volumes and delays between the two project entities (retail and student housing), an analysis adding only the retail portion of the Proposed Project was conducted.

4.2 Net Project Analysis

The mixed-use development consists of seven new buildings that would replace approximately 24 existing parcels in the study area. Many of these parcels are developed and currently generating traffic. Therefore, this analysis summarizes the existing site traffic, and subtracts it from Proposed Project traffic to yield net project traffic volumes. This net total traffic is then added to near-term and long-term baseline (no-build) traffic volumes to determine potential significant impacts. *Section 8.0 (Trip Generation)* provides more specific information on the gross and net project traffic generation.

4.3 Retail Scenarios

At this time, the exact retail tenants are unknown. The analysis classifies the retail uses as either "university/community-serving" retail uses, or as "university-serving" retail uses. The differences between these two retail types would be based largely upon the intended consumer demographic, and the subsequent retailers that would serve that demographic. The following describes each retail type in detail.

4.3.1 *University/Community-Serving Retail*

The demographic for university/community-serving retail uses would include both students and non-students living the College Area neighborhood, as well as those living in adjacent communities, such as Del Cerro, Rolando, Talmadge and La Mesa, for example. Retail uses that would attract consumers from the greater community (not just SDSU students and faculty) would likely be larger, national chain or franchise retailers. However, independent specialty retailers providing goods or services appealing to consumers county-wide would also attract trips from outside of the SDSU area, and therefore be considered a university/community-serving retailer.

University/community-serving retailers would generate higher traffic volumes than university-serving retailers, since more of the former's trips would originate in locations outside of the immediate SDSU area, and university/community-serving retail uses could include both retail and restaurant land uses.

4.3.2 *University-Serving Retail*

The demographic for university-serving retail uses would largely include faculty/staff and students and living on campus and in the College Area neighborhood. University-serving retail uses would be smaller, independent businesses such as bookstores, repair shops, record stores, coffee shops and small restaurants, which would rely heavily on the nearby concentration of students and faculty/staff SDSU for their business.

In contrast to university/community-serving retailers, these businesses would attract the vast majority of their trips from patrons already on campus, and would generate few trips from outside the College Area. Also, fewer vehicle trips would be expected, as patrons would be located close to their target market, making bike/walk trips very attractive. University-serving retail uses could include both retail and restaurant land uses.

The analyses assess the impacts of each of these retail options (called "*scenarios*") against the near-term baseline separately, since the traffic generation characteristics with each scenario are unique.

The student-housing traffic is added to each scenario separately such that those trips are segregated from the entire project. *Sections 9.0* and *10.0* contain the Near-term and Long-term (2030) analyses.

4.4 Level of Service Concept

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions (free-flow) and LOS F representing the worst operating conditions (gridlock). Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

4.5 Intersection Analysis Methodology

4.5.1 *Signalized intersections*

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 6.0) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection Level of Service (LOS). A more detailed explanation of the methodology is attached in ***Appendix C***.

4.5.2 *Unsignalized intersections*

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and Levels of Service (LOS) were determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 6.0) computer software. A more detailed explanation of the methodology is attached in *Appendix C.*

4.5.3 *Intersecting Lane Volume (ILV)*

Caltrans requires that State-owned intersections be analyzed using ***Intersecting Lane Volume (ILV)*** methodology as described in Chapter 400, Topic 406 of the Department Highway Design Manual. The ILV methodology is based on the concept that the capacity of intersecting lanes of traffic is 1,500 vehicles per hour. For the typical local street interchange there is usually a critical intersection of a ramp and the crossroads that establishes the capacity of the interchange.

Neither the City of San Diego nor Caltrans consider the ILV methodology as an approved methodology for determining significance of impacts. ILV methodology is basic, and does not allow for the sophisticated analysis that the HCM methodology discussed in 4.5.1 does. In some cases, ILV results will vary dramatically from HCM results. However, the local Caltrans District 11 requests ILV analyses be included for informational purposes.

Table 4–2 summarizes the ILV capacities.

TABLE 4–2
ILV CAPACITIES

UNDER (ILV/hr<1200)	**NEAR (ILV/hr 1200 – 1500)**	**OVER (ILV/hr >1500)**
Denotes stable flow with slight but acceptable delay. Occasional signal loading may develop. Free mid-block operations.	Denotes unstable flow with considerable delay. Some vehicles occasionally wait two or more cycles to pass through the intersection. Continuous backup occurs at some approaches.	Denotes stop and go operation with severe delay and heavy congestion[a]. Traffic volume is limited by maximum discharge rates of each phase. Continuous backup in varying degrees occurs on all approaches. Where downstream capacity is restrictive, mainline congestion can impede orderly discharge through the intersection.

Footnotes:

a. The amount of congestion depends on how much the ILV/hr value exceeds 1500. Observed flow rates will normally not exceed 1500 ILV/hr and the excess will be delayed in a queue.

4.6 Street Segments Methodology

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Diego's *Roadway Classification, Level of Service, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The City of San Diego's *Roadway Classification, Level of Service, and ADT Table* is attached in ***Appendix D***.

5.0 SIGNIFICANCE CRITERIA

The Proposed Project would add additional daily and peak-hour traffic volumes to the existing street system, including roadway segments and intersections that are already operating at undesirable LOS E and LOS F. Technical studies such as this traffic impact study rely on published significance criteria to provide definitive guidance on when and how a significant project impact is determined. As a state entity, CSU/SDSU is not subject to local planning directives, including those of the City of San Diego. Notwithstanding, for the purposes of this analysis, the City of San Diego significance criteria was applied.

In addition to the City of San Diego guidelines, the California Environmental Quality Act (CEQA) has published guidelines that include a checklist in Appendix G to evaluate project impacts based on seventeen criteria. Criterion XV of this appendix relates specifically to Transportation/Traffic impacts.

The following is detailed discussion of both the City of San Diego and the general CEQA significance criteria.

5.1 City of San Diego Significance Criteria

According to the City of San Diego's *Significance Determination Thresholds* report dated January 2007, a project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a City defined threshold. For projects deemed complete on or after January 1, 2007, the City defined threshold by roadway type or intersection is shown in ***Table 5–1***.

The impact is designated either a "direct" or "cumulative" impact. According to the City's *Significance Determination Thresholds* report,

> "*Direct* traffic impacts are those projected to occur at the time a proposed development becomes operational, including other developments not presently operational but which are anticipated to be operational at that time (near term)."
>
> "*Cumulative* traffic impacts are those projected to occur at some point after a proposed development becomes operational, such as during subsequent phases of a project and when additional proposed developments in the area become operational (short-term cumulative) or when affected community plan area reaches full planned buildout (long-term cumulative)."
>
> It is possible that a project's near term (direct) impacts may be reduced in the long term, as future projects develop and provide additional roadway improvements (for instance, through implementation of traffic phasing plans). In such a case, the project may have direct impacts but not contribute considerably to a cumulative impact."
>
> For intersections and roadway segments affected by a project, level of service (LOS) D or better is considered acceptable under both direct and cumulative conditions."

If the project exceeds the thresholds in *Table 5–1*, then the project may be considered to have a significant "direct" or "cumulative" project impact. A significant impact can also occur if a project causes the Level of Service to degrade from D to E, even if the allowable increases in *Table 5–1* are not exceeded. A feasible mitigation measure will need to be identified to return the impact within the City thresholds, or the impact will be considered significant and unmitigated.

TABLE 5–1
CITY OF SAN DIEGO
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project[b]	Allowable Increase Due to Project Impacts[a]					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
E	0.010	1.0	0.02	1.0	2.0	1.0[c]
F	0.005	0.5	0.01	0.5	1.0	

Footnotes:

a. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. The project applicant shall then identify feasible improvements (within the Traffic Impact Study) that will restore/and maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note b), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating the project's direct significant and/or cumulatively considerable traffic impacts.

b. All LOS measurements are based upon Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments are estimated on an ADT/24-hour traffic volume basis (using Table 2 of the City's Traffic Impact Study Manual). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped locations). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

c. The impact is only considered significant if the total delay exceeds 15 minutes.

General Notes:

- Delay = Average control delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
- LOS = Level of Service
- V/C = Volume to Capacity Ratio (capacity at LOS E should be used)
- Speed = Arterial speed measured in miles per hour for Congestion Management Program (CMP) analyses

5.2 California Environmental Quality Act (CEQA) "Appendix G" Checklist

The published 2009 CEQA Statute & Guidelines provide a checklist in Appendix G specifically related to transportation and traffic impacts. These consist of seven questions, listed "a" through "g". The analyst must answer whether the project would result in "Potentially Significant Impact", "Less than Significant with Mitigation Incorporation", "Less than Significant Impact", or "No Impact". This traffic study addresses each of these questions, where applicable. ***Table 5–2*** lists the seven questions and shows which sections within this traffic impact study address them.

TABLE 5–2
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

	CEQA Question	Corresponding Traffic Study Section
a)	Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets highways and freeways, pedestrian and bicycle paths, and mass transit?	Section 9.0 – *Analysis of Near-term Traffic Volumes;* Section 10.0 – *Analysis of Long-term Traffic Volumes;* Section 15.0 – *Transit;* and Section 16.0 – *Pedestrian/Bicycle Circulation*
b)	Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency or designated roads or highways?	Section 9.0 – *Analysis of Near-term Traffic Volumes;* Section 10.0 – *Analysis of Long-term Traffic Volumes*, and Section 11.0 – *Congestion Management Program Compliance*
c)	Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	*(This is not applicable to this traffic impact study)*
d)	Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	Section 13.0 – *College Avenue/ Lindo Paseo Driveway Access*
e)	Would the project result in inadequate emergency access?	Section 18.0 – *Emergency Vehicle Access*
f)	Would the project result in inadequate parking capacity? (Note: While this criteria has been removed from the CEQA Guidelines, an analysis of available parking capacity nevertheless was conducted.)	Section 14.0 – *Parking*
g)	Would the project conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities supporting Scenario transportation (e.g., bus turnouts, bicycle racks)?	Section 15.0 – *Transit;* and Section 16.0 – *Pedestrian/Bicycle Circulation;*

Source: *2009 California Environmental Quality Act – Statute & Guidelines*

6.0 ANALYSIS OF EXISTING CONDITIONS

The analysis of existing conditions includes the assessment of the study area intersections and street segments using the methodologies described in Section 4.0. ***Appendix E*** contains the existing conditions analysis worksheets and ILV operations sheets.

6.1 Peak Hour Intersection Analysis

Table 6–1 summarizes the peak hour intersection operations for existing conditions. As shown in *Table 6–1*, all study area signalized intersections are calculated to currently operate at LOS D or better except the following:

2. College Avenue / I-8 EB Off-Ramp (LOS E during the AM peak hour)
3. College Avenue / Canyon Crest Drive (LOS E during the PM peak hour)
4. College Avenue / Zura Way (LOS F during the AM peak hour)
7. College Avenue / El Cajon Boulevard (LOS E during the PM peak hour)

In addition, the unsignalized intersection of College Avenue and Zura Way is calculated to operate at LOS F for southbound left-turn onto Zura Way during the AM peak hour and LOS C during the PM peak hour.

6.2 Daily Street Segment Analysis

Table 6–2 summarizes the existing segment operations. As shown in *Table 6–2*, all segments in the study area are calculated to operate at LOS D or better except the following:

5. College Avenue between Canyon Crest Drive and Zura Way (LOS F)
6. Montezuma Road between 55th Street and College Avenue (LOS E)

6.3 ILV Operations

Table 6–3 summarizes the results of the existing ILV analysis. As shown in *Table 6–3*, the College Avenue / I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours.

TABLE 6–1
EXISTING PEAK HOUR INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. College Avenue / I–8 Westbound Ramps	Signal	AM PM	9.3 8.3	A A
2. College Avenue / I–8 Eastbound Ramps	Signal	AM PM	77.0 15.2	E B
3. College Avenue / Canyon Crest Drive	Signal	AM PM	48.6 57.5	D E
4. College Avenue / Zura Way	TWSC[c]	AM PM	67.0 16.2	F C
5. College Avenue / Lindo Paseo	Signal	AM PM	11.9 20.1	B C
6. College Avenue / Montezuma Road	Signal	AM PM	36.6 45.7	D D
7. College Avenue / El Cajon Boulevard	Signal	AM PM	36.6 56.4	D E
8. Montezuma Road / Collwood Boulevard	Signal	AM PM	21.2 24.7	C C
9. Montezuma Road / 55th Street	Signal	AM PM	41.2 34.1	D C
10. Montezuma Road / Campanile Drive	Signal	AM PM	28.0 34.2	C C
11. Montezuma Road / Catoctin Drive	Signal	AM PM	20.0 20.4	B C
12. Montezuma Road / El Cajon Boulevard	Signal	AM PM	24.6 20.7	C C

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 6–2
EXISTING DAILY STREET SEGMENT OPERATIONS

Street Segment	Capacity (LOS E) [a]	ADT [b]	LOS [c]	V/C [d]
College Avenue				
Canyon Crest Drive to Zura Way	40,000	44,000	F	1.100
Zura Way to Montezuma Road	40,000	30,000	C	0.750
Montezuma Road to El Cajon Boulevard	40,000	29,100	C	0.728
Montezuma Road				
Collwood Boulevard to 55th Street	40,000	30,600	C	0.765
55th Street to College Avenue	30,000	26,100	E	0.870
College Avenue to Catoctin Drive	30,000	14,800	C	0.493

Footnotes:

a. Capacities based on City of San Diego Roadway Classification Table.

b. Average Daily Traffic Volumes.

c. Level of Service.

d. Volume to Capacity.

TABLE 6–3
EXISTING ILV OPERATIONS

Intersection	Peak Hour	Existing	
		Total Operating Level (ILV / Hour)	Capacity[a]
College Ave / I-8 WB Ramps	AM PM	596 682	Under Under
College Ave / I-8 EB Ramps	AM PM	615 1124	Under Under

Footnote:

a. CAPACITY is shown as *UNDER* capacity, *NEAR* capacity or *OVER* capacity;
***Under** Capacity* = <1200 ILV/Hour
Near Capacity = >1200 but < 1500 ILV/Hour
Over Capacity = >1500 ILV/Hour

General Notes:

1. See *Appendix E* for ILV calculation sheets.

7.0 NEAR-TERM CUMULATIVE

There are other planned projects in the project vicinity, which will add traffic to the roadways surrounding the project site. Based on a review of other potential projects within the area, discussions with City of San Diego staff, and a review of the SDSU Master Plan Update (completed June 2007) it was determined that the following cumulative development projects listed on ***Table*** *7–1* were included in the traffic analysis. ***Figure*** *7–1* shows a summary of the total near-term cumulative project traffic assignment. ***Figure*** *7–2* shows the existing + near-term cumulative traffic volumes.

TABLE 7–1
CUMULATIVE PROJECTS SUMMARY

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
City of San Diego Redevelopment Agency					
Crossroads Redevelopment Area					
1a–1c	Crossroads Redevelopment Project	Three non-contiguous subareas within the following boundaries: (a) El Cajon Boulevard and University Avenue from 54th Street to the City of La Mesa, (b) the east side of 54th Street and north of College Grove Drive, and (c) Redwood and Thorn Streets, Martin Luther King Freeway, and 54th Street	Redevelopment project consisting of a variety of programmatic, residential, commercial, and public facilities with approximately 2,421 dwelling units ("DUs") proposed to be built over a 1,032-acre redevelopment area.	Approved	2032
2	Mesa Commons I[a]	El Cajon Boulevard and Catoctin Drive	Mixed-use project containing 52 DUs and 2,833 square feet ("SF") of retail. Residential component includes 16 row homes, 31 condominium units, and 5 rental units.	Approved	2015
3	Mesa Commons II[a]	4883, 4905, and 4915 Catoctin Drive, northeast of Art Street	33 "for sale" attached row home-style units in seven buildings, and seven detached single-family units (170 total beds).	Approved	2015
4	Centrepoint[a]	Intersection of 63rd Street and El Cajon Boulevard	63 townhouse units and 249 residential flats. The project will also include nearly 4,000 SF of retail space, 610 off-street parking spaces, open space, and recreational facilities.	Approved	Fall 2013

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
5	Chollas Triangle Redevelopment Project	Southside of 5400 University Avenue	Pedestrian-oriented mixed-use project (possibly 500-600 DUs) on 36-acre site.	In planning process	Unknown
College Community Redevelopment Area					
6	5566 Lindo Paseo	5566 Lindo Paseo	Demolish existing residences and construct a 7,771 SF, 26-bed fraternity house.	In planning process	Unknown
7	Village Lindo Paseo (formerly known as Plaza Lindo Paseo)	5565 – 5619 Lindo Paseo	Demolish five existing single-family DUs on six lots and construct an 896-bed student dormitory facility. The project also proposes an underground parking facility and accessory uses.	In planning process	2011/2012
8	6195 Montezuma Road	6195 Montezuma Road	Demolish two existing single-family DUs and construct a four-story structure with two levels of underground parking. Construct 40 DUs (22 four-bedroom DUs, 2 three-bedroom DUs, and 16 two-bedroom DUs), 84 on-site parking spaces, and associated improvements.	Approved	Through 2025
9	Plaza Lindo Paseo	5649–5691 Lindo Paseo	Demolish existing structures and construct 45 residential condominiums, 4 commercial condominiums, and 2 fraternity houses.	Approved	2011/2012

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
10	Wesley House	5716 Hardy Avenue	200 beds.	Anticipated future proposal	Unknown
11	SDSU Religious Centers Project	West of Campanile Drive, along Lindo Paseo and Hardy Avenue	Unknown.	Anticipated future proposal	Unknown
12	Sorority Row Housing Project	West side of College Avenue, south of Montezuma Road	Housing project for 215 student-sorority members on 1.56-acre vacant parcel. Project will include 65 apartments and 5 sorority chapter houses.	In Planning Process	Unknown
13	5030 College LLC	5030 College Avenue	Construct 107 rental DUs on a vacant site (site of SDSU Sorority Housing project that was approved but not constructed).	In planning process	Unknown
14	Aztec Inn at SDSU	Northwest corner of Campanile Drive and Montezuma Road	74-room hotel with associated meeting rooms and retail and service areas.	On hold	On hold

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
15	Alvarado Apartments (The Dinerstein Companies)	6599 Alvarado Road	Redesignate 9.9 acres of Institutional land to Very High Residential Land; construct 664 rental DUs and 2,800 SF of retail.	~~In planning process~~Approved	2011
16	Collwood Apartments	4929 Collwood Boulevard	Demolish existing 167-unit apartment building and construct 260 units.	Completed, undergoing inspections	Fall 2010
17	Aztec Court Apartments	6229–6245 Montezuma Road	Demolish existing residences and construct 25 DUs.	~~In planning process~~Approved	Unknown

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
City of San Diego					
18	Parc @ 54 (formerly Park at 54th Street)	4079 54th Street	90-unit apartment complex.	Completed	November 2009
19	Centrepoint-Grantville	Block bounded by Vandever Avenue, Fairmont Avenue, Twain Avenue, Mission Gorge Road	12-acre site for mixed-use development of 588 multi-family DUs and 135,228 SF of office, retail, and restaurant space.	Proposed	Unknown
20	Montezuma South	Near SE corner of College Avenue and Montezuma Road	450 beds.	Anticipated future proposal	Through 2025
21	Grantville Trolley Station Transit Oriented Development ("TOD")	4510 Alvarado Canyon Road	Approximately 900 beds.	Anticipated future proposal	Unknown
22	Kohl's Department Store	3450 College Avenue	73,872 SF of retail development.	Proposed	Unknown
23	-Levanto Townhomes	4525 Waring Road	100 units (multi-family complex).	Completed	June 2010

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
San Diego State University					
24	College of Business Administration Building	Southeastern portion of SDSU, between College Avenue and East Campus Drive (existing Lot F)	170,000 SF College of Business building in Lot F.	Proposed	Unknown
25	Parma Payne Goodall Alumni Center	55th Street between Athletics Center and Sports Deck	New 28,000 SF Alumni Center to house the offices of the Alumni Association, Annual Giving, and staff of University Advancement.	Completed	October 2009
26	Performing Arts Building	Adjacent to the existing Music Building in the central portion of campus	New five-story, 50,000 SF building to house a 400-seat black box performing arts theatre, dance studios, drama rehearsal space, and support space.	Proposed	Unknown
27	Campus Conference Center	East of 55th Street, immediately east of Viejas Arena	Three-story, 70,000 SF building to provide meeting/conference space, office space, food services and retail services. The building would consist of 1 subterranean and 2 above-ground floors.	Approved	Unknown

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
28	Aztec Center Expansion	West of College Avenue, northeast of Aztec Transit Center	Construction of additional meeting spaces; a multi-purpose theatre; a 24-hour study lounge; and expanded and improved office spaces for student organizations, student activities, and student life.	Approved	2012
29	Storm/Nasatir Halls Renovation	East of Aztec Circle Drive, south of parking structure 8	Upgrade structures to meet current Health and Safety Code standards, correct deferred maintenance issues, and improve energy conservation.	On hold	2012
30	Remington Road median	Western campus boundary, north of softball and baseball fields	Construct median in Remington Road.	In design (awaiting City permit)	Unknown
31	Softball Stadium Pressbox Addition	South of Remington Road, adjacent to Tony Gwynn Stadium	Construct press box at softball stadium.	On hold (possible future project)	Unknown
32	Bioscience TI	South of Canyon Crest Drive, west of A Lot adjacent to the Life Sciences North Building	Renovations to internal utilities.	Completed	2009

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
33	Student Housing Phase I	East of College Avenue, north of Montezuma Road on G Lot	10-story building (approximately 350,000 SF in size) to house 95–105 suite-style residential units.	Approved	Unknown
34	Olmeca/Maya Reconstruction	North of Montezuma Road, east of existing residence halls and Parking Structures 3 and 6	Two 10-story buildings (approximately 350,000 SF in size each) to house approximately 1,600 students.	Approved	Unknown
35	U Lot Residence Hall	North of Remington Road, west of 55th Street atop Parking Structure 7	10-story building (approximately 350,000 SF in size) to house approximately 800 students and redesign Parking Structure 7 to accommodate 750 vehicles.	Approved	Unknown
36	Villa Alvarado Residential Hall Expansion	South of Interstate 8, east of College Avenue on C Lot	Additional apartments (approximately 50 two-bedroom apartments) in 2-3 story structures to provide an additional 200 beds.	Approved	Unknown
37	Alvarado Hotel	South of Interstate 8, adjacent to Alvarado Road	Approximately 120-room hotel for visitors to SDSU. Facilities may also include a business center, exercise room, and several meeting rooms.	Approved	Unknown

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TABLE 7–1

CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
38	Alvarado Campus-D Lot	South of Alvarado Road, north of an undeveloped slope and Alvarado Creek on D Lot	Approximately 280,000 SF of instructional and research space.	Approved	Unknown
39	Alvarado Campus-Alvarado Medical Center	South of Alvarado Road, north of an undeveloped slope and Alvarado Creek at the existing Alvarado Medical Center	Approximately 332,285 SF of instructional and research space and a 1,840-car multi-story parking structure.	Approved	Unknown
40	Adobe Falls Phase I	North of Interstate 8, south of Adobe Falls Road	Housing for SDSU faculty and staff.	Approved	Unknown
41	Adobe Falls Phase II	North of Interstate 8, south of Adobe Falls Road	Housing for SDSU faculty and staff.	Approved	Unknown
42	Children's Center Landscape Upgrade	East side of campus, east of College Avenue, north of Zura Way (north of South E Lot)	Landscape improvements.	In design	Unknown
43	Tennis Locker Rooms	South of Remington Road, west of the Aztec Aquaplex	Construct additional locker rooms.	Complete	2009

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
44	Telecom-Infrastructure	Campus wide	Upgrade the campus telecommunication infrastructure to meet CSU standards.	Complete	Complete
City of San Diego Metropolitan Water Department					
45	Alvarado Water Treatment Plant	Located adjacent to Lake Murray near the City of San Diego's eastern boundary with La Mesa	Plant capacity will be increased to 200 million gallons per day to provide increased capacity and improve reliability.	Proposed	2011
City of La Mesa Redevelopment Agency					
46	Grossmont Transit Station	Southside of Fletcher Parkway at Grossmont Center Drive	TOD project to include a 527-unit apartment complex and a two-level (600 space) parking structure.	Completed, undergoing inspections	2010s
City of La Mesa					
47	Coleman College Site (former)	7380 Parkway Drive	9.2 acres redeveloped as 150 senior housing units.	On hold	Unknown
48	Jessie Avenue	4888 Jessie Avenue	47 townhomes and two commercial units.	Approved	Unknown
49	Parks Avenue Townhomes	Parks Avenue and El Cajon Boulevard	10 townhomes and one live/work unit.	Approved	Unknown

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TABLE 7–1
CUMULATIVE PROJECTS SUMMARY (CONT'D)

C.P. #	Project Title	Project Location	Project Description	Status	Buildout Year
50	Comanche Apartments	Comanche Drive and El Cajon Boulevard	19 townhomes with a small commercial component	In planning process	Unknown
51	Montebello North	5017 Thorne Drive	General Plan Amendment and rezone for multiple unit residential structure	In planning process	Unknown
52	Park Station Specific Plan	Several parcels centered around 4999 Baltimore Drive	Specific Plan for mixed-use development.	In planning process	Unknown
53	Lowell Street	North end of Lowell Street	Five-unit planned residential development.	In planning process	Unknown

End of List

8.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

8.1 Trip Generation Overview

The proposed Plaza Linda Verde retail/residential mixed use redevelopment will replace existing land uses on 24 parcels in the study area. This existing traffic was summarized from *The Paseo at San Diego State University EIR* and removed from the gross traffic generation for both the university/community-serving and university-serving retail scenarios to yield the net new traffic for the project.

Separate trip generation calculations were completed for both the university/community-serving and university-serving retail scenarios, based on their respective characteristics discussed in Section 4.0. Trip generation rates were based on City-approved retail trip rates published in the *College Community Redevelopment EIR* and *The Paseo at San Diego State University EIR.*

Trip generation was also calculated for the proposed student housing component of the project, using City-approved trip rates published in the *College Community Redevelopment EIR.*

The following is a detailed discussion of the trip generation calculations.

8.1.1 *Existing Site Traffic to be Removed*

The Proposed Project comprises seven buildings to be built on existing, occupied parcels within the study area. The Proposed Project has two primary trip generating components: 90,000 total square feet of retail use, and 400 total dwelling units of student housing, as assumed in this study. The current project description proposes slightly lower values. As stated in Section 4.0, the existing parcels upon which the project would be built are currently occupied and generating traffic. ***Figure 8–1*** shows the existing parcels to be removed. This existing traffic was summarized based on occupancy information provided by the applicant, as well as on a summary of existing land use trip generation contained in the traffic study prepared for *The Paseo at San Diego State University EIR (Section 3.2, p. 3-11).*

Table 8–1 shows the summary of the existing trip generation for the parcels to be redeveloped as part of the Proposed Project. This table shows the parcel-by-parcel reference to the summary table presented in the Paseo EIR traffic study, as well as the land use, size, and daily and peak hour traffic calculations. In total, the existing parcels are calculated to currently generate 3,113 ADT, with 110 inbound/ 90 outbound AM peak hour trips, and 132 inbound/ 127 outbound PM peak hour trips. These existing volumes were subtracted from the gross Plaza Linda Verde project traffic generation to yield the net project traffic generation for use in the analysis.

Appendix F contains the existing parcel trip generation information from *The Paseo at San Diego State University EIR.*

8.1.2 *University/Community-Serving Retail Scenario – Trip Generation*

Section 4.3.1 discussed in detail the characteristics associated with university/community-serving retail uses. Generally, retailers in the university/community-serving retail scenario would be stand alone, higher-profile, regional or national chains or franchises that would generate higher vehicle trips from a greater distance than university-serving retailers. University/community-serving retail uses would provide goods and services that would appeal to a wider demographic than just SDSU faculty/staff, students and local College Area residents.

A total of 90,000 square feet of retail development is proposed for the project for either retail scenario. Since exact tenants and land uses are unknown, the 90,000 SF was split in two to account for both higher (grocery and restaurant, for example) and lower (general retail, bike shop, dry cleaners, etc.) trip-generating retail uses. This is to allow the development to have flexibility to include a variety of retail land uses later on, when specific tenants are identified. Approximately one half (44,000 SF) was assessed using a higher trip generation rate, while the other half (46,000) was assessed using a lower rate. This would account for some higher generating uses (such as restaurant or grocery store) within the overall university/community-serving retail scenario.

Commercial/retail trip generation rates from both *The Paseo at San Diego State University EIR* and the *College Community Redevelopment EIR* were reviewed for applicability to the Proposed Project. Upon review, it was determined that the rates shown in both EIRs were comparable at 31.4 trips/ 1,000 SF for "retail". The Paseo EIR included an additional trip generation rate of 100 trips/ 1,000 SF for "restaurant" uses (Section 3.2, p. 3-9).

Thus, a trip generation rate of **100 trips/ 1,000 SF** was applied to 44,000 SF of the project square footage which is assumed to be developed as restaurants or grocery stores, based on rates published in *The Paseo at San Diego State University EIR.* This would allow for the development of higher trip generating commercial retail uses, including high-turnover, sit down restaurants and grocery stores (e.g., national chains). While the Paseo at San Diego State traffic study refers to the "100" trip rate as "restaurant", this rate would also cover grocery stores/supermarkets since the City of San Diego's published cumulative trip rate is higher for sit down restaurants than for grocery stores (104 trips/1,000 SF vs. 90 trips/1,000 SF, respectively). A combined pass-by/diverted/mixed use reduction of 48% was applied to this square footage, based on the percentage used in the *The Paseo at San Diego State University EIR (Section 3.2, p. 3-9).*

A rate of **31.4 trips/ 1,000 SF** (based on rates published in both the *College Community Redevelopment EIR* and *Paseo EIR [Section 3.2, p. 3-9]*) was applied to the balance of the retail (46,000 SF) to account for less intensive retail/commercial uses.

8.1.3 *University-Serving Retail Scenario – Trip Generation*

Section 4.3.2 discussed in detail the characteristics associated with university-serving retail uses, which would include retail uses/commercial uses that would generate fewer trips, and from closer distances as compared to university/community-serving retailers. Examples of university-serving retailers would include a locally-owned restaurant or store, catering primarily to faculty and students, and "commons"-type groups of retail and restaurants. This retail use would not attract as many vehicle trips as would a stand-alone national chain restaurant or store that would cater to both students and residents from adjacent communities.

As previously described, university-serving retail would be comprised of tenants that would serve students and faculty/staff already on campus. This would not include grocery stores such as Trader Joe's and stand alone restaurants such as Chili's or McDonalds. University-serving retail would generate very little new vehicular trips and the overall rate would be expected to be a small fraction of a "university/community-serving" retail rate. There are no published trip rates for "university-serving" retail. To be conservative, a full 50% of the university/community-serving retail trip rates discussed above, and based on the Paseo and Redevelopment EIRs, was utilized in this report.

A rate of **50 trips/1,000 SF** was applied to 44,000 SF of restaurant/ retail, while a rate of **15.7 trips/1,000 SF** was applied to 46,000 SF of retail. The same pass-by/diverted/mixed use combined reduction of 48% used in the university/community-serving retail assessment was applied to these square footages.

8.1.4 *Student Housing Trip Generation*

Student housing trip generation is unique among the trip rates associated with the various types of residential projects (e.g., single family, apartment, condominium, etc). Student housing and apartment/condominium land uses have similarities (high density, low trip generation), but trip rates for student housing are considered lower than typical multi-family rates. This is because unlike other multi-family dwellings (such as apartments), many students do not have cars, and those who do tend to make fewer trips since many trip ends associated with students lie within the sphere of the campus area. These include work (school) and pleasure trips (gym, sports fields), as well as trips to grocery stores, laundromats, drug stores, etc. Bike and walk trips are also easy and convenient within the sphere of the campus area.

LLG reviewed the trip generation rates published in both *The Paseo at San Diego State University EIR* the *College Community Redevelopment EIR*. The residential trip rate in the Paseo EIR was 3.1 trips/ DU for "high density" residential (Section 3.2, p. 3-9). This rate was approved by City Staff for use in that document. The Redevelopment EIR used a more conservative residential rate of 4.44 trips/ DU (Section 3, p. 3-15) that was also approved by City Staff. Based on a review of the particular Plaza Linda Verde project in terms of density and location, a residential rate of **4.44 trips/unit** was used in this study.

Section 8.3 of this report discusses the very real phenomenon that the provision of on-campus housing eliminates the need for those students to otherwise drive to campus, thereby resulting in a decrease in regional traffic. The student housing aspect of the project embodies smart growth principles by placing the trip origin (the student) very near their primary destination (the university). A trip reduction of this nature would be considered reasonable and, in fact, would provide a more accurate assessment of trip generation. However, in light of the relatively small difference in project trip generation (about 1,200 ADT) that would result from assuming that the student housing would eliminate some trips (which would be reflected in a reduced trip generation rate), and the fact that the number of significant impacts would be unchanged if the analysis made this assumption, the traffic analysis does not factor into the calculations the potential decrease in commuter trips that would result. Therefore, the impact analysis overstates the trip generation.

8.1.5 *Trip Generation Summary*

Table 8–2 and ***Table 8–3*** show summaries of the gross and net trip generation for the university/community-serving retail scenario, respectively. ***Table 8–4*** and ***Table 8–5*** show summaries of the gross trip and net trip generation for the university-serving retail scenario, respectively.

These tables show that the net new trips calculated within the study area are higher for the university/community-serving retail scenario, as would be expected. The calculated net ADT for this scenario (both retail and student housing) are 2,396 ADT, with 46 inbound/ 139 outbound net AM peak hour trips, and 195 inbound/ 84 outbound net PM peak hour trips.

By contrast, the university-serving retail scenario results in lower traffic volumes on a daily (ADT) basis, and peak hour basis. The calculated net ADT for this scenario (both retail and student housing) is 529 ADT, with -19 inbound/ 82 outbound net AM peak hour trips, and 101 inbound/ 8 outbound net PM peak hour trips. The net-negative AM inbound trips are calculated due to the change in trip characteristics from the existing to proposed land uses. For the purposes of the analysis, LLG did not subtract trips from the existing traffic volumes for this net negative value, but rather considered the change as "zero".

8.2 Trip Distribution/Assignment

The retail and student housing land uses are completely different with respect to their trip-origin/destination characteristics. Therefore, separate distributions and assignments were developed for each.

To determine the overall project's regional trip distribution percentages, a Select Zone Assignment (SZA) for the SDSU Traffic Analysis Zone (TAZ) was obtained from SANDAG. The model was reviewed to ensure that both retail and residential land uses were accounted for in the SDSU TAZ. This information was used as a starting point to develop two separate traffic distributions: one for the retail component of the project and one for the student housing component.

Figure 8–2a shows the retail traffic distribution. To be conservative, the retail traffic distribution for university-serving retail was assumed to be the same as university/community-serving retail, even though the former's trip lengths would be shorter. ***Figure 8–2b*** shows the student housing traffic distribution.

The net project traffic volumes for the university/community-serving and university-serving retail scenarios were multiplied against these distribution percentages to calculate the project traffic volumes in the study area. ***Figure 8–3*** shows the assignment of university/community-serving retail project peak hour volumes and ADT. ***Figure 8–4*** shows the assignment of university-serving retail project peak hour volumes and ADT. ***Figure 8–5*** shows the assignment of student housing project peak hour volumes and ADT.

The project traffic assignments described above were added to the existing + near-term cumulative (baseline) traffic volumes shows on *Figure 7–2* to develop the various "*existing* + *cumulative* + *project*" traffic volumes.

Figure 8–6 shows the assignment of existing + near-term cumulative + university/community-serving retail project peak hour volumes and ADT. ***Figure 8–7*** shows the assignment of existing + near-term cumulative + university-serving retail project peak hour volumes and ADT. **These volumes represent the addition of only retail traffic volumes, and are for informational purposes only.**

Figure 8–8 shows the assignment of existing + near-term cumulative + university/community-serving retail + student housing project peak hour volumes and ADT. Figure 8–9 shows the assignment of existing + near-term cumulative + university-serving retail + student housing project peak hour volumes and ADT. The volumes on these two figures represent the total project for each scenario, and are compared to the existing + near-term cumulative (baseline) traffic volumes in the analyses presented in Section 9.0.

8.3 Regional Net Traffic Decrease

The additional student housing proposed by the project would eliminate the need for those students to otherwise drive to campus, thereby resulting in a decrease in regional traffic. Development of the Proposed Project would be expected to result in a net decrease in commuter peak hour trips on Interstate 8, and other regional roadways in the area. This is because the student housing component will allow students who would have otherwise needed to commute to campus for classes to be located immediately adjacent to SDSU, thereby essentially converting a regional peak hour vehicle trip into a walk or bike trip. Please note, however, this information is provided for informational purposes only; no quantitative adjustments were made to the impacts analysis to account for this decrease in regional traffic. Also, the existing and proposed mixed-use developments (including the Proposed Project) would provide goods and services for the residents of the proposed student housing component that also would not require a vehicle trip.

The project is not increasing the number of students or faculty, so no new "to/from SDSU" school trips would occur. To the contrary, the project is eliminating these trips that would otherwise have occurred.

TABLE 8–1
EXISTING LAND USE TRAFFIC TO BE REMOVED

Parcel Location [a]	Paseo Map ID#/ Parcel #	Use	Size [b]	Daily Rate [c]	ADT [d]	AM Peak Hour						PM Peak Hour					
						% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
1	1	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	0%	0	0	0
2	18	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
3	19	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
4	20	Commercial	3.721 ksf	18 /ksf	67	13%	90 %	10%	8	1	9	14%	20%	80%	4	7	9
5	21	Commercial	1.825 ksf	18 /ksf	33	13%	90%	10%	4	0	4	14%	20%	80%	1	4	5
6	22	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
7	23	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
8	7	Residential	25 du	4.1 /du	103	8%	20%	80%	2	7	9	10%	70%	30%	9	3	10
9	13	Residential	1 du	4.1 /du	4	8%	20%	80%	0	0	0	10%	70%	30%	0	0	0
10	24	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
11	25	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	[illegible]	[illegible]		
12	31	Retail	5.98 ksf	36 /ksf	215	3%	60%	40%	4	3	7	9%	50%	50%	10	10	20
13	32	Office	1.224 ksf	18 /ksf	22	13%	90%	10%	3	0	3	14%	20%	80%	1	2	3
14	28	Restaurant	2.795 ksf	420 /ksf	1174	4%	60%	40%	28	19	47	8%	50%	50%	47	47	94
15	27	Retail	2.4 ksf	350 /ksf	840	9%	50%	50%	38	38	76	7%	50%	50%	29	29	58
16	30	Retail	1.52 ksf	104 /ksf	158	4%	60%	40%	4	3	7	8%	50%	50%	7	7	14
17	26	Restaurant	2.28 ksf	104 /ksf	237	8%	50%	50%	9	9	18	8%	60%	40%	13	8	19
18	29	Gas Station	8 fs	30 /ksf	240	8%	50%	50%	10	10	20	8%	50%	50%	10	10	20
19	5721	Residential	1 du	4.1 /du	4	8%	20%	80%	0	0	0	10%	70%	30%	0	0	0

Continued

TABLE 8–1 *continued*
EXISTING LAND USE TRAFFIC TO BE REMOVED

Parcel Location	Paseo Map ID#/ Parcel #	Use	Size	Daily Rate	ADT	AM Peak Hour						PM Peak Hour					
						% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
21	5118-5132	Parking Lot	0 ksf	0 /ksf	0	0%	0%	0%	0	0	0	0%	0%	0%	0	0	0
22	5734	Residential	1 du	4.1 /du	4	8%	20%	80%	0	0	0	10%	70%	30%	0	0	0
23	5742	Residential	1 du	4.1 /du	4	8%	20%	80%	0	0	0	10%	70%	30%	0	0	0
24	5750	Residential	1 du	4.1 /du	4	8%	20%	80%	0	0	0	10%	70%	30%	0	0	0
Total Existing Trips to be Removed					*3113*				*110*	*90*	*200*				*132*	*127*	*259*

Footnotes:

a. "Parcel Location" based on Plaza Linda Verde EIR figures.
b. Size of land use presented as "1,000 square feet" (ksf), "dwelling unit" (du), or "fueling station" (fs).
c. "Daily Rate" and all trip generation rate information are taken from the Paseo EIR Traffic Study source table.
d. ADT = Average Daily Traffic

General Notes:

1. Source: *The Paseo at San Diego State University EIR* Traffic Study
2. Additional land use data provided by SDSU (four digit parcel numbers). Trip generation rates for these parcels are based on those published in the Paseo EIR Traffic Study.
3. Shaded values represent parcels that do not generate traffic (e.g., parking lots).

TABLE 8–2
UNIVERSITY/COMMUNITY-SERVING RETAIL GROSS TRIP GENERATION

Location	Use [a]	Size [b]	Daily Rate	ADT	AM Peak Hour						PM Peak Hour					
					% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
Building 1	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	12.5 ksf	31.4/ ksf	393	4%	60%	40%	9	6	15	11%	50%	50%	22	22	44
	c. Retail	12.5 ksf	100 (.52/ /ksf	650	8%	50%	50%	26	26	52	8%	60%	40%	31	21	52
	Subtotal – Bldg 1			*1440*				*41*	*58*	*99*				*84*	*56*	*140*
Building 2	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	31.4/ ksf	314	4%	60%	40%	8	5	13	11%	50%	50%	17	17	34
	c. Retail	10 ksf	100 (.52)/ ksf	520	8%	50%	50%	21	21	42	8%	60%	40%	25	17	42
	Subtotal – Bldg 2			*1100*				*33*	*43*	*76*				*63*	*43*	*106*
Building 3	a. Retail	2 ksf	31.4/ ksf	63	4%	60%	40%	2	1	3	11%	50%	50%	3	3	6
Building 4	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	31.4/ ksf	314	4%	60%	40%	8	5	13	11%	50%	50%	17	17	34
	c. Retail	10 ksf	100 (.52)/ ksf	520	8%	50%	50%	21	21	42	8%	60%	40%	25	17	42
	Subtotal – Bldg 4			*1100*				*33*	*43*	*76*				*63*	*43*	*106*
Building 5	a. residential	90 du	4.44/1 du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. retail	11.5 ksf	31.4/ du	361	4%	60%	40%	9	6	15	11%	50%	50%	20	20	40
	c. retail	11.5 ksf	100 (.52)/ ksf	598	8%	50%	50%	24	24	48	8%	60%	40%	29	19	48
	Subtotal – Bldg 5			*1359*				*39*	*56*	*95*				*80*	*52*	*132*
Building 6	a. residential	50 du	4.44 du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Building 7	a. residential	50 du	4.44 du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Total Residential		*400 du*	–	*1776*				*28*	*114*	*142*				*138*	*58*	*196*
Total Retail		*90 ksf*	–	*3733*	-	-	-	*128*	*115*	*243*	-	-	-	*189*	*153*	*342*
Total Gross Trips				*5509*	-	-	-	*156*	*229*	*385*	-	-	-	*327*	*211*	*538*

Footnotes:

a. The 90,000 square feet of total retail land use is assessed as 44,000 square feet at 31.4 trips/ksf, and 46,000 sf at 100 trips/ ksf (See Section 8.1for discussion).

b. Size of land use presented as "1,000 square feet" (ksf), or "dwelling unit" (du).

General Notes:

1. Trip Generation Rates are based on trip rates published in *College Community Redevelopment EIR*, and the *Paseo EIR*.
2. ADT = Average Daily Traffic
3. The "Total Gross Trips" represent project traffic prior to removal of traffic volumes associated with existing land uses to be redeveloped with the Proposed Project.

TABLE 8–3
UNIVERSITY/COMMUNITY-SERVING RETAIL NET TRIP GENERATION

Location	Use [a]	Size [b]	Daily Rate	ADT	AM Peak Hour	PM Peak Hour

					% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
Building 1	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	12.5 ksf	31.4/ ksf	393	4%	60%	40%	9	6	15	11%	50%	50%	22	22	44
	c. Retail	12.5 ksf	100 (.52)/ ksf	650	8%	50%	50%	26	26	52	8%	60%	40%	31	21	52
	Subtotal – Bldg 1			*1443*				*41*	*58*	*99*				*84*	*56*	*140*
Building 2	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	31.4/ ksf	314	4%	60%	40%	8	5	13	11%	50%	50%	17	17	34
	c. Retail	10 ksf	100 (.52)/ ksf	520	8%	50%	50%	21	21	42	8%	60%	40%	25	17	42
	Subtotal – Bldg 2			*1100*				*33*	*43*	*76*				*63*	*43*	*106*
Building 3	a. Retail	2 ksf	31.4/ ksf	63	4%	60%	40%	2	1	3	11%	50%	50%	3	3	6
Building 4	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	31.4/ ksf	314	4%	60%	40%	8	5	13	11%	50%	50%	17	17	34
	c. Retail	10 ksf	100 (.52)/ ksf	520	8%	50%	50%	21	21	42	8%	60%	40%	25	17	42
	Subtotal – Bldg 4			*1100*				*33*	*43*	*76*				*63*	*43*	*106*
Building 5	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	11.5 ksf	31.4/ ksf	361	4%	60%	40%	9	6	15	11%	50%	50%	20	20	40
	c. Retail	11.5 ksf	100 (.52)/ ksf	598	8%	50%	50%	24	24	48	8%	60%	40%	29	19	48
	Subtotal – Bldg 5			*1359*				*39*	*56*	*95*				*80*	*52*	*132*
Building 6	a. Residential	50 du	4.44/ du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Building 7	a. Residential	50 du	4.44/ du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Total Residential		*400*	–	*1776*	-	-	-	*28*	*114*	*142*	-	-	-	*138*	*58*	*196*
Total Retail		*90*	–	*3733*	-	-	-	*128*	*115*	*243*	-	-	-	*189*	*153*	*342*
Total Gross Tips				***5509***	-	-	-	***156***	***229***	***385***	-	-	-	***327***	***211***	***538***
Total Existing Land Uses' Trips (Subtracted)				***(3113)***	-	-	-	***(110)***	***(90)***	***(200)***	-	-	-	***(132)***	***(127)***	***(259)***
Total Net Project Trips				***2396***	-	-	-	***46***	***139***	***185***	-	-	-	***195***	***84***	***279***

Footnotes:

a. The 90,000 square feet of total retail land use is assessed as 44,000 square feet at 31.4 trips/ksf, and 46,000 sf at 100 trips/ ksf (See Section 8.1 for discussion).

b. Size of land use presented as "1,000 square feet" (ksf), or "dwelling unit" (du).

General Notes:

1. Trip Generation Rates are based on trip rates published in *College Community Redevelopment EIR*, and the *Paseo EIR*.
2. ADT = Average Daily Traffic
3. The "Total Gross Trips" represent project traffic prior to removal of traffic volumes associated with existing land uses to be redeveloped with the Proposed Project.
4. The "Total Existing Land Uses' Trips" are the summary of trips from *Table 8–1* to be removed with redevelopment of the Proposed Project.
5. The "Total Net Project Trips" are the volumes used in the LOS analyses in *Sections 9.0* and *10.0* of this traffic study.

Table 8-4
University-Serving Retail Gross Trip Generation

Location	Use	Size	Daily Rate	ADT	AM Peak Hour						PM Peak Hour					
					% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
Building 1	a. Residential	90 du	4.44/du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	12.5 ksf	15.7 / ksf	196	4%	60%	40%	5	3	8	11%	50%	50%	11	11	22
	c. Retail	12.5 ksf	50 (.52)/ ksf	325	8%	50%	50%	13	13	26	8%	60%	40%	16	10	26
	Subtotal – Bldg 1			*921*				*24*	*42*	*66*				*58*	*34*	*92*
Building 2	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	15.7/ ksf	157	4%	60%	40%	4	3	7	11%	50%	50%	9	9	18
	c. Retail	10 ksf	50 (.52)/ ksf	260	8%	50%	50%	10	10	20	8%	60%	40%	12	8	20
	Subtotal – Bldg 2			*683*				*18*	*30*	*48*				*42*	*26*	*68*
Building 3	a. Retail	2 ksf	15.7/ ksf	31	4%	60%	40%	1	1	2	11%	50%	50%	2	2	4
Building 4	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	15.7/ ksf	157	4%	60%	40%	4	3	7	11%	50%	50%	9	9	18
	c. Retail	10 ksf	50 (.52)/ ksf	260	8%	50%	50%	10	10	20	8%	60%	40%	12	8	20
	Subtotal – Bldg 4			*683*				*18*	*30*	*48*				*42*	*26*	*68*
Building 5	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	11.5 ksf	15.7/ ksf	181	4%	60%	40%	4	3	7	11%	50%	50%	10	10	20
	c. Retail	11.5 ksf	50 (.52)/ ksf	299	8%	50%	50%	12	12	24	8%	60%	40%	14	10	24
	Subtotal – Bldg 5			*880*				*22*	*41*	*63*				*55*	*33*	*88*
Building 6	a. Residential	50 du	4.44 du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Building 7	a. Residential	50 du	4.44 du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Total Residential		*400 du*	-	*1776*	-	-	-	*28*	*114*	*142*	-	-	-	*138*	*58*	*196*
Total Retail		*90 ksf*	-	*1866*	-	-	-	*63*	*58*	*121*	-	-	-	*95*	*77*	*172*
Total Gross Tips				*3642*	-	-	-	*91*	*172*	*263*	-	-	-	*233*	*135*	*368*

Footnotes:

a. The 90,000 square feet of total retail land use is assessed as 44,000 square feet at 31.4 trips/ksf, and 46,000 sf at 100 trips/ ksf to reflect higher and lower-trip generating potential retail uses.
b. Size of land use presented as "1,000 square feet" (ksf), or "dwelling unit" (du).

General Notes:

1. Trip Generation Rates are based on trip rates published in *College Community Redevelopment EIR*, and the *Paseo EIR*.
2. ADT = Average Daily Traffic
3. The "Total Gross Trips" represent project traffic prior to removal of traffic volumes associated with existing land uses to be redeveloped with the Proposed Project.

TABLE 8-5
UNIVERSITY-SERVING RETAIL NET TRIP GENERATION

Location	Use	Size	Daily Rate	ADT	AM Peak Hour						PM Peak Hour					
					% AM	In:Out	Split	In	Out	Total	% PM	In:Out	Split	In	Out	Total
Building 1	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	12.5 ksf	15.7/ ksf	196	4%	60%	40%	5	3	8	11%	50%	50%	11	11	22
	c. Retail	12.5 ksf	50 (.52)/ ksf	325	8%	50%	50%	13	13	26	8%	60%	40%	16	10	26
	Subtotal – Bldg 1			*921*				*24*	*42*	*66*				*58*	*34*	*92*
Building 2	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	15.7/ ksf	157	4%	60%	40%	4	3	7	11%	50%	50%	9	9	18
	c. Retail	10 ksf	50 (.52)/ ksf	260	8%	50%	50%	10	10	20	8%	60%	40%	12	8	20
	Subtotal – Bldg 2			*683*				*18*	*30*	*48*				*42*	*36*	*68*
Building 3	a. Retail	2 ksf	15.7/ ksf	31	4%	60%	40%	1	1	2	11%	50%	50%	2	2	4
Building 4	a. Residential	60 du	4.44/ du	266	8%	20%	80%	4	17	21	11%	70%	30%	21	9	30
	b. Retail	10 ksf	15.7/ ksf	157	4%	60%	40%	4	3	7	11%	50%	50%	9	9	18
	c. Retail	10 ksf	50 (.52)/ ksf	260	8%	50%	50%	10	10	20	8%	60%	40%	12	8	20
	Subtotal – Bldg 4			*683*				*18*	*30*	*48*				*42*	*36*	*68*
Building 5	a. Residential	90 du	4.44/ du	400	8%	20%	80%	6	26	32	11%	70%	30%	31	13	44
	b. Retail	11.5 ksf	15.7/ ksf	181	4%	60%	40%	4	3	7	11%	50%	50%	10	10	20
	c. Retail	11.5 ksf	50 (.52)/ ksf	299	8%	50%	50%	12	12	24	8%	60%	40%	14	10	24
	Subtotal – Bldg 5			*880*				*22*	*41*	*63*				*55*	*33*	*88*
Building 6	a. Residential	50 du	4.44/ du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Building 7	a. Residential	50 du	4.44/ du	222	8%	20%	80%	4	14	18	11%	70%	30%	17	7	24
Total Residential		*400 du*	-	*1776*	-	-	-	*28*	*114*	*142*	-	-	-	*138*	*58*	*196*
Total Retail		*90 ksf*	-	*1866*	-	-	-	*63*	*58*	*121*	-	-	-	*95*	*77*	*172*
Total Gross Tips				***3642***	-	-	-	***91***	***172***	***263***	-	-	-	***233***	***135***	***368***
Total Existing Land Uses Trips (Subtracted)				***(3113)***	-	-	-	***(110)***	***(90)***	***(200)***	-	-	-	***(132)***	***(127)***	***(259)***
Total Net Project Trips				***529***	-	-	-	***-19***	***82***	***63***	-	-	-	***101***	***8***	***109***

Footnotes:

a. The 90,000 square feet of total retail land use is assessed as 44,000 square feet at 31.4 trips/ksf, and 46,000 sf at 100 trips/ ksf to reflect higher and lower-trip generating potential retail uses.

b. Size of land use presented as "1,000 square feet" (ksf), or "dwelling unit" (du).

General Notes:

1. Trip Generation Rates are based on trip rates published in *College Community Redevelopment EIR*, and the *Paseo EIR*.
2. ADT = Average Daily Traffic
3. The "Total Gross Trips" represent project traffic prior to removal of traffic volumes associated with existing land uses to be redeveloped with the Proposed Project.
4. The "Total Existing Land Uses' Trips" are the summary of trips from *Table 8–1* to be removed with redevelopment of the Proposed Project.
5. The "Total Net Project Trips" are the volumes used in the LOS analyses in *Sections 9.0* and *10.0* of this traffic study.

9.0 ANALYSIS OF NEAR-TERM SCENARIOS

The following scenarios were analyzed under near-term traffic conditions to determine the impacts of the "university-serving retail" scenario relative to the "university/community-serving retail" scenario, in combination with the student housing:

- Existing + Near-Term Cumulative (Baseline)
- Existing + Near-Term Cumulative + University-Serving Retail-only
- Existing + Near-Term Cumulative + University/Community-Serving Retail-only
- Existing + Near-Term Cumulative + University-Serving Retail + Student Housing
- Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing

The two scenarios that present the "retail-only" impacts are informational, and are included to help determine what, if any, impacts the student housing component has by itself. These results are summarized in *Sections 9.2* and *9.3*.

The "total project" impacts (retail + student housing) are measured against the published significance criteria to determine the overall project impacts. These results are summarized in *Sections 9.4* and *9.5*.

Table 9–1 shows the peak hour intersection analysis results comparison for all scenarios. ***Table 9–2*** shows the daily street segment analysis results comparison for all scenarios. ***Table 9–3*** shows the ILV operations comparison results for all scenarios. ***Appendix G*** contains the near-term intersection worksheets and ILV operations sheets.

9.1 Existing + Near-Term Cumulative

The Existing + Near-Term Cumulative traffic volumes were calculated using the existing traffic volumes and the addition of near-term cumulative traffic as described in *Section 7.0*. The results of these analyses form the baseline against which the total project impacts for both retail scenarios ("university -serving retail + student housing" and "university/community`-serving retail + student housing") are measured in *Sections 9.4* and *9.5,* respectively.

9.1.1 *Peak Hour Intersection Analysis*

Table 9–1 summarizes the peak hour intersection operations for the Existing + Near-Term Cumulative (Baseline) scenario. This table shows that the following study area intersections are calculated to operate at LOS E or worse with the addition of near-term cumulative project traffic:

2. College Avenue/ I-8 Eastbound Ramps (LOS F during the AM peak hour)
3. College Avenue/ Canyon Crest Drive (LOS E/F during the AM/PM peak hours, respectively)
4. College Avenue/ Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue/ Montezuma Road (LOS F during both AM/PM peak hours)
7. College Avenue/ El Cajon Boulevard (LOS E during the PM peak hour)

10. Montezuma Road/ Campanile Drive (LOS E during the PM peak hour)

In several cases, the LOS degrades to LOS E or LOS F with the addition of the cumulative projects' traffic volumes.

9.1.2 *Daily Street Segment Operations*

Table 9–2 summarizes the study area segment operations in the study area in the Existing + Near-Term Cumulative (Baseline) scenario. This table shows that all of the study area segments are calculated to operate at LOS D or better conditions on a daily basis with the exception of the following two segments:

- College Avenue: between Canyon Crest Drive and Zura Way (LOS F)
- Montezuma Road: between 55th Street and College Avenue (LOS F)

These two segments continue to operate at LOS F with the addition of the cumulative projects' traffic volumes.

9.1.3 *ILV Operations*

Table 9–3 summarizes the results of the Existing + Near-Term Cumulative (Baseline) ILV analysis. This table shows that the College Avenue/ I-8 interchange is calculated to operate "Under" or "Near" capacity during both the AM and PM peak hours.

As discussed in *Section 4.5.3*, the ILV method of analysis does not reliably correlate with the more advanced HCM method of signalized intersection analysis. This is evidenced in this case, where the ILV results show the College Avenue/ I-8 Eastbound Ramps operating at "Under" capacity (indicating good LOS), whereas the HCM method (discussed in *Section 9.1.1* above) shows LOS F operations.

Findings of significance are made using the results of the HCM method. Therefore, the ILV results should be considered informational.

9.2 Existing + Near-Term Cumulative + University-Serving Retail

This section presents the results of the University-Serving Retail project traffic when added to the Existing + Near-Term Cumulative traffic. The student housing component of the Proposed Project is not included in these volumes. Therefore, these results are informational, for use in determining the relative effects of student housing. These results **are not** for determining the ultimate findings of significance.

9.2.1 *Peak Hour Intersection Analysis*

Table 9–1 summarizes the peak hour intersection operations with the addition of the University-Serving Retail project traffic volumes. This table shows that with the addition of retail-only project traffic to the near-term baseline, the following study area intersections are calculated to continue to operate at LOS E or worse:

2. College Avenue/ I-8 Eastbound Ramps (LOS F during the AM peak hour)
3. College Avenue/ Canyon Crest Drive (LOS E/F during the AM/PM peak hours, respectively)
4. College Avenue/ Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue/ Montezuma Road (LOS F during both AM/PM peak hours)
7. College Avenue/ El Cajon Boulevard (LOS E during the PM peak hour)
10. Montezuma Road/ Campanile Drive (LOS E during the PM peak hour)

Again, these results are informational. Findings of significance for the University-Serving Retail scenario (including Student Housing) are shown in *Section 9.4*.

9.2.2 *Daily Street Segment Operations*

Table 9–2 summarizes the study area segment operations in the study area with the addition of University-Serving Retail-only project traffic volumes. This table shows that the majority of the study area segments are calculated to continue to operate at LOS D or better on a daily basis with the following exceptions:

- College Avenue: between Canyon Crest Drive and Zura Way (LOS F)
- Montezuma Road: between 55th Street and College Avenue (LOS F)

The addition of the University-Serving Retail-only traffic does not degrade any study area segment LOS. While these results are informational, findings of significance for the University-Serving Retail scenario (including Student Housing) can be found in *Section 9.4*.

9.2.3 *ILV Operations*

Table 9–3 summarizes the results of the Existing + Near-Term Cumulative + University-Serving Retail-only ILV analysis. This table shows that the College Avenue/ I-8 interchange is calculated to continue to operate "Under" or "Near" capacity during both the AM and PM peak hours. Again, ILV results are for informational purposes only.

9.3 Existing + Near-Term Cumulative + University/Community-Serving Retail

This section presents the results of the University/Community-Serving Retail project traffic when added to the Existing + Near-Term Cumulative traffic. The student housing component of the Proposed Project is not included in these volumes. Therefore, these results are informational, for use in determining the relative effects of student housing. These results **are not** for determining the ultimate findings of significance.

9.3.1 *Peak Hour Intersection Analysis*

Table 9–1 summarizes the peak hour intersection operations with the addition of the University/Community-Serving Retail project traffic volumes. This table shows that with the addition of the retail-only project traffic to the near-term baseline, the following study area intersections are calculated to continue to operate at LOS E or worse:

2. College Avenue / I-8 Eastbound Ramps (LOS F during the AM peak hour)

3. College Avenue / Canyon Crest Drive (LOS E/F during both AM/PM peak hours)
4. College Avenue / Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue / Montezuma Road (LOS F during both AM/PM peak hours)
7. College Avenue / El Cajon Boulevard (LOS E during the PM peak hour)
10. Montezuma Road / Campanile Drive (LOS E during the PM peak hour)

Again, these results are informational. Findings of significance for the University/Community-Serving Retail scenario (including Student Housing) are shown in *Section 9.5*.

9.3.2 *Daily Street Segment Operations*

Table 9–2 summarizes the study area segment operations in the study area with the addition of University/Community-Serving Retail-only traffic volumes. This table shows that the majority of the study area segments are calculated to continue to operate at LOS D or better on a daily basis with the following exceptions:

- College Avenue: between Canyon Crest Drive and Zura Way (LOS F)
- Montezuma Road: between 55th Street and College Avenue (LOS F)

The addition of the University/Community-Serving Retail-only traffic does not degrade any study area segment LOS. While these results are informational, findings of significance for the University/Community-Serving Retail scenario (including Student Housing) can be found in *Section 9.5*.

9.3.3 *ILV Operations*

Table 9–3 summarizes the results of the Existing + Near-Term Cumulative + University/Community-Serving Retail ILV analysis. This table shows that the College Avenue / I-8 interchange is calculated to continue to operate "Under" or "Near" capacity during both the AM and PM peak hours. Again, ILV results are for informational purposes only.

9.4 Existing + Near-Term Cumulative + University-Serving Retail + Student Housing

This section presents the results of the University-Serving Retail and Student Housing total project traffic when added to the Existing + Near-Term Cumulative (Baseline) traffic. The results of these analyses are compared to the Existing + Near-Term Cumulative baseline results to determine significance of impacts. ***These results are for use in determining the ultimate findings of significance.***

9.4.1 *Peak Hour Intersection Analysis*

Table 9–1 summarizes the peak hour intersection operations with the addition of the University-Serving Retail + Student Housing total project traffic volumes. This table shows that with the addition of total project traffic, the following study area intersections are calculated to continue to operate at LOS E or worse:

2. College Avenue / I-8 Eastbound Ramps (LOS F during the AM peak hour)

3. College Avenue / Canyon Crest Drive (LOS E/F during the AM/PM peak hours, respectively)
4. College Avenue / Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue / Montezuma Road (LOS F during both AM/PM peak hours)
7. College Avenue / El Cajon Boulevard (LOS E during the PM peak hour)
10. Montezuma Road / Campanile Drive (LOS E during the PM peak hour)

The proposed University-Serving Retail + Student Housing total project exceeds the allowable increase in delay at the College Avenue/Zura Way unsignalized intersection, and the College Avenue/Canyon Crest Drive and College Avenue/Montezuma Road signalized intersections. Based on the City's published significance criteria, ***significant impacts are calculated*** at these three intersections. The remaining four intersections are not considered significant since the project adds less than the maximum increase of allowable delay for a poorly operating intersection.

9.4.2 *Daily Street Segment Operations*

Table 9–2 summarizes the study area segment operations in the study area with the addition of the University-Serving Retail + Student Housing total project traffic volumes. This table shows that the majority of the study area segments are calculated to continue to operate at LOS D or better on a daily basis with the following exceptions:

- College Avenue: between Canyon Crest Drive and Zura Way (LOS F)
- Montezuma Road: between 55th Street and College Avenue (LOS F)

Although the street segments listed above continue to operate at LOS F, the increase in v/c due to the total project ~~is less than~~ **technically exceeds** 0.01 **for only the College Avenue segment between Canyon Crest Drive and Zura Way (increase = 0.0101). The project increase on the Montezuma Road segment is less than 0.01.** Therefore, based on the City's significance criteria, ~~these study area~~ **the project impact on the College Avenue** segments ~~***are***~~ ***is deemed*** ~~***not***~~ ***significant, just as it was for the University/Community-Serving Retail alternative.***

9.4.3 *ILV Operations*

Table 9–3 summarizes the ILV operations with the addition of the University-Serving Retail + Student Housing total project traffic volumes. This table shows that the College Avenue/I-8 interchange is calculated to continue to operate "Under" or "Near" capacity during both the AM and PM peak hours. This does not compare to the accepted HCM-method analysis results shown in *Table 9–1*. The ILV summaries should be considered for informational purposes only.

9.5 Existing + Cumulative + University/Community-Serving Retail + Student Housing

This section presents the results of the University/Community-Serving Retail and Student Housing total project traffic when added to the Existing + Near-Term Cumulative (Baseline) traffic. The results of these analyses are compared to the Existing + Near-Term Cumulative baseline results to determine significance of impacts. ***These results are for use in determining the ultimate findings of significance.***

9.5.1 *Peak Hour Intersection Analysis*

Table 9–1 summarizes the peak hour intersection operations with the addition of the University/Community-Serving Retail + Student Housing total project traffic volumes. This table shows that with the addition of total project traffic, the following study area intersections are calculated to continue to operate at LOS E or worse:

2. College Avenue / I-8 Eastbound Ramps (LOS F during the AM peak hour)
3. College Avenue / Canyon Crest Drive (LOS E/F during the AM/PM peak hours, respectively)
4. College Avenue / Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue / Montezuma Road (LOS F during both AM/PM peak hours)
7. College Avenue / El Cajon Boulevard (LOS E during the PM peak hour)
10. Montezuma Road / Campanile Drive (LOS E during the PM peak hour)

The proposed University/Community-Serving Retail + Student Housing total project exceeds the allowable increase in delay at the College Avenue/Zura Way unsignalized intersection, and the College Avenue/Canyon Crest Drive, ~~and~~ College Avenue/Montezuma Road, **and Montezuma Road/Campanile Drive** signalized intersections. Based on the City's published significance criteria, ***significant impacts are calculated*** at these ~~three~~ **four** locations. The remaining ~~four~~ **three** intersections are not considered significant since the project adds less than the maximum increase of allowable delay for a poorly operating intersection.

9.5.2 *Daily Street Segment Operations*

Table 9–2 summarizes the study area segment operations in the study area with the addition of University/Community-Serving Retail + Student Housing total project traffic volumes. This table shows that the majority of the study area segments are calculated to continue to operate at LOS D or better on a daily basis with the following exceptions:

- College Avenue: between Canyon Crest Drive and Zura Way (LOS F)
- Montezuma Road: between 55th Street and College Avenue (LOS F)

The increase in v/c due to the total project exceeds the allowable threshold of 0.01. Therefore, ***significant impacts are calculated*** at these two study area segments.

9.5.3 *ILV Operations*

Table 9–3 summarizes the ILV operations with the addition of the University/Community-Serving Retail + Student Housing total project traffic volumes. This table shows that the College Avenue/I-8 interchange is calculated to continue to operate "Under" or "Near" capacity during both the AM and PM peak hours. This does not compare to the accepted HCM-method analysis results shown in *Table 9–1*. The ILV summaries should be considered for informational purposes only.

TABLE 9–1
NEAR-TERM PEAK HOUR INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		(Baseline) Existing + Near-Term Cumulative		(Retail Only) Existing + Near-Term Cumulative + University-Serving Retail			(Retail Only) Existing + Near-Term Cumulative + University/Community-Serving Retail			(Total Project) Existing + Near-Term Cumulative + University-Serving Retail + Student Housing				(Total Project) Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing				Would Additional Traffic Due to Student Housing Cause the Impact?	
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	Δ[c]	Delay	LOS	Δ	Delay	LOS	Δ	Sig?	Delay	LOS	Δ	Sig?	University Retail	University/ Community Retail
1. College Avenue / I-8 Westbound Ramps	Signal	AM PM	9.3 8.3	A A	9.8 9.1	A A	9.8 9.1	A A	0.0 0.0	9.8 9.1	A A	0.0 0.0	9.8 9.1	A A	0.0 0.0	–	9.8 9.1	A A	0.0 0.0	–	–	–
2. College Avenue / I-8 Eastbound Ramps	Signal	AM PM	77.0 15.2	E B	109.7 38.8	F D	109.7 39.3	F D	0.0 0.5	109.7 40.6	F D	0.0 1.8	109.7 39.7	F D	0.0 0.9	–	109.7 41.4	F D	0.0 2.6	–	–	–
3. College Avenue / Canyon Crest Drive	Signal	AM PM	48.6 57.5	D E	68.5 148.9	E F	69.5 149.1	E F	1.0 0.2	69.0 **152.8**	E **F**	0.5 **3.9**	**72.0** **150.2**	**E** **F**	**3.5** **1.3**	Yes	**71.4** **153.4**	**E** **F**	**2.9** **4.5**	Yes	Yes	–
4. College Avenue / Zura Way	TWSC[d]	AM PM	67.0 16.2	F C	408.0 95.6	F F	**478.8** 95.4	**F** F	**>5.0** -0.2	**420.6** **128.2**	**F** **F**	**>5.0** **>5.0**	**468.5** 96.0	**F** F	**>5.0** 0.4	Yes	**463.3** **128.8**	**F** **F**	**>5.0** **>5.0**	Yes	–	–
5. College Avenue / Lindo Paseo	Signal	AM PM	11.9 20.1	B C	12.6 23.3	B C	11.5 23.3	B C	-1.1 0.0	14.6 30.9	B C	2.0 7.7	13.9 25.1	B C	1.3 1.8	–	17.0 32.9	B C	4.4 9.6	–	–	–
6. College Avenue / Montezuma Road	Signal	AM PM	36.6 45.7	D D	119.0 176.0	F F	119.0 **178.6**	F **F**	0.0 **2.6**	**121.1** **183.7**	**F** **F**	**2.1** **>5.0**	119.1 **181.6**	F **F**	0.1 **>5.0**	Yes	**121.3** **187.0**	**F** **F**	**2.3** **>5.0**	Yes	–	–
7. College Avenue / El Cajon Boulevard	Signal	AM PM	36.6 56.4	D E	38.3 69.8	D E	38.3 69.8	D E	0.0 0.0	38.3 70.4	D E	0.0 0.6	38.3 70.4	D E	0.0 0.8	–	38.3 70.9	D F	0.0 1.1	–	–	–
8. Montezuma Road / Collwood Boulevard	Signal	AM PM	21.2 24.7	C C	24.0 49.7	C D	24.0 51.2	C D	0.0 1.5	24.1 53.7	C D	0.1 4.0	24.0 53.3	C D	0.0 3.6	–	24.1 56.0	C D	0.1 6.3	–	–	–
9. Montezuma Road / 55th Street	Signal	AM PM	33.8 33.0	C C	52.5 40.3	D D	53.1 40.6	D D	0.6 0.3	52.7 42.0	D D	0.2 1.7	54.0 41.8	D D	1.5 1.5	–	53.7 42.4	D D	1.2 2.1	–	–	–
10. Montezuma Road / Campanile Drive	Signal	AM PM	28.0 34.2	C C	45.1 72.1	D E	45.8 72.8	D E	0.7 0.7	46.0 73.3	D E	0.9 1.2	47.0 73.6	D E	1.9 1.5	–	47.2 **75.6**	D **E**	2.1 **3.5**	–Yes	–	–
11. Montezuma Road / Catoctin Drive	Signal	AM PM	20.0 20.4	B C	21.1 21.9	C C	21.1 21.9	C C	0.0 0.0	21.1 21.9	C C	0.0 0.0	21.1 21.9	C C	0.0 0.0	–	21.1 21.9	C C	0.0 0.0	–	–	–
12. Montezuma Road / El Cajon Boulevard	Signal	AM PM	24.6 20.7	C C	24.9 22.0	C C	24.9 22.0	C C	0.0 0.0	24.9 22.0	C C	0.0 0.0	24.9 22.0	C C	0.0 0.0	–	24.9 22.2	C C	0.0 0.2	–	–	–

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service
c. Δ denotes an increase in delay due to project.
d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Notes:

1. BOLD typeface and shading indicates a significant impact.
2. (–) = Not significant
3. "Retail Only" results are compared to "Total Project" results to determine if impacts are due to the student housing component.

SIGNALIZED DELAY/LOS THRESHOLDS		UNSIGNALIZED DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 9–2
NEAR-TERM SEGMENT OPERATIONS

Segment	LOS E Capacity[a]	Existing			(Baseline) Existing + Near-Term Cumulative			(Retail Only) Existing + Near-Term Cumulative + University-Serving Retail				(Retail Only) Existing + Near-Term Cumulative + University/Community-Serving Retail				(Total Project) Existing + Near-Term Cumulative + University-Serving Retail + Student Housing					(Total Project) Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing					Would Additional Traffic Due to Student Housing Cause the Impact?	
		ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C	ADT	LOS	V/C	Δ[e]	ADT	LOS	V/C	Δ[e]	ADT	LOS	V/C	Δ	Sig?	ADT	LOS	V/C	Δ	Sig?	University Retail	University/ Community Retail
College Avenue																											
Canyon Crest Drive to Zura Way	40,000	44,000	F	1.100	45,258	F	1.131	45,353	F	1.134	0.003	45,828	F	1.146	0.015	**45,663**	**F**	**1.141**	**0.010[f]**	**Yes**	**46,138**	**F**	**1.153**	**0.022**	**Yes**	–	Yes
Zura Way to Montezuma Road	40,000	30,000	C	0.750	31,014	D	0.775	31,109	D	0.778	0.003	31,584	D	0.790	0.015	31,419	D	0.785	0.010	–	31,894	D	0.797	0.022	–	–	–
Montezuma Road to El Cajon Boulevard	40,000	29,100	C	0.728	33,041	D	0.826	33,081	D	0.827	0.001	33,286	D	0.832	0.006	33,236	D	0.831	0.005	–	33,441	D	0.836	0.010	–	–	–
Montezuma Road																											
Collwood Boulevard to 55th Street	40,000	30,600	C	0.765	34,277	D	0.857	34,357	D	0.859	0.002	34,767	D	0.870	0.013	34,552	D	0.864	0.007	–	34,962	D	0.874	0.017	–	–	–
55th Street to College Avenue	30,000	26,100	E	0.870	31,172	F	1.039	31,252	F	1.042	0.003	31,662	F	1.055	0.016	31,447	F	1.048	0.009	–	**31,857**	**F**	**1.062**	**0.023**	**Yes**	–	Yes
College Avenue to Catoctin Drive	30,000	14,800	C	0.493	18,547	C	0.618	18,582	C	0.619	0.001	18,757	C	0.625	0.007	18,697	C	0.623	0.005	–	18,872	C	0.629	0.011	–	–	–

Footnotes:

a. Capacities based on City of San Diego Roadway Classification & LOS table (See Appendix C).
b. Average Daily Traffic
c. Level of Service
d. Volume to Capacity ratio
e. Δ denotes a project-induced increase in the Volume to Capacity ratio
f. **The exact increase in V/C attributable to the project is *0.010125*, which technically exceeds the 0.01 threshold set in the City's guidelines.**

General Notes:

1. BOLD typeface and shading indicates a significant impact.
2. (–) = Not significant
3. "Retail Only" results are compared to "Total Project" results to determine if impacts are due to the student housing component.

Table 9–3
Near-Term ILV Operations

Intersection	Peak Hour	Existing		Existing + Cumulative Projects		Existing + Cumulative Projects + University-Serving Retail		Existing + Cumulative Projects + University/Community-Serving Retail		Existing + Cumulative Projects + University-Serving Retail + Student Housing		Existing + Cumulative Projects + University/Community-Serving Retail + Student Housing	
		Total Operating Level (ILV / Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity
1. College Avenue / I–8 Westbound Ramps	AM	596	Under	714	Under	716	Under	716	Under	721	Under	720	Under
	PM	682	Under	833	Under	834	Under	841	Under	837	Under	845	Under
2. College Avenue / I–8 Eastbound Ramps	AM	586	Under	693	Under	693	Under	698	Under	692	Under	698	Under
	PM	1,029	Under	1,227	Near	1,228	Near	1,235	Near	1,228	Near	1,235	Near

Footnote:

a. CAPACITY is shown as *UNDER* capacity, *NEA NEAR* capacity or *OVER* capacity;
Under *Capacity* = <1200 ILV/Hour
Near Capacity = >1200 but < 1500 ILV/Hour
Over Capacity = >1500 ILV/Hour

General Notes:

- See *Appendix E* for ILV calculation sheets.

10.0 ANALYSIS OF LONG-TERM SCENARIOS

The following scenarios were analyzed in the Long-Term (Year 2030) to determine the comparative impacts of the "university-serving retail" scenario and the "university/community-serving retail scenario" in combination with the student housing:

- Long-Term (2030) Without Project (Baseline)
- Long-Term (2030) + University-Serving Retail-only
- Long-Term (2030) + University/Community-Serving Retail-only
- Long-Term (2030) + University-Serving Retail + Student Housing
- Long-Term (2030) + University/Community-Serving Retail + Student Housing

The two scenarios that present the "retail-only" impacts are informational, and are included to help determine what, if any, impacts the student housing component has by itself. These results are summarized in *Sections 10.3* and *10.4.*

The "total project" impacts (retail + student housing) are measured against the published significance criteria to determine the overall project impacts. These results are summarized in *Sections 10.5* and *10.6.*

Table 10–1 shows the peak hour intersection analysis results for all scenarios. ***Table 10–2*** shows the daily street segment analysis results for all scenarios. ***Table 10–3*** shows the ILV operations for all scenarios. ***Appendix H*** contains the intersection analysis worksheets and ILV operations sheets.

10.1 Long-Term (2030) Traffic Forecasts

Long-term (Year 2030) traffic volumes were forecast using the **traffic model developed by** SANDAG **for the Campus Master Plan Update 2007 EIR,** ~~Series 10 model volumes for the Year 2030~~**which included the RTP Reasonably Expected funding scenario roadway network.** In addition, traffic generated by cumulative project that were assumed not already in the model were added to the Year 2030 forecast volumes. Additionally, these forecasts include the total SDSU Master Plan, and are consistent with the forecast volumes analyzed in that traffic study.

Figure 10–1 shows the Long-term (2030) Without Project traffic volumes. ***Figure 10–2*** shows the Year 2030 + University-Serving Retail project traffic volumes. ***Figure 10–3*** depicts the Year 2030 + University/Community-Serving Retail traffic volumes. ***Figure 10–4*** depicts the Year 2030 + University-Serving Retail + Student Housing traffic volumes. ***Figure 10–5*** depicts the Year 2030 + University/Community-Serving Retail + Student Housing traffic volumes.

10.2 Long-Term (2030) without Project Operations

The Long-term (2030) Without Project (Baseline) traffic volumes were analyzed to determine the peak hour intersection and daily segment analysis results. These results form the baseline against which the total project impacts for both retail scenarios (university/community-serving retail +

student housing and university-serving retail + student housing) are measured in *Sections 10.5* and *10.6*, respectively.

10.2.1 *Peak Hour Intersection Analysis*

Table 10–1 summarizes the Year 2030 without project (Baseline) peak hour intersection operations. This table shows that the majority of the study area intersections are calculated to operate at LOS E or worse during both the AM and PM peak hours.

10.2.2 *Daily Street Segment Analysis*

Table 10–2 summarizes the Year 2030 without project (Baseline) study area segment operations in the study area. This table shows that the majority of the study area segments are calculated to operate at LOS E or worse conditions on a daily basis.

10.2.3 *ILV Operations*

Table 10–3 summarizes the results of the Year 2030 without project (Baseline) ILV analysis. This table shows that the College Avenue/I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours with the exception of the College Avenue/I-8 Eastbound ramps, which is calculated to operate at over capacity during the PM peak hour. This does not compare to the accepted HCM-method analysis results shown in *Table 10–1*. The ILV summaries should be considered for informational purposes only.

10.3 Year 2030 + University-Serving Retail

This section presents the results of the University-Serving Retail project traffic when added to the Long-term (2030) Without Project traffic. The student housing component of the Proposed Project is not included in these volumes. Therefore, these results are informational, for use in determining the relative effects of student housing. These results **are not** for determining the ultimate findings of significance.

10.3.1 *Peak Hour Intersection Analysis*

Table 10–1 summarizes the peak hour intersection operations with the addition of the University-Serving Retail project traffic volumes. As shown in *Table 10–1*, with the addition of retail-only project traffic, the majority of the study area intersections are calculated to continue to operate at LOS E or worse conditions. Again, these results are informational. Findings of significance for the University-Serving retail scenario (including student housing) are shown in *Section 10.5*.

10.3.2 *Daily Street Segment Analysis*

Table 10–2 summarizes the study area segment operations with the addition of the University-Serving Retail-only project traffic volumes. As shown in *Table 10–2,* the majority of the study area segments are calculated to continue to operate at LOS E or worse conditions on a daily basis. Again, these results are informational. Findings of significance for the University-Serving retail scenario (including student housing) are shown in *Section 10.5*.

10.3.3 *ILV Operations*

Table 10–3 summarizes the results of the Year 2030 + University-Serving Retail-only ILV analysis. As shown in *Table 10–3*, the College Avenue/I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours with the exception of the College Avenue/I-8 Eastbound ramps, which is calculated to continue to operate at over capacity during the PM peak hour. Again, the ILV summaries are not used to determine significant impacts, and should be considered for informational purposes only.

10.4 Year 2030 + University/Community-Serving Retail

This section presents the results of the University/Community-Serving Retail project traffic when added to the Long-term (2030) Without Project (Baseline) traffic. The student housing component of the Proposed Project is not included in these volumes. Therefore, these results are informational, for use in determining the relative effects of student housing. These results **are not** for determining the ultimate findings of significance.

10.4.1 *Peak Hour Intersection Analysis*

Table 10–1 summarizes the peak hour intersection operations with the addition of the University/Community-Serving Retail-only project traffic volumes. As shown in *Table 10–1*, with the addition of retail-only project traffic, the majority of the study area intersections are calculated to continue to operate at LOS E or worse conditions. Again, these results are informational. Findings of significance for the University/Community-Serving retail scenario (including student housing) are shown in *Section 10.6.*

10.4.2 *Daily Street Segment Analysis*

Table 10–2 summarizes the study area segment operations with the addition of the University/Community-Serving Retail-only project traffic volumes. As shown in *Table 10–2,* the majority of the study area segments are calculated to continue to operate at LOS E or worse conditions on a daily basis. Again, these results are informational. Findings of significance for the University/Community-Serving retail scenario (including student housing) are shown in *Section 10.6.*

10.4.3 *ILV Operations*

Table 10–3 summarizes the results of the Year 2030 + University/Community-Serving retail-only ILV analysis. As shown in *Table 10–3*, the College Avenue/I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours with the exception of the College Avenue/I-8 Eastbound ramps, which is calculated to continue to operate at over capacity during the PM peak hour. Again, the ILV summaries should be considered for informational purposes only.

10.5 Year 2030 + University-Serving Retail + Student Housing

This section presents the results of the University-Serving Retail and Student Housing total project traffic when added to the Long-term Without Project (Baseline) traffic. The results of these analyses are compared to the Long-term Without Project baseline results. ***These results are for use in determining the ultimate findings of significance.***

10.5.1 *Peak Hour Intersection Analysis*

Table 10–1 summarizes the peak hour intersection operations with the University-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–1*, with the addition of project traffic, the majority of the study area intersections are calculated to continue to operate at LOS E or worse conditions.

The proposed University-Serving Retail + Student Housing total project exceeds the allowable increases in delay based on the established significance criteria at the following intersections:

2. College Avenue / I-8 Eastbound Ramps (LOS F during the PM peak hour)
3. College Avenue / Canyon Crest Drive (LOS F during both AM/PM peak hours)
4. College Avenue / Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue / Montezuma Road (LOS F during the PM peak hour)
9. Montezuma Road / 55th Street (LOS F during the AM peak hour)
10. Montezuma Road / Campanile Drive (LOS F during both AM/PM peak hours)

Based on the City's significance criteria, project impacts at these six intersections ***were deemed cumulatively significant.***

10.5.2 *Daily Street Segment Analysis*

Table 10–2 summarizes the study area segment operations with the proposed University-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–2,* the majority of the study area segments are calculated to continue to operate at LOS E or worse conditions on a daily basis. However, the project-attributable increase in v/c does not exceed those allowable based on the City's significance criteria. Therefore, project impacts at these three study area intersections are ***were deemed not cumulatively significant.***

10.5.3 *ILV Operations*

Table 10–3 summarizes the ILV operations with the addition of the University-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–3*, the College Avenue/I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours with the exception of the College Avenue/I-8 Eastbound ramps, which is calculated to continue to operate at over capacity during the PM peak hour. Again, the ILV summaries should be considered for informational purposes only.

10.6 Year 2030 + University/Community-Serving Retail + Student Housing

This section presents the results of the University-Serving Retail and Student Housing project traffic when added to the Long-term Without Project traffic. The results of these analyses are compared to the Long-term Without Project baseline results. ***These results are for use in determining the ultimate findings of significance.***

10.6.1 *Peak Hour Intersection Analysis*

Table 10–1 summarizes the peak hour intersection operations with the University/Community-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–1*, with the addition of total project traffic, the majority of the study area intersections are calculated to continue to operate at LOS E or worse conditions.

The proposed University/Community-Serving Retail + Student Housing total project exceeds the allowable increases in delay based on the established significance criteria at the following intersections:

2. College Avenue / I-8 Eastbound Ramps (LOS F during the PM peak hour)
3. College Avenue / Canyon Crest Drive (LOS F during both AM/PM peak hours)
4. College Avenue / Zura Way (LOS F during both AM/PM peak hours)
6. College Avenue / Montezuma Road (LOS F during both AM/PM peak hours)
9. Montezuma Road / 55th Street (LOS F during both AM/PM peak hours)
10. Montezuma Road / Campanile Drive (LOS F during AM/PM peak hours)

Based on the City's significance criteria, project impacts at these seven intersections ***were deemed cumulatively significant.***

10.6.2 *Daily Street Segment Analysis*

Table 10–2 summarizes the study area segment operations with the University/Community-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–2,* the majority of the study area segments are calculated to continue to operate at LOS E or worse conditions on a daily basis.

The University/Community-Serving Retail + Student Housing total project increases the v/c at the following three study area segments operating at LOS F by 0.01:

- College Avenue: between Canyon Crest Drive and Zura Way
- College Avenue: between Zura Way and Montezuma Road
- Montezuma Road: between 55th Street and College Avenue

Based on the City's significance criteria, project impacts at these three study area segments ***were deemed cumulatively significant.***

10.6.3 *ILV Operations*

Table 10–3 summarizes the ILV operations with the addition of the University/Community-Serving Retail + Student Housing total project traffic volumes. As shown in *Table 10–3*, the College Avenue/I-8 interchange is calculated to operate under capacity during both the AM and PM peak hours with the exception of the College Avenue/I-8 Eastbound ramps, which is calculated to continue to operate at over capacity during the PM peak hour. Again, the ILV summaries should be considered for informational purposes only.

TABLE 10–1
LONG-TERM (2030) PEAK HOUR INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Long-Term (2030) Without Project		(Retail Only) Long-Term (2030) + University-Serving Retail			(Retail Only) Long-Term (2030) + University/Community-Serving Retail			(Total Project) Long-Term (2030) + University-Serving Retail + Student Housing				(Total Project) Long-Term (2030) + University/Community-Serving Retail + Student Housing				Would Additional Traffic Due to Student Housing Cause the Impact?	
			Delay[a]	LOS[b]	Delay	LOS	Δ[c]	Delay	LOS	Δ	Delay	LOS	Δ	Sig?	Delay	LOS	Δ	Sig?	University Retail	University Community Retail
1. College Avenue / I-8 Westbound Ramps	Signal	AM PM	11.2 63.9	B E	11.2 63.9	B E	0.0 0.0	11.2 63.9	B E	0.1 0.0	11.2 63.9	B E	0.0 0.0	–	11.1 63.9	B E	0.0 0.0	–	–	–
2. College Avenue / I-8 Eastbound Ramps	Signal	AM PM	156.2 107.5	F F	156.3 107.8	F F	0.1 0.3	156.3 **109.6**	F **F**	0.1 **2.1**	156.4 **108.6**	F **F**	0.2 **1.1**	Yes	156.2 **110.1**	F **F**	0.0 **2.6**	Yes	Yes	–
3. College Avenue / Canyon Crest Drive	Signal	AM PM	214.1 426.3	F F	215.1 427.0	F F	1.0 0.7	**216.4** **434.1**	**F** **F**	**1.3** **>5.0**	**217.5** **430.2**	**F** **F**	**3.4** **3.9**	Yes	**218.8** **436.3**	**F** **F**	**4.7** **>5.0**	Yes	Yes	–
4. College Avenue / Zura Way	TWSC[d]	AM PM	765.8 1021.0	F F	**773.0** **1029.8**	**F** **F**	**>5.0** **>5.0**	**822.7** **1262.2**	**F** **F**	**>5.0** **>5.0**	**830.6** **1046.9**	**F** **F**	**>5.0** **>5.0**	Yes	**905.0** **1230.6**	**F** **F**	**>5.0** **>5.0**	Yes	–	–
5. College Avenue / Lindo Paseo	Signal	AM PM	13.1 24.8	B C	14.7 25.3	B C	1.6 0.5	18.7 28.6	B C	5.6 3.8	16.6 27.3	B C	3.5 2.5	–	22.7 48.4	C D	9.6 18.4	–	–	–
6. College Avenue / Montezuma Road	Signal	AM PM	176.6 336.0	F F	176.6 **339.5**	F **F**	0.0 **3.5**	**178.5** **346.2**	**F** **F**	**1.9** **>5.0**	176.7 **343.9**	F **F**	0.1 **>5.0**	Yes	**178.5** **350.5**	**F** **F**	**1.9** **>5.0**	Yes	–	–
7. College Avenue / El Cajon Boulevard	Signal	AM PM	132.4 202.1	F F	132.4 202.2	F F	0.0 0.1	132.9 202.6	F F	0.5 0.5	132.6 202.6	F F	0.2 0.5	–	133.1 202.4	F F	0.7 0.3	–	–	–
8. Montezuma Road / Collwood Boulevard	Signal	AM PM	43.6 155.9	D F	43.8 156.3	D F	0.2 0.4	44.7 156.5	D F	0.9 0.6	44.0 156.5	D F	0.4 0.6	–	44.9 156.9	D F	1.3 1.0	–	–	–
9. Montezuma Road / 55th Street	Signal	AM PM	134.0 148.0	F F	134.7 148.3	F F	0.7 0.3	134.6 **151.3**	F **F**	0.6 **3.3**	**137.2** 148.6	**F** F	**3.2** 0.6	Yes	**136.6** **151.7**	**F** **F**	**2.6** **3.7**	Yes	Yes	–
10. Montezuma Road / Campanile Drive	Signal	AM PM	82.2 219.4	F F	83.0 220.3	F F	0.8 0.9	83.3 **225.2**	F **F**	1.1 **>5.0**	**85.0** **221.5**	**F** **F**	**2.8** **2.1**	Yes	**85.3** **226.5**	**F** **F**	**3.1** **>5.0**	Yes	Yes	–
11. Montezuma Road / Catoctin Drive	Signal	AM PM	25.5 32.5	C C	25.5 32.7	C C	0.0 0.2	25.8 33.1	C C	0.3 0.6	25.5 32.6	C C	0.0 0.1	–	25.7 33.1	C C	0.2 0.6	–	–	–
12. Montezuma Road / El Cajon Boulevard	Signal	AM PM	76.0 80.1	E F	76.0 80.2	E F	0.0 0.1	76.3 80.2	E F	0.3 0.1	76.0 80.6	E F	0.0 0.5	–	76.2 80.6	E F	0.2 0.5	–	–	–

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project.
d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Notes:

1. BOLD typeface indicates a significant impact.
2. (–) = Not significant
3. "Retail Only" results are compared to "Total Project" results to determine if impacts are due to student housing component.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

Table 10–2
Long-Term (2030) Segment Operations

Segment	Buildout LOS E Capacity[a]	Long-Term (2030) Without Project			(Retail Only) Long-Term (2030) + University-Serving Retail				(Retail Only) Long-Term (2030) + University/Community-Serving Retail				(Total Project) Long-Term (2030) + University-Serving Retail + Student Housing					(Total Project) Long-Term (2030) + University/Community-Serving Retail + Student Housing					Would Additional Traffic Due to Student Housing Cause the Impact?	
		ADT[b]	LOS[c]	V/C[d]	ADT	LOS	V/C	Δ[e]	ADT	LOS	V/C	Δ[e]	ADT	LOS	V/C	Δ	Sig?	ADT	LOS	V/C	Δ	Sig?	University Retail	University/ Community Retail
College Avenue																								
Canyon Crest Drive to Zura Way	40,000	76,140	F	1.904	76,235	F	1.906	0.002	**76,710**	**F**	**1.918**	**0.014**	76,545	F	1.914	0.010	–	**77,020**	**F**	**1.926**	**0.022**	Yes	–	–
Zura Way to Montezuma Road	40,000	56,040	F	1.401	56,135	F	1.403	0.002	**56,610**	**F**	**1.415**	**0.014**	56,445	F	1.411	0.010	–	**56,920**	**F**	**1.423**	**0.022**	Yes	–	–
Montezuma Road to El Cajon Boulevard	40,000	40,200	F	1.005	40,240	F	1.006	0.001	40,445	F	1.011	0.006	40,395	F	1.010	0.005	–	40,600	F	1.015	0.010	–	–	–
Montezuma Road																								
Collwood Boulevard to 55th Street	40,000	33,850	D	0.846	33,930	D	0.848	0.002	34,430	D	0.861	0.015	34,125	D	0.853	0.007	–	34,625	D	0.866	0.020	–	–	–
55th Street to College Avenue	30,000	35,010	F	1.167	35,090	F	1.170	0.003	**35,500**	**F**	**1.183**	**0.016**	35,285	F	1.176	0.009	–	**35,695**	**F**	**1.190**	**0.023**	Yes	–	Yes
College Avenue to Catoctin Drive	30,000	28,800	E	0.960	28,835	E	0.961	0.001	29,010	E	0.967	0.007	28,950	E	0.965	0.005	–	29,125	E	0.971	0.011	–	–	–

Footnotes:

a. Capacities based on City of San Diego Roadway Classification & LOS table (See Appendix C).
b. Average Daily Traffic
c. Level of Service
d. Volume to Capacity ratio
e. Δ denotes a project-induced increase in the Volume to Capacity ratio

General Notes:

1. BOLD typeface and shading indicates a significant impact.
2. (–) = Not significant
3. "Retail Only" results are compared to "Total Project" results to determine if impacts are due to the student housing component.

TABLE 10–3
LONG-TERM ILV OPERATIONS

Intersection	Peak Hour	Long-Term (2030) Without Project		Long-Term (2030) + University-Serving Retail		Long-Term (2030) + University/Community-Serving Retail		Long-Term (2030) + University-Serving Retail + Student Housing		Long-Term (2030) + University/Community-Serving Retail + Student Housing	
		Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity	Total Operating Level (ILV/ Hour)	Capacity
1. College Avenue / I–8 Westbound Ramps	AM	902	Under	906	Under	906	Under	908	Under	907	Under
	PM	1,112	Under	1,113	Under	1,120	Under	1,116	Under	1,124	Under
2. College Avenue / I–8 Eastbound Ramps	AM	955	Under	955	Under	959	Under	955	Under	960	Under
	PM	1,633	Over	1,634	Over	1,648	Over	1,638	Over	1,641	Over

Footnotes:

a. CAPACITY is shown as *UNDER* capacity, *NEAR* capacity or *OVER* capacity;
***Under** Capacity* = <1200 ILV/Hour
Near Capacity = >1200 but < 1500 ILV/Hour
Over Capacity = >1500 ILV/Hour

General Notes:

- See *Appendix E* for ILV calculation sheets.

11.0 CONGESTION MANAGEMENT PROGRAM COMPLIANCE

The 2008 Congestion Management Program (CMP) is intended to link land use, transportation and air quality through level of service performance. The CMP requires an Enhanced CEQA Review of select principal arterials and freeway segments for projects that are expected to generate more than 2,400 ADT or more than 200 directional peak hour trips. Within the study area, Interstate 8 is the only roadway identified in the CMP.

As shown in *Table 8–3* and *Table 8–5*, the Proposed Project does not generate trips in excess of these thresholds. However, to be conservative, a CMP review and analysis was conducted for Interstate 8, using the Caltrans-approved peak hour volume/capacity methodology.

Tables 11–1, 11–2, 11–3 and ***11–4*** show the results of the CMP peak hour freeway analysis. These tables show that the project-induced increase in volume/capacity for any LOS E or worse-operating freeway segment does not exceed the minimum allowable increase of 0.01. ***Therefore, no significant project impacts are calculated.***

TABLE 11–1
NEAR-TERM FREEWAY MAINLINE OPERATIONS
UNIVERSITY-SERVING RETAIL

Freeway Segment	Dir.	# of Lanes	Hourly Capacity[a]	ADT	Existing Peak Hour Volume[b]		Near-Term Cumulative Project Volume		(Baseline) Existing + Near-Term Cumulative						University-Serving Retail + Student Housing Project Volume		(Total Project) Existing + Near-Term Cumulative + University-Serving Retail + Student Housing							
									Volume		V/C[b]		LOS[c]				Volume		V/C		LOS		Δ[d]	
					AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Interstate 8																								
Waring Road to College Avenue	EB	5	10,000	223,860	5,830	9,010	277	297	6,107	9,307	0.611	0.931	B	E	3	11	6,110	9,318	0.611	0.932	B	E	–	0.001
	WB	5	10,000		9,780	6,810	179	179	9,959	6,989	0.996	0.699	E	C	11	0	9,970	6,989	0.997	0.699	E	C	0.001	–
College Avenue to Lake Murray Boulevard	EB	4 + 1	9,200	193,190	4,040	7,970	48	71	4,085	8,041	0.444	0.874	B	D	6	0	4,091	8,041	0.445	0.874	B	D	–	–
	WB	5	10,000		9,300	5,740	145	192	9,445	5,932	0.945	0.593	E	B	0	8	9,445	5,940	0.945	0.594	E	B	0.000	–

TABLE 11–2
NEAR-TERM FREEWAY MAINLINE OPERATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL

Freeway Segment	Dir.	# of Lanes	Hourly Capacity[a]	ADT	Existing Peak Hour Volume		Near-Term Cumulative Project Volume		(Baseline) Existing + Near-Term Cumulative						University/ Community-Serving Retail + Student Housing Project Volume		(Total Project) Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing							
									Volume		V/C[b]		LOS[c]				Volume		V/C		LOS		Δ[d]	
					AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Interstate 8																								
Waring Road to College Avenue	EB	5	10,000	223,860	5,830	9,010	277	297	6,107	9,307	0.611	0.931	B	E	1	13	6,108	9,320	0.611	0.932	B	E	–	0.001
	WB	5	10,000		9,780	6,810	179	179	9,959	6,989	0.996	0.699	E	C	12	5	9,971	6,994	0.997	0.699	E	C	0.001	–
College Avenue to Lake Murray Boulevard	EB	4 + 1	9,200	193,190	4,040	7,970	48	71	4,085	8,041	0.444	0.874	B	D	5	1	4,090	8,042	0.445	0.874	B	D	–	–
	WB	5	10,000		9,300	5,740	145	192	9,445	5,932	0.945	0.593	E	B	1	9	9,446	5,941	0.945	0.594	E	B	0.000	–

Footnotes:

a. Capacities calculated at 2,000 vph per lane and 1,200 vph per auxiliary lane
b. V/C = Peak Hour Volume / Hourly Capacity
c. Level of Service
d. Δ = Project-attributable increase in V/C at LOS E or worse operating segment.

LOS	V/C
A	<0.41
B	0.62
C	0.8
D	0.92
E	1
F(0)	1.25
F(1)	1.35
F(2)	1.45

TABLE 11–3
LONG-TERM (2030) FREEWAY MAINLINE OPERATIONS
UNIVERSITY-SERVING RETAIL

Freeway Segment	Dir.	# of Lanes	Hourly Capacity[a]	ADT	(Baseline) Long-Term (2030) Without Project						University-Serving Retail + Student Housing Project Volume		(Total Project) Long-Term (2030) + University-Serving Retail + Student Housing							
					Volume		V/C [b]		LOS [c]				Volume		V/C		LOS		Δ [d]	
					AM	PM	AM	PM	AM	PM	AM	AM	PM	PM	AM	PM	AM	PM	AM	PM
Interstate 8																				
Waring Road to College Avenue	EB	5	10,000	245,000	7,070	11,292	0.707	1.129	C	F(0)	3	11	7,073	11,301	0.707	1.130	C	F(0)	–	0.001
	WB	5	10,000		11,844	7,394	1.184	0.739	F(0)	C	11	0	11,855	7,394	1.186	0.739	F(0)	C	0.002	–
College Avenue to Lake Murray Boulevard	EB	4 + 1	9,200	232,000	5,760	11,266	0.626	1.225	C	F(0)	6	0	5,766	11,266	0.627	1.225	C	F(0)	–	0.000
	WB	5	10,000		11,754	7,501	1.175	0.750	F(0)	C	0	8	11,754	7,509	1.175	0.751	F(0)	C	0.000	–

TABLE 11–4
LONG-TERM (2030) FREEWAY MAINLINE OPERATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL

Freeway Segment	Dir.	# of Lanes	Hourly Capacity[a]	ADT	(Baseline) Long-Term (2030) Without Project						University/ Community-Serving Retail + Student Housing Project Volume		(Total Project) Long-Term (2030) + University/Community-Serving Retail + Student Housing							
					Volume		V/C [b]		LOS [c]				Volume		V/C		LOS		Δ [d]	
					AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Interstate 8																				
Waring Road to College Avenue	EB	5	10,000	245,000	7,070	11,292	0.707	1.129	C	F(0)	1	13	7,071	11,305	0.707	1.131	C	F(0)	–	0.002
	WB	5	10,000		11,844	7,394	1.184	0.739	F(0)	C	12	5	11,856	7,399	1.186	0.740	F(0)	C	0.002	–
College Avenue to Lake Murray Boulevard	EB	4 + 1	9,200	232,000	5,760	11,266	0.626	1.225	C	F(0)	5	1	5,765	11,267	0.627	1.225	C	F(0)	–	0.000
	WB	5	10,000		11,754	7,501	1.175	0.750	F(0)	C	1	9	11,755	7,510	1.176	0.751	F(0)	C	0.001	–

Footnotes:

a. Capacities calculated at 2,000 vph per lane and 1,200 vph per auxiliary lane

b. V/C = Peak Hour Volume / Hourly Capacity

c. Level of Service

d. Δ = Project-attributable increase in V/C at LOS E or worse operating segment.

LOS	V/C
A	<0.41
B	0.62
C	0.8
D	0.92
E	1
F(0)	1.25
F(1)	1.35
F(2)	1.45
F(3)	>1.46

12.0 CONSTRUCTION TRAFFIC

Typically, substantial traffic generating components of any construction period include: demolition; excavation and grading; pouring of foundation, and; construction of the buildings. Other effects of construction include temporary road closures due to staging of equipment/materials, and trenching, among other things.

These elements all have varying effects on the nearby circulation system depending on a host of variables, including: the length of time each phase takes; the amount of material being moved to/from the site; which parts of the site are under construction, and; the hours of construction proposed. As discussed in Section 1.0, Project Description, Project Phase 1 construction is proposed to proceed as follows: Building 1, followed by Building 3, followed by Building 2. Under Phase II, Buildings 4 and 5 would be constructed simultaneously, followed by the simultaneous consecution of Buildings 6 and 7. Therefore, all 7 buildings would not be constructed simultaneously, and, instead, construction of no more than two buildings at a time presently is envisioned. If some construction phases could occur at night or on weekends, traffic impacts would be less.

Due to the uncertainty associated with the project construction, for purposes of this analysis, the traffic impacts associated with construction ***are considered potentially significant***. It is recommended that a construction traffic control plan (TCP) be prepared to mitigate the potential impact.

13.0 COLLEGE AVENUE/ LINDO PASEO DRIVEWAY ACCESS

The conceptual project site plan is shown on *Figure 2–1*. Based on the project description, 220 parking spaces are proposed in subterranean parking beneath Buildings 4 & 5, and would be served by what is currently the east leg of the College Avenue/ Lindo Paseo signalized intersection. In the future, the alleyway that runs parallel College Avenue (east of College Avenue) will be vacated. Also, the existing retail land uses on the east side of College Avenue between Montezuma Road and Hardy Avenue will be replaced with the proposed land uses for Buildings 4 and 5 (150 combined dwelling units of student housing and 43,000 SF of retail).

The analysis provided in *Table 9–1* (near-term) and *Table 10–1* (long-term) account for the removal of the existing commercial land uses' traffic volumes. The existing volumes for the turning movements to/from the new project driveway (the east leg of the College Avenue/ Lindo Paseo intersection) were removed, and the gross traffic volumes for Buildings 4 and 5 were added to the intersection. Thus, the resulting "+ project" LOS presented in the summary tables represents the operations with the existing land uses zeroed out, and the total traffic associated with Buildings 4 and 5 added in.

As stated in the project description (Section 2.1, Part III) ~~It is recommended that~~ a **project design feature is to include a** westbound left/thru lane and dedicated a right-turn lane on **the east leg (westbound approach) of the College Avenue**/Lindo Paseo **intersection** ~~be provided~~ to allow for adequate queuing of outbound trips from Buildings 4 and 5. The analysis shows that LOS D or better operations can be maintained at the College Avenue/ Lindo Paseo intersection with this westbound geometry.

The site plan for Buildings 4 and 5 is currently in a conceptual form. Specific dimensions and locations of the entry points to the subterranean parking garage are yet to be developed. Inbound queues to/from the parking garage could spill back and affect operations at the College Avenue/ Lindo Paseo intersection, resulting in a potential significant impact. The ultimate design of the garage entry should be designed to ensure that adequate throating and appropriate entry-gate controls (if any) are designed to accommodate peak traffic volumes.

As the final garage access and entry design are yet to be developed, for purposes of this analysis, the traffic impacts associated with access to Buildings 4 and 5 at the College Avenue/ Lindo Paseo intersections ***are considered potentially significant***. It is recommended that the subterranean garage entry be designed in a manner that ensures adequate throating and that appropriate entry-gate controls (if any) are designed to accommodate peak traffic volumes.

14.0 PARKING

14.1 Parking Supply

As stated in the project description, the project proposes to construct a parking structure located north of Lindo Paseo and west of Building 1, at the northwest corner of Lindo Paseo and Montezuma Place. The proposes five-storey parking structure would provide five levels of above ground parking and one level of below ground parking, totaling approximately 340 parking spaces in support of the retail component of the Proposed Project. The eastern portion of the parking structure would feature a ground-floor rentable retail space, accessible to pedestrians via an entrance opening to the adjacent public promenade.

An additional 160-220 spaces of project parking are proposed in subterranean parking associated with the Buildings 4 and 5, which will be located east of College Avenue. Thus, the project proposes to develop approximately 500-560 new off-street parking spaces.

Development of the various project buildings will result in the *loss* of approximately 288 existing off-street parking spaces from the affected SDSU surface parking lots serving students, faculty, staff and visitors, as shown in ***Table 14–1*** below:

TABLE 14–1
SDSU PARKING LOTS TO BE REMOVED

Proposed Building	Location	SDSU Lot Affected	Spaces
Campus Green	North of Hardy Drive, west of College Avenue	"5-Star" Lot [a]	- 123
Building 1	North of Lindo Paseo, between Montezuma Place and College Avenue	Lot O [b]	- 88
Building 2	Northwest corner of College Avenue and Montezuma Road	Lot P [b]	- 39
Building 6	Southwest corner of Lindo Paseo and Campanile	Lot S [b]	- 38
Net Parking Loss			***- 288***

Footnotes:

a. This lot is owned by the SDSU Foundation and currently leased to 5-Star Parking Management as public, for-pay parking.
b. This lot is a formal SDSU campus lot by permit only.

According to SDSU parking administrators, a maximum of 5% of the parking demand for the 288 spaces listed above is estimated to be used by non-SDSU related activities, such as patronization of adjacent retail uses, etc. This is equal to approximately 15 spaces. Those businesses not directly related to SDSU, and the related parking demand will be replaced by the Proposed Project, which will provide parking to serve itself. Thus, there is no parking impact to existing businesses since they will be replaced with development of the Proposed Project.

14.2 Residential Parking Demand

The project proposes to construct 400 units of residential student housing. To determine the appropriate residential parking ratios for the Proposed Project, LLG reviewed the parking analyses for both the *College Community Plan Redevelopment EIR (p. 3-51)* and *The Paseo at San Diego State University EIR*. Information from both EIR's is provided in ***Appendix I***. Upon review it was determined that the Paseo EIR used general "multifamily" residential parking ratios (and not student housing ratios) within a shared-parking analysis, whereas the Redevelopment EIR used parking ratios developed specifically for "medium/medium-high-density" and "high/very-high-density" student housing.

A shared parking analysis is not appropriate for the Proposed Project based on the land use mix and the need for specific parking for housing units.

Since the residential component of the Proposed Project is student housing, LLG determined that the Redevelopment EIR parking ratios were appropriate.

Table 3-15 of the *College Community Plan Redevelopment EIR* presents parking ratios for "medium-medium high density" residential at 1.87 parking spaces per unit. For "high density" and "very high density" residential, the ratios are lower at 1.56 parking spaces per unit. The medium-density ratios were deemed most applicable to the Proposed Project as proposed. These ratios are also the higher of the two, which yields a more conservative analysis.

Using the higher ratio (1.87 parking spaces per unit) for "high density/very high density", the residential student housing parking demand is calculated to be 748 spaces. Residential student housing parking for the entire development will not be provided on-site, but will occur in campus parking lots such as structures 3 and 6. A detailed parking study was conducted for the *SDSU Master Plan EIR,* which identified an overall parking supply of 15,591 parking spaces. It also identifies an overall demand of 12,103 spaces, which resulted in a campus-wide surplus of 3,488 spaces. The parking study data is provided in ***Appendix J***. This surplus can accommodate the student-housing demand of 748 spaces and the loss of 288 surface lot spaces.

Therefore, no significant parking impacts are calculated with respect to the residential student housing component.

14.3 Retail Parking Demand

As previously stated, the 90,000 square feet of "retail" development is assumed to be developed as 50% retail and 50% restaurant. To determine the appropriate retail parking ratios for the Proposed Project, LLG reviewed the parking analyses for both the *College Community Plan Redevelopment EIR (p. 3-51)* and *The Paseo at San Diego State University EIR (Appendix I)*. Upon review it was determined that the Paseo EIR used standard city commercial parking ratios for restaurant and retail in a shared-parking analysis, whereas the Redevelopment EIR used a retail parking ratio developed specifically for the "Core Subarea" of SDSU.

Again, no shared parking analysis was prepared for the Proposed Project as was prepared for the Paseo project, so Paseo ratios were not used. Additionally, the retail density proposed in the Redevelopment EIR project was 14,000 SF so the low "Core Subarea" ratios used in that study would be appropriate for a smaller mixed use development, but not applicable to the Proposed Project given its proposed square footage of 90,000 SF, and the corresponding potential for higher trip and parking generating retail uses. In lieu of either of these parking ratios, LLG instead determined that ratios based on the project's zoning and the City's published municipal code would be most appropriate.

The Proposed Project's commercial zoning is CN-1-2. The published *City of San Diego Municipal Code* general parking requirement for the CN-1-2 zone for restaurant ("eating and drinking establishment") is 12.8 spaces per 1,000 square feet, and for retail is 4.3 spaces per 1,000 square feet. These are general parking ratios used for this type of zoning in many low to medium density parts of the City.

However, the municipal code also acknowledges reduced parking requirement in specified areas throughout the city, called "planned districts", which generally have a high density and a complementary mix of land uses that justify a lower ratio. Currently, the College Area is not identified as a planned district. Nonetheless, SDSU and its surrounding area exhibit many of the characteristics of these typically older, denser districts that comprise many of these planned district areas including Golden Hill, Old Town, La Jolla and others. The City acknowledges that parking ratios lower than the general parking ratios are appropriate in most of these planned districts, since many have high density and mixed-use characteristics, as well as transit opportunities. These are all qualities that the Proposed Project development offers, and in addition, there are thousands of students, faculty, staff and visitors on campus every day that will serve as potential patrons of the retail/restaurant portion of the project.

Table 14–2 shows a summary of the various planned district parking ratios compared with the general City ratios described above. This table shows that within the planned districts, the highest ratios (which typically coincide with the general ratios) are for lower-density districts such as Carmel Valley and Otay Mesa. ***Table 14–2*** shows that on average, the percent-reduction in retail parking demand for planned districts as compared to the general ratios varies from 78% (eating/drinking establishment) to 56% (retail).

TABLE 14–2
"PLANNED DISTRICT" RETAIL PARKING RATIO COMPARISON

"Planned Districts"	Density and Ratio			
	Eating/Drinking Establishment [a]		Retail [b]	
	Lower Planned District Ratio	Higher Planned District Ratio	Lower Planned District Ratio	Higher Planned District Ratio
Barrio Logan: Subdistrict B[c]	1.00	–	1.00	–
Barrio Logan: Except Subdistrict B	2.10	–	2.10	–
Carmel Valley[d]	–	12.80	–	4.30
Cass Street	4.30	–	2.00	–
Central Urbanized	2.10	–	2.10	–
Golden Hill	1.25	–	1.25	–
La Jolla	4.30	–	1.70	–
La Jolla Shores	1.00	–	1.00	–
Mid City: CN-3, CV-3	1.25	–	1.25	–
Mid City: Except CN-3, CV-3	2.10	–	2.10	–
Mount Hope	2.80	–	2.80	–
Mission Valley: CV	4.30	–	2.10	–
Mission Valley: Except CV	4.30	–	2.10	–
Otay Mesa[d]	–	12.80	–	4.30
Old Town	3.40	–	3.40	–
Southeast San Diego	5.00	–	2.10	–
San Ysidro	4.30	–	2.10	–
West Lewis Street[c]	1.00	–	1.00	–
Average	***2.80***	***12.80***	***1.9***	***4.30***
Percent Reduction [e]	***78%***	***100%***	***56%***	***100%***

Footnotes:

a. Source: City of San Diego Municipal Code, Table 142-05E (ratios shown are "minimum required within a transit district")
b. Source: City of San Diego Municipal Code, Table 142-05D (ratios shown are "minimum required within a transit district")
c. Alley Access. For properties with alley access, one parking space per 10 linear feet of alley frontage may be provided instead of the parking ratio shown in Table 142-05D.
d. Ratios for these planned districts are also the general ratios published for project's CN-1-2 commercial zoning (minimum required within a transit district).
e. Percentages shown under planned district ratios represent the average percentage of reduction from the general ratios.

General Note:

1. Planned district rates shown represent rates within a transit area.

With respect to the Proposed Project, it is considered inaccurate to utilize general municipal code parking ratios which would be applicable to developments with lower densities and less synergistic, complementary land uses (e.g., development with little if any mixed-use interactions). For example, the proposed retail is located literally adjacent to a major university campus, which provides a substantial pool of ped/bike trips by virtue of the on-site student housing, and also a large pool of potential patrons who have already parked on campus. Also, the Proposed Project itself is a mixed-use project, which further reduces traffic (and therefore parking) by providing housing directly above the proposed retail uses. Finally, use of the general parking ratios would presume that parking characteristics for the Proposed Project would be the same as those for a similar development in a lower density, more auto-oriented neighborhood such as Carmel Valley or Otay Mesa (see *Table 14–2*). Clearly, the density, mixed-use opportunity, synergy of uses and ped/walk trips in the vicinity o[f]

SDSU are much higher than those of a general, typical suburban area associated with the general parking ratio. As such, it is reasonable that parking requirements for the Proposed Project would be less.

Based on these factors, it is considered appropriate to utilize the City's lower planned district ratios for the Proposed Project. *Table 14–2* shows that among all of the planned district ratios, the maximum ratio for restaurant ("eating and drinking establishment") is 5.0 spaces/1,000 sf, and the maximum ratio for "retail" is 3.40 spaces/1,000 sf. While lower than the general parking ratios for the project's zoning, these proposed ratios are higher than the average of all of the planned district ratios, as shown in *Table 14–2*.

Utilizing these ratios, the Proposed Project's total retail parking demand would be calculated as follows:

- Eating/Drinking Establishment – 5.00 spaces/1,000 sf * 45,000 sf = 225 spaces
- Retail – 3.40 spaces/1,000 sf * 45,000 sf = 153 spaces
- ***Total Parking Demand: 194 + 153 = 378 spaces***

Using the above assumptions, 378 spaces would be required for the proposed restaurant/retail uses. To be conservative, a 20% factor of safety was added (76 spaces), resulting in a total calculated retail parking requirement of 454 spaces. Since 500-560 spaces are proposed, adequate parking is being provided and no significant parking impacts would occur. ***Therefore, no significant parking impacts are calculated with respect to either the university-serving or university/community-serving retail components.***

15.0 TRANSIT

15.1 Existing Transit Service

The SDSU Transit Center connects the campus to the bus and trolley routes that serve the greater San Diego area, including the airport, train station and Qualcomm Stadium, where the Aztec football team plays. Students are able to purchase a discounted, unlimited transit-use semester pass.

Buses stop on the street level mezzanine. The green-line San Diego Trolley stops at the station located 55 feet underground. Trolley riders emerge from the station onto Aztec Green, a one-acre park that serves as a gateway to campus.

The following is a brief description of the existing transit service at SDSU:

15.1.1 *Bus Routes*

The San Diego Metropolitan Transit System (MTS) operates the following six bus routes which serve SDSU directly. All routes are "bike buses" and provide wheelchair lift service.

- *Bus Route 11*: runs from Paradise Hills at Paradise Valley Road, through downtown and Hillcrest, to campus
- *Bus Route 14*: runs from the Grantville Trolley Station eastward along Mission Gorge Road, Zion Avenue, Waring Road, College Avenue, Montezuma Drive and Lake Murray Boulevard, terminating at Baltimore Drive in La Mesa.
- *Bus Route 15*: runs from the Union Street Downtown to University Heights, then along El Cajon Boulevard to campus
- *Bus Route 955*: runs from the SDSU campus through southeastern San Diego to National City
- *Bus Route 115*: runs north and east from campus, through the neighborhoods of Del Cerro, Allied Gardens, Navajo, San Carlos, and Fletcher Hills, terminating in El Cajon on W. Marshall Avenue
- *Bus Route 936*: runs southeast from campus to the Spring Valley Shopping Center on Gillespie Drive
- *Bus Route 856*: runs from the SDSU campus through southeastern San Diego to Lemon Grove, Spring Valley, La Presa and Rancho San Diego

15.1.2 *Trolley Service*

As mentioned, SDSU is served by the Green Line trolley service between Santee and Old Town. Existing ridership at the SDSU Transit Center for fiscal year 2008 was 8,046 total riders/weekday, according to SANDAG records.

Along the green-line route, transfers are possible to the red-line (Mission Valley to Downtown), the Blue Line (Old Town to San Ysidro), and the Orange Line (Downtown to El Cajon). Transfers from the trolley to bus routes 11, 14, 15, 115, 856, 936, 955 are possible from the vicinity of the Transit Center, although only 6 routes serve SDSU directly.

15.2.1 Quantitative Assessment – MTS System

As to quantifying the potential impacts associated with the increased transit usage, neither the City of San Diego nor SANDAG publish guidelines specifying a methodology within traffic studies for the preparation of quantitative transit analyses. Therefore, LLG devised a method by which existing Green Line trolley ridership, in combination with increased ridership attributable to the Project, would be measured against the capacity of the trolley and the impacts assessed accordingly. **This type of analysis can be utilized for projects with a short buildout timeframe (several years), but accuracy would be limited for long-range projects (10-15 years) given the lack of accurate long-range transit facility data that is available.**

The following methodology is based on volume to capacity (V/C) methodology published in the Highway Capacity Manual (HCM).

Capacity:

Maximum "person-capacity" for the trolley system was determined using the following equation from the HCM:

$$P = \frac{3{,}600\, N_c P_c (PHF)}{h_{min}}$$

where:

P = maximum single track capacity in passengers per peak-hour direction,
N_c = number of cars per train = 2 (data obtained from MTS),
P_c = maximum allowed passenger load per car = 200 (data obtained from MTS),
h_{min} = minimum train headway (s), = 900 (data obtained from MTS), and
PHF = Peak hour factor = obtained from October 2008 ridership counts conducted by SANDAG

- 0.65 Eastbound Direction – AM peak
- 0.85 Westbound directions – AM peak
- 0.79 Eastbound Direction – PM peak
- 0.71 Westbound directions – PM peak

Based on the above formula, the maximum capacity (riders/hour) for the Green Line in the vicinity of the SDSU station was calculated for both the AM and PM peak hours. ***Table 15–1*** summarizes the calculated peak hour person capacity information.

Volume:

Existing trolley ridership information (volume) was obtained from October 2008 ridership counts conducted by SANDAG. *Table 15–1* summarizes the peak hour ridership information.

Project related ridership was estimated based on the project trip generation, distribution and the Proposed Project land uses, as well as the potential mode-split of the project trip generation between vehicular trips and "other" (e.g., pedestrian/bicycle trips, transit, etc.) trips. This mode-split assumption was based on information published in the trip generation calculations for *The College Community Redevelopment Project EIR (Table 3–10)* and the *Paseo EIR (p. 3-9)*, which determined that the amount of "other" trips associated with faculty/staff and students was 20% and 30%, respectively. Therefore, LLG applied a composite rate of 25% to the Proposes Project trip generation to estimate the potential increase in ridership associated with the Proposed Project. It should be noted that because this approach assumes that all non-vehicular trips (e.g., pedestrian, bicycle, bus and other) are trolley trips, the resulting ridership projections are higher than would be expected, and therefore conservative.

Table 15–1 summarizes the peak hour project and the peak hour Existing + Project ridership information.

Appendix M contains excerpts from the HCM used to develop this analysis methodology.

TABLE 15–1
TROLLEY ANALYSIS – VOLUME/CAPACITY METHOD
SAN DIEGO STATE UNIVERSITY

Direction	Peak Hour	Calculated Capacity (Riders/hr)	Existing	Project Ridership (Riders/hr)	Existing + Project
			Volume (Riders/hr)		Volume (Riders/hr)
Eastbound	AM	1,040	366	25	391
	PM	1,264	391	36	427
Westbound	AM	1,360	579	25	604
	PM	1,136	154	36	190

Table 15–1 shows that in the study area, the peak-hour ridership volume on the trolley system accounts for less than 50% of the estimated capacity. The forecasted peak hour project contribution is a modest 25-36 riders and can be accommodated within the capacity of the system.

With respect to the bus system, MTS runs six bus lines to the campus as described in *Section 15.1.1*. As compared to the trolley which runs on fixed lines and has limitations on the number and sizes of trains that can be run, the bus system is flexible. MTS regularly reviews the efficiency and level of service of its routes, and makes adjustments to routes, headways, and bus sizes depending on demand. The Proposed Project is expected to generate very few additional bus passengers.

15.2 Potential Project Impacts

The Proposed Project consists of both student residential housing, and retail land uses (either university-serving or university/community-serving retail). The student housing component places students within walking distance of many of their trip ends (e.g., classrooms, athletic facilities, commons and on-campus retail, etc.). As such, this element of the project would not be considered a major generator of new transit trips. Some new transit trips by the student housing residents would be expected to areas outside of the College Area community, such as trips downtown or to Mission Valley. However, the number of increased trips is expected to be relatively small, and would not occur during peak travel periods when demand is greatest. Additionally, by locating housing near the campus destination, the student housing component of the project could have the effect of reducing transit ridership to/from the university as these students would no longer be commuting to the campus for classes.

With respect to retail trips, both the university-serving and university/community-serving retail uses are expected to draw from relatively close to the project site. As stated previously in the report, the university/community-serving retail scenario could generate more vehicle trips if the tenants are comprised of retailers that appeal to other sectors of the population than students. While again it is possible that the development of such retail space could increase transit ridership, the relatively small scale of the development would not be expected to create a significant impact.

Thus, the proposed Project (student housing + retail component) is expected to generate little increase in transit ridership demand. A meeting was held with MTS staff and they agreed that the Proposed Project would generate low additional transit ridership. ***Appendix L*** contains a copy of the meeting notes. For the transit ridership demand that is generated, it can be served by either the trolley or the bus system. The trolley system is calculated to operate below capacity, and the bus system is flexible enough to be scaled to any demands potential demand changes that occur. ***Ultimately, no significant impacts to the bus or trolley system are calculated.***

16.0 Pedestrian/ Bicycle Circulation

Existing conditions at the site of the Proposed Project provide pedestrian facilities along all roadway segments that traverse and border the site.

With respect to bicyclists, east and westbound Montezuma Road is striped for Class II bicycle facilities between Campanile Drive and College Avenue. College Avenue is neither signed nor striped for bicycle facilities. (Class I bicycle facilities [Bicycle Path] are a paved right-of-way completely separated from any street or highway; Class II facilities [Bicycle Lane] are a striped and stenciled lane for one-way travel on a street or highway; Class III facilities [Bicycle Route] are a shared right-of-way designated by signs only, with bicycle traffic sharing the roadway with motor vehicles.)

The Mobility Element of the City of San Diego General Plan states that development, maintenance, and support of the bicycle network are guided by the City's Bicycle Master Plan ("BMP"). The BMP contains detailed policies, action items, and network maps, and addresses issues such as bikeway planning, community involvement facility design, bikeway classifications, multi-modal integration, safety and education, and support facilities. The BMP is intended to provide a citywide perspective that is enhanced with more detailed community plan level recommendations and refinements. (General Plan, March 2008, ME-36.)

The BMP is not intended to override the existing community plans or other existing plans. (BMP (May 2002) p. 3.) In that regard, and specific to the proposed project, the College Area Community Plan recommends the completion of Class II bike lanes on College Avenue. (BMP p. 22; see also College Area Community Plan, p. 65.) The BMP, meanwhile, recommends the segment of College Avenue in the vicinity of the proposed project as a "Top Priority Proposed Class 3 Bikeway." (BMP pp. 63, 70, 115.)

The City presently is in the process of revising the BMP and has issued a Draft Bicycle Master Plan Update (March 2010). The Draft BMP Update depicts College Avenue between I-8 and Montezuma Road as a "Class II or III". (Draft BMP Update, p. 133.) This segment of College Avenue does not appear on the BMP Update Top Priority Project List. (Addendum to March 2010 Draft City of San Diego Bicycle Master Plan Update: Revised Top Priority Project List; BMP Update p. 178.)

While CSU/SDSU as a state entity is not subject to local land use plans such as the Community Plan and Bicycle Master Plan, the Proposed Project includes sufficient right-of-way on College Avenue for the ultimate development of Class II bicycle lanes in the areas fronting the project. Specifically, Buildings 1, 2, 4, and 5 have been designed to provide adequate setback to facilitate the placement of Class II bicycle lanes within the College Avenue right-of-way. (See Project Description, Section 1.5.5.) Because these improvements would be implemented within the City of San Diego right-of-way, the improvements would require the approval of the City and would be implemented by the City, with CSU funding assistance. As such, the proposed Project would not result in significant impacts relative to bicycle plans.

There are no physical elements of the Proposed Project that would increase traffic hazards to pedestrians or bicyclists. Additionally, although the Proposed Project would increase vehicle traffic volumes in the vicinity of the campus, the increase in vehicle traffic volumes would not be substantial enough to result in or cause increased safety risks to pedestrian or bicyclists.

A review of the roadway improvement mitigation measures proposed to mitigate the identified significant impacts to roadway carrying capacities was conducted to determine if the improvements potentially could result in increased vehicle speeds on the mitigated roadways and, therefore, increased safety risks to pedestrians and bicyclists. (See Section 3.12.7, Mitigation Measures.)

The proposed mitigation measures along the College Avenue project frontage would widen the roadway for motorized vehicles by approximately 10 feet. This amount of widening would not result in a measurable increase in vehicular travel speeds. In addition, the current controlled pedestrian crossings on College Avenue will continue to exist at both the Lindo Paseo and Montezuma Road intersections, providing safe crossing for pedestrians and bicyclists at these locations. It also is noted that the proposed Project would include the construction of sidewalks along the College Avenue frontage from Montezuma Road north to the new pedestrian bridge, which will facilitate pedestrian and bicyclist movements outside the vehicular right of way. For these reasons, no significant impacts to pedestrian or bicycle movements are expected to occur as a result of implementation of the Proposed Project or the proposed College Avenue mitigation measures along the project frontage.

As to the other roadways that are the subject of the mitigation improvements, the mitigation measures could result in minor widening (less than 10 feet) of roadways, which also would not measurably increase roadway speeds. Therefore, no significant impacts to pedestrians or bicyclists are expected at these locations either.

17.0 ROADWAY CLOSURES/ STREET VACATIONS

The Proposed Project description includes several road closures/ street vacations in the project area, as shown on the site plan (*Figure 2–1*). The following is a brief description of these proposed modifications.

Montezuma Place

The project proposes to vacate Montezuma Place between Lindo Paseo and Hardy Avenue. This is to provide a pedestrian promenade between the proposed Building 1 and Building 3. Currently, this roadway serves residences to the west and a parking lot to the east. Traffic volumes on this portion of Montezuma Place primarily serve these uses, both of which will be removed and replaced with development of the project.

North of Hardy Avenue, the project proposes to vacate Montezuma Place for development of the Campus Green element of the project. This is currently a parking lot serving the transit station (approximately 122 spaces). Again, this portion of Montezuma Place currently only serves this existing parking lot, which will be removed as part of the project. Counts in March 2008 indicated approximately 820 ADT on this portion of Montezuma Place. This is a small amount of traffic that will be redistributed from Montezuma Place to the adjacent circulation system, would therefore not have a significant impact.

Between Lindo Paseo and Montezuma Road, the project proposes to vacate the existing diagonal-parking street easement which serves adjacent businesses. This portion of Montezuma Road does not carry much cut-through traffic, other than traffic destined to businesses on the west side of the street (approximately 870 ADT). Elimination of the diagonal parking would not affect vehicle flow on this segment.

Hardy Avenue

The project proposes to vacate Hardy Avenue between Montezuma Place and College Avenue. This is currently blocked from vehicular traffic by bollards, and appears to be an easement for a sewer or other utility line. No traffic or circulation impacts are expected with this vacation.

The project proposes to terminate Hardy Avenue at its intersection with Montezuma Place. The Campus Green will be developed to the north, Building 1 to the east, and Building 3 to the south. A remaining residential complex will remain adjacent to the cul-de-sac, and will be expected to have access from it. With the redevelopment of the adjacent area as part of the project (especially the vacation of Montezuma Place between Lindo Paseo and Hardy Avenue discussed above), no traffic impacts would be expected for the proposed Hardy Avenue modification since there would be no demand for through trips. Currently, the major demand for this portion of Hardy Avenue is for the transit station parking lot, which will be removed with development of the Campus Green. Accordingly, no significant impacts to traffic circulation are expected.

Lindo Paseo/Alley East of College Avenue

East of College Avenue, Lindo Paseo is proposed to be vacated in order to provide access to the underground parking proposed beneath Buildings 4 and 5. Currently, this very short portion of Lindo Paseo provides access to a small amount of metered parking for businesses on the south side of Lindo Paseo, as well as access to the 7-Eleven convenience store located on the north side. Lindo Paseo currently connects to an alleyway that runs parallel to College Avenue. This alleyway also provides access to parking and deliveries for businesses both north and south of Lindo Paseo. Counts in March 2009 showed between 1,450 and 1,920 ADT on this alleyway. However, this traffic is largely associated with the businesses that will be removed as Buildings 4 and 5 are developed. Therefore, the current demand associated with both Lindo Paseo and the alleyway will be terminated. *Section 13.0* discusses the driveway recommendations for this vacated portion.

In summary, several small roadways within the project area are proposed to be modified, vacated or otherwise changed. Upon review, it is clear that these roadways exist now to serve the current micro parking or retail demands placed upon them by the existing land uses (which will be removed). They do not function in any meaningful way as circulation roadways providing anything other than micro access within the study area. As discussed above, the development of the various buildings within the project area will remove and replace these existing businesses and residences with new retail and residential uses. Parking will be provided in new locations, and the proposed roadway system (including street vacations) will be designed to accommodate these revised demands. ***Therefore, the vacation of these roadways would not result in a significant impact to traffic circulation.***

18.0 Emergency Vehicle Access

An important consideration in evaluating the effects of a project on the circulation system is its potential impact to emergency vehicle response times. It is recognized that Alvarado Hospital, for instance, is located within 1 mile of the project site.

When evaluating emergency access it is important to note that emergency vehicles have the right-of-way and, therefore, are able to bypass traffic when driving to their destination. Specifically, drivers are required to pull to the right side of the road and stop to allow emergency vehicles to pass. If required, drivers of emergency vehicles are trained to utilize center turn lanes or to travel in opposing through lanes to pass through crowded intersections. Thus, the access entitled to emergency vehicles allows these vehicles to negotiate typical street conditions in urban areas such as the College Area, therefore ***no significant impacts to emergency vehicle access are expected.***

19.0 ALTERNATIVE MITIGATION MEASURE DIVERSION ANALYSIS

An alternative design for College Avenue has been presented that proposes to retain the majority of College Avenue in its current configuration as a 4-lane road. College Avenue is classified as a 6-lane roadway and is planned to be widened to 6-lanes in the future. The intent of this design would be to enhance the pedestrian experience along the College Avenue corridor in the vicinity of the campus in part by limiting additional vehicle capacity on College Avenue. By limiting additional capacity on College Avenue, however, this alternative design could result in the re-direction of traffic loads to other area roadways, thereby impacting these roads. This section provides an analysis of the potential impacts of the alternative design.

19.1 College Area Arterial Roadways

There are three major arterial roadways that provide regional access to SDSU and the surrounding College Area: Fairmount Avenue, College Avenue, and 70th Street. Two of these three arterials provide direct access to Montezuma Road, which provides local access to/from the College Area and adjacent neighborhoods. The following is a brief discussion of the College Area arterial roadways that could be affected by a reduction in capacity on College Avenue:

Fairmount Avenue serves to link I-8 and the neighborhoods of Kensington, Talmadge and City Heights, as well as providing efficient access to the western terminus of Montezuma Road and the College Area. Existing daily weekday traffic volumes on Fairmount Avenue are 78,800 ADT.

College Avenue serves as the primary link for regional SDSU traffic using the I-8 corridor. In addition, College Avenue is also an important Circulation Element roadway serving residents of the College Area, including the adjacent Rolando and Talmadge neighborhoods. College Avenue between El Cajon Boulevard and I-8 currently carries between 29,000 to 44,000 ADT during weekdays with SDSU in session. This traffic is comprised of both SDSU traffic and local residential and commercial traffic.

70th Street provides access to/from I-8 for the community of Rolando, as well as the City of La Mesa to the east. The eastern portion of the College Area can be accessed from 70th Street via El Cajon Boulevard to Montezuma Road. Existing daily weekday traffic volumes on Fairmount Avenue are 20,300 ADT.

Montezuma Road runs parallel to I-8 and El Cajon Boulevard, and provides access to SDSU and the College Area and I-8 via Fairmount Avenue. Montezuma Road also serves regional traffic to SDSU using 70th Street and El Cajon Boulevard. Existing daily weekday traffic volumes on Montezuma Road range from 14,800 to 30,600 ADT between Collwood Boulevard and Catoctin Drive.

19.2 Diverted Trips Estimation

The SANDAG traffic model was used to determine the potential amount of traffic that could divert from College Avenue to other roadways if the ultimate capacity on College Avenue were reduced from 6-lanes to 4-lanes as proposed in this alternative. The regional model is an appropriate tool for this analysis because it is in essence a "gravity model", which means that it connects trip attractors with trip generators using the roadway system as efficiently as possible; this means using the shortest routes on the largest (and presumably least constrained) roadways. When the capacities of the roadways in the system are changed, the model recognizes the increase or decrease in capacity (and the resultant change in constraint), and adjusts routes and volumes accordingly. However, the model will always seek to connect the generated trips with the attractions.

Specific to this analysis, the model recognizes the substantial trip attraction which is the SDSU campus. Additionally, under the model, the campus will attract the requisite number of trips regardless of whether the roadways serving it are two lanes or twenty lanes. Since the College Avenue capacity would reduce from 6-lanes to 4-lanes under the alternative design, some trips on College Avenue would be diverted to the adjacent, parallel routes to the west and east, which are Fairmount Avenue and 70th Street, respectively. Due to the close proximity of the SDSU campus and parking garages to I-8, it is likely that the nature of the diverted trips would be residential, not SDSU related. In other words, drivers using College Avenue as a route from I-8 to more distant (2+ miles) residential destinations along the El Cajon Boulevard or University Avenue corridors could be expected to more readily travel out-of-direction on parallel routes to avoid congestion on a 4-lane College Avenue than would a commuting student or faculty member of SDSU, whose destination is along College Avenue and within 1/10 mile of I-8.

Based on the model runs conducted, the diverted ADT from College Avenue commensurate with the reduction in capacity from 6-lanes to 4-lanes was 4,000 ADT. For perspective, this equates to approximately 9%-14% of existing traffic volumes on College Avenue. For the purposes of this analysis, this diverted traffic was considered to be non-SDSU related for the reasons explained above. This traffic was distributed to Fairmount Avenue and 70th Street assuming a 75:25 split, respectively, based on existing daily traffic volumes on these roadways. These volumes were then distributed along Montezuma Road and El Cajon Boulevard to the neighborhoods along these corridors, again using existing traffic volumes as the basis of distribution.

19.3 Analysis

To assess the potential impacts to the surrounding streets that would result from the diverted traffic, a long-term street segment analysis was conducted for segments on Fairmount Avenue, 70th Street and Montezuma Road using roadway capacities consistent with the long-term street segment analysis utilized in Section 10.0. These long-term segment volumes represent the "No Diversion, 6-Lane College Avenue" baseline condition. The diverted volumes discussed above (4,000 ADT) were added to the long-term baseline volumes to yield "With Diversion, 4-Lane College Avenue" conditions. The LOS for each condition was calculated, as was the volume/capacity (V/C) ratio. The change in the V/C ratio was then calculated, and compared to the City of San Diego's significance criteria (*Section 5.0*) to determine if the reduction in lanes would result in a significant impact.

Table 19–1 shows the analysis results.

TABLE 19–1
LONG-TERM (2030)
STREET SEGMENT OPERATIONS
WITHOUT AND WITH COLLEGE AVENUE DIVERSION

Street Segment	Long Term Capacity (LOS E) [a]	No Diversion (6-Lane College Avenue)			With Diversion (4-Lane College Avenue)				
		ADT [b]	V/C [c]	LOS [d]	ADT	V/C	LOS	Δ [e]	Sig?
Fairmount Avenue *(+3,000 ADT)*									
Montezuma Road to I-8	60,000	89,000	1.483	F	**92,000**	**1.533**	**F**	**0.050**	**Yes**
Montezuma Road *(+ Variable ADT)*									
Collwood Boulevard to 55th Street	40,000	33,850	0.846	D	35,650	0.891	D	0.045	No
55th Street to College Avenue	30,000	35,010	1.167	F	**36,510**	**1.217**	**F**	**0.050**	**Yes**
College Avenue to Catoctin Drive	30,000	28,800	0.960	E	**30,150**	**1.005**	**F**	**0.045**	**Yes**
70th Street *(+1,000 ADT)*									
Alvarado Road to El Cajon Boulevard	40,000	33,000	0.825	D	34,000	0.850	D	0.025	No

Source:
SANDAG Series 11 Traffic Model.
LLG Plaza Linda Verde Traffic Study, June 2010.

Footnotes:
a) Capacities based on City of San Diego Roadway Classification & LOS table.
b) Average Daily Traffic
c) Volume ÷ Capacity
d) Level of Service
e) Δ denotes a decrease in volume to capacity ratio attributable to diversion of trips from College Avenue onto these segments.

Table 19–1 shows that the diversion of 4,000 ADT from College Avenue to Fairmount Avenue, 70th Street and Montezuma Road would cause significant cumulative impacts at the following locations:

- Fairmount Avenue from Montezuma Road to I-8
- Montezuma Road from 55th Street to College Avenue
- Montezuma Road from College Avenue to Catoctin Drive

19.4 Summary/Conclusions

The proposed alternative design for College Avenue that maintains a 4-lane cross section would result in approximately 4,000 ADT to be diverted from College Avenue to adjacent arterial roadways in the study area. These diverted trips would result in increases in traffic volumes on several roadways forecasted to operate at LOS F at buildout. The V/C contribution of the diverted trips would exceed the allowable increase in V/C on one segment on Fairmount Avenue, and two segments on Montezuma Road.

There are no feasible mitigation measures that would provide sufficient additional capacity on Fairmount Avenue to accommodate the increased traffic, i.e., due to existing physical constraints and lack of available right-of-way, the significantly impacted segment cannot be sufficiently widened to add the necessary additional travel lanes. Therefore, this impact would remain significant and unmitigated. With respect to Montezuma Road, improvements to the impacted segments that would bring the road up to Major Road standards would increase the capacity from 30,000 ADT to 40,000 ADT. This would reduce the identified significant impact to the segment of Montezuma from 55th Street to College Avenue to less than significant. However, improvement to Major Road standards would not reduce the significant impacts to the second segment (College Avenue to Catoctin Drive), and improvements beyond these standards are not feasible due to existing physical constraints, lack of available right-of-way and the fact that existing structures would likely need to be demolished in order to provide for a six-lane facility. Therefore, the significant impacts to Montezuma Road between College Avenue and Catoctin Drive would remain significant and unmitigated.

20.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

Based on the City of San Diego significance criteria, significant impacts were determined at several study area intersections and street segments in the near-term and long-term scenarios.

20.1 Significance of Impacts

The following is a list of the significant impacts based on the established significance criteria for each of the two project scenarios

20.1.1 *Near Term (University-Serving Retail Scenario)*

Intersections

A–1. College Avenue/ Canyon Crest Drive

A–2. College Avenue/ Zura Way

A–3. College Avenue/ Montezuma Road

Segments

A–4. College Avenue: Canyon Crest Drive to Zura Way

20.1.2 *Near Term (University/Community-Serving Retail Scenario)*

Intersections

B–1. College Avenue/ Canyon Crest Drive

B–2. College Avenue/ Zura Way

B–3. College Avenue/ Montezuma Road

B–4. Montezuma Road/ Campanile Drive

Street Segments

C–1. College Avenue: Canyon Crest Drive to Zura Way

C-2. Montezuma Road: 55th Street to College Avenue

20.1.3 *Long-Term (University-Serving Retail Scenario)*

Intersections

D–1. College Avenue/ I-8 Eastbound Ramps

D–2. College Avenue/ Canyon Crest Drive

D–3. College Avenue/ Zura Way

D–4. College Avenue/ Montezuma Road

D–5. Montezuma Road/ 55th Street

D–6. Montezuma Road/ Campanile Drive

20.1.4 *Long-Term (University/Community-Serving Retail Scenario)*

Intersections

E–1. College Avenue/ I-8 Eastbound Ramps

E–2. College Avenue/ Canyon Crest Drive

E–3. College Avenue/ Zura Way

E–4. College Avenue/ Montezuma Road

E–5. Montezuma Road/ 55th Street

E–6. Montezuma Road/ Campanile Drive

Street Segments

F–1. College Avenue: Canyon Crest Drive to Zura Way

F–2. College Avenue: Zura Way to Montezuma Road

F-3. Montezuma Road: 55th Street to College Avenue

20.1.5 *Both Retail Scenarios*

Other

G–1. Construction Impacts

G–2. College Avenue/Lindo Paseo Driveway Access Impacts

20.2 Mitigation Measures

The mitigation measures (MMs) listed below are intended to mitigate the direct and cumulative impacts associated with the Plaza Linda Verde mixed-use development project.

20.2.1 *Near Term (University-Serving Retail Scenario)*

Intersections

Mitigation Measure A–1: College Avenue/ Canyon Crest Drive

- Contribute a fair share towards restriping College Avenue to provide an additional (third) northbound through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps.

Mitigation Measure A–2: College Avenue/ Zura Way

- Contribute a fair share towards the provision of a traffic signal at the intersection. No widening of College Avenue is necessary to mitigate this impact.

- An Alternate mitigation would be to prohibit southbound left-turns at the intersection. As a result of this mitigation option, an additional southbound left-turn lane would be necessary at the College Avenue/ Montezuma Road intersection.

Mitigation Measure A-3: College Avenue/ Montezuma Road

- Contribute a fair share towards widening the College Avenue/ Montezuma Road intersection to provide an additional (second) left turn lane at the southbound and westbound approaches.

Segments

Mitigation Measure A–4: College Avenue: Canyon Crest Drive to Zura Way

- **Contribute a fair share towards restriping College Avenue to provide an additional (third) northbound through lane on College Avenue between I-8 and Zura Way.**

20.2.2 *Near Term (University/Community-Serving Retail Scenario)*

Intersections

Mitigation Measure B–1: College Avenue/ Canyon Crest Drive

- Contribute a fair share towards restriping College Avenue to provide an additional (third) northbound through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps.

Mitigation Measure B–2: College Avenue/ Zura Way

- Contribute a fair share towards the provision of a traffic signal at the intersection. No widening of College Avenue is necessary to mitigate this impact.

- An Alternate mitigation would be to prohibit southbound left-turns at the intersection. As a result of this mitigation option, an additional southbound left-turn lane would be necessary at the College Avenue / Montezuma Road intersection.

Mitigation Measure B-3: College Avenue/ Montezuma Road

- Contribute a fair share towards the widening of the College Avenue/ Montezuma Road intersection to provide an additional (second) left turn lane at the southbound and westbound approaches.

Mitigation Measure B-4: Montezuma Road/ Campanile Drive

- **Contribute a fair share towards widening Campanile Drive to provide a 75-foot long dedicated right-turn lane on the northbound approach.**

Street Segments

Mitigation Measure C–1: College Avenue: Canyon Crest Drive to Zura Way

- Contribute a fair share towards restriping College Avenue to provide an additional (third) northbound through lane on College Avenue between I-8 and Zura Way.

Mitigation Measure C–2: Montezuma Road: 55th Street to College Avenue

- Contribute a fair share towards providing a raised median on Montezuma Road between 55th Street and College Avenue.

20.2.3 *Long-Term (University-Serving Retail Scenario)*

Intersections

Mitigation Measure D–1: College Avenue/ I-8 Eastbound Ramps

- The fair share contribution towards restriping College Avenue to provide an additional northbound through lane from 500 feet south of Canyon Crest Drive to the I-8 Eastbound Ramps (MM A–1/B–1) would mitigate this cumulative impact.

Mitigation Measure D–2: College Avenue/ Canyon Crest Drive

- The fair share contribution towards restriping College Avenue to provide an additional northbound through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A–1/B–1) would mitigate this cumulative impact.

Mitigation Measure D–3: College Avenue/ Zura Way

- The fair share contribution towards installing a traffic signal at the College Avenue/ Zura Way intersection (MM A–2/B–2) would mitigate this cumulative impact.

Mitigation Measure D–4: College Avenue/ Montezuma Road

- The fair share contribution towards widening the College Avenue/Montezuma Road intersection to provide an additional (second) left turn lane at the southbound and westbound approaches (MM A–3/B–3) would mitigate this cumulative impact.

Mitigation Measure D–5: 55th Street/ Montezuma Road

- Contribute a fair share towards the provision of a right-turn overlap phase for the westbound approach at the 55th Street / Montezuma Road intersection.

Mitigation Measure D–6: Montezuma Road/ Campanile Drive

- Contribute a fair share towards widening Campanile Drive to provide a 75-foot long dedicated right-turn lane on the northbound approach.

20.2.4 *Long-Term (University/Community-Serving Retail Scenario)*

Intersections

Mitigation Measure E–1: College Avenue/ I-8 EB Ramps

- The fair share contribution towards restriping College Avenue to provide an additional northbound through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A–1/B–1) would mitigate this cumulative impact.

Mitigation Measure E–2: College Avenue/ Canyon Crest Drive

- The fair share contribution towards restriping College Avenue to provide an additional northbound through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A–1/B–1) would mitigate this cumulative impact.

Mitigation Measure E–3: College Avenue/ Zura Way

- The fair share contribution towards installing a traffic signal at the College Avenue/ Zura Way intersection (MM A–2/B–2) would mitigate this cumulative impact.

Mitigation Measure E–4: College Avenue/ Montezuma Road

- The fair share contribution towards widening the College Avenue/Montezuma Road intersection to provide an additional (second) left turn lane at the southbound and westbound approaches (MM A–3/B–3) would mitigate this cumulative impact.

Mitigation Measure E–5: 55th Street/ Montezuma Road

- Contribute a fair share towards the provision of a right-turn overlap phase for the westbound approach at the 55th Street / Montezuma Road intersection.

Mitigation Measure E–6: Montezuma Road/ Campanile Drive

- Contribute a fair share towards widening Campanile Drive to provide a 75-foot long dedicated right-turn lane on the northbound approach.

Street Segments

Mitigation Measure F–1: College Avenue: Canyon Crest Drive to Zura Way

- The fair share contribution to the restriping of College Avenue to provide an additional (third) northbound through lane between I-8 EB Ramps and Zura Way (B-3) would mitigate this cumulative impact.

Mitigation Measure F–2: College Avenue: Zura Way to Montezuma Road

- Contribute a fair share towards widening the southbound approach of College Avenue at Montezuma Road to provide a second left-turn lane. This extra lane results in a 7-lane cross section on College Avenue between Montezuma Road and Lindo Paseo. Also, provide a third northbound through lane on College Avenue between Lindo Paseo and Zura Way.

Mitigation Measure F–3: Montezuma Road: 55th Street to College Avenue

- The fair share contribution towards providing a raised median on Montezuma Road between 55th Street and College Avenue (MM C-2) would mitigate this cumulative impact.

20.2.5 *Both Retail Scenarios*

Other

Mitigation Measure G–1: Construction Impacts

- Prepare appropriate Traffic Control Plans to ensure maximum roadway capacity during the construction period

Mitigation Measure G–2: College Avenue/Lindo Paseo Driveway Access Impacts

- Ensure that the ultimate site plan, including any access control to the subterranean garages located in Buildings 4 and 5, be designed in a manner that ensures adequate throating and that appropriate entry-gate controls (if any) are designed to accommodate peak traffic volumes.

Table 20–1 shows a summary of the near-term and long-term impacts and mitigation measures for both the university-serving and university/community-serving retail scenarios.

TABLE 20–1
~~NEAR-TERM~~ PROJECT IMPACT/MITIGATION SUMMARY

Impact	Location	Significant Impact? University - Serving Retail + Residential	Significant Impact? University/ Community - Serving Retail + Residential	Mitigation	Correspond-ing Impact from Master Plan	Does Additional Student Housing Cause the Impact?
Near-Term						
Intersections (University- Serving Retail)						
A-1	3. College Avenue/ Canyon Crest Drive (signalized)	✓	✓	Contribute fair share towards restriping College Avenue to provide an additional (third) NB thru lane	A-3	✓
A-2	4. College Avenue/ Zura Way (unsignalized)	✓	✓	Contribute a fair share towards the provision of a traffic signal at the intersection. No widening of College Avenue is necessary. An Alternate mitigation would be to prohibit southbound left-turns at the intersection. As a result of this mitigation option, an additional southbound left-turn lane would be necessary at the College Avenue/ Montezuma Road intersection.	A-4	–
A-3	6. College Avenue/ Montezuma Road (signalized)	✓	✓	Contribute fair share towards widening the College Avenue/Montezuma Road intersection to provide an additional (second) left-turn lane at the SB and WB approaches.	A-5	–
Segments (University- Serving Retail)						
A-4	**College Avenue: Canyon Crest Drive to Zura Way**	✓	✓	**Contribute fair share towards restriping College Avenue to provide an additional (third) NB thru lane**	**B-3**	–
Intersections (University/Community-Serving Retail)						
B-1	3. College Avenue/ Canyon Crest Drive (signalized)	✓	✓	Contribute fair share towards restriping College Avenue to provide an additional (third) NB thru lane	A-3	–
B-2	4. College Avenue/ Zura Way (unsignalized)	✓	✓	Contribute a fair share towards the provision of a traffic signal at the intersection. No widening of College Avenue is necessary. An Alternate mitigation would be to prohibit southbound left-turns at the intersection. As a result of this mitigation option, an additional southbound left-turn lane would be necessary at the College Avenue/ Montezuma Road intersection.	A-4	–
B-3	6. College Avenue/ Montezuma Road (signalized)	✓	✓	Contribute fair share towards widening the College Avenue/Montezuma Road intersection to provide an additional (second) left-turn lane at the SB and WB approaches	A-5	–
B-4	**10. Montezuma Road/ Campanile Drive (signalized)**	–	✓	**Contribution a fair share towards widening Campanile Drive to provide a 75-foot long dedicated NB right-turn lane**	**E-3**	

TABLE 20–21 CONT'D
~~LONG-TERM~~ PROJECT IMPACT/MITIGATION SUMMARY

Impact		Location	Significant Impact?		Mitigation	Correspond-ing Impact from Master Plan	Does Additional Student Housing Cause the Impact?
Near-Term *(cont'd)*	*Segments (University/Community-Serving Retail)*						
	C-1	College Avenue: Canyon Crest Drive to Zura Way	–	✓	Contribute fair share towards restriping College Avenue to provide an additional (third) NB thru lane	B-3	✓
	C-2	Montezuma Road: 55th Street to College Avenue	–	✓	Contribute a fair share towards providing a raised median on Montezuma Road between 55th Street and College Avenue	F-8	✓
Long-Term	*Intersections (University-Serving Retail)*						
	D-1	2. College Avenue/ I-8 Eastbound Ramps (signalized)	✓	✓	The fair share contribution towards restriping College Avenue to provide an additional NB thru lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A-1/B-1) will mitigate this cumulative impact	A-2, E-6	✓
	D-2	3. College Avenue/ Canyon Crest Drive (signalized)	✓	✓	The fair share towards restriping College Avenue to provide an additional NB thru lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A-1/B-1) will mitigate this cumulative impact	E-7	✓
	D-3	4. College Avenue/ Zura Way (unsignalized)	✓	✓	The fair share contribution towards installing a traffic signal at this intersection (MM A-2/B-2) will mitigate this cumulative impact	E-8	–
	D-4	6. College Avenue/ Montezuma Road (signalized)	✓	✓	The fair-share towards widening the College Avenue/Montezuma Road intersection to provide an additional (second) left-turn lane at the SB and WB approaches (MM A-3/B-3) will mitigate this cumulative impact	E-9	–
	D-5	9. Montezuma Road/ 55th Street (signalized)	✓	✓	Contribute a fair share towards the provision of a right-turn overlap phase for the WB approach at the Montezuma Road/55th Street intersection	E-2	✓
	D-6	10. Montezuma Road/ Campanile Drive (signalized)	✓	✓	Contribution a fair share towards widening Campanile Drive to provide a 75-foot long dedicated NB right-turn lane	E-3	✓

Continued

Table 20–~~12~~ Cont'd
~~Long-Term~~ Project Impact/Mitigation Summary

Impact		Location	Significant Impact?		Mitigation	Correspond-ing Impact from Master Plan	Does Additional Student Housing Cause the Impact?
Long-Term *(cont'd)*	*Intersections (University/Community-Serving Retail)*						
	E-1	2. College Avenue/ I-8 Eastbound Ramps (signalized)	✓	✓	The fair share contribution towards restriping College Avenue to provide an additional NB thru lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A-1/B-1) will mitigate this cumulative impact	A-2, E-6	–
	E-2	3. College Avenue/ Canyon Crest Drive (signalized)	✓	✓	The fair share contribution towards restriping College Avenue to provide an additional NB thru lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 Eastbound Ramps (MM A-1/B-1) will mitigate this cumulative impact	E-7	–
	E-3	4. College Avenue/ Zura Way (unsignalized)	✓	✓	The fair share contribution towards installing a traffic signal at this intersection (MM A-2/B-2) will mitigate this cumulative impact	E-8	–
	E-4	6. College Avenue/ Montezuma Road (signalized)	✓	✓	The fair-share contribution towards the widening the College Avenue/ Montezuma Road intersection to provide an additional (second) left-turn lane at the SB and WB approaches (MM B-3) will mitigate this cumulative impact	E-9	–
	E-5	9. Montezuma Road/ 55th Street (signalized)	✓	✓	Contribute a fair share towards the provision of a right-turn overlap phase for the WB approach at the Montezuma Road/55th Street intersection	E-2	–
	E-6	10. Montezuma Road/ Campanile Drive (signalized)	✓	✓	Contribution a fair share towards widening Campanile Drive to provide a 75-foot long dedicated NB right-turn lane on Campanile Drive	E-3	–

Continued

Table 20–12 Con't
~~Long-Term~~ Project Impact/Mitigation Summary

Impact		Location	Significant Impact?		Mitigation	Correspond-ing Impact from Master Plan	Does Additional Student Housing Cause the Impact?
Long-Term *(cont'd)*	*Segments (University/Community-Serving Retail)*						
	F-1	College Avenue: Canyon Crest Drive to Zura Way	–	✓	The fair share contribution to the restriping of College Avenue to provide an additional (third) NB thru lane (MM A-2/B-2) will mitigate this cumulative impact	F-4	✓
	F-2	College Avenue: Zura Way to Montezuma Road	–	✓	Contribute a fair share towards widening the southbound approach on College Avenue at Montezuma Road to provide a second left-turn lane. This extra lane results in a 7-lane cross section on College Avenue between Montezuma Road and Lindo Paseo. Also, provide a third northbound through lane on College Avenue between Lindo Paseo and Zura Way	F-5	✓
	F-3	Montezuma Road: 55th Street to College Avenue	–	✓	The fair share contribution towards providing a raised median on Montezuma Road between 55th Street and College Avenue (MM C-2) will mitigate this cumulative impact	F-8	✓
Other	*Other (Both Retail Scenarios)*						
	G-1	Construction Impacts	✓	✓	Prepare appropriate Traffic Control Plans to ensure maximum roadway capacity during the construction period	N/A	–
	G-2	College Avenue/ Lindo Paseo Driveway Impacts	✓	✓	Ensure that the ultimate site plan, including any access control to the subterranean garages located in Buildings 4 and 5, be designed in a manner that ensures adequate throating and that appropriate entry-gate controls (if any) are designed to accommodate peak hour traffic	N/A	–

Source: LLG 2009

20.3 Mitigation Measure Fair Share Contributions

Table 20–3 and ***Table 20–4*** show fair share percentages for each of the mitigation measures listed above. These percentages are calculated based on a commonly used City of San Diego formula:

$$\text{Near-Term Project Impact Fair Share \%} = \frac{(\text{Project Volumes})}{(\text{Existing} + \text{Cumulative} + \text{Project Volumes}) - (\text{Existing Traffic Volumes})}$$

$$\text{Long-Term Project Impact Fair Share \%} = \frac{(\text{Project Volumes})}{(\text{Year 2030} + \text{Project Volumes}) - (\text{Existing Traffic Volumes})}$$

The impacts identified in the Plaza Linda Verde study were calculated for the *SDSU 2007 Campus Master Plan Revision* EIR traffic study as well (*Tables 16–2* and *16–3*).

TABLE 20–3
NEAR-TERM MITIGATION FAIR SHARE CONTRIBUTIONS

	Mitigation Measure Number	Impacted Locations	Near Term Impacts Fair Share Percentage		
			University Serving Retail %	University/ Community Serving Retail %	Student Housing %
Near-Term	*Intersections: (University-Serving Retail)*				
	A–1	3. College Avenue/ Canyon Crest Drive	1.13%	N/A	2.18%
	A–2	4. College Avenue/ Zura Way	1.26%	N/A	2.33%
	A–3	6. College Avenue / Montezuma Road	1.00%	N/A	1.47%
	Segments: (University-Serving Retail)				
	A–4	**College Avenue: Canyon Crest Drive to Zura Way**	**4.44%**	**N/A**	**5.16%**
	Intersections: (University/ Community-Serving Retail)				
	B–1	3. College Avenue/ Canyon Crest Drive	N/A	3.53%	2.18%
	B–2	4. College Avenue/ Zura Way	N/A	3.77%	2.33%
	B–3	6. College Avenue / Montezuma Road	N/A	3.21%	1.80%
	B–4	**10. Montezuma Road/ Campanile Drive**	**N/A**	**5.31%**	**1.53%**
	Segments: (University/ Community-Serving Retail)				
	C–1	College Avenue: Canyon Crest Drive to Zura Way	N/A	29.49%	5.74%
	C–2	Montezuma Road: 55th Street to College Avenue	N/A	6.77%	0.91%

General Notes:

- Student housing fair share percentages (%) could potentially vary between University-Serving and University/ Community-Serving Retail based on which peak hour (or both) has been impacted.
- N/A = Not applicable for this scenario.

TABLE 20–4
LONG-TERM AND OTHER MITIGATION FAIR SHARE CONTRIBUTIONS

	Mitigation Measure Number	Impacted Locations	Year 2030 Impacts Fair Share Percentage		
			University Serving Retail %	University/ Community Serving Retail %	Student Housing %
Long-Term	*Intersections: (University-Serving Retail)*				
	D–1	2. College Avenue/ I-8 Eastbound Ramps	0.79%	N/A	1.35%
	D–2	3. College Avenue/ Canyon Crest Drive	0.51%	N/A	0.95%
	D–3	4. College Avenue/ Zura Way	0.73%	N/A	1.32%
	D–4	6. College Avenue/ Montezuma Road	0.72%	N/A	1.06%
	D–5	9. Montezuma Road/ 55th Street	0.32%	N/A	0.52%
	D–6	10. Montezuma Road/ Campanile Drive	0.67%	N/A	0.80%
	Intersections: (University/ Community-Serving Retail)				
	E–1	2. College Avenue/ I-8 Eastbound Ramps	N/A	2.77%	1.35%
	E–2	3. College Avenue/ Canyon Crest Drive	N/A	1.57%	0.95%
	E–3	4. College Avenue/ Zura Way	N/A	2.16%	1.32%
	E–4	6. College Avenue/ Montezuma Road	N/A	2.26%	1.27%
	E–5	9. Montezuma Road/ 55th Street	N/A	2.00%	0.88%
	E–6	10. Montezuma Road/ Campanile Drive	N/A	2.05%	0.80%
	Segments: (University/ Community Serving Retail)				
	F–1	College Avenue: Canyon Crest Drive to Zura Way	N/A	1.74%	0.33%
	F–3	College Avenue: Zura Way to Montezuma Road	N/A	2.14%	0.40%
	F–3	Montezuma Road: 55th Street to College Avenue	N/A	5.21%	0.72%

General Notes:
- N/A = Not applicable for this scenario.

The fair share contribution calculations for each impacted location listed below can be found in ***Appendix M.***

21.0 Post Mitigation Operations

With the implementation of the mitigation measures recommended in Section 19.2, all impacts are mitigated to below a level of significance. The "University/Community-Serving Retail + Student Housing" scenario is the higher trip generator of the two retail scenarios studied. The impact locations are identical for both this and the less intense "University-Serving Retail + Student Housing" scenarios, as are proposed mitigation measures. This section shows how the proposed mitigation measures would result in acceptable LOS at the impacted locations for the more intensive "University/Community-Serving Retail + Student Housing" project, so it is reasoned that the mitigation would suffice for the less intensive "University-Serving + Student Housing" scenario as well.

It should be noted that the provision of a raised median on Montezuma Road (proposed mitigation measures C-2 and F-3) will limit the driveways serving uses along this segment to right-turns. Field reviews show that very few vehicles currently make the left-turn into the driveways since there are no mid-block left-turn lanes along Montezuma Road at the driveways. Field reviews also show very few left-turns are made out at the driveways, since high volumes on Montezuma Road make this movement very difficult. Therefore, the provision of a raised median will result in a nominal amount of displaced left-turns, which will be served as eastbound and westbound u-turns at the College Avenue/Montezuma Road and Montezuma Road/55th Street signalized intersections, respectively.

Table 21–1 and ***Table 21–2*** show summaries of the mitigated near-term intersection and street segment calculations for the "University/Community-Serving Retail + Student Housing" scenario, respectively.

Appendix N contains the mitigated analysis worksheets.

TABLE 21–1
MITIGATED NEAR-TERM INTERSECTION CALCULATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL + STUDENT HOUSING

Intersection	Control Type	Peak Hour	(Baseline) Existing + Near-Term Cumulative		(Total Project) Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing			With Mitigation		
			Delay [a]	LOS [b]	Delay	LOS	Δ[d]	Delay	LOS	Δ[d]
3. College Avenue/ Canyon Crest Drive	Signal	AM	68.5	E	71.4	E	2.9	50.6	D	-17.9
		PM	148.9	F	153.4	F	4.5	76.9	E	-72.0
4. College Avenue/ Zura Way	OWSC [c]	AM	408.0	F	463.3	F	>5.0	26.4	C	-381.6
		PM	95.6	F	128.8	F	>5.0	49.2	D	-46.4
6. College Avenue/ Montezuma Road	Signal	AM	119.0	F	121.3	F	2.3	59.7	E	-59.3
		PM	176.0	F	187.0	F	>5.0	144.5	F	-31.5
10. Montezuma Road/ Campanile Drive	**Signal**	**PM**	**72.1**	**E**	**75.5**	**E**	**3.5**	**67.6**	**E**	**-4.5**

Footnotes:

a. Average delay expressed in seconds per vehicle.

b. Level of Service.

c. OWSC – One-Way Stop Controlled intersection. Minor street approach delay is reported.

d. Δ denotes project induced delay increase.

~~*General Notes:*~~

~~Bold and shading represents a significant impact~~

SIGNALIZED DELAY/LOS THRESHOLDS Delay	LOS	UNSIGNALIZED DELAY/LOS THRESHOLDS Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 21–2
MITIGATED NEAR-TERM SEGMENT OPERATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL + STUDENT HOUSING

Segment	LOS E Capacity [a]	(Baseline) Existing + Near-Term Cumulative			(Total Project) Existing + Near-Term Cumulative + University/Community-Serving Retail + Student Housing				Mitigated LOS E Capacity [a]	With Mitigation		
		Volume	LOS [b]	V/C [c]	Volume	LOS [b]	V/C [c]	Δ		Volume	LOS	V/C
College Avenue												
Canyon Crest Drive to Zura Way	40,000	45,258	F	1.131	45,933	F	1.148	0.017	45,000	45,933	F	1.021
Montezuma Road												
55th Street to College Avenue	30,000	31,172	F	1.039	31,662	F	1.055	0.016	35,000	31,662	E	0.905

Footnotes:

a. Capacities based on City of San Diego's Roadway Classification & LOS table. The mitigation includes the addition of a 3rd northbound lane on College Avenue. An additional capacity of 5,000 ADT is assumed. The mitigation includes the addition of a raised median on Montezuma Road. The increase in capacity between a Collector and a Major road is 10,000 ADT. The raised median is part of the description of a Major that yields this increase. Therefore, an additional capacity of 5,000 ADT is assumed for the capacity provided by a raised median.

b. Average Daily Traffic

c. Volume to Capacity ratio

Table 21–3 and ***Table 21–4*** show summaries of the mitigated long-term (2030) intersection and street segment calculations for the "University/Community-Serving Retail + Student Housing" scenario, respectively.

TABLE 21–3
MITIGATED LONG-TERM (2030) INTERSECTION CALCULATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL + STUDENT HOUSING

Intersection	Control Type	Peak Hour	Long-Term (2030) Without Project		(Total Project) Long-Term (2030) + University/Community-Serving Retail + Student Housing			With Mitigation		
			Delay [a]	LOS [b]	Delay	LOS	Δ[d]	Delay	LOS	Δ[d]
2. College Avenue/ I-8 Eastbound Ramps	Signal	AM	132.5	F	135.0	F	2.5	117.6	F	-14.9
		PM	107.5	F	110.1	F	2.6	35.8	D	-71.7
3. College Avenue/ Canyon Crest Drive	Signal	AM	214.1	F	218.8	F	4.7	88.6	F	-125.5
		PM	426.3	F	436.3	F	>5.0	195.9	F	-230.4
4. College Avenue/ Zura Way	OWSC [c]	AM	765.8	F	905.0	F	>5.0	46.3	D	-719.5
		PM	102.1	F	107.5	F	>5.0	121.9	F	-899.1
6. College Avenue/ Montezuma Road	Signal	AM	176.6	F	178.5	F	1.9	115.9	F	-60.7
		PM	336.0	F	350.5	F	>5.0	169.9	F	-166.1
9. Montezuma Road/ 55th Street	Signal	AM	134.0	F	136.6	F	2.6	123.5	F	-10.5
		PM	148.0	F	151.7	F	3.7	136.4	F	-11.6
10. Montezuma Road/ Campanile Drive	Signal	AM	82.2	F	85.3	F	3.1	78.7	F	-3.5
		PM	219.4	F	226.5	F	>5.0	186.2	F	-33.2

Footnotes:

a. Average delay expressed in seconds per vehicle.

b. Level of Service.

c. OWSC – One-Way Stop Controlled intersection. Minor street approach delay is reported.

d. Δ denotes project induced delay increase.

General Notes:

Bold and shading represents a significant impact

SIGNALIZED DELAY/LOS THRESHOLDS Delay	LOS	UNSIGNALIZED DELAY/LOS THRESHOLDS Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 21–4
MITIGATED LONG-TERM (2030) SEGMENT OPERATIONS
UNIVERSITY/COMMUNITY-SERVING RETAIL + STUDENT HOUSING

Segment	LOS E Capacity [a]	Long-Term (2030) Without Project			(Total Project) Long-Term (2030) + University/Community-Serving Retail + Student Housing				Mitigated LOS E Capacity [a]	With Mitigation		
		Volume	LOS [b]	V/C [c]	Volume	LOS [b]	V/C [c]	Δ		Volume	LOS	V/C
College Avenue												
Canyon Crest Drive to Zura Way	40,000	76,140	F	1.904	76,815	F	1.920	0.016	45,000	76,815	F	1.707
Zura Way to Montezuma Road	40,000	56,040	F	1.401	56,715	F	1.418	0.017	45,000	56,715	F	1.260
Montezuma Road												
55th Street to College Avenue	30,000	35,010	F	1.167	35,565	F	1.186	0.019	35,000	35,565	F	1.016

Footnotes:

a. Capacities based on City of San Diego's Roadway Classification & LOS table. The mitigation includes the addition of a 3rd northbound lane on College Avenue. An additional capacity of 5,000 ADT is assumed. The mitigation includes the addition of a raised median on Montezuma Road. The increase in capacity between a Collector and a Major road is 10,000 ADT. The raised median is part of the description of a Major that yields this increase. Therefore, an additional capacity of 5,000 ADT is assumed for the capacity provided by a raised median.

b. Average Daily Traffic

c. Volume to Capacity ratio

22.0 REDUCED PROJECT ALTERNATIVE – QUALITATIVE IMPACT COMPARISON

A reduced Project Alternative has been considered which would construct 195 dwelling units and 38,605 square feet (sf) of commercial retail. This reduced intensity yields slightly less than half of the Proposed Project, which proposes 400 dwelling units and 90,000 sf of retail. A qualitative analysis of potential reductions to the Proposed Project's significant impacts (listed above in *Section 19.0)* was prepared, using identical trip generation rates for both the retail and residential land uses as used for the Proposed Project, and identical trip distribution throughout the study area.

When compared to the Proposed Project's trip generation, The Project Alternative would generate 642 less ADT with 26 less total AM peak hour trips, and 16 less total PM peak hour trips.

22.1 Near-Term Impact Assessment

LLG reviewed the Proposed Project's near-term intersection and street segment impacts (shown in *Tables 9–1* and *9–2, respectively*) to determine if a reduced project contribution to these locations could result in the determination of no near-term impacts, based on whether the increase over the allowable thresholds (seconds of delay for intersections, V/C increase for segments) was minor or great. The five impacted locations that were reviewed included:

- College Avenue / Canyon Crest Drive (Impact A-1, B-1)
- College Avenue / Zura Way (Impact A-2, B-2)
- College Avenue / Montezuma Road (Impact A-3, B-3)
- **Montezuma Road / Campanile Drive (Impact B-4)**
- College Avenue from Canyon Crest Drive to Zura Way (Impact A-4, C-1)
- Montezuma Road from 55th Street to College Avenue (Impact C-2)

Based on the reduced project traffic volumes associated with the Project Alternative, LLG estimates that near-term impacts would remain at the following two locations:

- College Avenue / Zura Way (Impact A-2, B-2)
- College Avenue / Montezuma Road (Impact A-3, B-3)

As shown in *Table 9–1*, the delay increase due to the project is in excess of 2.1 seconds at LOS F intersections. If the Project Alternative were to result in a 50% reduction in delay increase at these locations (commensurate with a 50% reduction in trip generation), it is reasoned that the delay increase would still exceed 1.0 second, which would be the allowable maximum at these LOS F-operating intersections.

22.2 Long-Term Impact Assessment

LLG reviewed the Proposed Project's long-term intersection and street segment impacts (shown in *Tables 10–1* and *10–2, respectively*) to determine if a reduced project contribution to these locations could result in the determination of no long-term impacts using the method described above. The nine impacted locations that were reviewed included:

- College Avenue / I-8 Eastbound Ramps (Impact D-1, E-1)
- College Avenue / Canyon Crest Drive (Impact D-2, E-2)
- College Avenue / Zura Way (Impact D-3, E-3)
- College Avenue / Montezuma Road (Impact D-4, E-4)
- Montezuma Road / 55th Street (Impact D-5, E-5)
- Montezuma Road / Campanile Drive (Impact D-6, E-6)
- College Avenue from Canyon Crest Drive to Zura Way (Impact F-1)
- College Avenue from Zura Way to Montezuma Road (Impact F-2)
- Montezuma Road from 55th Street to College Avenue (Impact F-3)

Based on the reduced project traffic volumes associated with the Project Alternative, LLG estimates that long-term impacts would remain at the following five locations:

- College Avenue / Canyon Crest Drive (Impact D-2, E-2)
- College Avenue / Zura Way (Impact D-3, E-3)
- College Avenue / Montezuma Road (Impact D-4, E-4)
- Montezuma Road / 55th Street (Impact D-5, E-5)
- Montezuma Road / Campanile Drive (Impact D-6, E-6)

Again, were the adjusted delay increases of the Project Alternative to result in a 50% reduction at these locations, the remaining delay increase would continue to be in excess of 1.0 second, and cumulative project impacts would continue to be calculated.

F3.12

Linscott Law & Greenspan, *Traffic Impact Analysis, Plaza Linda Verde,*
Appendices C, D and I
(August 6, 2010)

APPENDIX C

INTERSECTION ANALYSIS METHODOLOGY

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for unsignalized intersections is determined by the computed or measured control delay and is defined for each minor movement. Level of Service is not defined for the intersection as a whole. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The criteria are given in the following the table, and are based on the average control delay for any particular minor movement.

LEVEL OF SERVICE	AVERAGE CONTROL DELAY SEC/VEH			EXPECTED DELAY TO MINOR STREET TRAFFIC
A	0.0	≤	10.0	Little or no delay
B	10.1	to	15.0	Short traffic delays
C	15.1	to	25.0	Average traffic delays
D	25.1	to	35.0	Long traffic delays
E	35.1	to	50.0	Very long traffic delays
F		>	50.0	Severe congestion

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This Level of Service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits. LOS F may also appear in the form on side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

In most cases at Two-Way Stop Controlled (TWSC) intersections, the critical movement is the minor-street left-turn movement. As such, the minor-street left-turn movement can generally be considered the primary factor affecting overall intersection performance. The lower threshold for LOS F is set at 50 seconds of delay per vehicle. There are many instances, particularly in urban areas, in which the delay equations will predict delays of 50 seconds (LOS F) or more for minor-street movements under very low volume conditions on the minor street (less than 25 vehicle/hour). Since the first term of the equation is a function only of the capacity, the LOS F threshold of 50 sec/vehicle is reached with a movement capacity of approximately 85 vehicle/hour or less.

This procedure assumes random arrivals on the major street. For a typical four-lane arterial with average daily traffic volumes in the range of 15,000 to 20,000 vehicles per day (peak hour, 1,500 to 2,000 vehicle/hour), the delay equation used in the TWSC capacity analysis procedure will predict 50 seconds of delay or more (LOS F) for many urban TWSC intersections that allow minor-street left-turn movements. **The LOS F threshold will be reached regardless of the volume of minor-street left-turn traffic.** Not-withstanding this fact, most low-volume minor-street approaches would not meet any of the volume or delay warrants for signalization of the *Manual on Uniform Traffic Control Devices* (MUTCD) since the warrants define an asymptote at 100 vehicle/hour on the minor approach. As a result, many public agencies that use the HCM Level of Service thresholds to determine the design adequacy of TWSC intersections may be forced to eliminate the minor-street left-turn movement, even when the movement may not present any operational problem, such as the formation of long queues on the minor street or driveway approach.

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At Level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

APPENDIX D

CITY OF SAN DIEGO ROADWAY CLASSIFICATION TABLE

TABLE 2
ROADWAY CLASSIFICATIONS, LEVELS OF SERVICE (LOS) AND AVERAGE DAILY TRAFFIC (ADT)

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no Center lane) (continuous left-turn lane)	4 lanes 2 lanes	64/84 50/70	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

LEGEND

XXX/XXX = Curb to curb width (feet)/right of way (feet): based on the City of San Diego Street Design Manual.

XX,XXX = Approximate recommended ADT based on City of San Diego Street Design Manual

Notes:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.
2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

APPENDIX I

EXCERPTS FROM COLLEGE COMMUNITY PLAN REDEVELOPMENT EIR AND THE PASEO AT SAN DIEGO STATE UNIVERSITY EIR

COLLEGE COMMUNITY REDEVELOPMENT PROJECT ENVIRONMENTAL IMPACT REPORT

TRANSPORTATION AND PARKING ANALYSIS

FINAL REPORT

Prepared for:

City of San Diego
Redevelopment Agency

Prepared by:

JHK & Associates
8989 Rio San Diego Drive, Suite 335
San Diego, CA 92108

In Association with:

Cotton/Beland/Associates
6310 Greenwich Drive, Suite 220
San Diego, CA 92122

December 1992

Table 3-15

COLLEGE COMMUNITY REDEVELOPMENT PROJECT EIR
ESTIMATED PARKING DEMAND[1]

Subarea	Type of Land Use	Size	Parking Ratio	Required Parking Spaces
Core	High Density Residential	755 du	----2	1,180
	Very High Density Residential	1,745 du	----2	2,727
	Retail	302,600 sf	1/400 sf[3]	757
	Religious Centers	42,000 sf	1/300 sf[4]	140
	Fraternity/Sorority	1,520 students	0.58/student [5]	882
			Subtotal	**5,686**
55th Street	Medium-Medium High Density Residential	600 du	---2	1,125
			Subtotal	**1,125**
Alvarado Rd	University-Serving Office	600,000 sf	1/300 sf	2,000
	University-Serving R&D	110,000 sf	1/400 sf	275
			Subtotal	**2,275**
Lot A	Hotel/Conference Center	300 rooms	1/room	300
			Subtotal	**300**
Montezuma School	Office	20,000 sf	1/300 sf	67
	Daycare/Preschool	117 students	0.25/student	30
	Library	10,000 sf	1/200 sf[6]	50
			Subtotal	**147**
			Grand Total	**9,533**

1. Unless otherwise noted, parking demand was estimated based on Transportation Planning Division parking rates dated August 30, 1992.

2. Parking ratio varies for residential units depending on a variety of factors. For this calculation, it was assumed that the residential units would be one third studios, one third one bedroom units, and one third two bedroom units. In the Core Subarea, it was also assumed that a density of 73 to 142 units per acre would be achieved and that the retail gross floor area would be 13% or more of the total of the residential and retail gross floor area. The final project parking demand should be revised when site plans are available and the assumptions listed above can be verified.

3. The recommended parking ratio for retail use in the Core Subarea is less than the 1/200 sf ratio shown in the Transportation Planning Division parking rates for retail uses. The recommendation of 1/400 sf is based on the high level of walking trips expected in the Core Subarea and will have to be verified at the time of site plan approval. See text.

4. Parking demand based on office parking ratio. See text.

5. Parking ratio based on City of San Diego Transportation Planning Division Memorandum dated February 10, 1992. Fraternities and sororities are not mentioned in the Transportation Planning Division parking rates.

6. Assumes no high meeting room use.

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APPENDIX L

Shared Parking Study

Shared Use Parking Study for the Paseo Project

San Diego State University Foundation

By David Belson, Ph.D.

March 5, 2004

Table of Contents

Introduction

This report provides calculations of the expected parking demand for the Paseo Project, the mixed-use development alongside San Diego Statue University. The expected parking demand is determined for two representative busy days, Tuesday and Friday, during late September when the Paseo is complete and the fall semester has begun.

The calculation is based on the several published documents on parking demand in similar situations, prior studies in the SDSU area, the applicable City of San Diego parking codes, interviews and familiarity with University environments. The approach assumes a shared use where different types of visitors occupy a certain amount of the parking spaces during various times of the day. For example, office building workers require parking during the daytime and cinema visitors require parking mostly in the evening. It does not consider the effect of special events in the vicinity such as sporting events at Cox Arena. A subsequent study will review the parking demand during such special event days and occasions of unusually high demand.

The inputs to the calculation are:

- The sq. ft. of building space for various types of usage; residential, offices, cinema, retail and restaurants
- The ratio of parking required per 1,000 sq. ft. This is defined by city code as well as several publications and prior studies.
- The time of day distribution of visitors for each of the uses. This is also defined by city code as well as by prior studies and what is known about the expected tenants.
- Assumptions that modify the Paseo situation from an isolated and typical shopping center.

The calculations resulting from these inputs are shown in the tables in Appendix A.

Peak Parking Demand

The peak parking demand is determined for Tuesday and Friday in Tables 1 A and 1 B in the Appendix. They define a sum of the parking demand for the various uses within the Paseo development. The parking demand for each of the separate uses is shown in Tables 2 through 7. Each of these tables shows the percentage of expected parking demand by time of day, the source data, the parking space code requirements and related notes. A summary of the adjustment factors used in these calculations is shown in Table 8. The peak parking demand is expected to be 1856 spaces at 8:00 p.m. on a Friday evening.

The adjustment factors are necessary to make the calculation reflect a realistic picture of the Paseo project. Obviously, the Paseo is not in operation so assumptions were necessary. We believe the assumptions are reasonable but Table 9 shows the effect of making the assumptions higher or lower.

Reasonableness

The calculations attempt to achieve a reasonable and likely picture of the parking demand. Obviously, the actual demand will not be known until the Paseo is built and in operation. Moreover, the demand will vary depending on the time of year, day of the week, mix of tenants, weather, etc. We have tried to reflect a relatively busy time period, such as Fridays and late September. In September the school year begins but after a few weeks it stabilizes and is at a relative peak for the year. Movie attendance in September drops off considerably. (See Appendix C) Thus, we have been conservative with assuming a high student population during the same time as peak movie demand. It is more likely that when the movie theaters are busiest, in June, July and August, the University parking demand will be at its lowest. Thus, by matching the peaks and valleys in the University and Shopping center demand we can use the existing infrastructure at a higher and more efficient level and avoid building more roads and structures than necessary.

The parking demand calculated here will not cover all the days of the year but at least 85% or more. Special event days, such as large concerts or sporting events, are not included in this report as well as other events causing unusual demand. The exact extent to which such demand occurs, as well as how it will be dealt with, is presented in a study of special events, in Appendix B.

It is also likely that during the period soon after the Paseo is first opened there will be a surge in demand. People will visit the Paseo out of curiosity, perhaps from greater distances, more often than will ongoing customers. This will create a high parking demand for a limited time period. Alternate temporary parking strategies are available. Valet parking can add over 300 spaces. Employees can be parked at certain existing University parking available on weekends and evenings. For example, lot PS 2 can act as an overflow; its 600 spaces have easy access to Paseo by walking down Linda Paseo road. More distant lots can be added by a shuttle service for employees, if necessary.

As a check on the reasonableness of the Cinema parking figures, the parking demand at other theaters and shopping centers can be compared. For example, the Bridge Theaters in Los Angeles are operated by General Amusements and anchors the Howard Hughes Promenade, which is a very similar type of project. It has 2,064 parking spaces. On an average Friday evening in September 2002 the Center parked a number of cars about equal to the number of seats in the theater (4,200). The Paseo theater is 2,900 seats. We plan to park about 2,200 cars for Cinema, Restaurant and Retail visitors after 5 PM on Friday, assuming an average stay of 3 hours. (See Table 10 as a comparison of two approaches to calculating demand; shared parking model and turnover-based model.) Plus, the pedestrians from the University and visitors by trolley add to the effective capability of accommodating visitors.

Specific aspects of the planned Paseo leasing are included. For example, most of the restaurants will not be open for breakfast and therefore the typical breakfast period demand at restaurants will not be proportional to the total square foot area leased. We have accordingly adjusted the area available for food service in Table 5 for different mealtimes.

The residential parking demand is based on the planned assignment of spaces for various sizes of apartment units. Parking of 848 spaces will be provided which matches the City code required formula if campus impact zone increases are not applied. The hourly parking demand calculation reflects the proposed policy concerning the Paseo's residents on weekends after 4 PM on Friday. The three and four bedroom units will each have one tandem parking space and the single and two bedroom units will each have one standard parking space assigned at all times and located in the restricted residential parking zone of the structure. In order to meet the additional code requirement of 1.25 and 1.75 spaces for the one and two bedroom apartments, respectively, those additional 119 spaces will be available in the general, non-restricted areas of the project's parking structure, except from 4 PM Friday until 6 PM Sunday, when these spaces will be made available in existing University parking structures within easy walking distance. The University has reviewed this arrangement. On weekends, considerable parking within the University is commonly available.

The 848 spaces will be limited to students. This will be done by the parking operator and will include tactics such as having a key card access, gated area, car stickers, tickets given by enforcement officers, or other forms of identification by the security staff.

Surveys of current residential parking (Fraternity Row and PDS) show that student residential parking areas never seem to fill to 100% based on data regarding typical student behavior. However, we have not deducted for this effect.

We will work with the residents to provide the maximum number of permits possible. The additional 119 spaces may become available within the Paso, once it is open. Residential parking will be isolated from the other visitor parking.

The Paseo project is providing an additional 848 full time parking spaces for existing SDSU students. Since SDSU cannot increase its enrollment, See Appendix D, these additional spaces will take pressure off of the overall parking conditions in the surrounding neighborhoods. The dwelling units/beds are also relieving pressure from the surrounding neighborhoods. They are being placed in the redevelopment district, virtually on campus. That is the same intent as the Parking Impact Zone law intends, and therefore we are meeting the intent of that law. Thus, campus parking is being increased without increase in demand.

SDSU enrollment is capped at 25,000 FTE (full time equivalent students). This cap is both CSU system wide, mandated by the SDSU current master plan, and also restricted by the College Area Community Plan. Any new planning, according to San Diego State University Foundation Senior Management will not start its efforts until 2005. After that planning is complete and approved by the CSU Board of Trustees and after a new EIR with public input, etc. might any changes take place in the plan. Therefore, enrollment will not increase in the planning window for which the Paseo is being reviewed without additional environmental review.

The CSU board of Trustees approved the current SDSU master plan and EIR on March 21, 2001. The plan and minutes can be found at: http://www.calstate.edu/BOT/Agendas/Mar01/CPBG.pdf See also Appendix D.

Another factor that may reduce the overall actual parking demand is the trolley system. The trolley usage may reduce the demand for several types of visitors but only a 15% effect on cinema and office workers has been included. This represents about 500 visitors or about 4% of the daily trolley riders on the San Diego Trolley Mission Valley East Line. (See Appendix F.)

The source for trolley & pedestrian percentages, come from inquiries to Environmental Impact Report and transit planners, similar shopping center situations and discussions with operators of other mixed-use developments. The 15% amounts are conservative, since the percentages might turn out to be much greater and are unlikely to be much less or zero. I spoke to operations and planning specialists at UC Irvine, The City of Irvine, UCLA, USC, University of Arizona and others in similar situations. Planners were contacted such as

Cotton/Bridges Associates a division of P & D Consultants, EDAW, Linscott Law & Greenspan, SANAG as well as real estate advisors at CB Richard Ellis, Grubb & Ellis and Madison Marquette and various shopping center and retail architects. Of course input from SDSU planners and their consultants was also included.

Sensitivity

Certain of the factors used in the analysis may vary once the development is completed. The calculations in Tables 1 through 8 represent a base case of assumptions. These assumptions were tested by doing the same calculation with an increase and with a decrease to provide a range of possible results. The sensitivity of the total demand to higher or lower values is shown in Table 9.

Other consultants have also studied the Paseo project and also advised various adjustment factors. For example, the Rich study (Campus Parking Study & Master Plan, Rich and Associates, September 1996.) suggested reductions of 50% for retail, 40% for restaurant and 30% for cinema as a result of SDSU pedestrians. Studies by Lesser and Company and Wilber Smith estimated 30% to 40% of the use from SDSU visitors. I generally used smaller reductions in the parking requirements.

Conclusion

I realize that because of the impacted parking conditions at the University we cannot overpark which would allow Paseo parkers to disrupt the University parking situation and we also cannot underpark the project to the extent that Paseo tenant sales are affected. That would increase the risk of the development. Keeping the parking tight but workable is the correct strategy and using the existing University capacity when it is clearly available is an environmentally friendly approach.

The peak parking demand occurs on Friday at 8PM, also Tuesday at 6 PM but at a lower level, over the two days studied. This peak number of 1,856 spaces is the critical measurement of the adequacy of the parking requirement. Other time periods, particularly when the demand is well below this number, represent parking spaces available for other purposes. The Paseo structure is being designed to accommodate 1,923 parking spaces, with an additional 31 surface spaces dedicated to the eastern block of the project.

Sources

These calculations were based on the following sources.

1. San Diego Municipal Code, Chapter 14: General Regulations, Article 2: General Development Regulations, Division 5: Parking Regulations.
2. The Dimensions of Parking, 4th Edition, Urban Land Institute, 2000, Washington, DC.
3. Parking Requirements for Shopping Centers, 2nd Edition, Urban Land Institute, 2000, Washington, DC.
4. Addendum received from the ICSC for the report "Parking Requirements for Shopping Centers" publication jointly sponsored by the International Council of Shopping Centers and Urban Land Institute, 2000, Washington, DC. This is an unpublished item but it was received directly from ICSC/ULI as a correction to their most current publication.
5. Parking, Selected References, Packet No. 327, Urban Land Institute, November 2002.
6. Parking Generation, 2nd Edition Institute of Transportation Engineers, Washington, D.C., 1987.
7. Shared Parking, Urban Land Institute, 1983.
8. Entertainment Industry Economics, by Harold L. Vogel, Cambridge University Press, NY, NY. 1990.
9. Simmons Market Research Inc., Simmon's Study of Media and Markets
10. National Restaurant Association, web site http://www.restaurant.org// . Quotes from the current web site include: "August is the most popular month to eat out and Saturday is the most popular day of the week for dining out." "The most popular days for dining out are Saturday, Friday and Sunday, respectively, followed by Thursday, Wednesday, and Tuesday. Monday is the least popular day to dine out."
11. Studies A number of studies of the Paseo project as well as traffic at SDSU are relevant. These include:
    a. Campus Parking Study & Master Plan, Rich and Associates, September 1996.

b. SDSU Mixed Use Retail Element Feasibility Analysis, Speer Consulting, May 31, 2001

c. SDSU Mixed Use Project Market and Feasibility Analysis, The London Group, October 2000.

d. Strategic Merchandising Plan, CB Richard Ellis, June 2003 and related correspondence.

e. Transportation Analysis for the Paseo, Urban Systems Associates, June 18, 2003

12. Interviews. A variety of individuals were interviewed who were familiar with the issues and/or the plans for the Paseo. These included executives of probable tenants who expressed what they felt would be the likely mix of customers and the time of day fluctuations that can be expected. Some of the contacts and input came through Reg Kobzi of the Rental Services group at CB Richard Ellis. Others were familiar with shopping centers alongside universities such as UC Irvine, UCLA, USC, Arizona State, etc. or who were people active in traffic planning and real estate development. Contacted persons include executives of Karl Strauss, Urban Outfitters, Century Theaters, General Amusements, Tricon Corporation developers of Taco Bell and other fast food operations, Rubios Restaurants, Payway Corp., owner/developer of Trattoria Acqua in La Jolla, the former director of food services at Universal Studios Citywalk, current General Manager of Universal Studios Citywalk, Grubb & Ellis, real estate advisor for Islands and Pei Wei restaurant chains, the EDAW planning firm, the architectural firm Tarlos & Assoc, Madison Marquette real estate consultants and city planning management at Irvine, CA and Tempe, AZ. The consensus of opinions is represented in the assumptions shown in Table 9.

Appendix

A. Tables 1 through 10

B. Special Event Days, Shared Use Parking for the Paseo Project

C. Urban Land Institute; Data Regarding Cinema Attendance. They did not provide data on the size of their samples. Demand rates are given for Southern California. Hourly percentages are national figures but other sources report a similar pattern for California.

D. Enrollment at California State University

E. Religious Center plans

F. San Diego Trolley

Table 1 A

The Paseo - Shared Use Parking Demand - Tuesday Total

Time of Day	Residential	Office	Cinema	Food Services	Retail	Total
6:00 AM	848	14	-	7	-	869
7:00 AM	831	43	-	25	25	924
8:00 AM	819	157	-	36	76	1,088
9:00 AM	795	256	-	29	127	1,208
10:00 AM	767	285	10	11	178	1,251
11:00 AM	747	285	39	116	204	1,392
Noon	733	256	59	179	255	1,482
1:00 PM	729	242	115	143	242	1,471
2:00 PM	729	256	122	99	217	1,422
3:00 PM	729	256	122	63	204	1,373
4:00 PM	729	242	145	54	191	1,360
5:00 PM	729	157	197	91	204	1,377
6:00 PM	729	71	273	223	248	1,544
7:00 PM	729	43	329	275	233	**1,608**
8:00 PM	729	14	329	275	186	1,533
9:00 PM	729	14	279	275	140	1,437
10:00 PM	731	14	230	172	93	1,239
11:00 PM	746	-	214	103	47	1,110
Midnight	763	-	197	34	-	995
1:00 AM	806	-	99	10	-	915
Peak (100%)	848	285	329	275	255	**1,608**
	See Table 2	See Table 3	See Table 4	See Table 5A & 5B	See Table 6 & 7	

See notes and basis for computations on the following Tables.

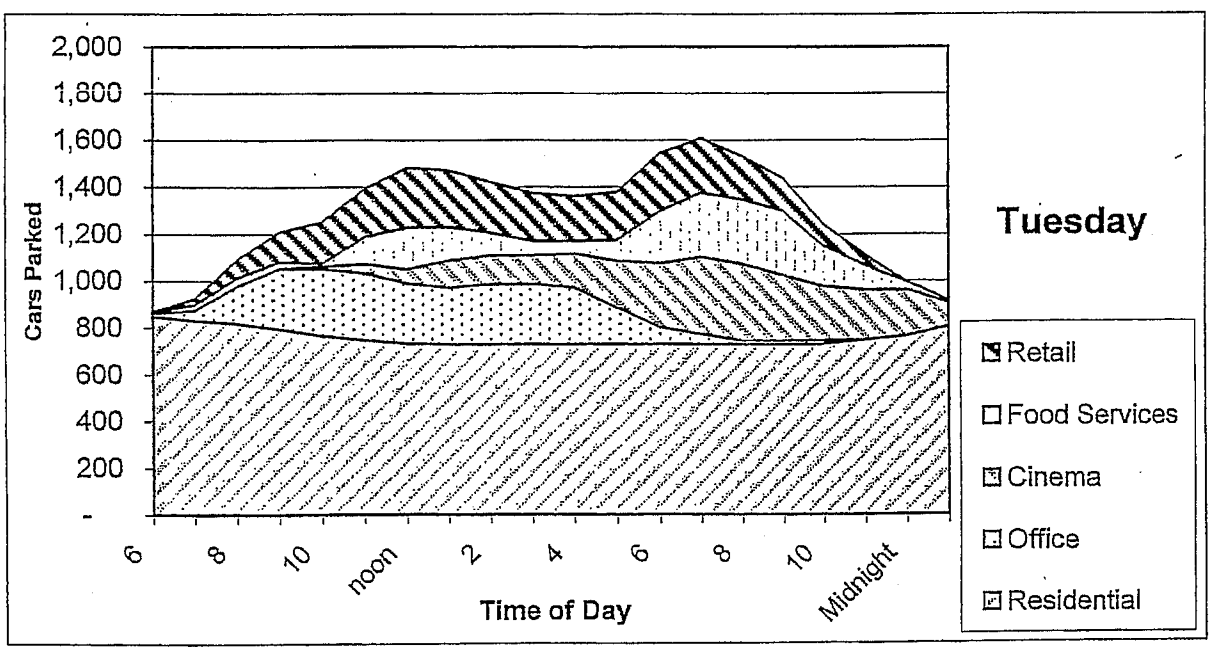


Table 1 B

The Paseo - Shared Use Parking Demand - Friday Total

Time of Day	Residential	Office	Cinema	Food Services	Retail	Total
6:00 AM	806	14	-	12	-	831
7:00 AM	790	41	-	42	29	902
8:00 AM	778	149	-	61	88	1,077
9:00 AM	756	243	-	50	147	1,196
10:00 AM	729	270	11	19	206	1,235
11:00 AM	729	270	22	200	235	1,456
Noon	729	243	37	307	294	1,610
1:00 PM	729	230	129	246	279	1,613
2:00 PM	729	243	148	169	250	1,539
3:00 PM	729	243	203	108	235	1,518
4:00 PM	729	218	240	92	220	1,499
5:00 PM	729	141	277	156	235	1,538
6:00 PM	729	64	351	287	248	1,679
7:00 PM	729	38	406	368	261	1,802
8:00 PM	729	13	462	368	284	**1,856**
9:00 PM	729	13	499	331	213	1,785
10:00 PM	729	13	443	258	88	1,531
11:00 PM	729	-	351	147	44	1,271
Midnight	729	-	332	37	-	1,098
1:00 AM	729	-	88	11	-	828
Peak (100%)	806	270	499	368	294	**1,856**
	See Table 2	See Table 3	See Table 4	See Table 5A & 5B	See Table 6 & 7	

See notes and basis for computations on the following Tables.

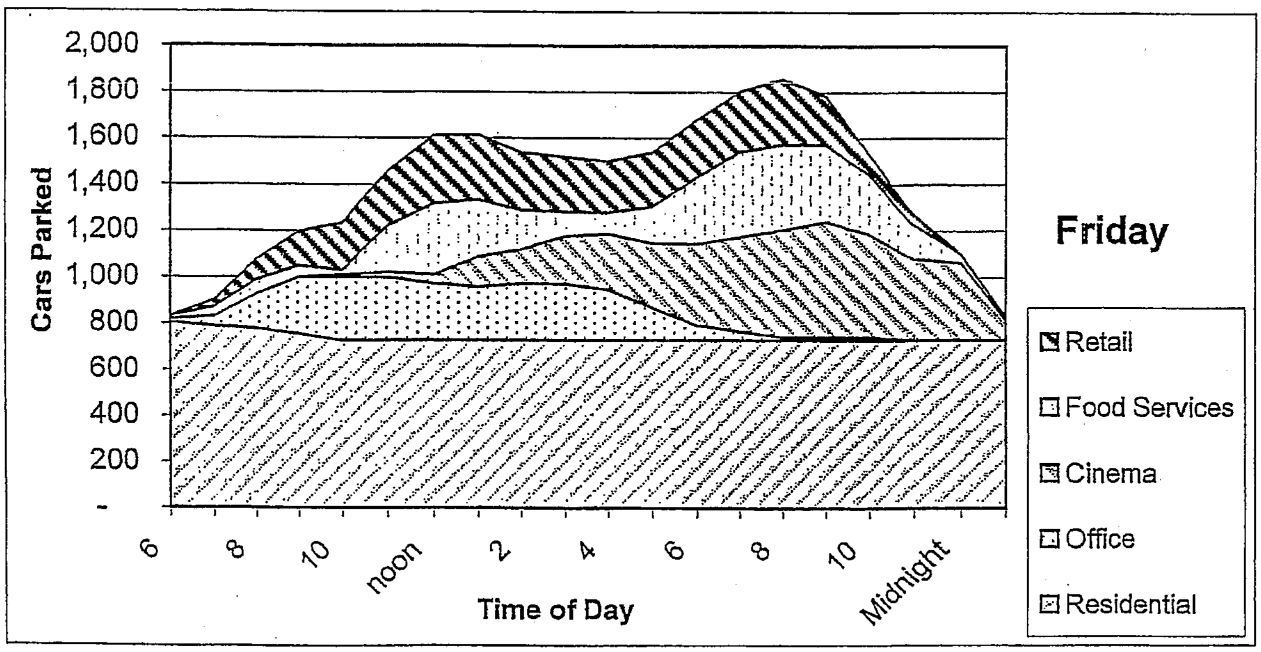


Table 5 A
Restaurant Parking

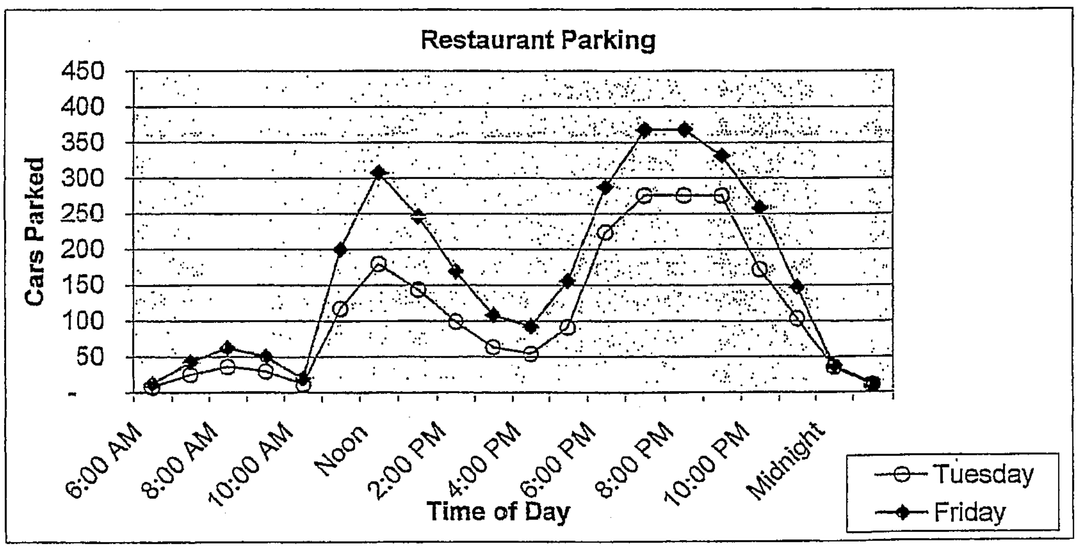
Tuesday Time of Day	Weekday per Code	Sq. Ft. Restaurant open	Parking Spaces
6:00 AM	15%	10,000	7
7:00 AM	55%	10,000	25
8:00 AM	80%	10,000	36
9:00 AM	65%	10,000	29
10:00 AM	25%	10,000	11
11:00 AM	65%	40,000	116
Noon	100%	40,000	179
1:00 PM	80%	40,000	143
2:00 PM	55%	40,000	99
3:00 PM	35%	40,000	63
4:00 PM	30%	40,000	54
5:00 PM	45%	45,085	91
6:00 PM	65%	45,085	223
7:00 PM	80%	45,085	275
8:00 PM	80%	45,085	275
9:00 PM	80%	45,085	275
10:00 PM	50%	45,085	172
11:00 PM	30%	45,085	103
Midnight	10%	45,085	34
1:00 AM	3%	45,085	10

Friday Weekday increased for Friday evening	Sq. Ft. Restaurant open	Parking Spaces
15%	10,000	12
55%	10,000	42
80%	10,000	61
65%	10,000	50
25%	10,000	19
65%	40,000	200
100%	40,000	307
80%	40,000	246
55%	40,000	169
35%	40,000	108
30%	40,000	92
45%	45,085	156
78%	45,085	287
100%	45,085	368
100%	45,085	368
90%	45,085	331
70%	45,085	258
40%	45,085	147
10%	45,085	37
3%	45,085	11

5 ?

	Pedestrian	Cinema		Pedestrian	Cinema
Daytime	65%	0%	Daytime	40%	0%
Evening	30%	15%	Evening	25%	15%

Tuesday evening demand expected to peak 20% below hourly pattern on Friday.



Parking Requirement		
Square ft.	45,085	
Code	12.8	Code required (2)

(1) Some restaurants are not open for breakfast and some not for lunch.
(2) SD Code for Transit area, Table 142-05H

Table 5 B

Restaurant Parking

Restaurant Parking requirements - Alternate Analysis

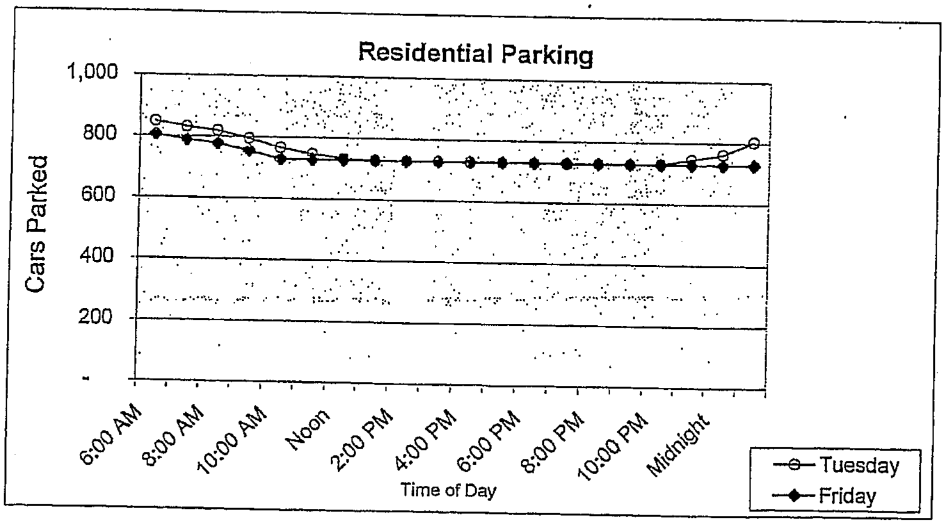
	Sit Down Restaurants	Casual/Fast Food Restaurants	Notes
Interior Sq. Ft.	25,649	19,436	current plan
Additional area for patios	4,400	4,400	based on desires of potential tenants and feasibility in the current design
Total Sq. Ft.	30,049	23,836	
Back of house	40%	40%	% of interior, estimates per architects, vendors & operators. It varies depending on the particular restaurant
Visitor areas	19,789	16,062	total area minus back of house
Sq. Ft. per seat	15	12	12 is a typical ratio according to architects & designers contacted and fast food restaurants typically have less space per seat than sit down ones.
Seats per parking space	3	3	typical std.
Parking demand	440	446	
% already on site	25%	90%	fast food customers are often cinema visitors or students who are already parked
% demand at 6 PM peak	100%	75%	fast food more of a lunchtime business
Demand at peak	330	33	few visitors expected to drive to Paseo as a destination for fast food
Total Demand		363	sit down plus fast food parking demand

Note: This approach yields a parking demand that is similar to the amount based on the shared parking analysis in Table 5.

As a crosscheck, this results in a back of house area of 21,168 sq. ft for 2,765 restaurant visitors or 7.66 sq. ft. of back of house per person (cover) which is within common standards.

Table 2 A
Residential Parking

	Residential Parking Demand (hourly percentage is an average of weekday patterns)				Source Data				
	Tuesday		Friday		Piedra Del Sol		Fraternity Row		PDS & Frat.
Time of Day	% (1) (2)	Parking Spaces	% (1) (2)	Parking Spaces (4) (5)	Tuesday/ Thursday	Monday/ Wednesday	Tuesday/ Thursday	Monday/ Wednesday	Saturday
6:00 AM	100%	848	100%	806	84%	87%	89%	93%	
7:00 AM	98%	831	98%	790	82%	84%	88%	92%	
8:00 AM	97%	819	97%	778	80%	82%	88%	91%	
9:00 AM	94%	795	94%	756	79%	80%	86%	86%	
10:00 AM	90%	767	90%	729	75%	77%	84%	83%	
11:00 AM	88%	747	88%	729	74%	73%	81%	83%	
Noon	86%	733	89%	729	74%	71%	78%	82%	70%
1:00 PM	81%	729	85%	729	74%	66%	69%	78%	69%
2:00 PM	78%	729	82%	729	70%	64%	69%	74%	67%
3:00 PM	78%	729	79%	729	69%	64%	71%	72%	62%
4:00 PM	77%	729	77%	729	65%	64%	72%	70%	59%
5:00 PM	76%	729	75%	729	64%	64%	70%	72%	56%
6:00 PM	77%	729	78%	729	66%	65%	70%	72%	60%
7:00 PM	78%	729	82%	729	67%	66%	71%	72%	67%
8:00 PM	80%	729	91%	729	69%	69%	73%	73%	80%
9:00 PM	83%	729	93%	729	72%	71%	73%	76%	82%
10:00 PM	86%	731	95%	729	75%	72%	79%	78%	82%
11:00 PM	88%	746	97%	729					79%
Midnight	90%	763	100%	729					78%
1:00 AM	95%	806	100%	729					



Parking requirements					
Occupancy	Units	Parking made available per unit	Parking Required (3)	Weekend parking available (5)	Planned parking for Friday evening
Single	51	1.25	64	1.00	51
2 BR	142	1.75	249	1.00	142
3 BR	102	2.00	204	2.00	204
4 BR	166	2.00	332	2.00	332
Total Units	461		848		729
Total Beds	1,305				

Notes: Residential parking is based on the time of day distribution, the spaces required per code and planned operations. Because much of thi parking is isolated, it does not go lower than a number of spaces designated.

Tuesday % an average of weekday source data and Friday an average of weekday and Saturday.
(1) Data not available for late hours, assumed level returns to 100% during
(2) Results of recent surveys were scaled to 100% at max.
(3) Per SD Code, Ch 14., Art. 2, Div. 5, for Transit area
(4) Friday lower by 5% based on counts at Fraternity Row and PDS.

(5) On weekends, certain residential tenants will have a limited set of spaces available. These are unavalible for other uses. Therefore the parking is a planned number of spaces, after 4 PM. The remainder of residential tenants will park in available spaces in University parking.

Note: LRT may reduce the need for student housing, but this has not been used in this analysis.

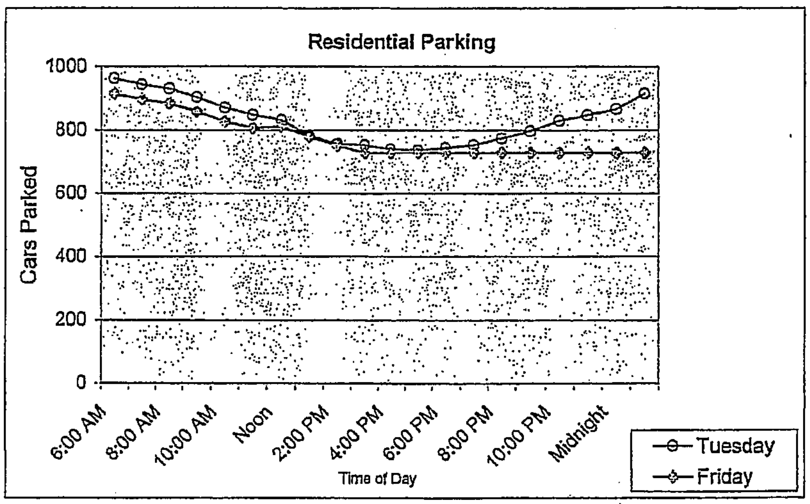
Table 2 B
Residential Parking
Table 2A revised to reflect "Basic" rates with the City's impact zones applied

Residential Parking Demand
(hourly percentage is an average of weekday patterns)

	Tuesday		Friday	
Time of Day	% (1) (2)	Parking Spaces	% (1) (2)	Parking Spaces (4) (5)
6:00 AM	100%	964	100%	915
7:00 AM	98%	944	98%	897
8:00 AM	97%	931	97%	884
9:00 AM	94%	903	94%	858
10:00 AM	90%	871	90%	827
11:00 AM	88%	849	88%	806
Noon	86%	832	89%	812
1:00 PM	81%	783	85%	779
2:00 PM	78%	756	82%	753
3:00 PM	78%	753	79%	729
4:00 PM	77%	740	77%	729
5:00 PM	76%	737	75%	729
6:00 PM	77%	745	78%	729
7:00 PM	78%	753	82%	729
8:00 PM	80%	775	91%	729
9:00 PM	83%	797	93%	729
10:00 PM	86%	830	95%	729
11:00 PM	88%	848	97%	729
Midnight	90%	867	100%	729
1:00 AM	95%	915	100%	729

Source Data

Piedra Del Sol		Fraternity Row		PDS & Frat.
Tuesday/ Thursday	Monday/ Wednesday	Tuesday/ Thursday	Monday/ Wednesday	Saturday
84%	87%	89%	93%	
82%	84%	88%	92%	
80%	82%	88%	91%	
79%	80%	86%	86%	
75%	77%	84%	83%	
74%	73%	81%	83%	
74%	71%	78%	82%	70%
74%	66%	69%	78%	69%
70%	64%	69%	74%	67%
69%	64%	71%	72%	62%
65%	64%	72%	70%	59%
64%	64%	70%	72%	56%
66%	65%	70%	72%	60%
67%	66%	71%	72%	67%
69%	69%	73%	73%	80%
72%	71%	73%	76%	82%
75%	72%	79%	78%	82%
				79%
				78%



Parking requirements

Occupancy	Units	Parking made available per unit (3)	Parking Required	Weekend parking available (5)	Planned parking for Friday evening (5)
Single	51	1.50	77	1.00	51
2 BR	142	2.00	284	1.00	142
3 BR	102	2.25	230	2.00	204
4 BR	166	2.25	374	2.00	332
Total Units	461		964		729
Total Beds	1,305		(6)		

Notes: Residential parking is based on the time of day distribution, the spaces required per code and planned operations. Because much of this parking is isolated, it does not go lower than a number of spaces designated.

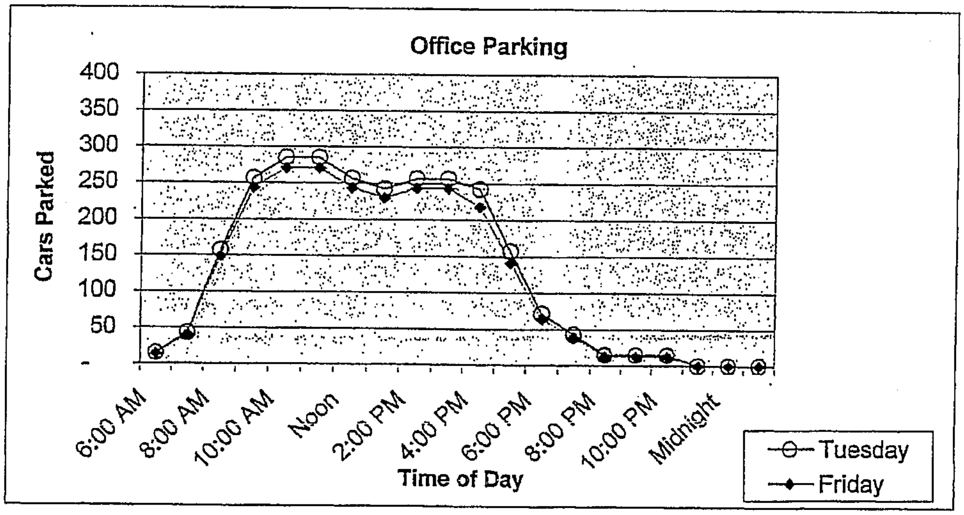
Tuesday % an average of weekday source data and Friday an average
(1) Data not available for late hours, assumed level returns to 100% during nightime
(2) Results of recent surveys were scaled to 100% at max.
(3) Per SD Code, Ch 14., Art. 2, Div. 5, basic requirement Table 142-05C
(4) Friday lower by 5% based on counts at Fraternity Row and PDS.

(5) On weekends, certain residential tenants will have a limited set of spaces available. These are unavalible for other uses. Therefore
Note: LRT may reduce the need for student housing, but this has not been used in this analysis.

(6) This is an increase of 115 over the calculation when using the transit area rates in Table 2 A.

Table 3
Office Parking Demand

Time of Day	Tuesday % (weekday code)	Tuesday Parking Spaces	Friday % (weekday code)	Friday Parking Spaces (1)
6:00 AM	5%	14	5%	14
7:00 AM	15%	43	15%	41
8:00 AM	55%	157	55%	149
9:00 AM	90%	256	90%	243
10:00 AM	100%	285	100%	270
11:00 AM	100%	285	100%	270
Noon	90%	256	90%	243
1:00 PM	85%	242	85%	230
2:00 PM	90%	256	90%	243
3:00 PM	90%	256	90%	243
4:00 PM	85%	242	85%	218
5:00 PM	55%	157	55%	141
6:00 PM	25%	71	25%	64
7:00 PM	15%	43	15%	38
8:00 PM	5%	14	5%	13
9:00 PM	5%	14	5%	13
10:00 PM	5%	14	5%	13
11:00 PM	0%	-	0%	-
Midnight	0%	-	0%	-
1:00 AM	0%	-	0%	-

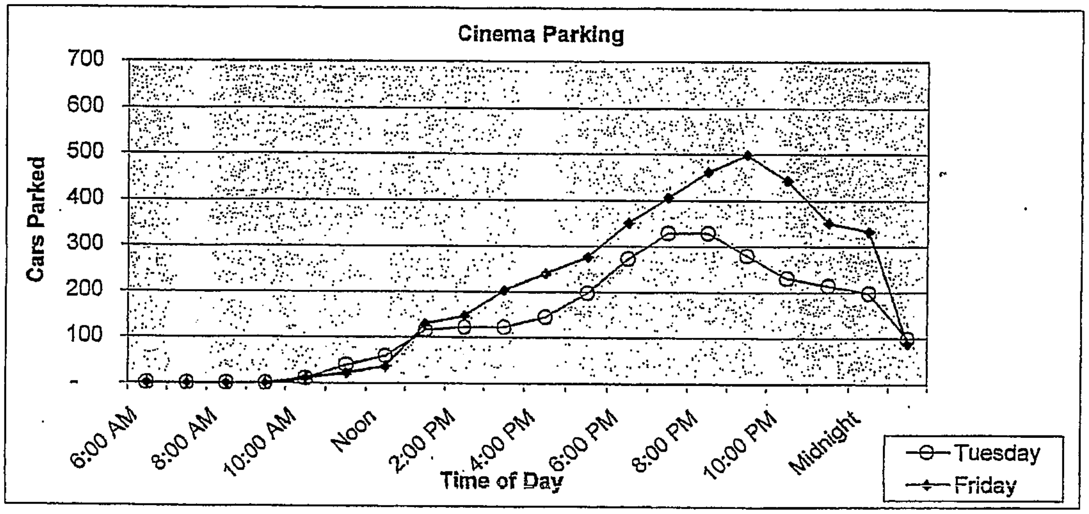


Building Sq. Ft.	101,500	100,000	Office Building
Parking ratio per code	3.3 per 1,000 sq. ft. (4)	1,500	Religious Center (2)
Parking requirement	335	101,500	Total Offices
Friday lower by:	10% reduction is assumed for parking after 4 PM vs. Tuesdays	5%	reduction before 4 PM on Fridays
Demand reduced due to Transit use (5)	15% on Tuesdays	15%	on Fridays

(1) Generally office parking demand drops on Friday afternoons. University business is generally less on Fridays as well. Source; Based on several university surveys, experience, SDSU and other universities.
(2) Religious center is mostly meeting space for students already at campus, however 1,500 SF is for offices which require parking. 20% of 7,500 See also report Appendix D.
(3) Visitors to offices may frequently come from campus, reducing the parking demand, but the effect not included here.
(4) Per code for weekday. ULI suggests 3.0 per 1,000 sq. ft. to accomidate the 85th percentile in demand for office buildings. Transit area in code recommends only 2.8.

Table 4
Cinema Parking

	Cinema, Parking Demand			
	Tuesday		Friday	
Time of Day	Per ULI (3)	Parking Spaces	Per ULI (3)	Parking Spaces
6:00 AM	0%	-	0%	-
7:00 AM	0%	-	0%	-
8:00 AM	0%	-	0%	-
9:00 AM	0%	-	0%	-
10:00 AM	3%	10	2%	11
11:00 AM	12%	39	4%	22
Noon	18%	59	7%	37
1:00 PM	35%	115	26%	129
2:00 PM	37%	122	30%	148
3:00 PM	37%	122	41%	203
4:00 PM	44%	145	48%	240
5:00 PM	60%	197	56%	277
6:00 PM	83%	273	70%	351
7:00 PM	100%	329	81%	406
8:00 PM	100%	329	93%	462
9:00 PM	85%	279	100%	499
10:00 PM	70%	230	89%	443
11:00 PM	65%	214	70%	351
Midnight	60%	197	67%	332
1:00 AM	30%	99	18%	88



Cinema requirement reduced by pedestrian walk on visitors already parked at the University
Tuesday 20% Friday 15%

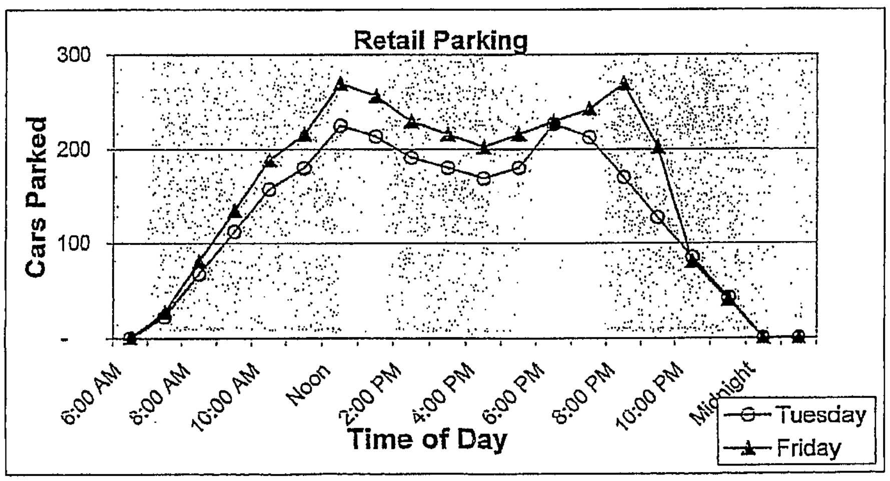
Net required	587	
		0% Reduction due to visitors arriving by trolley. (1992 EIR suggests 10% may occur)
Spaces per code	587	Seats 2,899
		Required 4.2 seats per space (3)
Tuesday lower by (1)	30%	Transit area 85% adjustment (4)
Tuesday requirement	411	(Spaces = Seats * 0.85 / 4.2)

Classroom use possible by theaters but not during peak parking demand hours & not included here.
(1) Weekday afternoon (Tuesday) is lower than Fridays by 1/3, typical for theater operation according to some operators.
(2) Institute of Transportation Engineers, report on Friday 16 screen multiplex.
(3) From the publication "Parking Requirements for Shopping Centers" publication jointly sponsored by the International Council of Shopping Centers and Urban Land Institute. See Appendix B.
(4) Transit use by cinema visitors represents a small amount of total trolley visitors, see Appendix F.
Other sources:

Similarly, a recent review of Horton Plaza movie ticket sales showed weekday 30% lower than Friday. Per 5/1/03 Dick Shoup memo. Theaters report lower demand on Tuesdays. Institute of Transportation Engineers Parking Generation Report quotes peak Saturday rate as 0.26 per seat and 0.19 per seat on weekdays.

Table 6
Retail Parking - Main Block

Time of Day	Tuesday: Normal pattern weekdays, per code	Tuesday: Parking Spaces	Time of Day	Friday: Hourly Pattern (2)	Friday: Parking Spaces
6:00 AM	0%	-	6:00 AM	0%	-
7:00 AM	10%	22	7:00 AM	10%	27
8:00 AM	30%	67	8:00 AM	30%	81
9:00 AM	50%	112	9:00 AM	50%	135
10:00 AM	70%	157	10:00 AM	70%	189
11:00 AM	80%	180	11:00 AM	80%	216
Noon	100%	225	Noon	100%	270
1:00 PM	95%	213	1:00 PM	95%	256
2:00 PM	85%	191	2:00 PM	85%	229
3:00 PM	80%	180	3:00 PM	80%	216
4:00 PM	75%	169	4:00 PM	75%	202
5:00 PM	80%	180	5:00 PM	80%	216
6:00 PM	80%	226	6:00 PM	85%	229
7:00 PM	75%	212	7:00 PM	90%	243
8:00 PM	60%	170	8:00 PM	100%	270
9:00 PM	45%	127	9:00 PM	75%	202
10:00 PM	30%	85	10:00 PM	30%	81
11:00 PM	15%	42	11:00 PM	15%	40
Midnight	0%	-	Midnight	0%	-
1:00 AM	0%	-	1:00 AM	0%	-



Building Space	104,500	Main Block East Block (see Table 7)
Code requirement	4.3	(1)
Gross Parking Requirement	449	

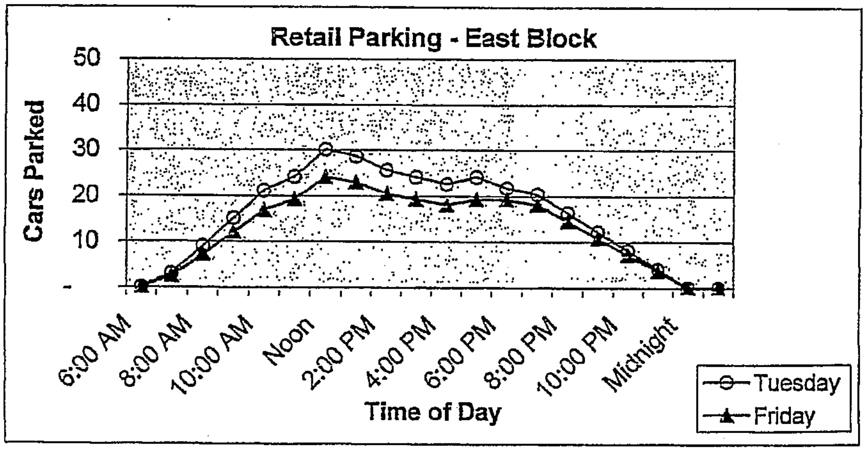
	Pedestrian	Cinema		Pedestrian	Cinema
Daytime	50%	0%	Daytime	40%	0%
Evening	30%	10%	Evening	20%	25%

Sources: Survey of prospective tenants.
Note: Rich & Assoc. study 9/96 reported current nearby businesses' customers were 50% to 80% SDSU related. Other studies and managers report very large percentages, often over 50%. Have used only about 1/2 that amount here.
(1) Per 1,000 sq. ft. SD Code for Transit area, Table 142-05H
(2) An 8 PM peak for retail is based on the opinion that that a significant parking demand will come from non-campus visitors drawn to the Paseo who arrive for a combination of cinema, restaurant and retail purposes. Students have more free time on Friday afternoons than other days of the week, but for they are already parked on campus and will therefore not generally require parking in the Paseo.

Table 7
Retail Parking - East Block

Tuesday		
Time of Day	Normal pattern weekdays per code	Parking Spaces
6:00 AM	0%	-
7:00 AM	10%	3
8:00 AM	30%	9
9:00 AM	50%	15
10:00 AM	70%	21
11:00 AM	80%	24
Noon	100%	30
1:00 PM	95%	29
2:00 PM	85%	26
3:00 PM	80%	24
4:00 PM	75%	23
5:00 PM	80%	24
6:00 PM	80%	22
7:00 PM	75%	20
8:00 PM	60%	16
9:00 PM	45%	12
10:00 PM	30%	8
11:00 PM	15%	4
Midnight	0%	-
1:00 AM	0%	-

Friday		
	Normal pattern weekdays per code	Parking Spaces
6:00 AM	0%	-
7:00 AM	10%	2
8:00 AM	30%	7
9:00 AM	50%	12
10:00 AM	70%	17
11:00 AM	80%	19
Noon	100%	24
1:00 PM	95%	23
2:00 PM	85%	20
3:00 PM	80%	19
4:00 PM	75%	18
5:00 PM	80%	19
6:00 PM	80%	19
7:00 PM	75%	18
8:00 PM	60%	14
9:00 PM	45%	11
10:00 PM	30%	7
11:00 PM	15%	4
Midnight	0%	-
1:00 AM	0%	-



Building Space	28,000	
Code requirement		4.3 per 1,000 sq. ft.
Gross Parking Requirement		120

	Pedestrian	Cinema
Daytime	75%	0%
Evening	75%	10%

	Pedestrian	Cinema
Daytime	75%	0%
Evening	75%	0%

Reduction on Friday	20%

Occupancy by book store and convienience stores (7-eleven, cleaner, etc.) likely results in a fairly high student orientation and level pattern of use. Friday level of business less due to lower numbers of students on campus and taking classes.

Table 8

Summary of Adjustment Factors

Adjustments assumed for the parking demand for individual types of uses.

Use	Reduction Tuesday vs. Friday (1)	Captive Visitors, reduction at peak time due to visits to Cinema combined with retail, restaurant or residential visits		Reduction at peak time due to pedestrian use by students & staff already parked elsewhere		Reduction due to trolley use (3)
		Tuesday	Friday	Tuesday	Friday	
Residential	0%	0%	0%	0%	0%	0%
Office (2)	0%	0%	0%	0%	0%	15%
Cinema	30%	0%	0%	20%	15%	15%
Restaurant	0%	15%	15%	30%	25%	0%
Retail - Main	0%	10%	25%	30%	20%	0%
Retail - East Block	-20%	10%	0%	75%	75%	0%

(1) Tuesday lower, average change, varies during day.

(2) Visitors to offices may frequently come from campus, reducing the parking demand, but the effect is not included here.

(3) Recent statements by MTDB reflect 4,300 passengers per day at the SDSU station in 10 years. This may further reduce the demand for several uses but it has not been included here. Used only 15% for transit district, per code, for cinema only, no additional reduction.

Table 9

Sensitivity Analysis

Degree to which results vary under different assumptions

Scenarios	Peak Parking Space Demand		Effect on spaces required. Amount of change in evening parking			
	Tuesday	Friday		Tuesday	Friday	
Base case, shown in preceding tables	1,608	1,856				As shown in Tables 1 through 8
No effect of captive cinema visits	1,680	1,894	Higher	72	39	Reduced to zero for Food & Retail
No effect of trolley visits	1,673	1,881	Higher	66	25	Reduced to zero for Office & no Transit area adjustment for Cinema
Less pedestrian visits from SDSU campus	1,753	1,930	Higher	145	74	Reduced by 50%
Higher level of pedestrian visits from campus	1,340	1,547	Lower	(267)	(308)	Doubled the rate all day
Greater effect of captive cinema visits	1,572	1,756	Lower	(36)	(99)	Increased by 50%
Higher retail parking demand	1,642	1,842	Higher	35	(14)	5 per 1,000 vs. 4.3

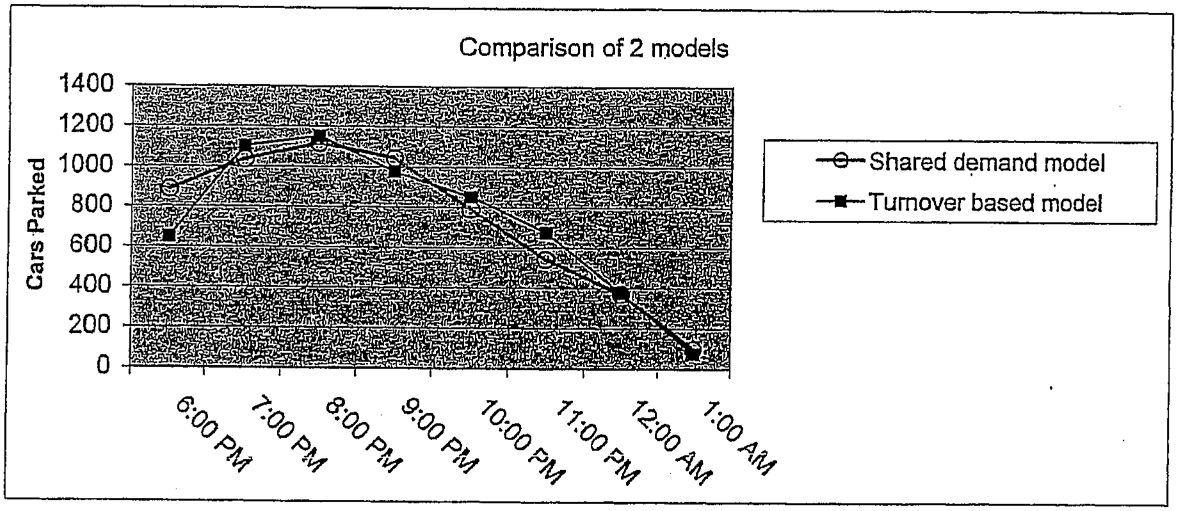
Additional notes:
It is recognized that the pedestrian visits from campus will reduce parking demand at the Paseo. However, this will increase the length of stay in the University's lots. Since most of these visits are in the evening, the longer stay should not greatly impact the University's turnover.

A University study indicated daily turnover ratios ranging from 1.1 to 3.0.

Table 10
Model of Paseo visitor parking turnover

Comparison of prior demand model (11 26 03) and an example of how turnover might occur.

Shared demand model; Cars Parked for Cinema, Retail & Rest. (2)	Time of day	6 PM visitors 400	7 PM visitors 500	8 PM visitors 400	9 PM visitors 300	10 PM visitors 300	11 PM visitors 300	Total visitors for cinema, retail & rest. 2,200
		Calculation based on turnover and length of stay (1)						
668	5:00 PM	200						200
886	6:00 PM	400	250					650
1,035	7:00 PM	400	500	200				1,100
1,114	8:00 PM	100	500	400	150			1,150
1,043	9:00 PM		125	400	300	150		975
789	10:00 PM			100	300	300	150	850
542	11:00 PM				75	300	300	675
369	12:00 AM					75	300	375
99	1:00 AM						75	75
Peak								Peak
1,114	Average Length of stay (hours)	2.8	2.8	2.8	2.8	2.8	2.8	1,150
						Overall Turnover =		2
					(Total visitors divided by max. number of spaces used)			



Notes

(1) Assumed 1/2 of each hour's visitors arrive early and 1/4 stay longer than an intended 2 hours, for an average length of stay of 2.8 hours.
(2) These figures were used elsewhere based on the hourly hsared demand.

Regarding turnover, we only referred to that as an amount reported by another mixed-use development (the Howard Hughes development in Los Angeles) which is of a similar size and mix. Our study was not based on a turnover amount but based on typical total demand pattern and types of uses. The total parking demand includes visitors staying for various lengths of time. Some visitors stay a short time and other longer. Their overlapping visits result in a total cumulative demand each hour. This also depends on the purpose of a visit. A retail visitor may stay for only an hour, for example.

We did not approach the demand calculation from a turnover viewpoint, but a turnover calculation is shown in this Table 10 as an examination of the relationship of turnover, length of stay and the number of visitors. This table compares the parking demand computed in this report vs. an example of visitor turnover. The length of stay will vary for each visitor but we assumed a representative average amount for each hour's visitors. About 2,200 visitors can be accommodated at the Paseo with a turnover of 2 and an average length of stay of 2.8 hours on a Friday evening, which results in a similar total hourly demand as the shared use model.

Special Event Days

In the main body of this report, the peak parking demand was computed for relatively busy days at the Paseo. Peak demand on Tuesdays and Fridays was determined which represents the maximum requirement for most of the year. However, special days can be expected to exceed even those levels, and this report addresses the events and situations that might occur.

The events and sources creating unusually high parking demand include the following items in excess of the peaks described in the main report:

- Saturdays, when very busy, could require 100 more visitor parking spaces in the evening than had been calculated for Fridays;
- During maximum demand situations at the Paseo, such as the holiday season, weekend peak parking demand can increase by 400 spaces on Saturday;
- Some weekends, residential parking for between 119 and 251 students needs to be relocated to University lots (depending on what assumptions are made; 235 when using the City's "basic" rates and 251 based on 70% of 1,400 beds);
- Employee parking, which would be helpful to locate away from the Paseo at certain times, could be up to 151 cars at the busiest of times, but generally much less.

Tactics to reduce and manage the impact

The ability to handle the demand during special situations depends on the alternatives available to utilize other parking, such as at the University, and to move employees out of the Paseo parking. A number of scenarios occur involving unusual demand at the Paseo as well as at the University, Cox Arena and other University venues. A list of the possible events is given in Table 11 and alternate tactics to deal with them is listed in Table 12. It appears that a simultaneous peak at more than two of the potential sources (Paseo, University and Cox) rarely if ever will occur.

Peak Demand

The size of the demand for parking at the Paseo was calculated in the main report. This was based on a relatively busy period during late September on Tuesdays and Fridays, when classes at the University have begun and when the Paseo is built and operating stably after its initial opening period has passed. However, special events and situations will cause demand to occasionally exceed these levels.

Events

The following events may create unusually high parking demand. When they occur, special actions can be taken to reduce the effect. When more than one of these events occur simultaneously, the total effect is obviously greater.

Table 11

Event	Frequency	Individual Effect
Cox Amphitheater, sold out	Few times per year, such as major concerts, can be weekday or weekend, generally in the evening. Only 7 times in 2003 was it 80% *or more* full.	12,000 seats, which represents from 3,000 to 6,000 cars parked depending on the type of event. Traffic flow is significantly impacted and most parking structures are used.
Cox Amphitheater, in use but not full	Concerts, basketball games, special events such as graduation, can be weekday or weekend, daytime or evening. Used 71 times in 2003. Only about 1/3 of the time it was more than ½ full.	On the average it is 38% full, about 2,000 cars to be parked
Campus weekday busy	During the school year, Tuesdays and Thursdays are busiest daytime weekdays, evenings Monday through Thursday are also relatively busy	University lots fill up, particularly in the mornings, *drop off in the afternoon and then increase somewhat in the evenings*
Campus, early in semester	First two or three weeks are busiest, particularly the Fall Semester, Spring semester less so, change is gradual over the semester.	University lots fill up, particularly in the mornings, tandem parking is sometimes employed
Open Air Amphitheater	Mostly concerts, during the school year, generally in the evening. Seats 5,000. Used 16 days in 2003, averages about ½ full, plus graduation day.	Added parking demand occurs, particularly on nearby lots. Can represent 2,500 cars but many may already be parked at the university
Other Campus venues such as performing arts concerts	Multiple simultaneous events can occur with 1,000+ visitors, during weekend evenings, about 20 times per year.	Added parking demand occurs, particularly on nearby lots PS 2 & PS 4.
Paseo, moderately busy weekdays including Friday	Paseo parking will approach its maximum, in the evening around 8 PM Fridays	As determined in the main report, demand will peak at 1,856 cars

Paseo busy on a weekend, Saturday	Paseo parking may reach its limit, in the evening around 7 or 8 PM	Demand will sometimes be greater than Fridays, by perhaps 100 cars at peak
Paseo, holiday weekday, such as Christmas season or summer with large cinema demand	Generally last few weeks of December weekdays and certain summer weekends, depending on movie releases and other events	Paseo parking will reach or exceed its limit unless mitigating tactics are undertaken

Occasionally, two of these events might occur simultaneously, which amplifies the demand. Fortunately it appears very unlikely for there to be a simultaneous scheduling of Cox, a peak at the University and a peak day at the Paseo. The Paseo peaks occur during the summer on weekends, and during Christmas, when the University is much less busy. Cox events are almost always in the evening when University parking is not crowded. And, Cox is rarely used at the same time as the Open Air Amphitheater. When both are open at the same time, 4 times in 2003, Cox was not particularly full.

Saturdays

Saturdays could be a problem for certain weekends. Saturdays are often 15% greater or more than Fridays for the cinema, retail and restaurant demand. This pushes up the Saturday evening peak by 100 or more and may reach the parking capacity in the Paseo. The office workers are not parked but this does not reduce the previously determined evening peak which recognized that office workers are largely gone at that time. Of course, on weekends considerable University parking is available for overflow visitors or employees.

Office and Residential Demand

Office parking can be assumed to not change significantly over the year. While it may drop somewhat during holiday periods, its peak requirement in the middle of the day on weekdays which does not directly impact the Paseo's peak demand, which is usually in the evening and on weekends. Residential parking is also relatively stable and much of it will be emptied during holidays and the summer. The only unusual requirement is that University residents sometimes desire visitor parking, and this is often on weekends. The University has procedures that limit this access for existing residences and a similar policy can be applied for the residents at the Paseo.

Retail

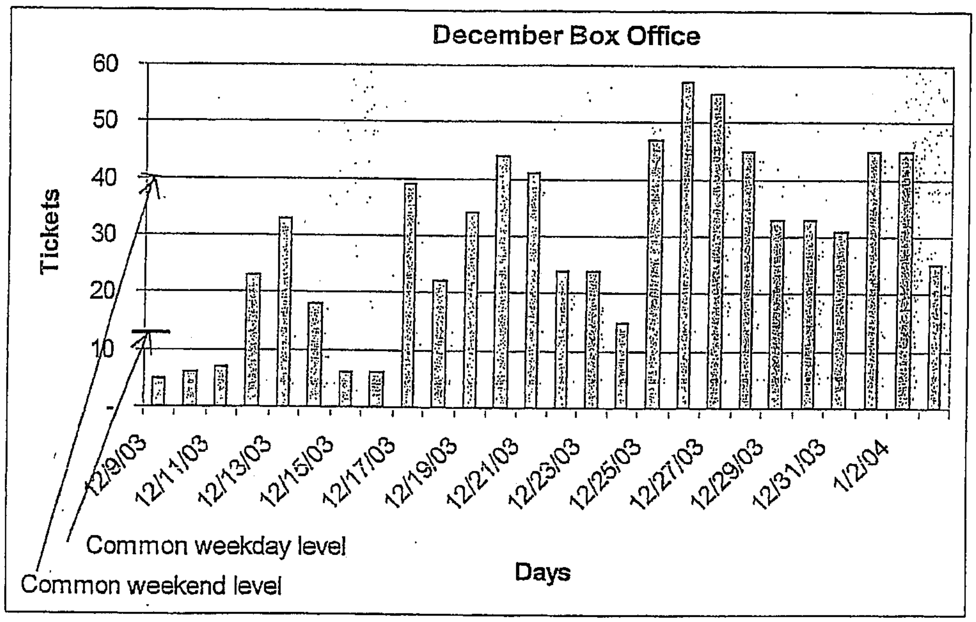
Retail areas at shopping centers report their busiest demand during the Christmas season. ULI's study of shopping center parking demand reports that the highest demand occurs during the two or three weeks of late December. However, some shopping centers with the large restaurant and cinema components find that peak demand occurs during weekends when cinema activity is highest and not necessarily have their highest demand during the

December holiday shopping period. Thus, peak retail demand will probably occur during the summer peak movie period as well as the December holiday time period.

December holiday period generally increases the retail level about 25% above the busiest of other times. This means that at least two weekends and 10 or more weekdays are impacted. If the retail parking demand increases by 25%, then the Tuesday level increases by 53 spaces and Friday by 67.

Cinema

Cinema demand peaks in the summer and to a lesser degree during the Thanksgiving and Christmas holiday periods. This pattern is fairly stable although there are considerable day-to-day fluctuations. While no one knows which picture will be the post popular one, Hollywood always have enough product to satisfy these peak demand periods. The International Council of Shopping Centers, ULI and movie theater organizations (NATO) report similar seasonality distributions. The highest demand occurs during the last two or three weekends of December depending on the calendar and the success of the most popular films. (for 2003 see below)



If the cinema business increases by 25% then peak cinema parking will increase by up to 150 cars. This amount only occurs on weekends and during holiday periods.

Restaurants

Restaurant demand may follow the seasonality of cinema parking. Thus, certain weekends in the summer and about 20 days during the November and December holidays will be highest and may exceed the Paseo parking capacity. However, to the extent restaurants are supported by University students and faculty, the vacation periods will reduce the typical restaurant patterns. We had previously assumed a relatively busy period, such as September. Restaurant demand can be expected to increase its maximum of about 20% above these peak periods. A 20% increase in restaurant parking increases the Tuesday level by 50 and the Friday peak by about 70.

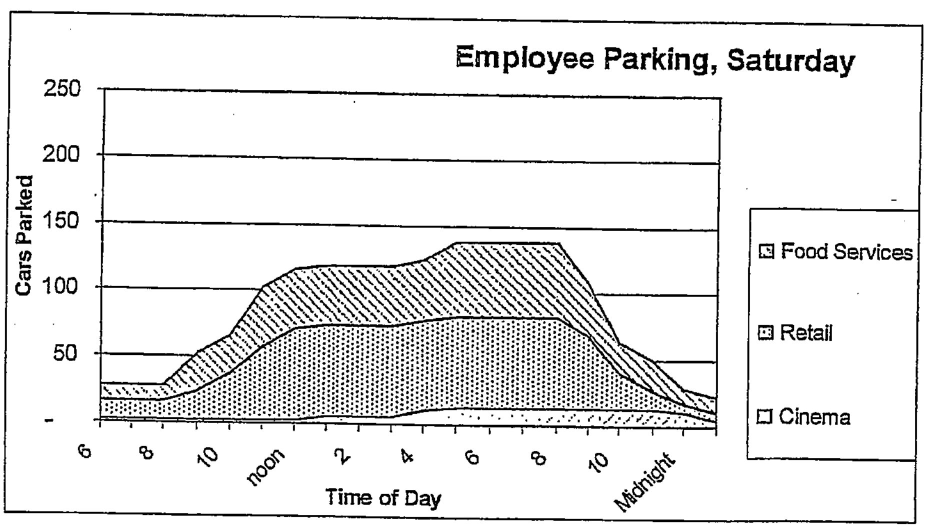
The total of cinema, retail and restaurants increasing simultaneously during the maximum peak holiday season could add up to an additional requirement of 300 parking spaces. On the weekend, this could be in addition to the Saturday increase of 100 spaces for a total of 400.

Tactics for Managing the Impact

Opportunities for managing overflow parking include relocating employee parking, using University lots when they are available and pricing to discourage parking and encourage the use of public transit.

Employee Parking

Employees for cinema, retail and food services require parking. At peak, employees for cinema are at most 30, retail about 100 and food service about 120 for a total of 250. Not all require parking, however. Demand will be proportionately less on Fridays and still less on other weekdays. A typical hourly pattern is shown below.



The actual demand is reduced by the fact than many of the employees will be University students and already parked in University lots. Also, some employees will take public transit and not require parking. Thus, the calculation below appears to be the maximum requirement during the entire year, based on interviews with possible Paseo leasing tenants:

	Cinema	Retail	Food Services	Total
Number of establishments	1	20	9	30
Number of employees	100	25	45	170
Number present at peak time	30	8	15	53
	30	160	135	325
% University students	40%	20%	20%	
% Public Transit users	20%	33%	33%	
Parking Requirement at Peak	12	75	63	151

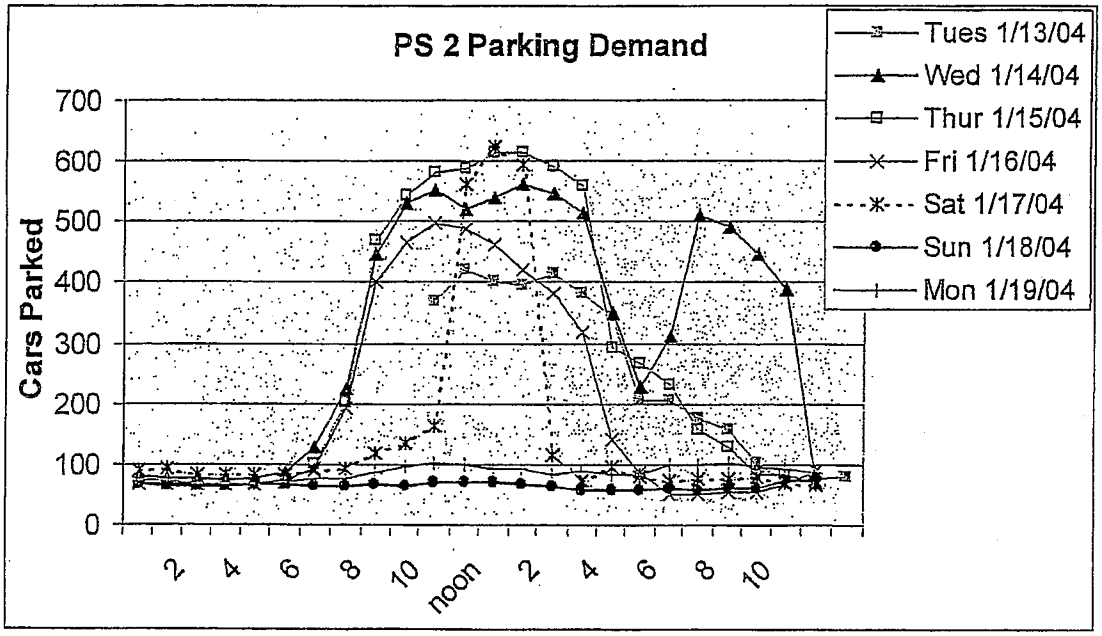
Residential Parking

In addition to moving Paseo employees to parking outside the Paseo, other options are available. Some of the residential parking, on weekends, which is not specifically assigned, can be moved to University lots on weekends. This was described in the previous report and could range from 115 to 250 cars. It would only occur on weekends and only when such parking is not available in the general Paseo parking area.

Parking at the University

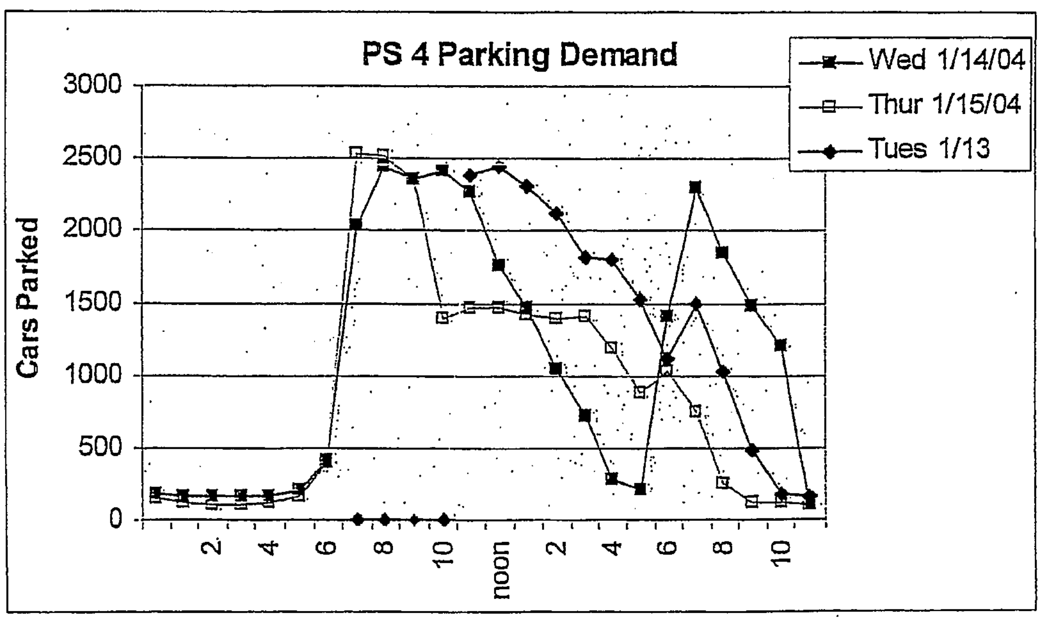
Several University lots appear to be resources for additional parking, on weekends and when the University is not in session.

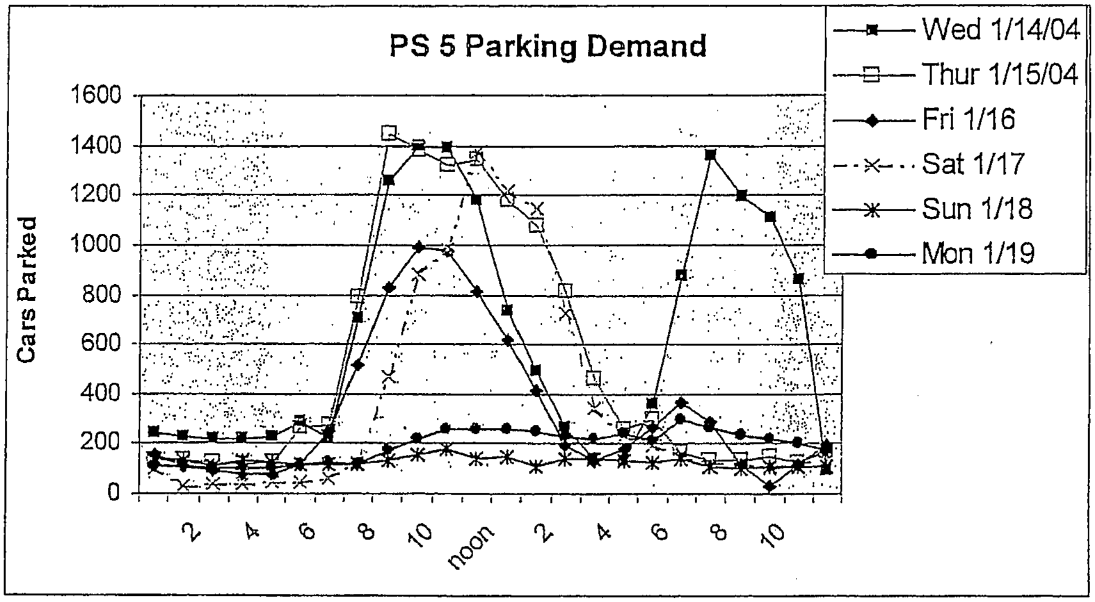
The closest and most user-friendly University lot for the Paseo is PS 2. It has 600 spaces and is often not full in the evenings and on weekends. Evening weekdays and even during special events at the Cox Arena it is not always filled. By 4 PM there seems to generally be 200 available spaces and later in the day even more according to a recent count. On Wednesday 1/14/04 there was an unusually large event in the Cox Arena, which caused a second peak in demand after 6 PM but barely filled it. See graph below. (Wed. 1/14 was a special event at Cox at 7 PM, Monday 1/19 was a holiday.)



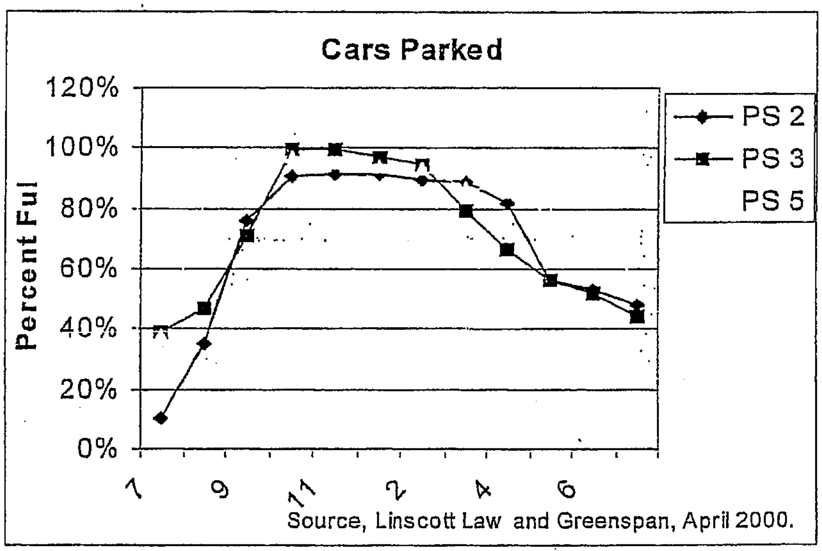
Parking Tactics

Still other options are to use various University lots for Paseo visitor and employee parking when the Paseo demand is unusually high and space is available at the University. Several University structures have space available in the evening and weekends. Recent graphs for PS 4 and PS 5 are shown below.





This and earlier studies of university parking show a drop off in demand in the afternoon on weekdays.



Thus, various tactics are available. The University along with the operators of COX and OAT as well as the Paseo will have to determine which is best overall in each scenario. A matrix of the various combinations of demand and response tactics is summarized in Table 12, below.

J. Institute tandem and/or valet parking in the Paseo parking area. This adds an operational cost but the Paseo parking area is relatively open and flat and it could accommodate it.

K. The Paseo may have available parking for University use by other venues. When there is a large weekday event at Cox, for example, during most of the year, several hundred spaces in the Paseo could be accommodated. Additionally, some overflow University parking during the first two weeks of the fall and spring semester may also be accommodated by the Paseo.

L. Increase patrols of the parking area to assure that appropriate people are using the spaces. This would be facilitated by a sticker system for cars parked regularly at the campus and at Paseo.

Table 12

	Scenarios	Paseo	Cox Amphitheater	Open Air Amph. & other campus venues	University	Parking Tactics	Description of this scenario
		Sources of Parking Demand					
	Non holiday dates:						
1	Weekday	Not busy	**Busy, big event**	Closed	**Busy, particularly early in semester, Tuesday and Thursdays**	B, C, K, L	This occasion is when 2 of the sources of parking demand are busy; Cox with a large event and the University at a relatively busy level of attendance.
2	Weekday	Not busy	**Busy, big event**	Closed	Normal weekday during semester.	B, C, K, L	This occasion is when 2 of the sources of parking demand are busy; Cox with a large event and the University at a normal weekday pattern.
3	Weekend	Not busy	**Busy, big event**	Closed	Not busy, most students, faculty and staff not at campus	B, C, K	This occasion is when there is a big event at Cox and it's a weekend causing a different parking demand a the Paseo, but the University has few visitors.
4	Saturday	Moderately busy	Not open	Closed	Not busy, most students, faculty and staff not at campus	B, C,	Typical weekends.
5	Saturday	Moderately busy	Not open	**Open**	Normal weekday during semester.	B, C, H	The Paseo can accomidate its visitors and move employees to University lots, such as PS 3 and 6 if necessary. OAT and other venues can then use nearby University lots as they do curently.
6	Saturday	Moderately busy	**Busy, big event**	Closed	Not busy, most students, faculty and staff not at campus	B, C, H	Typical Paseo weekend with the Cox in use.
	Holidays:						
7	Weekday	Moderately busy	**Busy, big event**	Closed	Not busy, most students gone	A, B, C, I, J	Holidays (such as Christmas) will elevate the parking demand at Paseo and may occur at the same time as an event at the Cox Arena.
8	Weekend	**Busy**	**Busy, big event**	Closed	Not busy, most students gone	A, B, C, F, H, I, J,	This is an occasion where there is a big event at Cox and the Paseo has a busy holiday weekend.
9	Weekday	**Busy**	Not open	Closed	Not busy, most students gone	A, D, E, G, H, I,	Busy holiday weekdays will occur at the Paseo where parking capacity is exceeded but Cox is not in use and the University has relatively few visitors.
10	Weekend	**Busy**	Not open	Closed	Not busy, most students gone	A, D, E, H, I,	Busy holiday weekends will occur at the Paseo where parking capacity is exceeded but Cox is not in use and the University has relatively few visitors.
11	Weekday	**Busy**	Not open	**Open**	Not busy, most students gone	A, B, C, F, H, I, J,	Very busy Paseo combined with other events on campus.
12	Weekend	**Busy**	Not open	**Open**	Not busy, most students gone	A, B, C, F, G, H, I, J	Very busy Paseo weekend with other events on campus.

Sources for Appendix B

1. Main Parking Demand Study
2. Interviews with prospective tenants of the Paseo
3. Parking counts by Martin Parrish of TDSSW, January, 2002
4. Parking and Traffic Analysis by Linscott Law & Greenspan, September 11, 2000.

Appendix C

From the publication "Parking Requirements for Shopping Centers" publication jointly sponsored by the International Council of Shopping Centers and Urban Land Institute (ULI). Additional unpublished data as a supplement to their publication.

TABLE 1

Cinema Peak Parking Demand

Day	**Parking Demand per Seat**			
	Single Screen Theater	So. Cal Counts	No. Cal Ticket Sales	National Average Counts
Mon-Thurs	0.25	0.16	0.13	0.17
Fri-Sat	0.33	0.24-0.33	0.23	0.24

Day	**Seats per unit of parking Demand**			
	Single Screen Theater	So. Cal Counts	No. Cal Ticket Sales	National Average Counts
Mon-Thurs	4.00	6.25	7.69	5.88
Fri-Sat	3.03	3.51	4.35	4.17

Appendix C

(page 2 of 3)

TABLE 2
CINEMA PARKING DEMAND

Hour Beginning TIME	Single Screen Sat	2003 Field Counts Mon-Thurs	Fri	Sat	Average Ticket Sales
6 a.m.	0%	0%	0%	0%	0%
7 a.m.	0%	0%	0%	0%	0%
8 a.m.	0%	0%	0%	0%	0%
9 a.m.	0%	0%	0%	0%	0%
10 a.m.	0%	3%	2%	5%	3%
11 a.m.	41%	12%	4%	10%	33%
12 noon	69%	18%	7%	20%	31%
1 p.m.	69%	35%	26%	35%	41%
2 p.m.	85%	37%	30%	52%	38%
3 p.m.	81%	37%	41%	60%	44%
4 p.m.	50%	44%	48%	61%	44%
5 p.m.	33%	60%	56%	68%	50%
6 p.m.	35%	83%	70%	75%	68%
7 p.m.	**100%**	**100%**	81%	80%	83%
8 p.m.	**100%**	**100%**	93%	90%	**100%**
9 p.m.	81%	85%	**100%**	**100%**	94%
10 p.m.	78%	70%	89%	**100%**	90%
11 p.m.	71%	65%	70%	**100%**	94%
12 mid.	0%	60%	67%	95%	73%

TABLE 3
CINEMA PARKING DEMAND
MONTHLY VARIATION

MONTH	% of Peak Month	
	Field Counts	National Ticket Sales
Jan	78%	68%
Feb	72%	62%
Mar	69%	64%
Apr	61%	58%
May	81%	66%
Jun	99%	84%
Jul	**100%**	**100%**
Aug	91%	79%
Sept	58%	45%
Oct	63%	55%
Nov	81%	82%
Dec	75%	84%

COMMITTEE ON CAMPUS PLANNING, BUILDINGS AND GROUNDS

Certify a Final Environmental Impact Report and Approve the Campus Master Plan Revision for San Diego State University

Presentation By

J. Patrick Drohan
Assistant Vice Chancellor
Capital Planning, Design and Construction

Summary

This item requests the following actions by the Board of Trustees for San Diego State University:

- Certification of a Final Environmental Impact Report (FEIR)
- Approval of a Campus Master Plan Revision

Attachment A to the item is the proposed campus master plan dated March 2001 and Attachment B is the existing campus master plan dated May 1999.

Included in the agenda mailing are the FEIR, an Addendum to the FEIR, and the Findings of Fact and Statement of Overriding Considerations with the Environmental Mitigation Measures Monitoring and Reporting Plan.

There are no significant remaining contested issues based on CSU responses to the comments received in the public review period. San Diego State University (SDSU) and the City Redevelopment Agency will implement mitigation measures for the College Community Redevelopment project that will address all potential significant issues identified in the Draft EIR (DEIR).

Background

The existing SDSU campus master plan provides for 25,000 full-time equivalent students. The proposed campus master plan revision continues to provide for 25,000 FTES while improving, enhancing and rehabilitating campus facilities. The primary goal of the proposal is to create a template of uniform planning for future campus development. The project components have been designed in a manner that is consistent with the November 1997 *SDSU Physical Master Plan, Phase 1, Existing Conditions*, which states a need for new campus facilities and sets forth guidelines for campus landscaping, lighting, visual quality, gateways, open areas and other campus features. The existing master plan focuses on campus boundaries, parking facilities, athletic facilities, pedestrian malls, and existing and future campus buildings and structures.

Campus Master Plan

The proposed campus master plan revision includes redevelopment of several classroom, office, research and student facilities, and provides for the development of several new buildings, a physical plant and corporation/maintenance yard, parking structure and central campus park area. The project was divided into two groups of "project components" for purposes of the environmental analysis. One group was identified and analyzed on a program level and the other was analyzed on a project level. The program level components consist of two academic/research buildings, a performing arts complex, a science research building, a physical plant, and an addition to the north life sciences building. The project level components consist of a faculty office/classroom/gallery building and parking structure, an addition to the communication building, a new campus childcare center, an addition to the International Student Center and a central park. As discussed in greater detail below, since completion of the FEIR, a project-level environmental analysis is provided in an Addendum to the FEIR.

Proposed Project Components

Attachment A identifies each of the proposed new facilities using "PGM" in rectangles for program components and "PJT" in ovals for the project level components as indicated below:

Program Level Components

PGM-1N: Site for new Academic/Research Building A
PGM-1S: Site for new Academic/Research Building B
PGM-2: Site for new Performing Arts Complex
PGM-3: Site for new Science Research Building (this will require the demolition of the Industrial Technology Building 9)
PGM-4: Site for new Physical Plant
PGM-5: Site for North Life Sciences Addition (this will add a five-floor addition to the existing Life Sciences North Building 35 and displace a temporary campus office facility 817)

Project Level Components

PJT-1: Site for new Faculty Office/Classroom/Gallery/Parking Structure 8 (this will require the demolition of the existing Family Studies and Consumer Science Building 7 while relocating the Campus Childcare Center 85 as PJT-3)

Appendix E

Newman Center

Preliminary Specifications and Scope of Work for Tenant Improvements

The Paseo - Space at NE corner of Campanile Ave and Lindo Paseo

October 17, 2003

1. Program and Area - SDSU Foundation will provide a built-out ground level commercial space at the corner of Campanile Ave and Lindo Paseo Drive, a ground level adjacent outdoor patio space, and one 2-Bedroom student apartment directly above the commercial space with connection between apartment and commercial space via adjacent residential elevator and fire stairs.

   a. Commercial Ground Floor Area

▪ Multi-purpose room		32' x 40'	1,280 SF
▪ Dining/Reception Area		12' x 46'	552 SF
▪ Entry Lobby		9' x 12'	108 SF
▪ Library		17' x 22'	374 SF
▪ Offices	4 each @	10' x 15'	600 SF
▪ Public Restrooms	2 each @	5' x 8'	80 SF
▪ Storage		12' x 12'	144 SF
▪ Chapel		17' x 22'	374 SF
Interior Ground Floor Area			3,512 SF

   b. 2nd Level 2 Bedroom Apartment

▪ Bedrooms	2 each @	9' x 13'	234 SF
▪ Living and Dining		20' x 12'	240 SF
▪ Kitchen		9' x 15'	135 SF
▪ Full Bath		8' x 8'	64 SF
▪ Balcony		6' x 12'	72 SF
▪ Other/Storage		8' x 10'	80 SF
Interior Second Floor Area			825 SF
Total Interior Program Area			**4,337 SF**
▪ Exterior Private Patio Area			2,000 SF
Total Program Area			**6,337 SF**

MTS

MTDB

Metropolitan Transit System

January 2004

MISSION VALLEY EAST LIGHT RAIL TRANSIT PROJECT

PROJECT STATUS

The Metropolitan Transit System (MTS) began Final Design on the Mission Valley East Light Rail Transit (MVE LRT) extension in November 1998, and construction on the first of five contracts started in November 2000. MTS is scheduled to complete construction on the extension in 2005 with operation in June 2005. For ongoing up-to-date project information, visit www.sdcommute.com and click on "Major Projects."

ROUTE

The 5.8-mile (9.3 km) MVE LRT project will extend to Santee Town Center. The MTS Board approved the new line segment, adding an additional line to Trolley's Orange and Blue Lines. The new Green Line will go from Old Town Transit Center to Santee Town Center. The MVE line will travel primarily adjacent to Interstate 8, with a diversion from the freeway to serve San Diego State University (SDSU). The LRT segment will include elevated and ground-level sections and a tunnel under SDSU.

STATIONS

Four new stations are planned on the MVE LRT segment: Grantville, SDSU, Alvarado Medical Center, and 70th Street. The Grantville Station will be elevated. The Grantville and 70th Street stations will have park-and-ride lots. The SDSU Station will be a subway station in a tunnel. The SDSU Station is designed to be integrated into a future community redevelopment project on the south side of the SDSU campus.

ADA

In compliance with the Americans with Disabilities Act (ADA), each station will have uniform design features and each light rail vehicle will be equipped with a wheelchair lift or be a low-floor vehicle with ramp access.

PUBLIC ART

Each station will include public art as an integral component of the station design. Four artists, one for each station, have developed artistic themes that reflect the history and character of the station areas.

BUS SERVICES

Bus routes will serve all four new stations.

OTHER FEATURES

An extension of Alvarado Canyon Road to Waring Road opened in June 2003 providing access to the Grantville Station.

BENEFITS

The MVE LRT project will provide the following transportation benefits:

- Increase direct transit access to SDSU, Cox Arena, the Alvarado Medical Center, Mission Valley's major activity centers, and Old Town.
- Generate approximately 11,000 new average daily riders and significantly more on special events and school days.
- Attract over 2.5 million new annual transit riders in the region as a result of improved transit connectivity.
- Increase transportation capacity and improve mobility in the Interstate 8 corridor.
- Provide connections to future, planned transit improvements in the Interstate 15 and Interstate 5 corridors.

OPERATING PLAN

When completed, the Trolley's route from the Old Town Transit Center to the Santee Town Center Station will total 19.4 miles. San Diego Trolley, Inc., a non-profit subsidiary of MTDB, will operate the line using electrically propelled vehicles in trains of up to four vehicles. The average operating speed will be 25 mph, with a maximum speed of 55 mph.

COST AND FUNDING

Estimated project costs are $496 million (including vehicles). Funding will include local half-cent Transportation Sales Tax (TransNet), State, and Federal sources. In June 2000, MTDB and the Federal Transit Administration executed a Full Funding Grant Agreement establishing the federal share of the project at approximately 80 percent of the total costs. Federal funds will consist of $13.7 million in Congestion Mitigation and Air Quality (CMAQ) funding and annual appropriations of Section 5309 Fixed Guideway New Starts funding anticipated to total $330 million.

1255 Imperial Avenue, Suite 1000, San Diego, CA 92101-7490 (619) 231-1466 **www.sdcommute.com**

Metropolitan Transit System (MTS) is comprised of the Metropolitan Transit Development Board (MTDB), a public agency, San Diego Transit Corporation, and San Diego Trolley, Inc., in cooperation with Chula Vista Transit and National City Transit. MTS is also the Taxicab Administrator for eight cities, and MTDB is the owner of the San Diego and Arizona Eastern Railway Company.

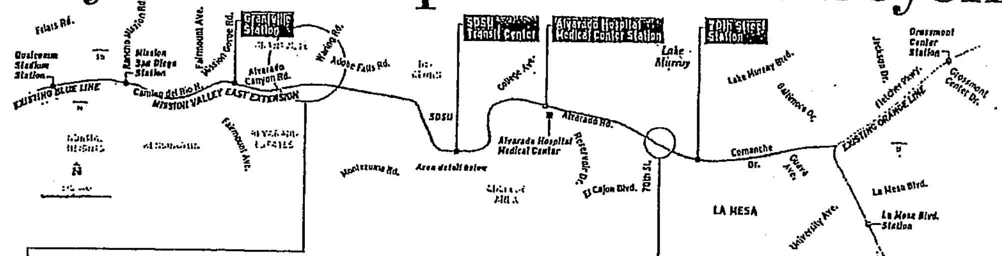
Trolley's next stop: SDSU and beyond

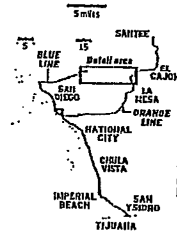
Research and graphic by DAVID HARDMAN / San Diego Union-Tribune

Completing a missing link in the San Diego Trolley system, the 5.8-mile Mission Valley East extension will carry an estimated 10,800 riders daily when it goes into service in early 2005.

Envisioned more than 25 years ago, the Metropolitan Transit Development Board's extension of the trolley's Blue Line will connect Mission Valley and East County along the Interstate 8 corridor. The extension adds four stops: Grantville, San Diego State University, Alvarado Hospital Medical Center and 70th Street. It will intersect the Orange Line in La Mesa.

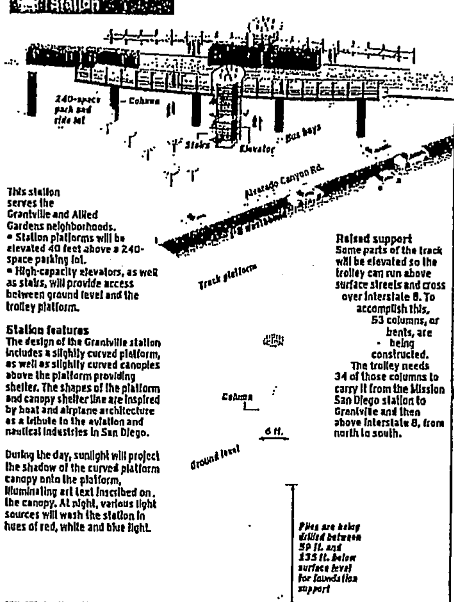
The construction budget, a combination of federal, state and local funds, is expected to be at least $451 million. A $20 million increase over the projected budget was announced last week along with plans to get lagging portions of the project back on schedule. Engineers estimate the cost could rise an additional $5.6 million before construction is finished in January 2004. Track, electrical, signaling and other post-construction work will follow.





The missing link
The Mission Valley extension connects the Blue Line to the Orange Line near Baltimore Drive in La Mesa. The Blue Line currently stretches from San Ysidro in the South Bay through Chula Vista and National City to downtown San Diego, Old Town and Mission Valley. The Orange Line runs from Santee through El Cajon to La Mesa, Lemon Grove, eastern San Diego and then into downtown San Diego.

Grantville Station



This station serves the Grantville and Allied Gardens neighborhoods.
- Station platforms will be elevated 40 feet above a 240-space parking lot.
- High-capacity elevators, as well as stairs, will provide access between ground level and the trolley platform.

Station features
The design of the Grantville station includes a slightly curved platform, as well as slightly curved canopies above the platform providing shelter. The shapes of the platform and canopy shelter line are inspired by boat and airplane architecture as a tribute to the aviation and nautical industries in San Diego.

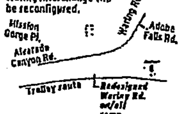
During the day, sunlight will project the shadow of the curved platform canopy onto the platform, illuminating art text inscribed on the canopy. At night, various light sources will wash the station in hues of red, white and blue light.

Raised support
Some parts of the track will be elevated so the trolley can run above surface streets and cross over Interstate 8. To accomplish this, 53 columns, or bents, are being constructed. The trolley needs 34 of those columns to carry it from the Mission San Diego station to Grantville and then above Interstate 8, from north to south.

SOURCES: Jennifer Callester, OCS Public Relations; Jim Hecht and Ramon Rueles, MTDB; www.sdcommute.com/mve/

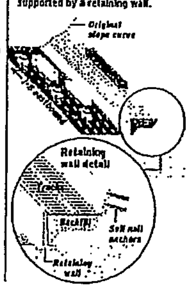
Road extension

Alvarado Canyon Road is being extended to meet Adobe Falls Road so that Allied Gardens traffic can reach the Grantville Station more easily. A two-lane traffic bridge, with sidewalks, is being built over Waring Road. On the south side of I-8, the Waring interchange will be reconfigured.



Raised route

After the trolley line crosses Interstate 8, it will run parallel to the eastbound lanes of the freeway until it begins to climb toward the center of SDSU. With limited space between I-8 and the hillside, a platform for the track will be cut into the slope, supported by a retaining wall.

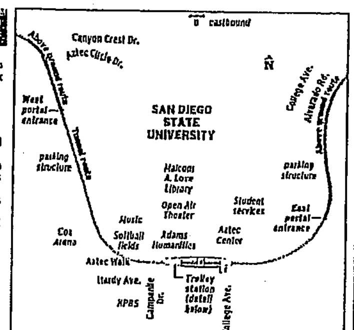


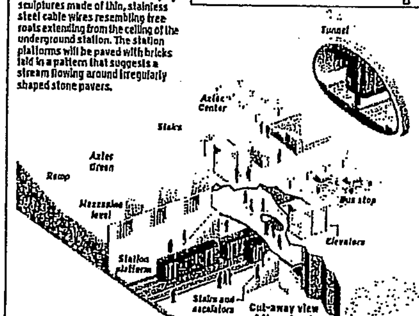
SDSU Transit Center

- The station provides easy access to the heart of the campus, including Cox Arena, Aztec Center and Open Air Theater.

Station features
The main entrance to the station will be on the North side of Aztec Walk. The Aztec Green will be re-graded with terraces and a series of retaining walls to create a plaza at the mezzanine level of the underground station. This concept allows natural light and ventilation through the North wall of the underground station.

The trolley platforms will be located 25 feet below the mezzanine with stairs and elevators moving riders from level to level, and escalators between the platforms and mezzanine. The underground station's aesthetic elements include hanging sculptures made of thin, stainless steel cable wires resembling tree roots extending from the ceiling of the underground station. The station platforms will be paved with bricks laid in a pattern that suggests a stream flowing around irregularly shaped stone pavers.

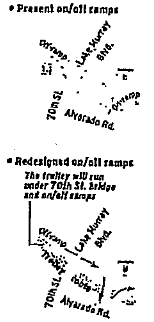




A tunnel runs through it
The trolley tunnel at SDSU is 3/4-mile long and varies in depth from about 40 feet below ground level to 60 feet below.

Ramp improvements

The outdated design of the Interstate 8/70th Street interchange prompted CalTrans and MTDB engineers to come up with a more efficient method of moving traffic through this busy area.

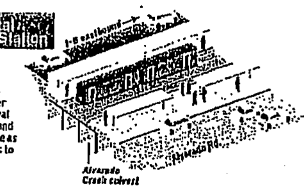


The new design eliminates two off-ramps that fed onto crowded 70th Street. A new two-lane ramp will carry traffic from eastbound I-8 to a three-lane intersection with Alvarado Road. The intersection will be controlled by a traffic signal and at that point Alvarado will be seven lanes.

A bridge will be constructed on 70th Street to pass over the trolley and Alvarado Creek.

Alvarado Hospital Medical Center Station

- With the station just a few steps from Alvarado Hospital and the surrounding medical complex, the hospital will join the ranks of Kaiser Permanente in Los Angeles, the Naval Medical Center in Washington D.C. and Johns Hopkins Hospital in Baltimore as medical centers with direct access to transit.



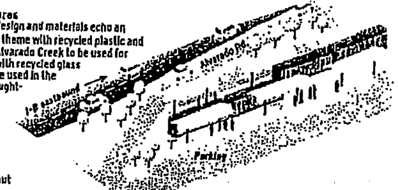
Station features
The Alvarado Hospital Medical Center Station features a garden design with vines on trellises planted along the 360-foot freeway retaining wall. Transparent canopies will provide rain protection, and louvers will offer sun protection. The station design also features a 12-line riddle, provided as a fun activity for waiting riders. The riddle will be printed rhythmically on three bands of concrete tiles along the upper part of the retaining wall, which will have a rustic stone appearance.

Storm drain
From Alvarado Hospital Medical Center to 70th Street, the trolley tracks will be built atop Alvarado Creek by replacing the channel with a concrete structure that will carry storm water. The box culvert has been designed to carry the volume of water that might be seen from a 100-year storm.

70th Street Station

- The station includes a 130-space parking lot located south of the platform.
- The station will serve western La Mesa and eastern College Area. Lake Murray is a short jaunt up Lake Murray Boulevard.

Station features
The station's design and materials echo an environmental theme with recycled plastic and cobbles from Alvarado Creek to be used for benches, and with recycled glass aggregate to be used in the platforms. Drought-tolerant native plants and educational plaques to further the environmental theme will be found throughout the station.



Appendix F

F3.12

Linscott Law & Greenspan, Traffic Count Data

EXISTING TRAFFIC VOLUME INVENTORY

Study Area	Date	Source[a]
Intersections		
1. College Avenue / I–8 Westbound Ramps	11/13/2008	LLG
2. College Avenue / I–8 Eastbound Ramps	11/13/2008	LLG
3. College Avenue / Canyon Crest Drive	02/07/2008	LLG
4. College Avenue / Zura Way	11/13/2008	LLG
5. College Avenue / Lindo Paseo	5/07/2009	LLG
6. College Avenue / Montezuma Road	02/07/2008	LLG
7. College Avenue / El Cajon Boulevard	11/13/2008	LLG
8. Montezuma Road / Collwood Boulevard	02/06/2008	LLG
9. Montezuma Road / 55th Street	02/06/2008	LLG
10. Montezuma Road / Campanile Drive	02/07/2008	LLG
11. Montezuma Road / Catoctin Drive	11/13/2008	LLG
12. Montezuma Road / El Cajon Boulevard	11/20/2008	LLG
Segments		
College Avenue		
Canyon Crest Drive to Zura Way	12/10/2008	LLG
Zura Way to Montezuma Road	12/10/2008	LLG
Montezuma Road to El Cajon Boulevard	12/10/2008	LLG
Montezuma Road		
Collwood Boulevard to 55th Street	12/10/2008	LLG
55th Street to College Avenue	02/06/2008	LLG
College Avenue to Catoctin Drive	12/10/2008	LLG

Footnotes:

a. LLG commissioned counts.

Academic Calendar 2008–2009

SUMMER TERM 2008

May 26	Holiday–Memorial Day. Faculty/staff holiday. Campus closed.
May 27	First day of summer term.
May 28	First day of classes.
May 28-July 9	Session S1.
May 28-August 20	Session T1.
June 5	Session S1 schedule adjustment. (6:00 p.m. deadline.)
June 12	Session T1 schedule adjustment. (6:00 p.m. deadline.)
July 1	Applications for bachelor's degree for May and August 2009 graduation accepted.
July 4	Holiday–Independence Day. Faculty/staff holiday. Campus closed.
July 10-August 20	Session S2.
July 18	Session S2 schedule adjustment. (6:00 p.m. deadline.)
July 22	Census.
August 20	Last day of classes. (Final examinations are the last day of classes for each summer session.)
August 22	Grades due from instructors. (11:00 p.m. deadline.)
August 22	Last day of summer term.

FALL SEMESTER 2008

August 25	First day of fall semester.
August 26-27	Faculty/Staff Advising.
August 27	New Graduate Student Orientation.
August 27	Last day to officially withdraw for fall semester 2008 and receive a full refund.
August 28	Convocation.
August 30	New Student and Family Convocation.
September 1	Holiday–Labor Day. Faculty/staff holiday. Campus closed.
September 2	First day of classes.
September 2-22	Schedule adjustment and late registration.
September 22	Last day for payment of fees for late registration. (4:00 p.m. deadline.)
September 22	Last day to add classes, drop classes, or change grading basis. (6:00 p.m. deadline.)
September 22	Last day to officially withdraw from the university for fall semester 2008.
September 22	Last day to file application for bachelor's degree for December 2008 graduation.
September 22	Last day to file petition for concurrent master's degree credit for fall semester 2008.
September 22	Last day to apply for December 2008 graduation with an advanced degree, Division of Graduate Affairs.
September 26-27	Family Weekend.
September 29	Census.
October 1	Applications for admission or readmission to San Diego State University for the fall semester 2009 accepted. Applications are NOT accepted after November 30 (postmarked). Graduate applicants should consult the *Graduate Bulletin* for closing dates.
November 6	Last day to officially withdraw from all classes for fall 2008 and receive a prorated refund (withdrawal after September 22 requires special approval and a penalty fee is assessed).
November 11	Holiday – Veteran's Day Faculty/staff holiday. Campus closed.
November 27-29	Holiday–Thanksgiving recess. Faculty/staff holiday. Campus closed.
December 12	Last day of classes before final examinations.
December 13-20	Final examinations.
December 24-29	Holiday – Winter recess. Faculty/staff holiday. Campus closed.
December 31	Grades due from instructors. (11:00 p.m. deadline.)
December 31	Last day to apply for a leave of absence for fall semester 2008.
December 31	Last day of fall semester.
January 1	Holiday– New Year's Day. Faculty/staff holiday. Campus closed.

SPRING SEMESTER 2009

January 15	First day of spring semester.
January 15-16	Faculty/Staff Advising.
January 19	Holiday–Martin Luther King, Jr. Day. Faculty/staff holiday. Campus closed.
January 21	Last day to officially withdraw for spring semester 2009 and receive a full refund.
January 22	First day of classes.
Jan. 22-Feb. 11	Schedule adjustment and late registration.
February 11	Last day for payment of fees for late registration. (4:00 p.m. deadline.)
February 11	Last day to add classes, drop classes, or change grading basis. (6:00 p.m. deadline.)
February 11	Last day to officially withdraw from the university for spring semester 2009.
February 11	Last day to file application for bachelor's degree for May and August 2009 graduation.
February 11	Applications for bachelor's degree for December 2009 graduation accepted.
February 11	Last day to file petition for concurrent master's degree credit for spring semester 2009.
February 11	Last day to apply for May 2009 graduation with an advanced degree, Division of Graduate Affairs.
February 18	Census.
March 28	Last day of classes before spring recess.
March 30-April 3	Spring recess.
March 31	Holiday–César Chavez Day. Faculty/staff holiday. Campus closed.
April 4	Classes resume.
April 6	Last day to officially withdraw from all classes for spring 2009 and receive a prorated refund (withdrawal after February 11 requires special approval and a penalty fee is assessed).
May 13	Last day of classes before final examinations.
May 14-21	Final examinations.
May 21	Commencement, Imperial Valley Campus.
May 22-24	Commencement days, main campus.
May 25	Holiday–Memorial Day. Faculty/staff holiday. Campus closed.
May 26	Grades due from instructors. (11:00 p.m. deadline.)
May 26	Last day to apply for a leave of absence for spring semester 2009.
May 26	Last day of spring semester.

SUMMER TERM 2009

NOTE:	Summer session dates to be determined. Refer to SDSU Summer Session *Class Schedule*.
July 1	Applications for bachelor's degree for May and August 2010 graduation accepted.
July 3	Holiday–Independence Day observed. Faculty/staff holiday. Campus closed.
July 4	Holiday–Independence Day. Faculty/staff holiday. Campus closed.

(Please Note: This is not to be construed as an employee work calendar and is subject to change. Refer to SDSU Web site for any changes to this calendar.)

F3.12

Linscott Law & Greenspan, Supplement to LLG Tech Report
Dated August 6, 2010; Responses to Comments
(March 10, 2011)

MEMORANDUM

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To:	Mr. Michael Haberkorn Gatzke Dillon & Ballance LLP	Date:	March 10, 2011
From:	John Boarman, P.E. & Chris Mendiara LLG, Engineers	LLG Ref:	3-08-1857
Subject:	Supplement to LLG Tech Report Dated August 6, 2010; Responses to Comments		

This memo provides supplemental analyses prepared to address comments received on the Draft Environmental Impact Report (DEIR) traffic section and technical traffic impact study (traffic study), dated August 6, 2010.

In summary, five (5) specific comments were addressed with supplemental analyses. These comments were:

1. Comment S-2-5: The traffic analysis scenario should include a project only analysis.
2. Comment L-4-31: The analysis of roadway segments and intersections abutting the project should be based on trip generation using the City of San Diego's published "driveway" trip rates.
3. Comment L-4-37: The project's access points to the public street system should be evaluated.
4. Comment L-4-51: Provide a figure showing the total project traffic associated with both components (retail and student housing) of the proposed project.
5. Comment L-4-58: The SANDAG *Series 11* 2030 traffic model is the currently accepted model.
6. Comment L-3-10: The assumptions that the 2007 Master Plan Project would add 10,000 cumulative trips may be inaccurate; if more trips do occur, impacts may be understated.

These comments are addressed in detail as follows:

1. Comment S-2-5: Project Only Analysis
The DEIR traffic impact study measured the near-term project impacts against an "existing + cumulative project" baseline, which included the additional traffic impacts of "reasonably foreseeable" cumulative projects that are proposed to be developed in the study area. This analytical baseline is in accordance with the published City of San Diego guidelines for the preparation of traffic impact studies. The comment requests that the project's impacts be measured under an "existing plus project" scenario. This scenario generally is regarded by traffic engineers as a hypothetical scenario because it assumes that the proposed project would be fully built out immediately, and the corresponding full buildout traffic volumes added to

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existing roadway volumes and infrastructure. As such, this scenario does not account for growth in cumulative traffic unrelated to the project and, potentially, understates impacts. The method of including cumulative projects in addition to baseline traffic volumes as presented in the DEIR is believed to yield more conservative results, since the additional cumulative traffic serves to usurp reserve capacity in the roadway system that would otherwise be available for the proposed project. Thus, the likelihood of a project causing a significant impact is increased when the cumulative projects are considered in the baseline.

In response to the comment, a full existing + project analysis of the "University/Community Serving Retail" project was conducted. The total proposed project traffic was added to the existing-only baseline, and the subsequent peak hour intersection, street segment and ILV intersection operations were evaluated. These results are shown in ***Attachment A***.

The results of the analyses show that under this scenario the proposed project would result in significant impacts at one intersection (College Avenue/Zura Way) and two roadway segments (College between Canyon Crest and Zura, and Montezuma between 55th Street and College). This is three (3) *fewer* peak hour intersection impacts than would occur under the analysis scenario presented in the DEIR and corresponding traffic study, which includes cumulative traffic. The same number of segment impacts (two) would occur, and the same number of ILV impacts (0) would occur.

Thus, the "existing" baseline analysis would yield no additional impacts to those already disclosed in the DEIR traffic study using the City of San Diego's required "existing + cumulative project" baseline and, in fact, would yield fewer impacts.

2. <u>Comment L-4-31: "Driveway" Trip Rates on Adjacent Network</u>
The trip rates utilized in the DEIR traffic study were derived from trip rates used in the City-approved The Paseo at San Diego State University (SCH No. 2003061060) and the College Community Redevelopment Project EIR (SCH No. 92091036) traffic studies. These rates were not labeled as either "driveway" or "cumulative".

If City of San Diego driveway rates were utilized, the only intersection where it may be appropriate to use such rates would be the College Avenue/Lindo Paseo intersection. Buildings 4 & 5 are located to the immediate east of this intersection, and would contain subterranean parking for up to 220 vehicles. Building 3 is located along Lindo Paseo to the west of this intersection, and proposes 342 parking spaces in a structure.

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The retail trip generation rates used in Table 8–5 of the DEIR traffic study were increased to reflect the City's driveway rates. The additional traffic associated with these higher retail rates was assigned to the intersection using the same project distribution used in the current DEIR traffic study. The HCM analyses were rerun using the same timing and geometric inputs, and the resulting delays and level of service at buildout (worst-case) were 29.9 seconds (LOS C) during the AM peak hour, and 51.2 seconds (LOS D) during the PM peak hour, which are acceptable based on published standards. Therefore, no new impacts would occur using the City's driveway rates.

Attachment B contains the HCM analysis worksheets for the intersection using the driveway rate volumes.

3. Comment L-4-37: Evaluate Project Access Points
   As discussed above, project access to proposed parking is largely via the College Avenue/Lindo Paseo signalized intersection, since all traffic to/from Buildings 4 & 5, and the majority of traffic to Building 3 would use this intersection. A conservative analysis is presented to address Comment L-4-31 above that uses buildout regional volumes and higher City of San Diego driveway rates. The results show acceptable LOS D or better operations with project traffic.

   An additional access analysis was prepared for the proposed Building 3 (parking structure) driveway on Lindo Paseo, west of College Avenue. Building 3 is a parking structure that will provide 342 parking spaces. As before, worst-case, buildout traffic volumes were used as the baseline on Lindo Paseo. Assuming conservative parking occupancy of 90% or greater during the AM and PM peak hours, driveway trips were determined at the access point. No roadway widening was assumed for turn lanes on Lindo Paseo, and the project driveway approach was assumed to have a single shared southbound left-right. Under these worst-case conditions, the resulting delays and level of service were 12.5 seconds (LOS B) during the AM peak hour, and 30.8 seconds (LOS D) during the PM peak hour. Therefore, no impacts would be expected.

   Attachment C contains the HCM analysis worksheets for the access point.

4. Comment L-4-51: Provide a "Total Project" Figure for the Proposed Project
   Attachment D includes a figure representing the summation of University/Community Serving Retail and Student Housing traffic volumes, shown in the DEIR traffic study on Figures 8–4 and 8–5, respectively.

5. Comment L-4-58: Justify Use of the SANDAG Series 10 Model
   The DEIR buildout analysis (2030) utilized a specific sub-area model that had been produced for use in the SDSU 2007 Campus Master Plan traffic study.

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The basis for the model was the Series 10 traffic model. This sub-area model included detailed land-use assumptions associated with the SDSU Campus Master Plan which made it the most accurate model available to forecast future traffic volumes in the project area. The volumes throughout the study area associated with the prior traffic model were found to be higher than those in the Series 11 traffic model. Therefore, the buildout analyses contained in the current Plaza Linda Verde DEIR traffic study are more conservative than analyses that would have been based on Series 11, since the Series 10 volumes are higher.

Attachment E contains a table comparing the Series 10 and Series 11 traffic volumes on key segments in the study area.

6. Comment L-3-10: 2007 Master Plan Cumulative Trips May be Understated. This comment relates to the cumulative consideration of the Campus Master Plan (CMP) project, and its additional 10,000 vehicle trips to the circulation system. The comment restates the fact that that project is in litigation, and part of the litigation relates to whether the 10,000 vehicle trips under represent that project's actual trip generation. If this were the case, the comment states cumulative impacts for the proposed Plaza Linda Verde redevelopment project could be understated for both vehicle and transit analyses.

   An analysis was conducted to determine the amount of additional near-term CMP traffic which could be added to the existing + cumulative scenario before a new significant impact would occur.

   Attachment F contains the summary tables.

   These tables show that an additional 3,000 Campus Master Plan-related ADT (13,000 ADT total) would result in a new significant impact at the Montezuma Road/55th Street intersection since the delay is just over 55.0 seconds (the threshold of LOS E). Thus, it was determined that an additional 2,700 ADT (12,700 ADT total) could be added before the project resulted in a significant impact at the Montezuma Road/55th Street intersection.

   Relatedly, the traffic impact analysis assumed a project completion year of 2015. Based on this assumption, a list of cumulative projects was developed for inclusion in the traffic study. In order to provide a conservative traffic forecast (i.e. higher traffic amount), projects that were in the "development pipeline" in 2010 were included in the cumulative traffic analysis as projects that could be constructed by 2015 although it was possible some of the projects would not reach buildout until a later date; this over inclusion resulted in a potential overstatement of impacts. The current estimate is that the Plaza Linda Verde project will be developed over approximately four to seven years, with buildout scheduled for 2015-2018. Based on our research of

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cumulative projects in the study area, no projects in addition to those already identified in the traffic study are expected to be built by 2018. Therefore, in the event project buildout is extended until 2018, since no additional cumulative projects are expected to be developed during this timeframe, the results of the EIR impact analysis are unaffected and no changes to the traffic study are warranted.

Attachments:

Attachment A: Existing + Project Analyses Tables
Attachment B: College Avenue/Lindo Paseo – Driveway Rate HCM Analysis
Attachment C: Lindo Paseo/Building 3 Access – HCM Analysis
Attachment D: Total Proposed Project Traffic Volume Figure
Attachment E: Series 10 vs. Series 11 – Comparison Table
Attachment F: Additional Campus Master Plan Cumulative Trip Analyses – Summary Tables

ATTACHMENT A

EXISTING + PROJECT ANALYSIS TABLES

TABLE A
EXISTING + PROJECT NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + University/ Community-Serving Retail + Student Housing Project		Δ [c]
			Delay [a]	LOS [b]	Delay	LOS	
1. College Avenue / I-8 Westbound Ramps	Signal	AM PM	9.3 8.3	A A	9.3 8.4	A A	0.0 0.1
2. College Avenue / I-8 Eastbound Ramps	Signal	AM PM	77.0 15.2	E B	77.1 15.3	E B	0.1 0.1
3. College Avenue / Canyon Crest Drive	Signal	AM PM	48.6 57.5	D E	49.0 58.0	D E	0.4 0.5
4. College Avenue / Zura Way	TWSC [d]	AM PM	67.0 16.2	F C	**81.4** 16.9	**F** C	**14.4** 0.7
5. College Avenue / Lindo Paseo	Signal	AM PM	11.9 20.1	B C	20.6 30.1	C C	8.7 10.2
6. College Avenue / Montezuma Road	Signal	AM PM	36.6 45.7	D D	37.1 47.2	D D	0.5 1.5
7. College Avenue / El Cajon Boulevard	Signal	AM PM	36.6 56.4	D E	36.6 57.0	D E	0.0 0.6
8. Montezuma Road / Collwood Boulevard	Signal	AM PM	21.2 24.7	C C	21.5 26.3	C C	0.3 1.6
9. Montezuma Road / 55th Street	Signal	AM PM	33.8 33.0	C C	42.4 34.5	D C	8.6 1.5
10. Montezuma Road / Campanile Drive	Signal	AM PM	28.0 34.2	C C	28.3 35.4	C C	0.3 1.2
11. Montezuma Road / Catoctin Drive	Signal	AM PM	20.0 20.4	B C	20.0 21.3	B C	0.0 0.9
12. Montezuma Road / El Cajon Boulevard	Signal	AM PM	24.6 20.7	C C	24.6 21.2	C C	0.0 0.5

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project.
d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

1. Bold typeface indicates a potential significant impact.

SIGNALIZED DELAY/LOS THRESHOLDS		UNSIGNALIZED DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

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TABLE B
EXISTING + PROJECT NEAR-TERM STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E)[a]	Existing			Existing + University/ Community-Serving Retail + Student Housing Project			Δ [e]
		ADT [b]	V/C[c]	LOS [d]	ADT	V/C	LOS	
College Avenue								
Canyon Crest Drive to Zura Way	40,000	44,000	1.100	F	**44,880**	**1.122**	**F**	**0.022**
Zura Way to Montezuma Road	40,000	30,000	0.750	C	30,880	0.772	C	0.022
Montezuma Road to El Cajon Boulevard	40,000	29,100	0.728	C	29,500	0.738	C	0.010
Montezuma Road								
Collwood Boulevard to 55th Street	40,000	30,600	0.765	D	31,285	0.782	C	0.017
55th Street to College Avenue	30,000	26,100	0.870	E	**26,785**	**0.893**	**E**	**0.023**
College Avenue to Catoctin Drive	30,000	14,800	0.493	C	15,125	0.504	C	0.011

Footnotes

a. Roadway capacity corresponding to Level of Service E from City of San Diego Standard Street Classification, Average Daily Vehicle Trips table.
b. Average Daily Traffic volumes
c. Volume / Capacity ratio.
d. Level of Service
e. Δ denotes an increase in V/C due to project.

General Note:

1. Bold typeface indicates a potential significant impact.

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TABLE C
EXISTING + PROJECT NEAR-TERM ILV INTERSECTION OPERATIONS

Intersection	Peak Hour	Existing		Existing + University/ Community-Serving Retail + Student Housing Project	
		ILV / Hour	Capacity	ILV / Hour	Capacity
1. College Avenue / I-8 WB Ramps	AM	596	Under	601	Under
	PM	682	Under	693	Under
2. College Avenue / I-8 EB Ramps	AM	586	Under	592	Under
	PM	1,029	Under	1,037	Under

General Notes:

ILV / Hour	Capacity
< 1,200	Under
≥1,200 but ≤ 1,500	Near
> 1,500	Over

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EXISTING PEAK HOUR

INTERSECTION CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	445	0	89	0	746	431	0	633	861
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	484	0	97	0	811	468	0	688	936
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	484	0	97	0	811	468	0	688	936
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				18.0		100.0		74.0	100.0		74.0	100.0
Effective Green, g (s)				18.0		100.0		74.0	100.0		74.0	100.0
Actuated g/C Ratio				0.18		1.00		0.74	1.00		0.74	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				595		1555		2619	1536		2619	1536
v/s Ratio Prot								0.23			0.19	
v/s Ratio Perm				c0.15		0.06			0.30			c0.61
v/c Ratio				0.81		0.06		0.31	0.30		0.26	0.61
Uniform Delay, d1				39.4		0.0		4.4	0.0		4.2	0.0
Progression Factor				1.00		1.00		1.15	1.00		1.00	1.00
Incremental Delay, d2				8.4		0.1		0.3	0.5		0.2	1.8
Delay (s)				47.7		0.1		5.4	0.5		4.4	1.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			39.8			3.6			2.9	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	411	0	211	0	951	1194	0	525	536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	447	0	229	0	1034	1298	0	571	583
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	447	0	229	0	1034	1298	0	571	583
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				17.0		100.0		75.0	100.0		75.0	100.0
Effective Green, g (s)				17.0		100.0		75.0	100.0		75.0	100.0
Actuated g/C Ratio				0.17		1.00		0.75	1.00		0.75	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				562		1555		2654	1536		2654	1536
v/s Ratio Prot								0.29			0.16	
v/s Ratio Perm				0.14		0.15			c0.84			0.38
v/c Ratio				0.80		0.15		0.39	0.85		0.22	0.38
Uniform Delay, d1				39.8		0.0		4.4	0.0		3.7	0.0
Progression Factor				1.00		1.00		1.03	1.00		1.00	1.00
Incremental Delay, d2				7.7		0.2		0.3	4.3		0.2	0.7
Delay (s)				47.5		0.2		4.8	4.3		3.9	0.7
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			31.5			4.5			2.3	
Approach LOS		A			C			A			A	

Intersection Summary

HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	268	0	1938	0	0	0	0	709	179	0	905	194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	0	2107	0	0	0	0	771	195	0	984	211
RTOR Reduction (vph)	0	0	63	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	291	0	2044	0	0	0	0	771	195	0	984	211
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.22			c0.28	
v/s Ratio Perm	0.09		c0.60						0.13			0.14
v/c Ratio	0.19		1.27					0.48	0.13		0.62	0.14
Uniform Delay, d1	15.4		26.5					19.3	0.0		20.9	0.0
Progression Factor	1.00		1.00					0.52	1.00		0.83	1.00
Incremental Delay, d2	0.1		125.1					0.9	0.1		1.6	0.2
Delay (s)	15.5		151.6					10.9	0.1		19.0	0.2
Level of Service	B		F					B	A		B	A
Approach Delay (s)		135.1			0.0			8.8			15.7	
Approach LOS		F			A			A			B	

Intersection Summary

HCM Average Control Delay	77.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	617	0	965	0	0	0	0	1440	508	0	743	430
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	671	0	1049	0	0	0	0	1565	552	0	808	467
RTOR Reduction (vph)	0	0	131	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	671	0	918	0	0	0	0	1565	552	0	808	467
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	35.9		35.9					56.1	100.0		56.1	100.0
Effective Green, g (s)	35.9		35.9					56.1	100.0		56.1	100.0
Actuated g/C Ratio	0.36		0.36					0.56	1.00		0.56	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1186		1233					1985	1536		1985	1536
v/s Ratio Prot								c0.44			0.23	
v/s Ratio Perm	0.20		c0.27						0.36			0.30
v/c Ratio	0.57		0.74					0.79	0.36		0.41	0.30
Uniform Delay, d1	25.8		28.0					17.3	0.0		12.5	0.0
Progression Factor	1.00		1.00					0.72	1.00		0.74	1.00
Incremental Delay, d2	0.6		2.5					0.3	0.1		0.6	0.5
Delay (s)	26.4		30.5					12.7	0.1		9.9	0.5
Level of Service	C		C					B	A		A	A
Approach Delay (s)		28.9			0.0			9.4			6.4	
Approach LOS		C			A			A			A	

Intersection Summary

HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↑↑	↱	↰↰	↑↑↑	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1846	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1846	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	43	17	23	26	113	66	127	656	59	468	985	624
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	18	25	28	123	72	138	713	64	509	1071	678
RTOR Reduction (vph)	0	0	23	0	0	51	0	0	44	0	0	614
Lane Group Flow (vph)	0	65	2	0	151	21	138	713	20	509	1071	64
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		9.5	9.5		13.0	29.7	13.4	31.8	31.8	29.7	48.1	9.5
Effective Green, g (s)		9.5	9.5		13.0	29.7	13.4	31.8	31.8	29.7	48.1	9.5
Actuated g/C Ratio		0.10	0.10		0.13	0.30	0.13	0.32	0.32	0.30	0.48	0.10
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		171	143		240	470	237	1125	479	1020	2446	265
v/s Ratio Prot		c0.04			c0.08	0.01	c0.08	c0.20		c0.15	0.21	0.02
v/s Ratio Perm			0.00						0.01			
v/c Ratio		0.38	0.02		0.63	0.05	0.58	0.63	0.04	0.50	0.44	0.24
Uniform Delay, d1		42.5	41.0		41.2	25.0	40.7	29.1	23.6	29.0	17.1	41.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.86	0.78	3.49
Incremental Delay, d2		1.4	0.0		5.1	0.0	3.6	2.7	0.2	0.0	0.1	0.0
Delay (s)		43.9	41.1		46.3	25.1	44.3	31.9	23.7	24.9	13.4	146.5
Level of Service		D	D		D	C	D	C	C	C	B	F
Approach Delay (s)		43.1			39.5			33.2			55.9	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM Average Control Delay	48.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↑	↱	↰↰	↑↑↑	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1780	1506		1792	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1780	1506		1792	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	463	34	43	44	12	252	28	1335	75	190	962	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	503	37	47	48	13	274	30	1451	82	207	1046	114
RTOR Reduction (vph)	0	0	34	0	0	242	0	0	33	0	0	87
Lane Group Flow (vph)	0	540	13	0	61	32	30	1451	49	207	1046	27
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		7.4	11.7	4.9	40.9	40.9	11.7	47.7	24.0
Effective Green, g (s)		24.0	24.0		7.4	11.7	4.9	40.9	40.9	11.7	47.7	24.0
Actuated g/C Ratio		0.24	0.24		0.07	0.12	0.05	0.41	0.41	0.12	0.48	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		427	361		133	185	87	1447	616	402	2426	669
v/s Ratio Prot		c0.30			c0.03	0.02	0.02	c0.41		c0.06	0.21	0.01
v/s Ratio Perm			0.01						0.03			
v/c Ratio		1.26	0.04		0.46	0.17	0.34	1.00	0.08	0.51	0.43	0.04
Uniform Delay, d1		38.0	29.1		44.4	39.8	46.0	29.6	18.1	41.5	17.2	29.2
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.01	0.85	1.79
Incremental Delay, d2		136.6	0.0		2.5	0.4	2.4	24.3	0.3	0.9	0.4	0.0
Delay (s)		174.6	29.2		46.9	40.2	48.4	53.9	18.3	42.7	15.1	52.3
Level of Service		F	C		D	D	D	D	B	D	B	D
Approach Delay (s)		163.0			41.4			51.9			22.4	
Approach LOS		F			D			D			C	

Intersection Summary

HCM Average Control Delay	57.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱	↰	↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	87	983	139	496	840
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	95	1068	151	539	913
Pedestrians	20					20
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					2
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			733			1086
pX, platoon unblocked	0.93	0.94			0.94	
vC, conflicting volume	2623	574			1240	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2481	486			1193	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	80			0	
cM capacity (veh/h)	0	480			538	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	95	534	534	151	539	457	457
Volume Left	0	0	0	0	539	0	0
Volume Right	95	0	0	151	0	0	0
cSH	480	1700	1700	1700	538	1700	1700
Volume to Capacity	0.20	0.31	0.31	0.09	1.00	0.27	0.27
Queue Length 95th (ft)	18	0	0	0	357	0	0
Control Delay (s)	14.3	0.0	0.0	0.0	67.0	0.0	0.0
Lane LOS	B				F		
Approach Delay (s)	14.3	0.0			24.9		
Approach LOS	B						

Intersection Summary			
Average Delay	13.5		
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱	↰	↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	383	1113	77	158	861
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	416	1210	84	172	936
Pedestrians	20					20
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					2
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			733			1086
pX, platoon unblocked	0.91	0.88			0.88	
vC, conflicting volume	2041	645			1313	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1656	464			1222	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	10			65	
cM capacity (veh/h)	52	465			491	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	416	605	605	84	172	468	468
Volume Left	0	0	0	0	172	0	0
Volume Right	416	0	0	84	0	0	0
cSH	465	1700	1700	1700	491	1700	1700
Volume to Capacity	0.90	0.36	0.36	0.05	0.35	0.28	0.28
Queue Length 95th (ft)	245	0	0	0	39	0	0
Control Delay (s)	49.8	0.0	0.0	0.0	16.2	0.0	0.0
Lane LOS	E				C		
Approach Delay (s)	49.8	0.0			2.5		
Approach LOS	E						

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.96		1.00	0.99		1.00	0.95	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1731			1752		1770	3516		1770	3380	
Flt Permitted		0.81			0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1434			1562		1770	3516		1770	3380	
Volume (vph)	39	8	24	23	21	20	84	784	36	63	511	219
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	9	26	25	23	22	91	852	39	68	555	238
RTOR Reduction (vph)	0	18	0	0	16	0	0	2	0	0	22	0
Lane Group Flow (vph)	0	59	0	0	54	0	91	889	0	68	771	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		8.4			8.4		9.1	64.7		8.1	63.7	
Effective Green, g (s)		8.4			8.4		9.1	64.7		8.1	63.7	
Actuated g/C Ratio		0.09			0.09		0.10	0.69		0.09	0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		129			141		173	2441		154	2310	
v/s Ratio Prot							c0.05	c0.25		0.04	0.23	
v/s Ratio Perm		c0.04			0.03							
v/c Ratio		0.46			0.38		0.53	0.36		0.44	0.33	
Uniform Delay, d1		40.2			39.9		40.0	5.8		40.4	6.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.5			1.7		2.9	0.4		2.0	0.4	
Delay (s)		42.8			41.7		42.9	6.3		42.4	6.4	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		42.8			41.7			9.6			9.3	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.98		1.00	0.99		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1719			1781		1770	3516		1770	3449	
Flt Permitted		0.80			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1414			1510		1770	3516		1770	3449	
Volume (vph)	146	18	102	28	29	13	53	764	35	58	737	152
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	20	111	30	32	14	58	830	38	63	801	165
RTOR Reduction (vph)	0	19	0	0	7	0	0	2	0	0	11	0
Lane Group Flow (vph)	0	271	0	0	69	0	58	866	0	63	955	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.3			23.3		7.3	56.2		7.5	56.4	
Effective Green, g (s)		23.3			23.3		7.3	56.2		7.5	56.4	
Actuated g/C Ratio		0.24			0.24		0.07	0.57		0.08	0.57	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		333			355		131	1996		134	1965	
v/s Ratio Prot							0.03	0.25		c0.04	c0.28	
v/s Ratio Perm		c0.19			0.05							
v/c Ratio		0.81			0.19		0.44	0.43		0.47	0.49	
Uniform Delay, d1		35.8			30.3		43.9	12.3		43.8	12.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		14.1			0.3		2.4	0.7		2.6	0.9	
Delay (s)		49.8			30.6		46.3	13.0		46.4	13.5	
Level of Service		D			C		D	B		D	B	
Approach Delay (s)		49.8			30.6			15.1			15.6	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.92	1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1460	1770	3539	1464	3433	3433		1770	3539	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1460	1770	3539	1464	3433	3433		1770	3539	1468
Volume (vph)	202	327	76	25	560	179	395	713	112	94	316	87
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	220	355	83	27	609	195	429	775	122	102	343	95
RTOR Reduction (vph)	0	0	68	0	0	152	0	12	0	0	0	69
Lane Group Flow (vph)	220	355	15	27	609	43	429	885	0	102	343	26
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			15			15			15			15
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	16.5	16.5	16.5	20.0	20.0	20.0	13.1	28.1		9.3	24.3	24.3
Effective Green, g (s)	16.5	16.5	16.5	20.0	20.0	20.0	13.1	28.1		9.3	24.3	24.3
Actuated g/C Ratio	0.18	0.18	0.18	0.22	0.22	0.22	0.15	0.31		0.10	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	325	650	268	394	787	326	500	1073		183	957	397
v/s Ratio Prot	c0.12	0.10		0.02	c0.17		c0.12	c0.26		0.06	0.10	
v/s Ratio Perm			0.01			0.03						0.02
v/c Ratio	0.68	0.55	0.06	0.07	0.77	0.13	0.86	0.83		0.56	0.36	0.06
Uniform Delay, d1	34.2	33.3	30.3	27.6	32.8	28.0	37.5	28.6		38.3	26.5	24.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.5	0.9	0.1	0.1	4.8	0.2	13.6	7.2		3.6	1.0	0.3
Delay (s)	39.7	34.2	30.4	27.7	37.6	28.2	51.1	35.9		42.0	27.5	24.7
Level of Service	D	C	C	C	D	C	D	D		D	C	C
Approach Delay (s)		35.6			35.1			40.8			29.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.92	1.00	0.99		1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1460	1770	3539	1457	3433	3464		1770	3539	1460
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1460	1770	3539	1457	3433	3464		1770	3539	1460
Volume (vph)	263	757	399	207	544	213	295	508	52	215	640	121
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	286	823	434	225	591	232	321	552	57	234	696	132
RTOR Reduction (vph)	0	0	267	0	0	181	0	8	0	0	0	100
Lane Group Flow (vph)	286	823	167	225	591	51	321	601	0	234	696	32
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			15			15			15			15
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	24.0	24.0	24.0	21.5	21.5	21.5	12.0	24.0		12.0	24.0	24.0
Effective Green, g (s)	24.0	24.0	24.0	21.5	21.5	21.5	12.0	24.0		12.0	24.0	24.0
Actuated g/C Ratio	0.25	0.25	0.25	0.22	0.22	0.22	0.12	0.25		0.12	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	436	871	359	390	780	321	423	853		218	871	359
v/s Ratio Prot	0.16	c0.23		0.13	c0.17		0.09	0.17		c0.13	c0.20	
v/s Ratio Perm			0.11			0.04						0.02
v/c Ratio	0.66	0.94	0.47	0.58	0.76	0.16	0.76	0.71		1.07	0.80	0.09
Uniform Delay, d1	33.0	36.1	31.3	33.9	35.6	30.7	41.4	33.5		42.8	34.5	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	18.4	1.0	2.1	4.2	0.2	7.6	4.9		81.8	7.6	0.5
Delay (s)	36.6	54.5	32.2	36.0	39.8	30.9	49.0	38.4		124.5	42.1	28.8
Level of Service	D	D	C	D	D	C	D	D		F	D	C
Approach Delay (s)		44.9			37.0			42.0			58.6	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	97.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3444		3433	3433		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3444		3433	3433		1770	3539	1583	1770	3539	1583
Volume (vph)	208	364	80	97	493	123	161	959	92	97	262	109
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	396	87	105	536	134	175	1042	100	105	285	118
RTOR Reduction (vph)	0	16	0	0	19	0	0	0	56	0	0	73
Lane Group Flow (vph)	226	467	0	105	651	0	175	1042	44	105	285	45
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	31.7		6.1	26.3		15.3	48.2	48.2	9.5	42.4	42.4
Effective Green, g (s)	11.5	31.7		6.1	26.3		15.3	48.2	48.2	9.5	42.4	42.4
Actuated g/C Ratio	0.10	0.28		0.05	0.24		0.14	0.43	0.43	0.09	0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	354	979		188	810		243	1530	684	151	1346	602
v/s Ratio Prot	c0.07	0.14		0.03	c0.19		c0.10	c0.29		0.06	0.08	
v/s Ratio Perm									0.03			0.03
v/c Ratio	0.64	0.48		0.56	0.80		0.72	0.68	0.06	0.70	0.21	0.07
Uniform Delay, d1	48.0	33.0		51.4	40.2		46.1	25.5	18.5	49.6	23.3	22.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.4		3.6	5.8		10.0	2.5	0.2	13.0	0.4	0.2
Delay (s)	51.8	33.4		55.0	46.0		56.1	27.9	18.7	62.6	23.6	22.3
Level of Service	D	C		D	D		E	C	B	E	C	C
Approach Delay (s)		39.3			47.2			31.0			31.4	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	111.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3442		3433	3353		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3442		3433	3353		1770	3539	1583	1770	3539	1583
Volume (vph)	238	694	155	303	543	293	209	575	146	435	872	228
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	259	754	168	329	590	318	227	625	159	473	948	248
RTOR Reduction (vph)	0	16	0	0	59	0	0	0	126	0	0	163
Lane Group Flow (vph)	259	906	0	329	849	0	227	625	33	473	948	85
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.0	32.7		12.0	34.7		17.8	25.0	25.0	33.1	40.3	40.3
Effective Green, g (s)	10.0	32.7		12.0	34.7		17.8	25.0	25.0	33.1	40.3	40.3
Actuated g/C Ratio	0.08	0.28		0.10	0.29		0.15	0.21	0.21	0.28	0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	289	947		347	979		265	745	333	493	1201	537
v/s Ratio Prot	0.08	c0.26		c0.10	0.25		0.13	0.18		c0.27	c0.27	
v/s Ratio Perm									0.02			0.05
v/c Ratio	0.90	0.96		0.95	0.87		0.86	0.84	0.10	0.96	0.79	0.16
Uniform Delay, d1	53.9	42.4		53.1	39.9		49.3	45.0	37.8	42.2	35.4	27.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.8	19.4		34.6	8.2		22.8	10.9	0.6	30.0	5.3	0.6
Delay (s)	81.7	61.7		87.6	48.0		72.0	55.9	38.4	72.2	40.7	28.0
Level of Service	F	E		F	D		E	E	D	E	D	C
Approach Delay (s)		66.1			58.6			56.8			47.8	
Approach LOS		E			E			E			D	

Intersection Summary

HCM Average Control Delay	56.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	118.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	206	3539	3433	1583
Volume (vph)	1087	258	49	890	947	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1182	280	53	967	1029	65
RTOR Reduction (vph)	0	0	0	0	0	18
Lane Group Flow (vph)	1182	280	53	967	1029	47
Turn Type		pm+ov	Perm			Perm
Protected Phases	4	2		8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	36.2	81.5	36.2	36.2	45.3	45.3
Effective Green, g (s)	36.2	81.5	36.2	36.2	45.3	45.3
Actuated g/C Ratio	0.40	0.91	0.40	0.40	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1431	1583	83	1431	1738	801
v/s Ratio Prot	c0.33	0.09		0.27	c0.30	
v/s Ratio Perm		0.09	0.26			0.03
v/c Ratio	0.83	0.18	0.64	0.68	0.59	0.06
Uniform Delay, d1	23.8	0.4	21.4	21.8	15.6	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.1	15.0	1.3	1.5	0.1
Delay (s)	27.9	0.5	36.4	23.1	17.1	11.4
Level of Service	C	A	D	C	B	B
Approach Delay (s)	22.6			23.8	16.7	
Approach LOS	C			C	B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.09	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	165	3539	3433	1583
Volume (vph)	1388	335	53	787	306	36
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1509	364	58	855	333	39
RTOR Reduction (vph)	0	0	0	0	0	7
Lane Group Flow (vph)	1509	364	58	855	333	32
Turn Type		pm+ov	Perm			Perm
Protected Phases	4	2		8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	45.2	90.3	45.2	45.2	45.1	45.1
Effective Green, g (s)	45.2	90.3	45.2	45.2	45.1	45.1
Actuated g/C Ratio	0.46	0.92	0.46	0.46	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1627	1583	76	1627	1575	726
v/s Ratio Prot	c0.43	c0.11		0.24	0.10	
v/s Ratio Perm		0.12	0.35			0.02
v/c Ratio	0.93	0.23	0.76	0.53	0.21	0.04
Uniform Delay, d1	25.0	0.4	22.1	18.9	15.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.5	0.1	35.7	0.3	0.3	0.1
Delay (s)	34.6	0.5	57.8	19.2	16.2	14.8
Level of Service	C	A	E	B	B	B
Approach Delay (s)	27.9			21.7	16.1	
Approach LOS	C			C	B	

Intersection Summary

HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	4.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93		0.99		1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97		0.95	0.96	1.00
Satd. Flow (prot)	3433	3508		1692	3539	1468		1760		1681	1691	1461
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.97		0.95	0.96	1.00
Satd. Flow (perm)	3433	3508		1692	3539	1468		1760		1681	1691	1461
Volume (vph)	646	432	15	8	619	259	38	13	6	80	3	129
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	702	470	16	9	673	282	41	14	7	87	3	140
RTOR Reduction (vph)	0	3	0	0	0	206	0	4	0	0	0	117
Lane Group Flow (vph)	702	483	0	9	673	76	0	58	0	44	46	23
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	22.5	47.8		0.7	26.0	26.0		16.1		16.1	16.1	16.1
Effective Green, g (s)	22.5	47.8		0.7	26.0	26.0		16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.23	0.49		0.01	0.27	0.27		0.17		0.17	0.17	0.17
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	799	1734		12	952	395		293		280	282	243
v/s Ratio Prot	c0.20	0.14		0.01	c0.19			c0.03		0.03	c0.03	
v/s Ratio Perm						0.05						0.02
v/c Ratio	0.88	0.28		0.75	0.71	0.19		0.20		0.16	0.16	0.10
Uniform Delay, d1	35.8	14.3		47.9	31.9	27.3		34.7		34.5	34.5	34.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	10.8	0.1		128.3	2.4	0.2		1.5		1.2	1.2	0.8
Delay (s)	46.6	14.4		176.2	34.3	27.5		36.2		35.7	35.8	34.9
Level of Service	D	B		F	C	C		D		D	D	C
Approach Delay (s)		33.4			33.7			36.2			35.2	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	96.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.93		0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.96	1.00
Satd. Flow (prot)	3433	3449		1770	3539	1477		1749		1681	1696	1473
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.96	1.00
Satd. Flow (perm)	3433	3449		1770	3539	1477		1749		1681	1696	1473
Volume (vph)	382	885	98	28	512	191	30	18	11	423	32	403
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	415	962	107	30	557	208	33	20	12	460	35	438
RTOR Reduction (vph)	0	9	0	0	0	155	0	8	0	0	0	355
Lane Group Flow (vph)	415	1060	0	30	557	53	0	57	0	241	254	83
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	15.0	35.2		1.4	21.6	21.6		16.2		16.2	16.2	16.2
Effective Green, g (s)	15.0	35.2		1.4	21.6	21.6		16.2		16.2	16.2	16.2
Actuated g/C Ratio	0.18	0.41		0.02	0.25	0.25		0.19		0.19	0.19	0.19
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	606	1428		29	899	375		333		320	323	281
v/s Ratio Prot	c0.12	c0.31		0.02	0.16			c0.03		0.14	c0.15	
v/s Ratio Perm						0.04						0.06
v/c Ratio	0.68	0.74		1.03	0.62	0.14		0.17		0.75	0.79	0.30
Uniform Delay, d1	32.8	21.1		41.8	28.1	24.5		28.8		32.5	32.8	29.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	3.2	2.1		177.9	1.3	0.2		1.1		15.1	17.4	2.7
Delay (s)	36.0	23.2		219.7	29.3	24.7		29.9		47.6	50.1	32.2
Level of Service	D	C		F	C	C		C		D	D	C
Approach Delay (s)		26.8			35.3			29.9			41.1	
Approach LOS		C			D			C			D	

Intersection Summary

HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			0.96		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	3510		1770	3402			1639		1681	1770	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (perm)	1770	3510		1770	3402			1639		1681	1770	1583
Volume (vph)	105	394	13	20	842	147	22	20	49	15	10	31
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	428	14	22	915	160	24	22	53	16	11	34
RTOR Reduction (vph)	0	2	0	0	15	0	0	40	0	0	0	31
Lane Group Flow (vph)	114	440	0	22	1060	0	0	59	0	16	11	3
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Over
Protected Phases	7	4		3	8		2	2		6	6	7
Permitted Phases												
Actuated Green, G (s)	7.9	42.2		2.2	36.5			16.1		16.1	16.1	7.9
Effective Green, g (s)	7.9	42.2		2.2	36.5			16.1		16.1	16.1	7.9
Actuated g/C Ratio	0.09	0.46		0.02	0.39			0.17		0.17	0.17	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	151	1600		42	1341			285		292	308	135
v/s Ratio Prot	c0.06	0.13		0.01	c0.31			c0.04		c0.01	0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.75	0.27		0.52	0.79			0.21		0.05	0.04	0.02
Uniform Delay, d1	41.4	15.7		44.7	24.7			32.8		31.9	31.8	38.8
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	19.1	0.1		11.3	3.3			1.6		0.4	0.2	0.1
Delay (s)	60.5	15.8		56.0	27.9			34.4		32.3	32.0	38.9
Level of Service	E	B		E	C			C		C	C	D
Approach Delay (s)		24.9			28.5			34.4			35.9	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥		↰	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			0.94		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.97			0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	0.96	1.00
Satd. Flow (prot)	1770	3520		1770	3375			1555		1681	1707	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	0.96	1.00
Satd. Flow (perm)	1770	3520		1770	3375			1555		1681	1707	1583
Volume (vph)	102	1202	26	99	579	124	22	17	143	121	19	119
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	1307	28	108	629	135	24	18	155	132	21	129
RTOR Reduction (vph)	0	2	0	0	19	0	0	129	0	0	0	118
Lane Group Flow (vph)	111	1333	0	108	745	0	0	68	0	75	78	11
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Over
Protected Phases	7	4		3	8		2	2		6	6	7
Permitted Phases												
Actuated Green, G (s)	7.9	41.0		6.0	39.1			16.1		16.1	16.1	7.9
Effective Green, g (s)	7.9	41.0		6.0	39.1			16.1		16.1	16.1	7.9
Actuated g/C Ratio	0.08	0.43		0.06	0.41			0.17		0.17	0.17	0.08
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	147	1516		112	1386			263		284	289	131
v/s Ratio Prot	0.06	c0.38		c0.06	0.22			c0.04		0.04	c0.05	0.01
v/s Ratio Perm												
v/c Ratio	0.76	0.88		0.96	0.54			0.26		0.26	0.27	0.08
Uniform Delay, d1	42.7	24.8		44.5	21.2			34.4		34.4	34.4	40.3
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	19.6	6.2		73.2	0.4			2.4		2.3	2.3	0.3
Delay (s)	62.3	31.0		117.6	21.6			36.7		36.7	36.7	40.6
Level of Service	E	C		F	C			D		D	D	D
Approach Delay (s)		33.4			33.5			36.7			38.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	95.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.93			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	3514		1770	3530			1693			1698	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.92	
Satd. Flow (perm)	1770	3514		1770	3530			1571			1598	
Volume (vph)	14	146	7	46	675	12	20	1	23	25	7	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	159	8	50	734	13	22	1	25	27	8	40
RTOR Reduction (vph)	0	5	0	0	1	0	0	13	0	0	21	0
Lane Group Flow (vph)	15	162	0	50	746	0	0	35	0	0	54	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	1.1	14.7		4.6	18.2			29.7			29.7	
Effective Green, g (s)	1.1	14.7		4.6	18.2			29.7			29.7	
Actuated g/C Ratio	0.02	0.24		0.08	0.30			0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	32	847		133	1053			765			778	
v/s Ratio Prot	0.01	0.05		c0.03	c0.21							
v/s Ratio Perm								0.02			c0.03	
v/c Ratio	0.47	0.19		0.38	0.71			0.05			0.07	
Uniform Delay, d1	29.7	18.4		26.8	19.0			8.2			8.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.5	0.1		1.8	2.2			0.1			0.2	
Delay (s)	40.1	18.5		28.6	21.2			8.3			8.5	
Level of Service	D	B		C	C			A			A	
Approach Delay (s)		20.3			21.7			8.3			8.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✣			✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.90			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3524		1770	3505			1670			1714	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.88	
Satd. Flow (perm)	1770	3524		1770	3505			1619			1534	
Volume (vph)	29	675	19	61	293	20	24	20	112	26	7	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	734	21	66	318	22	26	22	122	28	8	29
RTOR Reduction (vph)	0	2	0	0	6	0	0	67	0	0	16	0
Lane Group Flow (vph)	32	753	0	66	334	0	0	103	0	0	49	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	20.3		4.9	22.4			30.2			30.2	
Effective Green, g (s)	2.8	20.3		4.9	22.4			30.2			30.2	
Actuated g/C Ratio	0.04	0.30		0.07	0.33			0.45			0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	74	1061		129	1165			725			687	
v/s Ratio Prot	0.02	c0.21		c0.04	0.10							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.43	0.71		0.51	0.29			0.14			0.07	
Uniform Delay, d1	31.5	20.9		30.1	16.6			11.0			10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.0	2.2		3.4	0.1			0.4			0.2	
Delay (s)	35.5	23.1		33.5	16.7			11.4			10.8	
Level of Service	D	C		C	B			B			B	
Approach Delay (s)		23.6			19.5			11.4			10.8	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	67.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	1.00
Frt	1.00	1.00	0.96	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3270	1441	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3270	1441	3433	1583
Volume (vph)	83	379	501	619	112	29
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	412	545	673	122	32
RTOR Reduction (vph)	0	0	24	356	0	17
Lane Group Flow (vph)	90	412	689	149	122	15
Turn Type	Prot			Prot		Prot
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	8.2	38.0	25.8	25.8	41.3	41.3
Effective Green, g (s)	8.2	38.0	25.8	25.8	41.3	41.3
Actuated g/C Ratio	0.09	0.44	0.30	0.30	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	166	1540	966	426	1624	749
v/s Ratio Prot	c0.05	0.12	c0.21	0.10	c0.04	0.01
v/s Ratio Perm						
v/c Ratio	0.54	0.27	0.71	0.35	0.08	0.02
Uniform Delay, d1	37.8	15.8	27.4	24.2	12.6	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.1	2.5	0.5	0.1	0.0
Delay (s)	41.3	15.8	30.0	24.7	12.7	12.3
Level of Service	D	B	C	C	B	B
Approach Delay (s)		20.4	27.8		12.6	
Approach LOS		C	C		B	

Intersection Summary

HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	87.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱	↱	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3390	1441	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3390	1441	3433	1583
Volume (vph)	59	280	530	191	429	43
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	304	576	208	466	47
RTOR Reduction (vph)	0	0	0	157	0	22
Lane Group Flow (vph)	64	304	576	51	466	25
Turn Type	Prot			Prot		Prot
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	5.2	28.0	18.8	18.8	41.2	41.2
Effective Green, g (s)	5.2	28.0	18.8	18.8	41.2	41.2
Actuated g/C Ratio	0.07	0.36	0.24	0.24	0.53	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	119	1284	826	351	1832	845
v/s Ratio Prot	c0.04	0.09	c0.17	0.04	c0.14	0.02
v/s Ratio Perm						
v/c Ratio	0.54	0.24	0.70	0.14	0.25	0.03
Uniform Delay, d1	34.8	17.2	26.6	22.9	9.7	8.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	2.6	0.2	0.3	0.1
Delay (s)	39.5	17.2	29.2	23.1	10.0	8.6
Level of Service	D	B	C	C	B	A
Approach Delay (s)		21.1	27.6		9.9	
Approach LOS		C	C		A	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

EXISTING + TOTAL PROJECT PEAK HOUR

INTERSECTION CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↓↓	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	446	0	89	0	756	439	0	643	861
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	485	0	97	0	822	477	0	699	936
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	485	0	97	0	822	477	0	699	936
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				18.0		100.0		74.0	100.0		74.0	100.0
Effective Green, g (s)				18.0		100.0		74.0	100.0		74.0	100.0
Actuated g/C Ratio				0.18		1.00		0.74	1.00		0.74	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				595		1555		2619	1536		2619	1536
v/s Ratio Prot								0.23			0.20	
v/s Ratio Perm				c0.15		0.06			0.31			c0.61
v/c Ratio				0.82		0.06		0.31	0.31		0.27	0.61
Uniform Delay, d1				39.4		0.0		4.4	0.0		4.2	0.0
Progression Factor				1.00		1.00		1.18	1.00		1.00	1.00
Incremental Delay, d2				8.4		0.1		0.3	0.5		0.3	1.8
Delay (s)				47.8		0.1		5.5	0.5		4.5	1.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			39.9			3.7			2.9	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	420	0	211	0	966	1194	0	560	536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	457	0	229	0	1050	1298	0	609	583
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	457	0	229	0	1050	1298	0	609	583
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				17.2		100.0		74.8	100.0		74.8	100.0
Effective Green, g (s)				17.2		100.0		74.8	100.0		74.8	100.0
Actuated g/C Ratio				0.17		1.00		0.75	1.00		0.75	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				568		1555		2647	1536		2647	1536
v/s Ratio Prot								0.30			0.17	
v/s Ratio Perm				0.14		0.15			c0.84			0.38
v/c Ratio				0.80		0.15		0.40	0.85		0.23	0.38
Uniform Delay, d1				39.8		0.0		4.5	0.0		3.8	0.0
Progression Factor				1.00		1.00		1.02	1.00		1.00	1.00
Incremental Delay, d2				8.1		0.2		0.3	4.2		0.2	0.7
Delay (s)				47.9		0.2		4.9	4.2		4.0	0.7
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			32.0			4.5			2.4	
Approach LOS		A			C			A			A	

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↓↓	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	268	0	1939	0	0	0	0	727	185	0	916	194
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	0	2108	0	0	0	0	790	201	0	996	211
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	291	0	2048	0	0	0	0	790	201	0	996	211
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.22			c0.28	
v/s Ratio Perm	0.09		c0.60						0.13			0.14
v/c Ratio	0.19		1.27					0.50	0.13		0.63	0.14
Uniform Delay, d1	15.4		26.5					19.5	0.0		21.0	0.0
Progression Factor	1.00		1.00					0.54	1.00		0.83	1.00
Incremental Delay, d2	0.1		126.1					0.9	0.2		1.7	0.2
Delay (s)	15.5		152.6					11.5	0.2		19.2	0.2
Level of Service	B		F					B	A		B	A
Approach Delay (s)		136.0			0.0			9.2			15.9	
Approach LOS		F			A			A			B	

Intersection Summary

HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	617	0	978	0	0	0	0	1456	511	0	787	430
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	671	0	1063	0	0	0	0	1583	555	0	855	467
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	671	0	952	0	0	0	0	1583	555	0	855	467
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	37.0		37.0					55.0	100.0		55.0	100.0
Effective Green, g (s)	37.0		37.0					55.0	100.0		55.0	100.0
Actuated g/C Ratio	0.37		0.37					0.55	1.00		0.55	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1222		1271					1946	1536		1946	1536
v/s Ratio Prot								c0.45			0.24	
v/s Ratio Perm	0.20		c0.28						0.36			0.30
v/c Ratio	0.55		0.75					0.81	0.36		0.44	0.30
Uniform Delay, d1	24.9		27.5					18.3	0.0		13.4	0.0
Progression Factor	1.00		1.00					0.70	1.00		0.76	1.00
Incremental Delay, d2	0.5		2.5					0.4	0.1		0.7	0.5
Delay (s)	25.4		29.9					13.2	0.1		10.8	0.5
Level of Service	C		C					B	A		B	A
Approach Delay (s)		28.2			0.0			9.8			7.2	
Approach LOS		C			A			A			A	

Intersection Summary

HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1845	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1845	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	43	17	23	28	113	66	127	656	63	468	996	624
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	18	25	30	123	72	138	713	68	509	1083	678
RTOR Reduction (vph)	0	0	23	0	0	48	0	0	49	0	0	615
Lane Group Flow (vph)	0	65	2	0	153	24	138	713	19	509	1083	63
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		9.3	9.3		13.1	33.2	13.7	28.4	28.4	33.2	47.9	9.3
Effective Green, g (s)		9.3	9.3		13.1	33.2	13.7	28.4	28.4	33.2	47.9	9.3
Actuated g/C Ratio		0.09	0.09		0.13	0.33	0.14	0.28	0.28	0.33	0.48	0.09
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		167	140		242	526	242	1005	428	1140	2436	259
v/s Ratio Prot		c0.04			c0.08	0.02	c0.08	c0.20		c0.15	0.21	0.02
v/s Ratio Perm			0.00						0.01			
v/c Ratio		0.39	0.02		0.63	0.05	0.57	0.71	0.05	0.45	0.44	0.24
Uniform Delay, d1		42.7	41.2		41.2	22.7	40.4	32.1	26.0	26.2	17.2	42.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.83	0.80	3.47
Incremental Delay, d2		1.5	0.0		5.3	0.0	3.2	4.2	0.2	0.0	0.1	0.0
Delay (s)		44.2	41.2		46.5	22.7	43.6	36.3	26.2	21.9	13.9	146.2
Level of Service		D	D		D	C	D	D	C	C	B	F
Approach Delay (s)		43.4			38.9			36.7			55.2	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	49.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1780	1506		1792	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1780	1506		1792	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	463	34	43	44	12	252	28	1354	78	190	1019	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	503	37	47	48	13	274	30	1472	85	207	1108	114
RTOR Reduction (vph)	0	0	34	0	0	242	0	0	34	0	0	87
Lane Group Flow (vph)	0	540	13	0	61	32	30	1472	51	207	1108	27
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		7.4	11.7	4.9	40.9	40.9	11.7	47.7	24.0
Effective Green, g (s)		24.0	24.0		7.4	11.7	4.9	40.9	40.9	11.7	47.7	24.0
Actuated g/C Ratio		0.24	0.24		0.07	0.12	0.05	0.41	0.41	0.12	0.48	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		427	361		133	185	87	1447	616	402	2426	669
v/s Ratio Prot		c0.30			c0.03	0.02	0.02	c0.42		c0.06	0.22	0.01
v/s Ratio Perm			0.01						0.03			
v/c Ratio		1.26	0.04		0.46	0.17	0.34	1.02	0.08	0.51	0.46	0.04
Uniform Delay, d1		38.0	29.1		44.4	39.8	46.0	29.6	18.1	41.5	17.5	29.2
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.83	1.74
Incremental Delay, d2		136.6	0.0		2.5	0.4	2.4	28.1	0.3	0.9	0.5	0.0
Delay (s)		174.6	29.2		46.9	40.2	48.4	57.6	18.3	42.4	15.0	50.9
Level of Service		F	C		D	D	D	E	B	D	B	D
Approach Delay (s)		163.0			41.4			55.3			21.8	
Approach LOS		F			D			E			C	

Intersection Summary

HCM Average Control Delay	58.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	87	1012	139	496	853
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	95	1100	151	539	927
Pedestrians	20					20
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					2
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			733			1086
pX, platoon unblocked	0.94	0.89			0.89	
vC, conflicting volume	2662	590			1271	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2382	421			1184	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			0	
cM capacity (veh/h)	0	502			514	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	95	550	550	151	539	464	464
Volume Left	0	0	0	0	539	0	0
Volume Right	95	0	0	151	0	0	0
cSH	502	1700	1700	1700	514	1700	1700
Volume to Capacity	0.19	0.32	0.32	0.09	1.05	0.27	0.27
Queue Length 95th (ft)	17	0	0	0	396	0	0
Control Delay (s)	13.8	0.0	0.0	0.0	81.4	0.0	0.0
Lane LOS	B				F		
Approach Delay (s)	13.8	0.0			29.9		
Approach LOS	B						

Intersection Summary			
Average Delay	16.1		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱	↰	↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	383	1135	77	158	927
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	416	1234	84	172	1008
Pedestrians	20					20
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					2
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			733			1086
pX, platoon unblocked	0.91	0.83			0.83	
vC, conflicting volume	2101	657			1337	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1558	378			1200	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	16			63	
cM capacity (veh/h)	59	496			470	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	416	617	617	84	172	504	504
Volume Left	0	0	0	0	172	0	0
Volume Right	416	0	0	84	0	0	0
cSH	496	1700	1700	1700	470	1700	1700
Volume to Capacity	0.84	0.36	0.36	0.05	0.37	0.30	0.30
Queue Length 95th (ft)	212	0	0	0	41	0	0
Control Delay (s)	39.7	0.0	0.0	0.0	17.0	0.0	0.0
Lane LOS	E				C		
Approach Delay (s)	39.7	0.0			2.5		
Approach LOS	E						

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.93		1.00	0.99		1.00	0.95	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1727			1713		1770	3497		1770	3380	
Flt Permitted		0.64			0.82		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1134			1417		1770	3497		1770	3380	
Volume (vph)	61	27	57	52	38	89	84	784	68	140	511	219
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	29	62	57	41	97	91	852	74	152	555	238
RTOR Reduction (vph)	0	22	0	0	34	0	0	4	0	0	26	0
Lane Group Flow (vph)	0	135	0	0	161	0	91	922	0	152	767	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		15.1			15.1		8.7	55.6		13.2	60.1	
Effective Green, g (s)		15.1			15.1		8.7	55.6		13.2	60.1	
Actuated g/C Ratio		0.16			0.16		0.09	0.58		0.14	0.63	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		179			223		161	2027		244	2118	
v/s Ratio Prot							0.05	c0.26		c0.09	0.23	
v/s Ratio Perm		c0.12			0.11							
v/c Ratio		0.75			0.72		0.57	0.45		0.62	0.36	
Uniform Delay, d1		38.6			38.4		41.8	11.5		39.0	8.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		16.4			11.0		4.5	0.7		4.9	0.5	
Delay (s)		55.1			49.4		46.3	12.2		43.9	9.1	
Level of Service		E			D		D	B		D	A	
Approach Delay (s)		55.1			49.4			15.3			14.7	
Approach LOS		E			D			B			B	

Intersection Summary

HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.94		1.00	0.99		1.00	0.97	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732			1719		1770	3488		1770	3436	
Flt Permitted		0.65			0.81		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1152			1411		1770	3488		1770	3436	
Volume (vph)	147	47	104	66	52	105	92	764	82	171	737	178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	51	113	72	57	114	100	830	89	186	801	193
RTOR Reduction (vph)	0	17	0	0	28	0	0	6	0	0	14	0
Lane Group Flow (vph)	0	307	0	0	215	0	100	913	0	186	980	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.3			30.3		9.3	45.0		15.8	51.5	
Effective Green, g (s)		30.3			30.3		9.3	45.0		15.8	51.5	
Actuated g/C Ratio		0.29			0.29		0.09	0.44		0.15	0.50	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		339			415		160	1522		271	1716	
v/s Ratio Prot							0.06	0.26		c0.11	c0.29	
v/s Ratio Perm		c0.27			0.15							
v/c Ratio		0.91			0.52		0.62	0.60		0.69	0.57	
Uniform Delay, d1		35.0			30.3		45.2	22.2		41.3	18.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		26.4			1.1		7.4	1.8		7.0	1.4	
Delay (s)		61.4			31.4		52.6	23.9		48.3	19.5	
Level of Service		E			C		D	C		D	B	
Approach Delay (s)		61.4			31.4			26.7			24.0	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	103.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.92	1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1460	1770	3539	1464	3433	3434		1770	3539	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1460	1770	3539	1464	3433	3434		1770	3539	1468
Volume (vph)	213	327	76	25	560	184	395	719	112	105	330	107
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	355	83	27	609	200	429	782	122	114	359	116
RTOR Reduction (vph)	0	0	67	0	0	156	0	11	0	0	0	85
Lane Group Flow (vph)	232	355	16	27	609	44	429	893	0	114	359	31
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			15			15			15			15
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	16.9	16.9	16.9	20.0	20.0	20.0	13.1	28.1		9.3	24.3	24.3
Effective Green, g (s)	16.9	16.9	16.9	20.0	20.0	20.0	13.1	28.1		9.3	24.3	24.3
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.22	0.22	0.15	0.31		0.10	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	331	662	273	392	784	324	498	1069		182	952	395
v/s Ratio Prot	c0.13	0.10		0.02	c0.17		c0.12	c0.26		0.06	0.10	
v/s Ratio Perm			0.01			0.03						0.02
v/c Ratio	0.70	0.54	0.06	0.07	0.78	0.14	0.86	0.84		0.63	0.38	0.08
Uniform Delay, d1	34.3	33.2	30.2	27.8	33.1	28.2	37.7	28.9		38.8	26.8	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.6	0.8	0.1	0.1	4.9	0.2	14.2	7.7		6.6	1.1	0.4
Delay (s)	40.9	34.0	30.2	27.9	37.9	28.4	51.9	36.7		45.4	28.0	25.0
Level of Service	D	C	C	C	D	C	D	D		D	C	C
Approach Delay (s)		35.9			35.3			41.6			30.8	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.92	1.00	0.99		1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1459	1770	3539	1457	3433	3468		1770	3539	1459
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1459	1770	3539	1457	3433	3468		1770	3539	1459
Volume (vph)	311	757	399	207	544	238	295	538	52	223	650	139
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	338	823	434	225	591	259	321	585	57	242	707	151
RTOR Reduction (vph)	0	0	266	0	0	201	0	8	0	0	0	114
Lane Group Flow (vph)	338	823	168	225	591	58	321	634	0	242	707	37
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			15			15			15			15
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	24.0	24.0	24.0	21.8	21.8	21.8	12.0	24.0		12.0	24.0	24.0
Effective Green, g (s)	24.0	24.0	24.0	21.8	21.8	21.8	12.0	24.0		12.0	24.0	24.0
Actuated g/C Ratio	0.25	0.25	0.25	0.22	0.22	0.22	0.12	0.25		0.12	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	434	868	358	395	789	325	421	851		217	868	358
v/s Ratio Prot	0.19	c0.23		0.13	c0.17		0.09	0.18		c0.14	c0.20	
v/s Ratio Perm			0.11			0.04						0.03
v/c Ratio	0.78	0.95	0.47	0.57	0.75	0.18	0.76	0.75		1.12	0.81	0.10
Uniform Delay, d1	34.4	36.3	31.5	33.8	35.4	30.7	41.5	34.1		42.9	34.8	28.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.6	18.9	1.0	1.9	3.9	0.3	8.0	5.9		95.5	8.3	0.6
Delay (s)	43.0	55.2	32.4	35.7	39.4	31.0	49.5	40.0		138.4	43.1	29.2
Level of Service	D	E	C	D	D	C	D	D		F	D	C
Approach Delay (s)		46.4			36.6			43.1			62.1	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	47.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↱		↰↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3444		3433	3433		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3444		3433	3433		1770	3539	1583	1770	3539	1583
Volume (vph)	210	364	80	97	493	123	161	961	92	97	268	113
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	396	87	105	536	134	175	1045	100	105	291	123
RTOR Reduction (vph)	0	16	0	0	19	0	0	0	55	0	0	76
Lane Group Flow (vph)	228	467	0	105	651	0	175	1045	45	105	291	47
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	31.7		6.1	26.3		15.3	48.2	48.2	9.5	42.4	42.4
Effective Green, g (s)	11.5	31.7		6.1	26.3		15.3	48.2	48.2	9.5	42.4	42.4
Actuated g/C Ratio	0.10	0.28		0.05	0.24		0.14	0.43	0.43	0.09	0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	354	979		188	810		243	1530	684	151	1346	602
v/s Ratio Prot	c0.07	0.14		0.03	c0.19		c0.10	c0.30		0.06	0.08	
v/s Ratio Perm									0.03			0.03
v/c Ratio	0.64	0.48		0.56	0.80		0.72	0.68	0.07	0.70	0.22	0.08
Uniform Delay, d1	48.0	33.0		51.4	40.2		46.1	25.5	18.5	49.6	23.3	22.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.4		3.6	5.8		10.0	2.5	0.2	13.0	0.4	0.3
Delay (s)	52.0	33.4		55.0	46.0		56.1	28.0	18.7	62.6	23.7	22.3
Level of Service	D	C		D	D		E	C	B	E	C	C
Approach Delay (s)		39.4			47.2			31.0			31.2	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	111.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3442		3433	3353		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3442		3433	3353		1770	3539	1583	1770	3539	1583
Volume (vph)	247	694	155	303	543	293	209	588	146	435	875	231
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	754	168	329	590	318	227	639	159	473	951	251
RTOR Reduction (vph)	0	16	0	0	59	0	0	0	126	0	0	164
Lane Group Flow (vph)	268	906	0	329	849	0	227	639	33	473	951	87
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.0	32.7		12.0	34.7		17.8	25.0	25.0	33.1	40.3	40.3
Effective Green, g (s)	10.0	32.7		12.0	34.7		17.8	25.0	25.0	33.1	40.3	40.3
Actuated g/C Ratio	0.08	0.28		0.10	0.29		0.15	0.21	0.21	0.28	0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	289	947		347	979		265	745	333	493	1201	537
v/s Ratio Prot	0.08	c0.26		c0.10	0.25		0.13	0.18		c0.27	c0.27	
v/s Ratio Perm									0.02			0.06
v/c Ratio	0.93	0.96		0.95	0.87		0.86	0.86	0.10	0.96	0.79	0.16
Uniform Delay, d1	54.0	42.4		53.1	39.9		49.3	45.2	37.8	42.2	35.5	27.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.0	19.4		34.6	8.2		22.8	12.2	0.6	30.0	5.4	0.6
Delay (s)	88.0	61.7		87.6	48.0		72.0	57.4	38.4	72.2	40.9	28.1
Level of Service	F	E		F	D		E	E	D	E	D	C
Approach Delay (s)		67.7			58.6			57.7			47.8	
Approach LOS		E			E			E			D	

Intersection Summary

HCM Average Control Delay	57.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	118.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.11	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	200	3539	3433	1583
Volume (vph)	1108	258	50	927	947	62
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1204	280	54	1008	1029	67
RTOR Reduction (vph)	0	0	0	0	0	17
Lane Group Flow (vph)	1204	280	54	1008	1029	50
Turn Type		pm+ov	Perm			Perm
Protected Phases	4	2		8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	37.3	82.6	37.3	37.3	45.3	45.3
Effective Green, g (s)	37.3	82.6	37.3	37.3	45.3	45.3
Actuated g/C Ratio	0.41	0.91	0.41	0.41	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1457	1583	82	1457	1717	792
v/s Ratio Prot	c0.34	0.09		0.28	c0.30	
v/s Ratio Perm		0.09	0.27			0.03
v/c Ratio	0.83	0.18	0.66	0.69	0.60	0.06
Uniform Delay, d1	23.8	0.4	21.5	21.9	16.2	11.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.1	17.5	1.4	1.6	0.2
Delay (s)	27.7	0.5	39.0	23.4	17.7	11.8
Level of Service	C	A	D	C	B	B
Approach Delay (s)	22.6			24.2	17.4	
Approach LOS	C			C	B	

Intersection Summary

HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↱	↰	↑↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.09	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	162	3539	3433	1583
Volume (vph)	1432	335	56	803	306	42
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1557	364	61	873	333	46
RTOR Reduction (vph)	0	0	0	0	0	7
Lane Group Flow (vph)	1557	364	61	873	333	39
Turn Type		pm+ov	Perm			Perm
Protected Phases	4	2		8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	46.1	91.1	46.1	46.1	45.0	45.0
Effective Green, g (s)	46.1	91.1	46.1	46.1	45.0	45.0
Actuated g/C Ratio	0.47	0.92	0.47	0.47	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1646	1583	75	1646	1559	719
v/s Ratio Prot	c0.44	c0.10		0.25	0.10	
v/s Ratio Perm		0.13	0.38			0.02
v/c Ratio	0.95	0.23	0.81	0.53	0.21	0.05
Uniform Delay, d1	25.3	0.4	22.8	18.8	16.4	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	0.1	46.8	0.3	0.3	0.1
Delay (s)	37.0	0.5	69.6	19.1	16.7	15.3
Level of Service	D	A	E	B	B	B
Approach Delay (s)	30.1			22.4	16.5	
Approach LOS	C			C	B	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↱		↰	↑↱			✥		↰	↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			0.99		1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.95	1.00			1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.96			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	0.96	1.00
Satd. Flow (prot)	3433	3509		1690	3313			1759		1681	1691	1456
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.95	0.96	1.00
Satd. Flow (perm)	3433	3509		1690	3313			1759		1681	1691	1456
Volume (vph)	646	443	15	8	638	259	38	13	6	80	3	129
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	702	482	16	9	693	282	41	14	7	87	3	140
RTOR Reduction (vph)	0	2	0	0	42	0	0	4	0	0	0	118
Lane Group Flow (vph)	702	496	0	9	933	0	0	58	0	44	46	22
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	23.3	52.7		0.8	30.2			16.0		16.0	16.0	16.0
Effective Green, g (s)	23.3	52.7		0.8	30.2			16.0		16.0	16.0	16.0
Actuated g/C Ratio	0.23	0.52		0.01	0.30			0.16		0.16	0.16	0.16
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	788	1822		13	986			277		265	267	230
v/s Ratio Prot	c0.20	0.14		0.01	c0.28			c0.03		0.03	c0.03	
v/s Ratio Perm												0.02
v/c Ratio	0.89	0.27		0.69	0.95			0.21		0.17	0.17	0.10
Uniform Delay, d1	37.9	13.7		50.2	34.9			37.2		37.0	37.0	36.6
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	12.3	0.1		96.3	17.0			1.7		1.3	1.4	0.8
Delay (s)	50.2	13.7		146.5	51.9			38.9		38.3	38.4	37.4
Level of Service	D	B		F	D			D		D	D	D
Approach Delay (s)		35.0			52.7			38.9			37.8	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	101.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↱		↰	↑↱			↰↑↱		↰	↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.96			0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	0.96	1.00
Satd. Flow (prot)	3433	3452		1770	3337			1748		1681	1696	1468
Flt Permitted	0.95	1.00		0.95	1.00			0.98		0.95	0.96	1.00
Satd. Flow (perm)	3433	3452		1770	3337			1748		1681	1696	1468
Volume (vph)	382	935	98	28	531	191	30	18	11	423	32	403
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	415	1016	107	30	577	208	33	20	12	460	35	438
RTOR Reduction (vph)	0	8	0	0	36	0	0	8	0	0	0	360
Lane Group Flow (vph)	415	1115	0	30	749	0	0	57	0	241	254	78
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	15.7	39.4		2.3	26.0			16.1		16.1	16.1	16.1
Effective Green, g (s)	15.7	39.4		2.3	26.0			16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.17	0.44		0.03	0.29			0.18		0.18	0.18	0.18
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	600	1513		45	965			313		301	304	263
v/s Ratio Prot	c0.12	c0.32		0.02	0.22			c0.03		0.14	c0.15	
v/s Ratio Perm												0.05
v/c Ratio	0.69	0.74		0.67	0.78			0.18		0.80	0.84	0.30
Uniform Delay, d1	34.8	20.9		43.4	29.3			31.3		35.4	35.6	32.0
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	3.4	1.9		31.5	4.0			1.3		19.7	23.0	2.9
Delay (s)	38.3	22.9		74.9	33.3			32.6		55.1	58.6	34.9
Level of Service	D	C		E	C			C		E	E	C
Approach Delay (s)		27.0			34.8			32.6			46.5	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			0.96		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98			0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	3511		1770	3404			1639		1681	1770	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	1.00
Satd. Flow (perm)	1770	3511		1770	3404			1639		1681	1770	1583
Volume (vph)	107	404	13	21	861	147	22	21	50	15	10	32
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	439	14	23	936	160	24	23	54	16	11	35
RTOR Reduction (vph)	0	2	0	0	15	0	0	41	0	0	0	32
Lane Group Flow (vph)	116	451	0	23	1081	0	0	60	0	16	11	3
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Over
Protected Phases	7	4		3	8		2	2		6	6	7
Permitted Phases												
Actuated Green, G (s)	8.0	42.8		2.2	37.0			16.1		16.1	16.1	8.0
Effective Green, g (s)	8.0	42.8		2.2	37.0			16.1		16.1	16.1	8.0
Actuated g/C Ratio	0.09	0.46		0.02	0.40			0.17		0.17	0.17	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	152	1612		42	1351			283		290	306	136
v/s Ratio Prot	c0.07	0.13		0.01	c0.32			c0.04		c0.01	0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.76	0.28		0.55	0.80			0.21		0.06	0.04	0.02
Uniform Delay, d1	41.7	15.6		45.0	24.8			33.1		32.2	32.1	39.0
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	20.0	0.1		13.8	3.5			1.7		0.4	0.2	0.1
Delay (s)	61.7	15.7		58.8	28.3			34.8		32.6	32.3	39.1
Level of Service	E	B		E	C			C		C	C	D
Approach Delay (s)		25.1			28.9			34.8			36.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			0.94		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.97			0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	0.97	1.00
Satd. Flow (prot)	1770	3520		1770	3378			1557		1681	1708	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	0.97	1.00
Satd. Flow (perm)	1770	3520		1770	3378			1557		1681	1708	1583
Volume (vph)	108	1246	26	101	595	124	22	19	146	121	20	122
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	1354	28	110	647	135	24	21	159	132	22	133
RTOR Reduction (vph)	0	2	0	0	18	0	0	126	0	0	0	122
Lane Group Flow (vph)	117	1380	0	110	764	0	0	78	0	75	79	11
Confl. Peds. (#/hr)	30		30	30		30	30		30	30		30
Confl. Bikes (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Split			Split		Over
Protected Phases	7	4		3	8		2	2		6	6	7
Permitted Phases												
Actuated Green, G (s)	8.0	42.5		6.0	40.5			16.0		16.0	16.0	8.0
Effective Green, g (s)	8.0	42.5		6.0	40.5			16.0		16.0	16.0	8.0
Actuated g/C Ratio	0.08	0.44		0.06	0.42			0.17		0.17	0.17	0.08
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	147	1550		110	1418			258		279	283	131
v/s Ratio Prot	0.07	c0.39		c0.06	0.23			c0.05		0.04	c0.05	0.01
v/s Ratio Perm												
v/c Ratio	0.80	0.89		1.00	0.54			0.30		0.27	0.28	0.08
Uniform Delay, d1	43.4	24.9		45.2	21.0			35.3		35.1	35.2	40.9
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	25.0	6.8		85.8	0.4			3.0		2.4	2.4	0.3
Delay (s)	68.4	31.7		131.1	21.4			38.3		37.5	37.7	41.1
Level of Service	E	C		F	C			D		D	D	D
Approach Delay (s)		34.6			34.9			38.3			39.2	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	96.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.93			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1770	3515		1770	3530			1693			1698	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.92	
Satd. Flow (perm)	1770	3515		1770	3530			1571			1598	
Volume (vph)	14	154	7	46	680	12	20	1	23	25	7	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	167	8	50	739	13	22	1	25	27	8	40
RTOR Reduction (vph)	0	5	0	0	1	0	0	13	0	0	21	0
Lane Group Flow (vph)	15	170	0	50	751	0	0	35	0	0	54	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	1.1	14.8		4.6	18.3			29.7			29.7	
Effective Green, g (s)	1.1	14.8		4.6	18.3			29.7			29.7	
Actuated g/C Ratio	0.02	0.24		0.08	0.30			0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	32	851		133	1057			764			777	
v/s Ratio Prot	0.01	0.05		c0.03	c0.21							
v/s Ratio Perm								0.02			c0.03	
v/c Ratio	0.47	0.20		0.38	0.71			0.05			0.07	
Uniform Delay, d1	29.7	18.4		26.9	19.0			8.3			8.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.5	0.1		1.8	2.3			0.1			0.2	
Delay (s)	40.2	18.6		28.7	21.3			8.4			8.5	
Level of Service	D	B		C	C			A			A	
Approach Delay (s)		20.3			21.8			8.4			8.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.90			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3525		1770	3528			1670			1714	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.87	
Satd. Flow (perm)	1770	3525		1770	3528			1618			1528	
Volume (vph)	29	683	19	61	915	20	24	20	112	26	7	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	742	21	66	995	22	26	22	122	28	8	29
RTOR Reduction (vph)	0	2	0	0	2	0	0	71	0	0	17	0
Lane Group Flow (vph)	32	761	0	66	1015	0	0	99	0	0	48	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	25.3		5.1	27.6			30.2			30.2	
Effective Green, g (s)	2.8	25.3		5.1	27.6			30.2			30.2	
Actuated g/C Ratio	0.04	0.35		0.07	0.38			0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	68	1228		124	1341			673			636	
v/s Ratio Prot	0.02	0.22		c0.04	c0.29							
v/s Ratio Perm								c0.06			0.03	
v/c Ratio	0.47	0.62		0.53	0.76			0.15			0.08	
Uniform Delay, d1	34.2	19.7		32.6	19.6			13.2			12.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.1	0.9		4.3	2.5			0.5			0.2	
Delay (s)	39.2	20.6		36.9	22.1			13.6			13.0	
Level of Service	D	C		D	C			B			B	
Approach Delay (s)		21.3			23.0			13.6			13.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱	↱	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	1.00
Frt	1.00	1.00	0.96	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3261	1441	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3261	1441	3433	1583
Volume (vph)	84	379	501	623	117	33
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	412	545	677	127	36
RTOR Reduction (vph)	0	0	28	345	0	19
Lane Group Flow (vph)	91	412	702	147	127	17
Turn Type	Prot			Prot		Prot
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	8.2	38.4	26.2	26.2	41.3	41.3
Effective Green, g (s)	8.2	38.4	26.2	26.2	41.3	41.3
Actuated g/C Ratio	0.09	0.44	0.30	0.30	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	1550	974	430	1617	745
v/s Ratio Prot	c0.05	0.12	c0.22	0.10	c0.04	0.01
v/s Ratio Perm						
v/c Ratio	0.55	0.27	0.72	0.34	0.08	0.02
Uniform Delay, d1	38.0	15.7	27.5	24.0	12.7	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.1	2.7	0.5	0.1	0.1
Delay (s)	41.9	15.8	30.1	24.5	12.8	12.5
Level of Service	D	B	C	C	B	B
Approach Delay (s)		20.5	27.9		12.8	
Approach LOS		C	C		B	

Intersection Summary

HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	87.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3390	1441	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3390	1441	3433	1583
Volume (vph)	65	280	530	205	435	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	304	576	223	473	49
RTOR Reduction (vph)	0	0	0	169	0	24
Lane Group Flow (vph)	71	304	576	54	473	25
Turn Type	Prot			Prot		Prot
Protected Phases	7	4	8	8	6	6
Permitted Phases						
Actuated Green, G (s)	7.1	30.4	19.3	19.3	40.9	40.9
Effective Green, g (s)	7.1	30.4	19.3	19.3	40.9	40.9
Actuated g/C Ratio	0.09	0.38	0.24	0.24	0.52	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	1357	825	351	1771	816
v/s Ratio Prot	c0.04	0.09	c0.17	0.04	c0.14	0.02
v/s Ratio Perm						
v/c Ratio	0.45	0.22	0.70	0.15	0.27	0.03
Uniform Delay, d1	34.2	16.5	27.3	23.6	10.8	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1	2.6	0.2	0.4	0.1
Delay (s)	36.3	16.6	29.9	23.8	11.2	9.5
Level of Service	D	B	C	C	B	A
Approach Delay (s)		20.3	28.2		11.0	
Approach LOS		C	C		B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX B

COLLEGE AVENUE/LINDO PASEO "DRIVEWAY RATE" HCM ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.93		1.00	1.00		1.00	0.97	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1734			1710		1770	3523		1770	3420	
Flt Permitted		0.59			0.75		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1046			1298		1770	3523		1770	3420	
Volume (vph)	69	36	62	42	30	76	101	1366	42	95	906	263
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	39	67	46	33	83	110	1485	46	103	985	286
RTOR Reduction (vph)	0	18	0	0	32	0	0	2	0	0	17	0
Lane Group Flow (vph)	0	163	0	0	130	0	110	1529	0	103	1254	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.0			14.0		12.2	81.1		11.1	80.0	
Effective Green, g (s)		14.0			14.0		12.2	81.1		11.1	80.0	
Actuated g/C Ratio		0.12			0.12		0.10	0.69		0.09	0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		124			154		183	2417		166	2315	
v/s Ratio Prot							c0.06	c0.43		0.06	0.37	
v/s Ratio Perm		c0.16			0.10							
v/c Ratio		1.32			0.85		0.60	0.63		0.62	0.54	
Uniform Delay, d1		52.1			51.0		50.7	10.3		51.5	9.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		188.5			32.5		5.5	1.3		7.0	0.9	
Delay (s)		240.6			83.5		56.1	11.6		58.5	10.7	
Level of Service		F			F		E	B		E	B	
Approach Delay (s)		240.6			83.5			14.5			14.2	
Approach LOS		F			F			B			B	

Intersection Summary

HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	118.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1676		1770	1662		1770	3518		1770	3444	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1676		1770	1662		1770	3518		1770	3444	
Volume (vph)	176	62	124	55	40	101	278	1478	63	140	1316	289
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	67	135	60	43	110	302	1607	68	152	1430	314
RTOR Reduction (vph)	0	62	0	0	80	0	0	2	0	0	15	0
Lane Group Flow (vph)	191	140	0	60	73	0	302	1673	0	152	1729	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	12.0	17.5		5.5	11.0		19.0	65.1		11.0	57.1	
Effective Green, g (s)	12.0	17.5		5.5	11.0		19.0	65.1		11.0	57.1	
Actuated g/C Ratio	0.10	0.15		0.05	0.10		0.17	0.57		0.10	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	255		85	159		292	1990		169	1709	
v/s Ratio Prot	c0.11	c0.08		0.03	0.04		c0.17	0.48		0.09	c0.50	
v/s Ratio Perm												
v/c Ratio	1.03	0.55		0.71	0.46		1.03	0.84		0.90	1.01	
Uniform Delay, d1	51.5	45.2		54.0	49.2		48.0	20.7		51.5	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.9	2.4		23.3	2.1		61.8	4.5		41.1	24.7	
Delay (s)	126.5	47.6		77.3	51.3		109.9	25.2		92.6	53.7	
Level of Service	F	D		E	D		F	C		F	D	
Approach Delay (s)		85.9			58.6			38.1			56.8	
Approach LOS		F			E			D			E	

Intersection Summary

HCM Average Control Delay	51.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	115.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

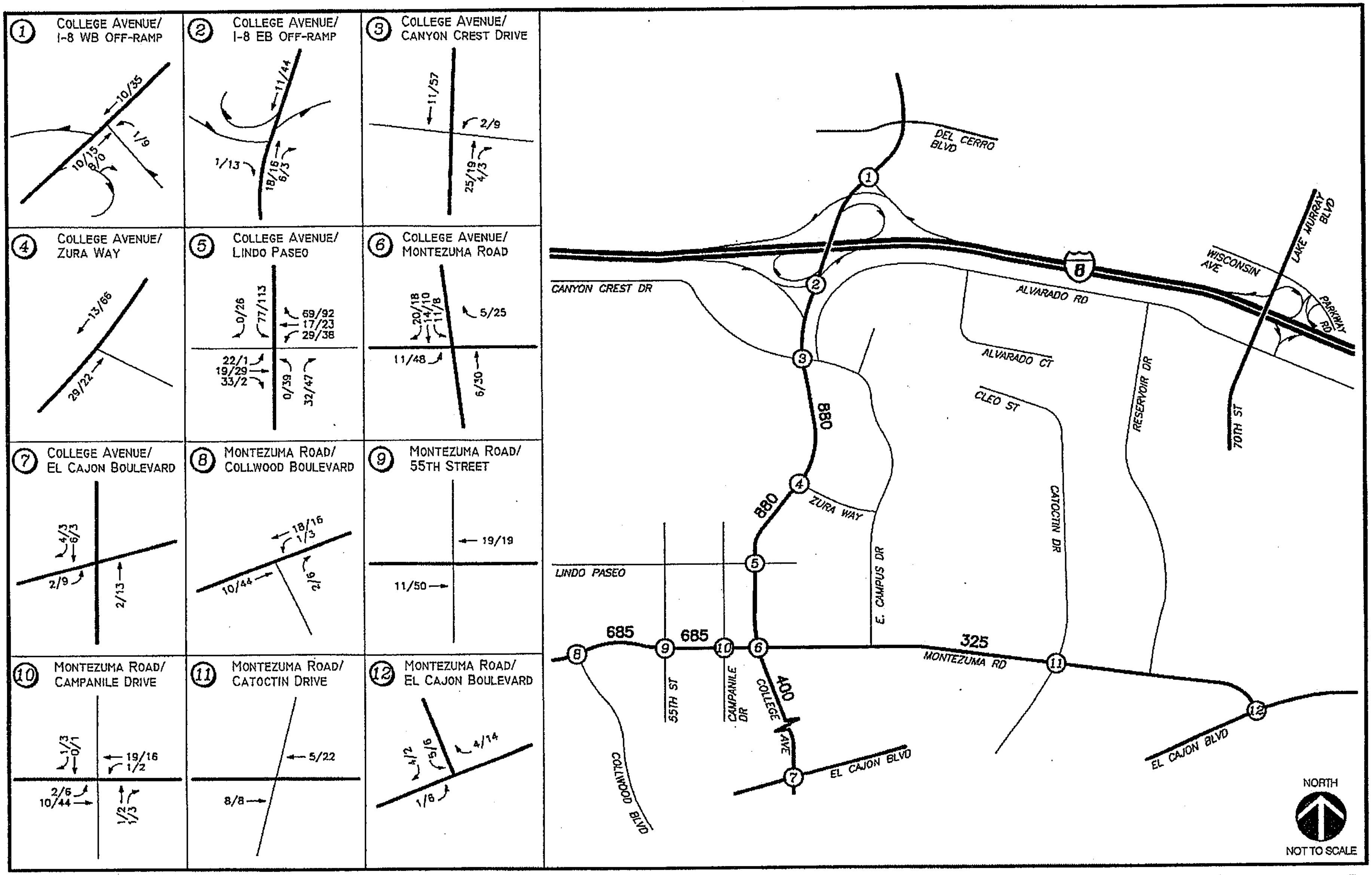
LINDO PASEO/BUILDING 3 ACCESS
HCM ANALYSIS

```
--------------------------------------------------------------------------------
                        Bldg 3 Driveway/Lindo Paseo
                       2030 + Uni/Comm Retail & SH AM
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1
********************************************************************************
Average Delay (sec/veh):      3.8      Worst Case Level Of Service: B[ 12.5]
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:         Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:         0  0  0  0  0   0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|----------------||----------------||----------------||----------------|
Volume Module:AM Peak Hour
Base Vol:       0    0     0   142    0    14    32   18     0     0   88   293
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   142    0    14    32   18     0     0   88   293
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:     0    0     0   154    0    15    35   20     0     0   96   318
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0   154    0    15    35   20     0     0   96   318
------------|----------------||----------------||----------------||----------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|----------------||----------------||----------------||----------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   344  344   255   414 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   656  582   789  1156 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   641  564   789  1156 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.24 0.00  0.02  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|----------------||----------------||----------------||----------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  652 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  1.0 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 12.5 xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx             12.5            xxxxxx            xxxxxx
ApproachLOS:         *                B                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
-------------------------------------------------------------------------------
                          Bldg 3 Driveway/Lindo Paseo
                         2030 + Uni/Comm Retail & SH PM
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #1
*******************************************************************************
Average Delay (sec/veh):       9.1      Worst Case Level Of Service: D[ 30.8]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:PM Peak Hour
Base Vol:        0    0    0   259    0    26    28   92     0     0  308   282
Growth Adj:   1.00 1.00 1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0    0    0   259    0    26    28   92     0     0  308   282
User Adj:     1.00 1.00 1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.92 0.92 0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92
PHF Volume:      0    0    0   282    0    28    30  100     0     0  335   307
Reduct Vol:      0    0    0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0    0   282    0    28    30  100     0     0  335   307
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   649  649   488   641 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   438  391   584   953 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   427  379   584   953 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.66 0.00  0.05  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.9 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *    *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  437 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  5.4 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 30.8 xxxxx   8.9 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     *    D     *     A    *     *     *    *     *
ApproachDel:       xxxxxx             30.8            xxxxxx           xxxxxx
ApproachLOS:          *                 D                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

APPENDIX D

TOTAL PROPOSED PROJECT TRAFFIC VOLUME FIGURE



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REV. 12/20/2010
N:\1857\Analysis\Ex+CP+3X ADT\Figures\LLG1857 FIG3-2

NOTES:

- ADT (Average Daily Traffic) shown midblock
- AM/PM peak hour volumes are shown at the intersections

Figure A

Total (Univ-Community Retail + Student Housing) Project Traffic Volumes
AM/PM Peak Hours & ADT

PLAZA LINDA VERDE

APPENDIX E

BUILDOUT STREET SEGMENT VOLUMES COMPARISON

YEAR 2030
STREET SEGMENT VOLUME COMPARISON

Segment	Campus Master Plan Traffic Study 2007 [1]	Series 11 (SANDAG 2007 RTP)
College Avenue		
Canyon Crest Drive to Zura Way	76,140	48,000
Zura Way to Montezuma Road	56,040	43,000
Montezuma Road to El Cajon Boulevard	40,200	33,000
Montezuma Road		
Collwood Boulevard to 55th Street	33,850	27,000
55th Street to College Avenue	35,010	23,000
College Avenue to Catoctin Drive	28,800	11,000

1. Volumes obtained from the subarea traffic model utilized in the SDSU Campus Master Plan Traffic Study 2007 based on the SANDAG Series 10 model.

ATTACHMENT F

ADDITIONAL CAMPUS MASTER PLAN CUMULATIVE TRIP ANALYSIS

TABLE A
NEAR-TERM PEAK HOUR INTERSECTION OPERATIONS
(Including 3,000 Additional Master Plan ADT)

Intersection	Control Type	Peak Hour	Existing		Existing + Near-Term Cumulative		Existing + Near-Term Cumulative + Total Project		
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	Δ[c]
1. College Avenue / I-8 Westbound Ramps	Signal	AM	9.3	A	10.0	A	10.0	A	0.0
		PM	8.3	A	9.5	A	9.5	A	0.0
2. College Avenue / I-8 Eastbound Ramps	Signal	AM	77.0	E	114.4	F	114.4	F	0.0
		PM	15.2	B	44.2	D	46.9	D	2.7
3. College Avenue / Canyon Crest Drive	Signal	AM	48.6	D	69.4	E	**72.8**	**E**	**3.4**
		PM	57.5	E	162.4	F	**167.3**	**F**	**4.9**
4. College Avenue / Zura Way	TWSC[d]	AM	67.0	F	458.0	F	**561.3**	**F**	**103.3**
		PM	16.2	C	108.7	F	**152.4**	**F**	**43.7**
5. College Avenue / Lindo Paseo	Signal	AM	11.9	B	12.7	C	22.2	C	9.5
		PM	20.1	C	23.5	C	32.5	C	9.0
6. College Avenue / Montezuma Road	Signal	AM	36.6	D	123.4	F	**125.4**	**F**	**2.0**
		PM	45.7	D	179.9	F	**190.2**	**F**	**10.3**
7. College Avenue / El Cajon Boulevard	Signal	AM	36.6	D	38.6	D	38.6	D	0.0
		PM	56.4	E	70.6	E	72.0	E	0.4
8. Montezuma Road / Collwood Boulevard	Signal	AM	21.2	C	24.3	C	24.4	C	0.1
		PM	24.7	C	50.6	D	54.8	D	4.2
9. Montezuma Road / 55th Street	Signal	AM	33.8	C	54.2	D	55.5	E	1.3
		PM	33.0	C	46.4	D	47.6	D	1.2
10. Montezuma Road / Campanile Drive	Signal	AM	28.0	C	45.7	D	47.7	D	2.0
		PM	34.2	C	73.7	E	**76.9**	**E**	**3.2**
11. Montezuma Road / Catoctin Drive	Signal	AM	20.0	B	21.1	C	21.1	C	0.0
		PM	20.4	C	21.9	C	21.9	C	0.0
12. Montezuma Road / El Cajon Boulevard	Signal	AM	24.6	C	24.9	C	24.9	C	0.0
		PM	20.7	C	22.0	C	22.2	C	0.2

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to PLV project traffic.
d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

1. Bold typeface indicates a potential significant impact.
2. SHADED values indicate new impact due to additional Master Plan Cumulative Traffic.

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TABLE B
NEAR-TERM STREET SEGMENT OPERATIONS
(INCLUDING 3,000 ADDITIONAL MASTER PLAN ADT)

Street Segment	Existing Capacity (LOS E)[a]	Existing		Existing + Near-Term Cumulative			Existing + Near-Term Cumulative + Total Project			
		ADT[b]	LOS[c]	ADT	V/C[d]	LOS	ADT	V/C	LOS	Δ[e]
College Avenue										
Canyon Crest Drive to Zura Way	40,000	44,000	F	46,748	1.169	F	**47,628**	**1.191**	**F**	**0.022**
Zura Way to Montezuma Road	40,000	30,000	C	32,504	0.813	D	33,384	0.835	D	0.022
Montezuma Road to El Cajon Boulevard	40,000	29,100	C	33,591	0.840	D	33,991	0.850	D	0.010
Montezuma Road										
Collwood Boulevard to 55th Street	40,000	30,600	D	35,117	0.878	E	35,802	0.895	E	0.017
55th Street to College Avenue	30,000	26,100	E	32,012	1.067	F	**32,697**	**1.090**	**F**	**0.023**
College Avenue to Catoctin Drive	30,000	14,800	C	19,057	0.635	C	19,382	0.646	C	0.011

Footnotes

a. Roadway capacity corresponding to "LOS E" from *City of San Diego Standard Street Classification, Average Daily Vehicle Trips* table.
b. Average Daily Traffic volumes
c. Level of Service
d. Volume / Capacity ratio.
e. Increase in V/C due to additional PLV traffic.

General Note:

1. Bold typeface indicates a potential significant impact.

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Linscott Law & Greenspan, Supplement to LLG Tech Report Dated August 6, 2010; Response to Caltrans Comment S-2-5 (March 10, 2011)

MEMORANDUM

To:	Mr. Michael Haberkorn Gatzke Dillon & Ballance LLP	Date:	March 10, 2011
From:	Chris Mendiara (CM) LLG, Engineers	LLG Ref:	3-08-1857
Subject:	Supplement to LLG Tech Report Dated August 6, 2010; Response to Caltrans Comment S-2-5		

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This memo provides supplemental analyses prepared to address Caltrans comment S-2-5 which questions the validity of using the "existing + cumulative" condition as the baseline against which to measure project impacts, and asks for further explanation of the baseline analysis.

The "existing + cumulative" baseline is a requirement of the City of San Diego, and a standard baseline against which near-term project impacts are measured in the majority of jurisdictions within San Diego County. The reason these jurisdictions prefer this baseline as opposed to the "existing-only" baseline alternative is that the former includes the traffic volumes of all "reasonably forseeable" cumulative projects in the study area, typically considered to be those projects which could be approved, designed, constructed and occupied within a 2-5 year period, potentially before the proposed project is built and occupied.

While subjective, this approach is preferred by the majority of jurisdictions because it provides a conservative baseline against which the project impacts are measured. Adding cumulative projects ahead of the proposed project diminishes potential "reserve capacity" in the roadway system, leaving less capacity for the proposed project, and increasing the likelihood that potential direct project impacts may occur.

The traffic study assessed the potential impacts of 53 cumulative projects in the study area. *Tables 9–1* and *9–2* in the traffic study shows the comparative results of the "existing" and "existing + cumulative" traffic volumes on intersection and segment analyses, respectively. A review of these tables clearly shows that the baseline including cumulative projects provides worse operating baseline conditions than if the baseline were "existing-only".

To further address this comment, an analysis of the I-8 interchange within Caltrans' jurisdiction was conducted to determine how interchange operations would be affected by adding the project-only traffic directly on to the existing baseline traffic volumes.

Table A shows the results.

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TABLE A
I-8/ COLLEGE AVENUE INTERCHANGE OPERATIONS
TOTAL PROJECT ADDED TO EXISTING-ONLY BASELINE

Intersection	Control Type	Peak Hour	Existing		Existing + Total Project [c] Traffic		Δ [d]
			Delay[a]	LOS[b]	Delay	LOS	
I-8/ College Avenue WB Ramps	SIGNAL	AM PM	9.3 8.3	A A	9.3 8.4	A A	0.0 0.1
I-8/ College Avenue EB Ramps	SIGNAL	AM PM	77.0 15.2	E B	77.1 15.3	E B	0.1 0.1

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. "Total Project" = University/Community-Serving Retail + Student Housing
d. Δ denotes an increase in delay due to project.

SIGNALIZED DELAY/LOS THRESHOLDS

Delay	LOS
0.0 < 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

This table shows that the addition of project traffic upon the existing-only baseline results in a maximum 0.1 second increase in delay, which would not be considered significant.

By comparison, the maximum increase in delay in project traffic upon the existing + cumulative baseline shown on *Table 9–1* of the traffic study is 2.6 seconds. This value is greater due to the diminished reserve capacity in the baseline due to the inclusion of cumulative project traffic. Hence, the approach used in the traffic study is conservative.

cc: File

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Linscott Law & Greenspan, Memorandum, Plaza Linda Verde - Construction Truck Analysis (March 14, 2011)

MEMORANDUM

To:	Ms. Laurie Cooper SDSU	Date:	March 14, 2011
From:	Mr. John Boarman LLG, Engineers	LLG Ref:	3-08-1857
Subject:	**Plaza Linda Verde - Construction Truck Analysis** City of San Diego		

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Linscott, Law, and Greenspan Engineers (LLG) has prepared the following letter report to identify if any potential significant traffic impacts would occur due to the truck trips that would be generated during the construction phase of the Plaza Linda Verde project.

The following items are included in this letter report:

- Project Description
- Expected Haul Route
- Construction Truck Trip Generation/Distribution
- Analysis Results
- Conclusions

PROJECT DESCRIPTION

The primary source of construction related truck trips would be the excavation and hauling associated with construction grading.

Two distinct phases of grading are expected. The first would be grading associated with the stand alone parking structure to be located on the north side of Lindo Paseo, west of College Avenue. Approximately 6,200 cubic yards of dirt would be hauled away. The second would be grading associated with the Buildings 4/5 underground parking, which is located just east of College Avenue at Lindo Paseo. Approximately 21,000 cubic yards of dirt would be hauled away, during this phase of construction.

EXPECTED HAUL ROUTE

Construction trucks are expected to be oriented to/from the eastern portion of San Diego and travel on I-8. Inbound trucks would head south on College Avenue and then turn onto Lindo Paseo. The return trip to the source site would be the reverse.

This letter report therefore focuses on the College Avenue corridor between I-8 and Lindo Paseo. LOS operations were determined utilizing the methodology found in Chapter 16 of the *2000 Highway Capacity Manual (HCM),* with the assistance of the *Synchro* (version 6) computer software. ***Attachment A*** contains Synchro analysis worksheets for all scenarios analyzed.

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The following four signalized intersections were analyzed in this letter report:

- College Avenue/ I-8 WB Ramps
- College Avenue/ I-8 EB Ramps
- College Avenue/ Canyon Crest Drive/ Alvarado Road
- College Avenue/ Lindo Paseo

CONSTRUCTION TRUCK TRIP GENERATION & DISTRIBUTION

There are no published trip generation rates for "demolition hauling". Therefore, LLG prepared site-specific trip generation estimates for both the Phase I and Phase II construction truck trips. ***Table 1*** summarizes the trip generation calculations for both construction phases.

Phase I Construction Operations—Phase I construction proposes to haul approximately 6,200 cubic yards of material that would require a total of 620 truck trips based on a standard truck capacity of 10 cubic yards of material. Phase I grading duration is expected to be 20 working days. This would result in approximately 31 one-way truck trips per day. The resulting trip generation is therefore 62 average daily trips (31 in/31 out), with 8 total AM peak hour trips (4 inbound/4 outbound) and 8 total PM peak hour trips (4 inbound/4 outbound), assuming the operation continues throughout an 8 hour day. It should be noted that construction would likely end at 4:00 pm each day, thereby not impacting the afternoon commuter peak. In order to provide a worst-case analysis, the trucks were assumed to be added to the PM peak hour. ***Figure 1*** illustrates the Phase I construction truck peak hour trip assignment.

Phase II Construction Operations—Phase II construction proposes to haul approximately 21,000 cubic yards of material which would require a total of 2,100 truck trips. Phase II grading duration is expected to be 60 days. This would result in approximately 35 one-way truck trips per day. The resulting trip generation is therefore 70 average daily trips (35 in/35 out), with 10 total AM peak hour trips (5 inbound/5 outbound) and 10 total PM peak hour trips (5 inbound/5 outbound). ***Figure 2*** illustrates the Phase II construction truck peak hour trip assignment.

Since these truck trips will exhibit diminished performance characteristics as compared to passenger vehicles, the standard of practice is to apply a "Passenger Car Equivalence" factor, or PCE factor to the trip generation. A PCE factor of 2.0 was applied to the trip generation, resulting in 32 total peak hour trips (16 inbound/16 outbound) for Phase I of construction and 40 total peak hour trips (20 inbound/20 outbound) for Phase II of construction. These volumes (with PCE) were the basis of the analysis.

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TABLE 1
CONSTRUCTION TRUCK TRIP GENERATION

Trip Type	Daily Total (ADT) [a]	AM Peak Hour			PM Peak Hour		
		In	Out	*Total*	In	Out	*Total*
Construction – Phase I							
Heavy Trucks w/ PCE[b]	124	8	8	*16*	8	8	*16*
Construction – Phase II							
Heavy Trucks w/ PCE[b]	140	10	10	*20*	10	10	*20*

Footnotes:
a. ADT = Average Daily Traffic (24-hour total bi-directional traffic on a roadway segment)
b. PCE = Passenger Car Equivalence Factor (2.0), used to reflect the additional impacts of heavy vehicles in the technical analyses.

SIGNIFICANCE CRITERIA

City of San Diego significance criteria were used to determine potential impacts associated with the construction truck traffic. See ***Table 2*** below.

TABLE 2
CITY OF SAN DIEGO—TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project[b]	Allowable Increase Due to Project Impacts[a]
	Intersections Delay
E	2.0 seconds
F	1.0 second

Footnotes:
a. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. The project applicant shall then identify feasible improvements (within the Traffic Impact Study) that will restore/and maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note b), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating the project's direct significant and/or cumulatively considerable traffic impacts.

General Notes:
1. Delay = Average control delay per vehicle measured in seconds for intersections.

ANALYSIS OF NEAR-TERM CUMULATIVE CONDITIONS – PHASE I CONSTRUCTION

The Near-Term Cumulative traffic volumes used for this analysis were obtained from the Plaza Linda Verde traffic impact analysis prepared by LLG dated January 11, 2011. Section 7.0 of the traffic report provides a detailed summary table of all near-term cumulative projects that were included in the analysis. The volumes were used as the baseline condition to which construction truck Phase I volumes were added.

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Existing + Near-Term Cumulative without Phase I Construction Traffic Peak Hour Intersection Levels of Service

Table 3 summarizes the Existing + Near-Term Cumulative intersection Levels of Service from the 2011 traffic impact analysis. As seen in *Table 3*, the study area intersections of College Avenue/I-8 WB Ramps and College Avenue/Lindo Paseo are calculated to operate at an acceptable LOS C or better during the AM and PM peak hours. The remaining two intersections below are calculated to operate at LOS E or F conditions.

- College Avenue/ I-8 Eastbound Ramps (LOS F during AM peak hour)
- College Avenue/Canyon Crest Drive (LOS E/F during the AM/PM peak hours)

Existing + Near-Term Cumulative + Phase I Construction Traffic Peak Hour Intersection Levels of Service

Table 3 summarizes the Existing + Near-Term Cumulative + Construction Phase I intersection Levels of Service. As seen in *Table 3*, the study area intersections of College Avenue/I-8 WB Ramps and College Avenue/Lindo Paseo are calculated to continue to operate at an acceptable LOS C or better during the AM and PM peak hours. The adjacent two intersections below are calculated to continue to operate at LOS E or F conditions.

- College Avenue/ I-8 Eastbound Ramps (LOS F during AM peak hour)
- College Avenue/Canyon Crest Drive (LOS E/F during the AM/PM peak hours)

These two intersections are not significantly impacted by the additional traffic since the project adds less than the maximum allowable increase of delay to a poorly operating intersection. Based on the City's published significance criteria, ***no significant impacts are calculated.***

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TABLE 3
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Near-Term Cumulative		Existing + Near-Term Cumulative + Construction Phase I		Delay Increase due to Project[c]	Impact Type
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS		
1. College Avenue / I–8 Westbound Ramps	Signal	AM	9.3	A	9.8	A	9.9	A	0.1	None
		PM	8.3	A	9.1	A	9.1	A	0.0	
2. College Avenue / I–8 Eastbound Ramps	Signal	AM	77.0	E	109.7	F	109.7	F	0.0	None
		PM	15.2	B	38.8	D	39.4	D	0.6	
3. College Avenue / Canyon Crest Drive	Signal	AM	48.6	D	68.5	E	69.3	E	0.8	None
		PM	57.5	E	148.9	F	149.3	F	0.4	
5. College Avenue / Lindo Paseo	Signal	AM	11.9	B	12.6	B	13.0	B	0.4	None
		PM	20.1	C	23.3	C	24.1	C	0.8	

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Project-attributable increase in delay.

SIGNALIZED
DELAY/LOS THRESHOLDS

Delay	*LOS*
0.0 ≤ 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.1	F

ANALYSIS OF NEAR-TERM CUMULATIVE CONDITIONS – PHASE II CONSTRUCTION

To determine potential impacts for Phase II of construction, LLG conducted a second LOS analysis. As part of the analysis, it should be noted that the Phase I development (Buildings 1, 2, and 3) traffic was added to the near-term cumulative traffic volumes to account for this portion of the project being completed and operational. This traffic forms the baseline to which construction Phase II volumes were added. LLG utilized the trip generation summary table from the 2011 traffic impact analysis and determined the total trips generated by Phase I. These trips were then assigned to the road network and included in the analysis.

Existing + Near-Term Cumulative + Project Phase I Traffic Peak Hour Intersection Levels of Service

Table 4 summarizes the Existing + Near-Term Cumulative + Project Phase I intersection Levels of Service. As seen in *Table 4*, the study area intersections are calculated to operate at an acceptable LOS C or better during the AM and PM peak

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hours with the exception of the following intersections which are calculated to operate at LOS E or F Conditions.

- College Avenue/ I-8 Eastbound Ramps (LOS F during AM peak hour)
- College Avenue/Canyon Crest Drive (LOS E/F during the AM/PM peak hours)

Existing + Near-Term Cumulative + Project Phase I Traffic + Phase II Construction Traffic Peak Hour Intersection Levels of Service

Table 4 summarizes the Existing + Near-Term Cumulative + Project Phase I + Phase II Construction intersection Levels of Service. As seen in *Table 4*, the study area intersections are calculated to operate at an acceptable LOS D or better during the AM and PM peak hours with the exception of the following intersections which are calculated to continue to operate at LOS E or F conditions.

- College Avenue/ I-8 Eastbound Ramps (LOS F during AM peak hour)
- College Avenue/Canyon Crest Drive (LOS E/F during the AM/PM peak hours)

These two intersections are not significantly impacted by the additional traffic since the project adds less than the maximum allowable increase of delay to a poorly operating intersection. Based on the City's published significance criteria, ***no significant impacts are calculated.***

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TABLE 4
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Near-Term Cumulative + Project Phase I		Existing + Near-Term Cumulative + Project Phase I + Construction Phase II		Delay Increase due to Project[c]	Impact Type
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS		
1. College Avenue / I–8 Westbound Ramps	Signal	AM	9.3	A	9.8	A	9.9	A	0.1	None
		PM	8.3	A	9.0	A	9.2	A	0.2	
2. College Avenue / I–8 Eastbound Ramps	Signal	AM	77.0	E	109.9	F	109.9	F	0.0	None
		PM	15.2	B	41.9	D	41.9	D	0.0	
3. College Avenue / Canyon Crest Drive	Signal	AM	48.6	D	70.9	E	71.9	E	1.0	None
		PM	57.5	E	155.9	F	156.5	F	0.6	
5. College Avenue / Lindo Paseo	Signal	AM	11.9	B	15.5	B	16.0	B	0.7	None
		PM	20.1	C	34.9	C	35.6	D	1.3	

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Project-attributable increase in delay.

SIGNALIZED
DELAY/LOS THRESHOLDS

Delay	*LOS*
0.0 ≤ 10.0	A
10.1 to 20.0	B
20.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
> 80.0	F

CONCLUSIONS

The capacity analyses performed at the College Avenue corridor signalized intersections indicate no significant traffic impacts due to the additional truck trips generated by the project construction activities.

ATTACHMENT A

INTERSECTION CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	509	0	170	0	917	525	0	819	946
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	553	0	185	0	997	571	0	890	1028
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	553	0	185	0	997	571	0	890	1028
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.1		100.0		71.9	100.0		71.9	100.0
Effective Green, g (s)				20.1		100.0		71.9	100.0		71.9	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				664		1555		2545	1536		2545	1536
v/s Ratio Prot								0.28			0.25	
v/s Ratio Perm				c0.17		0.12			0.37			c0.67
v/c Ratio				0.83		0.12		0.39	0.37		0.35	0.67
Uniform Delay, d1				38.3		0.0		5.5	0.0		5.3	0.0
Progression Factor				1.00		1.00		1.27	1.00		1.00	1.00
Incremental Delay, d2				8.8		0.2		0.4	0.6		0.4	2.3
Delay (s)				47.1		0.2		7.4	0.6		5.7	2.3
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			35.4			4.9			3.9	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↓↓	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	510	0	304	0	1155	1328	0	795	581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	554	0	330	0	1255	1443	0	864	632
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	554	0	330	0	1255	1443	0	864	632
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.1		100.0		71.9	100.0		71.9	100.0
Effective Green, g (s)				20.1		100.0		71.9	100.0		71.9	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				664		1555		2545	1536		2545	1536
v/s Ratio Prot								0.35			0.24	
v/s Ratio Perm				0.17		0.21			c0.94			0.41
v/c Ratio				0.83		0.21		0.49	0.94		0.34	0.41
Uniform Delay, d1				38.4		0.0		6.1	0.0		5.2	0.0
Progression Factor				1.00		1.00		0.94	1.00		1.00	1.00
Incremental Delay, d2				8.9		0.3		0.2	4.8		0.4	0.8
Delay (s)				47.2		0.3		6.0	4.8		5.6	0.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			29.7			5.3			3.6	
Approach LOS		A			C			A			A	

Intersection Summary

HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	309	0	2174	0	0	0	0	987	199	0	1075	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	0	2363	0	0	0	0	1073	216	0	1168	241
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	336	0	2328	0	0	0	0	1073	216	0	1168	241
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.30			c0.33	
v/s Ratio Perm	0.10		c0.68						0.14			0.16
v/c Ratio	0.22		1.44					0.67	0.14		0.73	0.16
Uniform Delay, d1	15.6		26.5					21.7	0.0		22.6	0.0
Progression Factor	1.00		1.00					0.87	1.00		0.81	1.00
Incremental Delay, d2	0.1		202.6					0.8	0.1		2.6	0.2
Delay (s)	15.7		229.1					19.7	0.1		20.8	0.2
Level of Service	B		F					B	A		C	A
Approach Delay (s)		202.6			0.0			16.4			17.3	
Approach LOS		F			A			B			B	

Intersection Summary

HCM Average Control Delay	109.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	674	0	1205	0	0	0	0	1780	557	0	1021	452
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	733	0	1310	0	0	0	0	1935	605	0	1110	491
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	733	0	1266	0	0	0	0	1935	605	0	1110	491
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	44.2		44.2					47.8	100.0		47.8	100.0
Effective Green, g (s)	44.2		44.2					47.8	100.0		47.8	100.0
Actuated g/C Ratio	0.44		0.44					0.48	1.00		0.48	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1460		1518					1692	1536		1692	1536
v/s Ratio Prot								c0.55			0.31	
v/s Ratio Perm	0.22		c0.37						0.39			0.32
v/c Ratio	0.50		0.83					1.14	0.39		0.66	0.32
Uniform Delay, d1	20.0		24.7					26.1	0.0		19.8	0.0
Progression Factor	1.00		1.00					0.81	1.00		0.80	1.00
Incremental Delay, d2	0.3		4.1					65.4	0.1		1.8	0.5
Delay (s)	20.3		28.8					86.5	0.1		17.6	0.5
Level of Service	C		C					F	A		B	A
Approach Delay (s)		25.7			0.0			65.9			12.3	
Approach LOS		C			A			E			B	

Intersection Summary

HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	49	19	46	87	144	152	152	910	89	522	1254	706
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	21	50	95	157	165	165	989	97	567	1363	767
RTOR Reduction (vph)	0	0	45	0	0	113	0	0	74	0	0	690
Lane Group Flow (vph)	0	74	5	0	252	52	165	989	23	567	1363	77
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		10.0	10.0		18.6	31.3	15.0	24.1	24.1	31.3	40.4	10.0
Effective Green, g (s)		10.0	10.0		18.6	31.3	15.0	24.1	24.1	31.3	40.4	10.0
Actuated g/C Ratio		0.10	0.10		0.19	0.31	0.15	0.24	0.24	0.31	0.40	0.10
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		180	151		340	495	266	853	363	1075	2054	279
v/s Ratio Prot		c0.04			c0.14	0.03	c0.09	c0.28		0.17	c0.27	0.03
v/s Ratio Perm			0.00						0.02			
v/c Ratio		0.41	0.03		0.74	0.10	0.62	1.16	0.06	0.53	0.66	0.27
Uniform Delay, d1		42.2	40.6		38.4	24.4	39.8	38.0	29.3	28.3	24.3	41.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.88	0.87	3.50
Incremental Delay, d2		1.5	0.1		8.4	0.1	4.4	84.7	0.3	0.0	0.2	0.0
Delay (s)		43.8	40.7		46.9	24.5	44.3	122.7	29.6	24.8	21.3	146.0
Level of Service		D	D		D	C	D	F	C	C	C	F
Approach Delay (s)		42.5			38.0			105.1			57.5	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	68.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1506		1784	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1783	1506		1784	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	502	56	88	99	13	281	66	1706	150	284	1390	115
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	546	61	96	108	14	305	72	1854	163	309	1511	125
RTOR Reduction (vph)	0	0	62	0	0	260	0	0	58	0	0	90
Lane Group Flow (vph)	0	607	34	0	122	45	72	1854	105	309	1511	35
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		11.7	14.9	8.2	33.4	33.4	14.9	40.1	24.0
Effective Green, g (s)		24.0	24.0		11.7	14.9	8.2	33.4	33.4	14.9	40.1	24.0
Actuated g/C Ratio		0.24	0.24		0.12	0.15	0.08	0.33	0.33	0.15	0.40	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		428	361		209	236	145	1182	503	512	2039	669
v/s Ratio Prot		c0.34			c0.07	0.03	0.04	c0.52		c0.09	0.30	0.01
v/s Ratio Perm			0.02						0.07			
v/c Ratio		1.42	0.09		0.58	0.19	0.50	1.57	0.21	0.60	0.74	0.05
Uniform Delay, d1		38.0	29.5		41.8	37.3	43.9	33.3	23.8	39.8	25.5	29.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.02	0.83	1.45
Incremental Delay, d2		201.5	0.1		4.1	0.4	2.7	260.0	0.9	1.3	1.6	0.0
Delay (s)		239.5	29.7		46.0	37.7	46.6	293.3	24.8	41.7	22.7	42.4
Level of Service		F	C		D	D	D	F	C	D	C	D
Approach Delay (s)		210.9			40.0			263.8			27.0	
Approach LOS		F			D			F			C	

Intersection Summary

HCM Average Control Delay	148.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.96		1.00	1.00		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1741			1752		1770	3523		1770	3430	
Flt Permitted		0.78			0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1400			1569		1770	3523		1770	3430	
Volume (vph)	60	8	24	23	21	20	84	1156	36	63	863	224
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	9	26	25	23	22	91	1257	39	68	938	243
RTOR Reduction (vph)	0	13	0	0	16	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	87	0	0	54	0	91	1295	0	68	1170	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.0			10.0		9.1	63.9		8.0	62.8	
Effective Green, g (s)		10.0			10.0		9.1	63.9		8.0	62.8	
Actuated g/C Ratio		0.11			0.11		0.10	0.68		0.09	0.67	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		149			167		172	2397		151	2294	
v/s Ratio Prot							c0.05	c0.37		0.04	0.34	
v/s Ratio Perm		c0.06			0.03							
v/c Ratio		0.59			0.32		0.53	0.54		0.45	0.51	
Uniform Delay, d1		40.0			38.8		40.4	7.6		40.9	7.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.8			1.1		2.9	0.9		2.1	0.8	
Delay (s)		45.8			39.9		43.3	8.5		43.0	8.6	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		45.8			39.9			10.7			10.5	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	93.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.98		1.00	1.00		1.00	0.98	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1781		1770	3526		1770	3475	
Flt Permitted		0.80			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1410			1512		1770	3526		1770	3475	
Volume (vph)	154	18	102	28	29	13	53	1319	35	58	1253	172
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	20	111	30	32	14	58	1434	38	63	1362	187
RTOR Reduction (vph)	0	18	0	0	7	0	0	1	0	0	7	0
Lane Group Flow (vph)	0	280	0	0	69	0	58	1471	0	63	1542	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.9			23.9		7.3	56.1		7.5	56.3	
Effective Green, g (s)		23.9			23.9		7.3	56.1		7.5	56.3	
Actuated g/C Ratio		0.24			0.24		0.07	0.56		0.08	0.57	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		339			363		130	1988		133	1966	
v/s Ratio Prot							0.03	0.42		c0.04	c0.44	
v/s Ratio Perm		c0.20			0.05							
v/c Ratio		0.83			0.19		0.45	0.74		0.47	0.78	
Uniform Delay, d1		35.8			30.1		44.2	16.2		44.1	16.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		15.0			0.3		2.4	2.5		2.7	3.2	
Delay (s)		50.8			30.4		46.6	18.8		46.8	20.1	
Level of Service		D			C		D	B		D	C	
Approach Delay (s)		50.8			30.4			19.8			21.1	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	99.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	517	0	170	0	917	525	0	819	946
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	562	0	185	0	997	571	0	890	1028
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	562	0	185	0	997	571	0	890	1028
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.3		100.0		71.7	100.0		71.7	100.0
Effective Green, g (s)				20.3		100.0		71.7	100.0		71.7	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				671		1555		2537	1536		2537	1536
v/s Ratio Prot								0.28			0.25	
v/s Ratio Perm				c0.17		0.12			0.37			c0.67
v/c Ratio				0.84		0.12		0.39	0.37		0.35	0.67
Uniform Delay, d1				38.3		0.0		5.6	0.0		5.4	0.0
Progression Factor				1.00		1.00		1.26	1.00		1.00	1.00
Incremental Delay, d2				9.0		0.2		0.4	0.6		0.4	2.3
Delay (s)				47.2		0.2		7.4	0.6		5.7	2.3
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			35.6			4.9			3.9	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	518	0	304	0	1155	1328	0	795	581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	563	0	330	0	1255	1443	0	864	632
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	563	0	330	0	1255	1443	0	864	632
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.4		100.0		71.6	100.0		71.6	100.0
Effective Green, g (s)				20.4		100.0		71.6	100.0		71.6	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				674		1555		2534	1536		2534	1536
v/s Ratio Prot								0.35			0.24	
v/s Ratio Perm				0.17		0.21			c0.94			0.41
v/c Ratio				0.84		0.21		0.50	0.94		0.34	0.41
Uniform Delay, d1				38.2		0.0		6.2	0.0		5.3	0.0
Progression Factor				1.00		1.00		0.94	1.00		1.00	1.00
Incremental Delay, d2				8.8		0.3		0.2	4.6		0.4	0.8
Delay (s)				47.0		0.3		6.1	4.6		5.7	0.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			29.7			5.3			3.6	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	309	0	2174	0	0	0	0	987	207	0	1083	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	0	2363	0	0	0	0	1073	225	0	1177	241
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	336	0	2329	0	0	0	0	1073	225	0	1177	241
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.30			c0.33	
v/s Ratio Perm	0.10		c0.68						0.15			0.16
v/c Ratio	0.22		1.44					0.67	0.15		0.74	0.16
Uniform Delay, d1	15.6		26.5					21.7	0.0		22.7	0.0
Progression Factor	1.00		1.00					0.88	1.00		0.80	1.00
Incremental Delay, d2	0.1		202.9					0.7	0.1		2.7	0.2
Delay (s)	15.7		229.4					19.7	0.1		20.9	0.2
Level of Service	B		F					B	A		C	A
Approach Delay (s)		202.8			0.0			16.3			17.4	
Approach LOS		F			A			B			B	

Intersection Summary			
HCM Average Control Delay	109.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	674	0	1205	0	0	0	0	1788	565	0	1029	452
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	733	0	1310	0	0	0	0	1943	614	0	1118	491
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	733	0	1267	0	0	0	0	1943	614	0	1118	491
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	44.2		44.2					47.8	100.0		47.8	100.0
Effective Green, g (s)	44.2		44.2					47.8	100.0		47.8	100.0
Actuated g/C Ratio	0.44		0.44					0.48	1.00		0.48	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1460		1518					1692	1536		1692	1536
v/s Ratio Prot								c0.55			0.32	
v/s Ratio Perm	0.22		c0.37						0.40			0.32
v/c Ratio	0.50		0.83					1.15	0.40		0.66	0.32
Uniform Delay, d1	20.0		24.7					26.1	0.0		19.9	0.0
Progression Factor	1.00		1.00					0.81	1.00		0.79	1.00
Incremental Delay, d2	0.3		4.1					67.5	0.1		1.8	0.5
Delay (s)	20.3		28.8					88.6	0.1		17.6	0.5
Level of Service	C		C					F	A		B	A
Approach Delay (s)		25.7			0.0			67.4			12.4	
Approach LOS		C			A			E			B	

Intersection Summary

HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	49	19	46	87	144	152	152	918	89	522	1262	706
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	21	50	95	157	165	165	998	97	567	1372	767
RTOR Reduction (vph)	0	0	45	0	0	113	0	0	73	0	0	690
Lane Group Flow (vph)	0	74	5	0	252	52	165	998	24	567	1372	77
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		10.0	10.0		18.6	31.3	15.0	24.1	24.1	31.3	40.4	10.0
Effective Green, g (s)		10.0	10.0		18.6	31.3	15.0	24.1	24.1	31.3	40.4	10.0
Actuated g/C Ratio		0.10	0.10		0.19	0.31	0.15	0.24	0.24	0.31	0.40	0.10
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		180	151		340	495	266	853	363	1075	2054	279
v/s Ratio Prot		c0.04			c0.14	0.03	c0.09	c0.28		0.17	c0.27	0.03
v/s Ratio Perm			0.00						0.02			
v/c Ratio		0.41	0.03		0.74	0.10	0.62	1.17	0.07	0.53	0.67	0.27
Uniform Delay, d1		42.2	40.6		38.4	24.4	39.8	38.0	29.3	28.3	24.3	41.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.88	0.87	3.48
Incremental Delay, d2		1.5	0.1		8.4	0.1	4.4	89.0	0.4	0.0	0.2	0.0
Delay (s)		43.8	40.7		46.9	24.5	44.3	126.9	29.6	24.8	21.4	144.9
Level of Service		D	D		D	C	D	F	C	C	C	F
Approach Delay (s)		42.5			38.0			108.6			57.1	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	69.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1506		1784	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1783	1506		1784	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	502	56	88	99	13	281	66	1714	150	283	1398	115
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	546	61	96	108	14	305	72	1863	163	308	1520	125
RTOR Reduction (vph)	0	0	62	0	0	260	0	0	58	0	0	89
Lane Group Flow (vph)	0	607	34	0	122	45	72	1863	105	308	1520	36
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		11.7	14.8	8.2	33.5	33.5	14.8	40.1	24.0
Effective Green, g (s)		24.0	24.0		11.7	14.8	8.2	33.5	33.5	14.8	40.1	24.0
Actuated g/C Ratio		0.24	0.24		0.12	0.15	0.08	0.34	0.34	0.15	0.40	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		428	361		209	234	145	1186	505	508	2039	669
v/s Ratio Prot		c0.34			c0.07	0.03	0.04	c0.53		c0.09	0.30	0.01
v/s Ratio Perm			0.02						0.07			
v/c Ratio		1.42	0.09		0.58	0.19	0.50	1.57	0.21	0.61	0.75	0.05
Uniform Delay, d1		38.0	29.5		41.8	37.4	43.9	33.2	23.8	39.9	25.6	29.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.02	0.83	1.44
Incremental Delay, d2		201.5	0.1		4.1	0.4	2.7	261.0	0.9	1.3	1.6	0.0
Delay (s)		239.5	29.7		46.0	37.8	46.6	294.2	24.7	41.8	22.8	42.2
Level of Service		F	C		D	D	D	F	C	D	C	D
Approach Delay (s)		210.9			40.1			264.8			27.0	
Approach LOS		F			D			F			C	

Intersection Summary

HCM Average Control Delay	149.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.96		1.00	1.00		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1744			1752		1770	3523		1770	3427	
Flt Permitted		0.77			0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1393			1572		1770	3523		1770	3427	
Volume (vph)	68	8	24	23	21	20	84	1156	36	63	863	232
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	9	26	25	23	22	91	1257	39	68	938	252
RTOR Reduction (vph)	0	12	0	0	16	0	0	1	0	0	12	0
Lane Group Flow (vph)	0	97	0	0	54	0	91	1295	0	68	1178	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.4			10.4		9.0	63.1		7.9	62.0	
Effective Green, g (s)		10.4			10.4		9.0	63.1		7.9	62.0	
Actuated g/C Ratio		0.11			0.11		0.10	0.68		0.08	0.66	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		155			175		171	2380		150	2275	
v/s Ratio Prot							c0.05	c0.37		0.04	0.34	
v/s Ratio Perm		c0.07			0.03							
v/c Ratio		0.63			0.31		0.53	0.54		0.45	0.52	
Uniform Delay, d1		39.7			38.2		40.2	7.8		40.7	8.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.7			1.0		3.2	0.9		2.2	0.8	
Delay (s)		47.4			39.2		43.4	8.7		42.9	8.9	
Level of Service		D			D		D	A		D	A	
Approach Delay (s)		47.4			39.2			10.9			10.7	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.98		1.00	1.00		1.00	0.98	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1722			1781		1770	3526		1770	3472	
Flt Permitted		0.79			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1405			1514		1770	3526		1770	3472	
Volume (vph)	162	18	102	28	29	13	53	1319	35	58	1253	180
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	176	20	111	30	32	14	58	1434	38	63	1362	196
RTOR Reduction (vph)	0	17	0	0	7	0	0	1	0	0	7	0
Lane Group Flow (vph)	0	290	0	0	69	0	58	1471	0	63	1551	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.8			24.8		7.3	55.8		7.6	56.1	
Effective Green, g (s)		24.8			24.8		7.3	55.8		7.6	56.1	
Actuated g/C Ratio		0.25			0.25		0.07	0.56		0.08	0.56	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		348			375		129	1964		134	1944	
v/s Ratio Prot							0.03	0.42		c0.04	c0.45	
v/s Ratio Perm		c0.21			0.05							
v/c Ratio		0.83			0.18		0.45	0.75		0.47	0.80	
Uniform Delay, d1		35.7			29.7		44.5	16.9		44.4	17.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		15.5			0.2		2.5	2.7		2.6	3.5	
Delay (s)		51.2			30.0		47.0	19.5		47.0	21.0	
Level of Service		D			C		D	B		D	C	
Approach Delay (s)		51.2			30.0			20.6			22.1	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↓↓	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	511	0	170	0	927	531	0	829	946
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	555	0	185	0	1008	577	0	901	1028
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	555	0	185	0	1008	577	0	901	1028
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.1		100.0		71.9	100.0		71.9	100.0
Effective Green, g (s)				20.1		100.0		71.9	100.0		71.9	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				664		1555		2545	1536		2545	1536
v/s Ratio Prot								0.28			0.25	
v/s Ratio Perm				c0.17		0.12			0.38			c0.67
v/c Ratio				0.84		0.12		0.40	0.38		0.35	0.67
Uniform Delay, d1				38.4		0.0		5.5	0.0		5.3	0.0
Progression Factor				1.00		1.00		1.25	1.00		1.00	1.00
Incremental Delay, d2				9.0		0.2		0.4	0.6		0.4	2.3
Delay (s)				47.3		0.2		7.3	0.6		5.7	2.3
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			35.5			4.9			3.9	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	517	0	304	0	1177	1331	0	820	581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	562	0	330	0	1279	1447	0	891	632
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	562	0	330	0	1279	1447	0	891	632
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.3		100.0		71.7	100.0		71.7	100.0
Effective Green, g (s)				20.3		100.0		71.7	100.0		71.7	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				671		1555		2537	1536		2537	1536
v/s Ratio Prot								0.36			0.25	
v/s Ratio Perm				0.17		0.21			c0.94			0.41
v/c Ratio				0.84		0.21		0.50	0.94		0.35	0.41
Uniform Delay, d1				38.3		0.0		6.3	0.0		5.4	0.0
Progression Factor				1.00		1.00		0.93	1.00		1.00	1.00
Incremental Delay, d2				9.0		0.3		0.2	4.5		0.4	0.8
Delay (s)				47.2		0.3		6.0	4.5		5.7	0.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			29.9			5.2			3.7	
Approach LOS		A			C			A			A	

Intersection Summary

HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	309	0	2177	0	0	0	0	1003	203	0	1087	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	0	2366	0	0	0	0	1090	221	0	1182	241
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	336	0	2333	0	0	0	0	1090	221	0	1182	241
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.31			c0.33	
v/s Ratio Perm	0.10		c0.68						0.14			0.16
v/c Ratio	0.22		1.45					0.68	0.14		0.74	0.16
Uniform Delay, d1	15.6		26.5					21.9	0.0		22.7	0.0
Progression Factor	1.00		1.00					0.90	1.00		0.81	1.00
Incremental Delay, d2	0.1		203.9					0.7	0.1		2.7	0.2
Delay (s)	15.7		230.4					20.3	0.1		21.0	0.2
Level of Service	B		F					C	A		C	A
Approach Delay (s)		203.7			0.0			16.9			17.5	
Approach LOS		F			A			B			B	

Intersection Summary

HCM Average Control Delay	109.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↓↓	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	674	0	1215	0	0	0	0	1805	561	0	1053	452
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	733	0	1321	0	0	0	0	1962	610	0	1145	491
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	733	0	1282	0	0	0	0	1962	610	0	1145	491
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	44.4		44.4					47.6	100.0		47.6	100.0
Effective Green, g (s)	44.4		44.4					47.6	100.0		47.6	100.0
Actuated g/C Ratio	0.44		0.44					0.48	1.00		0.48	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1467		1525					1685	1536		1685	1536
v/s Ratio Prot								c0.55			0.32	
v/s Ratio Perm	0.22		c0.37						0.40			0.32
v/c Ratio	0.50		0.84					1.16	0.40		0.68	0.32
Uniform Delay, d1	19.9		24.7					26.2	0.0		20.3	0.0
Progression Factor	1.00		1.00					0.81	1.00		0.80	1.00
Incremental Delay, d2	0.3		4.4					74.7	0.1		2.0	0.5
Delay (s)	20.1		29.0					96.0	0.1		18.1	0.5
Level of Service	C		C					F	A		B	A
Approach Delay (s)		25.8			0.0			73.2			12.8	
Approach LOS		C			A			E			B	

Intersection Summary

HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↑	↱	↰↰	↑↑↑	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	49	19	46	90	144	152	152	931	92	522	1269	706
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	21	50	98	157	165	165	1012	100	567	1379	767
RTOR Reduction (vph)	0	0	45	0	0	114	0	0	74	0	0	690
Lane Group Flow (vph)	0	74	5	0	255	51	165	1012	26	567	1379	77
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		10.0	10.0		18.7	31.2	14.9	24.1	24.1	31.2	40.4	10.0
Effective Green, g (s)		10.0	10.0		18.7	31.2	14.9	24.1	24.1	31.2	40.4	10.0
Actuated g/C Ratio		0.10	0.10		0.19	0.31	0.15	0.24	0.24	0.31	0.40	0.10
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		180	151		342	494	264	853	363	1071	2054	279
v/s Ratio Prot		c0.04			c0.14	0.03	c0.09	c0.29		0.17	c0.27	0.03
v/s Ratio Perm			0.00						0.02			
v/c Ratio		0.41	0.03		0.75	0.10	0.62	1.19	0.07	0.53	0.67	0.27
Uniform Delay, d1		42.2	40.6		38.4	24.5	39.9	38.0	29.3	28.3	24.4	41.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.88	0.88	3.47
Incremental Delay, d2		1.5	0.1		8.6	0.1	4.6	95.7	0.4	0.0	0.2	0.0
Delay (s)		43.8	40.7		47.0	24.6	44.5	133.6	29.7	24.9	21.5	144.5
Level of Service		D	D		D	C	D	F	C	C	C	F
Approach Delay (s)		42.5			38.2			114.0			57.0	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	70.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1506		1783	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1783	1506		1783	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	502	56	88	106	13	281	66	1737	155	284	1430	115
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	546	61	96	115	14	305	72	1888	168	309	1554	125
RTOR Reduction (vph)	0	0	62	0	0	260	0	0	59	0	0	87
Lane Group Flow (vph)	0	607	34	0	129	45	72	1888	109	309	1554	38
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		12.1	14.8	8.2	33.1	33.1	14.8	39.7	24.0
Effective Green, g (s)		24.0	24.0		12.1	14.8	8.2	33.1	33.1	14.8	39.7	24.0
Actuated g/C Ratio		0.24	0.24		0.12	0.15	0.08	0.33	0.33	0.15	0.40	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		428	361		216	234	145	1171	498	508	2019	669
v/s Ratio Prot		c0.34			c0.07	0.03	0.04	c0.53		c0.09	c0.31	0.01
v/s Ratio Perm			0.02						0.07			
v/c Ratio		1.42	0.09		0.60	0.19	0.50	1.61	0.22	0.61	0.77	0.06
Uniform Delay, d1		38.0	29.5		41.6	37.4	43.9	33.5	24.1	39.9	26.2	29.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.02	0.83	1.42
Incremental Delay, d2		201.5	0.1		4.4	0.4	2.7	279.5	1.0	1.3	1.9	0.0
Delay (s)		239.5	29.7		46.0	37.8	46.6	313.0	25.1	41.9	23.5	41.7
Level of Service		F	C		D	D	D	F	C	D	C	D
Approach Delay (s)		210.9			40.2			281.2			27.5	
Approach LOS		F			D			F			C	

Intersection Summary

HCM Average Control Delay	155.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.96		1.00	1.00		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1752		1770	3523		1770	3423	
Flt Permitted		0.80			0.87		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1422			1547		1770	3523		1770	3423	
Volume (vph)	84	8	53	23	21	20	104	1156	36	63	863	241
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	9	58	25	23	22	113	1257	39	68	938	262
RTOR Reduction (vph)	0	20	0	0	15	0	0	1	0	0	14	0
Lane Group Flow (vph)	0	138	0	0	55	0	113	1295	0	68	1186	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		13.8			13.8		9.8	59.6		7.8	57.6	
Effective Green, g (s)		13.8			13.8		9.8	59.6		7.8	57.6	
Actuated g/C Ratio		0.15			0.15		0.11	0.64		0.08	0.62	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		211			229		186	2253		148	2116	
v/s Ratio Prot							c0.06	c0.37		0.04	0.35	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.66			0.24		0.61	0.57		0.46	0.56	
Uniform Delay, d1		37.5			35.1		39.9	9.6		40.7	10.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.2			0.5		5.5	1.1		2.3	1.1	
Delay (s)		44.6			35.6		45.4	10.7		42.9	11.5	
Level of Service		D			D		D	B		D	B	
Approach Delay (s)		44.6			35.6			13.4			13.2	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.98		1.00	1.00		1.00	0.98	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1713			1781		1770	3526		1770	3460	
Flt Permitted		0.80			0.81		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1410			1479		1770	3526		1770	3460	
Volume (vph)	190	18	147	28	29	13	112	1319	35	58	1253	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	20	160	30	32	14	122	1434	38	63	1362	239
RTOR Reduction (vph)	0	20	0	0	6	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	367	0	0	70	0	122	1471	0	63	1590	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.0			30.0		12.6	57.5		8.0	52.9	
Effective Green, g (s)		30.0			30.0		12.6	57.5		8.0	52.9	
Actuated g/C Ratio		0.28			0.28		0.12	0.53		0.07	0.49	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		393			413		207	1886		132	1703	
v/s Ratio Prot							c0.07	0.42		0.04	c0.46	
v/s Ratio Perm		c0.26			0.05							
v/c Ratio		0.93			0.17		0.59	0.78		0.48	0.93	
Uniform Delay, d1		37.8			29.3		45.0	19.9		47.7	25.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		29.0			0.2		4.2	3.3		2.7	10.9	
Delay (s)		66.7			29.5		49.2	23.2		50.5	36.6	
Level of Service		E			C		D	C		D	D	
Approach Delay (s)		66.7			29.5			25.2			37.1	
Approach LOS		E			C			C			D	

Intersection Summary

HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	107.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	521	0	170	0	927	531	0	829	946
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	566	0	185	0	1008	577	0	901	1028
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	566	0	185	0	1008	577	0	901	1028
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.5		100.0		71.5	100.0		71.5	100.0
Effective Green, g (s)				20.5		100.0		71.5	100.0		71.5	100.0
Actuated g/C Ratio				0.20		1.00		0.72	1.00		0.72	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				677		1555		2530	1536		2530	1536
v/s Ratio Prot								0.28			0.25	
v/s Ratio Perm				c0.17		0.12			0.38			c0.67
v/c Ratio				0.84		0.12		0.40	0.38		0.36	0.67
Uniform Delay, d1				38.1		0.0		5.7	0.0		5.4	0.0
Progression Factor				1.00		1.00		1.24	1.00		1.00	1.00
Incremental Delay, d2				8.8		0.2		0.4	0.6		0.4	2.3
Delay (s)				47.0		0.2		7.4	0.6		5.8	2.3
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			35.4			5.0			4.0	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱		↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.97		1.00		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		0.98		1.00	0.97		1.00	0.97
Flpb, ped/bikes				0.96		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3304		1555		3539	1536		3539	1536
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3304		1555		3539	1536		3539	1536
Volume (vph)	0	0	0	527	0	304	0	1177	1331	0	820	581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	573	0	330	0	1279	1447	0	891	632
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	573	0	330	0	1279	1447	0	891	632
Confl. Peds. (#/hr)				20		20			20			20
Turn Type				custom		Free			Free			Free
Protected Phases								2			6	
Permitted Phases				8		Free			Free			Free
Actuated Green, G (s)				20.6		100.0		71.4	100.0		71.4	100.0
Effective Green, g (s)				20.6		100.0		71.4	100.0		71.4	100.0
Actuated g/C Ratio				0.21		1.00		0.71	1.00		0.71	1.00
Clearance Time (s)				4.0				4.0			4.0	
Vehicle Extension (s)				3.0				3.0			3.0	
Lane Grp Cap (vph)				681		1555		2527	1536		2527	1536
v/s Ratio Prot								0.36			0.25	
v/s Ratio Perm				0.17		0.21			c0.94			0.41
v/c Ratio				0.84		0.21		0.51	0.94		0.35	0.41
Uniform Delay, d1				38.1		0.0		6.4	0.0		5.5	0.0
Progression Factor				1.00		1.00		0.93	1.00		1.00	1.00
Incremental Delay, d2				9.2		0.3		0.2	4.5		0.4	0.8
Delay (s)				47.4		0.3		6.1	4.5		5.9	0.8
Level of Service				D		A		A	A		A	A
Approach Delay (s)		0.0			30.2			5.3			3.8	
Approach LOS		A			C			A			A	

Intersection Summary

HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	309	0	2177	0	0	0	0	1003	213	0	1097	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	336	0	2366	0	0	0	0	1090	232	0	1192	241
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	336	0	2334	0	0	0	0	1090	232	0	1192	241
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	47.0		47.0					45.0	100.0		45.0	100.0
Effective Green, g (s)	47.0		47.0					45.0	100.0		45.0	100.0
Actuated g/C Ratio	0.47		0.47					0.45	1.00		0.45	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1553		1614					1593	1536		1593	1536
v/s Ratio Prot								0.31			c0.34	
v/s Ratio Perm	0.10		c0.68						0.15			0.16
v/c Ratio	0.22		1.45					0.68	0.15		0.75	0.16
Uniform Delay, d1	15.6		26.5					21.9	0.0		22.8	0.0
Progression Factor	1.00		1.00					0.90	1.00		0.80	1.00
Incremental Delay, d2	0.1		204.2					0.6	0.1		2.8	0.2
Delay (s)	15.7		230.7					20.3	0.1		21.1	0.2
Level of Service	B		F					C	A		C	A
Approach Delay (s)		204.0			0.0			16.8			17.6	
Approach LOS		F			A			B			B	

Intersection Summary

HCM Average Control Delay	109.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱↱					↑↑	↱		↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	4.0
Lane Util. Factor	0.97		0.76					0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00		0.95					1.00	0.97		1.00	0.97
Flpb, ped/bikes	0.96		1.00					1.00	1.00		1.00	1.00
Frt	1.00		0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	3304		3434					3539	1536		3539	1536
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	3304		3434					3539	1536		3539	1536
Volume (vph)	674	0	1215	0	0	0	0	1805	571	0	1053	452
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	733	0	1321	0	0	0	0	1962	621	0	1145	491
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	733	0	1282	0	0	0	0	1962	621	0	1145	491
Confl. Peds. (#/hr)	20		20						20			20
Turn Type	custom		custom						Free			Free
Protected Phases								2			6	
Permitted Phases	4		4						Free			Free
Actuated Green, G (s)	44.4		44.4					47.6	100.0		47.6	100.0
Effective Green, g (s)	44.4		44.4					47.6	100.0		47.6	100.0
Actuated g/C Ratio	0.44		0.44					0.48	1.00		0.48	1.00
Clearance Time (s)	4.0		4.0					4.0			4.0	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	1467		1525					1685	1536		1685	1536
v/s Ratio Prot								c0.55			0.32	
v/s Ratio Perm	0.22		c0.37						0.40			0.32
v/c Ratio	0.50		0.84					1.16	0.40		0.68	0.32
Uniform Delay, d1	19.9		24.7					26.2	0.0		20.3	0.0
Progression Factor	1.00		1.00					0.81	1.00		0.79	1.00
Incremental Delay, d2	0.3		4.4					74.7	0.1		2.0	0.5
Delay (s)	20.1		29.0					95.9	0.1		18.0	0.5
Level of Service	C		C					F	A		B	A
Approach Delay (s)		25.8			0.0			72.9			12.8	
Approach LOS		C			A			E			B	

Intersection Summary

HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.97	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1798	1506		1828	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	49	19	46	90	144	152	152	941	92	522	1279	706
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	21	50	98	157	165	165	1023	100	567	1390	767
RTOR Reduction (vph)	0	0	45	0	0	114	0	0	74	0	0	690
Lane Group Flow (vph)	0	74	5	0	255	51	165	1023	26	567	1390	77
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		10.0	10.0		18.7	31.2	14.9	24.1	24.1	31.2	40.4	10.0
Effective Green, g (s)		10.0	10.0		18.7	31.2	14.9	24.1	24.1	31.2	40.4	10.0
Actuated g/C Ratio		0.10	0.10		0.19	0.31	0.15	0.24	0.24	0.31	0.40	0.10
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		180	151		342	494	264	853	363	1071	2054	279
v/s Ratio Prot		c0.04			c0.14	0.03	c0.09	c0.29		0.17	c0.27	0.03
v/s Ratio Perm			0.00						0.02			
v/c Ratio		0.41	0.03		0.75	0.10	0.62	1.20	0.07	0.53	0.68	0.27
Uniform Delay, d1		42.2	40.6		38.4	24.5	39.9	38.0	29.3	28.3	24.4	41.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.88	0.88	3.44
Incremental Delay, d2		1.5	0.1		8.6	0.1	4.6	101.0	0.4	0.0	0.2	0.0
Delay (s)		43.8	40.7		47.0	24.6	44.5	138.9	29.7	25.0	21.6	143.2
Level of Service		D	D		D	C	D	F	C	C	C	F
Approach Delay (s)		42.5			38.2			118.3			56.6	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	71.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	0.97	0.91	0.88
Frpb, ped/bikes		1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1783	1506		1783	1583	1770	3539	1506	3433	5085	2787
Flt Permitted		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1783	1506		1783	1583	1770	3539	1506	3433	5085	2787
Volume (vph)	502	56	88	106	13	281	66	1747	155	284	1442	115
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	546	61	96	115	14	305	72	1899	168	309	1567	125
RTOR Reduction (vph)	0	0	62	0	0	260	0	0	59	0	0	86
Lane Group Flow (vph)	0	607	34	0	129	45	72	1899	109	309	1567	39
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Turn Type	Split		Perm	Split		Over	Prot		Perm	Prot		Over
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases			4						2			
Actuated Green, G (s)		24.0	24.0		12.2	14.6	8.1	33.2	33.2	14.6	39.7	24.0
Effective Green, g (s)		24.0	24.0		12.2	14.6	8.1	33.2	33.2	14.6	39.7	24.0
Actuated g/C Ratio		0.24	0.24		0.12	0.15	0.08	0.33	0.33	0.15	0.40	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		428	361		218	231	143	1175	500	501	2019	669
v/s Ratio Prot		c0.34			c0.07	0.03	0.04	c0.54		c0.09	c0.31	0.01
v/s Ratio Perm			0.02						0.07			
v/c Ratio		1.42	0.09		0.59	0.19	0.50	1.62	0.22	0.62	0.78	0.06
Uniform Delay, d1		38.0	29.5		41.5	37.5	44.0	33.4	24.0	40.1	26.3	29.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.37
Incremental Delay, d2		201.5	0.1		4.3	0.4	2.8	281.2	1.0	1.4	1.9	0.0
Delay (s)		239.5	29.7		45.8	37.9	46.8	314.6	25.0	41.6	23.8	40.3
Level of Service		F	C		D	D	D	F	C	D	C	D
Approach Delay (s)		210.9			40.3			282.9			27.6	
Approach LOS		F			D			F			C	

Intersection Summary

HCM Average Control Delay	156.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	108.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.94		1.00	1.00		1.00	0.97	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1734		1770	3523		1770	3423	
Flt Permitted		0.78			0.88		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1377			1555		1770	3523		1770	3423	
Volume (vph)	84	8	53	23	21	30	104	1156	36	73	863	241
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	9	58	25	23	33	113	1257	39	79	938	262
RTOR Reduction (vph)	0	20	0	0	24	0	0	1	0	0	14	0
Lane Group Flow (vph)	0	138	0	0	57	0	113	1295	0	79	1186	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		13.9			13.9		9.8	59.0		8.2	57.4	
Effective Green, g (s)		13.9			13.9		9.8	59.0		8.2	57.4	
Actuated g/C Ratio		0.15			0.15		0.11	0.63		0.09	0.62	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		206			232		186	2233		156	2110	
v/s Ratio Prot							c0.06	c0.37		0.04	0.35	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.67			0.25		0.61	0.58		0.51	0.56	
Uniform Delay, d1		37.4			35.0		39.8	9.9		40.5	10.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		8.3			0.6		5.5	1.1		2.6	1.1	
Delay (s)		45.8			35.5		45.3	11.0		43.1	11.6	
Level of Service		D			D		D	B		D	B	
Approach Delay (s)		45.8			35.5			13.7			13.5	
Approach LOS		D			D			B			B	

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.96		1.00	1.00		1.00	0.98	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1713			1760		1770	3526		1770	3460	
Flt Permitted		0.79			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1387			1489		1770	3526		1770	3460	
Volume (vph)	190	18	147	28	29	23	112	1319	35	68	1253	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	20	160	30	32	25	122	1434	38	74	1362	239
RTOR Reduction (vph)	0	20	0	0	12	0	0	1	0	0	11	0
Lane Group Flow (vph)	0	367	0	0	75	0	122	1471	0	74	1590	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.0			30.0		12.6	56.9		8.5	52.8	
Effective Green, g (s)		30.0			30.0		12.6	56.9		8.5	52.8	
Actuated g/C Ratio		0.28			0.28		0.12	0.53		0.08	0.49	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		387			416		208	1868		140	1701	
v/s Ratio Prot							c0.07	0.42		0.04	c0.46	
v/s Ratio Perm		c0.26			0.05							
v/c Ratio		0.95			0.18		0.59	0.79		0.53	0.93	
Uniform Delay, d1		37.9			29.4		44.9	20.4		47.5	25.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		32.2			0.2		4.2	3.4		3.6	11.0	
Delay (s)		70.1			29.6		49.1	23.8		51.1	36.7	
Level of Service		E			C		D	C		D	D	
Approach Delay (s)		70.1			29.6			25.7			37.4	
Approach LOS		E			C			C			D	

Intersection Summary

HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	107.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

F3.12

Linscott Law & Greenspan, RBF Consulting, Responses to Caltrans Comment S-2-2

LINSCOTT
LAW &
GREENSPAN
engineers

December 2, 2010

Lauren Cooper
Director, Facilities Planning, Design and Construction
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-1624

LLG Reference: 3-08-1857

Subject: **SDSU Plaza Linda Verde Traffic Study**

Dear Ms. Cooper,

In response to comments submitted by Caltrans in its letter dated November 10, 2010, Linscott, Law & Greenspan, Engineers (LLG) was asked to prepare this Opinion Letter as to the level and type of mitigation required to mitigate the subject project's significant cumulative impact at the I-8 eastbound ramp/College Avenue intersection.

The improvements referenced in the Caltrans letter included increasing the storage capacity on the eastbound to College Avenue off-ramp, modifying the ramp's terminus with College Avenue (i.e. modifying the ramp alignment so that the lanes terminate at a right angle to College Avenue) and replacing and relocating the traffic signals at the intersections. It is our opinion that these improvements are not required to mitigate the project's significant cumulative impact at the intersection.

LLG's analysis shows that the addition of a third northbound through lane on College Avenue between Canyon Crest Drive and the I-8 eastbound on-ramp would fully mitigate the identified impact as shown in Table 21-3 of the traffic study and no further improvements are necessary.

Please call me if you have any questions.

Sincerely,

Linscott, Law & Greenspan, Engineers

John Boarman, P.E.
Principal

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RBF CONSULTING

December 2, 2010

Lauren Cooper, Director
Facilities Planning, Design and Construction
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-1624

Dear Ms. Cooper

We have reviewed the letter from Caltrans in relation to the traffic mitigation measures for the proposed Plaza Linda Verde project at San Diego State University (SDSU).

Per the mitigation measure recommended by LLG, RBF analyzed the impact from a civil engineering perspective required to "re-stripe College Avenue to provide an additional (third) northbound (NB) through lane from 500 feet south of the Canyon Crest Drive intersection to the I-8 EB ramps".

Per the letter sent to Lauren Cooper at SDSU on November 10, 2010, Caltrans had comments on the above referenced mitigation measure. The comments deemed directly applicable to the civil engineering aspect of the mitigation measure, along with responses/opinions, are as follows:

1. **"...removal of the median island..."**

   The median island will be removed and replaced. The restriping of College Avenue to add a third northbound lane will require the removal of the existing raised median. This median is anticipated to be replaced and moved to the west with a raised 2' median to accommodate the traffic signal at College Avenue and delineate the boundary of the two dedicated left turn lanes from Southbound College Avenue onto Alvarado Road.

2. **"...the free right to Canyon Crest Drive would be retained."**

   The existing free right is retained. It is not anticipated to be affected by the restriping of College Avenue.

3. **"The box culvert that runs under I-8 may need to be reviewed for possible modification..."**

   We reviewed the box culvert under I-8, and it will not be affected by the restriping effort. This box culvert is located at the beginning of the I-8 eastbound off ramp onto College Avenue. The restriping occurs on College Avenue itself and is not anticipated to affect the culvert or the off-ramp in the vicinity of the culvert.

4. "...at a minimum, require a retaining wall between the right shoulder and Alvarado Creek."

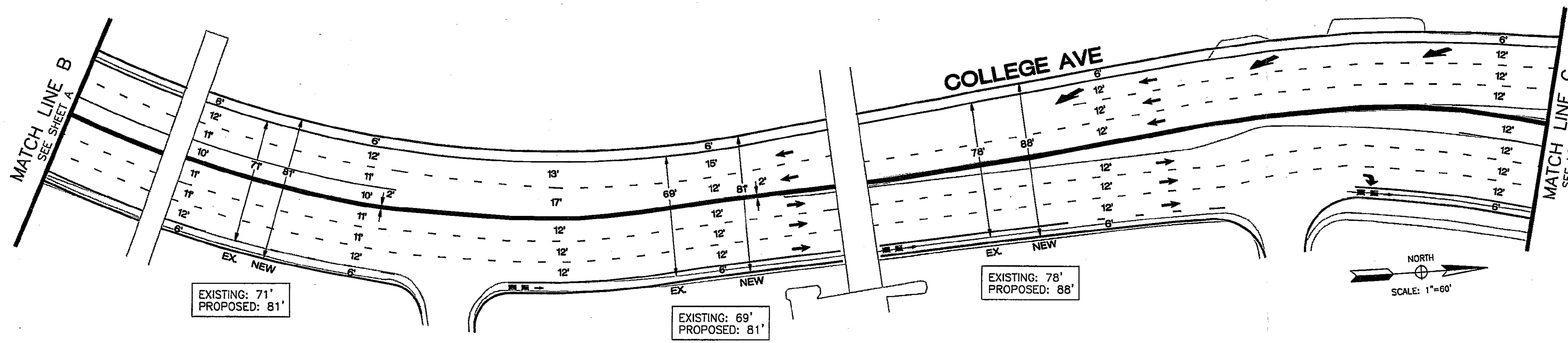
   The restriping is not anticipated to affect the right shoulder of College Avenue or the eastbound offramp. It is our opinion that the addition of a 3rd northbound lane on College Avenue through restriping does not warrant the addition of a retaining wall.

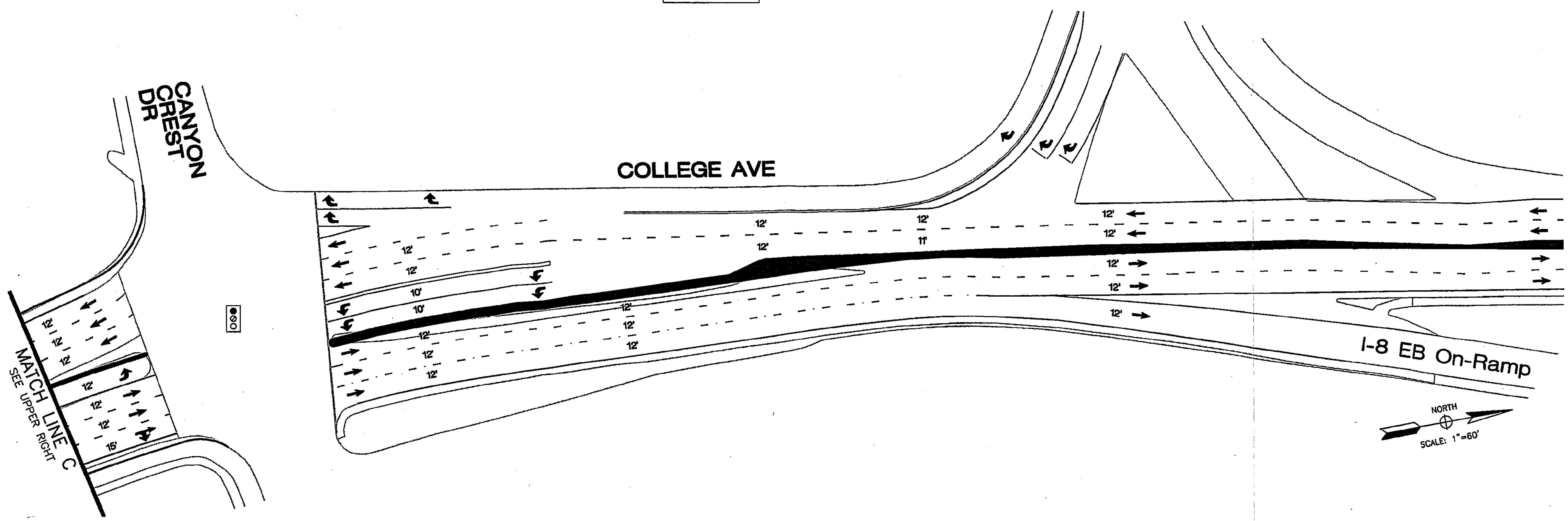
Upon completion of our review, it is our opinion that the mitigation measures recommended by LLG do not adversely affect Alvarado Creek or the accompanying drainage structures. Since improvements to the eastbound I-8 College Avenue off-ramp are not included with the mitigation measures recommended by LLG, no improvements in this area are anticipated.

If you have any questions or require addition information, please do not hesitate to contact either Brian Wiese 858-810-1467 (bwiese@rbf.com) or Jim Haughey 858-614-5038 (jrhaughey@rbf.com).

Sincerely

James Haughey, P.E.
Project Manager





LINSCOTT LAW & GREENSPAN
engineers

REV. 12/6/10
N:\1857\Figures\May 2010\LLG1857 B2.dwg

Figure B

Proposed Roadway Geometry

PLAZA LINDA VERDE

F3.12

Excerpts, 2007 Campus Master Plan Environmental Impact Report
Parking Analysis

the following freeway segments were analyzed to satisfy the CMP requirements. The results of the analysis are provided above, in **Section 3.14.7**:

- I-8 between Fairmount Avenue to Waring Road
- I-8 between Waring Road and College Avenue
- I-8 between College Avenue and Lake Murray Blvd / 70th Street
- I-8 east of Lake Murray Boulevard / 70th Street

As noted in **Section 3.14.7**, at buildout year, the proposed project would result in significant impacts to each of the four freeway segments.

3.14.10 PARKING ANALYSIS

3.14.10.1 Existing Parking Supply and Demand

LLG commissioned parking counts in October 2006, while school was in session, in order to determine the parking supply and demand on campus. The supply of parking when the counts were undertaken in October was 13,924 spaces campus-wide.

Table 3.14-34, Existing Parking Supply and Demand, lists by hour and category (students, faculty/staff, and special permit) the existing supply and demand for each parking lot and structure on the SDSU campus counted. From this table it is possible to determine the peak parking time and the peak parking occupancy for each parking lot and structure. In general, parking lots and structures closer to the central campus buildings have a higher occupancy level for greater portions of the day than those lots and structures that are more distant.

Table 3.14-35, Existing Parking Supply and Demand Summary, provides a summary of the parking supply and demand data contained in **Table 3.14-34**. As shown in **Table 3.14-35**, the average peak hour demand for parking is between 10:00 am and 11:00 am when 65% (9,030 out of 13,924 spaces) of the campus parking spaces are occupied.

3.14.10.2 Future Parking Requirements

Using the above parking count data and the current student headcount enrollment of 33,441 students, the existing average peak parking demand is 0.27 parking spaces per student. (9,030 existing parking demand ÷ 33,441 students) = 0.27 parking spaces per student.

Based on this parking rate, the future demand for student, faculty, staff, and visitor parking can be determined based on the projected increased student enrollment. Based on the project buildout 2024/25 projected enrollment of 44,826 students, the project buildout parking demand would be approximately 12,103 parking spaces. (44,826 students * 0.27 parking spaces per student) = 12,103 parking spaces.

Based on the number of existing and planned parking spaces on campus, there will be a total of 15,591 parking spaces planned for the horizon year. This amount represents 3,488 parking spaces more than the calculated demand of 12,103 parking spaces. **EIR Appendix N, Appendix O**, contains a table detailing the parking spaces to be provided over the next ten years, and a map of the existing parking lots/structures.

Based on the above calculations, the project would not result in significant impacts relating to parking.

Table 3.14-34
Existing Parking Supply And Demand

Parking Type	Supply	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM
Parking Lot A										
Student	447	201 [a]	310	366	363	Break	363	351	306	281
Special Permit [b]	19	9	10	10	13	Break	9	11	9	8
Total	466	210	320	376	376	Break	371	362	315	289
Percentage Occupied		45%	69%	81%	81%	Break	80%	78%	68%	62%
Parking Lot B										
Special Permit	8	4	5	6	6	Break	4	5	4	5
Percentage Occupied		50%	63%	75%	75%	Break	50%	63%	50%	63%
Parking Lot C										
Student	507	212	272	304	335	Break	332	297	279	241
Special Permit	8	4	6	4	3	Break	4	4	3	2
Total	515	216	278	308	338	Break	336	301	282	243
Percentage Occupied		42%	54%	60%	66%	Break	65%	58%	55%	47%
Parking Lot D										
Student	432	0	0	0	0	Break	0	0	0	0
Percentage Occupied		0%	0%	0%	0%	Break	0%	0%	0%	0%
Parking Lot E										
Student	229	126	159	163	160	Break	163	161	157	171
Special Permit	16	0	1	1	0	Break	0	0	0	0
Total	245	126	160	164	160	Break	163	161	157	171
Percentage Occupied		51%	65%	67%	65%	Break	67%	66%	64%	70%
Parking Lot F										
Faculty/Staff	253	180	253	253	253	Break	253	253	253	213
Special Permit	9	9	9	9	9	Break	9	9	9	25
Total	262	189	262	262	262	Break	262	262	262	238
Percentage Occupied		72%	100%	100%	100%	Break	100%	100%	100%	91%
Parking Lot G										
Faculty/Staff	49	32	49	49	49	Break	49	49	49	49
Special Permit	25	5	25	25	25	Break	25	25	25	25
Total	74	37	74	74	74	Break	74	74	74	74
Percentage Occupied		50%	100%	100%	100%	Break	100%	100%	100%	100%

Table 3.14-34
Existing Parking Supply And Demand

Parking Type	Supply	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM
Parking Lot H										
Special Permit	22	6	6	6	7	Break	7	11	6	8
Percentage Occupied		27%	27%	27%	32%	Break	32%	50%	27%	36%
Parking Lot K										
Special Permit	14	3	4	6	7	Break	5	4	5	5
Percentage Occupied		21%	29%	43%	50%	Break	36%	29%	36%	36%
Parking Lot L										
Special Permit	97	20	25	26	25	Break	22	22	22	21
Percentage Occupied		21%	26%	27%	26%	Break	23%	23%	23%	22%
Parking Lot M										
Special Permit	51	18	20	24	25	Break	25	27	23	32
Percentage Occupied		35%	39%	47%	49%	Break	49%	53%	45%	63%
Parking Lot N										
Special Permit	32	0	3	4	8	Break	2	0	0	0
Percentage Occupied		0%	9%	13%	25%	Break	6%	0%	0%	0%
Parking Lot P										
Special Permit	39	0	0	0	1	Break	2	1	2	1
Percentage Occupied		0%	0%	0%	3%	Break	5%	3%	5%	3%
Parking Lot Q										
Special Permit	44	3	7	8	10	Break	16	9	6	5
Percentage Occupied		7%	16%	18%	23%	Break	36%	20%	14%	11%
Parking Lot R										
Student	28	8	9	10	12	Break	7	10	5	4
Special Permit	16	2	1	3	3	Break	2	2	1	2
Total	44	10	10	13	15	Break	9	12	6	6
Percentage Occupied		23%	23%	30%	34%	Break	20%	27%	14%	14%
Parking Lot U										
Student	145	141	141	140	137	Break	137	137	140	140
Special Permit	11	6	6	6	4	Break	5	6	6	3
Total	156	147	147	146	141	Break	142	143	146	143
Percentage Occupied		94%	94%	94%	90%	Break	91%	92%	94%	92%

Table 3.14-34
Existing Parking Supply And Demand

Parking Type	Supply	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM
Parking Lot V										
Student	65	66	66	68	67	Break	66	64	64	63
Special Permit	17	8	9	9	7	Break	8	9	7	7
Total	82	74	75	77	74	Break	74	73	71	70
Percentage Occupied		90%	91%	94%	90%	Break	90%	89%	87%	85%
Parking Lot W										
Student	381	264	364	349	346	Break	321	334	340	352
Special Permit	16	0	1	2	4	Break	5	4	5	3
Total	397	264	365	351	350	Break	326	338	345	355
Percentage Occupied		66%	92%	88%	88%	Break	82%	85%	87%	89%
Parking Lot X										
Faculty/Staff	97	31	47	59	57	Break	65	63	56	47
Student	397	117	268	313	335	Break	301	258	232	205
Special Permit	6	2	1	1	0	Break	0	1	2	2
Total	500	150	316	373	392	Break	366	322	290	254
Percentage Occupied		30%	63%	75%	78%	Break	73%	64%	58%	51%
Underground Parking (Student Services)										
Special Permit	83	25	37	44	45	Break	52	52	52	56
Percentage Occupied		30%	45%	53%	54%	Break	63%	63%	63%	67%
Parking Structure 1										
Faculty/Staff	1112	283	410	585	648	Break	709	671	692	704
Student	656	494	761	762	761	Break	739	719	700	651
Special Permit	160	16	24	40	42	Break	56	59	58	55
Total	1928	793	1195	1387	1451	Break	1504	1449	1450	1410
Percentage Occupied		41%	62%	72%	75%	Break	78%	75%	75%	73%
Parking Structure 2										
Faculty/Staff	495	184	444	494	492	Break	465	478	457	413
Special Permit	17	4	6	11	11	Break	9	10	8	7
Total	512	188	450	505	503	Break	474	488	465	420
Percentage Occupied		37%	88%	99%	98%	Break	93%	95%	91%	82%

Table 3.14-34
Existing Parking Supply And Demand

Parking Type	Supply	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM
Parking Structure 3										
Faculty/Staff	22	0	0	1	3	Break	1	3	3	12
Student	1849	1043	959	737	536	Break	569	672	783	1001
Special Permit	8	4	3	3	4	Break	4	3	3	5
Total	1879	1047	962	741	543	Break	574	678	789	1018
Percentage Occupied		56%	51%	39%	29%	Break	31%	36%	42%	54%
Parking Structure 4										
Faculty/Staff	463	203	375	459	512	Break	483	496	444	429
Student	1416	1173	1366	1354	1365	Break	1305	1251	1243	1293
Special Permit	91	13	31	38	40	Break	43	32	29	27
Total	1970	1389	1772	1851	1917	Break	1831	1779	1716	1749
Percentage Occupied		71%	90%	94%	97%	Break	93%	90%	87%	89%
Parking Structure 5										
Faculty/Staff	27	17	17	17	17	Break	17	15	15	13
Student	1315	632	632	1259	1278	Break	1228	1179	1111	987
Special Permit	33	8	19	27	30	Break	29	31	31	29
Total	1375	657	668	1303	1325	Break	1274	1225	1157	1029
Percentage Occupied		48%	49%	95%	96%	Break	93%	89%	84%	75%
Parking Structure 6										
Student	2441	1474	1136	780	632	Break	673	850	861	1025
Special Permit	37	1	2	3	2	Break	8	2	2	1
Total	2478	1475	1138	783	634	Break	681	852	863	1026
Percentage Occupied		60%	46%	32%	26%	Break	27%	34%	35%	41%
Parking Structure 8										
Faculty/Staff	143	114	135	133	134	Break	127	125	115	115
Special Permit	76	15	26	33	32	Break	39	41	32	32
Total	219	129	161	166	166	Break	166	166	147	147
Percentage Occupied		59%	74%	76%	76%	Break	76%	76%	67%	67%

Notes:
a. Number in cell represents the parking demand at the listed time.
b. Special Permit parking spaces counted included disabled parking spaces, vendor spaces, visitor spaces, etc.

Table 3.14-35
Existing Parking Supply and Demand Summary

Parking Type	Supply	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM
Faculty/Staff	2,661	1,044	1,742	2,082	2,206	Break	2,211	2,190	2,115	2,029
Students	10,308	5,951	6,443	6,605	6,327	Break	6,204	6,283	6,221	6,414
Special Permit	955	185	285	343	360	Break	394	386	354	349
Grand Total	**13,924**	**7,180**	**8,470**	**9,030**	**8,893**	**Break**	**8,809**	**8,859**	**8,690**	**8,792**
Percentage Occupied		**52%**	**61%**	**65%**	**64%**	**Break**	**63%**	**64%**	**62%**	**63%**

Notes:

a. Number in cell represents the parking demand at the listed time.

b. Special Permit parking spaces counted included disabled parking spaces, vendor spaces, visitor spaces, etc.

F3.12

RBF Consulting, College Avenue Widening Feasibility

RBF CONSULTING

March 14, 2011 25-103924.001

Mr. Michael Haberkorn
Gatzke Dillon & Ballance LLP
1525 Faraday Avenue
Suite 150
Carlsbad, California 92008

RE: Plaza Linda Verde - College Avenue Street Widening

Dear Mr. Haberkorn:

Pursuant to your request, we reviewed the City of San Diego Street Design Manual for information regarding street improvements in previously developed areas. Accordingly, we found the following applicability statements in the city document:

"These guidelines are applicable primarily to newly developed areas and to older areas that are undergoing major revitalization and redevelopment. In areas with sensitive habitat or unusual difficult terrain, these guidelines may be modified as appropriate."

"The manual establishes guidelines to carry out the City's street design functions. It does not establish a legal standard for such functions nor is it intended that it should do so."

In the case of College Avenue, we have found that excessive site limitations predominantly exist. Therefore, widening of College Avenue is not a feasible alternative considering the existing site conditions.

From a civil engineering review and perspective, much of the roadway is aligned between sloping terrain. On the west side of the road, the adjacent side slope is steep with existing structures/facilities at the top making the possibility of widening largely infeasible. At the very least, construction of extremely high retaining walls would be required. If high retaining walls are used to create additional room for road widening, their significant height may make them undesirable from an aesthetic standpoint of the community.

On the east side of the road, the feasibility of a road widening is limited by the existing parking lots and parking structure immediately at the top/bottom of adjacent slopes. Additionally, part of the sloping area on the east side contains mature pine trees, the removal of which may detract from the visual appeal and character of a main transportation corridor in the College Area. In addition to the slopes, College Avenue crosses beneath three existing pedestrian bridges, at least one of which would require full replacement.

In summary, the existing physical constraints in the area limit the feasibility to widen College Avenue. The addition of a third northbound lane on College Avenue through re-striping has been determined by LLG to be sufficient in mitigating traffic impacts of the project for both the near and long term.

If you have any questions regarding this information, please do not hesitate to call.

Sincerely,

James R. Haughey, PE, LEED AP
Vice President
RBF Consulting

F3.12

MTS Bus Specifications

This photo was taken on January 2, 2009 in Banke Hill, San Diego, CA, US, using a Nikon D80.

3,505 views 27 comments 30 fav

This photo belongs to

So Cal Metro's photostream (11,169)

This photo also appears in

- Explore (set)
- My Favorites (set)
- Buses (set)
- San Diego MTS (set)
- San Diego (group)

MTS Bus

2008 North American Bus Industries (NABI) 60BRT articulated bus in Balboa Park, San Diego.

Low floor				
NABI BRT [16]	37 ft (11.28 m), 42 ft (12.80 m), 60 ft (18.29 m), 65 ft (19.81 m)	102 in (2.59 m)		Diesel, Compressed natural gas, Diesel-electric
Sirius [17]	37 ft (11.28 m), 42 ft (12.80 m), 60 ft (18.29 m), 65 ft (19.81 m)	102 in (2.59 m)		Diesel, Compressed natural gas, Diesel-electric
Optima Opus[18]	30 ft (9.14 m), 35 ft (10.67 m)	99 in (2.51 m)		Diesel, diesel-electric
NABI LFW [19]	31 ft (9.45 m), 35 ft (10.67 m), 40 ft (12.19 m)	102 in (2.59 m)		Diesel, diesel-electric, compressed natural gas, liquefied natural gas,
NABI Metro 45C [20]	45 ft (13.72 m)	102 in (2.59 m)		Diesel, Compressed natural gas
Blue Bird Ultra LF[21]	30 ft (9.14 m),	102 in (2.59 m)		Diesel, Compressed

F3.12

HCM Manual, Table 6,
Inputs and Assumptions for Intersection Capacity Analysis

TABLE 6
Inputs and Assumptions for Intersection Capacity Analysis
Using the Highway Capacity Manual (HCM) Method

- Arrival Type = 3-5
- Cycle Length © = 60-120 seconds (or observed at existing locations)
- Ideal Saturation Flow Rate for HCM software = 1,900 pcphpl
- Minimum Green for each phase = 5-10 seconds
- Yellow Interval:

85% Approach Speed (mph)	*Yellow Interval (seconds)
35 or less	3.0
40	3.5
45	4.0
50	4.5
55	5.0
60	5.5

*Add 1 second for an all-red interval at all intersections.

- Minimum Heavy Vehicles = 2-4%
- Peak Hour Factor (PHF) = 0.80-0.95
- Minimum Pedestrians = 10/hour/approach

The following factors are used to convert daily volumes to peak hour volumes:

- Directional Factor (D) = 0.55-0.75
- Design Hour Factor (K) = 0.07-0.11
- Peak Hour Peak Direction = 0.05-0.08

NOTES:

1. Arrival Type 4 or 5 should be used for intersection approaches which are part of a coordinated arterial system.
2. Ideal Saturation Flow rate inputs may be higher than 1,900 pcphpl for individual movements at intersections with very high traffic volume. The use of higher saturation flow rate must be identified.
3. Level of Service F is not acceptable for intersection approaches except for side streets on an interconnected arterial system.
4. The 85% speeds can be obtained from the City's Traffic Engineering Division, Traffic Safety Information and Research Section.

F3.12

SANDAG, Regional Planning Committee Agenda, Agenda Item #7
(December 3, 2010)

REGIONAL PLANNING COMMITTEE

December 3, 2010

AGENDA ITEM NO.: 7

Action Requested: INFORMATION

REGIONAL HOUSING NEEDS ASSESSMENT (RHNA) DETERMINATION File Number 3100000

Introduction

The Regional Housing Needs Assessment (RHNA) process for the fifth housing element cycle (January 1, 2013 – December 31, 2020) is being conducted in conjunction with the development of the 2050 Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) in accordance with Senate Bill (SB) 375 (Steinberg). SB 375 calls for the coordination and integration of housing planning with the regional transportation plan.

The RHNA process has three main components:

- RHNA-Determination - HCD's regionwide housing need determination;
- RHNA-Plan - SANDAG's plan to distribute the RHNA-Determination to the local jurisdictions by four income categories, which includes the RHNA methodology; and
- RHNA - Each jurisdiction's housing need allocation in four income categories for use in updating local housing elements.

SANDAG has received its RHNA-Determination from the California Department of Housing and Community Development (HCD) following a consultation process between the two agencies, which began in June 2010 (Attachment 1). State housing element law requires HCD to consult with SANDAG in determining the region's overall housing need. HCD's RHNA-Determination is required to be completed at least two years before the scheduled revision of the next housing element. Housing elements for the San Diego region are required to be completed within 18 months following the adoption of the 2050 Regional Transportation Plan (RTP). Based on the current RTP schedule, local jurisdiction housing elements for the fifth housing element cycle shall be completed (including a finding of compliance by HCD) by January 21, 2013 (18 months following the July 22, 2011, planned adoption of the RTP).

HCD's RHNA-Determination for the 11-Year RHNA Projection Period of January 1, 2010, through December 31, 2020, is 161,980 housing units. The regional distribution of the RHNA-Determination by income category is shown in the table below.

Regionwide Distribution of Total RHNA-Determination by Income Category

Income Categories	%	Units
Very Low	22.5%	36,450
Low	17.1%	27,700
Moderate	18.9%	30,610
Above-Moderate	41.5%	67,220
Total		161,980

SANDAG is holding joint meetings of the Regional Planning Technical Working Group (TWG) and Regional Housing Working Group (RHWG) to develop a draft of the RHNA-Plan. The RHNA-Plan will include the RHNA methodology, how the methodology meets the RHNA objectives, how the factors in housing element law were used in the RHNA methodology, and the RHNA for each jurisdiction.

Discussion

HCD-SANDAG Consultation Process

The consultation process for the RHNA-Determination between SANDAG and HCD occurred between June and November 2010. The consultation process included meetings and conference calls during which information was exchanged about assumptions and the methodology (population projections, vacancy rates, household formation rates, etc.) to be used in the determination. Attachment 2 (excerpted from housing element law) includes a list of the information SANDAG provided HCD during the consultation process.

Difference between HCD RHNA-Determination and SANDAG 2050 Regional Growth Forecast

As reported to the Regional Planning Committee, SANDAG Board of Directors, and at joint meetings of the Regional Planning TWG and RHWG, the 2050 Regional Growth Forecast (RGF) projects that about 127,000 housing units will be built during the 11-year RHNA projection period. The RHNA-Determination projects the need for 161,980 housing units, almost 35,000 more units than the 2050 RGF for the same time period.

The two projections have different purposes and were developed using different assumptions. The 2050 RGF reflects the number of housing units that are likely to be built in the region during the 11-year period based on economic, fiscal, and other policy factors. The RHNA-Determination is a projection of housing need based solely on demographic considerations such as population growth, vacancy rates and household formation rates, and is not influenced by economic factors. The 2050 RGF is oriented toward actual housing production, whereas the RHNA-Determination is focused on planning for adequate housing capacity.

Adequacy of Housing Capacity for RHNA based on 2050 Regional Growth Forecast

Data from the 2050 RGF demonstrate the San Diego region's ability to accommodate the overall RHNA-Determination of 161,980 housing units, and the lower income RHNA of ~~64,143~~ 64,150 units (~~36,445~~ 36,450 very low income units plus ~~27,698~~ 27,700 low income units). First, the 2050 RGF projects the construction of 169,528 housing units between January 1, 2010, and January 1, 2025 (only four years beyond the RHNA Projection Period).

Second, the forecast also contains a capacity of over 200,000 housing units in the category of 30 dwelling units per acre or greater (based primarily on existing general/community plans and policies), which demonstrates that the region has more than enough sites planned to meet its RHNA-Determination lower income housing need of ~~64,143~~ 64,150 units. Housing element law requires jurisdictions to identify adequate sites to accommodate their share of the region's lower income housing needs and allows the use of sites with densities of at least 30 dwelling units per acre (at least 20 dwelling units per acre for Coronado, Del Mar, and Solana Beach) in their analysis.

SB 375 (Steinberg) and RHNA

SB 375 calls for a land use pattern that will help meet regional GHG targets by improving transportation and land use coordination and jobs housing balance, creating more transit-oriented, compact and walkable communities, providing more housing capacity for all income levels, and protecting resource areas (such as sensitive habitat areas and mineral resources) and farmland.

SB 375 requires that the RHNA be consistent with the development pattern of the SCS, that the SCS show that it accommodates the RHNA, and that the SCS land use pattern, and therefore the RHNA, assist the region in meeting the greenhouse gas (GHG) reduction targets set by the California Air Resources Board (CARB) in September 2010. SANDAG is developing the RHNA, SCS, and RTP in a way that assists the region in meeting its GHG targets, and the 2050 Regional Growth Forecast serves as a foundation in their development.

State housing element law (Government Code Section 65584 (d)) states that the RHNA shall be consistent with the four following objectives. These objectives are consistent with the SANDAG RCP and Smart Growth Concept Map and include:

1. Increasing the housing supply and the mix of housing types, tenure, and affordability in all cities and counties within the region in an equitable manner, which shall result in all jurisdictions receiving an allocation of units for low- and very low-income households.
2. Promoting infill development and socioeconomic equity, the protection of environmental and agricultural resources, and the encouragement of efficient development patterns.
3. Promoting an improved intraregional relationship between jobs and housing.
4. Allocating a lower proportion of housing need to an income category when a jurisdiction already has a disproportionately high share of households in that income category.

The 2050 RGF (approved for planning purposes by the SANDAG Board in February 2010) provides the foundation for the 2050 RTP/SCS land use pattern and the RHNA for the fifth housing element cycle. The Forecast identifies existing land uses, planned land uses (on vacant land and in redevelopment and infill areas), habitat conservation areas, agricultural lands, and development constraints, such as steep slopes, floodplains, and wetlands on a parcel level basis, which also are factors that housing element law requires to be considered in the development of the RHNA methodology.

Next Steps

The information in this report will be presented to the Board of Directors on December 17, 2010. The Regional Planning TWG and RHWG are continuing to meet jointly to develop the RHNA-Plan and methodology for allocating the RHNA-Determination by jurisdiction and by the four income categories. Joint meetings of the two working groups are being held monthly through January, with the goal of making a recommendation on the draft RHNA-Plan to the RPC at its February 2011 meeting.

A public hearing on the draft RHNA-Plan is anticipated to be held by the Board of Directors in spring 2011, in addition to public workshops on the draft RHNA-Plan and draft RTP/SCS.

CHARLES "MUGGS" STOLL
Director of Land Use and Transportation Planning

Attachments: 1. Letter from California Department of Housing and Community Development (HCD), HCD Final RHNA-Determination – 1/1/10–12/31/20 (11-Year Projection Period)
2. Excerpt from Housing Element Law – RHNA-Determination

Key Staff Contact: Susan Baldwin, (619) 699-1943, sba@sandag.org

STATE OF CALIFORNIA -BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
DIVISION OF HOUSING POLICY DEVELOPMENT
1800 Third Street, Suite 430
P. O. Box 952053
Sacramento, CA 94252-2053
(916) 323-3177 / FAX (916) 327-2643
www.hcd.ca.gov

November 23, 2010

Mr. Gary L. Gallegos
Executive Director
San Diego Association of Governments
401 B Street, Suite 800
San Diego, CA 95101-4231

Dear Mr. Gallegos:

RE: Regional Housing Need Determination

This letter provides the San Diego Association of Governments (SANDAG) its Regional Housing Need Determination. Pursuant to State housing element law (Government Code Section 65584, et seq.), the Department of Housing and Community Development (Department) is required to provide the determination of SANDAG's existing and projected housing need.

As you know, recent legislation amended State laws impacting regional housing and transportation planning. SB 375 (Chapter 728, Statutes of 2008) strengthened coordination of housing and transportation planning and requires Metropolitan Planning Organizations (MPOs) to prepare a sustainable communities strategy to achieve greenhouse gas emission reductions. Among other things, SB 575 (Chapter 354, Statutes of 2009) included amendments establishing the due date for San Diego local governments to update the fifth revision of their housing elements. In assessing SANDAG's regional housing need, the Department considered the importance of these legislative amendments in connection with the critical role housing plays in creating sustainable communities and providing jobs.

In determining SANDAG's regional housing need, the Department and SANDAG staff completed an extensive consultation process. On June 21, 2010, the Department met with the following SANDAG staff: Mr. Muggs Stoll, Ms. Coleen Clementson, Ms. Susan Baldwin, and Ms. Beth Jarosz. The Department, along with Ms. Baldwin and Ms. Jarosz, also consulted with Ms. Mary Heim, State Department of Finance (DOF) Deputy Director of the Demographic Research Unit. Consultations between June and November included data generation and review by SANDAG, DOF, and the Department.

Attachment 1 displays the minimum regional housing need allocation (RHNA) of 161,980 total units among four income categories for SANDAG to distribute among its local governments. Attachment 2 explains the methodology applied pursuant to Government Code Section 65584.01. As you know, SANDAG is responsible for adopting a methodology and RHNA Plan for the *projection* period beginning January 2010 and ending December 2020. Within 30 days from adopting the Plan, SANDAG must submit the Plan to the Department for approval. Local governments are required to update their Housing Element for the *planning* period beginning January 2013 and ending December 2020 to accommodate the share of RHNA for each income category.

Pursuant to Government Code Section 65584, the methodology to prepare SANDAG's RHNA plan must be consistent with the following objectives:

(1) increasing the housing supply and mix of housing types, tenure, and affordability;
(2) promoting infill development and socioeconomic equity, protecting environmental and agricultural resources, and encouraging efficient development patterns;
(3) promoting an improved intraregional relationship between jobs and housing;
(4) balancing the distribution of households by income category.

The Department commends SANDAG for its leadership and efforts in fulfilling its important role in advancing the State's housing, transportation, and environmental goals. SANDAG is also recognized for successfully undertaking the challenging task of being the first MPO in the State to begin implementing SB 375 including efforts to develop its RHNA and sustainable communities strategy. The Department especially thanks Ms. Baldwin and Ms. Jarosz for their significant efforts and assistance. The Department looks forward to its continued partnership with SANDAG and its member jurisdictions and assisting SANDAG in its planning efforts to accommodate the region's share of housing need.

If the Department can provide any additional assistance, or if you, or your staff, have any questions, please contact Glen Campora, Assistant Deputy Director, at (916) 445-4728.

Sincerely,

Cathy E. Creswell

Cathy E. Creswell
Deputy Director

Enclosures

ATTACHMENT 1

HCD REGIONAL HOUSING NEED DETERMINATION

SANDAG GOVERNMENTS: JANUARY 2010 through DECEMBER 2020

Income Category	Percent	Housing Unit Need
Very-Low	22.5%	36,450
Low	17.1%	27,700
Moderate	18.9%	30,610
Above-Moderate	41.5%	67,220
Total	**100.0%**	**161,980**

Notes:

Housing Need Determination:
Refer to Attachment 2 for a description and explanation of methodology.

The Department and SANDAG staff acknowledge important differences between the "projection" methodology specified in statute to determine housing need versus the "forecasting" methodology SANDAG used for its 2050 Growth Forecast. The planning objective of the RHNA is to accommodate housing "capacity" for projected household growth. However, among the objectives of SANDAG's Growth Forecast is to estimate housing "production" based on policy considerations (including potential constraints) and assumptions regarding variables such as housing prices, resource limitations and market trends, etc. Differences in estimates of the number of housing units can occur from applying different methodologies.

Income Categories:
Each category is defined by California Health and Safety Code (Section 50093, et seq.). Percent is derived based on Census reported household income brackets and county median income. Housing unit need is derived from multiplying income category percent against total.

ATTACHMENT 2

HCD REGIONAL HOUSING NEED DETERMINATION: SANDAG January 2010-December 2020

Methodology

Projected Population, Households, and New Housing Unit Need: December 31, 2020					
1.	**Population: December 31, 2020 (SANDAG's Estimate):**				**3,568,556**
2.	*less: Group Quarter Population (SANDAG's Estimate)*				*-130,973*
3.	**Household (HH) Population:**				**3,437,583**
4.	**Projected Households (HHs):**	**HH Population**	***HH Formation or Headship Rate (DOF)***	**Households**	
	Age Groups (DOF):	3,437,583		1,258,980	
	Under 15 years	710,371	*0.00%*		
	15 - 24 years	427,306	*14.5589%*	62,211	
	25 - 34 years	495,193	*41.9984%*	207,973	
	35 - 44 years	422,529	*50.1651%*	211,962	
	45 - 54 years	425,138	*53.5210%*	227,538	
	55 - 64 years	433,523	*54.8790%*	237,913	
	65 plus years	523,523	*59.4782%*	311,383	
	Projected Households (HHs):				**1,258,980**
5.	*less: Existing Households at Beginning of Projection Period (January 1, 2010)*				*-1,103,320*
6.	**Household (HH) Growth: 11-Year Projection Period (New Housing Unit Need):**				**155,660**
7.	**Vacancy Allowance:**	**Owners**	**Renters**	**Total**	
	Tenure Percentage	55.4%	44.6%		
	New Unit Need	86,304	69,356	155,660	
	Vacancy Rate	2.0%	5.0%		
	Vacancy Allowance	1,726	3,468	5,194	5,194
8.	**Replacement Allowance:**	0.70%		160,853	1,126
REGIONAL HOUSING NEED DETERMINATION (New Housing Unit Need):					**161,980**

Explanation and Data Sources

1. Population: Population reflects SANDAG's January 1, 2021 projection from its 2050 Growth Forecast. Per Government Code 65584.01(b), HCD accepted SANDAG's projection upon determining it was within 3 percent of the population projected by State Department of Finance (DOF) for the same period.
2. Group Quarter Population: Figure is SANDAG's estimate of persons residing in group home/institution/military/dormatory quarters. As this population doesn't constitute a "household" population generating demand for a housing unit, the group quarter population is subtracted from total population to derive household population or the number of persons generating a housing need for a owner or renter unit.
3. Household (HH) Population: The population projected to reside in housing units after subtracting the group quarter population from total projected population.
4. Projected Households (HHs): Projected HHs are derived by applying (to HH population) estimated HH formation rates determined by DOF among displayed age groups. *HH formation or headship rates reflect the propensity of different population groups (by age, ethnicity, etc.) to form new households.*
5. Existing Households: This figure reflects DOF's estimate of "occupied" units at start of period of January 2010 (per DOF E-5 report released May 2010 by the Demographic Research Unit). Existing HHs (units) are subtracted from projected HHs at end of period (December 31, 2020) to derive household growth.
6. Household (HH) Growth: This figure reflects projected HH growth and need for new units.
7. Vacancy Allowance: An adjustment (unit increase) is made to facilitate availability among owner and renter units. Owner/Renter % is based on Census data. A smaller rate is applied to owner units due to less frequent movement. Information from different authoritative sources support an acceptable range of 1-4% for owner units and 4-8% for renter units depending on market conditions. The 2% owner rate was reduced from the 3% rate used in 2005. No change was made to the 5% renter rate.
8. Replacement Allowance: Rate (.7%) reflects housing losses localities annually reported to DOF each January for years 2000-2010.

Excerpt from Housing Element Law – Regional Housing Needs Assessment-Determination

65584.01. (a) For the fourth and subsequent revision of the housing element pursuant to Section 65588, the department, in consultation with each council of governments, where applicable, shall determine the existing and projected need for housing for each region in the following manner:

(b) The department's determination shall be based upon population projections produced by the Department of Finance and regional population forecasts used in preparing regional transportation plans, in consultation with each council of governments. If the total regional population forecast for the planning period, developed by the council of governments and used for the preparation of the regional transportation plan, is within a range of 3 percent of the total regional population forecast for the planning period over the same time period by the Department of Finance, then the population forecast developed by the council of governments shall be the basis from which the department determines the existing and projected need for housing in the region. If the difference between the total population growth projected by the council of governments and the total population growth projected for the region by the Department of Finance is greater than 3 percent, then the department and the council of governments shall meet to discuss variances in methodology used for population projections and seek agreement on a population projection for the region to be used as a basis for determining the existing and projected housing need for the region. If no agreement is reached, then the population projection for the region shall be the population projection for the region prepared by the Department of Finance as may be modified by the department as a result of discussions with the council of governments.

(c) (1) At least 26 months prior to the scheduled revision pursuant to Section 65588 and prior to developing the existing and projected housing need for a region, the department shall meet and consult with the council of governments regarding the assumptions and methodology to be used by the department to determine the region's housing needs. The council of governments shall provide data assumptions from the council's projections, including, if available, the following data for the region:

(A) Anticipated household growth associated with projected population increases.

(B) Household size data and trends in household size.

(C) The rate of household formation, or headship rates, based on age, gender, ethnicity, or other established demographic measures.

(D) The vacancy rates in existing housing stock, and the vacancy rates for healthy housing market functioning and regional mobility, as well as housing replacement needs.

(E) Other characteristics of the composition of the projected population.

(F) The relationship between jobs and housing, including any imbalance between jobs and housing.

(2) The department may accept or reject the information provided by the council of governments or modify its own assumptions or methodology based on this information. After consultation with the council of governments, the department shall make determinations in writing on the assumptions for each of the factors listed in subparagraphs (A) to (F), inclusive, of paragraph (1) and the methodology it shall use and shall provide these determinations to the council of governments.

(d) (1) After consultation with the council of governments, the department shall make a determination of the region's existing and projected housing need based upon the assumptions and methodology determined pursuant to subdivision (c). The region's existing and projected housing need shall reflect the achievement of a feasible balance between jobs and housing within the region using the regional employment projections in the applicable regional transportation plan. Within 30 days following notice of the determination from the department, the council of governments may file an objection to the department's determination of the region's existing and projected housing need with the department.

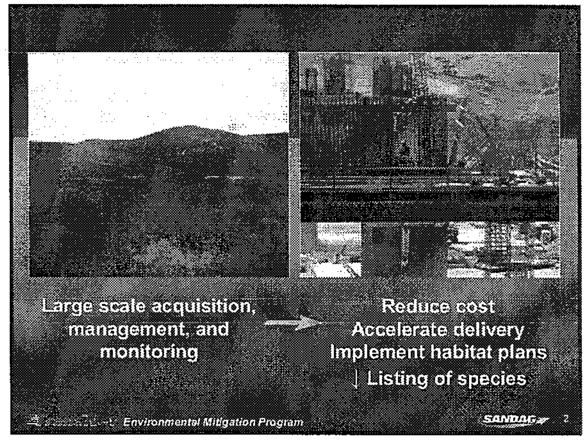
(2) The objection shall be based on and substantiate either of the following:

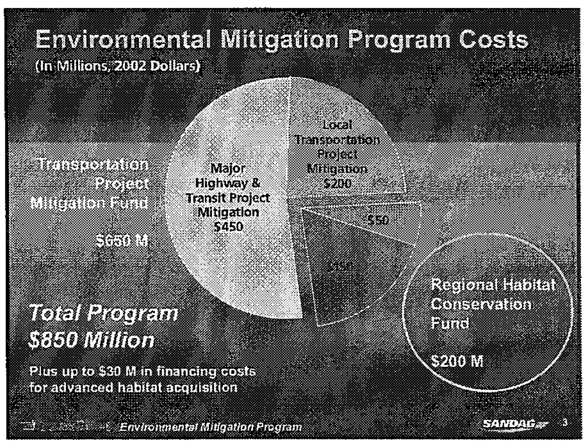
(A) The department failed to base its determination on the population projection for the region established pursuant to subdivision (b), and shall identify the population projection which the council of governments believes should instead be used for the determination and explain the basis for its rationale.

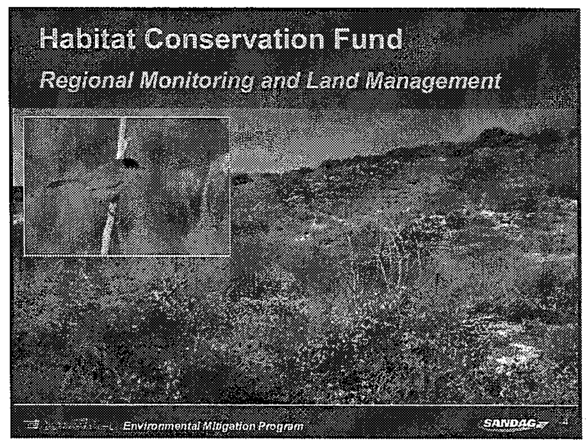
(B) The regional housing need determined by the department is not a reasonable application of the methodology and assumptions determined pursuant to subdivision (c). The objection shall include a proposed alternative determination of its regional housing need based upon the determinations made in subdivision (c), including analysis of why the proposed alternative would be a more reasonable application of the methodology and assumptions determined pursuant to subdivision (c).

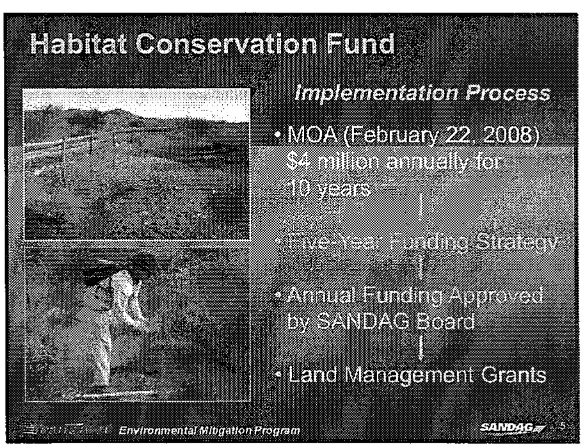
(3) If a council of governments files an objection pursuant to this subdivision and includes with the objection a proposed alternative determination of its regional housing need, it shall also include documentation of its basis for the alternative determination. Within 45 days of receiving an objection filed pursuant to this section, the department shall consider the objection and make a final written determination of the region's existing and projected housing need that includes an explanation of the information upon which the determination was made.

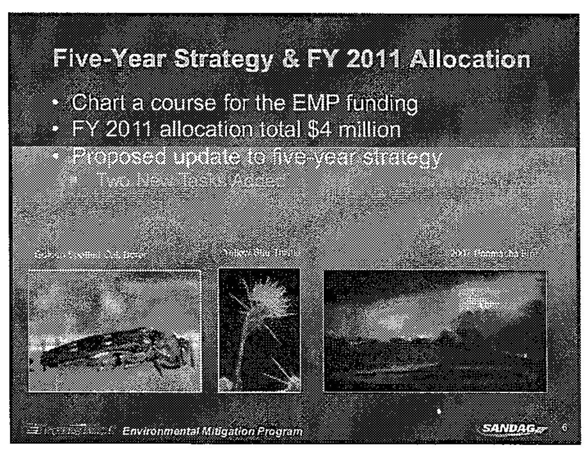

Environmental Mitigation Program
Calavera Preserve, Carlsbad
December 3, 2010
SANDAG 1


Large scale acquisition, management, and monitoring
Reduce cost
Accelerate delivery
Implement habitat plans
↓ Listing of species
Environmental Mitigation Program
SANDAG 2


Environmental Mitigation Program Costs
(In Millions, 2002 Dollars)
Transportation Project Mitigation Fund
$650 M
Major Highway & Transit Project Mitigation $450
Local Transportation Project Mitigation $200
$50
$150
Regional Habitat Conservation Fund
$200 M
Total Program
$850 Million
Plus up to $30 M in financing costs for advanced habitat acquisition
Environmental Mitigation Program
SANDAG 3


Habitat Conservation Fund
Regional Monitoring and Land Management
Environmental Mitigation Program
SANDAG 4


Habitat Conservation Fund
Implementation Process
• MOA (February 22, 2008) $4 million annually for 10 years
• Five-Year Funding Strategy
• Annual Funding Approved by SANDAG Board
• Land Management Grants
Environmental Mitigation Program
SANDAG 5


Five-Year Strategy & FY 2011 Allocation
• Chart a course for the EMP funding
• FY 2011 allocation total $4 million
• Proposed update to five-year strategy
Environmental Mitigation Program
SANDAG 6

Land Management Grants FY 2011

- Proposed fifth grant cycle
- FY 2011 proposed $1.95 million

Eligible Activities:

Invasive control and habitat restoration	$950,000
Species-specific management	$650,000
Habitat maintenance, access control, and volunteer coordination	$350,000

What's Next?

1) Transportation Committee: January 7, 2011
2) ITOC: January 12, 2011
3) SANDAG Board of Directors: January 28, 2011
4) Land Management Grants RFP: February 2011

Recommendation

The Regional Planning Committee is requested to recommend to the SANDAG Board of Directors to:

(1) approve the updated Five-Year Conceptual Funding Strategic Plan, the proposed management and monitoring activities and budget for FY 2011 totaling $4 million, and, subject to Board Policy No. 017, authorize staff to solicit proposals and enter into contracts or amend existing contracts accordingly; and

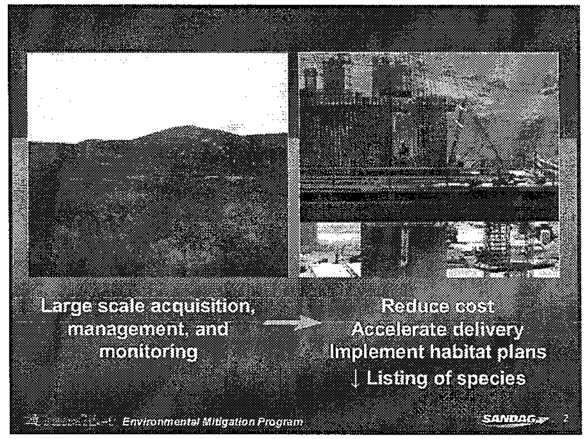
(2) adopt the modifications to the eligibility and evaluation criteria for land management grants for FY 2011 as described in Attachment 4 of the report.

Environmental Mitigation Program

Calavera Preserve, Carlsbad

December 2010


Environmental Mitigation Program
Calavera Preserve, Carlsbad
December 3, 2010
SANDAG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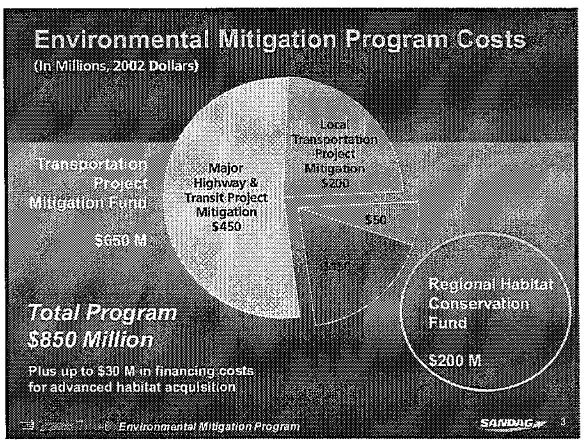
Environmental Mitigation Program
SANDAG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Regional Habitat Conservation Fund
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Total Program
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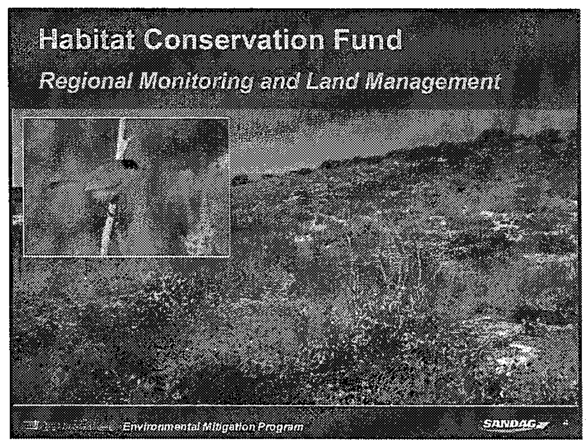
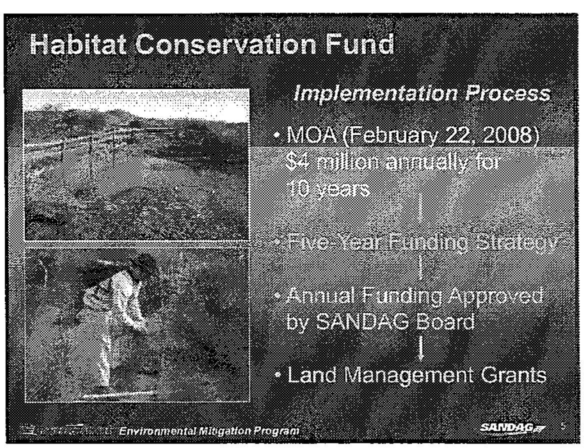
Plus up to $30 M in financing costs for advanced habitat acquisition
Environmental Mitigation Program
SANDAG


Habitat Conservation Fund
Regional Monitoring and Land Management
Environmental Mitigation Program
SANDAG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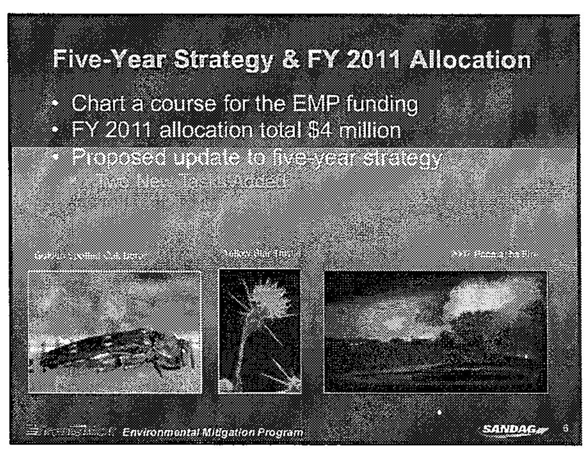
• Land Management Grants
Environmental Mitigation Program
SANDAG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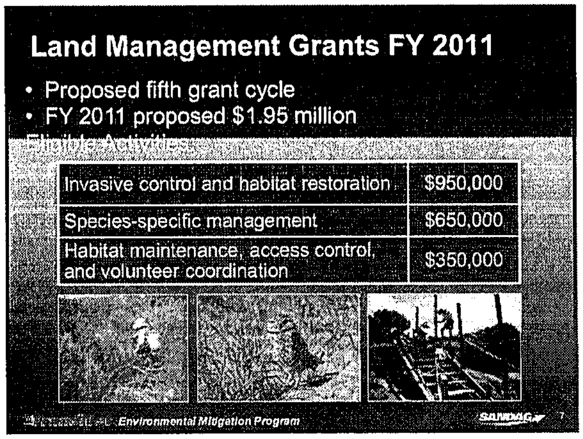
SANDAG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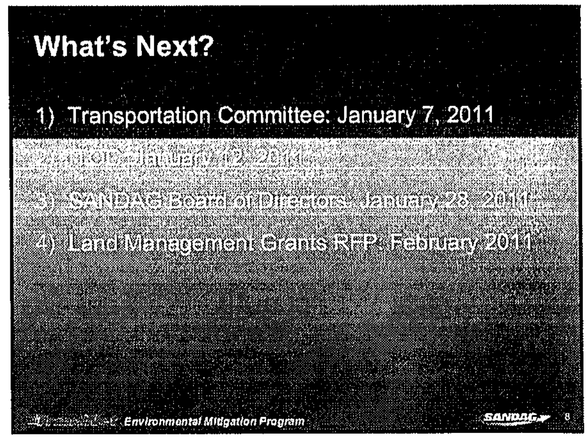
Environmental Mitigation Program
SANDAG
7


What's Next?
1) Transportation Committee: January 7, 2011
2) ITOC: January 12, 2011
3) SANDAG Board of Directors: January 28, 2011
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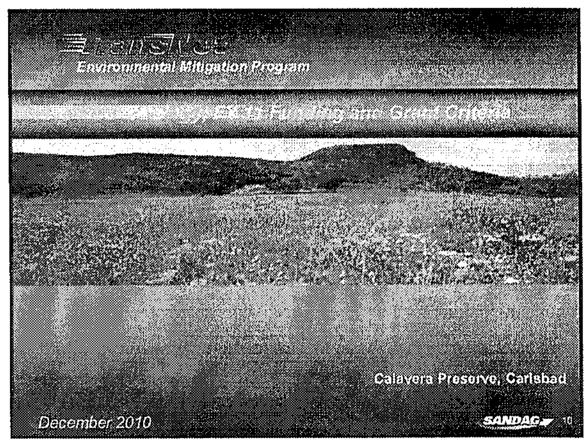
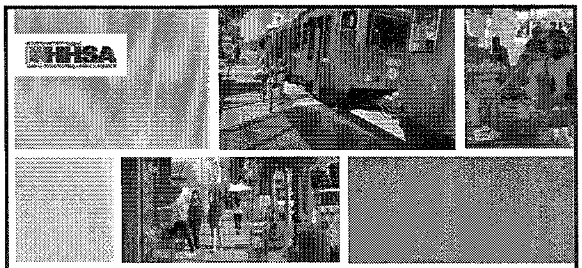
Environmental Mitigation Program
SANDAG
8


Recommendation
The Regional Planning Committee is requested to recommend to the SANDAG Board of Directors to:
(1) approve the updated Five-Year Conceptual Funding Strategic Plan, the proposed management and monitoring activities and budget for FY 2011 totaling $4 million, and, subject to Board Policy No. 017, authorize staff to solicit proposals and enter into contracts or amend existing contracts accordingly; and
(2) adopt the modifications to the eligibility and evaluation criteria for land management grants for FY 2011 as described in Attachment 4 of the report.
Environmental Mitigation Program
SANDAG
9


Environmental Mitigation Program
Calavera Preserve, Carlsbad
December 2010
SANDAG
10



Communities Putting Prevention to Work (CPPW)
Regional Planning Committee Meeting

December 3, 2010

SANDAG Initiatives

- Health impact and forecasting assessment
- Regional comprehensive land use and transportation policies
- Healthy communities campaign
- Countywide Safe Routes to School implementation
- Active commuters transportation promotion
- Regional bikeway signage and promotion

Healthy Communities Campaign

- Healthy community planning grants (00,000 total)
- Active community transportation grants (150,000 total)

Program Objectives: Healthy Community Planning Grants

- Integrate and institutionalize public health considerations in planning
- Address health disparities and inequities
- romote physical activity
- romote access to healthy and nutritious foods
- Establish collaborative working relationships
- Build consensus in the community

Eligibility: Healthy Community Planning Grants

- Cities and the County of San Diego
- Tribal overnments
- Existing projects are eligible to apply

Type of Projects: Healthy Community Planning Grants

- ublic health elements
- oning codes, street design guidelines, or subdivision ordinances
- Health impact assessments
- rban agriculture or food systems assessments
- ark master plans or design guidelines
- Other . . .

Evaluation Criteria: Healthy Community Planning Grants

- Address rogram Objectives (20 ts.)
- Implement an Innovative Approach (20 ts.)
- Serve High-Need Communities (20 ts.)
- Lead to Implementation and Systems Change (20 ts.)
- Build on Local Commitment to ublic Health (10 ts.)
- Support a Collaborative and Inclusive rocess (10 ts.)

Bonus Points

- Leverage Funds and Resources (10 ts.)

HHSA

Selection Panel: Healthy Community Planning Grants

- Two members of SANDA Staff
- One member from the TW
- One member from the HS
- One member of HHSA Staff
- Two health and the built environment experts
- One member from the San Diego Council of Design rofessionals

HHSA

Program Objectives: Active Community Transportation Grants

- Integrate and institutionalize public health considerations in planning
- Address health disparities and inequities
- romote physical activity
- romote access to healthy and nutritious foods
- Establish collaborative working relationships
- Build consensus in the community

HHSA

Eligibility: Active Community Transportation Grants

- Cities and the County of San Diego
- Tribal overnments

- Existing projects are eligible to apply

HHSA

Type of Projects: Active Community Transportation Grants

- Comprehensive, neighborhood- or corridor-level active transportation plans

HHSA

Evaluation Criteria: Active Community Transportation Grants

- Address rogram Objectives (20 ts.)
- Implement a Comprehensive Approach (20 ts.)
- Serve High-Need Communities (20 ts.)
- Lead to Implementation and Systems Change (20 ts.)
- Build on Commitment to Active Transportation (10 ts.)
- Support a Collaborative and Inclusive rocess (10 ts.)

Bonus Points

- Leverage Funds and Resources (10 ts.)

HHSA

Selection Panel: Active Community Transportation Grants

- Four members of SANDA Staff
- One member from the B W
- One member from the TW
- One professional with SRTS expertise
- One HHSA Staff

HHSA

Safe Routes to School Implementation

- Capacity building and planning grants (250,000 total)
- Education, encouragement, and enforcement grants (50,000 total)

HHSA

Program Objectives

- Increase walking and biking to schools
- Improve safety conditions
- Realize the benefits of SRTS efforts
- Consider all of the 5 E s
- Establish collaborative partnerships
- Evaluate effectiveness
- Strengthen support for SRTS
- Initiate institutional change

HHSA

Eligibility

- Cities and the County of San Diego
- Tribal overnments
- School Districts
- Non- rofit Organizations

- Existing projects are eligible to apply

HHSA

Type of Projects

- Capacity Building and lanning rants
  - Neighborhood, community, or citywide SRTS plans
- Education, Encouragement, and Enforcement rants
  - Safety courses, curriculums, and lesson plans
  - Incentive programs
  - Teen-oriented programs

HHSA

Evaluation Criteria

- Commitment to Active Transportation (20 ts.)
- Capacity to Implement (20 ts.)
- Evidence of Need (20 ts.)
- ethodology (20 ts.)
- Community Involvement (20 ts.)

Bonus Points

- Leverage Funds and Resources (10 ts.)

HHSA

Selection Panel

- Two members of SANDA Staff
- One member from the TW
- One member from the HS
- One member of HHSA staff
- One professional with SRTS expertise

Review Process

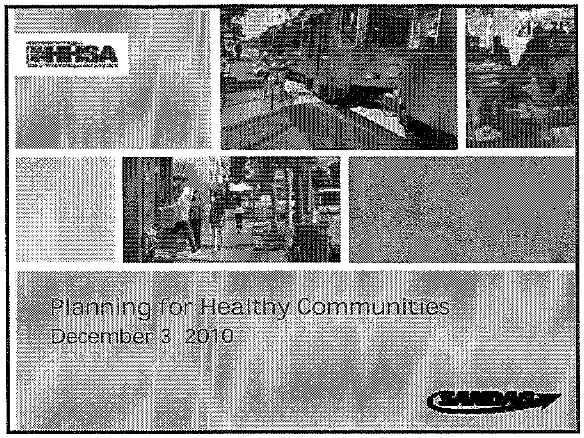
- Review workshops, October 19 and 21
- Bicycle and edestrian Working roup, October 2
- oint Regional lanning Technical Working roup and Cities County Transportation Advisory Committee meeting, October 28
- San Diego Regional Traffic Engineers Council, November 18
- ublic Health Stakeholder roup, November 18

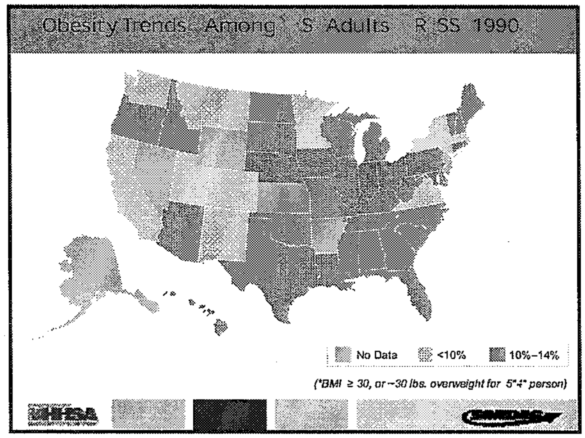
Proposed Grant Program Timeline

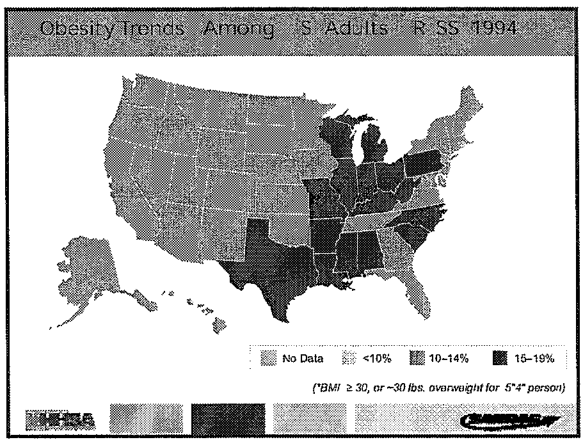
- Release call for projects by end-December, 2010
- Receive grant applications by mid-February, 2011
- Review applications and award grants by mid-April, 2011
- Contract with on-call list of consultants by end- arch, 2011
- roject completion by February 1, 2012

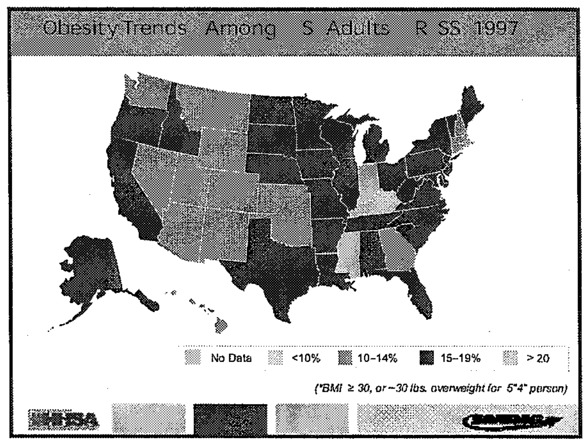
Recommendation

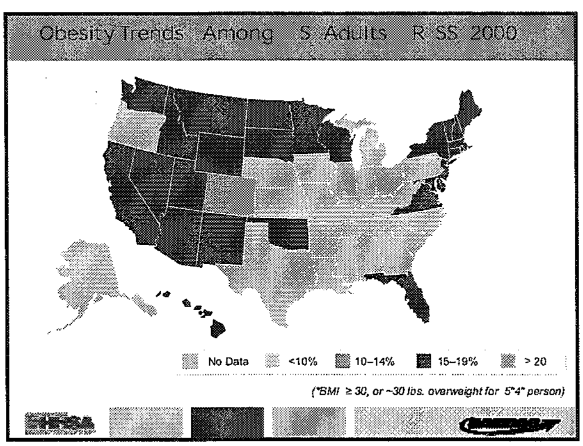
- The Regional lanning Committee is asked to recommend that the Board of Directors approve the proposed grant program objectives, eligibility, evaluation criteria, and process as shown in Attachment 2.

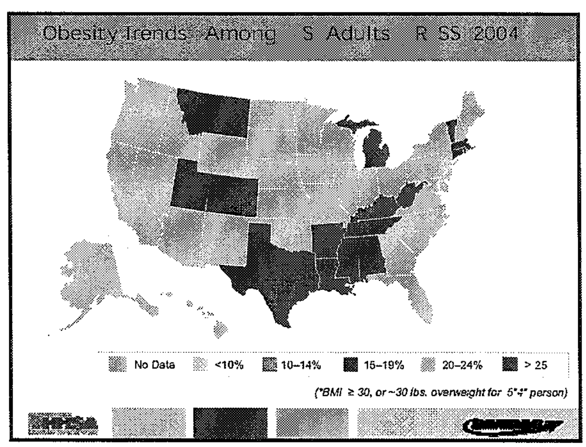

HHSA
Planning for Healthy Communities
December 3 2010
SANDAG


Obesity Trends Among S Adults R SS 1990
No Data
<10%
10%–14%
(*BMI ≥ 30, or ~30 lbs. overweight for 5'4" person)
HHSA
SANDAG


Obesity Trends Among S Adults R SS 1994
No Data
<10%
10–14%
15–19%
(*BMI ≥ 30, or ~30 lbs. overweight for 5'4" person)
HHSA
SANDAG


Obesity Trends Among S Adults R SS 1997
No Data
<10%
10–14%
15–19%
> 20
(*BMI ≥ 30, or ~30 lbs. overweight for 5'4" person)
HHSA
SANDAG


Obesity Trends Among S Adults R SS 2000
No Data
<10%
10–14%
15–19%
> 20
(*BMI ≥ 30, or ~30 lbs. overweight for 5'4" person)
HHSA
SANDAG


Obesity Trends Among S Adults R SS 2004
No Data
<10%
10–14%
15–19%
20–24%
> 25
(*BMI ≥ 30, or ~30 lbs. overweight for 5'4" person)
HHSA
SANDAG

eading Causes of Death in the S

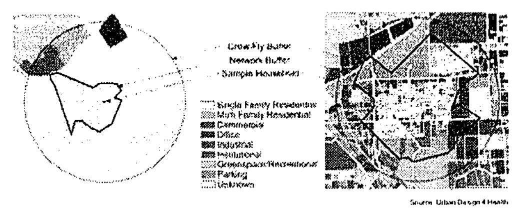
7 out of 10 deaths each year are from chronic diseases

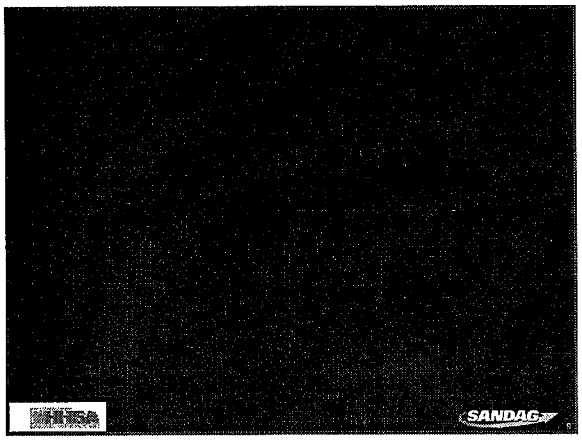
CDC's National Center for Chronic Disease revention and Health romotion (NCCD H), SA

uilt Environment Matters

Disconnected auto oriented

Connected wal able



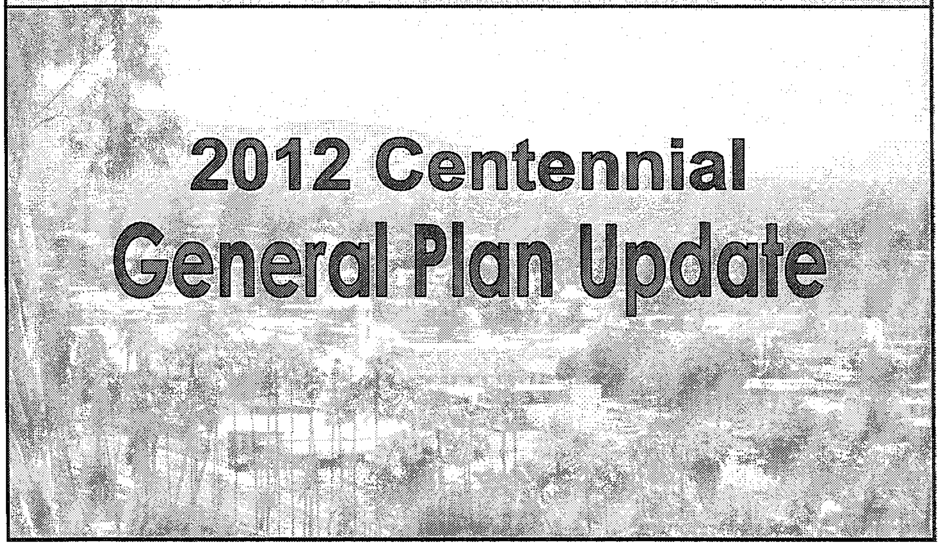


Ne t Steps

Public Health Policy Framework Development

- Circulate white paper for comment and feedback by December 31
- Develop key recommendations for inclusion in the 2050 Regional Transportation lan
- Develop a policy framework for including public health in a future update of the Regional Comprehensive lan

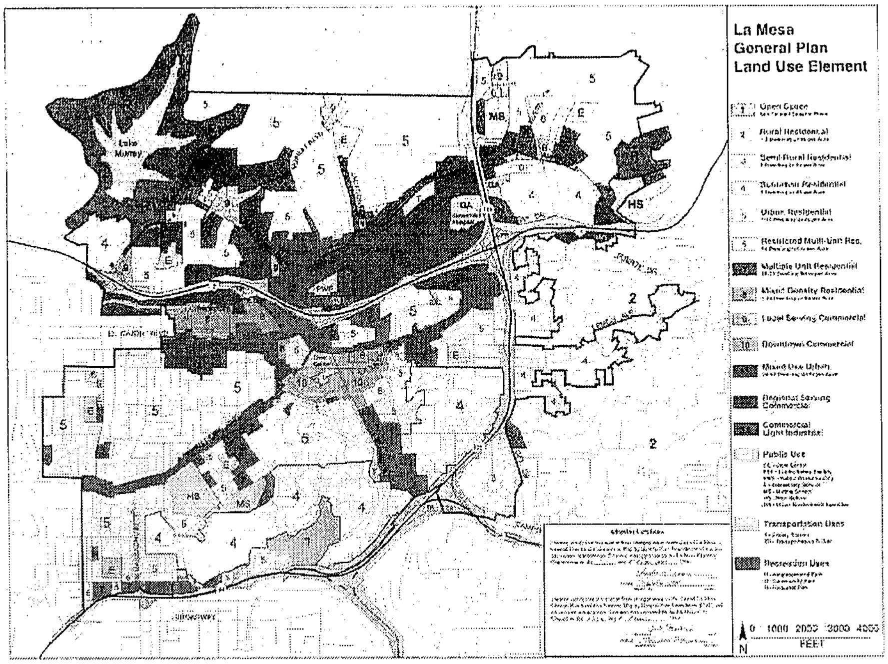
CITY OF LA MESA



CITY OF LA MESA

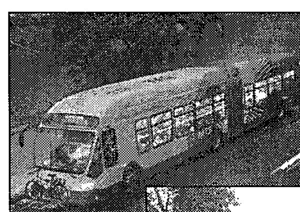
What is a General Plan

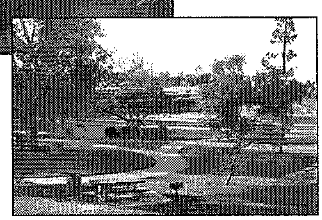
- Every city in California must have a General Plan, a blueprint for growth and development
- La Mesa's General Plan reflects community values and directs policy decisions and planning for the future
- The General Plan informs residents, developers and decision makers of the City's policies that guide future development of the City

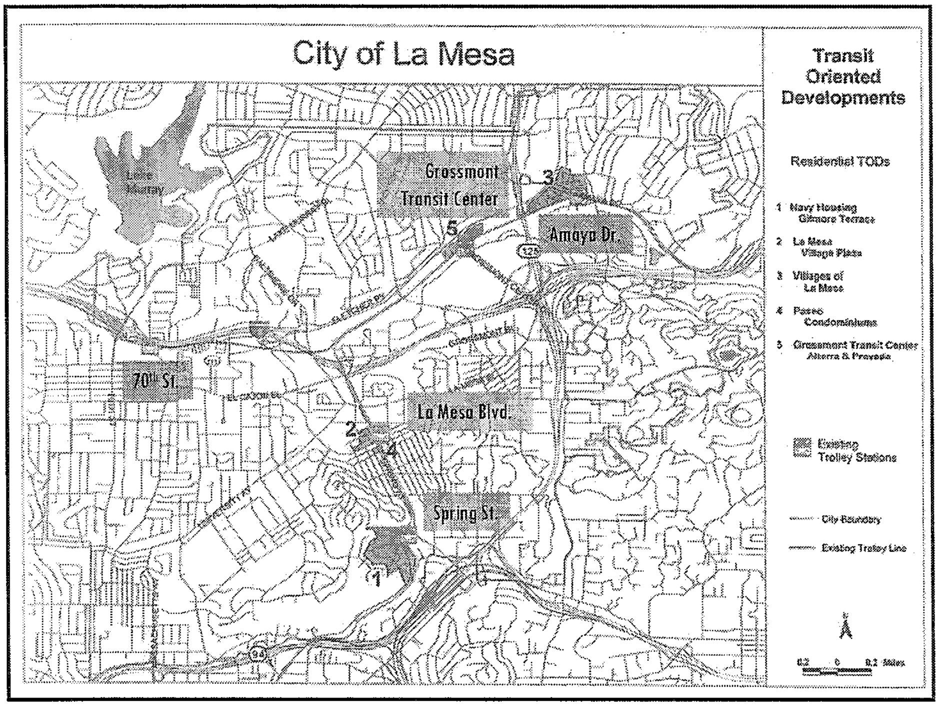


CITY OF LA MESA — Community Context

- 96% built-out
- Access to two Trolley lines, five Trolley stations, and five local bus routes
- City segmented by I-8, SR 125, and SR 94
- SANDAG 2050 Growth Forecast for La Mesa:
  - 2008 pop. 56,445
  - 2050 pop. 77,780 (38%)







Transit Oriented Developments

CITY OF LA MESA

1. Navy Housing
- 244 units, low & moderate income
- ¼ mile to trolley station, ½ mile to shopping

2. La Mesa Village Plaza
- 95 condos, office and commercial space
- Adjacent to Trolley station

3. Villages of La Mesa
- 384 units on 20 acres
- ¼ mile to Trolley

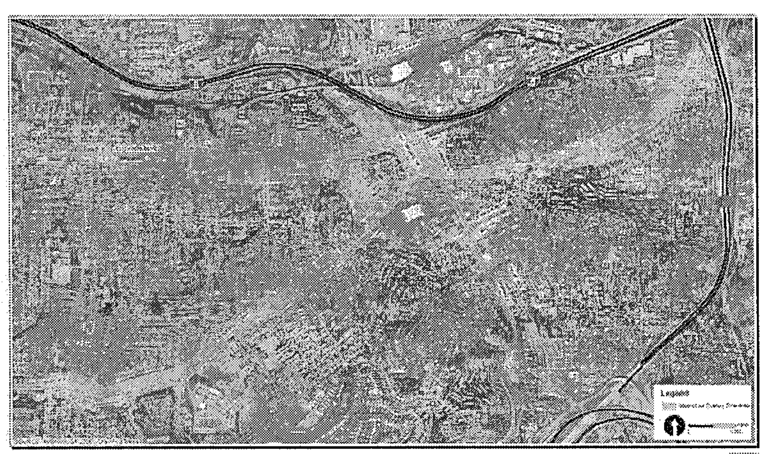
4. Paseo Condominiums
- 18 condominiums + retail
- ¼ mile to shopping/Trolley

5. Alterra & Pravada
- 527 residential units + retail 80 affordable units
- Adjacent to Trolley station

New TOD Opportunities

- Downtown La Mesa Village
  - Park Station mixed-use project, 80 du/acre
- Grossmont Shopping Center
  - 65-acre site planned for mixed-use retail and residential development
- 70th Street Trolley Station
  - Former trailer park, now RV park ready for a mixed-use Specific Plan

Mixed-Use Overlay Zone: Encouraging Smart Growth



Vicinity Map 2

Aragon – Mixed-Use TOD

Located on the El Cajon Blvd. transit corridor

40 du/acre

Why update?

- Initial goals for the General Plan:
  - Incorporate new issues of sustainability, climate change, water conservation, and wellness
  - Strengthen policies that preserve single-family neighborhoods while promoting in-fill development along transit corridors
  - Consistency with SANDAG Smart Growth Principles and SCS

New Components

- Health and Wellness Element
  - Funded with $50,000 Kaiser grant
  - Incorporates "Ready... Set... Live Well" Initiative for La Mesa/Spring Valley
- Sidewalk Master Plan and SANDAG funded Bicycle Facilities Plan
- Sustainability throughout the Elements

New Components

- Urban Agriculture
  - Community Garden
  - Weekly Farmer's Market

CITY OF LA MESA

State Legislation and Regional Plans

- AB 32
  - Reducing GHG emissions and utilizing SANDAG Climate Action Strategy and SCS
- SB 375
  - Links land use and transportation planning
- AB 1358
  - Complete Streets
- SANDAG 2050 RTP
- SANDAG Smart Growth Concept Map
- SANDAG Regional Comprehensive Plan

CITY OF LA MESA

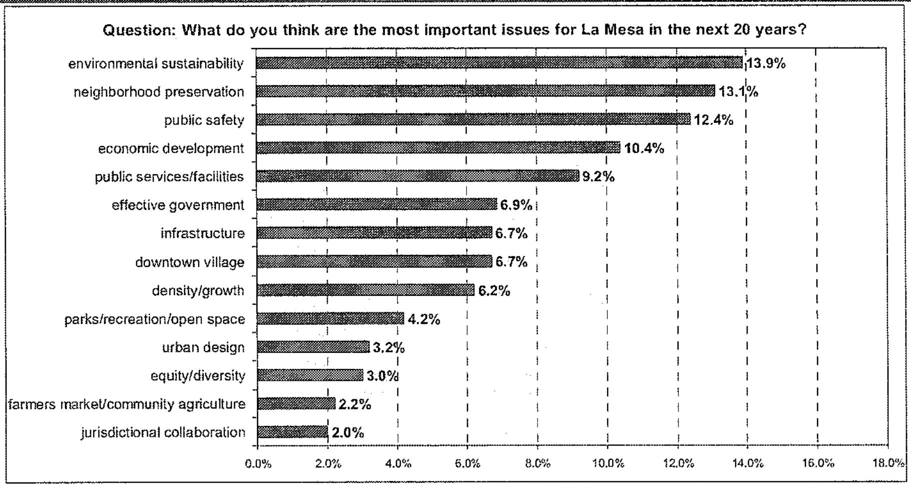
Public Participation

- www.cityoflamesa.com Web page
- E-updates (Notify Me)
- Community Workshops
- Online and Written Surveys
- Public Meetings and Hearings

Community Workshops

- April 15, 2010
  Public Workshop #1
- Sept. 23, 2010
  Public Workshop #2
- Oct. 9, 2010
  "Sustain La Mesa"
  Environmental Festival

Preliminary Survey Results

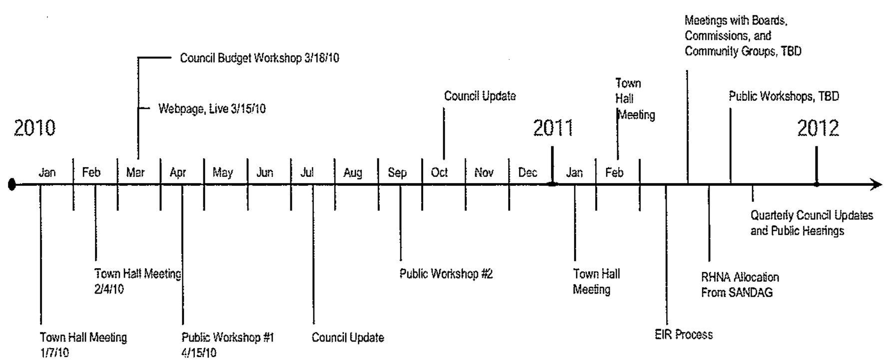


Based on 177 of 232 survey respondents who provided comments
3/2010 – 11/2010

Stakeholder Meetings

- City Council, Boards, and Commissions
- Governmental Agencies
- Business Associations
- Community Groups
- Faith-based Organizations
- Environmental Groups

Public Participation Schedule
for the
General Plan Update



CITY OF LA MESA

Challenge: Putting the Pieces Together

- Small budget
  - However, slow economy allows more staff time to work on the General Plan
  - Public Services and Facilities Element, Land Use and Sidewalk Master Plan completed in house
- Technical assistance
  - SANDAG bicycle facilities grant will ensure that Circulation Element contains Bicycle Master Plan and complete streets
  - Consultants completing Noise and Housing Element analysis

CITY OF LA MESA

EIR Challenge

- Funding yet to be identified
- EIR will cost more than the entire General Plan update
- Cannot adopt the new General Plan without an EIR

La Mesa General Plan

Questions?

F3.12

Del Cerro Action Council, et al. v. Board of Trustees of the California State University, Statement of Decision, Case No. GIC 855643 (February 11, 2010)

F I L E D
Clerk of the Superior Court

FEB 11 2010

BY: A. LUM

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN DIEGO

NORTH COUNTY DIVISION

DEL CERRO ACTION COUNCIL, Petitioner, vs. BOARD OF TRUSTEES OF CALIFORNIA STATE UNIVERSITY and DOES 1 through 20, inclusive. Respondents. SAN DIEGO STATE UNIVERSITY and DOES 21 through 40, inclusive, Real Parties-in-Interest. AND ALL CONSOLIDATED ACTIONS.	**Case No. GIC 855643 (Lead Case)** (Consolidated with case Nos. GIC 855701; 37-2007-00083692-CU-WM-CTL; 37-2007-00083768- CU-TT-CTL; 37-2007-83773- CU-MC-CTL) **STATEMENT OF DECISION**

I

FACTUAL AND PROCEDURAL BACKGROUND

On September 21, 2005, the Board of Trustees of the Cal. State University ("CSU") approved the SDSU 2005 Master Campus Plan Revision ("2005 Master Plan") and the certification of the final EIR. The City of San Diego and others challenged CSU's certification of the 2005 EIR.

On October 20, 2005, the instant petition for writ of mandate was filed by the Del Cerro Action Council challenging the approval of the 2005 Master Plan and the certification of the EIR. The City of San Diego and the Redevelopment Agency of the City of San Diego (referred to collectively as "City/Redevelopment Agency") also filed a petition for writ of mandate on October 20, 2005, challenging the 2005 Master Plan and EIR.

Before the trial court rendered a decision on the merits of the petitions, CSU determined that it was necessary to set aside the 2005 Master Plan and certified EIR because of an intervening decision from the California Supreme Court - City of Marina v. Board of Trustees of California State University (2006) 39 Cal.4th 341. Accordingly, judgment was entered against CSU in September 2006 and a writ of mandate issued directing CSU to bring the EIR into compliance with CEQA.

On November 17, 2007, CSU certified a new EIR and approved the 2007 Campus Master Plan Revision. While CSU prepared to file its return to the writ, on 12/14/07, four petitioners filed three petitions challenging the 2007 EIR.

On August 15, 2008, this court ordered consolidation of the following cases with the instant case:

GIC855701 City of San Diego et al. v. Board of Trustees of Cal. State University (filed October 20, 2005)

07-83692 San Diego Metropolitan Transit System v. Board of Trustees of Cal. State University (filed December 14, 2007)

07-83768 San Diego Assn. of Governments v. Board of Trustees of Cal. State University (filed December 14, 2007)

07-83773 City of San Diego v. Board of Trustees of California State University (filed December 14, 2007.

The court declined to add to the consolidation San Diego Superior Court case no. 08-91165, San Diego State University Foundation v. Redevelopment Agency.

Following oral argument on October 16, 2009, the court took the matter under submission. The following matters remain to be determined by the court:

1. The motion of CSU to strike documents from City/Redevelopment Agency's Request for Judicial Notice

2. The motion of CSU to augment the administrative record.

3. The motion of SANDAG to intervene in the motion to discharge

4. The motion of CSU to discharge the 2006 writ. San Diego Superior Court case no. GIC855643

5. The petitions of SANDAG/MTS for a writ of mandate.

6. The petition of the City of San Diego and the Redevelopment Agency of the City of San Diego for a writ of mandate.

7. Requests for Judicial Notice

II

DISCUSSION

A. CSU's motion to strike documents included in City/Redevelopment Agency's Request for Judicial Notice filed July 27, 2009

On February 8, 2008, CSU filed and served its notice of certification of the administrative record for the 2007 Master Plan litigation. Thereafter, in May 2008, in response to a motion brought by SANDAG/MTS that it had the right to prepare the administrative record, Judge Michael M. Anello decertified the administrative record prepared by CSU and ordered SANDAG/MTS to prepare the administrative record.

In October 2008, SANDAG/MTS presented CSU with a copy of the SANDAG/MTS-prepared administrative record. On November 28, 2008, CSU's counsel notified the City that it had reviewed the contents of the SANDAG/MTS-prepared administrative record and had determined that some of the documents proposed for inclusion by the City were not proper for inclusion in the record because they were not cited or relied upon in preparing the environmental documentation for the new 2007 EIR. CSU requested that the City provide CSU with additional legal support for the Challenged Documents. The City claims it did so. CSU says it did not.

On December 17, 2008, CSU filed and served its Notice of Certification of the Administrative Record and attached Certification Statement. The Certification Statement stated that the Challenged Documents were excluded from the certified administrative record for reasons set forth therein.

On March 9, 2009, this court ruled on Del Cerro Action Council's motion seeking certification of the record as prepared. The dispute centered around twenty-two lodged documents. The court denied the motion, finding that Del Cerro Action Council had failed to show that the challenged documents were contained in the project file and were before CSU at the time the 2007 EIR was certified.

Subsequently, the parties filed briefs in connection with CSU's motion to discharge the September 1, 2006 writ of mandate regarding the 2005 Master Plan and corresponding 2005 EIR. In conjunction with its opposition brief, the City filed a request for judicial notice of twenty-two extra-record documents. Twenty-one of the documents concern various state budgeting and financing matters, one document is a declaration by a staff member of nonparty Caltrans. Two of the documents (exhibits L and T) were expressly excluded from the certified administrative record pursuant to the court's March 9, 2009 order.

On August 9, 2009, CSU filed a motion seeking to strike the twenty-two documents set forth in the City's request for judicial notice. CSU argued that these extra-record documents must be stricken because they are irrelevant to the court's determination as to whether CSU complied with CEQA and were never considered by CSU when certifying the EIR and approving the 2007 project. CSU further argued that the one limited exception set forth in Western States Petroleum Assn. v. Superior Court (1995) 9 Cal. 4th 559 did not apply:

> "Extra-record evidence is admissible under this exception only in those rare instances in which (1) the evidence in question existed before the agency made its decision, and (2) it was not possible in the exercise of reasonable diligence to present this evidence to the agency before the decision was made so that it could be considered and included in the administrative record." Western States Petroleum Assn. v. Superior Court (1995) 9 Cal. 4th 559, 578.

In its opposition, the City argued that the extra-record evidence was necessary to prove that CSU complied with the legal mandates set forth in City of Marina supra. Specifically, the City argues that although CSU has identified twenty million dollars worth of necessary mitigation costs resulting from its campus expansion project, it "hyper-technically interprets"

City of Marina for the proposition that its obligations are simply discharged by "directing the CSU chancellor to request from the governor and the legislature through the annual state budget process funds to support those [mitigation] costs".

The court does not concur with the City's interpretation of City of Marina for the reasons set forth below. Accordingly, the motion to strike is granted. These documents were not part of the administrative record and were never considered by CSU when certifying the EIR and approving the 2007 project.

B. CSU's motion to augment administrative record

On July 27, 2009, CSU filed a motion to augment the administrative record to add an excerpt from Appendix E of the Redevelopment EIR Transportation and Parking Analysis that was inadvertently omitted by CSU from the certified record.

CSU alleged that in preparing his report, its traffic engineer Boarman relied on a table included in the supporting technical report prepared for the Redevelopment EIR. Boarman did not initially provide CSU with a copy of the table for inclusion in this record because his reliance on the table was relatively limited and it did not occur to him to include the table.

CSU argued that this excerpt was properly part of the administrative record pursuant to Public Resources Code, § 21167.6:

> "...copies of studies or other documents relied upon in any environmental document prepared for the project and either made available to the public during the public review period or included in the respondent public agency's files on the project, and all internal agency communications, including staff notes and memoranda related to the project or to compliance with this division."

The motion is granted. As the court tentatively indicated at oral argument, the entire appendix shall become part of the administrative record.

C. SANDAG/MTS' motion to intervene in the motion to discharge 2006 writ of mandate

On July 24, 2009, SANDAG/MTS filed a motion seeking to intervene in the motion to discharge the 2006 writ of mandate. SANDAG/MTS, who were not parties to the 2005 writ proceeding, sought leave to file written opposition to the motion. CSU opposed the motion, arguing that the interests of SANDAG/MTS were adequately represented in the 2005 writ proceeding by the other petitioners City of San Diego and Redevelopment Agency. This motion was subsequently withdrawn. See September 4, 2009 minutes.

D. CSU's motion to discharge 2006 writ of mandate

The motion to discharge the 2006 writ of mandate focuses solely on the City of Marina issue. See discussion of this issue in section D-3 below. Written opposition to this motion was filed by City/Redevelopment Agency and Del Cerro Action Council. The City/Redevelopment Agency's opposition also argues that (1) the FEIR did not consider impacts to transit facilities; (2) the FEIR's conclusions regarding trolley ridership and vehicle trip generation rates are not supported by substantial evidence; (3) the FEIR's determination that the project does not result in significant impacts to city park and recreational facilities is not supported by substantial evidence; (4) the FEIR defers mitigation; and (5) the statement of overriding considerations is improper because it relies on faulty traffic calculations and an improper deferral to legislative appropriation as a precondition to CSU's mitigation obligations. These arguments by the City/Redevelopment Agency are addressed in Sections E-7 (public transit facilities), E-6 (traffic impacts), E-2 (parks and recreation impacts), E-6-b (mitigation measures), and 9 (statement of overriding considerations), respectively.

The opposition filed by Petitioner Del Cerro Action Council also argues that CSU failed to comply with CEQA in the following respects: (1) the FEIR fails as a public disclosure document; (2) the FEIR fails to ensure that its proposed feasible mitigation measures will actually be implemented; and (3) the FEIR defers the formulation and analysis of mitigation measures. Del Cerro's arguments 1 and 2 are addressed below. Argument 3 regarding the deferral of mitigation measures is addressed in Section E-6-b.

1. Public disclosure document

> "The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project". Public Resources Code § 21061.

> "An EIR is an informational document which will inform public agency decisionmakers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency." 14 CCR 15121(a).

Petitioner argues that the FEIR fails to function as an "informational document" for the following reasons: (a) the FEIR fails to disclose that the Adobe Falls project component is inconsistent with the Navajo Community Plan and the local zoning ordinance regarding density, traffic safety and accessibility; (b) the FEIR fails to disclose the basis for its classifications of Del Cerro streets; and (c) the FEIR's analysis of project alternatives relies on mistaken street classifications to support its findings.

a. Consistency with Navajo Community Plan and the local zoning ordinance

Petitioner first argues that the FEIR "is inconsistent with the Navajo Community Plan and the local zoning ordinance covering Del Cerro in terms of density it proposes for the Adobe Falls Development" and fails to clearly disclose "the fact that the Adobe Falls project component will exceed the density allowed by the zoning ordinance by a multiple of ten…". See opposition brief, p. 18.

Contrary to Petitioner's contentions, the FEIR clearly discloses that the Adobe Falls project component conflicts with existing City zoning:

> "[T]he Adobe Falls Faculty/Staff Housing site is zoned for single-family residential development with a minimum of 40,000 square-foot lots. Under the proposed project, multi-family residences would be developed on the site on lot sizes smaller than 40,000 square-feet. Therefore, the Adobe Falls Faculty/Staff Housing component of the project would conflict with existing city zoning. However, this would not be a significant impact within the meaning of CEQA because the City's Zoning Code is not applicable to SDSU." AR 15:232:14635.

Second, Petitioner contends that the EIR incorrectly finds that the Adobe Falls component is consistent with the Navajo Community Plan as to traffic safety and accessibility. Petitioner takes issue with the EIR's conclusion that the additional trips engendered by project would not reduce the level of service on the affected street segments to below acceptable levels.

Petitioner argues that, in fact, the project will cause a decrease in the level of service for certain streets in the Del Cerro community because the EIR has improperly calculated trip generation rates. As stated in section E-6-a below, the Court has found that the EIR's traffic impacts analysis, including its calculation of trip generation rates, is supported by substantial evidence.

b. Street classification

Petitioner argues that the FEIR fails to disclose the basis for its classifications of Del Cerro streets. Specifically, Petitioner objects to the statement in the FEIR that certain specified roadways "have the characteristics of both a Residential Local Street and a two-lane Sub-Collector Street". AR 18:285:17787. Petitioner argues that this statement is misleading because depending on actual measurements, the streets could be "increased width Low Volume Residential Local Streets", which have lower ADT capacities. See Petitioner's opposition brief, p. 19.

The FEIR provided:

> "All of the roadways are unclassified on the Navajo Community Plan other than Del Cerro Boulevard. For these unclassified roadways, several potential options were considered for a design capacity using the 2002 City of San Diego Street Design Manual. These include Low Volume Residential Street (700 ADT), Residential Local Street (1,500 ADT) and a two-lane Sub-Collector (2,200 ADT). "Based on an extensive field review and based on the discussion below, a Residential Local Street classification was utilized for Rockhurst Drive, Lambda Drive, Genoa Drive, Capri Drive, Arno Drive and Adobe Falls Road. These roadways do not have a specific classification assigned to them by the City; there is no document that states the functional classification of these roadways. Therefore, a custom analysis of these streets was conducted based on a field review of the roadways and the associated driving conditions on each to determine the appropriate classification.
>
> "Both the City of San Diego Street Design Manual and City Traffic Impact Study Manual provide various criteria that may be considered in determining the classification of a roadway. According to the City Street Design Manual, factors to be considered include the curb-to-curb width of the roadway and corresponding right of way, the design speed, the maximum grade, the minimum curve radii and the fronting land uses. According to the City Traffic Impact Study Manual, the classification assigned to a particular roadway considers the number of lanes, the curb-to-curb width and corresponding right-of-way width, and the fronting uses.
>
> "As explained below, based on an analysis of Del Cerro community roadways utilizing the criteria provided in the City Street Design Manual and Traffic Impact

> Manual, it was determined that the Del Cerro community roadways (other than Del Cerro Boulevard) closely fit the characteristics of both a Residential Local Street and a Sub-Collector.
>
> "The City of San Diego Street Design Manual does not classify roadways, i.e., it does not list specific roadways and assign to them a classification such as "Collector," "Sub-collector,", etc. Instead, the Manual provides multiple design characteristics typically associated with each classification. Pages 19 & 31 of the Manual provide characteristics for Low Volume Residential Streets, Residential Local Streets and "Two-Lane Sub-Collectors" classifications. Guidance is given in terms of curb-to-curb width, right of way width, curve radii, and other factors.
>
> . . .
>
> "Based on a field review of these roadways and a review of the Street Design Manual Criteria, it was determined that the roads have the characteristics of both a Residential Local Street and a two-lane Sub-Collector. To be conservative, a design ADT of 1,500 ADT was used for the unclassified roadways."

The Court finds that this issue was adequately addressed in the FEIR. AR 18:264:17151; AR 18:285:17787. Petitioner's argument is nothing more than a disagreement of experts and is not a ground for invalidating the FEIR.

2. Implementation of mitigation measures

a. Nature preserve

Petitioner argues that the FEIR creates preserves but fails to adopt any type of monitoring program or implement any measure to ensure that these preserves will actually be created and properly maintained.

The FEIR provides for the creation of a 9.51on-site preserve for vegetation:

> "Prior to commencement of grading activities on the Adobe Falls Faculty/Staff Housing Upper Village site, SDSU, or its designee, shall preserve, or cause to be preserved, a total of 9.51 acres of onsite native habitats. The preservation areas shall occur outside of the Multi-Habitat Planning Area ("MHPA"), within the proposed open space on the Adobe Falls Faculty/Staff Housing Site, and shall include 5.20 acres of coastal sage scrub, 1.39 acres of baccharis scrub, 2.43 acres of southern mixed chaparral, 0.02 acre of valley needlegrass grassland, and 0.43 acre non-native annual grassland." AR 15:337:14491.

The FEIR also provides that a portion of the Adobe Falls site will be preserved as open space as part of the SDSU Field Stations Program:

> "A portion of the Adobe Falls Faculty/Staff Housing site will be preserved as open space foe natural habitat values, and will become part of the SDSU Field Stations Program, an educational and research program for undergraduate and graduate students that includes restoration and management of the lands for the long-term preservation of native flora and fauna. Under the Field Stations Program, the habitat and hydrology of the Adobe Falls site would be managed and restored to the maximum extent practicable, while providing an opportunity for research and education related to restoration and management. The Program would include watershed, wildlife and habitat monitoring to help inform management and restoration activities on the property. The Field Stations Program is described further in EIR Appendix D." AR 15:227:14495

In regards to the 9.51 on-site preserve, CSU has adopted a mitigation monitoring and reporting program ("MMRP") pursuant to Public Resources Code § 21081.6 that ensures implementation of the adopted mitigation measures. The Adobe Falls open space will be managed under the Field Stations Program. The Field Stations Program is part of the 2007 project description and will be implemented as part of the project and not as a mitigation measure. AR 15:222:14249.

b. Adobe Falls

Petitioner argues that the FEIR fails to guarantee that the Adobe Falls project component will not be used for student housing. Petitioner objects that the FEIR's reliance on the City of San Diego's land use and zoning ordinances does nothing to ensure enforcement of the faculty/staff restriction since the FEIR states that CSU is not subject to such ordinances.

The Adobe Hills project component is designed for staff and faculty housing only. No guarantee that it will be used exclusively for that purpose is required by CEQA. Petitioner is concerned that there is a potential for university housing to become "mini-dorms". This is a problem that the City has addressed through the adoption of land use and zoning ordinances. There is a major distinction between private single-family residences and university-owned staff and faculty housing. Privately-owned residences are, by their nature, more likely to house students than would the university-controlled Adobe Falls housing.

3. <u>City of Marina</u>

The arguments raised by the parties turn on their respective interpretations of this case. <u>City of Marina</u> involved an expansion of the CSU Monterey Bay campus. The campus occupies

1,370 acres of former Fort Ord that was transferred by the Army to CSU. The Fort Ord Reuse Authority ("FORA") was created to facilitate the transfer and reuse of the base. CSU prepared an EIR for the expansion. The EIR concluded that the proposed plan would significantly impact areas beyond the campus boundary. The EIR identified various mitigation measures, however, full mitigation required FORA to improve Ford Ord's infrastructure. Although CSU agreed to mitigate on-campus effects, it disclaimed responsibility for mitigating environmental effects occurring beyond the campus boundary. Specifically, CSU refused to pay its fair-share of the costs of certain off-campus infrastructure improvements proposed by FORA. CSU claimed it could not legally contribute funds toward such improvements as they amounted to an assessment prohibited by the state constitution and constituted an unlawful gift of public funds. Since CSU claimed it could not mitigate impacts, it adopted a statement of overriding considerations. A statement of overriding considerations can only provide a basis for approval of a project when the measures necessary to mitigate or avoid environmental effects are found to be infeasible. The court set aside the statement of overriding considerations.

The court stated:

> [W]e see no reason why an agreement between the Trustees and FORA regarding a voluntary payment negotiated according to the procedure set out in chapter 13.7 for the purpose of mitigating specified environmental effects (i.e., water supply, drainage and wastewater management) would not satisfy the Trustees' CEQA obligations as to those effects. While the amount determined by negotiation may not equal the amount FORA originally projected, for its own planning purposes, that the Trustees would pay, nothing in chapter 13.7 of the Government Code, CEQA or the FORA Act permits FORA unilaterally to determine the amount of any voluntary contribution the Trustees may choose to make as a way of satisfying their obligation under CEQA to mitigate the environmental effects of their project. <u>City of San Marino</u>, <u>supra</u>, p. 361.

The court then ruled:

> "To be clear, we do not hold that the duty of a public agency to mitigate or avoid significant environmental effects (Pub. Resources Code, § 21002.1, subd. (b)), combined with the duty to ask the Legislature for money to do so (id., § 21106), will always give a public agency that is undertaking a project with environmental effects shared responsibility for mitigation measures another agency must implement. Some mitigation measures cannot be purchased, such as permits that

> another agency has the sole discretion to grant or refuse. Moreover, a state agency's power to mitigate its project's effects through voluntary mitigation payments is ultimately subject to legislative control; if the Legislature does not appropriate the money, the power does not exist. For the same reason, however, for the Trustees to disclaim responsibility for making such payments before they have complied with their statutory obligation to ask the Legislature for the necessary funds is premature, at the very least. The superior court found no evidence the Trustees had asked the Legislature for the funds. In their brief to this court, the Trustees acknowledge they did not budget for payments they assumed would constitute invalid assessments under San Marcos, supra, 42 Cal.3d 154. That assumption, as we have explained, is invalid." Id., p. 367.

In short, the City of Marina court did not rule out the possibility that a voluntary payment negotiated according to the procedure set forth in Government Code § 54999 et seq. for the purpose of mitigating specified environmental effects would not satisfy the Trustees' CEQA obligations as to such effects. In reliance on this opinion, CSU negotiated with the City and Caltrans to determine its fair share of the offsite improvements. CSU then requested the necessary funds from the Legislature and in doing so, complied with the mandate of City of Marina.

Petitioners argue that CSU abused its discretion by failing to identify voluntary contributions or other alternatives, as required by City of Marina, to ensure implementation of feasible mitigation. The City quotes from the opinion: "Trustees have abused their discretion under CEQA by certifying an EIR that improperly fails to identify voluntary contributions to FORA as a feasible method of mitigating the environmental effects of their project to expand CSUMB." However, the sentence actually reads: "FORA claims the Trustees have abused their discretion…." This is something altogether different.

Petitioners suggest that CSU must discuss other methods to fund mitigation measures, such as non-state funded revenue bonds or reducing the scope of the project. City of Marina does not so hold. Further, such arguments were not raised in the underlying proceedings and cannot be raised now. A project opponent cannot make a skeletal showing during the administrative process and then obtain a hearing on expanded issues in the reviewing court. City of Walnut Creek v. County of Contra Costa (1980) 101 Cal.App.3d 1012, 1019. Here, Petitioners cited to several comment letters on page 6 of their opening brief, however, the alternative funding claims were not raised in these comment letters.

Finally, Petitioners argue that CSU's fair share calculations are not based on substantial evidence because it relies upon a flawed and defective traffic analysis. This issue is discussed under traffic impacts.

The Court finds that CSU has met the requirements of City of Marina and CEQA. The 2006 writ is discharged.

E. Hearing on petitions for writs of mandate

The petition filed by Caltrans/MTS focuses on two alleged unmitigated impacts: traffic and public transit. The City/Redevelopment petition focuses on the City of Marina issue, water supply impacts, parks and recreation impacts and inconsistency with land use plans. The City of Marina issue is discussed in section D, infra.

1. Water supply impacts

Petitioners City/Redevelopment argue that the EIR's discussion of potential significant impacts to water supply was inadequate because the EIR improperly deferred its analysis. See City/Redevelopment opening brief, p. 21. In support of such contention, Petitioners cite to the following excerpts from the EIR:

> *Water Demand/Supply and Systems*: The project would result in a gradual increase in water demand over the 15-20 year project buildout period. To the extent modifications to existing water conveyance facilities are necessary to serve the increased demand, the project applicant would be responsible for implementing such modifications, although none are known to be needed as of this writing. AR 19:297:18503.
>
> SDSU, or its designee, shall consult with the City's Development Services Department, Water Review Section, on exact sizing and extensions required for water and sewer lines that will serve each project component as it moves forward with site-specific design plans for each project component. AR 19:297:18504.

Specifically, Petitioners claim the deferral of analysis was contained in the EIR's statement that such impacts would be reduced to less than significant levels because CSU "will consult with the City's Development Services Department, Water Review Section, on the sizing and extension required for water and sewer lines that will serve each project component as it moves forward with site-specific design plans".

As CSU correctly pointed out, Petitioners are confusing the EIR's findings regarding water delivery infrastructure impacts (i.e. sizing, extension of lines) with water supply impacts. The sizing and extension of pipes concerns infrastructure, not supply. The EIR determined that impacts to water delivery infrastructure were potentially significant but impacts to water supply were not. CSU opposition brief, p. 35.

As for the alleged deferral of analysis, CSU persuasively argues that this is simply a situation where the results of consultation or later studies are used to tailor mitigation measures to fit actual conditions. For example, see Dry Creek Citizens Coalition v. County of Tulare (1999) 70 Cal.App.4th 20, 25 [water diversion structure to be designed by registered engineer and final design approved by public works.]

The Court finds that the water supply impacts analysis is adequately addressed and supported by substantial evidence.

2. Parks and recreation impacts

Petitioners City/Redevelopment argue that the EIR fails to address the fact that the campus expansion and Adobe Falls development would create an increase in the population surrounding the area, which would then create an increased demand for park and recreation facilities and services. See City/Redevelopment opening brief, p. 21. Petitioners cite to the City's November 13, 2007 comment letter which states:

> "The City agrees with SDSU that student park needs will be adequately met by university recreational facilities. However, residents of Adobe Falls, which will include families with children, would utilize and impact City park facilities. Based on a City General Plan standard of providing 2.8 acres of park facilities per 1000 residents and a population per household factor of 2.44, the North Adobe Falls project would generate a need for 0.33 acres of parks at an estimated cost of $738,769. SDSU has indicated that some open space and/or recreational facilities would be provided within the project boundaries. However, information has not been provided on whether these facilities would meet population park standards and $738,769 is needed to mitigate for park impacts..." AR 27:592:22572.

///

In response to such comment, the EIR concluded that the existing on-campus parks and recreational facilities met (and exceeded) the City's population standard and future parks and recreational facilities would meet the City's resident population standard relative to the increased population. Specifically, under the City's 2.8 acres per 1,000 resident standard, the on-campus resident body requires 13.8 acres of park facilities. As of the 2006/2007 school year, the campus had 45.5 acres of park facilities. The additional 5,711 students, faculty and staff added to the residential community by 20024/2005 will increase the population to 10,653, requiring 29.8 acres. In 2024/2025, SDSU will have 42.5 acres. The additional 5,711 on campus residents includes the Adobe Falls residents. AR 18:264:17275-17276.

The EIR further stated:

> "Specific to Adobe Falls, while the use of Del Cerro park and recreation facilities may occur, it is reasonable to assume that future faculty and staff residents of the Adobe Falls Villages would utilize on-campus recreation resources, more than the average Del Cerro resident, due to their familiarity with and convenience of using on-campus facilities." AR 18:264:17276.

The Court finds that the parks and recreation impacts analysis is adequately addressed and supported by substantial evidence.

3. Consistency with local land use plans

Petitioners City/Redevelopment argue that the EIR fails to address inconsistencies between the campus expansion project and adopted land use plans governing the project area, specifically, the College Community Area Redevelopment Plan.

Petitioners' brief sets forth the background of the Redevelopment Plan. Petitioners' Opening Brief, pp. 24-25. Petitioners allege: In 1988, the San Diego State Foundation, an auxiliary organization acting on behalf of SDSU, approached the Redevelopment Agency regarding the potential for establishing a Redevelopment Project Area in the area adjacent to and in close proximity to SDSU. In December 1991, an agreement was executed which included the provision that any project within the Redevelopment Project Area would be subject to the City permit approval process. The City adopted the Redevelopment Plan in November 1993. The Project Area consists of 131 acres located adjacent to or within close proximity to the SDSU campus.

In 2005, CSU took control of the "Paseo project", a redevelopment project for a high-density mixed use project adjacent to the campus. According to Petitioners, in late 2007, at the same time it was approving the current EIR, CSU "implied" that it would not go forward with the Paseo project but would pursue a project of its own design. In actuality, the City's public comment to the subject EIR objected that the project mixed in some of the proposed Paseo project but not the entire Redevelopment Project and the project should include the entire Paseo project, with mitigation of traffic impacts shared between the two segments of the project. AR 18:264: 17254. CSU responded:

> "The comment is incorrect. The former Paseo project is 'on hold' and is not a part of the 2007 Campus Master Plan Revision project, nor does the proposed project 'mix in' some of the former Paseo project...SDSU presently is re-assessing the viability of the former project in light of changing circumstances, and it is uncertain what will result on the property. However, because it is reasonable to expect that a Paseo-like project eventually will be developed on the former site, the Draft EIR includes the former Paseo project as Horizon Year cumulative project in the traffic analysis in order to account for the future vehicle trips that would be generated by a project of this nature. " Id.

Petitioners further allege that in January 2009, CSU issued a Notice of Preparation ("NOP") of a draft EIR for the Plaza Linda Verde project and notified the Redevelopment Agency that it would build a project on parcels owned by the Foundation within the footprint of the Paseo project. Pursuant to the NOP, the project would be carried out without Agency involvement, without City entitlements, limited parking, etc. Separate litigation is pending as to these issues. See San Diego State University Foundation v. Redevelopment Agency, San Diego Superior Court case no. 08-91165.

The 1991 agreement was not part of the administrative record and this Court previously excluded this document from the record. See March 9, 2009 minute order. In addition, as CSU notes, the NOP for the pending Plaza Linda Verde project was not even issued until 2009, two years after the subject 2007 Project was approved. CSU goes on to refute Petitioners' arguments as to the alleged inconsistency with the Redevelopment Plan, however, the Court need not address the specific arguments since the Plaza Linda Verde project is not currently before this court.

4. Informational document

Petitioners argue that the EIR fails as an informational document because of (1) the defective traffic analysis, (2) the failure to comply with City of Marina and (3) the failure to adequately discuss the Paseo Project. These issues are separately addressed in sections E-6, D-3 and E-5, respectively.

5. Cumulative impacts

Petitioners argue that the EIR fails to address cumulative impacts and that pursuant to Public Resources Code § 21083, an EIR must discuss the impacts of a project over time in conjunction with past, present and reasonably foreseeable future projects.

The EIR was not required to consider the cumulative impacts of the Plaza Linda Verde Project because its proposal was a post-certification occurrence and not a past, present or probable future project warranting inclusion as a cumulative project. In addition, the EIR's consideration of the Paseo project adequately accounts for the cumulative effects associated with the Plaza Linda Verde Project since the Plaza Linda Verde Project is substantially smaller than the former Paseo project with fewer ADT's.

6. Traffic impacts

a. Calculation of vehicle trip generation rates

Petitioners SANDAG/MTS argue that the EIR's traffic analysis was inadequate because the vehicle trip rates were artificially reduced through the use of erroneous public transit discounts. See Draft EIR Traffic Technical Report, Appendix N (17:257:16302-16790) and Final EIR Traffic Technical Report (revised pages), Appendix N-1 (18:285:17785-18200).

Petitioners allege that the traffic analysis added the vehicle trips that would be generated by four project components; (1) new resident students, (2) new non-resident (commuter) students, (3) faculty housing and (4) Alvarado Hotel. The vehicle trips generated by these four project elements were added together and the total presented as the total vehicle trips for the project.

(i) Vehicle trips for all project elements

Petitioners first argue that the traffic report's analysis did not include any vehicle trips that would be generated by the Alvarado Campus, Student Union and Campus Conference Center project elements.

In its opposition, CSU persuasively explains: The Alvarado Campus will provide additional academic/research and medical center space. Of the 612,000 square feet to be developed, approximately 457,000 square feet would be dedicated to academic uses and the remaining 155,000 square feet will house existing medical center uses displaced by the development. The academic/research space will generate student and faculty/staff vehicle trips that are accounted for within the increased student enrollment trip generation component. The medical center uses will house existing uses and therefore will not generate additional trips over and above existing trips.

In regards to the Campus Conference Center, CSU alleges that it will provide meeting/conference space, office space, food services and retail services to serve the increased student enrollment. The facility will be used by students, faculty, staff and off-campus groups, individuals who are for the most part already on campus.

Finally, regarding the Student Union, CSU alleges that this project element consists of the renovation and expansion of the existing Aztec Center. The expansion will provide additional social space, recreation facilities, student organization offices and food and retail services to accommodate the increase in student enrollment. The Student Union will be used by persons already on campus and will not generate vehicle trips beyond those already accounted for in the increased student enrollment trip generation.

(ii) Calculation of ADT's for each category

Petitioners' major argument challenges the methodology used by the EIR traffic engineer to calculate the number of vehicle trips that will be added to the road as a result of the 2007 project.

The project has three traffic generating components: (1) increased student enrollment consisting of resident students (3,984) and non-resident (commuter) students (7,401), (2) Adobe

Falls Faculty/Staff Housing (172 dwelling units) and (3) Alvarado Hotel (1,200 rooms). AR 17:257:16341.

(a) New resident student

The Traffic Report states:

> "The resident student trip count was estimated using two different methods. The first was based on data contained in the approved College Community Redevelopment Plan EIR. Table 5-14 from this document indicates a trip rate ranging from 3.1 to 4.4 per dwelling unit depending on the type of resident housing. However, this rate does not take into account the trip reductions, which will occur due to the relocation of students to the campus. This reduction rate is outlined in Table 5-16 of the EIR and is calculated to be 2.8 ADT per unit.
>
> "Therefore the net new trips <u>per unit</u> would range from 0.3 (3.1–2.8) to 1.6 (4.4-2.8) ADT per unit. The next step is to translate this "per unit" to a "per student" rate.
>
> "The average number of students per unit is 2.50 based on SDSU data. Therefore, the ADT per resident student would range from 0.12 to 0.64 (0.3/25 = 0.12 & 1.6/2.5=0.64)
>
> "Another potential source of the resident student trip rate is the University of California San Diego master Plan EIR. This EIR documented a rate of 0.41 ADT per resident student.
>
> "Of these three potential rates (0.12, 0.41 & 0.64), a rate of 0.64 per resident student was utilized to be conservative." AR 17:257:16342.

In calculating the ADT's for the new resident student category, the number of new resident students (3,984) was first multiplied by a per student trip generation rate. The trip generation rate was derived from trip generation figures applied to multi-family housing units, such as apartments or condos. The report started off with a trip generation rate of 4.4 ADT's per multi-family dwelling unit ("DU") and divided it by 2.5 students, the average number of students expected to live in each unit. This resulted in a projected average vehicle trip generation rate of 1.76 ADT for new resident students. 1.76 ADT multiplied by the 3,984 new resident students results in a figure of 7,012 ADT. This figure, in turn, was further reduced as discussed below.

Petitioners object that the 1.76 ADT initial figure already included an upfront discount for public transit use that was later reduced two additional times on the basis of public transit use. Specifically, Petitioners argue that the initial trip generation rate of 4.4 ADT/DU for the new resident student category should have been 6.0 ADT/DU but was reduced by the subject EIR's reliance on the Redevelopment EIR which, in turn, had reduced the normal vehicle rate on the assumption the residents would be more likely to walk to SDSU or use public transit – the so-called Student Housing Discount.

Petitioners also claim that this figure was reduced twice more by public transit considerations, the so-called Relocation Discount and the Trolley Forecast Discount. The Relocation Discount was also adopted from the Redevelopment EIR which further reduced the 4.4 ADT/DU by an additional 2.8 trips to 1.6 ADT/DU based on a finding that the Redevelopment Project was going to relocate existing commuters closer to the SDSU campus. The Trolley Forecast Discount was derived from SANDAG trolley usage forecasts showing increased trolley usage. The EIR concluded that the 10,920 daily vehicle trips forecasted should be subtracted from its projection of campus vehicle trips.

For the reasons stated below, the Court finds that the calculation of ADT's for new resident students was proper.

(b) New commuter student

The per student trip generation rate was derived from a road tube count of SDSU campus vehicle trips conducted in November 2006. Campus vehicle trips during this period averaged 66,807 per day. The traffic report divided the 66,807 ADT by the 2006/2007 nonresident headcount (27,047) to conclude that the average trip generation rate for commuter students was 2.47 ADT. AR 17:257:16341. Using this 2.47 ADT rate, the traffic report concluded that 7,401 new commuter students would generate an additional 18,280 ADT.

Petitioners argue that this initial figure included an upfront discount for public transit use, that was later reduced a second time for public transit use. For the reasons stated below, the Court finds that the calculation of ADT's for new commuter students was proper.

(c) Adobe Falls Faculty/Staff Housing

City of San Diego trip generation rates were used for this project component, assuming the housing would function similar to townhome/apartment units. A rate of 8 ADT per unit was used for the portion with densities under 20 dwelling units/acre and a rate of 6 ADT per unit was used if the density exceeded this amount. AR 17:1257:16342. The Faculty Housing includes 172 dwelling units. A trip generation rate of 8 ADT was used, resulting in an initial trip generation of 1,376 vehicle trips per day (172 DU x 8 = 1,376). SANDAG/MTS does not challenge the calculation of the ADT for this project component.

(d) Alvarado Hotel

For the Alvarado Hotel, the City of San Diego trip rate for hotels was used, 10 ADT per hotel room. This resulted in an initial vehicle trip generation of 1,200 ADT (120 rooms x 10 = 1,200).

(iii) Discounts from ADT's

(a) Student Housing Discount

Petitioners allege that the Student Housing Discount was the initial 4.4 ADT trip generation rate applied to the new resident student category. According to Petitioners, this was a discount because the normal trip generation rate for a multi-unit housing was 6.0 to 8.0 ADT for each DU. The 4.4 ADT dwelling unit rate was borrowed from a 1993 College Community Redevelopment Project EIR prepared by the City for the redevelopment of areas surrounding the SDSU campus. The City had reduced the normal 6.0 multi-unit housing rate based on the assumption the residents would be more likely to walk to SDSU or use public transit. Thus, the standard trip generation rate of 6.0 ADT for multi-family housing was reduced to 4.4 ADT. Petitioners' opening brief, p. 9.

Petitioners allege that had the subject traffic analysis used the 6.0 ADT, the per student trip generation rate would have been 2.4 ADT (6.0 ADT divided by 2.5 students) as opposed to the 1.76 trip generation rate actually used. Petitioners allege that the net effect of this action was to lower the total daily trips for new resident students from 9,562 to 7,012. Petitioners do not challenge the use of this student housing discount but instead argue that duplicate reductions were made in other forms.

CSU explains that the Redevelopment EIR engineer, in reducing the trip generation rate from 6.0 ADT to 4.4 ADT, determined that when using a 6.0 rate, only 73 percent of the trips to and from the redevelopment area surrounding SDSU would be by automobile, 21 percent would be by walking or bicycle and the remaining 6 percent would be by carpool, vanpool or transit, which includes bus and trolley. The Redevelopment EIR engineer converted these percentages to per dwelling unit trip rates as follows: 4.39 automobile, 1.24 walking/biking and 0.37 transit (which includes carpool, vanpool, bus and trolley). Therefore, the original 6.0 rate was reduced by 1.6 (1.24 + 0.37) to account for the fact that 27 percent of the residents would not be traveling by automobile. The small amount projected to use trolley at the time (circa 1993) was because the redevelopment project area was well served by existing bus routes. There was no trolley station in the immediate vicinity nor would there be one for another 12 years. See CSU's opposing brief, p. 7.

Since there was no trolley station in the immediate vicinity of the redevelopment area, there is no double discount by virtue of the use of this 4.4 ADT figure and the trolley discount.

(b) Relocation Discount

Petitioners challenge the application of this discount. Petitioners argue that in addition to the Student Housing Discount, the new resident student category was given a second discount, the Relocation Discount, which also came from the Redevelopment Project EIR.

Petitioners allege that the Redevelopment Project EIR reduced the already discounted new resident student 4.4 ADT/DU by an additional 2.8 trips to 1.6 ADT/DU based on a finding that the Redevelopment Project was going to relocate existing commuters closer to the SDSU campus. A further subtraction of trips was made to account for SDSU faculty, staff and students who now commute but are also expected to relocate to occupy the residential development in the redevelopment project area. The subject EIR adopted the Relocation Discount and added it to the Student Housing Discount, reducing the trip generation rate for new students from 1.76 ADT/DU to 0.64 ADT/DU (1.6 ADT divided by 2.5 students per DU = 0.64 ADT/DU). Petitioners argue that the net effect was to lower the total daily vehicle trips generated by the new resident students from 7,012 to 2,500 [3,984 x 1.76 = 7,011.84; 3,984 x 0.64 = 2,549.76]. SANDAG/MTS opening brief, p. 10.

Petitioners argue that this relocation discount has no application to the subject project because it was a discount borrowed from the Redevelopment Project that was actually going to relocate existing commuters. The Redevelopment Project was not expanding the campus and was going to construct new housing for existing faculty and students. Petitioners argue that the subject project is not going to relocate existing commuters and instead is providing housing for new students.

In its opposition, CSU argues that Petitioners' argument misconstrues the purpose of the relocation adjustment. Petitioners are claiming that the 2007 Project would not relocate existing commuters but rather would provide housing for new students. CSU argues that the relocation adjustment applies in all instances in which a commuter (student, faculty or staff) no longer needs to commute due to the fact he/she now lives in close proximity to the primary destination. In all instances, whether a new or existing student, the student has effectively relocated to the campus proximity and in doing so, two vehicle trips have been removed from the regional trip inventory.

CSU alleges that after adjustment of the 6.0 ADT rate to 4.4/3.1 ADT, the Redevelopment EIR trip rate was reduced further downward by 2.8 ADT to account for the fact that SDSU students, faculty and staff who now commute are expected to relocate to the proposed residential development. The same holds true with the 2007 project.

CSU's arguments are persuasive. We are really talking about trip generation rates for existing resident students, existing commuters, new resident students and new commuter students. The rates for existing resident students will remain unchanged. They still walk to class. The existing commuters, whether they are students, faculty or staff, may now decide to relocate and live on campus or in the proximity of campus, thereby eliminating vehicle trips. New students may live on campus or commute. Contrary to Petitioners' contention, the subject project may relocate existing commuters. It makes no sense for Petitioners to claim that the new housing will be only for new students.

Petitioners further argue that no evidence was provided as to how the 0.64 trip generation rate, derived in part from UCSD's figures for its campus expansion project, was calculated, whether it was for multi-family housing units or dorms, etc. SANDAG/MTS opening brief, p. 15. CSU cites to the evidence supporting UCSD's figures. AR 21:20673.

The Court finds that the calculation of the resident student ADT's was proper and supported by substantial evidence.

(c) Trolley Use Discount

Petitioners argue that the EIR did not acknowledge the Trolley Use Discount. The initial trip generation rate for new commuter students was determined to be 2.47 ADT based upon a November 2006 survey of campus traffic: 66,807 [total vehicles counted] divided by 27,407 [total number of commuter students] = 2.47 ADT per student. Petitioners argue, in essence, that the survey data used to calculate this initial figure <u>necessarily</u> included a discount for public transit use because at the time the survey was taken, a substantial number of people who would normally drive were already using the Green Line Trolley, which began operation in July 2005. In November 2006, when the vehicle survey was conducted, it was estimated that there were approximately 4,900 one-way trolley trips generated by SDSU patrons each day. According to the EIR, each individual trolley boarding represents two fewer vehicle trips, one trip coming to campus and one trip leaving campus. Thus, the 4,900 one-way trolley trips translated to 9,800 fewer vehicle trips to and from campus. SANDAG/MTS opening brief, pp. 10-11.

Petitioners argue that if the individuals riding the trolley during the November 2006 survey had been driving their cars instead, the total number of vehicle trips counted would have increased by 9,800 to 76,607. This would have translated into a per student ADT of 2.83 [76,607 divided by 27,047 = 2.83]. According to Petitioners, the net effect of the Trolley Use Discount was to lower the projected vehicle trips for the 7,401 new commuter students from 20,945 to 18,280, a reduction of 2,665 vehicle trips as follows:

7,401 new commuter students x 2.83 ADT = 20,945 projected vehicle trips

7,401 new commuter students x 2.47 ADT = <u>18,280</u> projected vehicle trips

2,665

Petitioners' argument lacks merit. The calculation of the ADT's for existing commuter students in November 2006 was based on an actual tube count:

> "The trip rate for non-resident students was based on actual counts at the campus. Road tubes were placed at all entrances/exits to the campus parking areas and the total ADT (66,807) was determined. A five-day count was conducted the week of November 13, 2006 and an average of the five weekdays was utilized. The trip rate per student was determined by dividing the total campus generated ADT of 66,807 by the 2206/2007 non-resident headcount. A rate of 2.47 ADT per student was calculated. It should be noted that since this rate is based on all campus parking areas (including visitors, vendors, faculty and staff), the 2.47 rate accounts for all potential campus-related trips; including faculty/staff." AR 17:257:16341.

If one were to add to the actual count the number of trips for trolley ridership, this would be an inaccurate count. In November 2006, the trolley was in operation and therefore the trip rate already included trolley ridership.

(d) Trolley Forecast Discount

The EIR also took into consideration the extent to which transit ridership would affect future vehicle trips generated by the 2007 project.

Petitioners argue that use of the trolley forecast discount was not supported by substantial evidence. The EIR set forth its calculation of the transit ridership "discount" as follows:

> "In order to determine the extent to which transit ridership, particularly ridership on the San Diego Trolley, would affect future vehicle trips generated by SDSU, LLG worked extensively with [SANDAG] to obtain existing and projected daily passenger trolley boardings at the SDSU station...The existing number of Passenger boardings is 5,982...
>
> "SANDAG projects that by the year 2012, the number of SDSU trolley riders will increase to 6,669, an increase of 1,943 additional trolley riders. By the year 2024-25, SANDAG projects that the number of SDSU trolley riders will increase over existing [ridership] by 6,898 trolley riders to 11,624. Therefore, between now and 2024-25, during the same period when the SDSU student headcount will increase from 33,441 to 44,826, SANDAG estimates that trolley ridership will increase by 6,898 SDSU students, faculty and staff over existing numbers.
>
> "In order to account for this intermediate and long-term increase in SDSU related trolley ridership, and the corresponding future shift from vehicle trips to trolley trips that will result in fewer vehicles on the roadways, the 2012 and 2024-25 trip generation projections for the proposed project have been adjusted to account for the reduced vehicle trips due to the increased trolley ridership.

> "To translate transit usage into vehicle trips, a vehicle occupancy rate of 1.2 people per car was utilized, based on an LLG survey conducted in May 2000. Therefore, by project buildout year 2024/25, the one-way traffic that would shift to the trolley is 5,748 trips (6,898 students ÷ 1.2 people/car). A five percent factor is applied to this amount to account for the fact that some of the shift to the trolley would be from other transit opportunities and not from personal vehicles. Therefore, the one-way traffic that would shift to the trolley by the year 2024/25 is 5,460 trips. This number is multiplied by 2 to convert it to an ADT, which equates to a 10,920 ADT shift by the year 2024/25. A similar calculation was completed for 2012/2013 and the shift to the trolley was calculated to be 3,076 ADT.
>
> "[T]aking into account the forecasted increase in trolley ridership, the net increase in ADT that would result from the proposed project is 2,531 ADT by the year 2012, and 12,484 by the year 2024-25." AR 17:257:16343

Petitioners argue that this was a 47 percent across-the-board reduction in projected vehicle trips that was applied to all four traffic generation categories. Specifically, Petitioners argue that the subtraction of the projected future trolley ridership was taken after vehicle trips had already been discounted to 23,404 ADT as a result of the Student Housing Discount, Relocation Discount and Trolley Forecast Discount. See chart at p. 12 of SANDAG/MTS opening brief. Petitioners argue that the net result of this discount was to lower the ADT's from 23,404 ADT to 12,484 ADT, hence, an additional 47 percent reduction. The EIR used this discounted vehicle trip figure of 12,484 ADT to calculate how many new vehicle trips would be placed on local roadways as a result of the subject project.

Petitioners argue that this Trolley Forecast Discount was duplicative of the Student Housing Discount and the Relocation Discount since both discounts were premised on an assumption that a large percentage of individuals using the expanded campus facilities would use public transit instead of car and the public transit that would most likely be used would be the Green Line Trolley. Such additional trolley riders would necessarily be part of the increase in trolley usage reflected in the Trolley Forecast Discount.

Contrary to Petitioners' contention, the deduction for projected future trolley ridership does not constitute the second and third discount for the same transit trip. The initial reduction [Student Housing Discount] from 6.0 ADT for normal multi-use housing to 4.4 ADT for college area housing was made on the basis that residents would be more likely to walk to SDSU or use public transit. Only 0.37 was allocated to transit and such minimal amount included all forms of transit, including carpool, vanpool, bus and trolley.

In regards to the Relocation Discount, car trips were eliminated by virtue of the fact that existing students, faculty and staff would no longer commute. This has nothing to do with the trolley ridership.

Finally, Petitioners further argues that the application of this discount to the Alvarado Hotel category is not supported by the facts. However, the trolley adjustment was not made to the Alvarado Hotel. The adjustment was made to the overall number of trips for the project to reflect the future increase in trolley ridership.

The Court finds that there was no duplication of discounts in the application of the reduction for future trolley ridership.

b. Mitigation measures

Petitioners argue that one proposed mitigation measure constituted an improper deferral of impact analysis.

In a public comment, SANDAG had commented that the proposed mitigation measures were aimed solely at improving motor vehicle access and suggested that given CSU's limited ability to expand the road network, that the EIR should provide mitigation measures supporting all modes of travel. In response to the comment, the EIR stated that SDSU would develop a campus Transportation Demand Management ("TDM") program to be developed in consultation with SANDAG and MTS to be implemented not later than the commencement of the 2012/2013 academic year. The EIR deferred completion of the TDM by stating that it was currently unnecessary as trolley ridership had not achieved its initial full potential. AR 18:264:17238.

There was no deferred mitigation. A similar argument was rejected in Sacramento Old City Assn. v. City Council of Sacramento (1991) 229 Cal.App.3d 1011. In that case, the opposition claimed the EIR for a downtown convention center expansion was deficient because the mitigation measures required preparation of a transportation management plan but deferred complete review to a future time:

> "Plaintiffs contend the EIR provides no specific mitigation measures for the parking impacts, but instead offers a list of "seven general measures of the sort that might be included in [the City's] unformulated 'Transportation Management Plan.'" This, according to plaintiffs, is not enough to satisfy CEQA."

The court distinguished the case from Sundstrom v. County of Mendocino (1988) 202 Cal.App.3d 296:

> "Although plaintiffs contend the lack of specific parking mitigation in the present case mirrors the situation in Sundstrom and compels a similar result, we note several distinct differences between the two cases. First, Sundstrom involved a negative declaration. A negative declaration must be prepared when an agency determines, after preparing an initial study, that a project 'does not have a significant effect on the environment.' Such a determination can be made only if '[t]here is no substantial evidence before the agency' that such impacts may occur. (Pub. Resources Code, § 21080, subd. (c); Guidelines, § 15070, subd. (a).) In other words, in Sundstrom the county had determined, before the required studies were even performed, that the project would not have a significant impact on the environment. In contrast, the City in the present case acknowledged traffic and parking have the potential, particularly under the worst case scenario, of causing serious environmental problems. The City did not minimize or ignore the impacts in reliance on some future parking study.
>
> "Moreover, the county in Sundstrom approved the project without considering or addressing any mitigation measures. In the present case, the City has set forth a list of alternatives to be considered in the formulation of a transportation management plan, a plan the City itself, not the developer, will prepare."

The court held that because the City had analyzed potential impacts and committed to preparing the TMP, the measure satisfied CEQA:

> As one commentator has opined, Sundstrom "need not be understood to prevent project approval in situations in which the formulation of precise means of mitigating impacts is truly infeasible or impractical at the time of project approval. In such cases, the approving agency should commit itself to eventually working out such measures as can be feasibly devised, but should treat the impacts in question as being significant at the time of project approval. Alternatively, for kinds of impacts for which mitigation is known to be feasible, but where practical considerations prohibit devising such measures early in the planning process (e.g., at the general plan amendment or rezone stage), <u>the agency can commit itself to eventually devising measures that will satisfy specific</u>

performance criteria articulated at the time of project approval. Where future action to carry a project forward is contingent on devising means to satisfy such criteria, the agency should be able to rely on its commitment as evidence that significant impacts will in fact be mitigated. (See Laurel Heights, supra, 47 Cal.3d at 418 [upholds mitigation measure by which project noise levels will be kept within performance standards]; and Schaeffer Land Trust v. San Jose City Council (6th Dist. 1989) 215 Cal.App.3d 612, 632 [upholds approval of general plan amendment based on a negative declaration because actual physical development will be contingent on devising plan to ensure compliance with city standards for traffic levels of service].)" (Remy et al., Guide to the Cal. Environmental Quality Act (1991 ed.) pp. 200-201, fn. omitted.)

. . .

Here, CSU committed to the future preparation of the plan. The EIR stated that SDSU would develop a campus Transportation Demand Management ("TDM") program to be developed in consultation with SANDAG and MTS to be implemented not later than the commencement of the 2012/2013 academic year. No precise plan could be implemented at this stage since full ridership had not yet been realized and was not in the near future.

Petitioners also argue that this response was insufficient since it did not take into consideration impacts to other modes of travel such as buses, sidewalks and bikes. Specifically, Petitioners' comment stated:

"The campus should focus development around public transit and support a variety of 3 transportation choices. In addressing the trip generation impacts of the planned expansion, the DEIR proposes mitigation measures aimed solely at improving motor vehicle access. Given the limited ability to expand the road network, the DEIR should take a more balanced approach to mobility, and provide mitigation measures supporting all modes of travel." AR 18:264:17237.

In response to such comment, CSU stated that it supported several transportation demand management activities AR 18:264:17237-17238. In addition, as CSU points out the EIR did not find any significant impacts as to buses, sidewalks and bicycles.

c. Failure to consult with SANDAG

Petitioners argue that CSU failed to consult with it in good faith regarding traffic impacts as required by Public Resources Code § 21092.4. This statute provides:

§ 21092.4. **Lead agency to consult with affected planning and public agencies**

(a) For a project of statewide, regional, or area wide significance, the lead agency shall consult with transportation planning agencies and public agencies that have transportation facilities within their jurisdictions that could be affected by the project. Consultation shall be conducted in the same manner as for responsible agencies pursuant to this division, and shall be for the purpose of the lead agency obtaining information concerning the project's effect on major local arterials, public transit, freeways, highways, overpasses, on-ramps, off-ramps, and rail transit service within the jurisdiction of a transportation planning agency or a public agency that is consulted by the lead agency. A transportation planning agency or public agency that provides information to the lead agency shall be notified of, and provided with copies of, environmental documents pertaining to the project.

(b) As used in this section, "transportation facilities" includes major local arterials and public transit within five miles of the project site and freeways, highways, overpasses, on-ramps, off-ramps, and rail transit service within 10 miles of the project site.

The Court finds that CSU properly consulted with SANDAG.

d. Failure to respond to public comment

Petitioners argue that CSU failed to adequately respond to public comments. The comments submitted by SANDAG on the Draft EIR and the corresponding responses are found in the record at AR 18:17229 – 17240. CEQA does not require that responses to comments be exhaustive. The responses need only demonstrate a "good faith, measured analysis". 14 CCR § 15088(c).

7. Public transit facilities

Petitioners argue that the EIR failed to consider the project's impact on the regional public transit system. Specifically, Petitioners allege that according to the EIR, an estimated 12,000 students, faculty and staff can be accommodated at the SDSU trolley station. The 2006 trolley use survey showed almost 5,000 SDSU patrons using the trolley. The trolley forecast information projects an additional 6,896 transit trips. Adding the 5,000 trips and the 6,896 trips plus the additional transit discounts based on public transit use, the usage will far exceed 12,000. SANDAG testified that the projected increase in usage would overwhelm existing facilities without mitigation measures and improvements to transit facilities. See Petitioners' opening brief, pp. 19-20, citing AR 27:592:22577.

In its opposition, CSU argues that it did, in fact, consider such impacts. CSU alleges that on an annual basis, the 2007 Project would add approximately 383 riders per year over the next 18 years (6,898 divided by 18 = 383). CSU argues that there is no evidence in the record supporting a conclusion that the addition of these riders would result in significant transit impacts. CSU alleges that its engineer worked extensively with SANDAG to obtain existing and projected daily boardings at the SDSU station. At no time was any concern expressed by SANDAG re future capacity associated with the Green Line. CSU points out that SANDAG estimated SDSU-related trolley ridership will increase to 11,624 daily boardings by 2024/25 and the economic benefit analysis cited in SANDAG's brief states that 12,000 students, faculty and staff can be accommodated at the SDSU trolley station. See CSU's, opposition brief, pp. 21-23.

The Court finds that the EIR properly considered potential impacts to public transit facilities.

8. Findings not supported by substantial evidence

Petitioners argue that the EIR's findings of no impacts to the regional transportation system are not supported by substantial evidence because (1) CSU refused to consider potential environmental impacts to public transit and (2) CSU misapplied City of Marina. See discussion above.

9. Statement of Overriding Considerations

CSU adopted a statement of overriding considerations for direct and cumulative impacts to (1) aesthetics and visual quality, (2) air quality and (3) transportation and circulation. AR 19:297:18522-18525. Such a statement is adopted where feasible methods to avoid or reduce impacts to a level below significance are not available but the agency finds that project's benefits rendered acceptable such unavoidable or adverse environmental effects. 14 CCR §§ 15043(b), 15093. SANDAG repeats its arguments regarding CSU's alleged flawed analysis of impacts. This argument lacks merit in light of the rulings set forth above. The Court finds that the statement of overriding considerations is supported by substantial evidence.

F. Requests for Judicial Notice

City/Agency's June 10, 2009 request for judicial notice is granted as to exhibits 2 and 3. The request is denied as to exhibits 1, 4 and 5 as irrelevant.

SANDAG/MTS' June 10, 2009 request for judicial notice of the CSU CEQA Handbook is denied. There is no evidence that this handbook was considered by CSU in its decision.

The Court has issued a ruling as to CSU's July 27, 2009 request for judicial notice. See section II-A above.

City/Agency's August 25, 2009 request for judicial notice of the February 17, 2009 reporter's transcript is granted.

IT IS SO ORDERED.

Date: FEB 11 2010

THOMAS P. NUGENT
Judge of the Superior Court

SUPERIOR COURT OF CALIFORNIA, COUNTY OF SAN DIEGO

- ☐ COUNTY COURTHOUSE, 220 W. BROADWAY, SAN DIEGO, CA 92101-3814
- ☐ HALL OF JUSTICE, 330 W. BROADWAY, SAN DIEGO, CA 92101-3827
- ☐ FAMILY COURT, 1555 6TH AVE, SAN DIEGO, CA 92101-3294
- ☐ MADGE BRADLEY BLDG., 1409 4TH AVE., SAN DIEGO, CA 92101-3105
- ☐ KEARNY MESA BRANCH, 8950 CLAIREMONT MESA BLVD., SAN DIEGO, CA 92123-1187
- ☒ NORTH COUNTY DIVISION, 325 S. MELROSE DR., VISTA, CA 92083-6643
- ☐ EAST COUNTY DIVISION, 250 E. MAIN ST., EL CAJON, CA 92020-3941
- ☐ RAMONA BRANCH, 1428 MONTECITO RD., RAMONA, CA 92065-5200
- ☐ SOUTH COUNTY DIVISION, 500 3RD AVE., CHULA VISTA, CA 91910-5649
- ☐ JUVENILE COURT, 2851 MEADOW LARK DR., SAN DIEGO, CA 92123-2792
- ☐ JUVENILE COURT, 325 S. MELROSE DR., VISTA, CA 92083-6634

FOR COURT USE ONLY

FILED
Clerk of the Superior Court
FEB 11 2010
BY: A. LUM

PLAINTIFF(S)/PETITIONER(S)

DEL CERRO ACTION COUNSEL

DEFENDANT(S)/RESPONDENT(S)

BOARD OF TRUSTEES OF THE CALIFORNIS STATE UNIVERSITY; and DOES 1 TO 20, inclusive

JUDGE: THOMAS P. NUGENT

DEPT: 30

CLERK'S CERTIFICATE OF SERVICE BY MAIL (CCP 1013a(4))

CASE NUMBER: GIC 855643

I, certify that: I am not a party to the above-entitled case; that on the date shown below, I served the following document(s):

Statement of Decision dated February 11, 2010

on the parties shown below by placing a true copy in a separate envelope, addressed as shown below; each envelope was then sealed and, with postage thereon fully prepaid, deposited in the United States Postal Service at: ☐ San Diego ☒ Vista ☐ El Cajon ☐ Chula Vista ☐ Ramona, California.

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CLERK OF THE SUPERIOR COURT

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by [signature], Deputy
A. LUM, Deputy